Pointe du Bois to Whiteshell (PW75)

Transmission Project

Environmental Assessment Report

Prepared by Manitoba Hydro

Asset Planning and Delivery

Transmission & Distribution
Environment and Engagement
July 2023

Prepared for:

Environmental Approvals Branch

Land acknowledgement

Manitoba Hydro has a presence right across Manitoba, on Treaty 1, Treaty 2, Treaty 3, Treaty 4, and Treaty 5 lands – the original territories of the Anishinaabe, Cree, Ojibway-Cree, Dakota, and Dene peoples – and the traditional homeland of the Red River Métis. We acknowledge these lands and pay our respects to the ancestors of these territories.

The proposed Pointe du Bois to Whiteshell Transmission Project is on Treaty 1 and Treaty 3 lands, the traditional territories of the Anishinaabe, Anishininiwag and Cree peoples, and the homeland of the Red River Métis. We acknowledge these nations, who have occupied and cared for these lands for thousands of years and recognize the importance of learning and considering the unique perspectives of these nations share throughout the project.

Executive Summary

Manitoba Hydro has developed this report to outline the environmental assessment carried out for the Pointe du Bois to Whiteshell Station 115-kV transmission line project.

This report outlines the proposed project, project engagement, the environment in which it will be built and operated, the potential effects of the project, and our assessment of the significance of those effects.

Using input from project engagement, experience with the design and construction of transmission lines, and proven mitigation, we feel the proposed project meets the intent of sustainable development and will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations.

The proposed project consists of:

- Construction of 51 km of 115-kV transmission line (PW75)
- Installation and upgrade of equipment at:
  - Whiteshell Station
  - Pointe du Bois Station
  - Lee River distribution supply centre
- Decommissioning of existing 66 kV double circuit line from Pointe du Bois Station to the Lee River distribution supply centre

The Winnipeg River region in southeastern Manitoba has an extensive human history which has shaped the cultural landscape of the region over time.

The project will be on lands occupied and cared for by Indigenous people for thousands of years, including the traditional territories of the ancestors of the Anishinaabe, Anishininiwag and Cree peoples and the homeland of the Red River Métis.

The project footprint is a diverse mix land cover dominated by upland vegetation, developed land and wetlands, with smaller portions of agricultural land types and riparian vegetation.

The assessment process was developed through a review of regulations, current practice in environmental assessment and experience from assessments of similar projects. The methods were also influenced by:

- The information requirements of The Grand Council Treaty #3 – Manito Aki Inakonigaawin Project Application Framework
- Feedback received during project engagement

Based on the above, the following valued components were used for the assessment:

- Harvesting and important sites
- Heritage resources
- Birds and bird habitat
- Fish and fish habitat
- Wetlands
- Amphibians and reptiles
- Vegetation
- Terrestrial wildlife and wildlife habitat
- Infrastructure and services
- Land and resource use
- Commercial agriculture
- Economic opportunities
- Well-being (human health)

The proposed project will alter the landscape affecting the biophysical and socioeconomic environments.

The changes to the biophysical environment are primarily through the change from forested area to shrub and grassland. This will have varying affects to birds and wildlife depending on habitat preferences. The project will increase edge habitat and linear features on the landscape and reduce intactness. However, routing preferences to parallel existing linear features and developed areas have minimized these effects.

The project will cross agricultural land and the presence of the line will have nuisance effects on farmers, residents, landowners, and recreational users. Construction will have nuisance effects due to increased noise and traffic. These effects may lead to changes in the health and well-being of people who live, work, and play in the area.

Manitoba Hydro’s tendering and hiring policies are designed to maximize the potential positive economic benefits of the project although these will be short term.

As described above, the project will be on lands occupied and cared for by Indigenous people for thousands of years. We aim for sustainable development but understand that any change to the landscape alters the human-nature relationships and land use. We will continue to engage on the project and use the knowledge gathered to continually improve how we undertake projects and assess the effects of these projects.

Manitoba Hydro's environmental protection program and associated protection plans, including project specific mitigation measures, have been adapted and updated to minimize the overall impacts.

The proposed project was considered in the context of the current landscape, including past changes, as well as future changes to determine the significance of the project. Overall, the assessment conclusion is that the proposed project's effects to the environment will be not significant and that the project meets the intent and purpose of sustainable development.

Authors' acknowledgement

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Acronyms and abbreviations

AAC	Annual allowable cut
BBA	Breeding bird atlas
CEnvPP	Construction environmental protection plan
CHRPP	Culture and heritage resources protection plan
CIW	Canadian index of well-being
CWB	Community well-being
EA	Environmental assessment
ECCC	Ecological community of conservation concern
EMF	Electromagnetic fields
EPP	Environmental protection program
FNMEP	First Nation and Métis engagement process
FPR	Final preferred route
FRI	Forest resource inventory
GCT#3	Grand Council Treaty #3
HADD	harmful alteration, disruption, or destruction
HWM	High water mark
IAP2	International Association for Public Participation
LAA	Local assessment area
MBCDC	Manitoba Conservation Data Centre
MESEA	Manitoba Endangered Species and Ecosystems Act

MMF	Manitoba Métis Federation
MMTP	Manitoba-Minnesota Transmission Project
PEP	Public engagement process
PDA	Project development area
PREP	Pointe du Bois renewable energy project
RAA	Regional assessment area
RHA	Regional health authority
SAR	Species at risk
SARA	Species at Risk Act
SDOH	Social determinants of health
SOCC	Species of conservation concern
VC	Valued component

Glossary

Term	Definition
Adaptive management	The process of updating management practices in response to ongoing observations.
Adverse effects	Negative effects on the environment and people that may result from a proposed project.
Agricultural biosecurity	The security of crops and livestock from transmission of infectious diseases, parasites, and pests.
Areas of least preference	Features to avoid when siting a transmission line due to physical constraints (extreme slopes, long water crossings), regulations limiting development (protected areas), or areas that require extensive mitigation or compensation to minimize impacts
Built environment	An area of existing or proposed development found within the landscape, typically dominated by commercial, industrial, residential, and cultural structures.
Cumulative effect	The effect on the environment, which results when the effects of a project combine with those of the past, existing, and future projects and activities (CEAA 2018). OR the incremental effects of an action on the environment when the effects are combined with those from other past, existing, and future actions (Cumulative Effects Assessment)

Decommissioning	Planned shutdown, dismantling and removal of a building, equipment, plant and/or other facilities from operation or usage and may include site clean-up and restoration.
Developed	Land that has been altered for residential, commercial, or industrial use. Includes buildings, regularly managed green space and associated roads, parking lots, and trails.
Direct effect	An environmental effect that is: • A change that a project may cause in the environment; or • Change that the environment may cause to a project. It is a consequence of a cause-effect relationship between a project and a specific environmental component.
eCampaign	A notification mechanism targeted to self-identified interested parties. Email campaign recipients can unsubscribe from the email campaign service at any time, forward to other individuals, post on Twitter or share on Facebook.
Ecoregion	Characterized by distinctive regional ecological factors, including climate, physiography, vegetation, soil, water, and fauna.
Ecozone	An area of the earth's surface representative of large and very generalized ecological units characterized by interactive and adjusting abiotic and biotic factors.

Environmental Management System	Part of an organization's overall management practices related to environmental affairs. It includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining an environmental policy. This approach is often formally carried out to meet the requirements of the International Organization for Standardization (ISO) 14000 series.
Environmental protection plan	Within the framework of an environmental protection program, an environmental protection plan prescribes measures and practices to avoid and minimize potential environmental effects of a proposed project.
Final preferred route	Based on the environmental assessment and project engagement, the Final Preferred Route is the best-balanced approach of all disciplines' understanding.
Galloping	Refers to the uncontrolled movement of the conductor influenced by certain weather conditions.
Heritage sites / objects	Any site, object, work, or assembly of works of nature or human endeavor that is of value for its archaeological, paleontological, pre-historic, historic, cultural, natural, scientific, or aesthetic features.
Intangible cultural heritage	The UNESCO definition of intangible cultural heritage includes the traditions and living expressions that are transmitted from one generation to the next. Intangible cultural heritage manifests through five domains: oral traditions and expressions, performing arts, social practices and rituals, community knowledge and traditional craftsmanship.

Interested party	An interested party is someone or a group that would potentially have feedback to provide, may be affected by the decisions made regarding route selection, have a specific interest or mandate in the area, data to share, ability to disseminate information to membership or a general interest in the Project's route selection area.
Lands	Lands is a broad environmental component that includes terrestrial wildlife (e.g., white-tailed deer, moose, and furbearers, and species at risk) and their habitats.
Linear infrastructure	An existing network or system composed of transportation or utility-based facilities (e.g., roads, highways, railways, pipelines, and transmission lines).
Marshalling yard	An open area used to stockpile, store and assemble construction materials.
Mitigation	Means measures to eliminate, reduce, control or offset the adverse effects of a project, and includes restitution for any damage caused by those effects through replacement, restoration, compensation or any other means (Impact Assessment Act, 2019).
Natural environment	Naturally occurring physical features of the landscape. These features are represented by the hydrography, flora, fauna, and topography of a given area.
Public engagement process	The process of identifying interested individuals, including interested parties and the public, sharing information about the project, and providing opportunities for them to design how they want to participate and share their feedback and experiences. The process includes sharing how feedback and knowledge influenced decision making.

Skies	Skies is a broad environmental component that includes air, air quality, noise, and birds.
Soils	Soils is a broad environmental component that includes terrain, rocks, soil, trees, medicines, berries, gardening, and vegetation species of conservation concern.
Species of Conservation Concern	Species that are rare, disjunct, or at risk throughout their range in Manitoba and in need of further research. The term also encompasses species that are listed under (Manitoba) *The Endangered Species and Ecosystems Act of Manitoba*, (federal) *Species at Risk Act*, or that have a special designation by the Committee on the Status of Endangered Wildlife in Canada.
Species at Risk (SAR)	Is an extirpated, endangered, or threatened species or a species of special concern, as defined by the Species at Risk Act.
Waters	Waters is a broad environmental component that includes ground and surface waters, fish and fish habitat, wetlands, amphibians and reptiles, and wild rice that exist in an overall aquatic ecosystem.
Wildlife management area	Lands that exist for the benefit of wildlife and for the enjoyment of people including biodiversity conservation, wildlife-related forms of recreation, hunting and trapping.

1.0 Introduction

This environmental assessment (EA) report outlines the assessment of potential effects of the proposed project in pursuit of a provincial Class 2 *Environment Act* Licence.

The proposed project consists of:

1. Construction of a 51 km long 115-kV transmission line
2. Installation of equipment at Whiteshell Station to terminate the new transmission line
3. Expansion of the Pointe du Bois Station and installation of equipment to terminate the new transmission line
4. Upgrading the transformer at Lee River distribution supply centre to 115-kV capacity.
5. Salvage of P3/P4 66 kV transmission lines from Pointe du Bois Station to the Lee River distribution supply centre

Based on the conclusions of the assessment, the potential effects of constructing and operating the proposed transmission line are deemed not significant.

The transmission line and associated station work are part of a larger project, the Pointe du Bois Renewable Energy Project (PREP). PREP will increase the supply of renewable, dependable electricity at the Pointe du Bois Generating Station and enhance electrical reliability in the Lee River and Lac du Bonnet areas of Manitoba. PREP consists of:

1. The replacement of eight of the original 16 generating units within the Pointe du Bois Generating Station powerhouse, and
2. The construction and operation of a new 115 kV transmission line between Pointe du Bois and Whiteshell Stations and the Lee River distribution supply centre and associated station work.

PREP is on Treaty 1 and Treaty 3 lands, the original territories of the Anishinaabe, Anishininew and Cree peoples and the homeland of the Red River Métis (Map 1-1). The project is in an area of the province that is of historical and contemporary interest to the Manitoba Métis Federation (MMF) and its citizens. This area is also known in Anishinaabemowin as Manito Ahbee, a word meaning, where the Creator sits and is recognized and honoured by Indigenous peoples across Turtle Island (North America) as a sacred place for all people.

1.1 Manitoba Hydro's evolving environmental assessment process

Manitoba Hydro operates throughout Manitoba, on the original territories of the Anishinaabe, Anishininew, Cree, Dakota, and Dene peoples, and on the homeland of the Red River Métis. We understand that Indigenous peoples have a strong cultural and spiritual connection to the lands and waters and acknowledge the impacts of our projects and operations. We are committed to working cooperatively to strengthen and improve our relationships with First Nations and the Manitoba Métis Federation.

As part of our endeavour to fulfill this commitment, over the last several years, Manitoba Hydro's approach to undertaking environmental assessments has been evolving in pursuit of increasing the presentation of information in ways that better reflect Indigenous worldviews and values, versus presenting information solely from a mostly Eurocentric worldview.

Compared to previous projects, this environmental assessment:

- Draws its topics and valued components from what we heard during project engagement, notably through the four engagement circles that were held at various stages of project planning, a meeting with the Pointe du Bois cottager's association in June 2022, and an in-person open house event in Lac du Bonnet in March 2023.
- Consists of environmental setting content organized under themes which we hope to align better with Indigenous worldviews, i.e., skies, waters, soils, and lands.
- Aims to present potential project effects in a more holistic manner to better reflect the interconnectedness of environmental, socio-economic, cultural and heritage, and well-being aspects that may be adversely impacted by the project.
- Attempts to braid Indigenous worldviews with Eurocentric worldviews with respect to potential effects assessment.
  - For example, through engagement, we learned that our typical assessments of project effects on agriculture focus on modern commercial agriculture and do not include the "pre-settler" agricultural activities that were undertaken by First Nations or the agricultural operations of historical and contemporary importance to the Red River Métis. As a result, for the current environmental assessment, we sought to better elaborate on aspects of Indigenous food systems that relate to agriculture.

In addition to the above noted efforts to better reflect Indigenous worldviews in this assessment, since 2014, Manitoba Hydro has also adopted new approaches for conducting project engagement and transmission line route selection. For example, in considering that most of the project's footprint falls within Treaty 3 Territory, Manitoba Hydro engaged with the Grand Council Treaty #3 (GCT#3), as the governing body responsible for guiding project authorizations and proponent consultations with the Anishinaabe Nation in Treaty #3, early in the engagement process. Through discussions with the GCT#3, Manitoba Hydro learned about Manito Aki Inakonigaawin (MAI), the Great Earth Law of the Anishinaabeg, and how it applies to development projects such as the proposed project.

Manitoba Hydro initiated the MAI process by compiling a report (the MAI report) that responded to the information needs identified in The Grand Council Treaty #3 – Manito Aki Inakonigaawin Project Application Framework. The MAI report was submitted to The Grand Council on February 2, 2023. The intent of the MAI report was to:

- provide project information (e.g., project location, timelines, budget, engagement process, and anticipated areas of assessment)
- describe how Manitoba Hydro understood the engagement and environmental assessment processes undertaken on this project to align with the phases of The Grand Council's MAI project review process
- solicit feedback from the GCT#3 about the MAI report to help inform the compilation of this environmental assessment report

1.2 Regulatory framework

Manitoba Hydro projects are subject to provincial and federal regulations. The following sections describe the regulatory framework of the project.

1.2.1 Provincial regulatory framework

The proposed transmission line component of PREP involves the construction of a 115-kV transmission line, which requires a provincial licence for a Class 2 development (i.e., transmission lines of 115-kV and over but not exceeding 230-kV) under the *Environment Act* (Manitoba).

The environmental assessment is conducted in accordance with Manitoba Hydro's corporate and environmental policies and satisfies Manitoba's environmental assessment legislation. It is also consistent with Canadian and international environmental assessment best practices and guidance. This environmental assessment report is submitted as part of the *Environment Act* proposal for the project.

1.2.2 Federal regulatory framework

Federally, the project is not considered a physical activity under the Physical Activities Regulations SOR/2019-285 and therefore does not trigger an environmental assessment under the *Impact Assessment Act*.

1.3 Manitoba Hydro's mission and goals

Manitoba Hydro's mission is to "Help all Manitobans efficiently navigate the evolving energy landscape, leveraging their clean energy advantage while ensuring safe, clean, reliable energy at the lowest possible cost."

For more than 50 years Manitoba Hydro's projects have primarily focused on the development of renewable hydroelectric power and have played a major role in the development of the provincial economy and the province. Manitoba Hydro operates based on our foundational principles of safety, environmental leadership, respectful engagement with interested parties and communities, and respect for each other.

The energy services that we offer Manitobans rely on natural resources which are of critical importance to us all, and that is why environmental leadership is identified as a key principle of our business.

We consider the environmental impacts of our activities, products, and services. To deliver on this commitment effectively, we employ an Environmental Management System (EMS) that aligns with ISO 14001 Standard by:

- Ensuring that the work performed by our employees and contractors meets environmental, regulatory, contractual, and voluntary commitments
- Recognizing the needs and views of its interested parties and ensuring that relevant information is communicated
- Assessing its environmental risks to ensure they are managed effectively
- Reviewing its environmental objectives regularly, seeking opportunities to improve its environmental performance
- Considering the life cycle impacts of its products and services
- Ensuring that its employees and contractors receive relevant environmental training
- Fostering an environment of continual improvement

1.4 Purpose of the document

The purpose of this report is to support our application for a Class 2 development licence under *The Environment Act* (Manitoba) for the PW75 transmission line. For Class 2 developments, proponents are required to submit a cover letter, an

Environment Act Proposal Form, an EA report, and an application fee to Manitoba Environment and Climate's Environmental Approvals Branch.

This EA report identifies and assesses the potential effects of the project and identifies the mitigation measures that will be used to address adverse environmental effects and enhance benefits associated with the project and forms part of *The Environment Act* proposal.

1.5 Environmental assessment report outline

Chapter 2.0 outlines project planning and the various components of the project, summarizes easement procurement and compensation, and project activities.

Chapter 0 summarizes the route selection process used to determine the location of the proposed projects footprint. The objectives of the route selection process are also discussed in this section (e.g., reducing project effects).

Chapter 4.0 summarizes the engagement process (i.e., both public engagement and First Nations and Métis engagement). This chapter includes a discussion of the purpose, goals and objectives, methods, and a summary of feedback received.

Chapter 5.0 outlines the methods used conduct the environmental assessment. This includes a description of the scope, temporal, and spatial boundaries as well as how areas of assessment (i.e., valued components) were identified. In addition, methods used to determine effects to valued components, mitigation, residual effects, and cumulative effects assessment are also outlined.

Chapter 6.0 provides a description of the existing cultural, environmental, and socio-economic setting. The topics under which the existing conditions of the project are presented were drawn from First Nation, Métis, and public engagement feedback and fell under four themes. The four themes are historical and cultural significance, environment, socioeconomics, and well-being. Under the environment theme, topics were further broken down into components understood to better align with Indigenous worldviews, namely skies, waters, soils, and lands.

Chapter 6.0 presents the assessment of potential project effects on the 13 valued components considered relevant for the project. In addition, this chapter identifies mitigation measures, characterizes residual effects, assesses cumulative effects, presents follow-up and monitoring, and describes sensitivity to future climate change scenarios.

Chapter 8.0 discusses the effects of the environment on the project.

Chapter 9.0 summarizes greenhouse gas and climate change information compiled for the project.

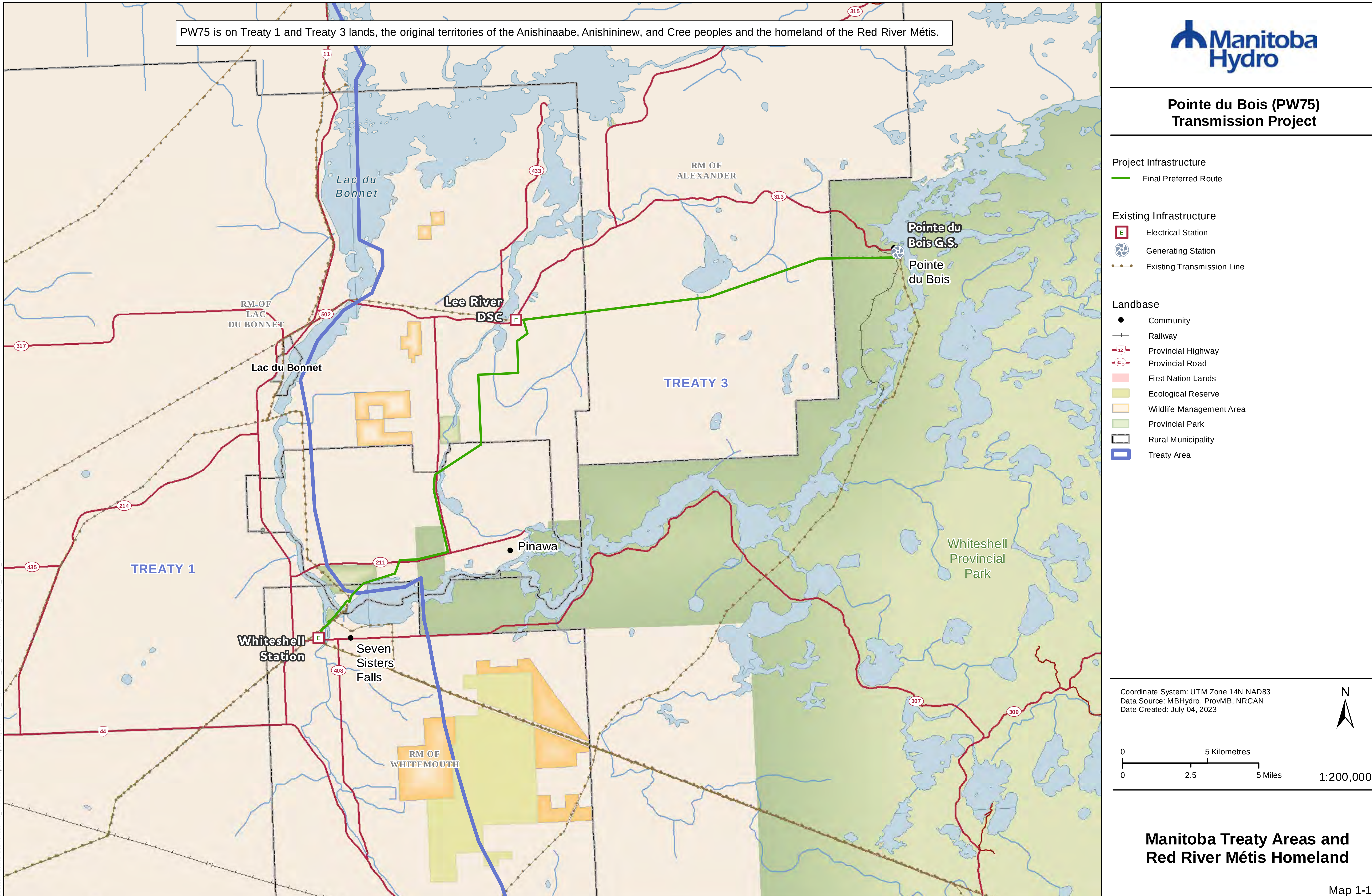
Chapter 10.0 outlines unplanned events that may occur from project activities (i.e., accidents and malfunctions).

Chapter 11.0 describes the environmental protection program, including the various plans, roles, and communication protocols that will be in place to mitigate project activities and effects.

Chapter 12.0 provides a summary of the document.

Chapter 13.0 lists the references from which information was drawn.

Following Chapter 13.0, the document ends with appendices.


PW75 is on Treaty 1 and Treaty 3 lands, the original territories of the Anishinaabe, Anishininew, and Cree peoples and the homeland of the Red River Métis.
Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway
Provincial Road
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Rural Municipality
Treaty Area
Lac du Bonnet
RM OF ALEXANDER
RM OF LAC DU BONNET
Lac du Bonnet
Lee River DSC
Pointe du Bois G.S.
Pointe du Bois
TREATY 3
TREATY 1
Pinawa
Whiteshell Provincial Park
Whiteshell Station
Seven Sisters Falls
RM OF WHITEMOUTH
315
11
433
313
502
317
214
211
435
408
44
307
309
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0
5 Kilometres
0
2.5
5 Miles
1:200,000
Manitoba Treaty Areas and Red River Métis Homeland
Map 1-1

2.0 Project description

2.1 Project overview

The proposed project consists of the construction of 51 km of 115-kV transmission line (PW75), terminating at Whiteshell and Pointe du Bois stations (Map 2-1) including:

- Terminate the new 115-kV line at Pointe Du Bois Station Switchyard.
- Expand Pointe du Bois Station Switchyard to accommodate new terminations and re-align access road.
- Re-align existing terminations of Pointe Du Bois to Slave Falls transmission lines R1 and R2 at Pointe Du Bois Station Switchyard.
- Replace two power transformers at Pointe Du Bois Station generating station unit yard.
- Upgrade existing Unit lines from Pointe Du Bois Generating Station to Pointe Du Bois Station Switchyard.
- Upgrade two 66-kV power transformers to 115-kV at Lee River distribution supply centre.
- Realign existing termination of Seven Sisters to Whiteshell Station SW4 115-kV transmission line.
- Salvage of P3/P4 66-kV transmission line from Pointe du Bois Station to the Lee River distribution supply centre.

2.2 Project alternatives considered

Two double circuit 66-kV sub-transmission lines – P1/P2 and P3/P4 (P-Lines) – that run from Pointe du Bois Station, in Whiteshell Provincial Park, to Rover Station, in the City of Winnipeg, have reached the end of their serviceable life.

The P-lines need to be replaced to continue to deliver reliable power to customers and protect public and employee safety.

Manitoba Hydro considered five options to replace the existing P-lines. The lines were evaluated based on cost and system performance. The five options were:

1. Salvage of the 66-kV P lines from Pointe du Bois Station to Rover Station, and construction of a 115-kV overhead line from Pointe du Bois Station to Rover Station.

2. Salvage of the 66-kV P lines from Pointe du Bois Station to Rover Station, and construction of a 115-kV overhead line from Pointe du Bois Station to Transcona Station.
3. Salvage of the 66-kV P lines from Pointe Du Bois Station to Rover Station, and construction of a 115-kV overhead line from Pointe du Bois Station to Whiteshell Station.
4. Upgrade of the 66-kV P lines from Pointe du Bois Station to Rover Station.
5. Salvage of the 66-kV P lines from Pointe du Bois Station to Rover Station. This option requires the construction of 66-kV overhead sub-transmission lines around Winnipeg.

Based on a comparison of the options, Option 3 was selected because:

- Options 1 and 2 are more expensive than Option 3.
- Option 4 is not technically practical.
- Option 5 incurs the loss of power capacity into the power system in the Winnipeg central area and isolates the power generation of the Pointe du Bois Generating Station.

2.3 Transmission line components

The final preferred route for PW75 is shown on Map 2-1 and in detail in Appendix A. The route selection process is described in Chapter 0.

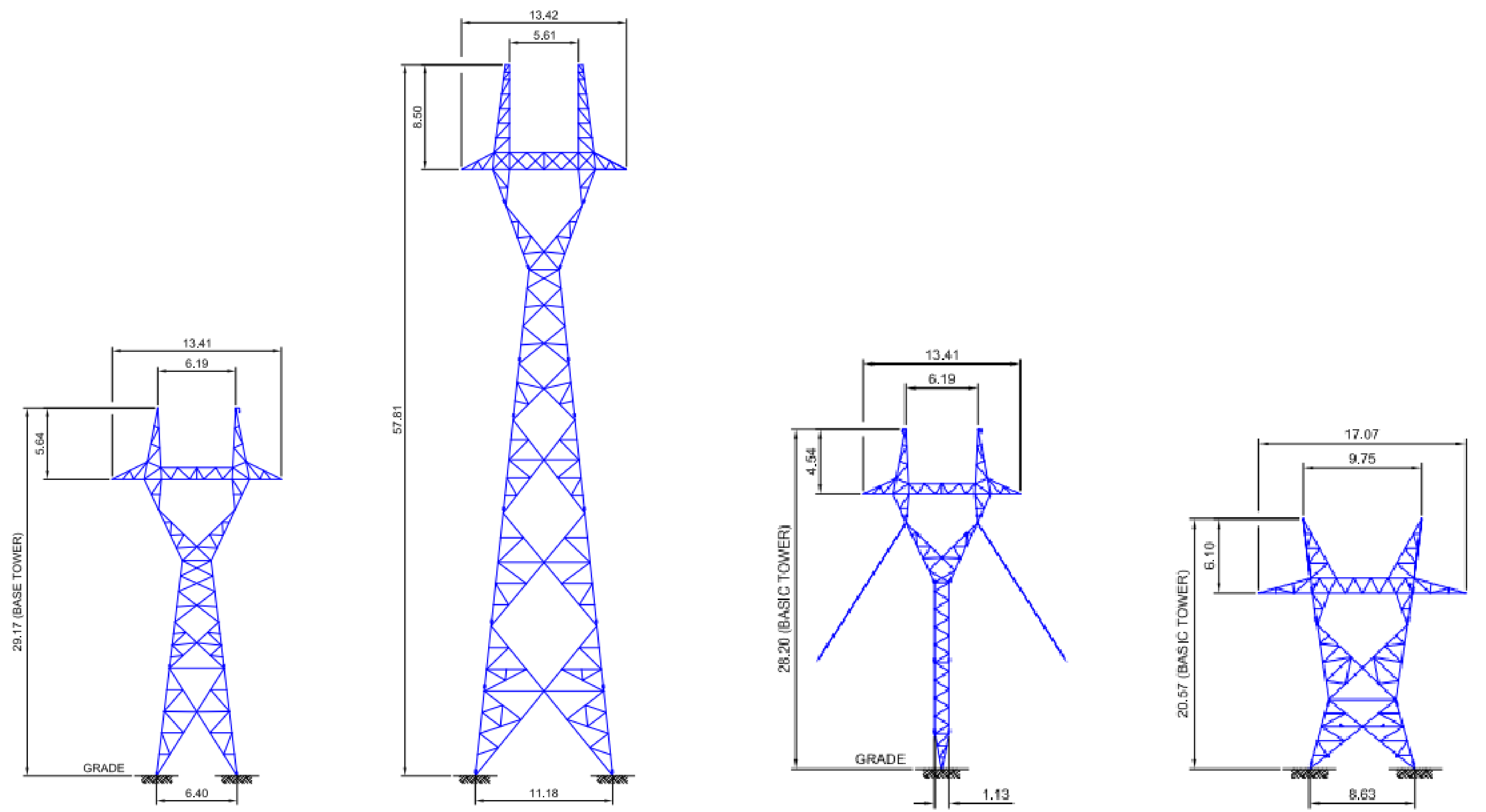
The transmission line's design and construction will meet or exceed the requirements as set out by the Canadian Standards Association, as well as the North American Electric Reliability Corporation.

2.3.1 Structures

A combination of guyed and self-supporting steel lattice transmission structures will be used including suspension, angle, and dead-end towers (Figure 2-1). In addition, two specialty towers (Figure 2-1) are required to cross the Winnipeg River.

Heavy angle and dead-end structures will be required at specific locations to accommodate line redirection and to terminate the transmission line into the stations.

Other structure designs may be considered to mitigate site specific issues along the final route alignment.



Typical self-supporting structure | Winnipeg River crossing structure | Typical guyed structure | Typical angle / dead-end structure

Figure 2-1: PW75 structure types - Preliminary Design (Units in Meters)

2.3.2 Conductors

Line PW75 is designed for three 795 MCM 26/7 ACSR "Drake" type conductors, 28 millimetres (mm) in diameter. Each conductor, consisting of aluminum strands with a center core of steel strands, will be supported from the structures by insulators. The ground-to-conductor heights will meet or exceed the C22.3 No. 1 "Overhead Systems" regulations.

2.3.3 Insulators

Overhead transmission conductors will be air insulated using ceramic bell style insulator cups tied together in strings of seven to nine bells. The insulator assemblies are suspended from the structures and support the conductors. The insulator assemblies have flexibility in movement to allow for blow-out and galloping of the conductor during various weather and electrical loading conditions.

2.3.4 Ground wires

Two ground wires will be strung at the tops of the structures above the main conductors. These wires are designed to provide grounding and lightning protection for the line. One of the ground wires will be a galvanized steel stranded cable approximately 7mm in diameter. The other ground wire will be designed using an Optical Ground Wire, which will be slightly larger in diameter containing a fiberoptic cable for telecommunications purposes during the transmission lines operation.

2.3.5 Transmission line right-of-way requirements

Manitoba Hydro obtains the legal right to construct, operate and maintain their transmission lines within a right-of-way. This right is generally obtained through easement of privately owned lands, or initially by a Crown Land Reservation, pending easement, for right of use on provincial Crown Land.

Property easements for the required right-of-way are being secured. For private lands, this process is typically completed by direct negotiation with the affected landowners.

The right-of-way widths are determined to allow safe conductor swing or blow-out as well as tower placement. The right-of-way width also provides adequate lateral distance under wind conditions to limit flashovers onto objects located near the edge of the right-of-way. The typical right-of-way requirements for a 115-kV guyed lattice steel structure are illustrated in Figure 2-2.

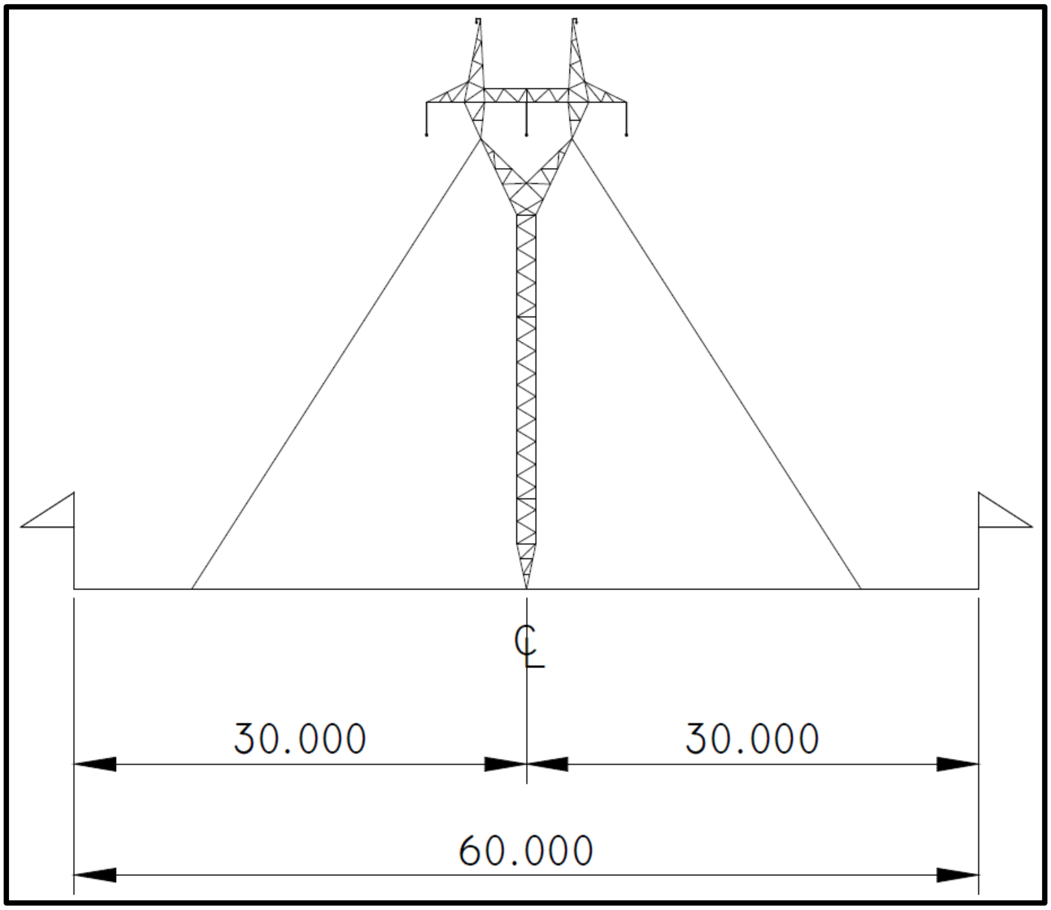
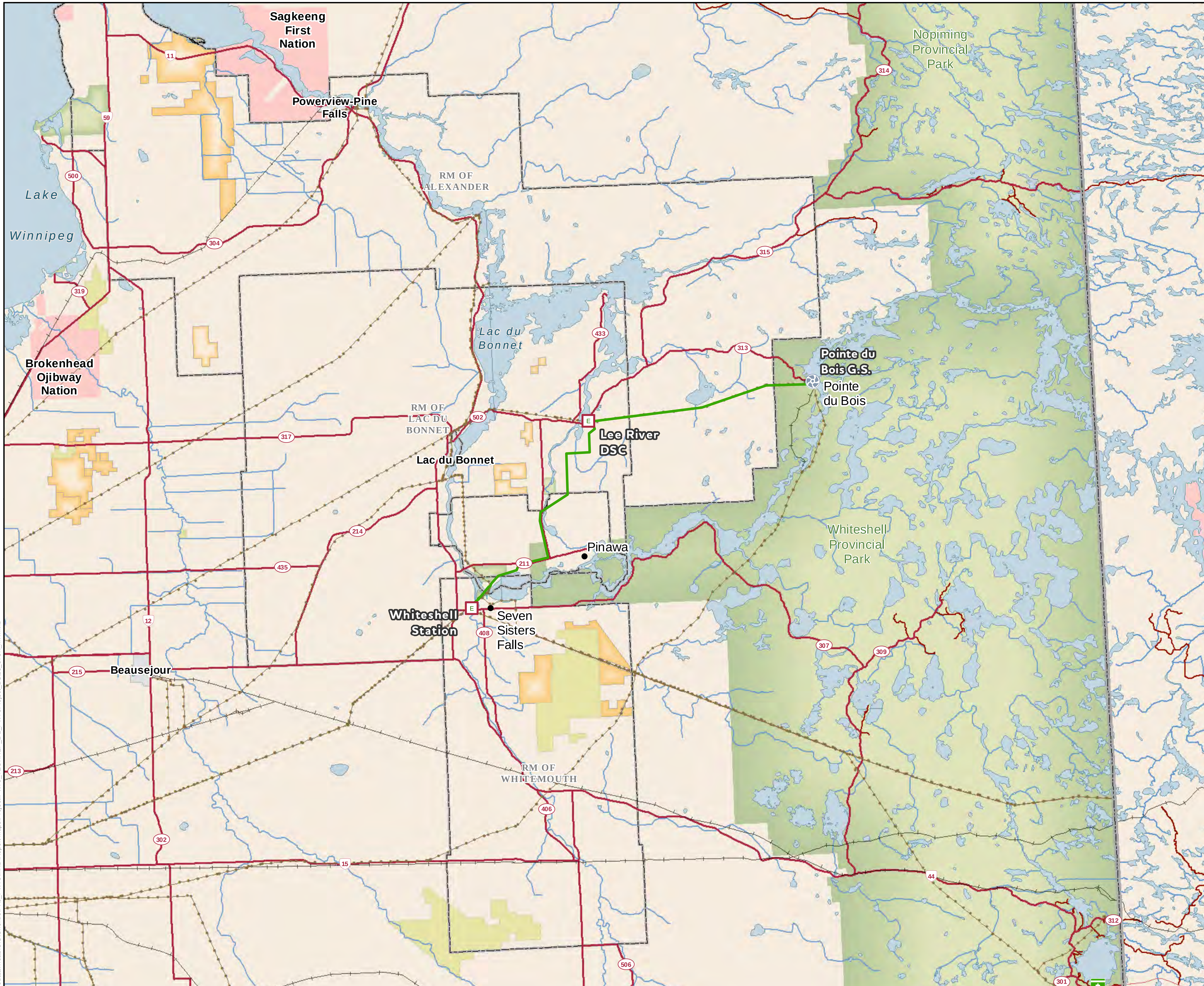


Figure 2-2: Typical right-of-way requirements in meters

From Pointe du Bois Station, PW75 will utilize an existing Manitoba Hydro right-of-way for approximately 23 km to fulfill its ROW requirements. The existing 66-kV sub-transmission lines which occupy the right-of-way (P3/-P4 lines) will be decommissioned once the new line is in service. The existing right-of-way needs to be widened by 38 m to accommodate construction of PW75. The widening will occur to the south to allow the existing 66-kv P3-P4 line to remain in service during construction to ensure the power supply to the Lee River distribution supply centre is maintained and local service is not interrupted.

From the Lee River distribution supply centre to the Winnipeg River a new 60 m right-of-way will be developed on crown, private and Manitoba Hydro owned property. South of the Winnipeg River to Whiteshell station the line (PW75) will use a combination of new and existing rights-of-way. See Appendix A for details.



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

- Final Preferred Route

Existing Infrastructure

- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Community
- Railway
- Provincial Highway
- Provincial Road
- Rural Municipality
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 5 10 Miles
1:375,000

PW75 Project Footprint (Final Preferred Route)

Map 2-1

2.4 Station components

2.4.1 Whiteshell Station

2.4.1.1 Station layout

PW75 will be terminated at the Whiteshell Station. One new 115-kV bay will be constructed. The new bay will have space to install two breakers, four switches and terminate the new line (Figure 2-3).

2.4.1.2 Transmission line terminations

The existing Seven Sisters to Whiteshell Station transmission line SW4 termination will be moved into a new position to permit the addition of the termination of PW75 Station Equipment

Specific equipment for the Whiteshell Station will accommodate the termination of PW75. The major equipment components will include:

- One 115-kV breakers
- Various 115-kV switches
- Other associated components

2.4.1.3 Station structures

Associated with the required station equipment installations will be foundations needed to support the equipment and to allow the equipment to be connected to the existing 115-kV transmission system.

The associated structures will be steel lattice and/or welded steel structures of hollow structural steel construction. These will be supported on concrete foundations located inside the station site.

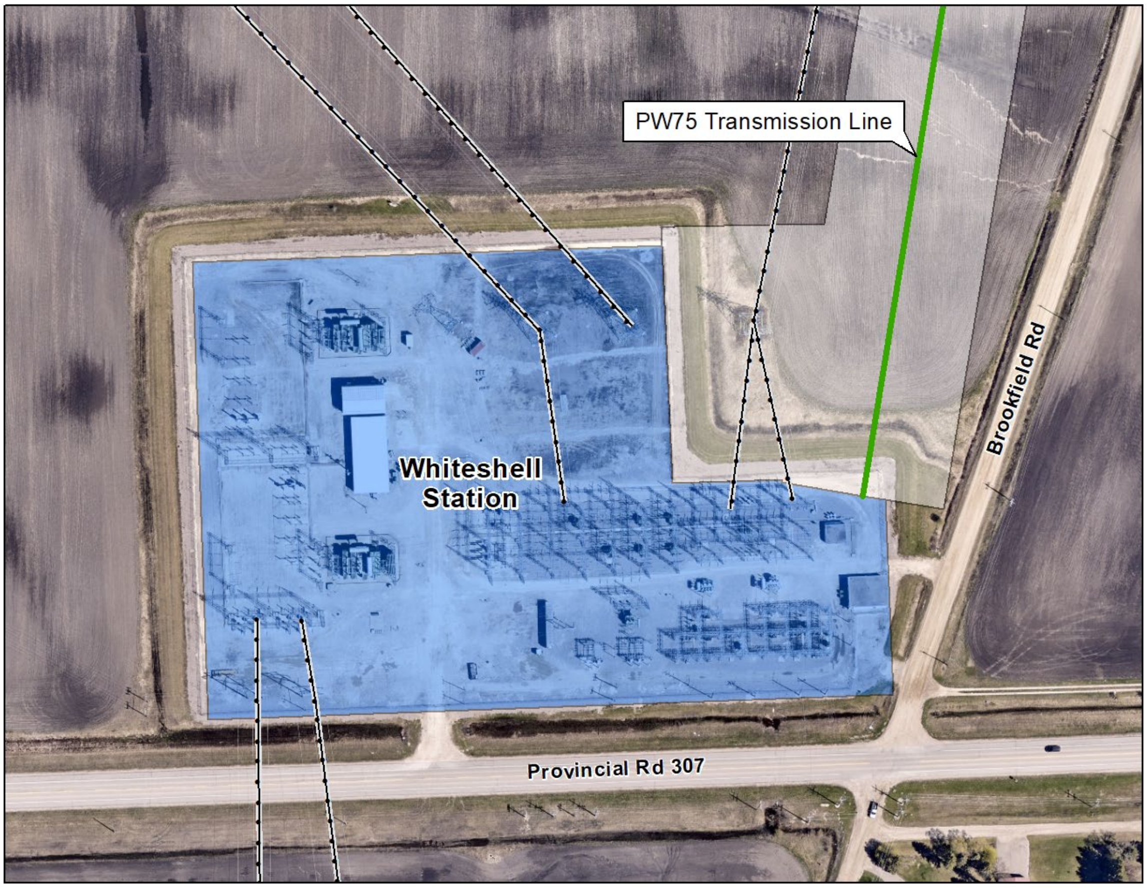


Figure 2-3: Whiteshell Station layout

2.4.1.4 Site security

The station site is enclosed within a continuous perimeter chain link fence. The height of the fence will be approximately 2.1 m, with a top guard of at least three strands of barbed wire extending the fence to an overall height of approximately 2.4 m.

2.4.1.5 Grounding

Stations incorporate a subsurface ground grid required to equalize electrical ground gradients that develop in the event of electrical faults, which conforms to Manitoba Hydro specifications for station design. The ground grid will be adjusted to ensure safety criteria are met with the new fault levels while ensuring a bond to all the new equipment. The ground grid will be expanded to accommodate the new equipment and potential expansion of the station.

2.4.1.6 Oil

Oils and gases are typically required to provide an insulating medium for equipment within substations. These are required for the safe operation of the station's equipment. The station has two containment pits and oil traps. The modifications to the Whiteshell Station will not result in a net increase in oil containing equipment.

2.4.1.7 Site access

The station is presently accessible by permanent all-weather road access from Provincial Trunk Highway (PTH) 11 and PR 307. Existing access will be used for equipment placement at the station site.

2.4.2 Pointe du Bois Station

2.4.2.1 Switchyard layout

Pointe du Bois Station will require expansion to accommodate the new line. The station will be expanded to the southeast beyond Manitoba Hydro's property boundaries (Figure 2-4). A new control building will be built, and new foundations and support structures will be constructed to support the new equipment.

PW75 is planned to egress from the south side of the expanded Pointe du Bois Station (Figure 2-4).

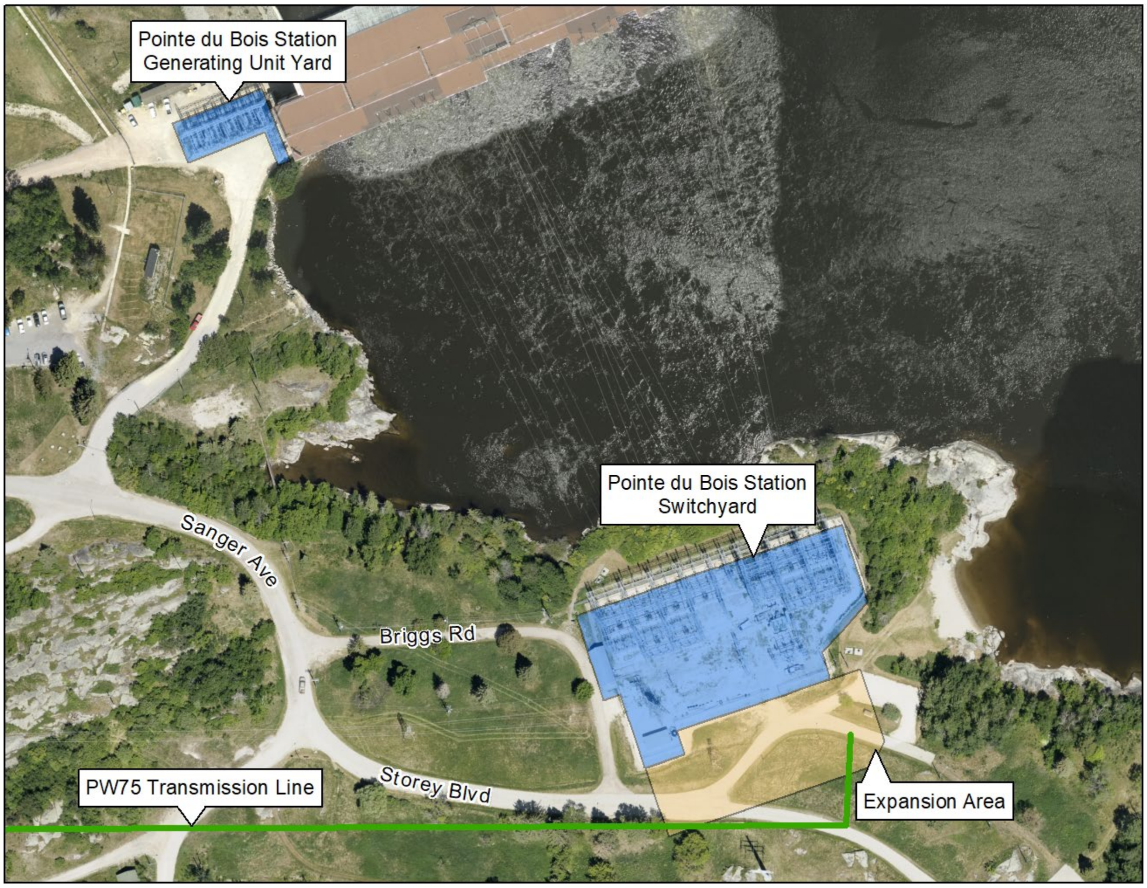


Figure 2-4: Pointe du Bois Station yard layouts

2.4.2.2 Transmission line terminations/re-alignments

The existing Pointe Du Bois to Slave Falls transmission lines R1 and R2 will be re-aligned to permit safe station construction while energized and a new termination for R2 in the expanded station area.

2.4.2.3 Station equipment

Additional equipment requirements needed to complete the connection of PW75 to the station include:

Within Switchyard

- Four 115-kV breakers
- Various 115-kV switches
- Control Building
- Other associated components

Within Generating Station Unit Yard

- Two-115 kV power transformers
- Other associated components

2.4.2.4 Station structures

Associated with the required station equipment installations will be foundations needed to support the new 115-kV transmission infrastructure. The associated structures will be steel lattice in design and will be supported on concrete foundations.

2.4.2.5 Site security

The station yards are currently contained within a continuous, chain link fence enclosure. The switchyard fencing will be expanded to encompass the yard expansion. The fence has several barbed wire strands at the top of the fence for additional security. All new equipment additions will be located within the existing fenced area. All gates and other access points to the station will be locked.

2.4.2.6 Station grounding

The existing grounding system which is currently used for this station will be used for grounding the new equipment additions. The ground grid will be adjusted to ensure safety criteria are met with the new fault levels while ensuring a bond to all the new equipment. Within the switchyard the ground grid will be expanded to accommodate new equipment additions to the station.

2.4.2.7 Oil

The equipment additions for the Pointe du Bois Station will require mineral oils and insulating gases to ensure the proper operation of the power transformers and circuit breakers. The alterations to the station will include:

- (2) 115-kV Power Transformer – Mineral Oil – 14,000 litres/unit
- (6) 145-kV Capacitive Voltage Transformer – Mineral Oil – 75 litres/unit

The station has an oil containment berm and oil/water separators.

2.4.2.8 Site access

The station is presently accessible by permanent all-weather road access from PR 313. Existing access will be modified due to switchyard expansion. Access is to be maintained to areas serviced to the east of station during and post construction.

2.4.2.9 Marshalling yard

The station construction will require approximately 0.5 hectare of previously disturbed land for storage of equipment and materials.

2.4.3 Lee River Distribution Supply Centre

2.4.3.1 Station equipment

Additional equipment requirements needed to complete the connection of PW75 (Figure 2-5) to the distribution supply centre include upgrades:

- (2) 115-kV power transformers – Mineral Oil – 12,000 litres/unit
- Other associated equipment

2.4.3.2 Site access

The distribution supply centre is presently accessible by permanent all-weather road access from PR 313.

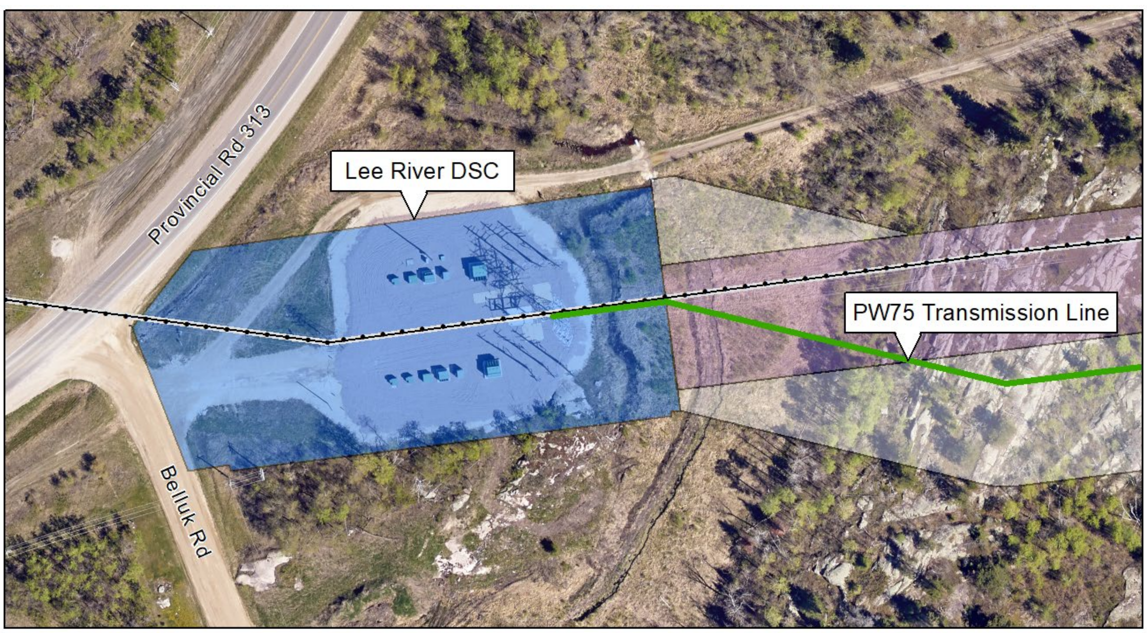


Figure 2-5: Lee River distribution supply centre

2.4.4 Salvage of P3/P4

The P3/P4 lines will remain in service until the portion of the line from Pointe Du Bois Station to the Lee River distribution supply centre is constructed and in service.

The P-lines will be disconnected from their station terminations to allow for safe dismantling. Salvage will involve removing and salvaging the conductor. The towers will be disassembled and removed from site.

Soil will be excavated surrounding the tower foundations allowing them to be cut off below grade, in accordance with the land agreements. Excavated soil will be used to backfill the excavation and graded to allow for re-vegetation.

After dismantling the project, high value components will be removed for re-use or recycling. The remaining materials will be reduced to transportable size and removed from the site for disposal.

The P3/P4 salvage is currently scheduled for the spring of 2025.

2.5 Project schedule

Receipt of an *Environment Act* Licence for the project is targeted for August 2024. Upon receipt of the *Environment Act* Licence, property acquisition for the PW75 right-of-way will be finalized. The construction schedule will occur over two years fall 2024 to summer 2026.

2.5.1 Construction schedule

Table 2-1 shows the planned transmission line construction schedule.

Transmission line construction will take place in four phases:

1. Clearing
2. Foundations
3. Tower assembly / erection
4. Conductor stringing

This work will generally take place under frozen conditions (which may extend into the spring).

Work at Pointe du Bois and Whiteshell Stations can occur year-round as access is not seasonal. Work at both stations will start in Fall 2024.

The in-service date for the project is planned for Summer 2026.

Construction will start in the winter of 2024/25. The right-of-way will be cleared between the Lee River distribution supply centre and Pointe du Bois Station (section 1). The right-of-way will also be cleared between Whiteshell Station and Lee River distribution supply centre (section 2).

Foundations and anchors will be installed, towers will be assembled and erected, and section 1 will be strung and commissioned in section 1 the first winter, while P3/P4 remain in service.

Section 2 will be constructed (foundations, anchors, towers, stringing, commissioning) in the winter of 2025/26. When the new line is connected to the Lee River distribution supply centre and the two stations, the P3/P4 line will be salvaged in that same winter, prior to spring thaw.

Table 2-1: Transmission line construction schedule

Construction phase	2024	2025				2026		
	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer
Mobilization (staff presence)								
Vehicle / equipment use								
Right-of-way clearing								
Watercourse crossings								
Marshalling / fly yards								
Tower construction								
Implodes								
Helicopter use								
Existing Transmission Line Decommissioning								

2.6 Pre-construction

Overhead transmission line construction is preceded by a survey to establish the centerline of the right-of-way. The edges of the right-of-way will be flagged to ensure that tree clearing is completed according to CSA and NERC standards. The survey will also establish the specific locations of each transmission structure.

2.6.1 Geotechnical investigations

Geotechnical investigations involve soil drilling or the excavation of test pits to create a soil profile that is used by civil designers to inform the foundation design.

Investigations can take place in cleared areas and road allowances prior to construction or as the right-of-way is cleared to allow access. Test pits will be excavated by a tracked excavator and be backfilled once tests are complete.

2.7 Transmission line construction

Transmission line construction will begin after receipt of the Environment Act Licence as regulated by *The Environment Act (Manitoba)*. Other work permits and/or authorizations will be obtained as required.

It’s expected that construction activities will be carried out by contractors, under the supervision of Manitoba Hydro. Both Manitoba Hydro field staff and the contractors will be provided with the Environment Act Licence for the project, which will outline conditions to be implemented during construction phases of the project.

Manitoba Hydro will adopt the standard procedures for protecting the environment by adhering to a Construction Phase Environmental Protection Plan (CEnvPP). The CEnvPP will outline general and site-specific mitigation, and on-ground activity for preventing or minimizing environmental effects.

Transmission line construction includes:

- Vehicle and equipment use
- Mobilization
  - Workforce presence
  - Accommodations and construction camps
- Access route development
- Right-of-way clearing
- Granular materials
- Biosecurity measures
- Marshalling / fly yards

- Tower construction
    - Foundation installation
    - Structure and conductor installation
    - Use of implodes
    - Use of helicopters
- Clean-up
    - Waste disposal

2.7.1 Vehicle and equipment use

Clearing and construction equipment can include:

- feller-bunchers
- skidders
- bulldozers with shear blades, dozer blades and rakes
- bulldozers with stringing equipment such as tensioners and pullers
- drill rigs
- mulchers
- chippers
- backhoes with attachments
- excavators and cranes
- materials delivery trucks and trailers
- Grout plant equipment
- various smaller equipment as required

2.7.2 Mobilization

The first step in project construction is mobilizing a workforce to an area. Mobilization includes the movement of Manitoba Hydro and contractor staff, vehicles, and equipment to the job site. It also includes the presence of the workforce at accommodations in the local community and their commute to and from the work site.

Generally, mobilization is ongoing throughout the construction phase as different types of equipment are required for specific activities such as clearing, tower assembly / erection construction and conductor stringing.

2.7.2.1 Workforce presence

The transmission line construction workforce will range in number from about 45 personnel monthly, during mobilization and de-mobilization phases, to a maximum of 112 personnel per month during peak construction periods.

Transmission line construction will be conducted primarily during winter months, extending from December 2024 to the end of March 2026.

2.7.2.2 Accommodations and construction camps

It is anticipated that clearing and construction workers will be housed in suitable accommodations available in local communities. There is the possibility of mobile construction camps. These would include sleeper units, a wash car, cooking and eating trailers, offices, and a machine/parts shop. The camps will be placed along the right-of-way or in pre-disturbed locations. The camp will use a diesel generator for electrical power. Camp size could be in the range of 10 to as many as 100 workers, but will vary according to the activity, contract size and labour force requirements.

2.7.3 Access route development

Access to the right-of-way will typically be from adjacent or intersecting roadways or existing trails.

Permission will be requested from landowners for use of roads or trails on private property. Provincial permits will be secured for access from provincial Crown and Park lands. Manitoba Transportation and Infrastructure (MTI) will be contacted for access from highways (i.e., PR 307, 313).

2.7.4 Right-of-way clearing

Clearing of trees and other vegetation within the right-of-way is required for construction and transmission line operating safety and reliability. Herbicides will not be used for clearing the right-of-way. The extent and type of clearing methods will be influenced by the transmission line route and the amount of vegetation to be cleared. Clearing methods can include machine clearing by mulching, selective clearing by feller-bunchers and hand clearing, particularly in environmentally sensitive areas. Trees will be cut close to ground level. Ground vegetation will not be grubbed except at structure sites where foundations are required, where access of equipment necessitates it, or for worker safety reasons. In circumstances where danger trees beyond the right-of-way are identified, they will be selectively removed.

The disposal of trees and other vegetation will conform to the recommendations as outlined in the environmental protection program (Section 8.0), in discussion with private property owners, as per applicable Provincial Acts and regulations. Where practical, Manitoba Hydro may set aside a limited quantity of timber for use and/or auction. The remaining debris/timber will be chipped or mulched.

2.7.5 Granular materials

Limited granular materials will be required during the construction of the transmission line for concrete batching and/or for granular backfill. Granular materials required for construction will generally be purchased from local suppliers. Locations and sites will be determined based on availability, quality of product, and location of the final licensed route. It is expected that the use of local granular materials will minimize the introduction of non-native and/or invasive plant species.

2.7.6 Biosecurity measures

Manitoba Hydro's Agricultural Biosecurity Policy was created to prevent the introduction and spread of disease, pests and invasive plant species in agricultural land and livestock operations. Manitoba Hydro will undertake project specific biosecurity management planning to minimize risks associated with this project.

2.7.7 Marshalling yards

Marshalling yards are used for storage of construction materials and equipment, and possibly the assembly of towers. These yards will be established near the transmission line route and, where practical, will take advantage of previously cleared sites such as borrow pits, aggregate stockpile site and wood yards. The number and location of the marshalling yards will be determined once the Project has received the required regulatory approvals. Contractor specifications and agreements will also influence the number and location of marshalling yards to be used.

2.7.8 Tower construction

Tower construction includes:

- Foundation installation
- Structure and conductor installation
- Use of implodes
- Use of helicopters

2.7.8.1 Foundation installation

For the guyed suspension lattice steel structures, design and construction of the tower foundations will depend on soil and terrain conditions. For surface or shallow bedrock conditions, the lattice structures will be founded on a steel column fixed directly to the rock by steel dowels drilled and grouted into the rock.

Where rock is not encountered, the structures will be founded on mat footings, sized to provide adequate bearing support (typically in the order of 1.8 m [6 ft.] square) and buried to a depth of approximately 3 m (10 ft.).

Depending on soil conditions, deep foundations (i.e., piles) may also be used.

For shallow or surface bedrock conditions, guy anchors will be secured by drilled and grouted anchors. Where bedrock is not encountered, deadman anchors, or other deep anchors (e.g., screw anchors, overburden) will be used.

Self-supporting suspension lattice steel structures will be supported by either mat or pile foundations. Mat foundations will typically be 3 m^2 (9.8 ft.) by 3 m^2 (9.8 ft.) deep. Pile foundations will involve individual piles or pile groups, one for each leg of the structure. Piles will be steel pile groups with a welded cap.

Piles may be cast-in-place concrete, or steel pile groups with a welded cap. Helical pile foundations may be used in sensitive areas. These involve individual piles or pile groups, for each leg of the structure.

Self-supporting angle and dead-end structures will be supported by either mat or pile foundations. Mat foundations will typically be 4 m^2 (13.1 ft.) by 3 m^2 (9.8 ft.) deep, for each leg of the structure. Pile foundations will typically consist of steel pile groups with a welded cap.

Dimensions will be subject to detailed design and will vary for specific foundation conditions.

2.7.8.2 Structure and conductor installation

If construction is contracted, the contractor's method for structure framing or assembly, and erection will typically prevail. Structures are generally assembled on-site or in designated marshalling yards and transported to the construction site by truck or helicopter.

Insulators will be attached to the cross-arms of each structure prior to structure erection. Structures are erected by cranes.

Reels of conductor will typically be transported by truck to the construction site. The conductors will be suspended from the insulators, attached to the structures. Conductor tensioning will be completed by machine to provide the pre-determined ground-to-conductor clearances.

Either implosive sleeves or hydraulic crimping will be used to splice conductor ends together.

2.7.8.3 Use of implodes

To create a continuous conductor the ends of conductor reels are spliced together by use of implosive sleeves. The implodes create a flash and a loud boom similar to the sound of a 12-guage shotgun blast (about 110 decibels; (CapX2020 2012)).

2.7.8.4 Use of helicopters

Contractors will have different preferences with respect to structure assembly. Some will choose to assemble structures at each tower site and then erect them by crane. Others will choose to assemble the structures at a central marshalling yard and then either truck the structures to the site and erect them by crane or use a helicopter to fly the towers to the site and erect them.

2.7.9 Clean-up

The final step in construction is demobilizing the workforce from an area. Demobilization includes the movement of Manitoba Hydro and contract staff, vehicles, and equipment from the job site, as well as the clean-up (and if required rehabilitation) of the right-of-way, marshalling / fly yards, and access routes.

Once the transmission line is constructed, all excess materials and equipment including debris, and unused supplies will be dismantled, if required, removed from the site, and disposed according to provincial and municipal regulations. Rehabilitation of any disturbed sites will be undertaken as required. All cleanup and rehabilitation activity will be subject to the requirements of the environmental protection program, described in Section 11.

Generally, demobilization is ongoing throughout the clearing and construction phase as different types of equipment are required for specific activities such as clearing, tower construction and conductor stringing. Construction cleanup will occur throughout clearing and construction.

2.7.9.1 Waste disposal

Disposal of waste materials will rely on the use of locally available services and will also be determined by conditions of the Environment Act Licence. Temporary waste disposal will be undertaken in accordance with provincial and municipal regulations, and by-laws. Once the transmission line is constructed, all excess materials and equipment including debris, and unused supplies will be dismantled, if required, removed from the site, and disposed of according to provincial and municipal regulations. Rehabilitation of sites such as marshalling yards will be undertaken as required.

2.8 Whiteshell Station

2.8.1 Access to the station site

As public and worker safety, as well as station security, are of utmost importance, only authorized personnel will be allowed in the construction area. The station is located immediately north of PR 307. Access to the station by construction vehicles will be from PTH 11 and PR 307. It's anticipated that no new access will be required for the equipment additions at this station.

2.8.2 Workforce requirements

The expected construction workforce for the Whiteshell Station equipment additions will range from 6 people at the start, during civil construction and end of the project, to a maximum of 20 people when civil, overhead line and/or electrical construction crews are overlapping on site.

2.9 Pointe du Bois Station

2.9.1 Access to the station site

As public and worker safety, as well as station security, are of utmost importance, only authorized personnel will be allowed in the construction area. The station is located off permanent all-weather roads in Pointe du Bois. No new access should be required for the equipment additions at the station.

2.9.2 Workforce requirements

The expected construction workforce for the Pointe du Bois Station equipment additions will range from 6 people to a maximum of 40 people when civil, overhead line and/or electrical construction crews are overlapping on site.

2.10 Project operations and maintenance

2.10.1 PW75 115-kV transmission line

PW75 will be designed to operate continuously, though the actual flow of electricity will vary with electrical load requirements. Maintaining PW75 in a safe and reliable operating condition will require regular inspection and maintenance. This will include inspections of the right-of-way as well as structures, conductors, and related hardware.

The inspections of the transmission line will include air patrols, ground patrols and non-scheduled maintenance by air or ground if unexpected repairs are required.

Ground travel can include snowmobile, flex-track or road vehicles. Regular inspections will typically occur once per year by ground and can occur up to three times per year by air.

2.10.1.1 Vegetation management

Vegetation management within the right-of-way is required for public and employee safety, as well as the reliable operation of the line. The right-of-way will be maintained on an ongoing basis throughout the life cycle of operation.

An integrated vegetation management approach will be undertaken to address non-desirable and non-compatible vegetation issues within the right-of-way. To achieve this, a variety of possible vegetation management methods are available, including mechanical, chemical, cultural (agricultural) and biological control techniques within reasonable costs and to minimize environmental impacts.

Options for vegetation management in the right-of-way include but are not limited to:

- Hand cutting: Where local conditions and factors permit, hand-cut deciduous trees might be stump treated with an approved herbicide to prevent re-growth. Hand cut trees (using chainsaws, brushsaws, axes and brush hooks) that do not receive stump treatment will require follow-up maintenance to address regrowth.
- Mechanical Cutting: where dense tree growth reoccurs on the right-of-way, mechanical cutting is generally undertaken. This type of right-of-way maintenance typically requires follow-up maintenance within two to three years to manage suckering of deciduous trees.
- Winter Shearing: This type of right-of-way maintenance is used in frozen ground conditions where a tracked vehicle equipped with "V" or "KG" blade is used to clear tree growth more than 2.5 cm in diameter. The tree growth is sheared just above ground level (frost line) to try to minimize environmental damage and disturbance to the organic soil layer.
- Herbicide Treatment: This method is used to control and reduce tree growth problems on a long-term basis and as a follow-up action to previous vegetation management work. All herbicide applications will be completed and supervised by licensed applicators and in accordance with a Pesticide Use Permit. Herbicide application rates will be determined by qualified and licensed staff, condition-based assessments, labelling, and subject matter expert consultation in accordance with product label instructions. Only herbicides identified in the Herbicide Use Permit will be used.

Broadcast stem application equipment such as machine applicators, and hose and handgun applicators are used for controlled droplet applications for vegetation heights of 2.5 m or less. Selective stem applicators such as hose and gun sprayers are the preferred method of application for trees under 2.5 m.

Basal treatment applications are used for a direct spray onto the tree stem or root collar. This can be completed in any season and is generally used for tree growth over 2.5 m in tree height. Stump treatment is used following hand cutting, where practical, to provide selective control of suckering for deciduous tree species and to minimize effects on desirable species. Tree injection methods might also be used on trees over 2.5 m in height, subject to aesthetic impact and resource considerations.

Biological control is a method of encouraging competing plant species, planting, and maintaining desirable plant species, encouraging specific wildlife use or secondary use of the right-of-way to control the spread of unwanted species.

Prior to any vegetation management work on private property, the landowner or authority will be contacted. On provincial Crown Lands, Manitoba Hydro will follow the Provincial Document PTN-15-00116 entitled Guideline for Manitoba Hydro Brushing or Clearing Projects on Existing Transmission Line Rights-of-Way. The Manitoba Hydro Chief Forester is also responsible for obtaining the necessary Pesticide Use Permits and submitting Post Season Control Reports as required by the Manitoba Regulation 94-88R under The Environment Act (Manitoba).

The operations and maintenance phase of the project will be compliant with Manitoba Hydro's operation phase EnvPP.

2.10.2 Station maintenance

The sub-stations are not manned on a continual basis. However, routine inspections and maintenance operations will be required to ensure safe and reliable operation. Weed control within the station sites is necessary for operating reliability of equipment, as well as safety of personnel working within the stations.

2.10.3 Project decommissioning

When an asset has reached end of life or is no longer required, it will be decommissioned. The following sections describe the decommissioning process for the transmission line. Station work would be similar.

2.10.3.1 Preparation activities

The transmission line will be disconnected from the grid to allow for the safe dismantling of the project. To disconnect, Manitoba Hydro will:

- Trip the breaker(s) at Pointe du Bois and Whiteshell Stations
- Open the 115-kV disconnects
- Disconnect the conductors at the substations

2.10.3.2 Removal of facilities

The disassembly and removal of the equipment will be the same as the installation described above, but in reverse order.

Salvage will involve removing and salvaging the conductor onto spools under tension to be removed from site. The towers will be disassembled and lowered using a crane onto flat bed trucks for transport.

Soil will be excavated surrounding the tower foundations allowing them to be cut off 1.5 meters below grade, in consultation with the landowner and in accordance with the land agreements. Surrounding soil will be used to backfill the excavation and graded to allow for re-vegetation.

2.10.3.3 Salvage and disposal

After dismantling the project, high value components will be removed for re-use or recycling. The remaining materials will be reduced to transportable size and removed from the site for disposal. Waste handling and disposal will be subject to conventional Manitoba Hydro codes of practice and relevant provincial and federal legislation.

2.10.3.4 Restoration

Following removal of the line, the right-of-way will be restored to the surrounding land use. Disturbed areas will be graded to original contours and the soils will be restored to a condition consistent with intended land use.

Disturbed areas will be rehabilitated consistent with the rehabilitation and invasive species management plan developed for the project. This will include the restoration of any access areas along the right-of-way.

If seed is applied, any erosion and sediment control measures required on-site would be left in place until seed is fully established, as determined by an environmental officer.

If project components are sited on industrial properties or those that are no longer under agricultural production or in a natural state, different methods would be used.

2.11 P3-P4 salvage

After the new line between Pointe du Bois Station and Lee River distribution supply centre is energized, P3-P4 will be salvaged. The process will follow the same process as described above. The lines will be de-energized, the conductor and towers will be removed and disposed.

2.12 Project funding

Manitoba Hydro has approved funding of $441 million for the Pointe du Bois Renewable Energy Project to replace eight generating units (i.e., units 2, 3, 4, 5, 7, 8, 9 and 11) and the associated transmission upgrades.

Funding is currently being provided entirely by Manitoba Hydro. However, Manitoba Hydro has applied for funding under the Government of Canada's Investing in Canada's Infrastructure Program, administered by Infrastructure Canada, which if received would cover a portion of total project costs.

3.0 Route selection

3.1 Introduction

This chapter outlines the route selection process used to determine the location of the proposed transmission line. Details on the route selection process can be found in Appendix B.

The routing methods used for this project are based on those developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) for overhead electric transmission line siting (EPRI-GTC 2006).

For each step in the EPRI-GTC process, route evaluation criteria were grouped into four perspectives

- Natural (e.g., forest, wetlands)
- Built (e.g., residences, agricultural land use)
- Engineering (e.g., cost, accessibility)
- Simple average (i.e., treating all three perspectives equally)

The routing process involved the following general steps:

- Establishing the route planning area
- Generating routing corridors
- Developing transmission line routes
- Presenting the routes through project engagement
- Analyzing the routes
- Developing mitigative segments
- Evaluating the routes using the route evaluation model
- Selecting the preferred route using preference determination
- Presenting the preferred route through project engagement
- Finalizing the preferred route

Each step involves a process of narrowing and refining the geographic area under consideration to get to a specific preferred route.

3.2 Establishing the route planning area

The purpose of establishing a route planning area (Map 3-1) is to focus the routing process. Data is gathered within the bounds of the route planning area and all route planning is limited to those bounds.

The northern boundary was drawn to include a small buffer north of the existing P3/4 right-of-way.

The western boundary was drawn to allow paralleling of the existing P3/4 right-of-way across the Pinawa Channel but staying east of the Winnipeg River.

The southern boundary was drawn to allow a buffer south of Whiteshell Station.

The eastern boundary avoids the town of Pinawa and stays just outside Whiteshell Provincial Park.

3.3 Generating routing corridors

The next step in the routing process was to produce four corridors that represent the different perspectives (i.e., built, natural, engineering, and simple average) within the route planning area. Corridors map the suitability for locating a transmission line and further narrow the geographic area under consideration for route development.

Creating the corridors involved:

- determining areas of least preference
- developing the corridor model
- gathering geospatial data
- creating geospatial data layers
- creating suitability surfaces
- developing routing corridors

Details on the above steps are provided in Appendix A.

The combination of the four corridors resulted in the composite corridor (Map 3-2). The composite corridor depicts the most suitable areas, based on the criteria used in the model, in which to develop routes for the transmission line.

3.4 Developing transmission line routes

Once corridors were identified, the routing team developed routes within those corridors. The routes are potential, preliminary centerline routes for the proposed transmission line that can be analyzed and evaluated by the project team and presented during project engagement for feedback.

The routes are composed of individually numbered route segments that connect to form contiguous routes from the start (Lee River distribution supply centre) to end point (Whiteshell Station).

3.5 Presenting the routes through project engagement

The route segments (Map 3-3) were presented for feedback through project engagement (Section 4.2.6).

Information received during engagement (either general comments or specific segment suggestions) may lead to additional segments being added to the process (see mitigative segments, Section 3.7).

3.6 Analyzing the routes

Project team discipline specialists gather data (through desktop studies, consideration of existing databases, and field surveys) and analyze the routes / segments from the perspective of potential effects.

Recommendations are made by project team members for segment adjustments to mitigate concerns (see mitigative segments Section 3.7 below).

3.7 Developing mitigative segments

Mitigative segments may be proposed during engagement or by project team members. Mitigative segments are evaluated by the routing team for technical feasibility and cost. Consideration is also given to whether the mitigative segment results in net-minimization of effect (e.g., does not shift potential effects from one landowner to another or one area/land type to another). Segments that meet these criteria are retained and move forward for consideration in the next step of evaluation. No mitigative segments were added to the evaluation.

3.8 Evaluating the routes using the route evaluation model

All routes were compared against each other and evaluated with the use of criteria that represent the four perspectives. The route evaluation model (Appendix A) is used to help evaluate the routes. Route statistics are developed that allow route comparisons using substantial amounts of data.

Details of model development and route statistics are provided in Appendix A.

The full set of routes were evaluated at a workshop (details in Appendix A). The goal was to use the route statistics as well as expert judgement to reduce the number of routes to a set of finalists. Five routes (Map 3-4) were chosen to move forward to the next step.

3.9 Selecting a preferred route using preference determination

The final five routes were compared using the preference determination model (Appendix A). The final routes were compared and scored by the project team. Each route received a value between 1 and 3, for each of the criteria in the model, with lower values indicating higher suitability for routing a transmission line.

The scores given to each route were entered into the preference determination model (Table 3-1). The rationale for each score is provided in Appendix A. Route D received the lowest total score and was therefore selected as the preferred route (Map 3-5).

At this stage the community perspective is included in the process. This perspective attempts summarize input from information gathered throughout project engagement. Details on community input into the routing process is provided in Section 4.2.7.

Table 3-1: Preference determination table

Criteria	%	Route				
		A	B	C	D	E
Cost	40%	1.3	2.2	1	2.2	1.7
Weighted		0.52	0.88	0.4	0.88	0.68
Community	30%	3	1	1.5	1	2
Weighted		0.15	0.05	0.075	0.05	0.1
Risk To Schedule	10%	3	1.1	2	1	2
Weighted		0.3	0.11	0.2	0.1	0.2
Environment (Natural)	7.5%	3	1	2	1.5	2.5
Weighted		0.225	0.075	0.15	0.1125	0.1875
Environment (Built)	7.5%	1	2.5	3	2	1.5
Weighted		0.075	0.1875	0.225	0.15	0.1125
System Reliability	5%	3	1.5	3	1	2.1
Weighted		0.9	0.45	0.9	0.3	0.63
TOTAL	100%	2.17	1.75	1.95	1.59	1.91
RANK		5	2	4	1	3

3.10 Presenting the preferred route through project engagement

The preferred route was presented for feedback through project engagement.

Information received during engagement (either general comments or specific segment suggestions) may lead to minor adjustments being made to the preferred route. Generally, these adjustments are within the same land parcel, and to accommodate land use.

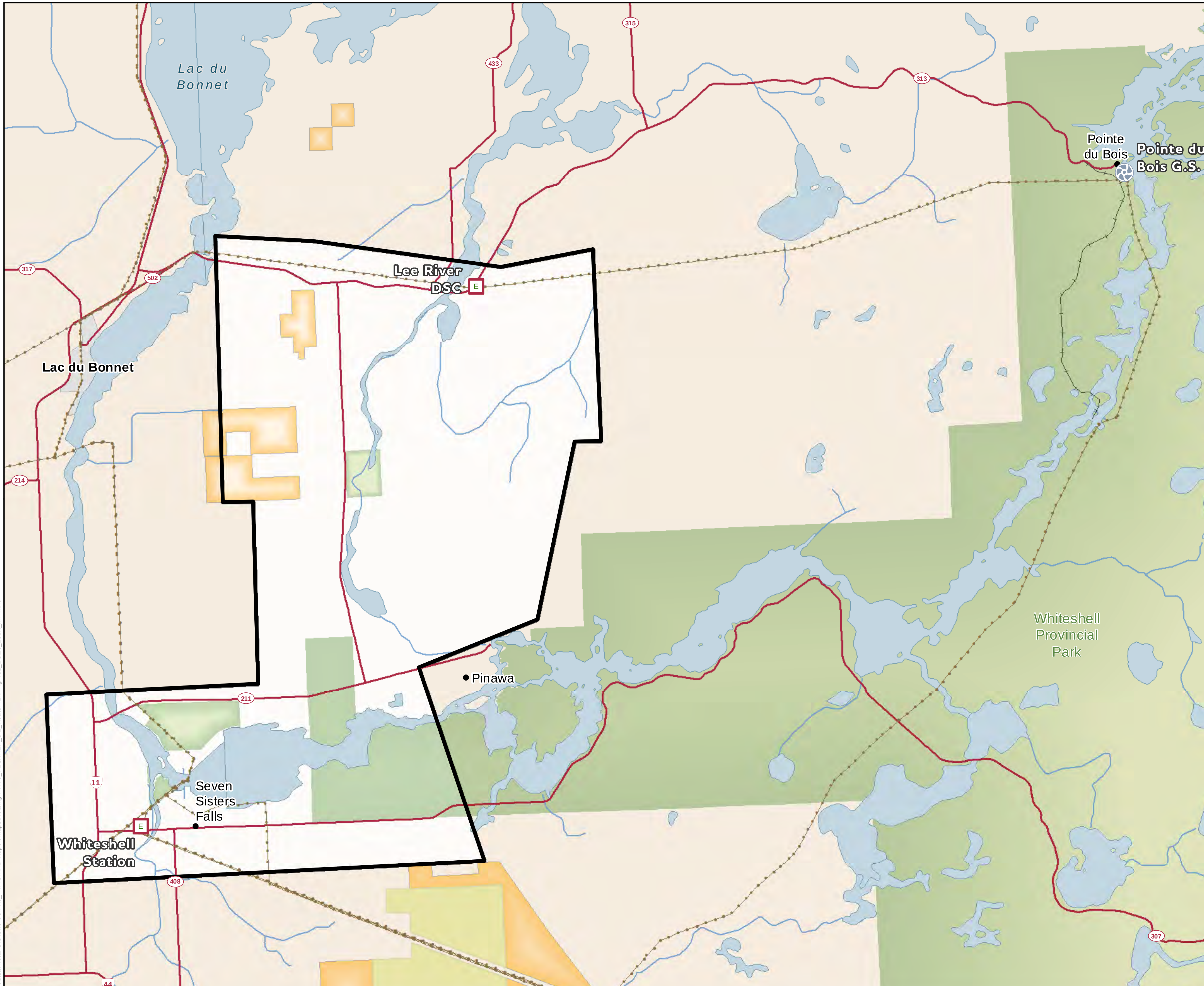
3.10.1 Finalizing the preferred route

Two changes were made from the preferred route (Map 3-6). The preferred route was moved a few meters south along PR 211 to avoid the protected provincial park. A change was made south of the Lee River DSC based on discussions with the landowner.

3.11 The final preferred route

The final preferred route is shown on (Map 3-7). Table 3-2 shows the route statistics for the final preferred route as well as the minimum and maximum values for routes considered during the evaluation stage.

Table 3-2: Final preferred route – statistics	
REM Criteria	FPR
Built	
Relocated Residences	0
Proposed Developments	1
Special Features	17
Specialty Agriculture	3
Diagonal crossing of Agriculture Crop Land (acres)	11
Historic / Cultural Resources	3
Current Agricultural Land Use	13
Natural	
Intactness (acres)	14
High quality wildlife habitat (acres)	172
Wetlands (acres)	123
Riparian Habitat (acres)	27
Natural Forest (acres)	304
Engineering	
Length (km)	51
General construction costs	$33M
Accessibility / constructability	61M
Reliability	0
Existing infra crossings	15



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Route Planning Area
- Route Planning Area

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

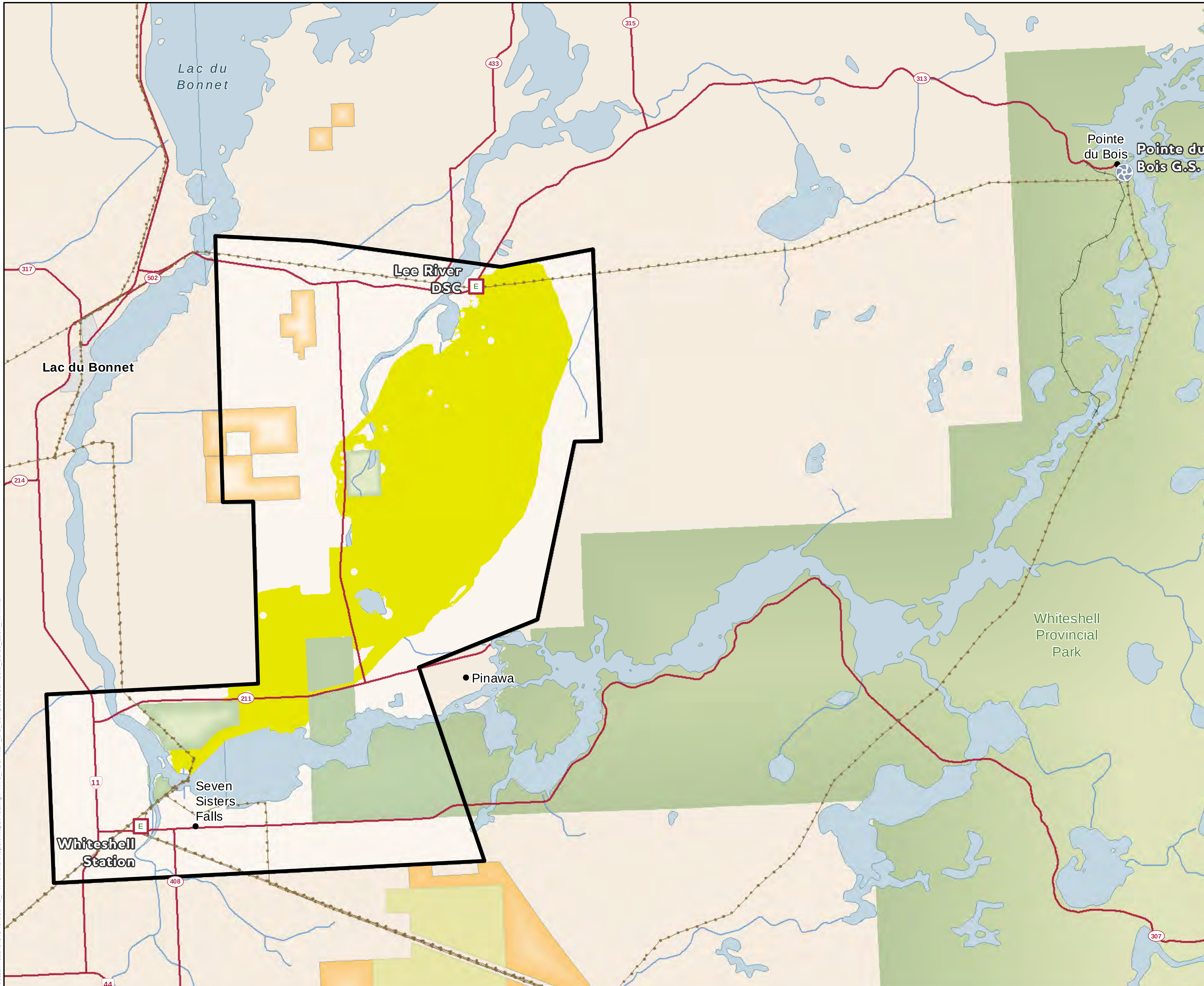
N

0 5 Kilometres
0 1.5 3 Miles

1:130,000

Route Planning Area

Map 3-1



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Composite Corridors
- Composite Corridor

Route Planning Area
- Route Planning Area

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

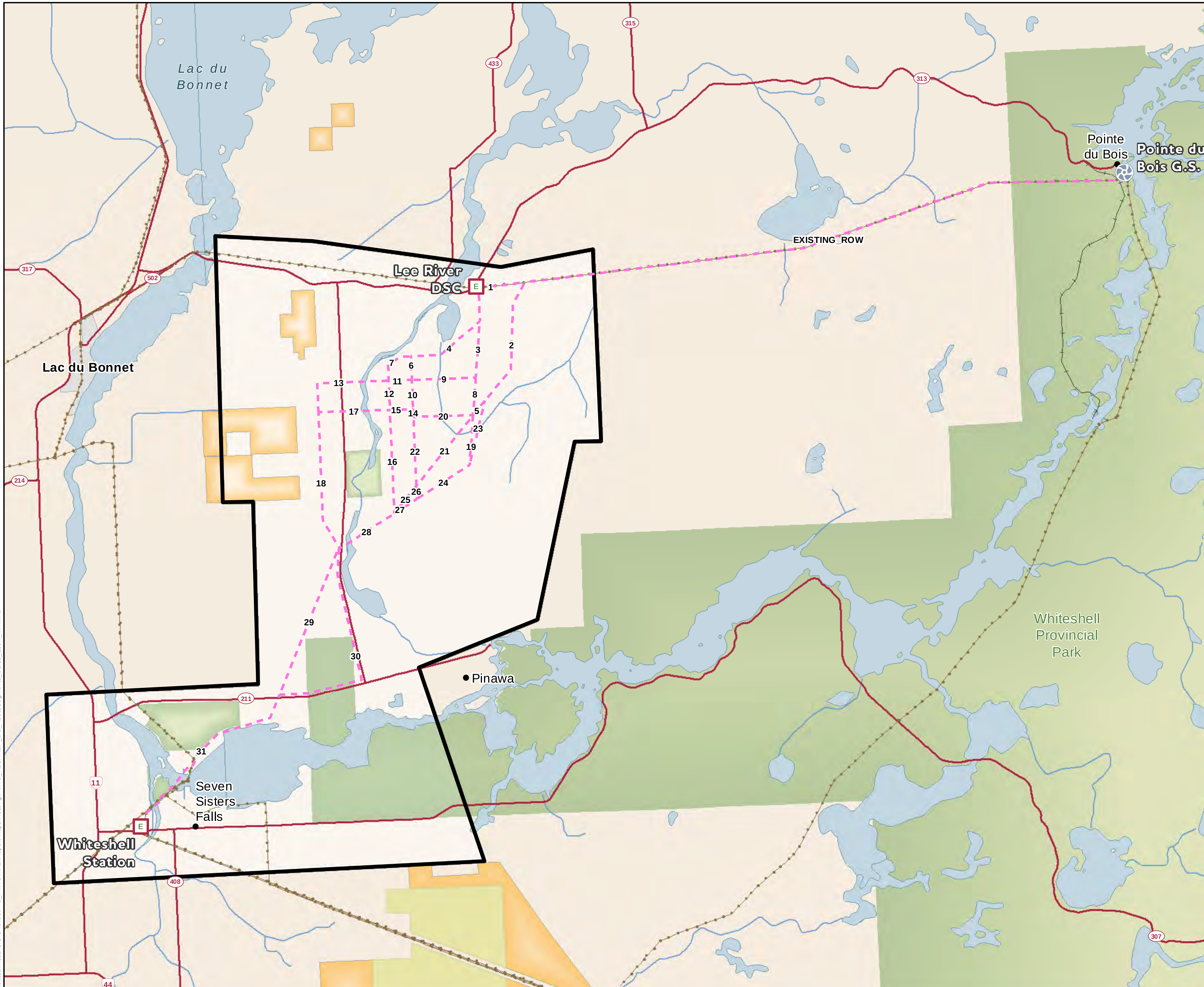
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 Kilometres
0 1.5 3 Miles
1:130,000

Composite Corridors

Map 3-2



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- PW75 Alternative Route Segment

Route Planning Area
- Route Planning Area

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

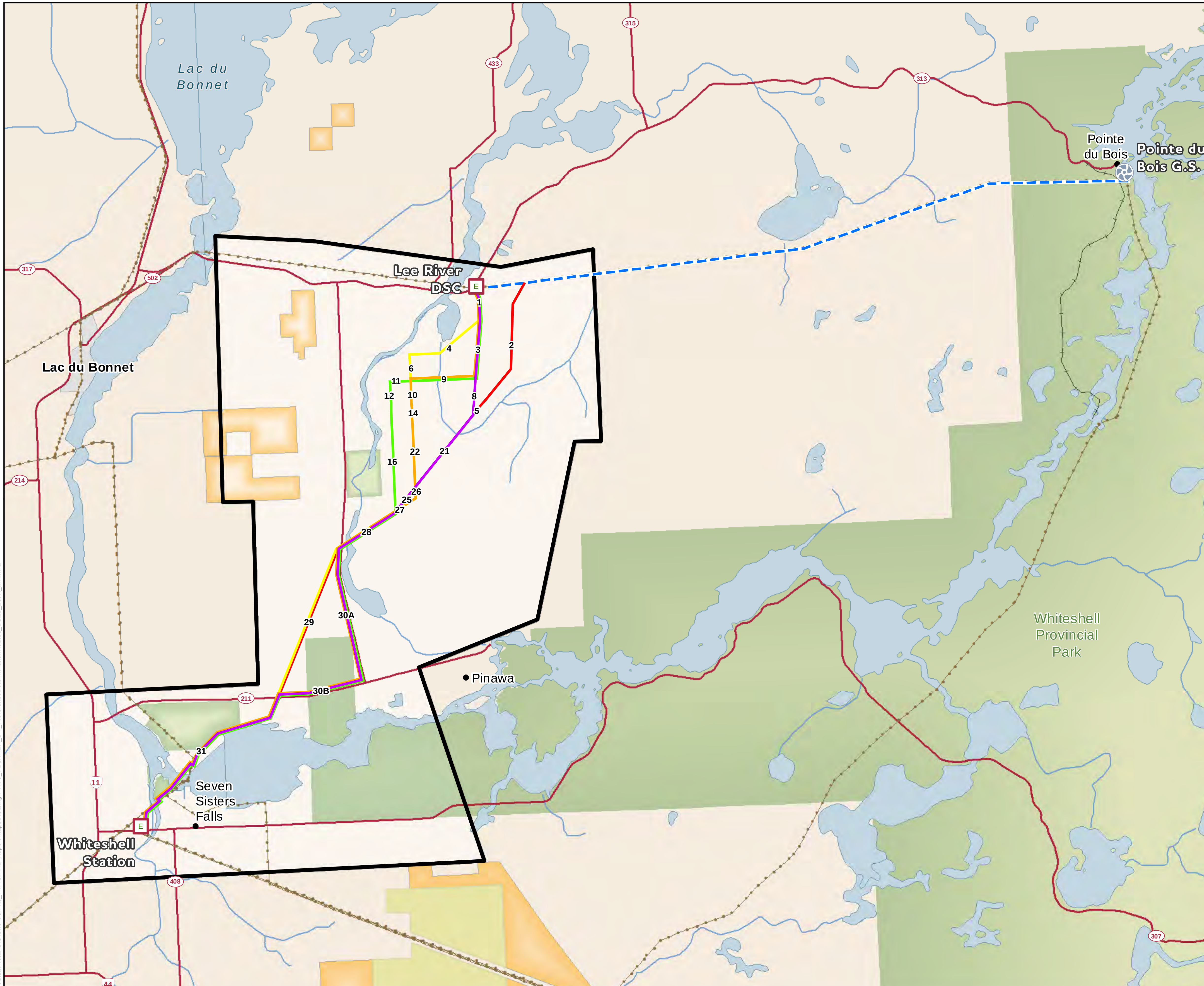
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 Kilometres
0 1.5 3 Miles
1:130,000

Alternative Route Segments

Map 3-3



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- PW75 Established Route

Preference Determination Routes
- Route A
- Route B
- Route C
- Route D
- Route E

Route Planning Area
- Route Planning Area

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

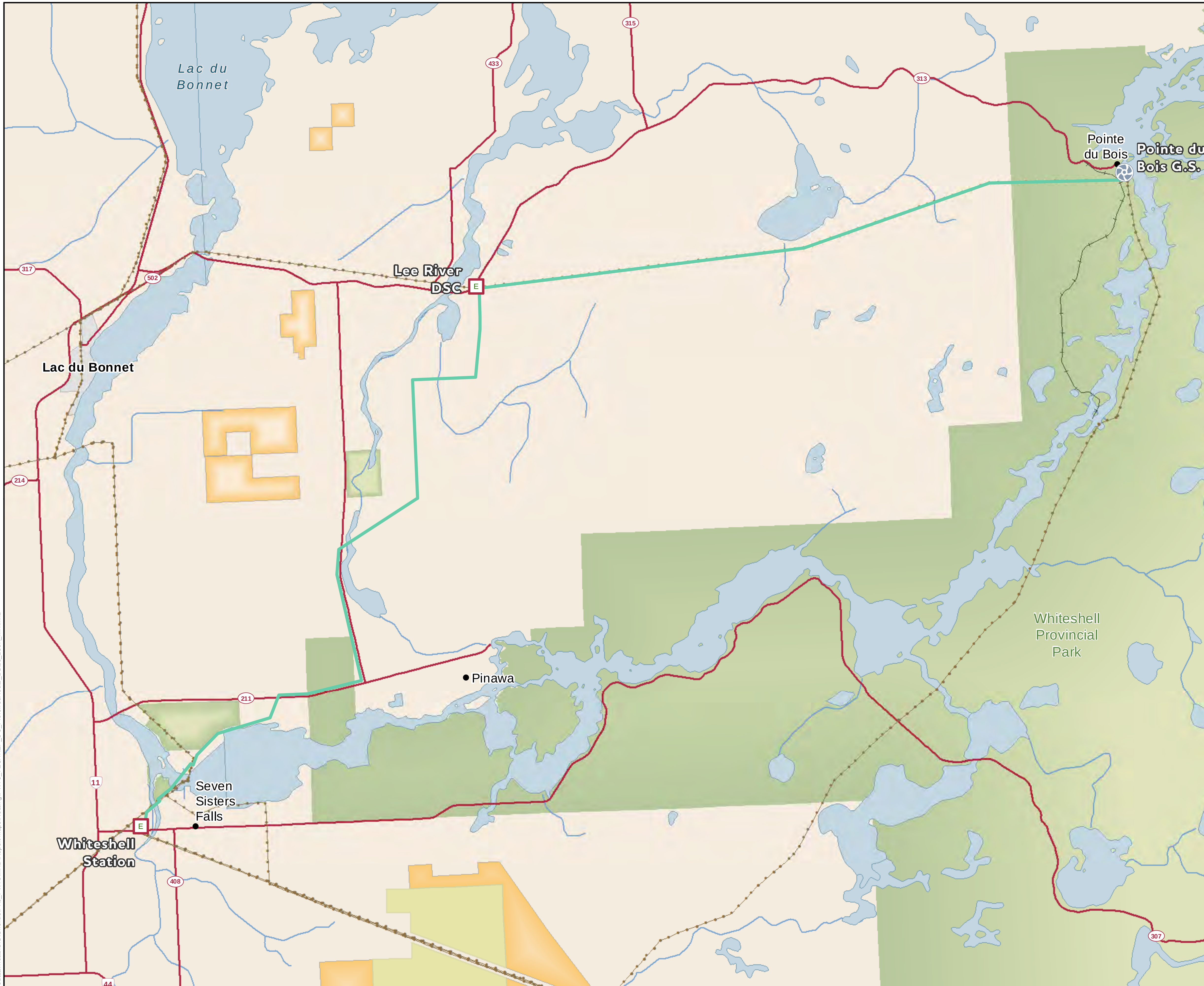
N

0 5 Kilometres
0 1.5 3 Miles

1:130,000

Preference Determination Routes

Map 3-4



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Preferred Route

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

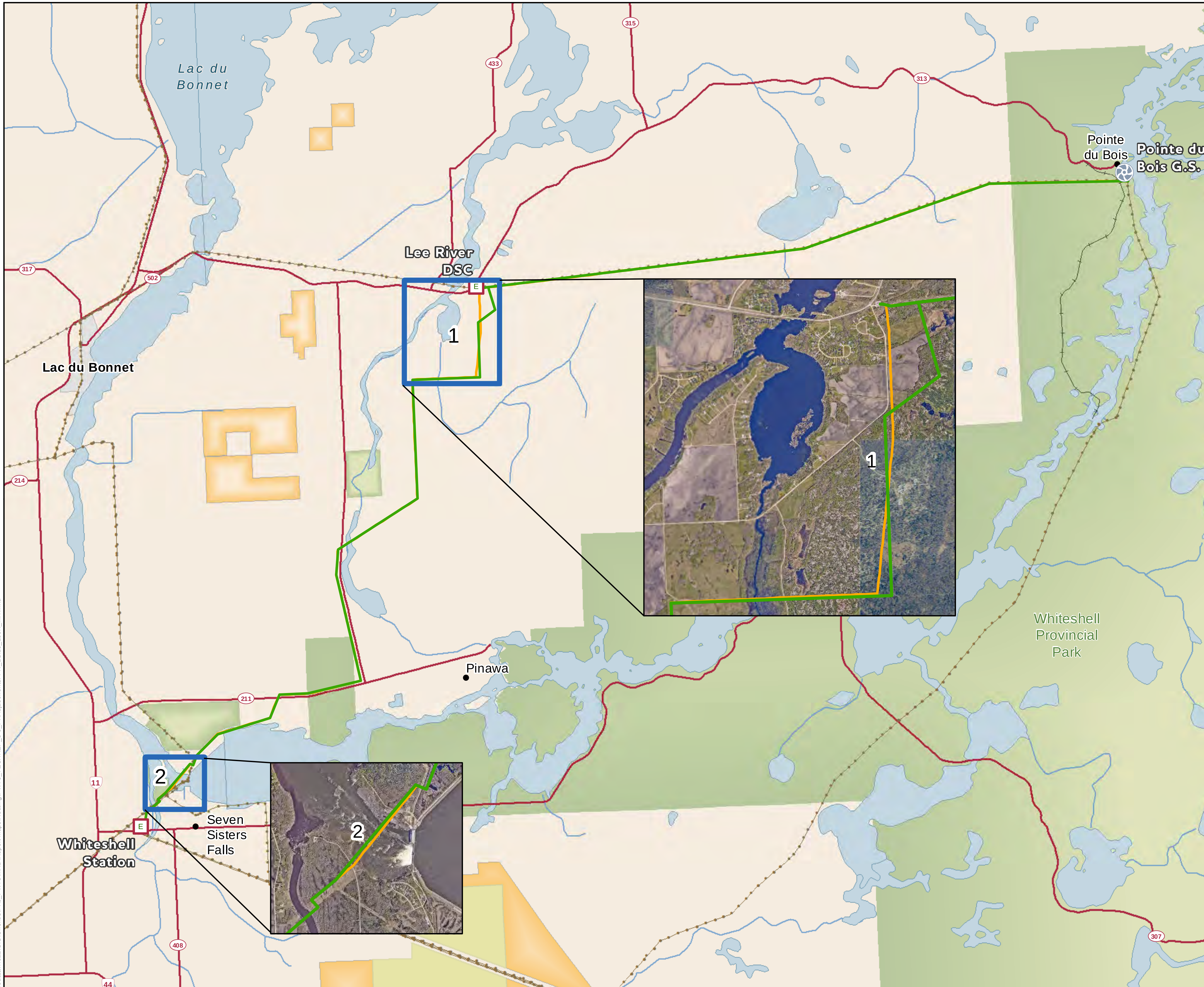
N

0 5 Kilometres
0 1.5 3 Miles

1:130,000

Preferred Route

Map 3-5



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route
- Preferred Route Adjustments

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

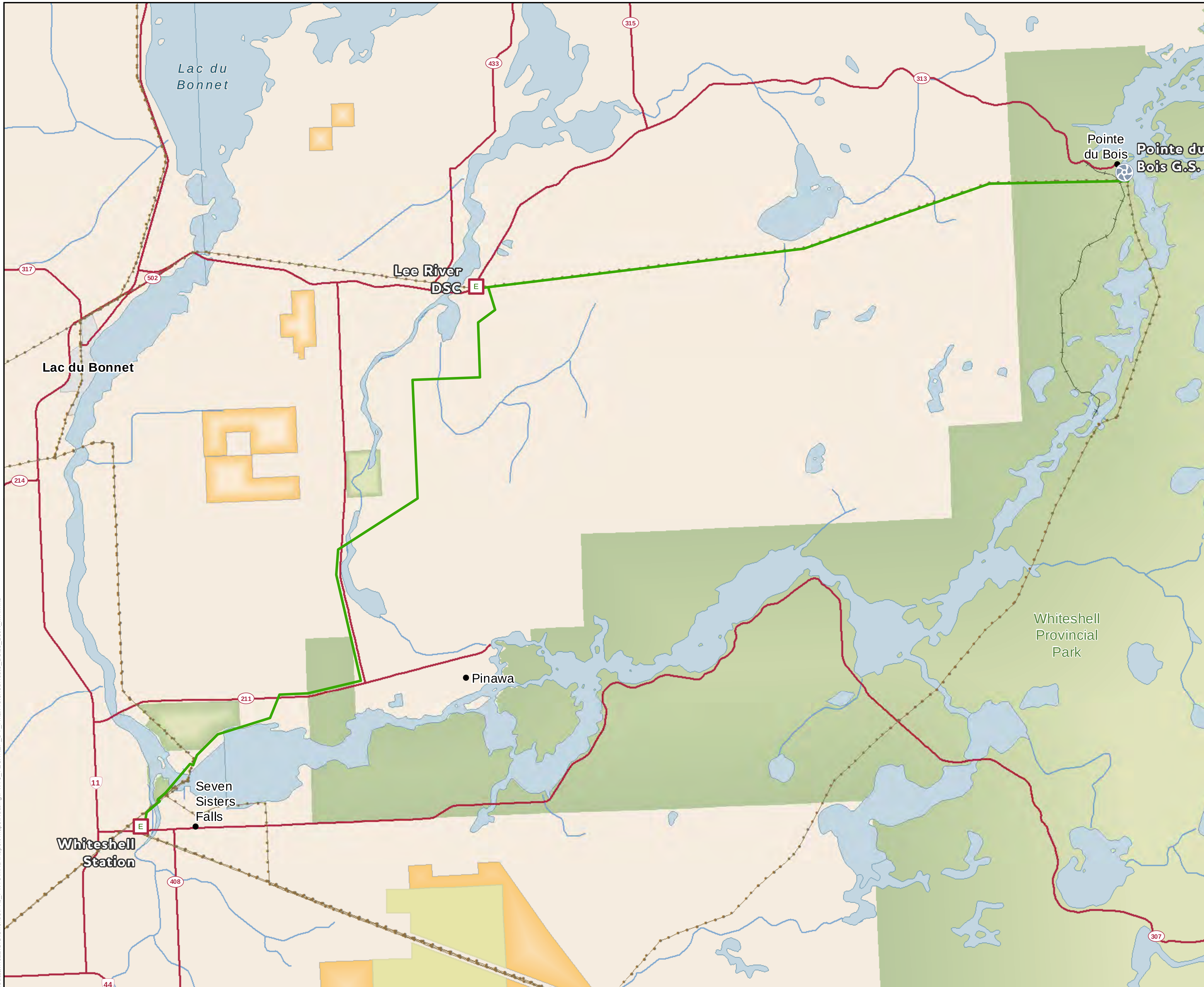
N

0 | 5 Kilometres
0 | 1.5 | 3 Miles

1:130,000

Preferred Route Adjustments and Final Preferred Route

Map 3-6



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

- Final Preferred Route

Existing Infrastructure

- E Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Community
- Railway
- 12 Provincial Highway
- 301 Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 Kilometres

0 1.5 3 Miles

1:130,000

Final Preferred Route

Map 3-7

4.0 Project engagement

This section provides an overview of the engagement processes that Manitoba Hydro undertook for the Pointe du Bois Renewable Energy Project (PREP). Through engagement, we shared information, answered questions, and heard feedback about both the generation and transmission line components of PREP. This section focuses primarily on engagement related to the PW75 transmission line as well as references broader engagement activities and discussions. Where relevant, we have included engagement feedback related to the generation components of the project and how they are connected to the PW75 transmission line within this section.

Manitoba Hydro undertakes separate, but complementary, processes for public audiences and First Nations and Métis audiences. The public engagement process (PEP) and the First Nation and Métis engagement process (FNMEP) are aligned on the same project timeline but are intended to reflect the necessity of unique processes for different audiences. Throughout this section, the engagement process is described uniquely for each the PEP and FNMEP where there are differences, and, cohesively where the processes converge.

4.1 Goal and objectives of engagement

The goal of project engagement is to work directly with those who may be affected by the project to understand and consider concerns and interests.

In developing an engagement plan for this project, Manitoba Hydro's engagement team identified two objectives to support the achievement of this goal during engagement on the PW75 transmission line:

1. To listen, learn and work to resolve concerns.
2. To share how feedback and knowledge influenced decision making.

Our approach to engagement is guided by the following principles:

- Being inclusive and accessible by offering opportunities for those interested or affected by the project to be involved in project engagement. This may mean sharing information with a wide audience and offering multiple on-ramps for those who may become interested over the course of the project.
- Being clear and deliberate in our communications. Using plain language and not overwhelming audiences with messaging that is not coordinated or consistent.
- Listening and being responsive to concerns. This means we have the resources to respond to concerns as they arise.

- Seeking to understand the perspective of our audiences so people feel heard; to share and reflect those perspectives in our communications.
- Being trustworthy and accountable for our actions. This means we'll do what we say we'll do and be honest, timely and accurate in our messaging.
- Demonstrating how feedback has influenced the project. Where feedback will not influence the project, be clear.
- Being respectful to those we engage with, including honouring the way in which communities want to engage. This means tailoring our engagement to the needs of our audiences, including different identity groups and Indigenous communities, and have the required resources in place to support the various engagement needs.

Each of the above principles is important to achieving meaningful engagement.

In the context of the FNMEP, we understand meaningful engagement to be the timely process of seeking, discussing, and carefully considering the views of others, in a manner that is cognizant of all parties' cultural values. We also recognize that what is considered meaningful may vary by audience. In the pursuit of meaningful engagement through the FNMEP, we prioritized the above principles as well as the following additional principles:

- Reaching out early and often to foster relationship building and work to provide information in a manner that supports informed decision making and assessment of potential project impacts on First Nation and Métis rights and title.
- Encouraging nations to determine how they engage in the environmental assessment, by offering funding and opportunities to develop community-specific engagement processes,
- Incorporating available First Nation and Métis knowledge in the environmental assessment.
- Providing formal opportunities to provide feedback at key points throughout the environmental assessment process.

Our FNMEP is separate from any section 35 Crown consultation process that may be initiated by the Province of Manitoba on the PW75 transmission line. We understand that the Crown may rely on our engagement activities and feedback received through the FNMEP to inform their consultation process. We sought to achieve meaningful engagement that may support the fulfillment of their duty.

4.2 Approach to engagement

4.2.1 Overview

Through engagement, we worked to provide a variety of opportunities to share information and engage on the project. We recognize that different audiences have different preferences and levels of comfort with how and when they would like to be engaged.

Our engagement approach was influenced by several legislative Acts, guidelines, principles, standards, and beneficial practices. Examples include, but are not limited to: Manitoba's Environment Act; Canada's Principles and Guidelines for Public Engagement; Canada's Principles respecting the Government of Canada's relationship with Indigenous peoples; Articles of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP); Manitoba's Path to Reconciliation Act; International Association for Public Participation (IAP2)'s core values and the public participation spectrum; as well as Indigenous laws, tenets and guides relevant to the nations and organizations potentially interested in or affected by PREP, including The Seven Sacred Laws and Manito Aki Inakonigaawin.

The following sections outline the engagement methods and activities we undertook to work towards the engagement objectives and achieving meaningful engagement on the PW75 transmission line.

4.2.2 Identification of engagement audiences

To achieve our engagement objectives, it is important that our engagement efforts reach audiences that may be affected by the project. We implemented different tools and considered different types of information to uniquely determine the audiences that would be engaged under each the FNMEP and the PEP. An explanation of how we identified engagement audiences for each is outlined below.

4.2.2.1 Identification of public audiences

For the PEP, we undertook an interested party[1] mapping exercise to understand public interests in the vicinity of the project. This involved gathering information about the project study area and the public groups that reside, work, and undertake

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[1] Interested party: a general term used to describe an individual or group that would potentially have feedback to provide, may be affected by the project or decisions about the project, have a specific interest or mandate in the area, data to share, ability to disseminate information to membership or a general interest in the area. Interested party is used in place of the term stakeholder.

activities in the area. This exercise was also informed by groups that were likely to be interested or affected in the project based on involvement in previous projects in the area. This resulted in a group of interested parties to initially contact with information about the project. This list is not intended to be exclusive and additional interested parties can be added or removed based on interest as the project progresses.

The audiences identified for the PEP included:

- Affected and adjacent landowners
- Communities/municipalities:
    - RM of Whitemouth
    - RM of Lac du Bonnet
    - RM of Alexander
    - RM of Reynolds
    - Pinawa
    - Pointe du Bois
    - Lac du Bonnet
    - Powerview Pine Falls
    - Cottage areas by Pointe du Bois Station, along the Lee River, and surrounding areas
- Local businesses (including lodges and outfitters, chambers of commerce, and individual trappers)
- Recreational resource user groups (including cottage associations, trails organizations)
- Individuals not directly affected by the project who may have an interest in the project (i.e., the public)

The outcome of the interested party mapping exercise including a detailed list of the specific audiences identified for engagement under each category is provided by Figure 4-1. Our rationale for including each audience is similar for all, i.e., all may be potentially interested in or affected by the project.

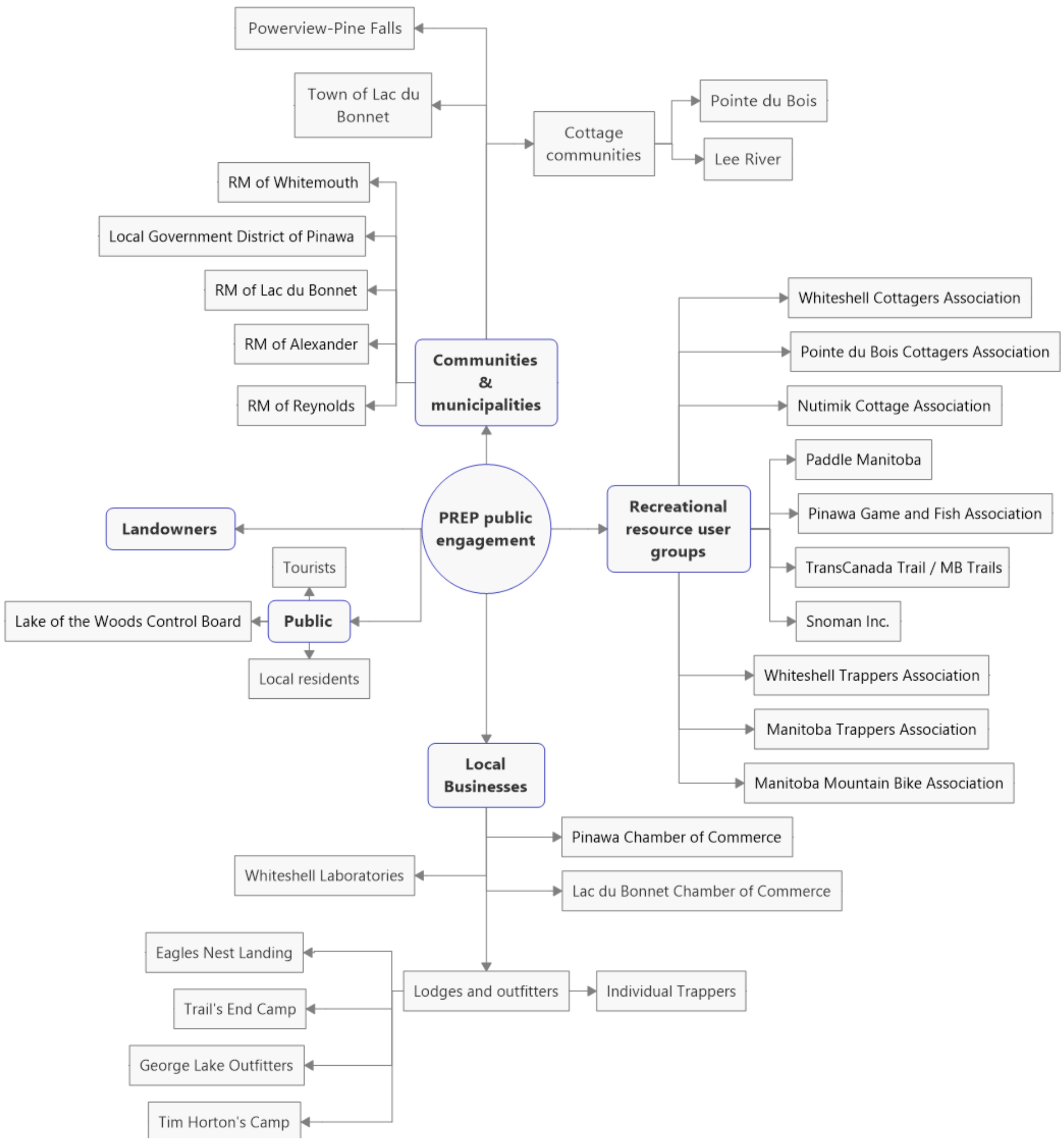


Figure 4-1: Interested party mapping of audiences identified for the PEP

Our PEP is informed by the International Association for Public Participation (IAP2) spectrum of public participation, which helps to define the role and level of influence the public has on the overall decision-making process. The IAP2 spectrum is shown below in Figure 4-2.

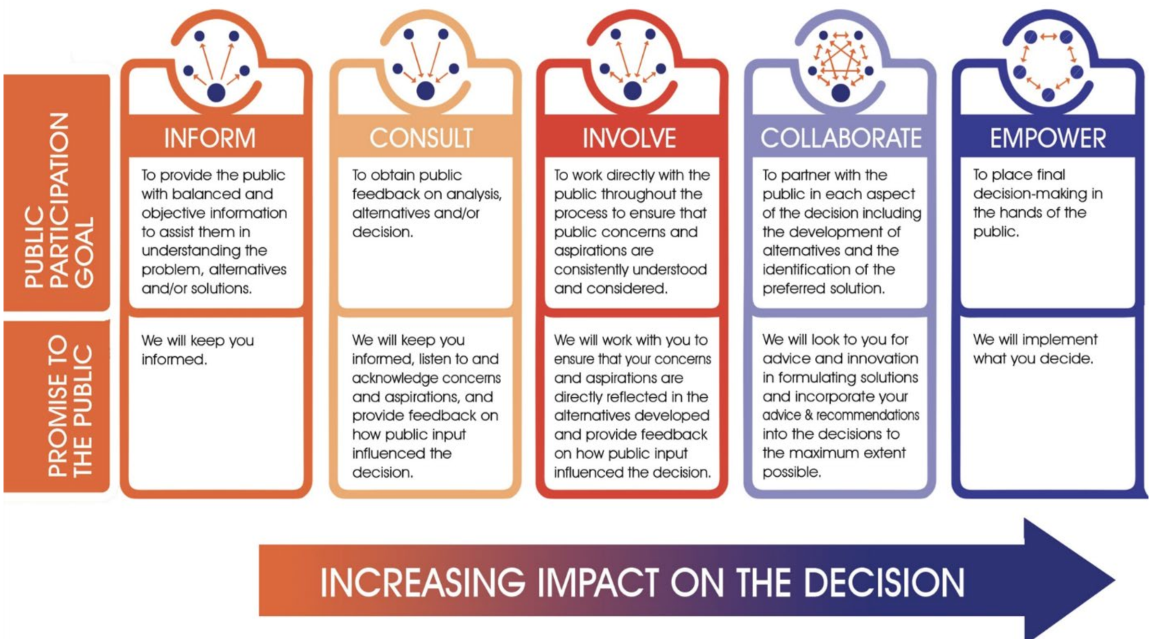


Figure 4-2: IAP2 Spectrum of Public participation

The level of public participation on the PW75 transmission line ranged from consult to involve. We engaged directly affected landowners and municipalities at the IAP2 involve level by working to consistently understand and consider their concerns and demonstrate how their feedback influenced project decisions. We engaged other public audiences at the consult level. We strategically chose engagement techniques that aligned with the goals of the consult and involve levels of the IAP2 public participation spectrum.

4.2.2.2 Identification of First Nation and Métis audiences

For the FNMEP, we undertook a traditional territory assessment to identify First Nation and Métis audiences that may be affected by or interested in the project.

The PW75 transmission line is proposed on Treaty 1 and Treaty 3 lands, the original territories of the Anishinaabe, Anishininiwag and Cree peoples and the homeland of the Red River Métis. The project is in an area of the province that is of historical and contemporary interest to the Manitoba Métis Federation (MMF) and its citizens. This area is also known in Anishinaabemowin as Manito Ahbee, a word meaning, where the Creator sits and is recognized and honoured by Indigenous people across Turtle Island, or North America, as a sacred place for all people.

We have heard through engagement on this project and past projects that treaty areas should not be the only criteria considered when determining which First Nations to engage because the boundaries were imposed by government and do not acknowledge the breadth of the territories used traditionally and contemporarily by different nations. Although the majority of the PW75 transmission line is proposed to be located within Treaty 3 with the southerly portion entering Whiteshell Station in Treaty 1, we have also engaged certain First Nations from Treaty 5 based on analysis of additional criteria for inclusion in the engagement process.

We established the following four criteria to determine the First Nation and Métis audiences that we would initiate project engagement with:

1. Known historical and/or contemporary use of the project area
2. Treaty rights to the area
3. Anticipated inclusion in Crown consultation
4. Interest in the project based on previous projects

Figure 4-3 below presents the information that was considered under the traditional territory assessment to evaluate each of the four criteria and how they applied to potential FNMEP audiences.

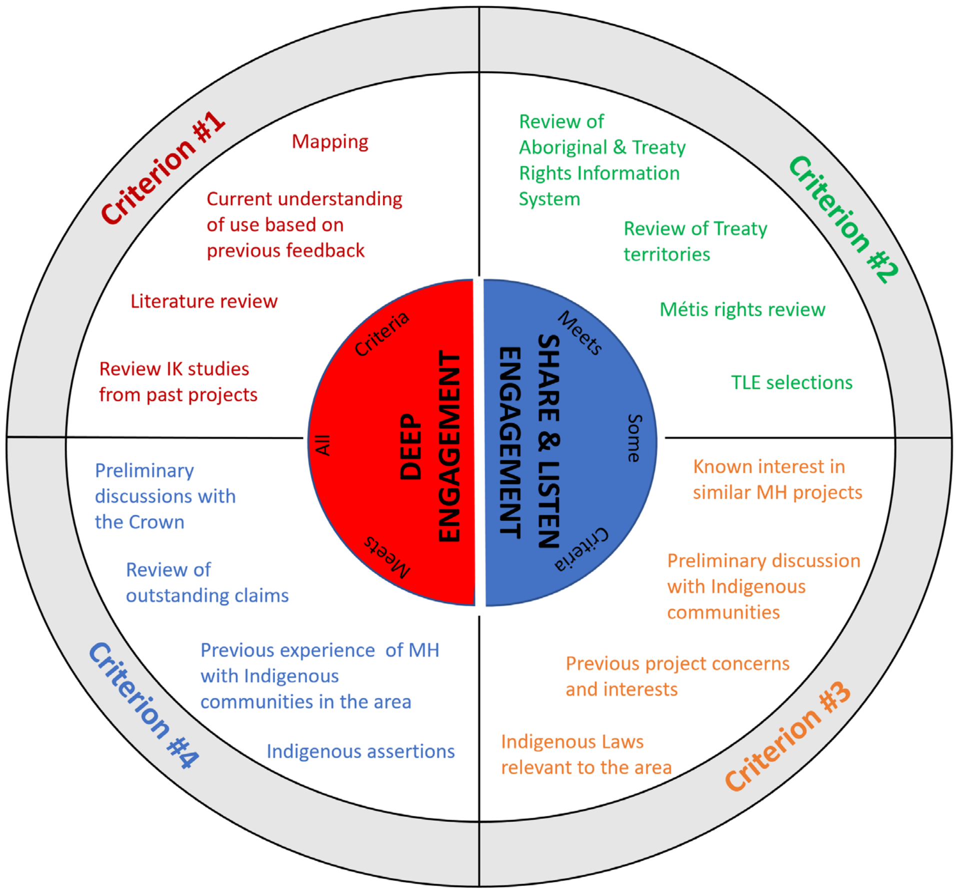


Figure 4-3: Traditional territory assessment model used to determine FNMEP audiences

We identified two levels of engagement for the FNMEP based on the evaluation of the criteria:

1. Deep engagement
2. Share and listen

It is our understanding that certain First Nation and Métis audiences have the potential to experience greater impacts because of the PW75 transmission line, including impacts to constitutionally protected rights and associated activities. We supported a deeper engagement process for audiences that met all the criteria, or most of the criteria and was assumed to have interest in a deeper engagement process based on involvement in a previous version of this project assessed in 2014. Deeper engagement was anticipated to include more targeted community engagement in a manner preferred by the community, support for gathering Indigenous Knowledge from the community in the form of interviews or an

Indigenous Knowledge study, and other items or activities that may reasonably support meaningful participation in the engagement process.

This approach, using ‘levels’ of engagement, aligns with the approach used by Canada and Manitoba in their section 35 Crown consultation processes. Canada and Manitoba tier their consultation so the depth of consultation is proportionate to the strength of claim a community may have to the area and the seriousness of potential adverse effect to that claim.

Based on the conclusions of the traditional territory assessment, we engaged nine rights-bearing nations (seven First Nations, the Manitoba Métis Federation, and Grand Council Treaty #3) and four audiences that may act to communicate issues important to Indigenous people. We facilitate engagement with Red River Métis citizens through the Manitoba Métis Federation in accordance with the MMF’s Resolution 8. The other audiences identified were Northern Affairs Communities located in the vicinity of the project area.

Table 4-1 lists the audiences that we engaged under the FNMEP and the rationale (i.e., the criteria that apply) for inclusion and the level of engagement undertaken with each.

Table 4-1: Audiences engaged in the FNMEP and the rationale for inclusion

Level	FNMEP audience:	Rationale for inclusion (criteria that apply):
Deep engagement	Rights-bearing nations:	
	Black River First Nation [1,2]	• Known historical and/or substantial contemporary use of the project area • Anticipated interest in the project based on previous projects
	Brokenhead Ojibway Nation[1,2]	• Known historical and/or contemporary use of the project area • Treaty rights to the area (Treaty 1) • Anticipated interest in the project based on previous projects • Anticipated inclusion in Crown consultation
	Manitoba Métis Federation, the recognized government of the Red River Métis [1,2]	• Known historical and/or contemporary use of the project area • Métis Rights to the area (within Métis Natural Resource Harvesting Zone) • Anticipated interest in the project based on previous projects • Anticipated inclusion in Crown consultation
	Peguis First Nation[1,2]	• Known historical and/or contemporary use of the project area • Treaty rights to the area (Treaty 1) • Anticipated interest in the project based on previous projects • Anticipated inclusion in Crown consultation
	Sagkeeng Anicinabe First Nation [1,2]	• Known historical and/or substantial contemporary use of the project area • Treaty rights to the area (Treaty 1 and member of Treaty 3) • Anticipated interest in the project based on previous projects • Anticipated inclusion in Crown consultation

Table 4-1: Audiences engaged in the FNMEP and the rationale for inclusion		
Share and listen	Hollow Water First Nation [1,3]	• Known historical and/or contemporary use of the project area • Anticipated interest in the project based on previous projects
	Norway House Cree Nation[3]	• Anticipated inclusion in Crown consultation
	Wabaseemoong Independent Nations	• Anticipated inclusion in Crown consultation
	Grand Council Treaty #3[3]	• Treaty rights to the area • Oversees Manito Aki Inakonigaawin, the Great Earth Law of the Anishinaabeg
	Other groups who may act to communicate issues important to Indigenous peoples	
	Community of Manigotagan[1,3]	Anticipated inclusion in Crown consultation
	Community of Bissett[3]	Anticipated inclusion in Crown consultation
	Community of Aghaming[1,3]	Anticipated inclusion in Crown consultation
	Incorporated Community of Seymourville[1,3]	Anticipated inclusion in Crown consultation

1 The nation or community was included in engagement on a previous version of this transmission line project
2 The nation is likely to prefer deep engagement
3 The nation or community is likely to prefer a share and listen approach to engagement

The FNMEP audiences identified were also part of the 2013-14 engagement process associated with the earlier version of the PW75 transmission line project and environmental assessment except for Norway House Cree Nation, Wabaseemoong Independent Nations, and Grand Council Treaty #3.

Other Indigenous communities may develop interest in the project as the project progresses. The Grand Council Treaty #3 process may result in direction to engage with additional Treaty 3 First Nations. We would include them in engagement activities as we learn of their interest.

The FNMEP audiences and anticipated levels of engagement identified represented a starting point for engagement. We remained open to adapting who we engage and how we engage (level) if we learned other nations, communities, or Indigenous organizations were interested in the project. We also reached out to representatives from the Province of Manitoba to determine whether Manitoba Hydro's list of engaged communities was in alignment with those communities that Manitoba would likely consult under their section 35 Crown consultation process. At the point of submission of this report, Manitoba has not recommended any additional FNMEP audiences.

Profiles with additional information about each FNMEP audience are included in Appendix C.

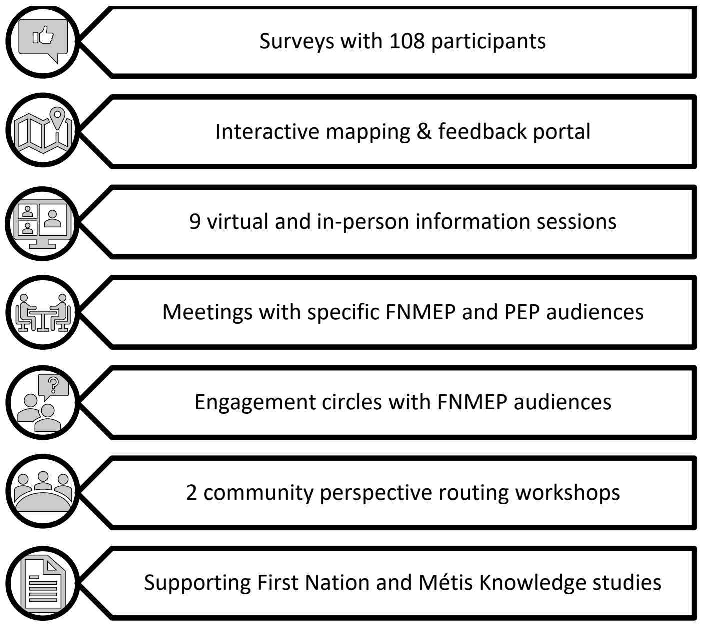
4.2.3 Communication methods

Communication methods for the project involved the following:

- Over 2500 postcards to residents
- eCampaign for project updates
- Social media advertisements
- Emails, phone calls and letters
- Project webpage, information line and email address
- Radio advertisements in Kenora

4.2.4 Engagement methods

We offered several different methods for participants to ask questions and provide feedback on the project:



Our engagement process for the PW75 transmission line has consisted of pre-engagement activities, followed by two phases of engagement, referred to as 1) alternative route segment engagement and 2) preferred route engagement, with ongoing engagement that will continue beyond Manitoba Environment and Climate's decision regarding the project. The engagement phases were directly tied to the transmission line routing process and enabled First Nation, Métis, and public feedback to inform routing decisions.

The following sections highlight the engagement activities that took place during each of these phases of the engagement process.

4.2.5 Pre-engagement

We began preliminary engagement with interested parties, First Nations, and the Manitoba Métis Federation on April 5, 2022 by reaching out via email. The purpose of this pre-engagement was to inform about the upcoming project and to begin to discuss engagement needs and interest in participation. Additionally, given the record-high water levels on the Winnipeg River in Spring 2022, the pre-engagement was also intended to gauge communities' ability to participate during potential flood events.

We met with the following groups as part of our pre-engagement phase:

Table 4-2: Pre-engagement meetings

Date	Community / organization	Location
April 26, 2022	Peguis First Nation	Virtual – MS Teams
May 11, 2022	Black River First Nation	Virtual – MS Teams
May 24, 2022	Brokenhead Ojibway Nation	Manitoba Hydro Place
May 24, 2022	Manitoba Métis Federation	Virtual – MS Teams
May 27, 2022	Hollow Water First Nation	Manitoba Hydro Place

4.2.6 Alternative route segment engagement

We formally announced the start of our alternative route segment engagement on June 8, 2022 by notifying First Nations, the Manitoba Métis Federation, Grand Council Treaty #3, Northern Affairs Communities, and interested parties via email that the alternative route segments were open for feedback. The purpose of this round of engagement was to understand segments of concern and preferential segments, as well as general interests and concerns in the project area.

We held six virtual information sessions during the summer of 2022 with a total of 28 participants.

Table 4-3: Virtual information sessions during alternative route segment engagement

Date	Number of participants
July 13, 2022	1
July 14, 2022	10
July 20, 2022	3
July 21, 2022	2
August 9, 2022	9
August 10, 2022	3

We held meetings with First Nations, the Manitoba Métis Federation, Grand Council Treaty 3, Northern Affairs Communities, and interested parties on the following dates:

Table 4-4: Meetings with interested parties during alternative route segment engagement

Date	Community / organization	Location
June 15, 2022	Grand Council Treaty #3	Kenora Treaty 3 office
June 26, 2022	Pointe du Bois Cottagers Association	Hydro Office, Pointe du Bois
July 19, 2022	Norway House Cree Nation	Manitoba Hydro Place
July 26, 2022	Rural Municipality of Whitemouth	RM of Whitemouth Office
July 27, 2022	Municipality of Alexander	Municipality of Alexander Office
July 28, 2022	Local Government District (LGD) of Pinawa	Pinawa Government Office
August 8, 2022	Town of Powerview-Pine Falls	Powerview-Pine Falls office
August 8, 2022	Sagkeeng Anicinabe First Nation	Virtual - Zoom
August 9, 2022	Rural Municipality of Lac du Bonnet	Virtual – MS Teams
August 11, 2022	Whiteshell Cottagers Association	Virtual – MS Teams
January 10, 2023	Manitoba Métis Federation	Virtual – MS Teams
January 25, 2023	Incorporated Community of Seymourville	Seymourville office
January 27, 2023	Rural Municipality of Lac du Bonnet	Virtual – MS Teams
January 30, 2023	Bissett	Bissett Community Hall
January 31, 2023	Peguis First Nation	Virtual – MS Teams
February 20, 2023	Sagkeeng Anicinabe First Nation	Virtual – MS Teams

The original deadline to provide feedback on the alternative route segments was August 30, 2022. Based on feedback about our engagement timelines and requests for additional time to collect community-specific data, we extended the timeline for submitting comments through the online survey and feedback portal until December 15, 2022.

Additionally, although we had already reached several landowners in the area through other communication methods during the summer, we sent letters to potentially affected landowners on October 14, 2022, to notify them that additional opportunities were available to provide feedback on the alternative route segments and share concerns.

During this phase, we established agreements with Sagkeeng Anicinabe First Nation and Peguis First Nation to support Indigenous Knowledge studies in the project area. We have also had discussions with the Manitoba Métis Federation about conducting a Métis Knowledge study but have not yet established a work plan or agreement. Based on feedback from the MMF that coordination capacity would help support meaningful engagement, Manitoba Hydro offered to fund an engagement coordinator position. The position has not yet been filled.

During the winter of 2023, a service agreement was also executed with Sagkeeng Anicinabe First Nation for the establishment of a winter access trail along the existing portion of the right-of-way between Pointe du Bois and Lee River to enable pre-construction geotechnical drill tests.

Other opportunities for participation during the alternative route segment phase of engagement included inviting First Nation and Métis participation in field studies that took place to establish baseline information about vegetation and wildlife in the project area.

4.2.7 Community perspective routing workshops

Following the completion of alternative route segment engagement, we reached out to the RM of Lac du Bonnet, Black River First Nation, Brokenhead Ojibway Nation, Peguis First Nation, Sagkeeng Anicinabe First Nation and the Manitoba Métis Federation to gauge interest in helping to evaluate PW75 route options from the community perspective. We invited these audiences to attend two virtual community perspective routing workshops held on January 20 and January 31, 2023. The purpose of the first workshop was to discuss the project and the process for evaluating (i.e., ranking and scoring) the route options from a community perspective. Following the first workshop, we sent out five route options by email for participants to review and evaluate from the perspective of the community (nation or municipality) they represented prior to the second workshop.

During the second community perspective workshop, participants shared concerns related to impacts on private land, agricultural operations, biosecurity risks, access and trespassing, and proximity to homes. We also heard concerns related to routing on Crown land, traversing intact forested areas, culture and heritage sites, impacts on the ability for Treaty Land Entitlement agreements to be fulfilled in the area, and impacts to trees and vegetation. These preferences and concerns were considered by the engagement team in developing a set of scores for the finalist routes. The engagement team identified a preferred route from a community perspective as the option that was the most balanced from the overall community perspective. We reached out to participants immediately following the workshop on January 31, 2023, to share that we planned to recommend Route D as the preferred route from the community perspective and the rationale behind the recommendation (balance). During the workshop, participants noted that information shared made some groups reconsider their perspectives and requested more time to revisit their preferences. In the follow-up email, we asked that any additional feedback to help inform the preferred route determination be provided to us by February 6, 2023.

More information on the evaluation of route options from the community perspective and the routing workshops can be found in Section 3.0: Routing Selection.

4.2.8 Preferred route engagement

We announced the start of preferred route engagement on February 28, 2023, by engaging the same audiences by email, following up with phone calls to confirm receipt of information. Directly affected landowners and landowners immediately adjacent to the route were contacted by mailed letter to provide information on the preferred route and upcoming engagement opportunities.

We held two virtual information sessions and one in-person open house as part of our engagement on the preferred route, with a total of 35 participants attending across the three events.

Table 4-5: Information sessions during preferred route engagement

Date	Number of participants	Location
March 15, 2023	18	Virtual – MS Teams
March 21, 2023	9	Virtual – MS Teams
March 25, 2023	16	Pioneer Seniors Club, Lac du Bonnet

As part of our preferred route engagement, we held meetings with First Nations, the Manitoba Métis Federation and interested parties on the following dates:

Date	Community / organization	Location
March 2, 2023	Grand Council Treaty #3	Virtual – MS Teams
March 13, 2023	Eastern Region Integrated Resources Management Team (IRMT)	Virtual – MS Teams
March 16, 2023	SnoMan and EastMan SnoPals	Virtual – MS Teams
March 22, 2023	Black River First Nation	Black River First Nation Band Hall
March 23, 2023	Manitoba Métis Federation	Virtual - MS Teams
March 23, 2023	MLA for Lac du Bonnet	Manitoba Legislature
April 18, 2023	Pointe du Bois Cottagers Association	Virtual – MS Teams
May 19, 2023	Peguis First Nation	Virtual – MS Teams

4.2.9 Engagement circles

Through engagement on past projects, we heard there was interest in Manitoba Hydro holding engagement events that would bring engaged First Nation and Métis audiences together. To respond to this interest, we invited FNMEP audiences to attend a total of four engagement circles as follows:

Date	Event	Location	Attended by representatives of:
August 24, 2022	Engagement Circle #1	Wilderness Edge Retreat & Conference Centre, Pinawa, MB	BRFN, GCT#3, the MMF, PFN, SAFN, Long Plain First Nation (LPFN) Elder assisting with facilitation, Province of Manitoba, Stantec Consulting
December 13, 2022	Engagement Circle #2	South Beach Casino, Scanterbury, MB	BRFN, BON, the MMF, PFN, LPFN Elder assisting with facilitation, Province of Manitoba, Stantec Consulting
March 24, 2023	Engagement Circle #3	South Beach Casino, Scanterbury, MB	BRFN, NHCN, the MMF, PFN, LPFN Elder assisting with facilitation, Stantec Consulting
May 24, 2023	Engagement Circle #4	Pinewood Lodge, Seven Sisters, MB	BRFN, PFN, LPFN Elder assisting with facilitation, Stantec Consulting, InterGroup Consultants Ltd.

The engagement circles were strategically scheduled so that feedback gathered at each circle could inform the PW75 routing and development of this environmental assessment report.

Each engagement circle was structured to include an update on the project and/or environmental assessment process, interactive group activities, a series of self-directed stations, and a sharing circle for open discussion. Each session was facilitated by a Manitoba Hydro representative with the support of an Elder from Long Plain First Nation.

At each engagement circle, we advised participants that notes would be recorded, but that feedback shared, and outcomes developed would be attributed to the group, not to specific individuals or the nation, community, or organization they represent. Following each engagement circle, we sent participants a summary report that captured the discussions that took place, as well as comments and questions raised by participants. Participants had the opportunity to suggest revisions to the summary reports if comments, questions, or concerns were not accurately reflected.

4.2.9.1 Engagement Circle #1

The purpose of Engagement Circle #1 was to lay the groundwork for the PW75 environmental assessment through the participatory identification of topics and issues of interest related to the project. This activity involved brainstorming topics that could be affected by the project, recording them on paper bubbles, and working to develop logical groupings of these topics. We planned this interactive group activity to inform scoping for the environmental assessment. Four self-directed stations at Engagement Circle #1 also provided the opportunity for participants to share the following types of feedback:

- Station 1: High level mapping to understand the area – to collect preliminary feedback about the project area
- Station 2: Stories and histories of the area
- Station 3: Additional engagement or project information needs
- Station 4: Project concerns, interests, and feedback

4.2.9.2 Engagement Circle #2

The purpose of Engagement Circle #2 was to gather feedback about the alternative route segments and to refine the proposed structure of the environmental assessment report for the project, building on the information and environmental assessment structure generated during Engagement Circle #1 and additions suggested by Manitoba Hydro and Stantec Consulting. Three self-directed stations provided the opportunity for participants to share the following types of feedback:

- Station 1: Routing and landscape mapping exercise – to collect feedback on the alternative route segments
- Station 2: Engagement and information needs
- Station 3: Open discussion topics

4.2.9.3 Engagement Circle #3

The purpose of Engagement Circle #3 was to gather feedback about the preferred route and to have deeper discussions about certain topics of interest identified during the first two engagement circles. Through a combination of interactive group discussions and self-directed stations, we gathered additional feedback to deepen our understanding of the following topics:

- Group activity: Traditional agriculture
- Station 1: Preferred route and landscape mapping
- Station 2: Cultural species that may be used to demonstrate interconnectedness of the environment
- Station 3: Engagement & information needs
- Station 4: Components of well-being
- Station 5: Holistic monitoring

4.2.9.4 Engagement Circle #4

The purpose of Engagement Circle #4 was to share how the engagement circles influenced the environmental assessment and to hear additional input about monitoring, and culture and heritage. Based on interests shared during past engagement circles, a presentation on the Winnipeg River system was also part of the agenda.

We gathered feedback about the following topics:

- Group activity 1: Holistic monitoring (what should be monitored and how to monitor)
- Group activity 2: Culture and heritage (based on known or registered information)
- Station 1: Lessons learned (feedback about the engagement circles)
- Station 2: Incorporating ceremony and cultural protocols into project activities

4.3 Engagement feedback

Through the engagement processes, we heard concerns related to the following topics and themes, recognizing that these themes are interwoven and that many of the feedback topics discussed could fall under more than one of the key themes identified.

4.3.1 Access and travel

Participants shared concerns related to changes to access of the project development area resulting from the project. The right-of-way and the establishment of any new access trails will make the area more accessible to people, which may result in increased pressure on resources harvested by First Nations people and Métis citizens.

First Nation and Métis participants shared concern that changes to existing access and trails alter predator-prey relationships and can transport different plant communities into an area, which has a ripple effect on the areas surrounding trails and access routes.

4.3.2 Agriculture

Participants in the project area shared information about their agricultural operations related to crops and livestock. The participants were concerned about the logistics and feasibility of farming around transmission line towers. Participants also shared biosecurity concerns related to where the transmission line crosses property boundaries, particularly related to cattle-ranching operations. The agricultural producers noted that there are already biosecurity concerns related to trespassing on private property and that the transmission line could increase the likelihood of incidents between people and cattle.

First Nation and Métis participants indicated the need to distinguish and elaborate more on traditional agriculture, which has historically been part of holistic resource management, versus focusing only on modern and typically business-centric agriculture, which is driven by human interest.

4.3.3 Culture and heritage

The cultural significance of the project area and the potential for the PW75 transmission line to encounter and impact both tangible and intangible heritage were major areas of focus. We learned about the spiritual importance of Manito Ahbee (where the Creator sits) and the cultural and ceremonial importance of the area to different nations with unique connections to the area.

First Nation and Métis participants shared knowledge about specific locations in the project area that are culturally important and/or have high potential for heritage resources including petroforms at Bannock Point, the area surrounding Rice Lake, and along waterways including the Winnipeg River, the Lee River, tributaries, and paleochannels, which have acted as historical travel ways for Indigenous people.

We heard concerns and feedback about archaeological methodology including field methods. One recommendation was that Lidar information be used as a non-invasive way of detecting unknown petroform locations. Participants also shared concerns that work crews may not be aware of appropriate actions to take if heritage finds or items of cultural value are encountered. We heard about the importance of having clear protocols developed to protect potential heritage finds and the need for First Nation and Métis involvement in the development of these protocols. We heard that there is interest in working collaboratively with the project archaeologists and being involved in heritage monitoring.

First Nation and Métis participants shared that culturally-specific approaches are important and that Elders and Knowledge Holders should be involved in discussions about the project area to develop a more complete understanding of the cultural landscape.

We heard about the importance of protecting intangible components of culture including acknowledging the land and spirits affected by a project. One specific recommendation from Black River First Nation was to lay down tobacco prior to tree clearing.

4.3.4 Economics

First Nations, the MMF, and Northern Affairs Communities expressed interest in employment and business opportunities that may be available on the PW75 transmission line and generation components of the PREP project. Through individual meetings with community-specific employment contacts, we learned about the types of work that are of interest and about barriers to employment.

FNMEP participants were interested in understanding the procurement processes for the project and how Indigenous content will be considered. Participants also expressed interest in an Indigenous monitoring program for the project.

We also heard concerns about the project potentially negatively impacting Treaty Land Entitlement (TLE) selections in the area or the ability to select TLE lands in the future.

During engagement, several First Nations and the MMF also raised broader issues related to economic reconciliation and expressed interest in revenue sharing or other long-term economic benefits from Manitoba Hydro transmission lines being located on their traditional territories.

4.3.5 Environment

We heard a range of feedback related to how the PW75 transmission line may affect the overall environment in the project area and feedback that helped deepen our understanding of First Nation and Métis perspectives on the environment. First Nation and Métis participants shared that all components of the environment are interconnected and expressed concerns that traditional approaches to environmental assessment based on Eurocentric science tend to consider different components of the environment in isolation and look at pathways of effect in a linear manner. There is concern that cascading effects and feedback loops that may occur due to the interconnectedness of all components of the environment, living and non-living, may be missed in our assessment of the effects of the project. Participants shared the importance of considering whether mitigating impacts on one component of the environment may cause unintended impacts to connected components of the environment.

During the engagement circles, participants also suggested that monitoring the health of certain species could provide an indication of the health of the overall environment and how it may be responding to the presence of the project. Moose and alpha predators such as wolves were suggested as potential indicator species. We heard about the importance of holistic environmental monitoring that considers knowledge from different types of Knowledge Keepers such as water protectors and sky protectors.

We heard concerns about environmental degradation and what will be left for future generations. We heard about the 7th generation approach, which considers how actions will affect seven generations in the future.

4.3.6 Harvesting

FNMEP participants shared various concerns about potential impacts the PW75 transmission line may have on the ability to successfully undertake rights-based harvesting activities in the project area, which may include hunting, fishing, trapping, and gathering plants. We heard that the project may not only impact the practice of harvesting and success rate of harvesting but could also impact knowledge transfer that occurs through harvesting and the harvesting experiences integral to distinct First Nation and Métis cultures.

We heard specific concerns about wild rice, medicines, and traditional foods being potentially impacted by the project.

FNMEP participants shared that both Crown and private lands are used for practicing rights-based activities. However, the predominate routing preference heard through the FNMEP was to avoid Crown land where possible, specifically, undisturbed areas of Crown land. We understand that Crown lands are of particular importance as they are available for First Nations people and Red River Métis citizens to use for harvesting without permission. First Nations and the MMF have expressed concerns about the lack of a structured compensation program for rights-holders whose harvesting activities are impacted using Crown land for transmission line development, while landowners receive compensation when transmission lines cross private land.

4.3.7 Property

Participants shared concerns about the transmission line right-of-way leading to trespassing by ATVs, snowmobiles, hunting and other foot traffic on private property. The area traversed by the preferred route does not have many points of access and participants noted that the tranquility of the area is part of the appeal of owning or renting property in the area. Participants shared that there are some existing issues regarding trespassing by recreational vehicles on private property, and the concern is that these incidents will increase with the transmission line creating a new linear pathway through land that is otherwise relatively inaccessible. Participants had questions about how to control and manage access along the right-of-way.

4.3.8 Recreation and travel

We received feedback about known trails in the area, including the TransCanada Trail near PR 520 and PR 211, the EastMan SnoPals snowmobile trails, the Lee River Snow Riders snowmobile trails, ski trails in Whitemouth Falls Provincial Park, and the Granite Groove Out mountain bike trails near the former Canadian Nuclear Laboratories site. Participants shared concerns about the aesthetic impacts of the transmission line related to these trails and recreational activities, and shared preferences to consider tower location and construction timelines related to periods of high trail use.

4.3.9 Routing

Participants shared perspectives on the alternative route segments presented in the first phase of engagement and on the preferred route presented in the second phase. Routing preferences, and the rationale behind those preferences, varied between audiences. Routing preferences heard most frequently through the FNMEP included preferences to avoid intact areas and undisturbed Crown land and to use previously developed or disturbed areas such as options parallel to existing roads. Feedback from the PEP from potentially affected landowners included preferences for routing on Crown land and avoiding private lands. Routing feedback was considered and evaluated in determining the final preferred route.

Participants also shared feedback and concerns about the routing process and how feedback is weighted to make routing decisions.

4.3.10 Trees & vegetation

Participants asked questions about the vegetation management practices for transmission line rights-of-way, and shared concerns about herbicide application for vegetation management. Participants asked if certain areas could be excluded from herbicide spraying due to concerns with runoff entering waterways. Participants shared that bees have recently been reappearing in the area and they feel this is as a result of landowners not using herbicides. FNMEP participants were interested in the implementation of mitigation protocols to protect rare and traditional use plants.

Participants noted concerns related to the removal of trees and forested areas for transmission line development and some participants requested to follow existing linear infrastructure and previously disturbed areas to minimize the impacts. Participants also asked what would be done with the timber that is removed as part of right-of-way clearing on both private land and Crown land.

We heard there is interest in providing interested First Nations and the MMF the opportunity to harvest medicinal plants along the transmission line route prior to construction. FNMEP participants also expressed interest in wood being made available for community use following clearing of the right-of-way.

General concerns about impacts to or loss of wetlands and forested areas were shared. Participants recommended that disturbances to wetlands or forests should be offset.

4.3.11 Wildlife & habitat

Participants shared concerns about impacts to wildlife. Participants identified sandhill crane nesting sites, deer wintering areas, and known habitat for Great Grey Owl that were traversed by, or in proximity to, the alternative route segments and the preferred route. Participants shared that they see many birds and animals on their properties throughout the year, and that this part of the province is an important area for many wildlife species. Participants shared information about birds traveling east to west across the preferred route alignment between food sources and the Lee River. Concerns were also shared related to habitat fragmentation in areas where the alternative route segments traverse undeveloped crown land or intact forested areas.

Specific species of concern identified included moose and deer. We heard concerns about species moving into different habitats due to noise, changes to access, disruption of intact habitats, or changes to vegetation cover and composition resulting from the construction and presence of the PW75 transmission line. Participants expressed concern that changes in wildlife movement may result in potential increases in disease.

Participants expressed interest in staying informed about the results of baseline field studies regarding wildlife and wildlife habitat in the project area.

4.3.12 First Nation and Métis engagement

Throughout engagement, FNMEP participants shared feedback about the engagement process itself. We understand that engagement preferences and needs vary and reflect the uniqueness of each community, First Nation, and the MMF.

The following sections include brief summaries of the feedback Manitoba Hydro has heard from each engaged First Nation, the MMF, GCT#3, and Northern Affairs Communities.

4.3.1.1 Black River First Nation:

Through correspondence, phone calls, and meetings during pre-engagement and preferred route engagement, we understand Black River First Nation's key feedback about the project to include:

- Interest in training, employment, and business opportunities for community members on the project.
- Importance of participation in engagement from leadership and at the community level.
- Importance of opportunities to gather perspectives from many nations and not restrict conversations to a certain Treaty area.
- Concerns about pesticide use along the right-of-way.
- Concerns about environmental degradation and what is being left for future generations.
- Interest in being included in Indigenous monitoring programming.
- Concern about the lack of a process to compensate First Nations for transmission lines crossing through Crown land, while landowners are compensated for crossing their private land.
- Concern that the increase in energy resulting from the project may create an influx of tourists and cottages in the area.
- Interest in the timber from tree clearing.
- Recommendation to lay tobacco down before cutting trees along the right-of-way.

Representatives from Black River First Nation have also participated in all four engagement circles. Feedback and concerns shared through those events were attributed to the collective group of attendees at each event.

4.3.1.2 Brokenhead Ojibway Nation

Through correspondence and discussions, we understand that the key area of interest for Brokenhead Ojibway Nation (BON) currently, is focusing on broad economic reconciliation interests. BON has shared that they are not in support of the project until such time as broader discussions about economic reconciliation on BON's traditional territory have taken place.

BON representation attended the community perspective routing workshops in an observer capacity only.

Representatives from BON participated in Engagement Circle #2. Feedback and concerns shared through that event were attributed to the collective group of attendees at each event.

4.3.1.3 Hollow Water First Nation

Through correspondence and a meeting during alternative route segment engagement, we understand Hollow Water First Nation's key feedback about the project to include:

- Interest in employment and business opportunities, noting their experience building a transmission line from Pine Falls to Hollow Water.
- General concerns about environmental impacts.
- The project is located on shared traditional territory and Hollow Water First Nation has outstanding land claims along the Lee River.

4.3.1.4 Manitoba Métis Federation

We have had various correspondence and meetings with the MMF throughout the engagement process. To date, we have not established an agreement with the MMF to support a Métis Knowledge study in the area. Discussions about a work plan continue in hopes of supporting the MMF to undertake citizen engagement. Based on feedback from the MMF that coordination capacity would help support meaningful engagement, Manitoba Hydro offered to fund an engagement coordinator position. The position has not yet been filled.

Our understanding of feedback that the MMF has communicated about the project to date includes:

- Interest in distinctions-based approaches to engagement and to support Métis procurement.
- Interest in distinctions-based ways to mitigate potential impacts to Crown land that would specifically benefit Red River Métis citizens, recognizing that the Red River Métis have a different type of use of and preferences for land.

- Interest in gaining further understand about procurement policies and processes related to projects in southern Manitoba, recognizing that the northern purchasing policy is applied.
- Interest in involvement in project monitoring.
- Interest in keeping informed about technical information arising from field studies.
- Interest in detailed information about the routing process and understanding how different inputs are weighed to determine the preferred route so the MMF can explain the influence of feedback to citizens.

Representatives from the MMF have also participated in three of the four engagement circles held during project engagement. Feedback and concerns shared through those events were attributed to the collective group of attendees at each event.

4.3.1.5 Peguis First Nation

Through correspondence, discussions, and meetings with representatives of Peguis First Nation leadership and the Consultation and Special Projects Office during all phases of engagement, we understand Peguis First Nation's key feedback about the Project to include:

- That the area is highly spiritual and has a heavy ceremonial use by many different nations, being referred to as Manito Ahbee (where the Creator sits). As a result, there is high potential for intangible heritage in the area.
- Concerns that the overall project area has high potential to discover heritage resources. Areas of particular concern include areas adjacent to waterways (rivers, tributaries, paleochannels). One specific area of concern was in the vicinity of the Lee River distribution supply centre because the Lee River was heavily used as a travel way since it was not as dangerous to travel as the Winnipeg River with the many rapids along it.
- The need for and interest in participating in heritage monitoring.
- The perspective that heritage work should involve archaeologists, First Nations, and Métis working together from the start (before construction) and the importance of getting out in the field.
- Suggestion that the Lidar information could be used as a non-invasive way of detecting unknown petroform locations.
- A preference to avoid any clearing of natural areas to reduce environmental impacts as much as possible.
- A preference for route options paralleling existing roads and cleared areas used for agricultural purposes to reduces environmental impacts.

Peguis First Nation actively participated in the routing process, submitting their own evaluation, and ranking of route options, participating in both community perspective routing workshops, and providing a list of concerns and recommendations specific to the preferred route. Peguis First Nation's feedback on the preferred route included concerns on the culture and heritage impacts to the project area, as this area is known to have high cultural importance as a spiritual and gathering place for many Indigenous peoples. Some areas of concern Peguis First Nation included in their correspondence include potential areas for camping or spotting game, hunting, or harvesting sites, and travel routes.

We received a heritage-focused report from Peguis First Nation with a Final Report including an Engagement and Elder Knowledge report and a Field Study Report, with additional heritage surveys, aerial drone work and a traditional plant survey, to follow.

Representatives from Peguis First Nation also participated in all four engagement circles. Feedback and concerns shared through those events were attributed to the collective group of attendees at each event.

4.3.1.6 Sagkeeng Anicinabe First Nation

Through correspondence throughout the FNMEP, and meetings with Sagkeeng Anicinabe First Nation leadership representatives and with Sagkeeng Anicinabe First Nation's Community Liaison Committee during alternative route segment engagement we understand Sagkeeng Anicinabe First Nation's key feedback about the project to include:

- Dissatisfaction that private landowners receive compensation for transmission lines on private land, while rights-holders do not receive compensation for projects on treaty lands.
- The position that Sagkeeng Anicinabe First Nation's concerns should be prioritized as they will be the most impacted by the project since it falls directly in an area where they practice their rights and that Sagkeeng Anicinabe First Nation has a title claim.
- The need to obtain community input and have proper community consultation.
- Concerns that Manitoba Hydro may already have a route decided prior to hearing feedback.
- Interest in training and job opportunities, including longer term economic benefits such as revenue sharing since the project is proposed in Sagkeeng Anicinabe First Nation's traditional territory.
- Interest in deeper discussions about the portion of the route that involves widening the existing ROW between Pointe du Bois and Lee River, stating that this

portion seems more impactful than the development of the new portion of the route between Lee River and Whiteshell Station, which is in an area that is already more highly developed and disturbed.

Sagkeeng Anicinabe First Nation was invited to participate in the community perspective routing workshops and attended the second workshop on January 31, 2023. Following this workshop, Sagkeeng Anicinabe First Nation requested additional time to review the route options and provide routing feedback. In response, Manitoba Hydro provided an extension to provide routing feedback to inform the selection of a preferred route by February 22, 2023. A written submission about routing feedback was not received. However, Sagkeeng Anicinabe First Nation communicated the following route preferences during a meeting on February 20, 2023:

- To prioritize routing on already disturbed lands, such as agricultural land, and along existing features (e.g., roads). One reason for this preference is that medicine harvesters typically do not pick medicines by transmission lines due to concerns about radiation and they also already typically avoid the area next to roads due to vehicle pollution. Therefore, paralleling a road does not result in new loss of preferred areas for harvest.
- To prioritize routing on private land, avoiding new disturbances to Crown land, which has high value for the exercise of rights. Another reason for this preference is that private landowners can be compensated, but there is no compensation available to Sagkeeng Anicinabe First Nation when Crown land is used.
- Interest in an option that would mix-and-match parts of different route options by paralleling the road through the developed cottage/residential area just south of Lee River distribution supply centre (similar to route C in the northerly part of the project area) and also paralleling the road in the southerly part of the project area rather than cutting through the forested area (segment 29).

Manitoba Hydro considered Sagkeeng Anicinabe First Nation's mix-and-match route suggestion above but determined that it would not be feasible due to a large increase in cost when compared to the other route options being considered.

Sagkeeng Anicinabe First Nation submitted a technical memorandum with the "Preliminary Findings from Sagkeeng Anicinabe First Nation's Indigenous Knowledge and Use Study specific to Manitoba Hydro's Pointe Du Bois Renewable Energy Project" on March 30, 2023. In this interim report, Sagkeeng Anicinabe First Nation shared feedback around the ongoing cumulative impacts to Sagkeeng Anicinabe First Nation rights due to historic and existing Manitoba Hydro developments, the importance of building a concrete relationship between Sagkeeng Anicinabe First Nation and Manitoba Hydro, and the importance of incorporating ceremony into the project. Within the project footprint, Sagkeeng Anicinabe First Nation members reported 145 site-specific values, reporting use of the area from the 1940s to 2022, and an ancestral burial site. Sagkeeng Anicinabe First Nation also shared an interest in employment and business opportunities and stressed the importance of educating Sagkeeng Anicinabe First Nation youth about the importance of monitoring.

On June 23, 2023, Sagkeeng Anicinabe First Nation submitted their final report titled "Sagkeeng Anicinabe Knowledge and Use Study Specific to Manitoba Hydro's Pointe Du Bois Renewable Energy Project", dated June 7, 2023. This report builds on the information shared in the technical memorandum and has the goal to "assist Sagkeeng Anicinabe First Nation in identifying and protecting important areas and aspects of Sagkeeng Anicinabe First Nation lands, culture and livelihoods." (Sagkeeng Ancinabe First Nation, 2023).

Through the technical memorandum with preliminary findings and the final report, Sagkeeng Anicinabe First Nation shared four key values that may be impacted by the project:

- Potential impacts to hunting and trapping values
  - Impacts to forage and habitat for game species
  - Noise-related impacts
  - Avoidance of rights-of-way by game species
  - Increased access to area by hunters, trappers, and cottagers, increasing pressure on target species
- Potential impacts to water and fishing values
  - Fluctuating water levels associated with damming waterways in the territory
  - General decline in quality of drinking water
- Potential impacts to harvesting food plants and medicines values
  - Impacts to generational traplines
  - Loss of access to viable harvesting and gathering areas
  - Important medicine and berry picking areas
  - Chemical spraying along rights-of-way
  - Flooding of wild rice harvesting areas

    - Increased traffic in areas used to harvest plants
- Potential impacts to cultural continuity values (through potential impacts to land-based practices)
    - Restricted access to harvesting and gathering areas
    - Plant and animal contamination concerns due to chemical spraying of right-of-way
    - Impacts to target species due to increased pressures by recreational hunters, trappers, and cottagers
    - An interruption in and loss of transmission of knowledge to younger generations
    - Flooding of key harvesting areas

In addition to the final report, Sagkeeng Anicinabe First Nation also submitted an implications letter regarding the project and review comments related to portions and excerpts from the draft environmental assessment report that were shared with Sagkeeng Anicinabe First Nation. We have worked to address several of the revisions recommended by Sagkeeng Anicinabe First Nation prior to finalizing and submitting this report.

4.3.1.7 Grand Council Treaty #3

During a meeting on June 15, 2022, the Grand Council Treaty #3 (GCT#3) Territorial Planning Unit shared information on the Grand Council Treaty #3 – Manito Aki Inakonigaawin (MAI) Project Application Framework and how it applies to projects in Treaty #3.

Grand Council Treaty #3 (2022) states "Manito Aki Inakonigaawin has been an inherent law to Anishinaabe in Treaty #3 territory since time immemorial. The law governs relationships with the land and its inhabitants throughout daily life. This includes:

- Respecting the lands and waters
- Giving offerings to spirits and Creator when you benefit from Mother Earth's gifts such as hunting, fishing or transportation
- Knowing your rights as a Treaty #3 member
- Understanding the responsibility as a steward of the land

Manito Aki Inakonigaawin is based on meaningful engagement and respect for inherent and treaty rights. Grand Council Treaty #3 states that any development or activity that may affect natural resources within Treaty #3 territory must abide by these rights and proponents have a duty to engage with the potentially affected nations. As such, Manito Aki Inakonigaawin is considered a foundational process of mutual respect (Grand Council Treaty #3 2022).

Since the law was formally written in 1997, it has helped uphold traditional land rights and created a nation-based law-making process in the territory.

During our initial meeting, GCT#3 advised that projects such as PREP would need to seek authorization at two levels:

1) Through GCT#3's MAI process
2) Directly with individual Treaty #3 Nations

The GCT#3 advised that their Environment Chiefs Committee could provide a recommendation on which communities to involve in the process.

Other feedback that GCT#3 has shared included concerns regarding the sale of power generated by water in Treaty 3 territory, water regulation, and historical Manitoba Hydro operations.

Based on this feedback, Manitoba Hydro compiled an application to meet the information requirements of the MAI framework. We submitted the application to GCT#3 on February 2, 2023. In the application, we provided an overview of the project, discussed potential impacts and benefits of the project, potential plans for mitigation and monitoring, potential areas of assessment, and explained how, from Manitoba Hydro's perspective, different activities included in our project engagement process align with the phases of the MAI framework, which include the visioning, scouting, hunter/gatherer, and feasting and celebrating phases.

On March 2, 2023, we met with the Director of the Territorial Planning Unit to present an overview of the application, answer questions, and discuss the next steps. We have not received any feedback or recommendations regarding our application or next steps to date. We remain open to receiving this feedback and recommendations, if any, about the application and how to engage the nations they represent during the ongoing phases of engagement.

4.3.1.8 Wabaseemoong Independent Nations

We have not received any feedback about the project from Wabaseemoong Independent Nations (a Treaty #3 nation). We have continued to share information about project milestones, informing about opportunities to provide feedback, and remain open to further engagement if Wabaseemoong Independent Nations is interested in participating later.

4.3.1.9 Norway House Cree Nation

Through correspondence and a meeting during alternative route segment engagement, we understand Norway House Cree Nation's key feedback about the Project to include:

- Interest in salvaging poles, if possible, from the decommissioning of the existing P3/P4 lines.
- General concerns about development through wetlands and forested areas and interest in whether offsets are required.
- Potential concerns from harvesters in the area.
- Interest in focusing engagement on what benefits, such as employment opportunities, the project may be able to provide communities.

Representatives from Norway House Cree Nation also participated in Engagement Circle #3. Feedback and concerns shared through Engagement Circle #3 were attributed to the collective group of attendees at the event.

4.3.1.10 Community of Manigotagan

We have not received any feedback about the project from the Community of Manigotagan. We have continued to share information about project milestones, informing about opportunities to provide feedback, and remain open to further engagement if Manigotagan is interested in participating later.

4.3.1.11 Community of Bissett

Through correspondence and a meeting during alternative route segment engagement, we understand the Community of Bissett's key area of interest on this project to be training, employment, and business opportunities that the project may create for community members. No other feedback about the project has been received from Bissett.

4.3.1.12 Community of Aghaming

We have not received any feedback about the project from the Community of Aghaming. We have continued to share information about project milestones, informing about opportunities to provide feedback, and remain open to further engagement if Aghaming is interested in participating later.

4.3.1.13 Incorporated Community of Seymourville

Through correspondence and a meeting during alternative route segment engagement, we understand the Incorporated Community of Seymourville's key feedback about the Project to include:

- Potential opportunities for community member employment on the project. It was noted that on previous projects, communities like Seymourville and Manigotagan have not been included in certain employment opportunities due to not being a First Nation. However, many First Nations members reside in the community and Seymourville would like their residents to have a fair opportunity to get work on the project.
- Supporting specific efforts to promote employment opportunities for women.
- Interest in receiving wildlife and plant data for the area.
- Interest in understanding the process that takes place if heritage resources are encountered, noting that areas near rivers and riverbanks have higher potential for finding cultural items and burials as people used the river and tributaries for travel.
- Interest in what will happen to timber that results from clearing the right-of-way.

4.3.1.14 Key feedback from engagement circles:

Through the engagement circles, participants shared a wealth of feedback that helped inform various aspects of the project and directly influenced the form of this environmental assessment report. Participants discussed and provided feedback about alternative route segments, and at subsequent engagement circles, about the preferred route.

Additionally, participants assisted with the identification of topics that should be included in this environmental assessment report, which includes topics such as well-being, of both humans and species, increased access to the area and its associated impacts, agriculture, which includes traditional agriculture, and harvesting of country foods and medicine, among many other topics.

Overall, participants expressed the desire to be able to see themselves and their communities' values and perspectives reflected in this Report. See Section 4.4.2 below for more information on how we incorporated the information collected through the engagement circles in the environmental assessment report.

4.4 Engagement results

Through our engagement processes, we received feedback covering many topics. Table 4-6 below provides a summary of concerns shared through engagement, grouped by topics, as well as how this feedback was considered in the routing and environmental assessment processes for the project.

Table 4-6: Summary of engagement feedback received and how it was considered

Topic	Concerns	How this was considered
Access & travel	Trespassing Recreational vehicle traffic on private land Skiing, snowmobile, hiking and biking trails Increased access to area means increased pressure on resources Increased access alters predator/prey relationship	We are working with local trail groups, ski, and snowmobile clubs to understand the location of these trails and how tower spotting can be used to minimize impacts to trail systems. The timing of construction activities is typically in the winter months, which can limit the impacts of construction activities on biking and hiking trails. Manitoba Hydro will develop an Access Management Plan to minimize the need to construct new access roads and trails. Related to access and trespassing, we will work with landowners to make commitments around signage, fencing and other deterrents for transposing on private land rights-of-way.
Agriculture	Agriculture and livestock operations Farming around towers Potential biosecurity concerns for cattle	Manitoba Hydro understands that biosecurity is a concern in the agricultural sector globally. We recognize that our staff and contractors have the potential to affect agricultural biosecurity through construction and maintenance activities. Our biosecurity policy outlines the activities Manitoba Hydro staff and contractors must follow to ensure our operations do not pose biosecurity threats to crops and livestock. We are planning to use self-supporting towers in agricultural fields to reduce the impact to agriculture operations.

Table 4-6: Summary of engagement feedback received and how it was considered

Topic	Concerns	How this was considered
Wildlife & habitat	Sandhill crane nesting sites Deer wintering sites Impacts on moose and deer Habitat fragmentation Known sites for Great Grey owl	The environmental assessment process will identify potential impacts to wildlife and will prescribe appropriate mitigation measures.
Trees & vegetation	Vegetation management along the ROW Herbicide use Removal of trees / forested areas Impacts to wetlands Culturally important vegetation (wild rice & medicines)	No herbicides will be used for clearing during construction. Herbicides are an important tool in integrated vegetation management to reduce impacts to the environment during maintenance activities. Herbicides are not used indiscriminately and are used to target tall growing species. An Integrated Vegetation Management Plan will be developed for maintenance of the right-of-way. Impacts to forested areas and wetlands were considered as part of the routing process and determination of a preferred route.
Culture & heritage	Protection of sacred sites Areas of high potential (Lee River, riverbanks) Spiritual importance -	Information on potential cultural and heritage sites has been shared by the Historic Resources Branch (HRB) and through feedback from the First Nation and Métis Engagement Process. A Culture and Heritage Resource Protection Plan (CHRPP) will be developed for the project to provide instructions on what to do during

Table 4-6: Summary of engagement feedback received and how it was considered

Topic	Concerns	How this was considered
	Manito Ahbee and ancestors Incorporating ceremony in the project	construction if heritage or cultural sites are found. Manitoba Hydro considered known and potential heritage sites in the determination of a preferred route for PW75. Further identification of heritage sites will be undertaken as part of the environmental assessment process.
Environment	Species health as overall indicator of health of the environment Consider what is being left for future generations; degradation Need for monitoring throughout the project	Manitoba Hydro has included well-being as a valued component in the environmental assessment to reflect the potential project impacts more holistically, by recognizing the important connections within the environment and impacts that may result from these connections. Well-being is intended to capture a more holistic perspective of health, one that considers the health of species, including humans, and the environment (skies, waters, soils and lands). Concerns related to the degradation of different types of habitats were considered as part of the routing process and determination of a preferred route. Through the FNMEP, Manitoba Hydro will continue to discuss monitoring for the project.
Economics	Employment & business opportunities, interest in First Nation and Métis	We are meeting with First Nations, Northern Affairs Communities, and the MMF to discuss business and employment opportunities associated with the project. We are compiling a list of local businesses

Table 4-6: Summary of engagement feedback received and how it was considered

Topic	Concerns	How this was considered
	monitoring programs	in the project area and will make this information available to contractors prior to the start of construction. We will continue to discuss monitoring interests with First Nations, the MMF and other interested parties.
Routing	Avoid intact areas and undisturbed Crown land Use existing roads and cleared areas Use previously disturbed or developed areas Minimize impacts to landowners	The preferred route aims to leverage existing linear infrastructure while balancing the impacts. We are leveraging the existing right-of-way between Pointe du Bois and the Lee River distribution supply centre to route the first portion of the transmission line.
Engagement	Focus on needs of each engaged audience and benefits the project may offer Engagement should be about having a voice at the table and being heard Differentiate between stakeholders and rightsholders	Manitoba Hydro will continue to support engagement on the project in a manner preferred by each audience and engagement ideas will be considered as the process continues. Through project engagement, Manitoba Hydro developed further understanding on the needs and preferences of engaged audiences. Manitoba Hydro worked to tailor engagement activities accordingly on this project and will consider this feedback on future projects. Manitoba Hydro developed a Public Engagement Process and a First Nation and Métis Engagement Process to reflect

Table 4-6: Summary of engagement feedback received and how it was considered

Topic	Concerns	How this was considered
		differences between rightsholders and the public.

4.4.1 Route adjustments

Feedback collected during the March 25, 2023 open house in Lac du Bonnet included discussions with affected landowners about potential route adjustments. Landowners shared concerns related to aesthetics and access and requested for us to revisit the routing of the transmission line.

Participants shared concerns related to the aesthetic impacts of the transmission line, particularly immediately south of the Lee River DSC where the preferred route would run parallel to Belluk Road. In response to this feedback and in conversations with the affected landowners, the final preferred route has moved further away from Belluk Road to leave the Lee River DSC east along the existing ROW before moving south.

4.4.2 Structure and content of the environmental assessment report

Many of the topics discussed in this environmental assessment report as well as how the content is organized was influenced by the feedback gathered from FNMEP participants during the four engagement circles that took place during project engagement. The engagement circles are also described in Sections 4.2.9 and 4.3.1.14.

In Engagement Circle #1, we heard concerns regarding potential effects on several environmental, cultural, and socio-economic values from both First Nation and Métis perspectives. These were arranged through a collaborative process into three main groups or categories (Figure 4-4), having several interrelated themes or elements of concern. These themes were linked through the Winnipeg River and increased access, which participants considered to be the two main pathways of effect for the project.

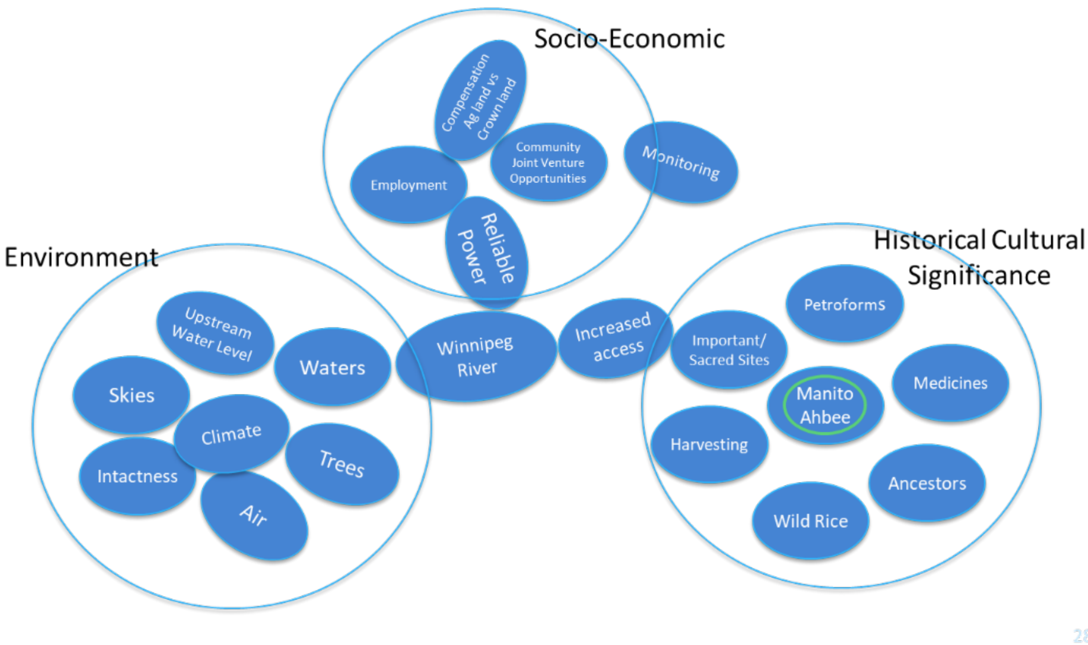


Figure 4-4: Valued topics, themes, and pathways from Engagement Circle #1

At Engagement Circle #2, the topics, themes, and pathways shown above were further refined and participants helped place topics, themes, and pathways added my Manitoba Hydro staff and consultants. The refined result is shown below in Figure 4-5.

Figure 4-5: Valued topics, themes, and pathways following Engagement Circle #2

Based on this feedback collected during Engagement Circle #1 and further refined during Engagement Circle #2, we presented the specific topics that were being considered as part of the environmental assessment during Engagement Circle #3:

1. **Environment:** This includes the climate, skies, waters, soil and land, with associated subtopics.
2. **Socioeconomic**: This includes infrastructure, property and services, population, land and resource use, economic employment and benefits, Indigenous lands, and agriculture, which is recognizing traditional agriculture and modern agriculture distinctly.
3. **Historical and cultural:** This includes petroforms, harvesting, heritage sites, holistic monitoring, the principle of Manito Ahbee, and the potential of sacred sites, that are both tangible and intangible.

4. **Well-being:** During Engagement Circle #2, participants shared that species health could serve as an indicator of how the environment may respond to the presence of the project because the health of species is connected to and affected by all other aspects of the environment. This theme was ultimately renamed to well-being to also include human and environmental aspects. The topics under the well-being theme include noise, air quality, water quality, electromagnetic fields, aesthetics, and stress and mental well-being.

Another outcome of the engagement circles that is reflected in the environmental assessment report was revising typical assessment categories to better capture the interests and concerns of FNMEP participants. During the engagement circles, participants shared their feedback on which topics should be considered through the environmental assessment that may otherwise be overlooked. Two examples of revised assessment categories are through historic/traditional agriculture and well-being.

In our environmental assessments for transmission lines, we typically consider the impacts of the project on agriculture in a contemporary modern context. During Engagement Circle #2, participants shared that traditional agriculture has been practiced by Indigenous people historically for thousands of years and that we should consider changes to its practice over time. Participants noted that Indigenous people have had established effective agricultural practices that are not well-documented. These methods, such as the use of natural fertilizers, can promote sustainable use of the land. Participants suggested that historic/traditional agriculture be separated and be assessed separately from modern agriculture and agribusiness.

Another topic of discussion was human health, which typically includes noise, impacts to water quality, impacts to air quality, and electromagnetic fields. In Engagement Circle #2, participants discussed the concept of human health and how it is connected to and influenced by everything else in the environment (i.e., by all other components of the environment). Participants shared that it would be more appropriate to expand this topic to species health because human health flows from species health and the health of the environment. Participants shared that humans depend on the health of the environment and, because humans were the last ones put on this earth, are responsible for taking care of everything else in the environment first.

To incorporate this discussion, we assessed the impacts of the project on well-being, which we understand to be a holistic concept that encompasses physical, mental, emotional, and spiritual health, and is deeply connected to the health of the environment in which people live. Our assessment of well-being includes changes in perceived health and stress associated with EMF and property values, changes in aesthetics, tranquility, and connection to the land, and changes in healthy populations associated with the presence of the temporary workforce in the region.

Finally, Section 7.2 of the environmental assessment report assesses the impact of the project on harvesting and important sites. This section is intended to serve as a topic to synthesize impacts from other components that may impact First Nations and the Red River Métis. The two topics, harvesting and important sites, were identified as two ways that rights-bearing nations value the area.

4.5 Ongoing engagement

We notified each affected landowner once the final preferred route was determined and provided them with contact information, an outline of the regulatory process and the upcoming timelines.

Following Manitoba Environment and Climate's decision regarding the PW75 transmission line, Manitoba Hydro will notify the engaged First Nations, the MMF, Grand Council Treaty #3, Northern Affairs Communities, affected landowners, and interested parties of the outcome of the decision and if we are granted a licence we will keep them informed of construction schedules and activities. We will continue to compile a list of local businesses in the project area and make this information available to contractors and staff undertaking construction activities.

We will continue to meet with employment contacts for the MMF and the engaged First Nations and Northern Affairs Communities about anticipated opportunities for training, employment, and business opportunities as additional information about the contract for the PW75 transmission line becomes known. Through these discussions, we will gather feedback about potential barriers to employment on the project. We plan to also engage in further discussions about heritage monitoring and project monitoring options.

Manitoba Hydro will also reach out to FNMEP participants to arrange a ceremony or ceremonies at times that works for those who are interested and engaged on the project.

We will remain open and responsive to any questions or concerns that may arise from the PEP and FNMEP audiences through construction and operation of the project. The project webpage will continue to be updated as the project progresses and the toll-free phone number (1-877-343-1631) and project engagement email address (projects@hydro.mb.ca) will remain available. Any feedback about the engagement process will help support the continual improvement of Manitoba Hydro's engagement efforts on future projects.

5.0 Environmental assessment methods

This chapter describes the methods used for assessing the project's potential cultural, environmental (i.e., both physical and biological), social, and economic effects. These methods were informed by past Manitoba Hydro assessments and initiatives and have guided the preparation of this assessment to meet the requirements of the *Environment Act (Manitoba)* and the Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Environment and Climate, 2022).

These methods have been developed through a review of regulations, current practice in environmental assessment and experience from assessments of similar projects. In addition to past Manitoba Hydro experience and regulatory requirements, the methods presented in this section were influenced by:

- The information requirements of The Grand Council Treaty #3 – Manito Aki Inakonigaawin Project Application Framework
- Feedback received during project engagement. Information obtained through project engagement is presented in relevant sections throughout this report.

5.1 Scope of the assessment

This section describes the scope of the assessment. Scoping the assessment serves to focus the assessment on important components of the project and the environment. Each valued component assessment section will follow the steps outlined below.

5.1.1 Existing conditions

The existing conditions for each valued component are described in Chapter 6.0 based on data collected during desktop analysis, field programs, engagement, and the assessment boundaries for the valued component.

In many cases, existing conditions expressly or implicitly include those environmental effects that may be or may have been caused by other present or past projects or activities that are or have been carried out. In focusing on valued components, the description of existing conditions is at a level of detail and scope that supports the assessment of environmental effects.

5.1.2 Scope of the project

The proposed project consists of:

- Construction of a 51 km115-kV transmission line terminating at Whiteshell and Pointe du Bois Stations

- Installation of equipment at Whiteshell Station to terminate the line
- Expansion of Pointe du Bois Station, relocation of existing towers outside the station and installation of equipment to terminate the line
- Conversion of the Lee River distribution supply centre from 69-kV:25-kV to 115-kV:25-kV
- Construction of a tapping structure at the Lee River distribution supply centre
- Salvage of P3/P4 66-kV sub-transmission lines from Pointe du Bois Station to the Lee River distribution supply centre
- Decommissioning of the PW75 transmission line

5.1.3 Selection of valued components

This assessment focuses on the identification and assessment of project-related environmental effects on valued components. Valued components (VCs) are elements of the biophysical, social, cultural, and economic environments that, if altered by the project, may be of concern to regulatory agencies, Indigenous peoples, resource managers, scientists, key stakeholders and/or the public. VCs are similar to key values which are defined as including tangible or biophysical resources as well as less tangible social, economic, cultural, health, and knowledge-based values (Malone and Firelight Research Inc. with the Sagkeeng Anicinabe First Nation 2023).

Project-related environmental effects and cumulative environmental effects are assessed using a standard framework for each VC with standard tables and matrices to facilitate and document details of the evaluation.

The residual project-related environmental effects (i.e., those environmental effects that remain after the planned mitigation measures have been applied) are characterized using specific criteria that are defined for each VC.

Several factors including the following were considered during VC selection:

- VCs adopted for previous transmission project environmental assessments and the feedback received for those assessments
- Input from regulators, First Nations, and their members, the MMF and Red River Métis citizens, landowners, interested parties and the public
- The professional judgment of the environmental assessment team

Based on the above factors, the following VCs were selected for the assessment:

- Birds and bird habitat
- Fish and fish habitat
- Wetlands

- Amphibians and reptiles
- Vegetation
- Terrestrial wildlife and wildlife habitat
- Harvesting and important sites
- Heritage resources
- Commercial agriculture
- Infrastructure and services
- Economic opportunities
- Land and resource use
- Well-being (human health)

The themes presented in the existing environment and the valued components assessed in this report have been developed as a way to organize information in the EA, but it is understood that the themes are connected with humans interacting with all valued components.

5.1.4 Regulatory and policy setting

Each valued component assessment section will describe federal and provincial regulations and policies specific to that VC, that will apply to the project.

5.1.5 Project engagement input

Each valued component assessment section will summarize engagement input specific to that VC and outline how that input helped scope the assessment.

5.1.6 Spatial boundaries

The spatial boundaries for the assessment of potential project effects were selected based on the geographic extent over which project activities and their effects on valued components are likely to occur.

- **Project Development Area (PDA)**: The PDA encompasses the anticipated area of physical disturbance associated with the construction and operation of the project. As such, the PDA represents the physical project footprint and consists of the area of physical disturbance associated with the transmission line, right-of-way, marshalling and fly yards, station components and structures as described in the project description (Chapter 2.0).
- **Local Assessment Area (LAA)**: The LAA encompasses the area where environmental effects from project activities and components are predicted to occur. The definition of the LAA will vary for each valued component and is provided in each valued component section.

- **Regional Assessment Area (RAA)**: The RAA is the area where residual environmental effects from project activities and components may interact cumulatively with the residual environmental effects of other past, present, and known, certain, or reasonably foreseeable future projects/physical activities. The definition of the RAA may vary for each valued component and is provided in each valued component section.

While the PDA is the same across VCs, the LAA and RAA boundaries may differ among the VCs and the rationale for the selected LAA, and RAA boundaries is stated in each VC section.

5.1.7 Temporal boundaries

Temporal boundaries identify when an environmental effect may occur in relation to specific project activities. The temporal boundaries are based on the timing and duration of project activities and the nature of the interactions with each VC. The temporal boundaries for the project include the following:

- **Construction:** Construction is planned to commence in the winter of 2024/2025 and last up to 1.5 years.
  - Transmission line construction will be restricted to the winter months, under frozen conditions
  - Station construction will occur year-round
  - Salvaging of the existing P3/P4 lines is planned for the second winter
- **Operation:** The in-service date for the project is planned for spring 2026. Once operational, the project is anticipated to last a minimum of approximately 75 years with maintenance.
- **Decommissioning:** Decommissioning would occur during a two-year period at the end of the life of the project (75 years or more into the future).

5.2 Assessment of project effects

The effects assessment for each VC is presented in Chapter 7.0 and follows a standard format.

5.2.1 Project – environment interactions

The potential for interaction between project activities and each VC was considered for the construction, operation and maintenance, and decommissioning phases of the project (Table 5-1). The identification of potential interactions between project activities and individual VCs are described and assessed in each VC in Section 6.0.

Table 5-1: Project valued components and project activity interaction matrix

Project activity	Valued component												
	Birds and bird habitat	Fish and fish habitat	Wetlands	Amphibians and reptiles	Vegetation	Terrestrial wildlife and wildlife habitat	Harvesting and important sites	Heritage resources	Commercial agriculture	Infrastructure and services	Economic opportunities	Land and resource use	Well-being (human health)
Transmission Line Construction													
Mobilization and staff presence	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vehicle and equipment use	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Right-of-way clearing	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Watercourse crossings	✓	✓	✓	✓	✓	-	✓	✓	-	-	✓	✓	✓
Marshalling / fly yards	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Transmission tower construction	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Implodes	✓	-	-	✓	✓	✓	✓	-	-	-	✓	✓	✓
Helicopter use	✓	-	-	✓	-	✓	✓	-	-	-	✓	✓	✓
Clean-up and demobilization	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Station Modification													
Mobilization and staff presence	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓
Vehicle and equipment use	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓
Marshalling / fly yard (Pointe du Bois Station)	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	✓	✓

Project activity	Valued component												
	Birds and bird habitat	Fish and fish habitat	Wetlands	Amphibians and reptiles	Vegetation	Terrestrial wildlife and wildlife habitat	Harvesting and important sites	Heritage resources	Commercial agriculture	Infrastructure and services	Economic opportunities	Land and resource use	Well-being (human health)
Realignment of access road (Pointe du Bois Station)	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓
Site preparation (Pointe du Bois Station)	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	✓	✓
Station footprint expansion (Pointe du Bois Station)	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	✓	✓
Installation of electrical equipment	-	-	-	-	-	-	-	✓	-	-	✓	✓	✓
Clean-up and demobilization	✓	-	✓	✓	✓	✓	-	✓	-	-	✓	✓	✓
Transmission Line and Station Operation and Maintenance													
Transmission line and station presence	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓
Vehicle and equipment use	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓
Inspection and maintenance	✓	-	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓
Vegetation management	✓	✓	-	✓	✓	✓	✓	-	✓	-	✓	✓	✓

Project activity	Valued component												
	Birds and bird habitat	Fish and fish habitat	Wetlands	Amphibians and reptiles	Vegetation	Terrestrial wildlife and wildlife habitat	Harvesting and important sites	Heritage resources	Commercial agriculture	Infrastructure and services	Economic opportunities	Land and resource use	Well-being (human health)
Decommissioning													
Mobilization and staff presence	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vehicle and equipment use	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Rehabilitation	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓
Clean-up and demobilization	✓	-	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓

5.2.2 Effects pathways

The assessment of each VC begins with a description of the mechanisms whereby specific project activities interacting with the existing environment could result in an environmental effect (i.e., the effect pathways).

For each VC, the project's potential effects are identified and assessed in the context of the VC's existing conditions, as well as its biophysical or socio-economic characteristics, regulatory context, and input received through project engagement.

Once effect pathways are identified, one or more parameter(s) are selected to facilitate quantitative and qualitative assessment of residual project effects and residual cumulative effects.

Measurable parameters provide defensible and acceptable means to characterize change in a VC attributable to the project and contribute to the determination of significance for those effects.

Where practical, these parameters are measurable and quantifiable (e.g., direct habitat loss). However, some effects lack defined parameters to measure effects and are therefore predicted qualitatively using the scientific literature, professional judgement, engagement input and past project experience.

5.2.3 Mitigation of project effects

Mitigation measures are identified to reduce or eliminate potential adverse effects and/or enhance potential positive effects of the project on each VC. These measures include site-specific and established general protection measures and practices, compliance with legislation, regulations and guidelines, and planning considerations applicable to the project. Mitigation measures are identified in the individual VC-specific sections.

5.2.4 Characterizing residual effects

Residual effects are effects that are predicted to occur after the application of mitigation has been considered. Residual effects are characterized for each VC, considering how the proposed mitigation will avoid or reduce the effect. The residual effects are characterized using the following terms:

Direction: the long-term trend of the residual effect (e.g., positive, adverse, neutral).

Magnitude: the amount of change in a residual effect for a VC relative to its existing conditions (e.g., low, moderate, high).

Geographic Extent: the geographic area in which a residual effect occurs (e.g., PDA, LAA, RAA).

Timing: Considers when the residual effect is expected to occur, where relevant to the VC (low, moderate, or high sensitivity). In terms of timing, the critical life stages include episodes that will vary both by VC and annually depending on seasonal conditions. For example, winter is outside of bird nesting and breeding periods and that spring is fully within this critical time. Early spring and late fall are a transitional period that, depending on the seasonal conditions, may affect the life stage. Timing is also relevant to Indigenous activities such as harvesting of rare plants or cultural events.

Duration: the time until the residual effect can no longer be measured or otherwise perceived (e.g., short-term, medium-term, long-term).

Frequency: how often the residual effect occurs and how often during the project or in a specific phase (e.g., single event, irregular events, multiple regular events, or continuous).

Reversibility: refers to whether the residual effect on a VC can be reversed once the physical work or activity causing it ceases (i.e., reversible, irreversible).

A summary of the characterization of residual environmental effects is provided in each VC section.

5.2.5 Significance definition

The assessment provides an overall determination of significance for the project's residual effects and cumulative effects after the implementation of mitigation measures. The determination of significance involves assessing the predicted residual and cumulative VC effects against established threshold criteria. Where residual and cumulative VC effects exceed threshold criteria, the associated effects are considered significant.

The thresholds are defined in consideration of regulatory requirements, standards, objectives, or guidelines as applicable to the VC. Where thresholds are not set by guidelines or regulations, a threshold is developed using the measurable parameters established for the VC, along with professional judgement and previous experience assessing project effects on the VC. The significance determination focuses on residual and cumulative adverse effects; therefore, if positive or neutral residual or cumulative effects are identified, they are not assessed further.

5.3 Assessment of cumulative effects

This assessment considers cumulative environmental effects predicted to result from the project's adverse residual effects in combination with other past, present, and reasonably foreseeable future projects or physical activities. Past, present, and reasonably foreseeable projects whose may overlap spatially and temporally with those of the project are identified. The project's contribution to the cumulative effect is then evaluated.

The effects of past and current projects inherently contribute to baseline conditions upon which project effects are assessed. Cumulative effects are described as additional incremental effects resulting from residual project effects combined with reasonably foreseeable future projects and activities.

Two conditions must be met to initiate an assessment of cumulative effects on a VC:

- There are predicted adverse residual project effects on the VC.
- The adverse residual project effects on a VC have potential to act cumulatively with the residual effects of other past, present, and reasonably foreseeable future projects or physical activities on the same VC.

If either condition is not met, there is no expectation that the project will contribute cumulatively to residual effects, and further assessment is not warranted. If both conditions are met, then the assessment of cumulative effects continues within the VC section following assessment of project residual effects.

Where a cumulative effects assessment is completed for a VC, the focus is on those other projects and physical activities that could result in similar residual effects to those being considered for the project.

5.3.1 Project/activity inclusion list

The project/activity inclusion list (Table 5-2; Figure 5-1) identifies known past, present and reasonably foreseeable future projects and physical activities with potential residual environmental effects that could overlap spatially and temporally with the project's residual environmental effects.

Reasonably foreseeable future projects are those that are publicly announced (with adequate descriptive detail), currently in a regulatory approval process, or under construction.

Table 5-2: Project/activity inclusion list

Type of Project/Activity	Select specific activities/projects	Activity/Project Timeline	Timeline for construction, if applicable
The Project			
PW75	Proposed project	-	2024 to 2026
Existing/Ongoing Projects and Activities			
Agriculture	Crop and Livestock Production	Ongoing since 1870	-
Domestic Resource Use	Includes Hunting, Fishing, Trapping	Ongoing since before 1870	-
Recreational Activities	Includes Canoeing, Snowmobiling, Hiking	Ongoing since before 1870	-
Infrastructure	Includes existing rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities	Ongoing since 1870	-
Generating Stations	Pointe du Bois Generating Station	Ongoing since 1911	-
	Slave Falls Generating Station	Ongoing since 1948	1928 to 1948
	Seven Sisters Generating Station	Ongoing since 1931	1929 to 1931
Transmission Lines	P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines	Ongoing since 1920	-

Table 5-2: Project/activity inclusion list			
Type of Project/Activity	Select specific activities/projects	Activity/Project Timeline	Timeline for construction, if applicable
	R1 and R2 (Pointe du Bois to Slave Falls) 115-kV transmission lines	Ongoing since 1930	-
	S2 (Slave Falls to Stafford) 115-kV transmission line	Ongoing since 1931	-
	SK1 (Seven Sisters to Star Lake) 115-kV transmission line	Ongoing since 1989	-
	SG12 (Great Falls to Seven Sisters) 115-kV transmission line	Ongoing since 1928	-
	SR3 (Seven Sisters to McArthur Falls) 115-kV transmission line	Ongoing since 1930	-
	SW1, SW2, SW3 and SW4 (Seven Sisters to Whiteshell) 115-kV transmission lines	Ongoing since 1937	-
	ST5 and ST6, (Seven Sisters to Transcona) 115-kV transmission lines	Ongoing since 1931	-
	K21W and K22W (Whiteshell to Kenora)	Ongoing since 1972	-

Table 5-2: Project/activity inclusion list			
Type of Project/Activity	Select specific activities/projects	Activity/Project Timeline	Timeline for construction, if applicable
	230-kV transmission line		
Nuclear Power	Whiteshell Laboratories (Former nuclear facility)	1963 to 2003	-
Other Industrial and Processing Developments/ Facilities	Commercial Wild Rice Harvesting Operation at Rice Lake	Ongoing since 1917	-
Future Projects and Activities			
Generating Stations			
Slave Falls Generating Station	Slave Falls 7-Bay Sluiceway Life Extension Project	Future maintenance works at an existing generating station	August 2024 to 2027
Nuclear Power	Whiteshell Laboratories - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	Future project at an already developed property. Activities anticipated to start in 2026. End date unknown.	Unknown

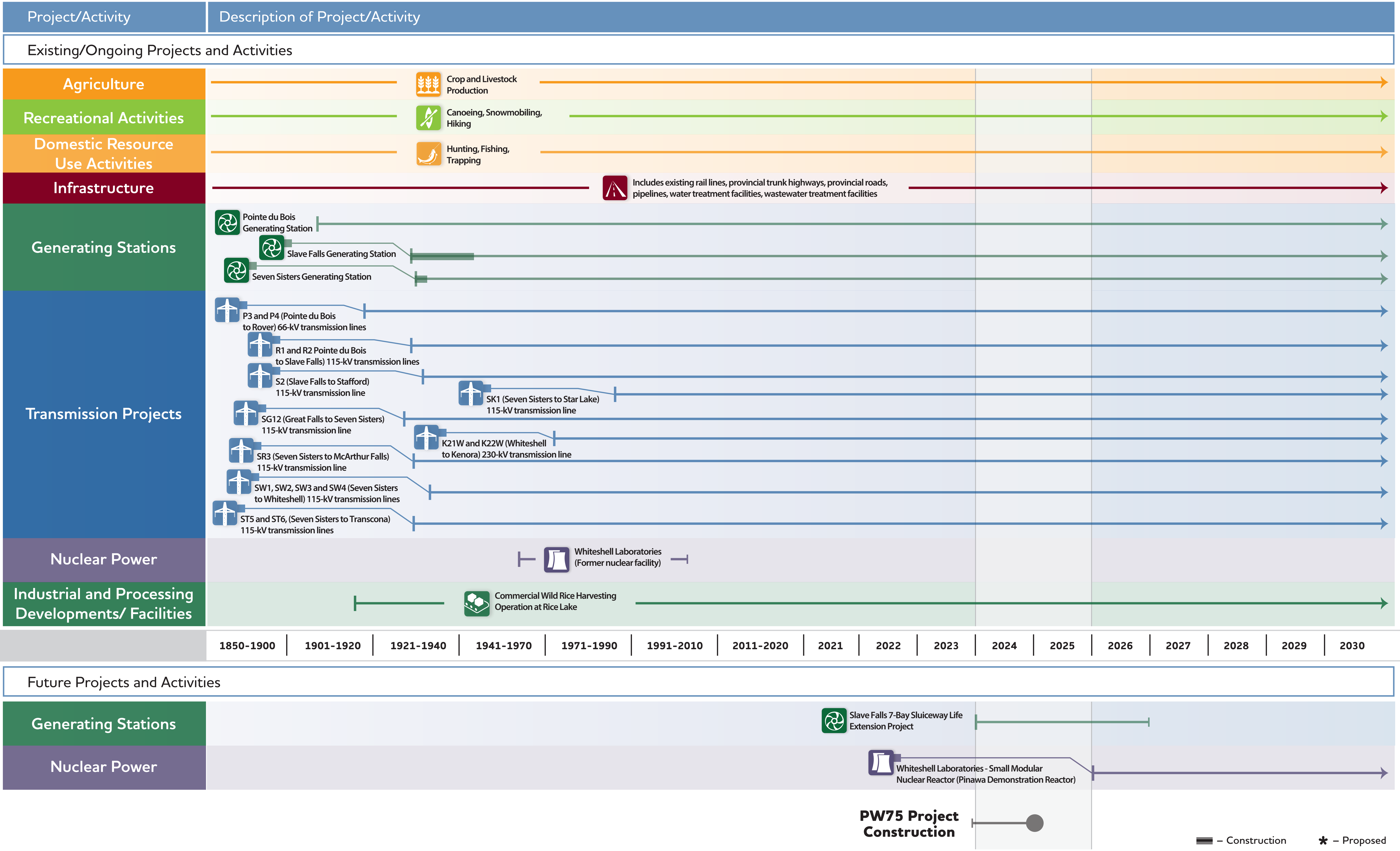


Figure 5-1. Past, Present and Future Projects in the PW75 Regional Assessment Area

5.4 Follow-up and monitoring

Manitoba Hydro's environmental protection program (Chapter 11.0) provides the framework for implementation, management, monitoring and follow-up of environmental protection measures. Environmental protection, management, and monitoring plans (as required) will be prepared and implemented under the environmental protection framework to address environmental protection requirements in a responsible manner.

Follow-up and monitoring are intended to verify the accuracy of the environmental assessment, assess the implementation and effectiveness of mitigation and the nature of the residual effects, and to manage adaptively if required.

Follow-up and monitoring will be implemented through inspection, monitoring, management, and auditing actions.

5.4.1 Inspection

Inspection is the organized and routine examination or evaluation, including observations, measurements and sometimes tests, of a construction project or activity. Inspection results are compared to pre-defined requirements or standards to determine whether an activity conforms to these requirements. Inspection provides an essential function in environmental protection and implementation of mitigation measures. Much of the success in environmental protection will be attributable to how well environmental inspection is carried out during the construction phase of a project.

Manitoba Hydro has established a comprehensive and integrated environmental inspection program to ensure effective implementation of environmental protection measures, compliance with regulatory approvals and fulfillment of corporate environmental objectives.

Trained inspectors visit work sites and inspect for compliance with license terms and conditions, and adherence to environmental protection measures.

5.4.2 Monitoring

Monitoring is the continuing observation, measurement, or assessment of environmental conditions at and surrounding a construction project or activity. Two main types of monitoring are typically undertaken for environmental assessments:

1) Environmental monitoring to verify the accuracy of the predictions made and the effectiveness of the mitigation measures implemented.

2) Compliance monitoring to verify whether a practice or procedure meets legislated requirements.

Monitoring determines if environmental effects occur as predicted, residual effects remain within acceptable limits, regulatory limits, criteria, or objectives are not exceeded, and mitigation measures are as effective as predicted. Monitoring also allows for adaptive management where monitoring results show there is a need for additional environmental protection or enhancement.

5.4.3 Management

Management is the control of pre-defined environmental effects, issues, and concerns through the implementation of reasoned and approved courses of action. Management plans will be prepared to address important management issues, regulatory requirements and corporate commitments identified in the environmental assessment report. The management plans will describe the management actions, roles and responsibilities, evaluation mechanisms, updating requirements and reporting schedules. The following management plans have been prepared for the construction of the project (detailed in Chapter 11.0):

- Access management plan
- Biosecurity management plan
- Erosion and sediment control management plan
- Rehabilitation and invasive species management plan
- Waste and recycling management plan

A clearing management plan will be developed prior to clearing.

The above plans have been prepared by Manitoba Hydro. They will be adjusted based on continued engagement and the regulatory approval process.

6.0 Existing conditions

This chapter provides an overview of the existing conditions, which the project will interact with, to provide a baseline for the assessment of project effects.

To define the environment that may interact with the project, Manitoba Hydro facilitated collaborative exercises during engagement circles that took place during project engagement. These exercises provided the opportunity for FNMEP participants to identify environmental values or topics that may be affected by the project in beneficial or adverse ways, to arrange the topics into themes, and to discuss connections between topics and themes.

This chapter is organized into sections based on interrelated themes identified through the engagement circles. The sections used to describe the project setting in this chapter, and the topics discussed under each, are as follows:

Historical and cultural setting (Section 6.1):

- Heritage resources
- History of the cultural landscape
- Indigenous lands
- Contemporary land use

Environmental setting (Section 6.2):

- Climate
- Skies
- Waters
- Soils
- Lands

Socio-economic setting (Section 6.3):

- Infrastructure and services
- Land and resource use
- Agricultural land use
- Population
- Employment and economic benefits
- Well-being (human health)

Through the engagement circles, well-being was introduced as a fourth theme. This theme arose from discussions about how species health could serve as an indicator of how the environment responds to the project and feedback that environmental assessment topics should include a human element that discusses the effects that may be experienced holistically by humans. This discussion about existing conditions related to well-being has been included under the socio-economic setting with references to well-being made in other relevant connected sections.

The existing conditions were established based on based on data collected during desktop analysis, field programs, engagement, and the assessment boundaries for the valued component.

6.1 Historical and cultural setting

Southeastern Manitoba has an extensive human history, which has physically and culturally shaped the landscape and relationships with land in the project area.

During engagement on this project and past projects, we have heard feedback about extending the timeline and scope of the cultural landscape. On previous projects, participants shared feedback that the ways sites and intangible characteristics of culture are described under the *Heritage Resources Act* can be too narrow.

We have learned that to develop understanding of the geographic context of the project and to determine present-day conditions, it is important to acknowledge and recognize the history and cultural chronology of the land and people connected to the land, and the effects of anthropogenic impacts on human-nature relationships and land use over time.

The section begins with a discussion of heritage resources and the archaeologic record in the project area along with a summary of historical events that have altered the lands and the connection of people and lands over time. The section will then discuss the contemporary setting including Indigenous lands (designated areas and interests) and contemporary land use by First Nations and the Red River Métis.

This section discusses the history of the land, people, and human-nature relationships that have evolved over time within and surrounding the project region.

The intent of this section is to support understanding of the historical and cultural setting of the project.

6.1.1 Heritage resources

According to the archaeological record, human occupation of the study area most likely began after the meltwater of glacial Lake Agassiz drained from the area *ca*. 8,000 years ago. Prior to that, the area was covered by the Late Wisconsinan ice sheet (MAS 1998a; Teller and Clayton 1983; Steinbring 1980; Bowe 1999).

A cultural chronology (or timeline) has been created and is based on technological innovations and historical happenings. The chronology comprises two major periods: the Indigenous Period and the Indigenous European Period. These are further subdivided into Early, Middle, and Late sub periods.

6.1.1.1 Indigenous Period (*ca.* 12,000-350 BP)[2]:

Early Indigenous Period (*ca*. 8,000-6,5000BP)

According to the archaeological record, the area has been occupied since the Early Indigenous Period. Archaeologists refer to the material culture from this area and time as the Caribou Lake Complex. The peoples who occupied this area were bison hunters, who followed the herds into the newly formed grasslands and, in addition, took advantage of the forest resources present on the eastern margins of their habitation. The lithic toolkit of the Caribou Lake Complex is characterized by narrow, leaf-shaped lanceolate points, biface knives, trihedral adzes, and three-sided ground or chipped stone tools which were used as woodworking implements (MAS 1998a).

Middle Indigenous Period (*ca*. 6,500-2,000BP)

Several important cultural adaptations are found within the Middle Indigenous Period, including the appearance of notched or stemmed projectile points, end scrapers, adzes, and other cutting implements (OAS 2011). The appearance of new style projectile points and the introduction of the atlatl[3] suggest adaptive technological changes for procuring food resources.

Raw materials used by the Middle Indigenous period people became much more diverse, including the appearance and use of native copper which was used for making tools and adornments. The range of dates suggests cultural interaction and movement across a vast landscape (Wright 1972).

Culturally, this was a society of hunters, fishers, and gatherers whose members subsisted on a seasonally diverse diet of large game, fish, and local plants (Wright 1972, Kennett and Winderhalder 2006). The lithic tool kit included plains grasslands projectile point/dart forms such as Logan Creek (*ca*. 6,500-500BP), Oxbow (ca. 5,300-3,500BP), McKean (*ca*. 3,200-2,800BP) and Pelican Lake (*ca*. 3,200-1,600BP), along with stone knives and scrapers.

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[2] BP – "Before present" - a dating technique based on the number of years before A.D. 1950, the date that is used as the base for radiocarbon dating.

[3] Atlatl - a spear extender, which provided leverage to the spear thus increasing the velocity and accuracy of the projectile.

Ancient copper mines at Isle Royale on Lake Superior have been identified as the source material for projectile points within the southern part of Manitoba (Wright 1972, Steinbring 1980, Bouge 2007), to which at least seven sites have been documented along the Winnipeg River.

Late Indigenous Period (*ca*.2,000-300BP)

The introduction of Indigenous clay pottery marks the distinction of the Late Indigenous Period (Wright 1972), also known as Woodland. This tradition first developed in eastern North America and moved westwards. In Manitoba, the Woodland Tradition is further divided into two temporal periods, Middle and Late, which are based on vessel construction and stylistic attributes.

The Middle Woodland people using pottery in Manitoba are represented by the Laurel Culture (*ca*. 2,000-1,000BP) and the type of ceramic ware produced during this period. The pottery was conical in shape, manufactured using a coiling method, and decorated with various stamping techniques and incised design. The Laurel lithic toolkit consisted of a variety of lithic tools including triangular projectile points and copper awls and beads (Stoltman 1973). The Middle Woodland Culture is also characterized by people representing a shift from a reliance on grassland to forest and aquatic resources, including fish and wild rice harvesting (MAS 1998b).

The Late Woodland Tradition (*ca*. 1,000-300BP) contains several important pottery types that represent local variations that made them distinctive. Although pottery construction is believed to use similar techniques, there are signature differences within this tradition.

For the Winnipeg River study area, Blackduck, Minontoba and Selkirk pottery styles are the three main derivatives (Hyslop 2014, 2012). The people associated with these types of pottery constructed globular-shaped vessels made from masses of wet clay, using a lamination technique.

Archaeologists believe that these pots were pre-formed in a woven bag that left a distinct fabric impression on the exterior. Vessel rims, necks, and lips were embellished with combinations of design attributes such as decorative punctuates, small cord-wrapped-stick impressions, or incising (OAS 2011). Lithic tools associated with the Late Woodland Tradition include small triangular and side-notched projectile points, stone drills, and smoking pipes (Wright 1972).

In addition to the cultural materials mentioned above, the largest concentration of petroform sites in Manitoba is found within the Winnipeg River's drainage system (Steinbring 1980). These rock mosaics were created by placing stones and/or boulders on bedrock surfaces to achieve the desired outline, usually human or animal effigies. There has been no success in assigning these cultural features to a particular period. However, there is a direct link between the people of the Late Indigenous Period and the Anishinaabe who continue to use and occupy this area, and who continue to use some of the major petroforms in their ceremonies (Manitoba Government n.d).

6.1.1.2 Indigenous European Period (*ca*. 1700 to present)

Although the Winnipeg River area had experienced human activity for thousands of years, the first European influence came from explorers, and fur traders. The Indigenous peoples of the area had three routes by which European goods could be obtained: the English routes via the Hayes and Albany rivers, and the French route from the east via the Great Lakes system (Steinbring 1980).

Many traditional items were quickly replaced with more durable European counterparts: clay vessels with copper and sheet-iron kettles; stone tools with steel knives, porcupine quills, and other natural adornments with glass beads. These goods were often given as gifts to secure trade relations (NLHS 2007).

Coureurs de Bois were most likely the first Europeans to travel the Winnipeg River (Steinbring 1980), the explorer La Vérendrye was most influential in identifying the Winnipeg River as a trade route and establishing fur trade forts near Indigenous camps throughout the area.

La Vérendrye put great faith in local guides, especially in Auchagah (Ogachuk), who was a Cree guide, who informed him of various passable routes west of Lake Superior (Burpee 1927). This exploration-initiated settlements and cultural adaptation within the area (NLHS 2007). In 1734, La Vérendrye's group constructed Fort Maurepas, on Lake Winnipeg, in the vicinity of a large Indigenous village (Crouse 1928), located close to the present settlement of the present day Sagkeeng Anicinabe, also known as Sagkeeng Anicinabe First Nation.

Between 1734 and 1750, Fort Maurepas was abandoned, re-opened, and rebuilt by the Coureurs de Bois several times (Steinbring 1980). First Nation groups in the region traded with the Coureurs de Bois, and later with the Hudson's Bay Company (HBC), and the Montreal-based independents, who were generally referred to as 'les Canadiens". They also acted as middlemen, gathering furs from interior First Nation groups, and returning to the fort to secure European made goods (NLHS 2007).

Fort Alexander, the most notable fort to be built on the Winnipeg River was established in 1792 and is located on what is now Sagkeeng Anicinabe First Nation. The fort, built by the North West Company (NWC), was in continuous operation for more than a century. Although the HBC built three forts within the area, the NWC continued to flourish without competition from 1801 to 1822 (Steinbring 1980; NLHS 2007).

Dwindling fur resources, among other things, caused the HBC and NWC to amalgamate in 1821. This created a fur trading monopoly that covered one-quarter of North America. The result of this new cartel was downsizing; employment opportunities decreased, and many unprofitable posts were closed. Fort Alexander remained solvent, and an Indigenous community grew near the post (NLHS 2007).

6.1.1.3 Heritage Sites

Ancient land use practices can be observed within the archaeological record. In relation to cultural ecology, archaeologists examine how past cultures lived on certain landscapes or environments during a specific time (Cromley 1994). Within this landscape, certain features and areas contain tangible evidence of past people. Heritage resources were characterized for the region based on the locations of previously recorded, archaeological sites, registered century farms and a compiled list of municipally and provincially designated sites.

A search of historic trails and parish buildings as well as list of known cemeteries was also compiled.

The archaeological record provides physical and documented evidence of different cultural occupations that have occurred over millennia. Archaeological site information is held by the Province of Manitoba in an archaeological site inventory database.

A review of existing registered archaeological sites in the region was undertaken. A request was sent to the Manitoba's Historic Resources Branch (HRB) to review the archaeological site inventory for registered sites. The archaeological sites identified within 1 km of the preferred route totaled 16 registered sites. The documented archaeological sites (Table 6-1) reveal a human occupation of the area dating back to the Early Indigenous Period (*ca*. 8,000-6,500BP).

Table 6-1: Heritage sites recorded within 1km of the preferred route

Borden no.	Site type	Period	Description
EaLa-001/1976	Burial	Middle Indigenous Period to Late Indigenous Period	N/A
EaLa-001/1998	Burial	Middle Indigenous Period to Late Indigenous Period	N/A
EaLa-003	Burial; Campsite	Early Indigenous Period to Late Indigenous Period	N/A
EaLa-004	Burial	Unknown	N/A
EaLa-005	Burial	Late Indigenous Period	N/A
EaLa-009	Burial	Unknown	N/A
EbKx-057	Isolated Find	Woodland	Surface collected Blackduck ceramics
EaLa-002	Campsite	Late Indigenous Period, Indigenous European Period (Fur Trade)	Surface collected projectile points, ceramics
EaLa-008	Uninterpreted	Unknown	Unknown
EaLa-010	Petroform	Middle Indigenous Period	Linear rock feature
EbKv-012	Kill Site	Indigenous Period	Surface collected projectile points and flakes

Table 6-1: Heritage sites recorded within 1km of the preferred route			
Borden no.	Site type	Period	Description
EbKv-053	Isolated Find	Indigenous Period, Indigenous European Period (Fur Trade)	Surface collected flakes, biface, and iron knife.
EbKv-054	Campsite	Indigenous Period	Unknown
EbKv-Y1	Uninterpreted	Middle Indigenous Period	Surface collected projectile points.
EbKw-038	Uninterpreted	Indigenous European Period	A beehive-shaped stone hut by the edge of a granite outcrop.
EbKx-003	Settlement	Indigenous European Period (Recent)	The remains of a house and barn.

One Century Farm (Table 6-2) has been recorded within 1km of the PPR.

Table 6-2: Century farms recorded within 1km of the PPR			
Century farm	Original date	Plaque date	Description
Farm	1904	2005-07-26	N/A

There are three historic trails within 1 km of the preferred route. They are all labeled minor trails. No plaques and cemeteries have been registered or recorded within 1km of the preferred route.

6.1.2 History of the cultural landscape

As illustrated in the above discussion about heritage resources (Section 6.1.1), the history of human-nature relationships in the project area can be, at least partially, examined using archaeological records of technology (i.e., artifacts discovered during those times) of the project. We recognize that the archaeological record provides only a partial record of the history of the cultural landscape and that more work is needed to adequately understand the heritage and culture of the area. There are tangible and intangible elements that contribute to the cultural landscape, and we understand that events throughout history have contributed and shaped relationships of First Nation and Métis connections to land.

For this assessment we include an overview of events that have caused change or disruption to First Nation and Métis connections to land in the project region over time. This overview will provide important background for the cumulative effects assessment in Section 7.2.5 and cumulative effects assessments throughout the report. In addition, understanding the changes that have taken place in the project area over time is also relevant to understanding the project setting and effects that may result from this project.

We understand that truth-telling regarding our colonial histories that shape our project approval systems is an initial step to support reconciliation.

Figure 6-1 is a non-exhaustive summary of major events or periods of change to the geographical and political environments that have taken place in the project area, which have ultimately affected the landscape and the relationships Indigenous peoples have with land in the project area.

Figure 6-1: Timeline of events contributing to changes to the landscape and to the relationships that First Nations people and Métis citizens have with land in the project area

15th century

During the Pope's visit to Canada in July of 2022, discussion arose about the Doctrine of Discovery, a series of Papal Bulls (formal statements from the Pope) originating in the 1400s that divided up Indigenous lands for European powers. The principles of this doctrine made its way into Canadian law in the 1880s through the *St. Catherine's Milling* decision and supported colonization and the dispossession of sovereign Indigenous nations from their large territorial lands to British and Canadian colonial governments.

Past and ongoing colonial and assimilative strategies that have served to disconnect, relocate, and displace First Nation and Métis people from the land can be traced back to this early doctrine.

19th Century: Eradication of the buffalo

Eradication of the buffalo in the 19th century led to starvation and loss of culture, ultimately having "a profound influence on the lives of Indigenous peoples" (Phillips, 2018). Political views at the time encouraged hunting for safer train passage and it was understood that if the buffalo were decimated, Indigenous peoples on the prairies would be more "submissive without their main source of subsistence." Many of the First Nations engaged on this project have shared during other engagement processes that buffalo were an important species within their respective traditional territories even though buffalo may not be directly tied to the project area.

17th to mid-19th centuries: The fur trade

Beginning in the 1600s and extending for 250 years, the fur trade brought significant changes to the way of life of many First Nation peoples and communities as people adapted to new tools and a more commercially driven way of life (Royal Commission on Aboriginal Peoples, 1996).

The fur trade era marked the earliest contact between Europeans and Indigenous peoples in the project region. With the fur trade came small-pox, measles, influenza and other communicable diseases, trade goods, a money-based economy, and other factors that were disruptive to the culture and economies of the region's Indigenous peoples (Heagerty, 1928).

The intermingling of cultures eventually led to the emergence of a culturally distinct, diverse group of Métis people who later played a large role in the fur trade (Kloos, 2016).

The Winnipeg River was one of the main routes for traders heading west of Lake Superior into the interior of present-day Manitoba during the 18th century, which facilitated a regular presence of European traders passing through the region. Using a route shown to them by local Indigenous peoples, early fur traders frequently travelled along the Roseau River, also known as the Reed River, to travel between the Red River and Fort St. Charles on the Lake of the Woods (Burpee, 1927).

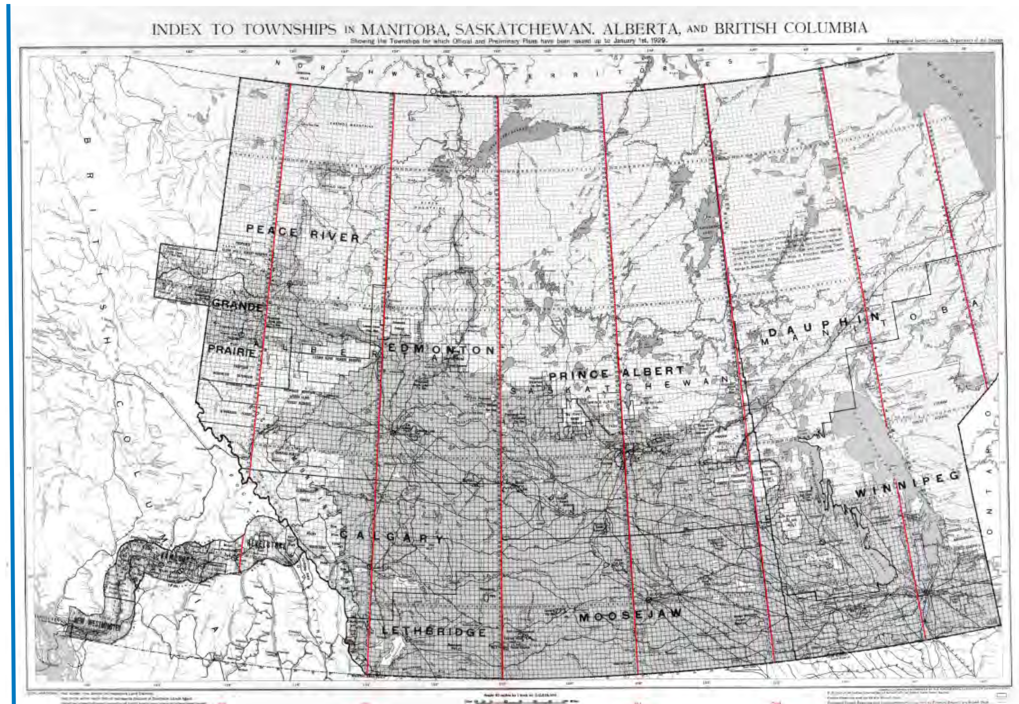
1871 to 1871 - Signing of the numbered treaties (overlapping the regional assessment area)

Through the signing of numbered treaties in the prairie provinces, many Indigenous peoples were forced to give up their traditional lifestyles and were moved onto reserves.

The Government of Canada has generally adopted a narrow view of treaty terms, originally considering the numbered treaties to be primarily a land conveyance agreement, intended to extinguish Indigenous title and open the region for settlement and development. The First Nation signatories to the numbered treaties, on the other hand, understood the treaties in the context of Indigenous peace and friendship treaties, which had long been used to mediate disputes and regulate external relations. From this perspective, the numbered treaties were an acknowledgement that Indigenous peoples would share the land with the newcomers, and in return, would receive material support and assistance, a recognition of their primacy of occupation of the land, and an assurance that Indigenous economies and freedom of movement would not be affected (Daugherty, 1983).

The interpretation and implementation of the numbered treaties remains a contested issue, but recent court decisions have supported the view that the honour of the Crown demands a liberal interpretation of the treaties.

The RAA overlaps Treaty 1 (signed in 1871) and Treaty 3 (signed in 1873) lands. Engaged First Nations that have active TLE agreements include Brokenhead Ojibway Nation (Treaty 1), Norway House Cree Nation (Treaty 5), and Peguis First Nation (Treaty 1).



Map of townships in western provinces, Library and Archives Canada, Land Grants of Western Canada, 1870-1930 (https://www.bac-lac.gc.ca/eng/discover/land/land-grants-western-canada-1870-1930/Pages/land-grants-western-canada.aspx#toc4)

1872: The Dominion Lands Act

In 1872, the Dominion Lands Act was signed, which outlined specific policies to encourage homestead settlement throughout the west. This Act allocated *"millions of prairie acres for homesteads, railway construction, and colonization companies"* (Brglez, 2021). As a result, settlers moved into the region. Canada intended to use natural resources and lands in the west to promote Western settlement and railway construction. The Act outlined a standard measure for surveying and subdividing land. The Dominion Land Survey divided the prairie lands into square townships. Each township comprised of 36 sections, where each section contained 640 acres (260 ha), which were further broken down into 160 acre (65 ha) quarter-sections. This division of the landscape led the way for the development of infrastructure along this square grid, including roads, drains, towns and sometimes, transmission lines.

1876 to present: The Indian Act

The Indian Act, first introduced in 1876, is a Canadian federal law that governs in matters pertaining to Indian status, bands, and Indian reserves. A new version of the Act was passed in 1951, and since then, has been amended several times, with changes mainly focusing on the removal of discriminatory sections. It is an evolving, paradoxical document that has enabled trauma, human rights violations and social and cultural disruption for generations of Indigenous people. The Indian Act has also enabled the government to determine the land base for nations in the form of reserves and defines who qualifies as 'Indian' in the form of Indian status. The Act outlawed traditional governance systems in favour of Band Chief and Councils with governing authority limited to Indian Reserve land. The Act also restricted Indigenous people from voting in federal elections until 1960, continued to take up and put laws on Indigenous land, and enfranchised those First Nations (especially women) who the government deemed to no longer have "status" (Assembly of First Nations, 2021).

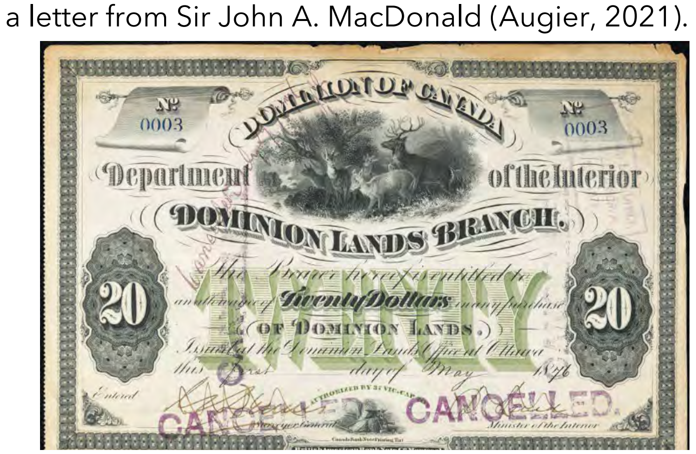
Late 1870s: Beginning of natural resource extraction

Forestry - Beginning in the late 1870s, the forest industry contributed significantly to deforestation in the region, creating increased access directly through logging roads and indirectly by supplying the timber needed to build the first railways though eastern Manitoba. The cleared land became available for agricultural conversion by settlers (HRB 2000).

Mining - Mining began in the region in 1898, with a small mining boom as claims were staked in the area and with the subsequent establishment of the Lac du Bonnet Mining, Developing, and Manufacturing Company (Strassel n.d.). This company had approximately 40 mining claims around the settlement of Lac du Bonnet and along the Bird River.

1885: Métis Scrip

In 1885, the federal government offered Métis families what was called 'scrip' in exchange for their land title. Scrip could be issued as land scrip (typically a quarter section of land), or it could also be issued as money scrip, valued at $160 or $240. Métis people were moved to create space for European settlers with the vision of reaching Canada's 'manifest destiny', as noted in a letter from Sir John A. MacDonald (Augier, 2021).



Métis scrip for purchase of dominion lands from 1905. Photo from Library and Archives Canada / The Canadian Encyclopedia (https://www.thecanadianencyclopedia.ca/en/article/dominion-lands-policy)

1930: Natural Resources Transfer Act

In 1930, the Natural Resources Transfer Act was passed by the federal government, transferring the jurisdiction of natural resources to the Province of Manitoba (Elias et al. 1997; Hall 2006). This provided provincial authority to exploit natural resources within the provincial boundary, including increased management over trapping, fishing, and hunting (Elias et al. 1997).

20th Century: Settlement era

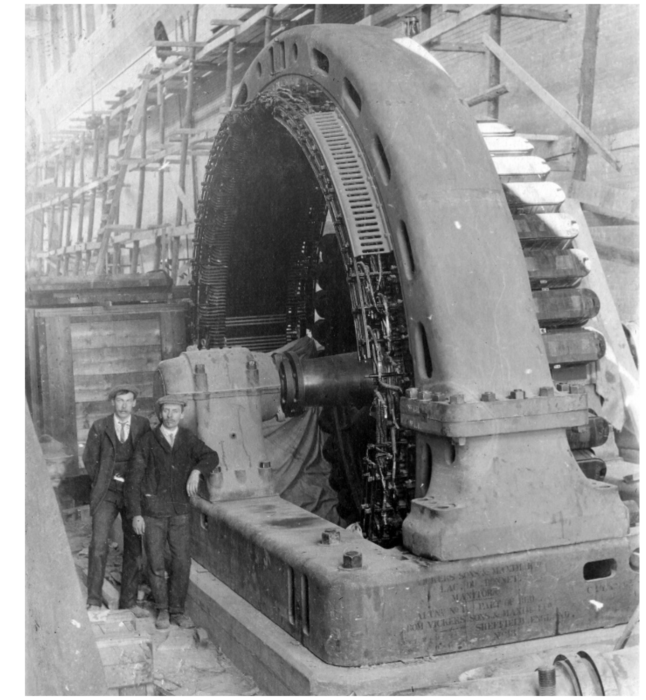
The settlement era marks the true influx of Europeans to the project region and represents a significant leap in effects pathways that decreased Indigenous access to lands and resources available for harvesting and cultural activities. Before 1930, homestead activity was concentrated in Lac du Bonnet and Riverland (located on the east side of the Winnipeg River) given the land's agricultural suitability. Old Pinawa was the first permanent settlement in the area, formed in approximately 1906 when the Winnipeg Electric Company built the Pinawa Dam for hydroelectric generation to meet increasing power demands in the City of Winnipeg (Pinawa, 2022). The site ceased generating power in 1951 and the townsite was abandoned. A new Pinawa townsite was started in 1963 by Atomic Energy of Canada Limited to house the employees for its Whiteshell Research Laboratories (Pinawa 2022).

This division of the landscape led the way for the development of infrastructure along this square grid, including roads, drains, towns and sometimes, transmission lines.

Late 19th century to present: Electrical power generation and transmission in the Winnipeg River area

Due to increasing demands for merchantable timber, fish, fur, minerals, agricultural lands, and hydroelectric power during the mid-1890s, interest grew in the Winnipeg River. The first dam on the Winnipeg River was the Pinawa Dam, which delivered power from 1906 until it was closed in 1951 (Government of Manitoba n.d.). There are currently six generating stations operating on the Winnipeg River: Great Falls, McArthur Falls, Pine Falls, Pointe du Bois, Seven Sisters, and Slave Falls.

Sagkeeng Anicinabe First Nation members reported that cumulative impacts have already substantially affected the ability to practice Aboriginal and Treaty Rights in much of their territory, including impacts from fluctuating water levels, erosion, loss of land, and access (Sagkeeng Anicinabe First Nation 2023).

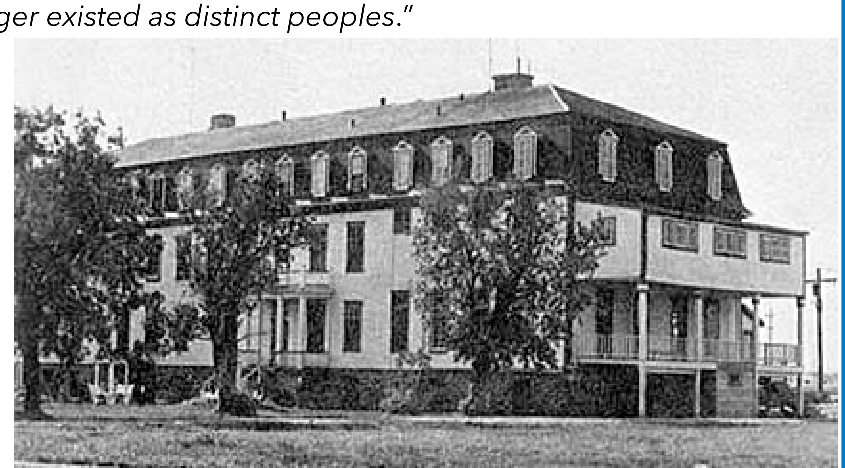


Pointe du Bois Generating Station, Manitoba Hydro's oldest generating station still in operation, went into service in 1911.

19th century to 1996: Residential school system

Residential schools were created by the federal government in the 1800s under the Indian Act as a tool of assimilation. Indigenous children were forcefully sent to institutions where they would "have their hair cut, their language killed, their relationships with family and community severed, their sense of belonging destroyed, and their physical, emotional, mental and spiritual health compromised" (Assembly of First Nations, 2021c). Many of these students never returned. Residential schools were characterized by the Truth and Reconciliation Commission as a cultural genocide and "*a systematic, government- sponsored attempt to destroy Aboriginal cultures and languages and to assimilate Aboriginal peoples so that they no longer existed as distinct peoples*."

In 1905, Fort Alexander Residential School opened and operated for 65 years. Located on the Fort Alexander Reserve (now Sagkeeng Anicinabe First Nation), it was operated by the Catholic Church until June 30, 1970, after which it operated as a day school for several years (NCTR n.d.). Children up to Grade 9 were forced to attend. Enrolment ranged from 45 at its lowest point to 130 at its highest (CBC News 2021).

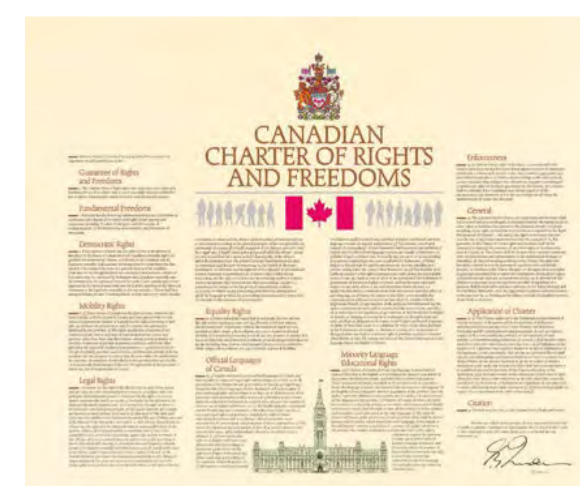


Fort Alexander School - Archives of the Société historique de Saint-Boniface, Fonds Oblats de Marie-Immaculée Province du Manitoba /Delegation, SHSB 24260

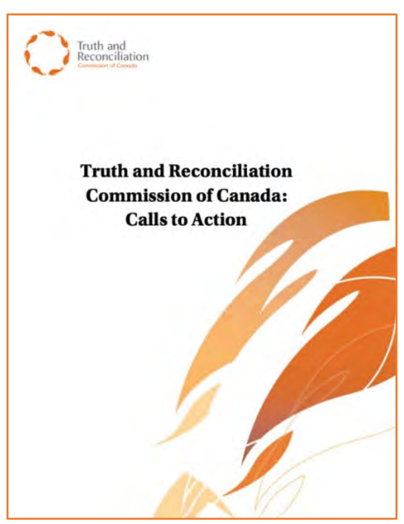
1982: The Constitution Act

The Constitution Act, 1982 enshrined the Charter of Rights and Freedoms into Canada's Constitution. Section 35 of the Act protects Aboriginal and Treaty rights and requires the Crown to act honourably in all its dealings with Indigenous peoples. Canadian courts, including the Supreme Court of Canada have made judgments clarifying the meaning of Section 35. One element of these judgments is the recognition that the Crown has a legal duty to consult with Aboriginal peoples about any decision or action that might adversely affect the exercise of an Aboriginal or Treaty right, before taking that action or making that decision.

The duty to consult is generally triggered in relation to decisions or actions that have the potential to adversely affect lands and resources used to exercise Aboriginal or Treaty rights such as hunting, fishing and trapping for food.



1988: The Environment Act
With the enactment of The Manitoba Environment Act in 1988, environmental assessment became a legislated requirement for certain types of development in Manitoba. The consideration of cumulative effects is central to environmental assessment as a tool for sustainability, particularly in areas where multiple large-scale projects operate or are planned. It is acknowledged as a best practice, but cumulative effects assessment is methodologically complex and there are challenges to its effective implementation. Manitoba's Environment Act and regulations do not include a requirement to include cumulative effects assessment at either the development or strategic level; however, it is not uncommon for proponents to address cumulative effects in their applications, such as this one.


Truth and Reconciliation Commission of Canada: Calls to Action

2007 – 2015: Truth and Reconciliation Commission
Between 2007 and 2015, the Truth and Reconciliation Commission (TRC) provided those directly or indirectly affected by the legacy of the Indian Residential School system with an opportunity to share their stories and experiences. The TRC spent 6 years travelling to all parts of Canada and heard from more than 6,500 witnesses.

The TRC developed a guiding set of ten principles for truth and reconciliation and made 94 calls to action to advance the process of reconciliation in Canada.

2016: The Path to Reconciliation Act
In 2016, the Government of Manitoba passed The Path to Reconciliation Act, which sets out the government's commitment to advancing reconciliation that is informed by, but not limited to the TRC Calls to Action.

2021: Unmarked graves
Since the Tk'emlups te Secwepemc announced in May of 2021 that the remains of as many as 215 children were found using ground-penetrating radar around the former Kamloops Indian Residential School in British Columbia, heritage concerns on Manitoba Hydro projects heard through engagement increased dramatically. Manitoba Hydro is learning new ways to better include First Nation and Red River Métis input in all aspects of understanding heritage concerns and values, including former residential schools sites and surrounding areas.

2021: UNDRIP Act
On June 21st, 2021, the United Nations Declaration on the Rights of Indigenous Peoples Act received Royal Assent and came into force. This Act provides a roadmap for the Government of Canada and Indigenous peoples to work together to implement United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) based on lasting reconciliation, healing, and cooperative relations. Through 24 preambular provisions and 46 articles, UNDRIP affirms and sets out a broad range of collective and individual rights that constitute the minimum standards to protect the rights of Indigenous peoples and to contribute to their survival, dignity and well-being. Article 32 (2) of UNDRIP provides that "states shall consult and cooperate in good faith with the Indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources."

2021: MMF-Canada Agreement
On July 6, 2021 the Manitoba Métis Federation (MMF) signed the Manitoba Métis Self-Government Recognition and Implementation Agreement with Canada at Upper Fort Garry. The agreement provided immediate recognition of the MMF as the democratically elected Métis Government for the Red River Métis. Prior to this agreement, Métis citizens had been displaced across their homelands since the passing of the Manitoba Act established the Province of Manitoba in 1870.

While many of the events and activities described in Figure 6-1 have been immensely harmful to and impactful to First Nations peoples, Métis citizens, and their traditional lands, it is important to note that the land wherein the project area lies is not singularly defined by the inflicted damage. Indigenous peoples' resilience in the face of change continues to grow representing a renewal and resurgence of Indigenous identity, self-determination, and sovereignty. Globally and within Canada there are increasing efforts to protect Indigenous rights (UNDRIP, calls for reconciliation nationally, and renewed interest in protecting language, culture, and constitutionally protected rights). Leaders of nations present in the project area continue to work to protect the rights of their communities by creating new nation to nation relationships (e.g., Manitoba Metis Self-Government Recognition and Implementation Agreement, July 6, 2021).

6.1.3 Indigenous lands

The project will be on lands occupied and cared for by Indigenous people for thousands of years, including the traditional territories of the ancestors of the Anishinaabe, Anishininiwag and Cree peoples and the homeland of the Red River Métis. The area is known in Anishinaabemowin as Manito Ahbee, a word meaning where the Creator sits and is recognized and honoured by Indigenous peoples across North America as a sacred place for all people.

The project lies on Treaty 1 and Treaty 3 lands, is in an area of the province of historical and contemporary interest to the Manitoba Métis Federation and its citizens and is partly within the Recognized Métis Harvesting Area.

During engagement, we heard that identifying who to engage with based on treaty areas is a colonial way of thinking since treaty area boundaries were imposed on First Nations, whereas Indigenous understandings of territories are relational and based on oral history. We heard that engaging based on historical territories of cultural groups would be more culturally appropriate and that it is important to gather perspectives from many nations.

Our FNMEP is consistent with this perspective by considering multiple criteria when determining who to engage on the project (Chapter 4.0). First Nations engaged on the project are members of Treaty 1, Treaty 3, and Treaty 5 in addition to the Manitoba Métis Federation, and Northern Affairs Communities. The broader region includes the Northern Affairs Communities of Aghaming, Bissett, Manigotagan, and the Incorporated Community of Seymourville. NACs are settlements located in unorganized territory within Manitoba that are designated under The Northern Affairs Act.

Treaty Land Entitlements (TLE) are agreements negotiated between certain First Nations and the federal government intended to fulfill outstanding land-related treaty obligations (Government of Canada 2017). Engaged First Nations that have active TLE agreements include Brokenhead Ojibway Nation, Norway House Cree Nation, and Peguis First Nation.

We understand that both Crown and private land contribute to the fulfillment of TLE agreements in Manitoba. Through the FNMEP, Sagkeeng Anicinabe First Nation and Brokenhead Ojibway Nation both shared concerns about potential impacts to the ability to select TLE land within the area now and in the future on both Crown and private lands. The potential effects of routing on both Crown and private lands were considered during the routing process.

Manitoba Hydro reviews TLE selections and Additions to Reserve selections through mapping provided by the Province of Manitoba and feedback heard during the FNMEP. Any TLE selections within the project area are identified as areas of least preference during the transmission line routing process. No part of the right-of-way crosses reserve lands, any TLE selections, or Additions to Reserve selections. There are TLE selections in the broader region and communities with TLE selection were scoped in for engagement through the FNMEP.

In addition to TLE selection opportunities, Crown land is also highly valued by First Nations people and Red River Métis citizens as areas that remain available for practicing rights-based activities.

We considered how the Manitoba Métis Federation specifically value Crown lands without occupiers. Any Crown land without an occupier as defined by the Municipal Assessment Act was considered during routing. The Manitoba-Minnesota Transmission Project (MMTP) Métis Interests Report (2016) explains how important unoccupied Crown land is to the MMF as it *"represents areas where they can exercise their Métis rights without permission. On all other land types, the exercise of Métis rights can be restricted from time to time under certain circumstances."*

Through the FNMEP, a topic that was often raised is the lack of a mechanism to compensate First Nation and Red River Métis harvesters for the use of Crown land like Manitoba Hydro's landowner compensation program implemented for private landowners directly affected by the PDA.

Private lands are also used for rights-based activities with the permission of landowners. Based on this understanding, we recognize that project effects to private land can still impact the ability for First Nations people and Red River Métis citizens to practice their rights.

6.1.4 Contemporary land use

First Nations people and Red River Métis citizens continue to practice a variety of traditional and cultural activities on both Crown and private lands in the regional assessment area even though the physical landscape and access permissions have changed over time as presented in Section 6.1.2.

The potential for disturbances to these activities, or the loss of access and resources that support these activities, are concerns frequently shared by First Nations people and Red River Métis citizens when new transmission lines are planned. Manitoba Hydro engaged with potentially affected First Nations, Northern Affairs Communities, the Manitoba Métis Federation, and Grand Council Treaty #3 to understand traditional and cultural practices and values within the regional assessment area, concerns, and relevant mitigation to reduce those impacts.

Rights-based activities that occur in the regional assessment area include hunting, fishing, trapping, gathering traditional plants and medicines, ceremonies, and other cultural activities. Below we include some of the information that has informed our understanding of contemporary land use in the regional assessment area and surrounding area.

6.1.4.1 Hunting and trapping

Brokenhead Ojibway Nation, Hollow Water First Nation, and Sagkeeng Anicinabe First Nation have reported that hunting and trapping were historically practiced in the region and continue to be important practices; however, we have heard concerns that it is becoming more difficult as lands are converted for development and regulatory barriers are increasing. Reported species hunted in the region include moose, deer, rabbits, geese, duck, coyote, chipmunk, porcupine, bobcat, and historically bison. Trapping was also practiced in the region for otter, marten, fisher, muskrat, lynx, fox, and beaver (BON, BR, and HWFN 2019).

Sagkeeng Anicinabe First Nation has indicated that hunting takes place between Lake Winnipeg and Nopiming Provincial Park, extending further south of the Piney area as well. An area south of Selkirk in and around Birds Hill Park is also utilized (Sagkeeng O-Pimatiziiwin 2016). In Sagkeeng Anicinabe First Nation's study report for this project, members reported several existing hunting and trapping areas. Sagkeeng Anicinabe First Nation members reported hunting and trapping sites for beaver, coyote, fisher, fox, lynx, marten, moose, muskrat, otter, prairie chicken (ptarmigan/grouse), rabbit, skunk, weasel, and white-tailed deer, as well as processing sites for deer and moose, a salt lick area, an identified ancestral hunting area, several temporary and permanent habitation sites used while hunting and trapping and multiple terrestrial trails used while hunting and trapping (Sagkeeng Anicinabe First Nation 2023).

Sagkeeng Anicinabe First Nation members shared that large game such as moose and deer are hunted, and small game such as rabbit, partridge, beaver, and muskrat are often taken by trap. Large and small game are important for diet, and small game are more important for fur, ceremonial, or medicinal purposes. Moose is one of the staple foods for Sagkeeng members and are a desirable harvest once per year by harvesters to share with family. However, Sagkeeng members noted that population decline in moose has led to harvest restrictions, which has not supported harvesting needs of Sagkeeng members. Hunting and trapping are very important to Sagkeeng members for the transmission of Indigenous knowledge and land-based learning for youth about wildlife management and cultural practices (Sagkeeng Anicinabe First Nation 2023).

Sagkeeng members also noted that current development in the project region has increased access to Sagkeeng Anicinabe's Territory, which has resulted in increased harvesting and hunting pressure by non-Indigenous recreational hunters and trappers. Sagkeeng members reported previous land clearing (for right-of-way and maintenance) along existing disturbed areas, as well as impacts of noise has already created avoidance behaviors by small and large game species, which move away from disturbed areas (Sagkeeng Anicinabe First Nation 2023). This can affect harvesting activities because Sagkeeng land users may have to travel further to access resources and can create less predictable wildlife behaviour for Indigenous hunters and trappers.

The Manitoba Métis Federation has reported hunting and trapping not only for recreation but for cultural, economic, and subsistence purposes for animals including moose, deer, coyote, weasel, mink, muskrat, rabbit, ruffed grouse, Canada geese, mallard duck, partridge, ptarmigan, and sharp-tailed grouse (Calliou Group 2016; MMF n.d.). Citizens of the MMF abide by the Laws of the Harvest as well as provincial regulations concerning sport hunting seasons and have reported that harvesting of moose, elk, and deer occurs primarily in the fall season, and secondarily in the winter season as the seasonality of moose, deer, and elk harvesting patterns are similar (MMF 2011a).

Peguis First Nation reported hunting for moose, deer, elk, waterfowl and trapping for lynx, mink, and otter in areas south of Lake Winnipeg (MI 2019). In a letter to Manitoba Hydro, Peguis First Nation reported that along PR211 there is a section where marshland meets raised forest, and that area has been used previously when water levels were higher, either as a camp location, or spotting location for game (see Table 6-3 and Table 6-4 later in this report).

Grand Council Treaty #3 has also identified hunting, fishing, and trapping as cultural activities and views trapping as a sacred way of life. Animals including beaver and muskrat have important cultural value (WIN n.d.).

6.1.4.2 Gathering

The project region is populated by streams, rivers, ponds, swamps, bogs, and lakes. Before European contact, the diverse ecosystems of the region provided a variety of harvestable plants and medicinal resources.

Through engagement, participants indicated that agriculture has been practiced by Indigenous people historically for thousands of years and shared potential project concerns regarding changes to traditional agricultural practices. Participants recommended that traditional agriculture be recognized apart from modern commercial agriculture in this assessment. Participants noted that traditional agricultural practices and their history are not well-documented, but that they can promote sustainable land use. A good example of a traditional agricultural practice is wild rice harvesting.

Sagkeeng members indicated that wild rice is of cultural importance and is noted as a key food that people relied on over generations. Sagkeeng members explained that seasonal harvesting of wild rice involves intergenerational family gatherings at traditional wild rice harvesting sites particularly, around Rice Lake. Berries are often harvested at the same time as wild rice.

Medicines are another important resource in the area. Some types of medicines in the region include willow, muskeg tea, Seneca root, cedar, aspen, Labrador tea, and rosehips (BON, BRFN & HWFN 2019). These medicines were used to treat various illnesses from toothaches to fever.

Sagkeeng Anicinabe First Nation reported that medicinal plant gathering occurs at several sites east and southeast of Winnipeg (Sagkeeng O Pimatiziiwin 2016). Sagkeeng members reported that harvesting medicines and plants support cardiovascular and joint health and help treat respiratory illnesses and skin aliments. Plant medicines are harvested and shared throughout the community using a specialized knowledge about specific cultural teachings held by Sagkeeng land users and community members (Sagkeeng Anicinabe First Nation 2023).

Sagkeeng members reported many harvesting sites throughout the Winnipeg River region. Sagkeeng members reported harvesting blueberries, chokeberries, cranberries, gooseberries, raspberries, strawberries, wild rice, wild plums and Labrador tea (muskeg tea) (Sagkeeng Anicinabe First Nation 2023).

Sagkeeng Anicinabe First Nation note that development continues to increase impacts on the harvesting of culturally important plants and medicines in the Winnipeg River region (Sagkeeng O-Pimatiziiwin 2016). Sagkeeng members reported that there is currently a loss of access to key harvesting areas, and impacts to culturally important plants, partly due to damming key waterways, chemical spraying along existing rights-of-way, and increased traffic in areas used for plant food harvesting (Sagkeeng Anicinabe First Nation 2023). For Sagkeeng Anicinabe First Nation, there is a natural interdependence among all things, and members are increasingly forced to find other places for harvesting, due to continued species decline in other areas (Manitoba Hydro 2015).

Brokenhead Ojibway Nation has also reported harvesting weekay ("wiikenh" ojibwejournal.wordpress.com/) and bullrushes (LWIC 2017) and Black River First Nation has reported harvesting berries, wild rice, and wiikenh (also known as sweet flag; (Manitoba Hydro 2015).

Brokenhead Ojibway Nation, Hollow Water First Nation, and Black River First Nation report using wild rice, blueberries, cranberries, Labrador tea, raspberries, saskatoon berries, chokecherries, wild plums, and wild ginger, which were harvested seasonally (BON, BRFN & HWFN 2019; MMF n.d.; Elias et al. 1997).

Brokenhead Ojibway Nation, Hollow Water First Nation, and Black River First Nation have also reported the practice of hunting gull eggs on islands in Lake Winnipeg, as well as picking frogs and snakes in the region (BON, BR, and HWFN 2019). Areas that are of importance for gathering plants include the small lakes and shoreline of the rivers throughout their territory, on the shores of Lake Winnipeg, Hollow Water, and the Brokenhead River (BON, BR, and HWFN 2019).

In a letter to Manitoba Hydro, Peguis First Nation reported that along Creek Crossing (PR520) there is a potential camping location leading to a marshy area where medicines are picked (see Table 6-3 and Table 6-4).

6.1.4.3 Fishing

Water is described by Sagkeeng Anicinabe First Nation as important for the sustenance of life and essential to cultural practices and beliefs (Manitoba Hydro, 2015). Sagkeeng members reported that riverbank erosion and damage to pickerel spawning areas have been a result of the fluctuating water levels associated with existing damming in the region (Sagkeeng Anicinabe First Nation 2023).

Sagkeeng members reported harvesting fish from Sylvia Lake, Margaret Lake, Otter Falls, Barrier Bay, Nutimik Lake, Numao Lake, along the Winnipeg River to Slave Falls, around Pointe du Bois, throughout the Lamprey Rapids, Bernic Lake, along Crescent Bay, McArthur Falls and Lac Du Bonnet, and north of Lac du Bonnet near Great Dam Falls along the Winnipeg River, and along the Winnipeg River from Crescent Bay to Natalie Lake. Rice Lake and the Winnipeg River are noted as particularly favorable for fishing. Sagkeeng members reported fishing sites for bass, catfish, crayfish, goldeye, jackfish, northern pike, perch, pickerel (walleye), sturgeon, sucker, sunfish, tullibee, and whitefish. Sagkeeng members noted that fish are harvested with nets as well as with rod and reel. Sagkeeng members also reported several catch and release sites for pickerel, fish processing sites and several spawning areas for pickerel, sturgeon and, walleye throughout the Winnipeg River region. Sagkeeng members noted that fishing is an important activity for cultural learning, often involving friends, children and family, and that fish are shared with the community (Sagkeeng Anicinabe First Nation 2023).

Black River First Nation has reported fishing for sunfish (various species), catfish (Channel Catfish, or bullhead), pickerel (walleye), and sturgeon (Lake sturgeon) in the rivers in the region and has identified Lake Winnipeg as an important fishing area. Other important fishing areas include Lone Island, Betula Lake, and Jessica Lake and the Winnipeg River up to MacArthur Falls and Lac du Bonnet (BON, BR, & HWFN 2019).

Red River Métis citizens often fish for sustenance throughout Lake Winnipeg and its tributaries, with the primary species harvested being Walleye, Goldeye, Northern Pike, Sauger, Channel Catfish, trout, and suckers (Caillou Group 2016; MMF 2011a). The Manitoba Métis Federation explained that fishing occurs mainly in summer but can take place year-round (MMF 2011a).

Peguis First Nation has reported fishing for species such as jackfish (Northern Pike), whitefish (Lake Whitefish or Cisco/Tullibee), and pickerel (walleye) in the lakes and rivers around Lake Winnipeg (MI 2019). Peguis First Nation reported fishing in several lakes, including Lake St. Martin, Lake Manitoba, Lake Winnipeg, and Mantagao (Birch) Lake (Golder Associates 2018).

6.1.5 Important sites and cultural land uses

Through project engagement, we heard that waterways were like a highway for Indigenous people. The project region will likely have many archaeological sites.

The region is highly important and includes Manito Ahbee (the place where the Creator sits), Bannock Point and other petroforms. Through engagement we heard that on the lands along the Lee River there is high archaeological potential for hunting and camp sites and known burial sites.

In a letter to Manitoba Hydro from Peguis Consultation and Special Projects (PCSP) office, Peguis First Nation shared sites and areas that are important for the practice of spiritual and cultural land and resource use activities in the project region, including camps, archaeological sites, historical sites, travel routes, harvesting sites, and heritage resources. The letter states that:

> *"Peguis' major concern is Cultural and Heritage Impacts. As we all know, the Whiteshell area is well known for its cultural significance to Indigenous Peoples all across North America, as It was a hub for spiritual practice and gatherings…… PCSP cannot stress enough how important that the heritage work for this area be completed at a level above and beyond anything prior."*

Peguis First Nation reported important sites in the project region, including some extremely important petroforms at Tie Creek and the sites at Whitemouth Falls, as well as sites along the ROW from Whiteshell Station to Pointe du Bois, including sites around Rice Lake (PCSPI 2023). Peguis First Nation describes petroforms as shapes created through the arrangement of rocks or boulders on open ground (PCSPI,2023). Common shapes in the area have included circles, snakes, and turtles and have been used to educate and tell stories and record history.

Rice Lake is important to Peguis First Nation as the entire region is an important site for harvesting wild rice. Peguis First Nation also reported burials located around Whitemouth Falls and Seven Sisters Dam near the Whiteshell station at the southern terminus of the line. Peguis First Nation also reported major travel routes and resource collection sites along the ROW from Pointe du Bois to Whiteshell in areas where the proposed project will traverse existing or historical waterways, including Lee River and access to Rice Lake (PSCPI 2023).

Important sites and areas of importance to Peguis First Nation are tabulated below for the new right-of-way, and the widened existing right-of-way.

Table 6-3: Important sites and areas of concern: PW75 new ROW: Peguis First Nation	
Whitemouth Falls Provincial Park & Seven Sisters Dam	This location has known sites, and therefore, heritage concerns.
PR211 Abatement	Along PR211 there is a section where marshland meets raised forested lands, this area could have been used previously when water levels in Glacial Lake Agassiz were higher, as a camp or for spotting game.
PR520 Creek Crossing	Near Lee River with potential to camp and pick medicine. Also leads to a marshy area.
Lee River Crossing	This section is of high concern. There are many paleochannels with the chance for archaeological sites at former water courses.
Boggy Creek Crossing & Granite outcropping	A high bank on boggy creek, so potential for sites from when Glacial Lake Agassiz was higher. The granite outcropping to the east is a good place for camping, collecting materials for tools, and getting a good view of the surrounding area.

Table 6-4: Important sites and areas of concern: PW75 existing ROW widening: Peguis First Nation	
Lee 1,2 & 53	Abatement, potential camping, hunting, or harvesting site.
Tower 50 & 49	Abatement, potential camping, hunting, or harvesting site.
Tower 45 – 42	Land comes to a promontory into marshy area and conceals a small inlet. Good area for hunting and harvesting.
Tower 32 – 34	High potential area near Rice Lake, looks to be historical in/outlets into lake.

Tower 28	Palaeochannel
Tower 19	Potential travel route from/to Rice Lake. Near larger marshy area to southwest, great for disembarking for hunting opportunity.
Tower 15 & 16	Peninsula in marsh area south. High travel potential.
Tower 12	Abatement
Tower 11 & 10	Channel crossing, potential travel route.
Tower 4	Crossing of potential travel route from Winnipeg River.

Sagkeeng members reported that there are several locations in the Winnipeg River region that are identified as important cultural and spiritual areas, including a birth place, burial sites dating back 3,500-3,700 years, several ceremonial sites, multiple gathering sites (some sites for collecting silver), an old tree planting site at the old Pointe Du Bois dam, an old Sagkeeng village site, a petroform dating back to 3000 years ago, locations with arrowheads, petroglyphs and multiple sacred and spiritual sites and place names. Sagkeeng members also reported permanent and temporary habitation sites and areas where experiential learning and knowledge transfer through hunting, trapping, fishing, and harvesting occurs, highlighting the importance of Sagkeeng members maintaining access to these sites and areas for the transmission of knowledge and teachings. Sagkeeng members explained the importance of cultural and spiritual sites for intergenerational teaching, which takes place in a variety of contexts, and is essential to Sagkeeng Anicinabe First Nation culture and tradition. Several temporary (day camps and campsites) and permanent habitation sites were identified where wild rice, blueberries and other medicinal plants are gathered and used while fishing (Sagkeeng Anicinabe First Nation 2023).

Terrestrial trails throughout the Winnipeg River region are also of importance to Sagkeeng members, as they provide access to sites and areas, including harvesting areas, that are important for the practice of Indigenous land and resource use activities (Sagkeeng Anicinabe First Nation 2023).

Based on engagement on this project, on past projects, and from existing literature, we identified two valued components directly related to matters considered important to First Nations people and Red River Métis citizens: harvesting and important sites. Section 7.2 includes our assessment of project effects on harvesting and important sites.

Manitoba Hydro understands that different cultural groups may experience project impacts to traditional and cultural activities and values uniquely.

Information about non-Indigenous land use is presented in Section 6.3.2.

6.2 Environmental setting

This section provides an overview of the existing environment in the project region.

The existing conditions were established based on data collected during desktop analysis, field programs, First Nation and Métis engagement, and public engagement. Desktop analysis included literature reviews and personal communications.

6.2.1 Climate

The region has a continental climate characterized by short, warm summers and long, cold winters (Smith et al. 1998). The western portion of the project region lies within the subhumid low boreal ecoclimatic region while the remainder lies within the subhumid transitional low boreal ecoclimatic region.

Climate parameters vary somewhat across the region with mean annual temperatures and total annual precipitation generally increasing from 1.9 °C and 540 mm in the west to 2.3 °C and 650 mm in the east (Smith et al. 1998).

provides mean temperature and precipitation parameters from 1981-2010 climate normals using data from the Pinawa weather station (Environment Canada 2013a), which is near the center of the project region. Mean annual temperature at Pinawa was 2.8 °C over the 30-year period. Mean daily temperature ranged from 19.3 °C in July to -16.6 °C in January. The growing season in terms of total degree days above 5 °C averaged 1,744 days.

Mean total annual precipitation was about 580 mm, with approximately 460 mm falling as rain. Precipitation was highest during the growing season. Moisture deficits were higher in the eastern portion of the region, but the number of growing degree-days and growing season days were consistent throughout the region at 1,600 and 180, respectively (Smith et al. 1998).

Table 6-5: Climate Normals (1981-2010) from Pinawa weather station

Month	Climate parameter					
	Mean daily temp (°C)	Mean daily max temp (°C)	Mean daily min temp (°C)	Total precip. (mm)	Total rainfall (mm)	Total snowfall (cm)
Jan	-16.6	-11.1	-22.1	22	0	21.4
Feb	-13.2	-7.3	-19	17	2	14.6
Mar	-5.7	0.2	-11.6	26	11	14.9
Apr	3.9	10.3	-2.5	29	20	9.4
May	11.2	17.7	4.6	67	65	2.1
June	16.4	22.5	10.3	99	99	0
July	19.3	25.2	13.2	89	89	0
Aug	18.2	24.3	12	65	65	0
Sep	12.3	18	6.7	62	61	0.5
Oct	5.1	9.7	0.4	48	40	7.9
Nov	-4.5	-0.7	-8.3	30	10	19.2
Dec	-13.1	-8.5	-17.6	26	2	24
Annual	2.8	8.4	-2.8	578	464	114

6.2.2 Skies

Skies is a broad environmental component that includes air, air quality, noise, and birds. Linear infrastructure such as transmission lines have the potential to adversely impact skies during both construction and operational activities as well as due to the physical presence of transmission lines and supporting towers. This section presents an existing condition for air quality, noise, and birds in the project region.

6.2.2.1 Air quality

Manitoba generally has good air quality, with poorer air quality being attributable to exceptional events such as wildfire smoke and transboundary pollutants from the United States or other Canadian provinces.

The project region comprises a mix of residential, agricultural, and natural settings.

Air quality in the area may be affected by dust and other particulates emanating from agricultural activities like application of fertilizers and manure, harvesting, and from smoke generated by local crop burning programs (Government of Manitoba 2021).

The primary chemicals of concern to human health from crop burning and forest fire smoke include asphyxiant and irritant gases, and particulate matter of less than 2.5 μm (PM2.5) (USEPA 2021).

The project is close to provincial highways or roads. Passenger vehicles on roads and highways may emit various air pollutants including ozone precursors (volatile organic compounds (VOCs) and nitrogen oxides (NO_x)), carbon monoxide (CO), sulphur oxides (S_{ox}) and particulate matter (PM) (Government of Canada 2017).

Comparison of PM2.5 and ozone for the three-year period from 2013 to 2015, as part of the national Air Quality Management System (AQMS), indicated that these parameters complied with the Canadian Ambient Air Quality Standards (CAAQS) at five air monitoring stations located across the province of Manitoba (Manitoba Environment Climate 2022).

6.2.2.2 Noise

Existing noise levels in the area would be typical of rural settings, with some areas typical of suburban residential areas. Noise in rural areas may be due to highway traffic, agricultural activities, airplanes, and recreational activities.

Based on a noise assessment conducted for the Selkirk Generating Station, typical baseline noise levels for an urban-rural mixed setting are between 40.4 and 44.5 dBA in the daytime (Stantec 2015).

Health Canada (2017) considers day-night noise levels to vary from less than 45 dBA for a typical quiet rural area to 53 to 57 dBA for a typical suburban residential area.

6.2.2.3 Birds

Birds and bird habitat provide ecological, aesthetic, recreational, economic, and cultural value to First Nations, the Red River Métis, stakeholders, the public, local businesses, and government agencies.

Having access to birds and bird habitat is important to communities, particularly resource users that practice cultural and recreational hunting activities throughout the region. Participants at Engagement Circle #2 shared that birds can often provide early indicators of changes to ecological health.

Methods

Existing conditions for birds and bird habitat were identified through a combination of background desktop review and field surveys to better understand the occurrence, distribution, and habitat associations of wildlife, including species at risk, and species of conservation concern.

In this assessment, species at risk are defined as plant and animal species protected under federal or provincial legislation or identified in federal or provincial tracking lists, including species:

- Listed on Schedule 1 of the *Species at Risk Act* (SARA) as special concern, threatened, or endangered (Government of Canada 2022a) or
- Listed under Manitoba's *The Endangered Species and Ecosystems Act* (MESEA) as threatened or endangered (Government of Manitoba 2023)

Species of conservation concern are defined as plant and animal species that are:

- Recommended by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing under SARA as special concern, threatened, or endangered (Government of Canada 2022b) or
- Listed by the Manitoba Conservation Data Centre (MB CDC) as provincially rare (i.e., S1, S2, or S3 rankings; MB CDC 2023)

A review of critical habitat was completed for those species at risk with federal recovery strategies. Federal recovery strategies for species at risk are designed to support the protection and recovery of a species listed as endangered or threatened under SARA (ECCC 2016). Some of these recovery strategies include the identification of a species' critical habitat, or areas of potential critical habitat, which is defined under SARA as "the habitat that is necessary for the survival or recovery of a listed wildlife species" (Government of Canada 2002).

Background information on birds and bird habitat was obtained through several sources, including First Nations people, Red River Métis citizens and local resource users, personal communications with provincial authorities, pertinent report and literature reviews, federal and provincial databases, and not-for-profit publications and data sources.

Key resources used during background reviews to assist in establishing the baseline conditions for birds and bird habitat can be found in the wildlife technical data report (Appendix D).

Overview

More than 280 bird species inhabit the project region due to the widespread availability of wetlands, rivers, lakes, and forests (eBird 2022, MB BBA 2022; Appendix D). Birds include waterfowl, waterbirds, birds of prey, upland game birds, woodpeckers, songbirds, and other birds.

Waterfowl and waterbirds are migratory, nesting in Manitoba in spring and wintering in the southern United States and Central and South America. Up to 29 species of waterfowl and 65 species of waterbirds may occur in the region (Appendix D).

These birds are associated with temporary and permanent waterbodies, and occasionally can be found along rivers, creeks, and beaver floods. Although several waterfowl species are common and ecologically diverse, boreal forest wetlands have low overall species diversity and density (Schindler 1998), in contrast to species-rich wetlands of the prairies (Swanson and Duebbert 1989).

During the engagement process, wetlands near Pinawa were identified as important Canada goose breeding habitat. Aquatic and riparian habitat for waterbirds, waterfowl, terns, gulls, and other species in the region is found within the Winnipeg River and Pinawa Channel.

Up to 28 species of birds of prey can be found in the region as migrants or year-round residents. Rivers, wetlands, and forest are important habitat for these species.

Upland game birds can be found in forested and non-forested habitats and mainly include grouse, woodcock, and turkey. Six species could be found in the project region, although ruffed grouse (*Bonasa umbellus*), spruce grouse (*Falcipennis canadensis*), and sharp-tailed grouse (*Tympanuchus phasianellus*) are the most likely residents, and woodcock (*Scolopax minor*) is a migrant.

Nine woodpecker species occur in Manitoba, five are permanent residents, three are summer visitors, and one is an infrequent visitor (Taylor 2003). Most of the woodpecker species observed during field surveys were associated with forested habitat.

Pileated woodpecker is a resident species that inhabits mature deciduous and mixedwood forest found throughout the region (Berger 2018). As per the Migratory Birds Regulations (MBR 2022), pileated woodpecker nests are protected year-round unless deemed abandoned (i.e., unoccupied for a minimum of 36 months; Government of Canada 2022c).

Songbirds and other birds, including passerines, are the most abundant of all bird groups in Manitoba. Some of the bird families in this group such as chickadees, nuthatches, and some finches and jays are year-round residents, while other groups including flycatchers, swallows, thrushes, kinglets, pipits, vireos, tanagers, blackbirds, sparrows, and warblers are migrants.

The primary nesting period for migratory birds in the project region is April 25 – August 14 (Nesting Zone C4; Government of Canada 2023).

Species at risk and species of conservation concern

Of the bird species found in the region, 16 are species at risk and four are species of conservation concern (Appendix D).

Yellow rail (*Coturnicops noveboracensis*), short-eared owl (*Asio flammeus*), common nighthawk (*Chordeiles minor*), eastern whip-poor-will (*Caprimulgus vociferus*), olive-sided flycatcher (*Contopus borealis*), Canada warbler (*Wilsonia canadensis*), and rusty blackbird (*Euphagus carolinus*) are the species most likely to breed in the region (Manitoba Hydro 2014).

Golden-winged warbler and eastern whip-poor-will critical habitat occurs in the region but does not overlap with the project. Golden winged-warbler critical habitat occurs south of PTH 44 and west of the Winnipeg River and PTH 11. Eastern whip-poor-will critical habitat occurs north PR 313 and Pinawa Bay on the Lee River.

Rice Lake is a small, shallow lake in the region that potentially provides high quality staging and breeding habitat to a wide variety of species including two species at risk, the yellow rail, and the trumpeter swan.

A pair of trumpeter swan was observed with young during field surveys.

Sensitive sites for birds

Rice Lake

Rice Lake may provide breeding habitat for birds that use wetland or shallow lake habitat for breeding and/or staging (Manitoba Hydro 2014), including two species at risk detected during baseline surveys, the yellow rail and trumpeter swan.

Natalie Lake

Natalie Lake is a large impoundment of the Winnipeg River in the southern portion of the region and may provide habitat for waterfowl and other birds that use lake habitat for breeding and/or staging.

Whitemouth River, Winnipeg River, Pinawa Channel

River habitats are natural travel corridors for numerous species of birds including waterfowl, waterbirds, and raptors.

Birds and bird habitat of First Nation, Red River Métis and public interest and concern

Ongoing First Nation and Métis engagement for the project has identified ruffed grouse, sandhill crane, and a variety of waterfowl and upland gamebird species as important bird species for their ecological and subsistence value.

During Engagement Circle #1, important grouse harvesting areas were identified.

The MMF reported harvesting ruffed grouse, Canada geese, mallard, partridge, ptarmigan, and sharp-tailed grouse (Calliou Group 2016; MMF n.d.).

Brokenhead Ojibway Nation, Hollow Water First Nation, and Black River First Nation have also reported the practice of hunting gull eggs on islands in Lake Winnipeg (BON, BR, and HWFN 2019) (see Section 6.1.2.1).

Through public engagement sessions and surveys collected by Manitoba Hydro, concerns were raised regarding potential project-related effects to birds and bird habitat related to habitat fragmentation, changes to biodiversity, and increased human access (e.g., recreational vehicles and hunting).

6.2.3 Waters

Waters is a broad environmental component that includes ground and surface waters, fish and fish habitat, wetlands, amphibians and reptiles, and wild rice that exist in an overall aquatic ecosystem.

Linear infrastructure such as transmission lines have the potential to adversely impact waters primarily during construction but also during operational activities and due to the physical presence of transmission lines and supporting towers.

This section presents the existing condition for groundwater, surface water, and fish and fish habitat in the project region. The existing condition for wild rice is presented in Section 6.3.2.

First Nations people and Red River Métis citizens participating in project engagement shared that issues concerning waters are longstanding and that the source of electrical energy comes from waters in Treaty 3 territory. Historical grievances over flooding of lands and changes to river flow are ongoing concerns. Regulation of water is an issue that participants raise in discussions of the use of electricity generated by water.

Through project engagement sessions and surveys conducted by Manitoba Hydro, concerns were raised by the Manitoba Métis Federation including harvesting and section 35 rights as well as fish and fish habitat, and water quality. Frustration was shared regarding Manitoba Hydro's use of water that all people depend on to live, including the release of water into the environment and substantial changes and cumulative effects to water from this and other existing projects.

6.2.3.1 Groundwater

In southeastern Manitoba, groundwater flows predominantly through fractures in the basal bedrock stratigraphic unit where flow is generally confined to the upper 60 to 150 m of the bedrock where joints are more common and more open (Betcher et al.1995). Groundwater yields are typically below 1.0 L/s and are generally limited in areas where the overburden is thin or absent (Betcher et al.1995).

Aquifers in localized areas of thick sand and gravel deposits are the primary sources for rural and community water supply in southeastern Manitoba, where groundwater yields exceed 5 L/s (Betcher et al. 1995), whereas surficial aquifers tend to be localized with little potential for substantial yields.

6.2.3.2 Surface water

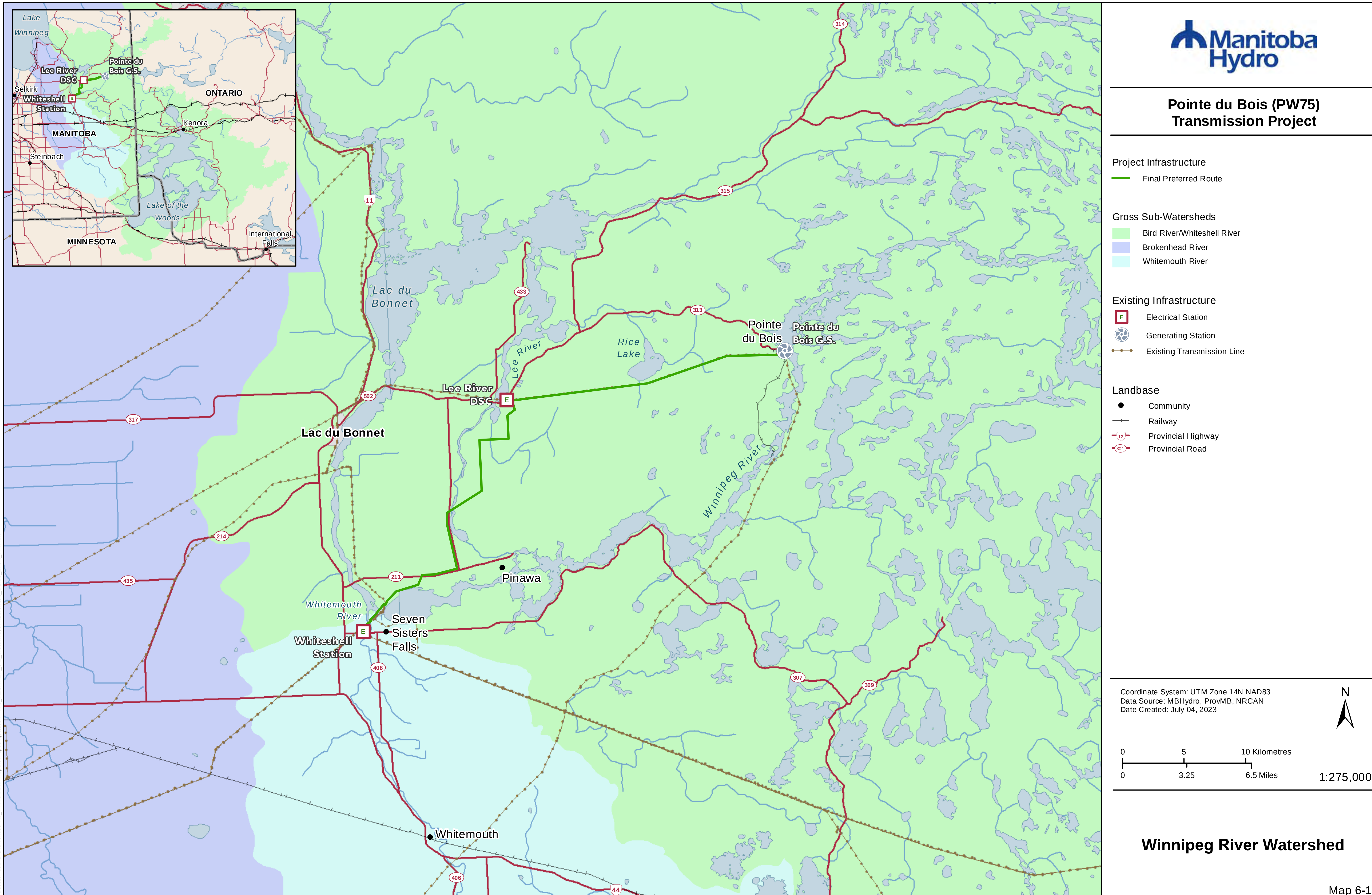
The project falls within the Winnipeg River watershed (Map 6-1). The Winnipeg River watershed is more than 126,000 km^2 in size, covering part of northwestern Ontario, northern Minnesota, and eastern Manitoba, and drains into Lake Winnipeg (Britannica, T. Editors of Encyclopaedia 2018).

There are three generating stations operating along the Winnipeg River within the project region: Pointe du Bois, Slave Falls and Seven Sisters Falls.

There are two major river systems that drain into the Winnipeg River. The Whitemouth River flows from Whitemouth Lake in southeastern Manitoba into the Winnipeg River at Seven Sisters Falls, just downstream of the Seven Sisters Generating Station (Map 6-1).

The Lee River drains from the Winnipeg River near Pinawa into Lac du Bonnet, part of the Winnipeg River system. The Pinawa Channel, which forms part of the Lee River, was originally constructed in the early part of the 1900s to increase power production at the Pinawa Dam (Manitoba Conservation and Water Stewardship, 2012). Water is diverted from the Winnipeg River through the Pinawa Channel to the Pinawa Dam. While the dam was decommissioned in 1951 (Government of Manitoba, 2014), water in the Pinawa Channel still flows northward through the Lee River.

The proposed transmission line will cross the Winnipeg River as well as Boggy Creek, which flows into the Lee River. Several lakes exist in the region, the largest of which is Rice Lake, a shallow lake approximately 1,200 ha in area in the northern portion of the region.


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Gross Sub-Watersheds
Bird River/Whiteshell River
Brokenhead River
Whitemouth River
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway
Provincial Road
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0 5 10 Kilometres
0 3.25 6.5 Miles
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Winnipeg River Watershed
Map 6-1
Lake Winnipeg
Lee River DSC
Pointe du Bois G.S.
Selkirk
Whiteshell Station
ONTARIO
Kenora
MANITOBA
Steinbach
Lake of the Woods
MINNESOTA
International Falls
Lac du Bonnet
Lee River
Rice Lake
Pointe du Bois
Winnipeg River
Pinawa
Whitemouth River
Seven Sisters Falls
Whitemouth
314
315
313
433
11
502
317
214
435
211
408
307
309
406
44

6.2.3.3 Fish and fish habitat

Fish and fish habitat play a fundamental role in the functioning of natural ecosystems and fish are key indicators of aquatic health. Fish are also of economic and recreational importance to Canadians.

Fish and fish habitat are valued by First Nations people and Red River Métis citizens, recreational and commercial users, and the public for social, recreational, commercial, and spiritual reasons. In addition, fish and fish habitat are protected under the federal Fisheries Act (R.S.C. 1985, c. F-14).

Methods

Potential watercourses crossed by the project were identified from existing Manitoba Hydro data (2014), a review of publicly available aerial imagery and Fisheries and Oceans Canada data.

Fish community composition was evaluated using:

- Stewart and Watkinson (2004)
- North-South Consultants Inc. (2011)
- Data from the Coordinated Aquatics Monitoring Program (CAMP 2017)
- Fisheries and Oceans Canada (2023)

Fish species information was cross-referenced with provincial and federal listings to determine if fish species identified in the region are listed as species at risk or species of conservation concern. Species at risk are listed under Schedule 1 of the federal SARA (Government of Canada 2022a) or by *Manitoba Endangered Species and Ecosystems Act* (MESEA; Government of Manitoba 2022).

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC; Government of Canada 2022b) designations were reviewed for species of conservation concern. These include species that are potentially at risk but not currently listed at a provincial or federal level.

A fish habitat assessment was completed on July 20, 2022, at the Whitemouth River crossing because the crossing location is mapped critical habitat for Carmine Shiner (WC-31; Map 6-2; Appendix E).

Field assessments were completed to support future potential regulatory submissions (Appendix E).

Watercourse crossings

Based on desktop review, 32 potential watercourse crossings were identified (Map 6-2; Table 6-6). Five watercourse crossings contain high-quality, complex fish habitat that meet the various life history requirements for resident fish species and include:

- Boggy Creek (WC-10 and WC-17)
- Pinawa Channel (WC-21)
- Winnipeg River (WC-30)
- Whitemouth River (WC-31)

As a conservative approach and based on DFO's precautionary principle (DFO 2018), the remaining watercourses are assumed to afford habitat for resident fish species but were not assessed. All standard mitigation applied to watercourse crossings will apply to these crossings.

Table 6-6: Watercourse crossings

Crossing ID	Watercourse Name
WC-01	Unnamed Tributary to Bear Creek
WC-02	Unnamed Tributary to Bear Creek
WC-03	Unnamed Tributary to Bear Creek
WC-04	Unnamed Tributary to Rice Lake
WC-05	Unnamed Tributary to Rice Lake
WC-06	Unnamed Tributary to Rice Lake
WC-07	Unnamed Tributary to Boggy Creek
WC-08	Unnamed Tributary to Boggy Creek
WC-09	Unnamed Tributary to Boggy Creek
WC-10	Boggy Creek
WC-11	Unnamed Tributary to Lee River
WC-12	Unnamed Tributary to Lee River
WC-13	Unnamed Tributary to Lee River
WC-14	Unnamed Drain [manmade]
WC-15	Unnamed Drain [manmade]

Table 6-6: Watercourse crossings

Crossing ID	Watercourse Name
WC-16	Unnamed Tributary to Boggy Creek
WC-17	Boggy Creek
WC-18	Unnamed Drain [manmade]
WC-19	Unnamed Tributary to Boggy Creek
WC-20	Unnamed Tributary to the Pinawa Channel (Lee River)
WC-21	Pinawa Channel
WC-22	Unnamed Tributary to the Pinawa Channel (Lee River)
WC-23	Unnamed Drain [manmade]
WC-24	Unnamed Tributary to Pinawa Channel (Lee River)
WC-25	Unnamed Drain [manmade]
WC-26	Unnamed Tributary to Winnipeg River (Lac du Bonnet)
WC-27	Unnamed Drain [manmade]
WC-28	Unnamed Tributary to Winnipeg River (Lac du Bonnet)
WC-29	Unnamed Tributary to Winnipeg River (Lac du Bonnet)
WC-30	Winnipeg River (Lac du Bonnet)
WC-31	Whitemouth River
WC-32	Unnamed Drain [manmade]

Fish species occurrence and distribution

Desktop review identified 76 species with distributions that overlap with the project and have historical or current occurrence within the Winnipeg River watershed (Appendix E), including 63 native species and 13 introduced species.

Black River First Nation, the Manitoba Métis Federation, and Peguis First Nation also report fishing sunfish, catfish, pickerel, lake sturgeon, northern pike, sauger, goldeye, trout, suckers, and whitefish or cisco/tullibee in the project region (BON, BR & HWFN 2019; Caillou Group 2016; MI 2019; MMF 2011a).

Species of conservation concern

Carmine shiner (*Notropis percobromus*) is listed as endangered under Schedule 1 of SARA (Government of Canada 2022a), and the Whitemouth River at the proposed project crossing (WC-31; Map 6-2) is mapped critical habitat for the species (DFO 2022).

Historical occurrence of carmine shiner is also known for the Pinawa Channel (Lee River) downstream of the old Pinawa Dam, and the Winnipeg River downstream of Whitemouth Falls (DFO 2013a), but these areas are not mapped critical habitat (DFO 2022).

Four additional fish species of conservation concern were identified:

- Lake sturgeon is considered endangered by COSEWIC and under consideration for Schedule 1 listing (Government of Canada 2022b) and are known to occur in the Winnipeg River (Government of Canada 2022b).
- Silver lamprey (*Icthyomyzon unicuspis*) is of special concern by COSEWIC (Government of Canada 2022b) and found in the Winnipeg River system (Stewart and Watkinson 2004).
- Northern brook lamprey (*Icthyomyzon fossor*) is considered endangered by COSEWIC (Government of Canada 2022b) and known to occur in the Winnipeg River system. The species has been identified in several locations throughout the Whitemouth River watershed (Stewart and Watkinson 2004), potentially overlapping with the project crossing location.
- Shortjaw cisco (*Coregonus zenithicus*) is considered threatened by COSEWIC (Government of Canada 2022b) and has a provincial status of S2 according to the Manitoba Conservation Data Centre (MB CDC 2021). The species is known to occur in the Winnipeg River watershed but is only known from deep, large lakes and has not been documented in riverine habitats (Stewart and Watkinson 2004).

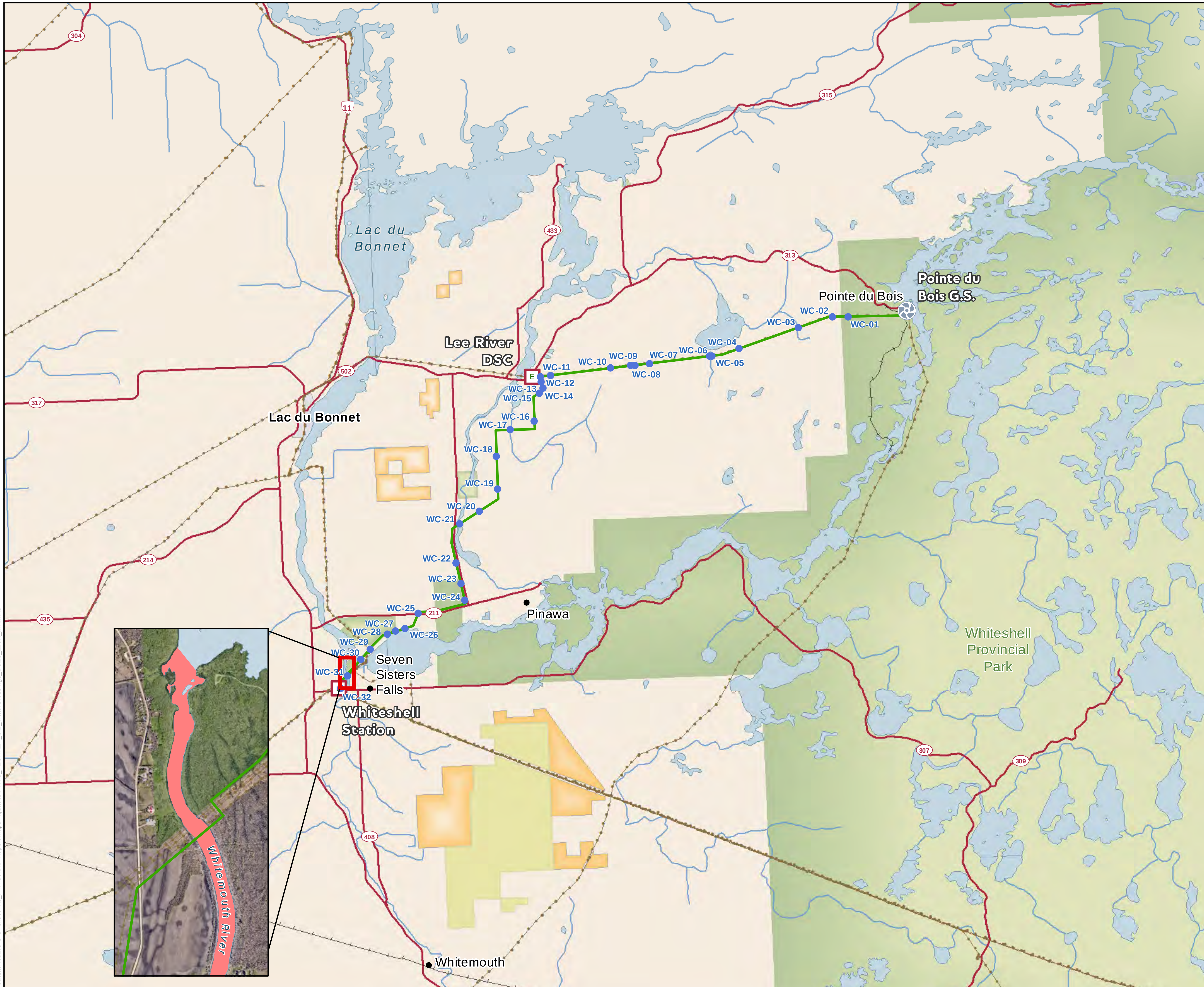
Critical habitat

The Whitemouth River near the proposed crossing is mapped critical habitat for the endangered carmine shiner, and the species has previously been documented in the lower reaches of the Whitemouth River near the project crossing location (DFO 2023; DFO 2013a; Becker and Hamel 2017).

Their known summer spawning and rearing habitats include large streams and moderate-sized rivers, at depths ranging from 0.12 to 2.8 m, flow velocities <1.7 m/s, conductivities of 102.6 to 265 µS/cm and water temperatures from 15.1 to 21.8 °C (DFO 2013a).

While the species is not known to tolerate high turbidity for extended periods or inhabit streams with high sediment loads and poor visibility, they are known to retreat to slower-flowing edges of flooded rivers into vegetated habitats where they may find refuge from the turbidity and access better foraging opportunities (DFO 2013a).

Each of these features associated with known carmine shiner habitat are consistent with habitat available at the proposed project crossing location on the Whitemouth River and with habitat available downstream of the site at Whitemouth Falls Provincial Park (Appendix E).



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

Final Preferred Route

Water Crossings

Water Crossing

Critical Habitat

Critical Habitat

Existing Infrastructure

Electrical Station

Generating Station

Existing Transmission Line

Landbase

Community

Railway

Provincial Highway

Provincial Road

First Nation Lands

Ecological Reserve

Wildlife Management Area

Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres

0 2.5 5 Miles

1:225,000

Water Crossings

Map 6-2

6.2.3.4 Wetlands

Wetlands are areas saturated with water long enough to support aquatic processes indicated by soils lacking oxygen, dominance of wetland dependant plants and biological activity associated with low oxygen (National Wetlands Working Group 1988; Burton and Tiner 2009).

Wetlands are important because they contain unique vegetation not typically found in uplands and provide ecological, aesthetic, recreational, economic, and cultural value. Wetland abundance and function are important to communities, particularly resource users that practice cultural and recreational hunting activities throughout the region.

Methods

Published literature, vegetation databases, maps, and aerial photographs were reviewed for information on existing conditions for wetlands in the project region.

Reviewed information included details on wetland abundance and distribution, plant community composition and plants of interest to Indigenous groups. Information sources reviewed for desktop baseline information on wetlands included:

- Terrestrial ecozones, ecoregions, and ecodistricts of Manitoba (Smith et al. 1998)
- Forest Resource Inventory (FRI) (Government of Manitoba 2022)
- Published scientific reports on wetlands

Wetland mapping

Wetland mapping previously done for the project (Manitoba Hydro 2014) was reviewed and revised using current air photographs and field survey data from 2022 as well as using recent FRI data (Manitoba Government 2022). Mapped wetland boundaries were revised and re-classed where appropriate, including changes due to new human disturbances that were not present in 2014.

Wetlands were also categorized to cover type following the Boreal Wetland Classes in the Boreal Plains Ecozone of Canada (Ducks Unlimited Canada 2018).

Field surveys

A sub-sample of wetlands intersected by potential alternate routes and the selected preferred route were surveyed in the field from August 6-12, 2022, as part of the plant species of conservation concern survey. Wetland extent, class and function were assessed at surveyed wetlands. Data were collected for indicators of the wetlands ability to provide plant and wildlife habitat, and hydrology and biogeochemistry functions and provide services such as flood attenuation, and water quality protection or improvement.

For more detailed information about field surveys and findings refer to the vegetation and wetlands technical data report (Appendix F).

Overview

Located in the Stead and Pinawa ecodistricts of the Lake of the Woods ecoregion in the Boreal Shield Ecozone, the project is situated in an area of abundant extensive peatlands (Smith et al 1998). Bogs, fens, and swamps are common. Black spruce (*Picea mariana*), alder (*Alnus* spp.), and moss ground cover are found in bogs. Fens are dominated by tamarack (*Larix larcina*), alder and birch shrubs (*Betula* spp.), and various sedges (*Carex* ssp.). Eastern white cedar (*Thuja occidentalis*), alder and other shrub species, as well as balsam poplar, are common in swamps and stream edges contain American elm (*Elmus americana*), ash (*Fraxinus* spp.) and bur oak (*Quercus macropcarpa*).

Within these ecodistricts, large areas of fen have been used for peat extraction or drained and used for producing sod.

Wetland abundance

Wetlands are abundant in the project region. Fens are the most common type, while swamps are uncommon in the area (see Table 6-7).

Considering a 1-km buffer on either side of the proposed project footprint:

- Wetlands are abundant, occupying over 3,0000 ha (>25% of the area).
- Fens are the most abundant wetland type equalling 2,373.3 ha (0.2% of the area), with fen–forested the most common cover type.
- Swamps, forested and shrubby cover types, are uncommon in the area, occupying less than 1%.
- Wetlands are widely distributed in the area, but most common in the portion adjacent to the existing right-of-way (Map 6-3).
- Swamps are also widely distributed and not aggregated in a specific portion of the area.

Forested swamps are likely more abundant than indicated by the landcover data as they often occur at the margins of other peatlands, such as fens (Halsey et al. 1997).

Landcover and tree composition information in the source data sets, and details visible in air photographs were used to re-classify areas to wetland type and cover type; however, the available information did not always support identification of smaller features such as swamps or bog islands contained in larger wetland complexes.

Table 6-7: Existing wetland abundance in the project region

Wetland Type	Cover Type	1 km buffer		15 km buffer	
		Area (ha)	% Area	Area (ha)	% Area
Bog	Bog - Forested	373	3	410	0.2
Fen	Fen - Forested	1,168	11	25,283	11.9
	Fen - Graminoid	357	3	615	0.3
	Fen - Shrubby	858	7	8,984	4.2
	Sub-total	2,383	20	34,882	0.2
Swamp	Swamp - Forested	25	0.2	25	<0.1
	Swamp - Shrubby	28	0.2	179	0.1
	Sub-total	53	0.4	204	0.0
Marsh	Marsh	109	1.0	3,424	1.6
Shallow Open Water	Shallow Open Water	107	1.0	3913	1.8
Undifferentiated Wetland	Undifferentiated Wetland – Peatland	0.0	0.0	4,232	2.0
	Undifferentiated Wetland – Forested	50	0.4	12,322	5.8
	Sub-total	50	0.4	16,554	6.1
Dugout	Dugout	0.0	0.0	4.0	0.0
Wetland Total		3,045	25	75,945	28.0

Wetland function

Wetland function is defined as the internal natural processes and features of wetlands independent of the benefits provided to humans (Burton and Tiner 2009; Hansen et al. 2008; Novitzki et al. 1997). Functions are commonly grouped into the following categories:

- Hydrological (e.g., water flood frequency, water level, and flow rates)
- Biogeochemical (e.g., nutrient cycling, biomass production, and decomposition)
- Habitat (e.g., plant composition and structure)

Wetland services (i.e., benefits to humans) are also included in this assessment. Services can include flood mitigation, water quality improvement, public use, and Indigenous use (e.g., hunting, plant gathering, cultural or ceremonial use).

Wetlands present within a 1-km buffer on either side of the proposed project footprint appear to mostly receive water inputs from direct precipitation. Overland surface water run-off may also contribute to these water inputs.

Fens, semi-permanent to permanent marshes, and shallow open water wetlands also typically have groundwater inputs (National Wetlands Working Group 1997; Stewart and Kantrud 1971).

Swamps may also have groundwater inputs as they can occur on clays to sandy soils and along the margins of fens.

Bogs receive most of their water from direct precipitation (National Wetlands Working Group 1997).

Water levels are highly variable in marshes, changing in response to seasonal and yearly temperature and precipitation levels. These variable water levels cause high rates of decomposition and nutrient levels tend to be high (National Wetlands Working Group 1997; Bayley and Mewhort 2004).

Fens and swamps also have fluctuating water levels, but the soil is more consistently wetted, particularly in fens. Water levels in fens are typically at or near the ground surface and water nutrient levels are poor (Vitt 2013).

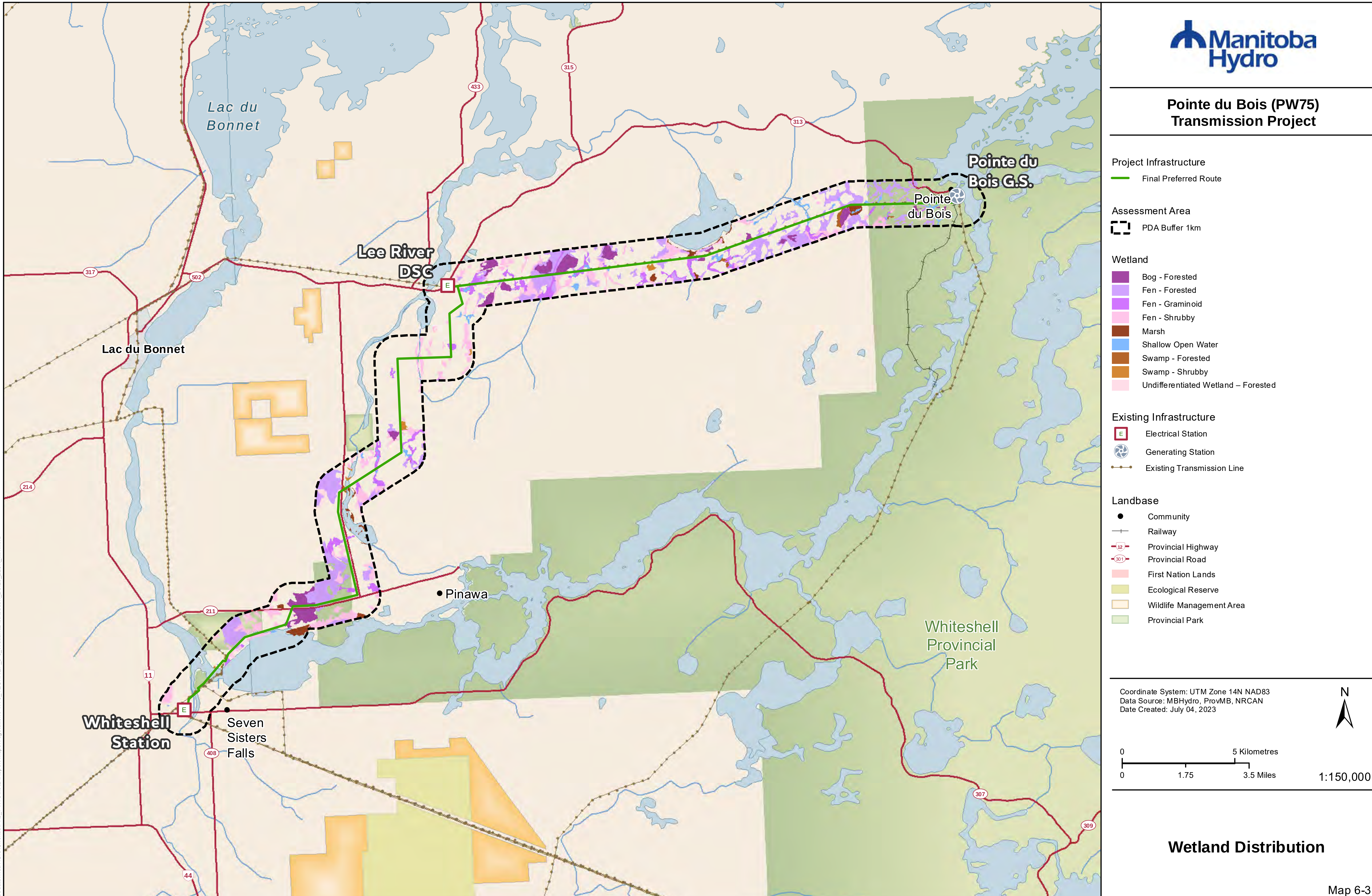
Swamps in Manitoba include areas on mineral soil and on peat (Locky et al. 2005). Fens and bogs have peat deeper than 40 cm (National Wetlands Working Group 1997).

Wetlands within a 1-km buffer of the proposed project footprint include a mix of areas with inlets and outlets without evident stream paths through the wetlands, areas with defined streams, and naturally vegetated and human modified areas. The wetlands often occur as complexes with more than one wetland type (e.g., marsh, swamp, fen, shallow open water) and cover types (e.g., graminoid, shrubby).

Habitat functions in naturally vegetated wetlands include different plant structure and composition associated with graminoid dominated areas, shrubby areas, and forested areas. These are reflected in the various wetland cover types.

Human disturbance has removed the tree and shrub layer in portions of swamps, fens, and bogs. Removal of trees and shrubs occurs primarily in electrical transmission rights-of-way intersecting wetlands. Full wetland loss has also occurred due to road and railway intersects, and possibly due to residential development and agricultural land use.

Fifteen wetlands were assessed in the field for wetland function. Assessed wetlands ranged from temporarily flooded shrubby swamps, semi-permanently flooded graminoid marshes, and permanently flooded graminoid fens. Eleven wetlands had standing open water lacking vegetation cover, all fresh water at the time of the survey, with water depth ranging from 0.2 cm to 100 cm. Inlets and outlets were present in eight of the wetlands and six of the wetlands had been altered by past human activity, including roads, electrical transmission right-of-way, and agriculture.


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment Area
PDA Buffer 1km
Wetland
Bog - Forested
Fen - Forested
Fen - Graminoid
Fen - Shrubby
Marsh
Shallow Open Water
Swamp - Forested
Swamp - Shrubby
Undifferentiated Wetland – Forested
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway
Provincial Road
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0
5 Kilometres
0
1.75
3.5 Miles
1:150,000
Wetland Distribution
Map 6-3
Lac du Bonnet
Lac du Bonnet
Lee River DSC
Pointe du Bois G.S.
Pointe du Bois
Pinawa
Whiteshell Station
Seven Sisters Falls
Whiteshell Provincial Park
315
433
313
317
502
214
211
11
408
44
307
309

6.2.3.5 Amphibians and reptiles

Amphibians and reptiles and their habitat provide ecological, aesthetic, recreational, economic, and cultural value.

Methods

Existing conditions for amphibians and reptiles and their habitat (e.g., wetlands) were identified through a combination of background review and field surveys to better understand the occurrence, distribution, and habitat associations within the project region, including species at risk, and species of conservation concern.

Background information on amphibians and reptiles was obtained through several sources, including personal communications with provincial authorities and local resource users (including Indigenous people), as well as literature reviews, federal and provincial databases, not-for-profit publications, and data sources. Key resources used during background reviews to assist in establishing the baseline conditions for amphibians and reptiles can be found in the wildlife technical data report (Appendix DAppendix D).

Overview

Up to 14 amphibian and reptile species inhabit the project region due to the widespread availability of wetlands, rivers, lakes, and forests (Appendix D). Of these, eight species were identified during 2013 field surveys (Manitoba Hydro 2014), and five species were identified during 2022 surveys (Appendix D).

Two species (i.e., northern leopard frog (*Lithobates pipiens)* and snapping turtle (*Chelydra serpentina*) are listed by SARA and were observed during field studies.

The 2022 autonomous recording unit surveys yielded incidental detections of American toad (*Anaxyrus americanus*), wood frog (*Lithobates sylvaticus*), gray tree frog (*Dryophytes versicolor*), and spring peeper (*Pseudacris crucifer*).

One incidental observation of species at risk (a juvenile northern leopard frog) was noted along the Whitemouth River during a fish habitat assessment in 2022.

One snapping turtle was observed during field studies undertaken in 2013.

Species at risk and species of conservation concern

The northern leopard frog is listed as a species of special concern by SARA due to habitat loss and degradation.

The snapping turtle is listed by SARA as a species of special concern due to reproductive loss because of adult mortality.

6.2.4 Soils

Soils is a broad environmental component that includes terrain, rocks, soil, trees, medicines, berries, gardening, and vegetation species of conservation concern. Linear infrastructure such as transmission lines have the potential to adversely impact soils during both construction and operational activities as well as due to the physical presence of transmission lines and supporting towers. This section presents an existing condition for geology, soils and terrain and vegetation in the project region.

6.2.4.1 Geology

The project lies within the Precambrian Shield physiographic region (Bostock 1970). The underlying geology is dominated by undulating eroded crystalline Archean bedrock, which controls physiography (Smith et al. 1998; Manitoba Conservation 2002a).

Where overburden covers the bedrock substrate, overburden thickness varies greatly and ranges up to 100 m in some areas. Overburden stratigraphy reflects the last glacier retreat eastward and subsequent inundation by Lake Agassiz, consisting mainly of glacial tills, pro-glacial lacustrine and marine sediments, and organics (Betcher et al. 1995).

The project overlaps a transition between flat to undulating terrain dominated by glaciolacustrine plains, glacial tills, and fluvial outwash plains in the west and the Canadian Shield, dominated by hummocky granitic rock outcrops, to the east.

Exposed bedrock is much more common in the eastern portion of the region, forming broadly sloping uplands and lowlands, with low areas filled by glaciolacustrine sediments, glacial till and organics (Smith et al. 1998; Manitoba Conservation 2002a).

Substrates toward the west are increasingly comprised of glacial till, glaciolacustrine, and peat deposits (Manitoba Conservation 2002a). In the southern portion of the project region, glaciofluvial deposits become more prevalent in the west while peat-covered lowlands of fens and bogs become dominant toward the southeast (Smith et al. 1998).

6.2.4.2 Soils and terrain

According to Matile and Keller (2007), the project region is covered by a mixture of mineral/bedrock and organic surface materials. The western portion of the region supports a variety of soil types associated with the higher diversity of surface materials and drainage conditions compared with areas to the east (Smith et al. 1998).

In upland areas, Dark Gray Chernozems have typically developed on calcareous tills and gravelly glaciofluvial materials. Gray Luvisols are primarily associated with glaciolacustrine deposits (Smith et al. 1964, 1967). In general, peaty Gleysols and Mesisols that are predominantly sedge peat have developed in depressional lowlands.

In contrast, most of the eastern portion of the project region is bedrock-controlled terrain characterized by a repeating pattern of bedrock outcrops, thin mineral veneers on slopes and organics in the depressions.

The dominant mineral soils are well to excessively drained Dystric Brunisols that have developed on discontinuous, sandy textured, stony veneers of glacial till. Gray Luvisols are found on clayey glaciolacustrine sediments along the Winnipeg River and in low-lying areas. Soils in the depressional peatlands are predominantly Typic (deep) and Terric (shallow) Mesisols and Fibrisols that have developed initially from sedge and then from sphagnum moss peat.

Within the project region, Organic soils, Luvisolic soils, and Gleysolic soils are most common (Table 6-8; Map 6-4).

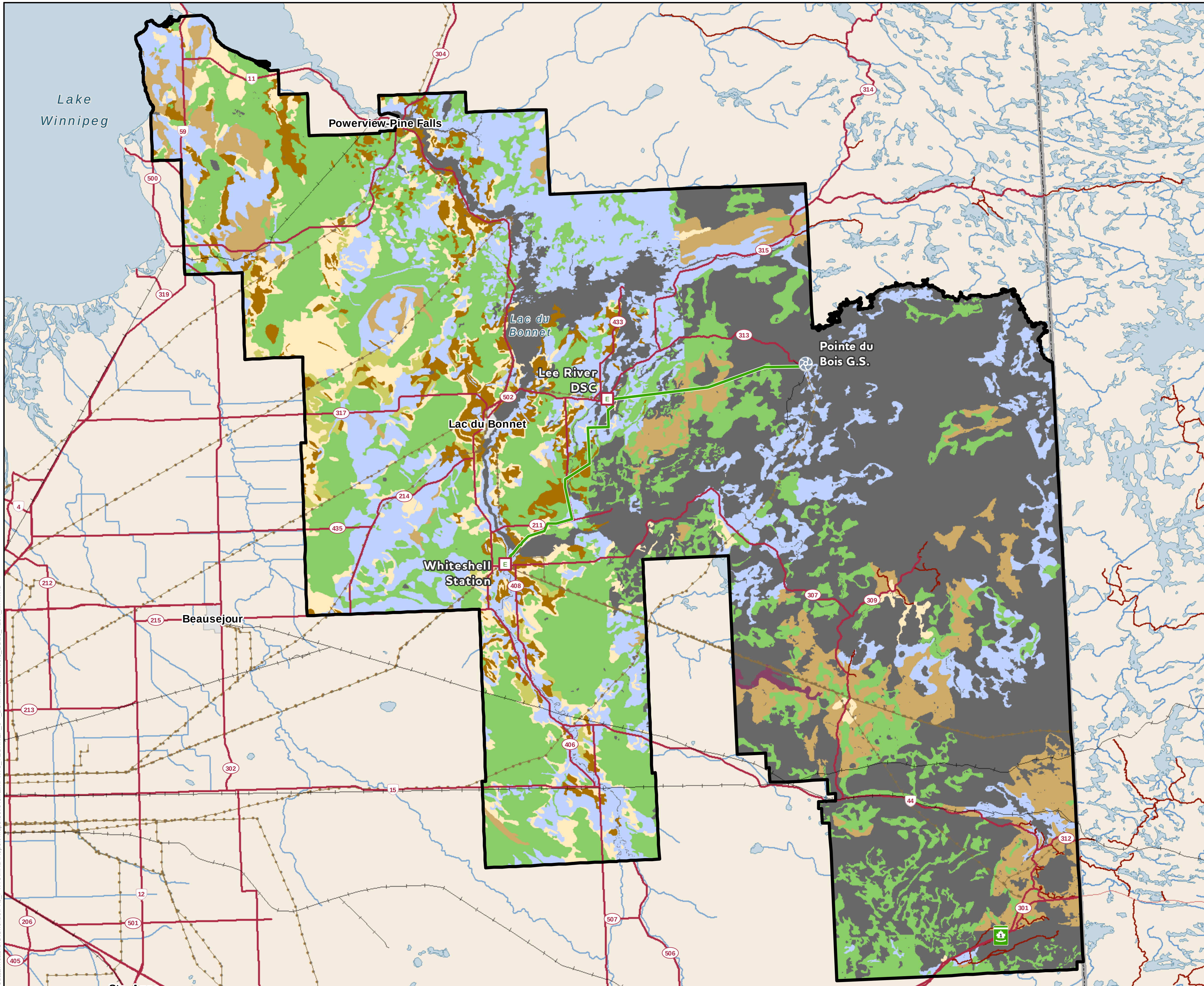
Table 6-8: Dominant soils in the project region

Soil Order	Soil Description	Area (ha)	Percentage (%)
Brunisolic	Forest soils	47,712	7.5
Chernozemic	Grassland soils	25,526	4.0
Gleysolic	Wetland soils	41,753	6.6
Luvisolic	Forest soils with downward movement of clay	122,237	19.2
Organic	Soils composed of mostly plant material	168,962	26.6
Regosolic	Weakly developed soils	901	0.1

Table 6-8: Dominant soils in the project region

Soil Order	Soil Description	Area (ha)	Percentage (%)
Vertisolic	Clay-rich soils	6,505	1.0
Not Applicable[1]	Not Applicable	221,488	34.9
Total		635,083	100

[1]Not Applicable includes unclassified land, acidic bedrock, water, and flooded land.



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

- Final Preferred Route

Assessment Area

- Project Region

Dominant Soil Orders

- BR - Brunisolic
- CH - Chernozemic
- GL - Gleysolic
- LU - Luvisolic
- OR - Organic
- RG - Regosolic
- SZ - Solonetzic
- VE - Vertisolic
- NA - Not Applicable

Existing Infrastructure

- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Railway
- Provincial Highway
- Provincial Road

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 5 10 Miles

1:425,000

Dominant Soils in the Project Region

Map 6-4

6.2.4.3 Vegetation

Vegetation is an important area of assessment as it provides ecological, aesthetic, recreational, economic, and cultural value and it supports wildlife. Vegetation use is important to communities, particularly resource users that practice cultural and recreational harvesting and cultural activities throughout the region.

Methods

Published literature, vegetation databases, and aerial photographs were reviewed for information on existing conditions for vegetation in the project region. Information sources reviewed included:

- Terrestrial ecozones, ecoregions, and ecodistricts of Manitoba book (Smith et al 1998)
- Government databases that included information on provincially listed species of conservation concern (Manitoba Conservation Data Centre [MB CDC] 2021) and federally listed species at risk (SAR) (Government of Canada 2023)
- FRI data (Government of Manitoba 2022)

Field surveys of the alternate routes were conducted, with surveys focusing on species of conservation concern (species of conservation concern). For more detailed information about field surveys and findings, refer to the vegetation and wetlands technical data report (Appendix F).

Land cover mapping

The 2014 environmental assessment landcover mapping was updated following 2022 field work using recent air photography of the project and field findings. Mapped landcover boundaries were revised and re-classed where appropriate, including changes due to new human disturbances that were not present in 2014.

The following information sources were reviewed for mapping the project region:

- ESRI World Imagery (ESRI 2019)
- 2020 Land Cover of Canada (LCC) (Government of Canada 2020)
- Manitoba FRI (2021) aerial photography (Government of Manitoba 2022)
- Bing Maps (2012-2023)
- Google Earth (2023)

Land cover classes and cover types (summarized in Table 6-9) were based on vegetation cover.

Table 6-9: Land cover classes and cover types identified for the project region

Land Cover Class	Cover Type	Definition
Agriculture	Annual Crop	Dominated by seeded annual crops usually a monoculture which is annually tilled, seeded, or cut.
	Hayland	Land seeded to perennial crops such as alfalfa and clover cut for hay
	Tame Pasture	Dominated by seeded perennial species and used for grazing e.g., cattle, sheep, etc.
	Undifferentiated Agriculture	Cover type could not be determined.
Developed	Industrial / Commercial	Land that is predominantly built-up or developed, including commercial and industry plants and mine structures; vegetation is not associated with this land cover category.
	Electrical Right-of-way	Electrical transmission rights-of-ways.
	Rural/Residential	Populated urban areas and farmsteads.
	Roads/Rail	Human-constructed routes for vehicles; includes surface/paved highways, railway road surfaces and non-surfaced trails.
Upland	Deciduous Forest	Forest lands where 75-100% of the canopy is broadleaf/deciduous or hardwood forests (e.g., poplar, including trembling aspen [*Populus tremuloides*] and birch species).
	Coniferous Forest	Forest lands where 75-100% of the canopy is coniferous or softwood forests (e.g., jack pine [*Pinus banksiana*] and spruce species).

Table 6-9: Land cover classes and cover types identified for the project region		
Land Cover Class	Cover Type	Definition
	Mixedwood Forest	Forest lands where 26-74% of the canopy is a mix of coniferous and broadleaf deciduous forest.
	Shrubland	Land dominated by woody, multi-stemmed plants or trees 3 m in height or less, such as willows (*Salix spp*.), wolf willow (*Elaeagnus commutate*), snowberry (*Symphoricarpos occidentalis*) and prairie rose (*Rosa arkansana*).
	Native Grassland	Lands of native prairie grasses or mixed native and tame prairie grasses and herbaceous vegetation.
	Naturally Barren/Rock Outcrop	Land that is predominately non-vegetated and non-developed. Includes: glacier, rock, sediments, other naturally occurring non-vegetated surfaces. Excludes fallow agriculture.
	Undifferentiated Upland	Cover type could not be determined.
Wetland	Fen - Forested	Peatland receiving water rich in dissolved minerals and influenced by groundwater; >25% tree cover of trees taller than 2 m.
	Fen - Shrubby	Peatland receiving water rich in dissolved minerals and influenced by groundwater; >25% shrub cover, ≤25% tree cover, shrubs >2m tall.
	Fen - Graminoid	Peatland receiving water rich in dissolved minerals and influenced by groundwater; ≤25% tree or shrub cover.

Land Cover Class	Cover Type	Definition
	Bog - Forested	Peatland receiving water only from precipitation and not influenced by groundwater; >25% tree cover of trees taller than 2m.
	Swamp - Forested	Periodically standing surface water and gently moving, nutrient-rich groundwater; >60% of canopy cover is coniferous, softwood or broadleaf/deciduous and trees are > 10m tall.
	Swamp – Shrubby	Periodically standing surface water and gently moving, nutrient-rich groundwater; >30% shrub cover, shrubs 2-10m tall.
	Marsh	Periodic or persistent standing water or slow-moving surface water which is circumneutral to alkaline and generally nutrient-rich; >25% emergent cover, ≤25% tree or shrub cover.
	Shallow Open Water	Wetlands with free surface water up to 2 m deep, present for all or most of the year and ≤25% emergent vegetation cover.
	Dugout	Human constructed holding area for water.
	Undifferentiated Wetland – Peatland	Wetland cover type could not be determined beyond peatland.
	Undifferentiated Wetland – Forested	Wetland cover type could not be determined beyond forested.
Water	Lakes/River	Large water bodies of freshwater.
	Ditch/Canal	Waterway channels built for drainage management.

Table 6-9: Land cover classes and cover types identified for the project region

Table 6-9: Land cover classes and cover types identified for the project region

Land Cover Class	Cover Type	Definition
Unclassified	Unclassified	Land cover type unclassified.
Riparian[1]		Defined under *The Water Protection Act* as an area of land on the banks or in the vicinity of a waterbody that would naturally support, an ecosystem that is distinctly different from the adjacent upland areas.

[1] A 30-metre (m) buffer was applied to either side of known watercourses (rivers and creeks) and waterbodies (lakes) for identification of riparian habitat.

The landcover mapping data was used to identify existing linear features. Linear feature density, and core area were used to evaluate landscape intactness. Linear feature density indicates the areas intersected by existing linear features such as transmission lines, dykes, trails, cutlines, roads, and highways. These linear features were separated into two categories according to their frequency of human use, high and low. High use linear features included dykes, protective features, railways, and roads (all weather and winter). Low use linear features included cutlines, trails, electrical lines, footpaths, and the TransCanada Trail.

Core area was determined by identifying the furthest mapped extent of polygons of a single cover type (e.g., deciduous forest) intersected by the final preferred route, buffered by 1 km, and calculating the size following the removal of buffers where adjacent human activity may have altered conditions. Core area is the area remaining after removing human development plus either a 200 m buffer for transmission lines, dykes, trails, and cutlines; or a 500 m buffer for other linear features (e.g., roads) from the patch.

Species of conservation concern

The species at risk public registry (Government of Canada 2023) was searched for federally listed species at risk within Manitoba. The Manitoba Conservation Data Centre was searched prior to field surveys to identify potential historical plant species of conservation concern within the project region (MB CDC 2022).

Surveys for plant species of conservation concern (i.e., provincially rare species, and provincial and federal species at risk) were completed from June 16-19, 2022, and

August 6-12, 2022. The surveys used a stratified meander technique with the crew walking a series of transects in pre-selected areas (120 m wide x 100 m long) and documenting the vascular plants observed. In addition, percent cover of dominant vascular plant species (tree and shrub height) and percent total of vascular plants, non-vascular plants, water, litter, and bare ground were recorded in 20 m x 20 m plots. Photos in all four cardinal directions (north, south, east, and west) were taken at the start and end points of each meander and at plot locations.

Regulated weeds

Noxious weed species listed under *The Noxious Weed Act* were documented opportunistically during the species of conservation concern surveys. Density distribution and location were recorded when noxious weeds were observed. Density distribution was evaluated following a guide for rating invasive species infestations (Saskatchewan Prairie Conservation Action Plant [SKPCAP] 2008; Table 6-10 Table 6-10)Table 6-10. A key person interview (KPI) was conducted to provide input regarding concerns of weeds in the project.

Table 6-10: Weed density distribution definitions

Density distribution rank	Definition
1	Rare
2	few sporadically occurring individual plants
3	a single plant
4	a single plant plus few sporadically occurring plants
5	several sporadically occurring plants
6	a single patch plus a few sporadically occurring plants

Berry abundance

Berry producing plant abundance was evaluated for approximately 1 km of the existing electrical transmission ROW and an additional 30 m of adjacent natural vegetation. The exiting ROW was walked and when berry producing plants were encountered, 20 m x 20 m of the area was assessed for berry producing plant abundance.

Overview

The project is in the Stead and Pinawa ecodistricts of the Lake of the Woods ecoregion in the boreal shield ecozone. The vegetation of the Stead ecodistrict varies with surficial materials and drainage (Smith et al. 1998).

Native vegetation on poorly drained clayey soils consists of meadow grasses, sedges, and prairie grasses with trees along the streambanks. In the southern section of the ecodistrict, eastern white cedar, alder, and other shrubs are common on shallow organic soils and in swamps.

The upland areas of the Stead Ecodistrict consists of mixed vegetation and upland forest, dominated by Jack pine (*Pinus banksiana*), trembling aspen (*Populus tremuloides*) and white birch (*Betula papyrifera*) with balsam poplar (*Populus balsamifera*) common around wetter sites (Smith et al. 1998).

The vegetation of the Pinawa ecodistrict is forested with a small portion of the area used for agriculture (Smith et al. 1998). Deciduous trees such as bur oak (*Quercus macrocarpa*) and ash grow around streams, Jack pine is primarily on bedrock and sandy deposits, or in combination with black (*Picea mariana*) and white spruce (*Picea glauca*), balsam fir (*Abies balsamea*) and trembling aspen is found on clayey and loamy upland sites.

There are several protected areas, including Whiteshell Provincial Park, Pinawa Provincial Wayside Park, Relax Ridge Seasonal Park, Lakeside Park, and Leslie Park, Pinawa Dam Provincial Heritage Park, and Whitemouth Falls Provincial Park in the region (see Designated Lands and Protected Areas Map in Appendix F).

Landscape intactness

Intactness refers to the degree to which an ecosystem has not been altered by human development and activities that remove habitat and increase fragmentation. Landscape intactness is an indicator for human effects on vegetation, wetlands, wildlife, species of conservation concern, and plants of importance to Indigenous groups.

The 1 km buffered final preferred route has over 400 km of linear features with an average density of 0.037 km/km^{2}Table 6-11 (Table 6-11). Linear feature length varies from dykes at 0.07 km to electrical lines at 164.31 kmTable 6-11. The linear feature density is highly variable and ranges from dykes at <0.001 km/km^2 to electrical lines at 0.025 km/km^{2}Table 6-11.

Table 6-11: Linear feature length and density within a 1 km buffer of the final preferred route

Linear Feature		Length (km)	Density (km/km^2)
Degree of Human Use	Type		
High	Dyke	0.07	<0.001
	Protective feature	6.97	0.001
	Railway	4.45	<0.001
	Road - all weather	133.68	0.012
	Road- winter	1.09	<0.001
High Use Total		146.27	0.014
Low	Cutline	9.19	0.001
	Cutline/ trail	1.27	<0.001
	Electrical Line	164.31	0.015
	Trail	55.03	0.005
	Trail/Footpath	8.61	0.001
	TransCanada Trail	17.92	0.002
Low Use Total		256.34	0.024
Grand Total		402.61	0.037

There are a total of 190 quarter sections within a 1 km buffer of the final preferred route, 109 of which have less than average density of low use linear features and 66 have less than the average density of high use linear features.

Most of the quarter sections with less than the average density of high and low use linear features are along the final preferred route west of the existing PW75 existing corridor and north and south of the PW75 existing corridor (Map 6-5).

A total of 168 patches of native vegetation are present within the buffered final preferred route, with size of cover area ranging from 1.1 ha to 354.4 ha (Table 6-12).

The average core area is largest for wetlands, 16.8 ha and smallest for riparian areas, 2.0 ha. Fen – forested has the largest average core area by cover type; however, deciduous forest has the highest maximum core area size.

Table 6-12: Native vegetation core area metrics for the final preferred route, buffered by 1 km

Land Cover Class	Cover Type	Number of Core Areas	Mean Core Area Size (ha)[1]	Maximum Core Area Size (ha)[2]	SD Core Area Size[3]
Upland	Coniferous Forest	152	17.3	302.2	36.2
	Deciduous Forest	146	15.6	354.4	47.9
	Mixedwood Forest	37	18.6	119.9	30.7
	Native Grassland3	1	7.0	7.0	-
	Naturally Barren/Rock Outcrop	1	1.1	1.1	-
	Shrubland	14	4.0	13.3	3.4
	Upland Total	351	16.1	354.4	40.3
Wetland	Bog - Forested	19	13.4	77.2	18.2
	Fen - Forested	70	32.9	346.2	71.7
	Fen - Graminoid	37	13.2	191.8	31.6
	Fen - Shrubby	77	14.6	140.6	26.0
	Marsh	21	5.9	44.6	10.5
	Shallow Open Water	26	3.6	28.9	5.9
	Swamp - Forested	4	4.1	9.7	3.8
	Swamp - Shrubby	3	5.7	10.3	4.7
	Undifferentiated Wetland – Forested	14	9.0	36.0	11.3
	Wetland Total	271	16.8	346.2	42.2

Table 6-12: Native vegetation core area metrics for the final preferred route, buffered by 1 km

Riparian	Upland	27	1.3	10.3	2.1
	Wetland	31	2.5	18.3	4.1
	Riparian Total	58	2.0	18.3	3.3
Grand Total		680	15.2	354.4	39.5

Core area equals the patch size removal of the area in a 200 m or 500 m strip inside the patch, depending on adjacent human disturbance type.

[1] Minimum map unit equals 0.01 ha.

[2]Grassland area identified by the land cover mapping is forest that has been previously cleared.

[3] SD = standard deviation.

Community diversity

The project footprint is a diverse matrix of plant cover types dominated by upland (48.5%), developed (23.7%) and wetland (18.7%) cover classes, with a smaller portion of agriculture, riparian and unclassified (Table 6-13). Developed areas occur in all areas of the project region but are most common in the western portion. Native cover types are most common in the eastern portion of the region, bordering the PW75 established route (Map 6-6).

Table 6-13: Land cover type existing conditions

Land Cover Class	Cover Type[1]	Project footprint		1 km buffer		15 km buffer	
		ha	%	ha	%	ha	%
Agriculture	Annual Crop	11.2	3.4	653.4	6.1	3703.8	1.7
	Hayland	3.3	1.0	63.3	0.6	2561.9	1.2
	Tame Pasture	4.7	1.4	127.6	1.2	974.8	0.5
	Undifferentiated Agriculture	0.0	0.0	0.0	0.0	8.9	<0.1
Agriculture Total		19.2	5.8	844.4	7.8	7,249.4	3.4
Developed	Developed[4]	6.5	2.0	110.3	1.0	19,330.4	9.1
	Electrical Right-of-Way	64.6	19.6	82.2	0.8	231.1	0.1
	Industrial/ Commercial	3.8	1.2	52.9	0.5	1,065.1	0.5
	Roads/Rail	3.1	0.9	174.8	1.6	1,469.7	0.7
	Rural/ Residential	0.0	0.0	134.9	1.3	1,481.3	0.7
Developed Total		78.0	23.7	555.1	5.2	23,577.6	11.1
Riparian	Upland	3.24	0.98	99.1	0.9	2,329.2	1.1
	Wetland	2.89	0.88	81.5	0.8	608.4	0.3
Riparian Total		6.1	1.9	182.8	1.7	2,967.2	1.4
Unclassified	Unclassified	0.0	0.0	3.3	<0.1	65.2	<0.1
Unclassified Total		0.0	0.0	3.3	<0.1	65.2	0.0
Upland	Coniferous Forest	42.3	12.8	1,897.7	17.6	42,202.1	19.9
	Deciduous Forest	66.7	20.3	2,169.7	20.1	39,834.8	18.8
	Mixedwood Forest	48.2	14.6	1,029.5	9.6	7,942.2	3.7
	Native Grassland	0.6	0.2	8.7	0.1	29.0	<0.1
	Naturally Barren/Rock Outcrop	0.0	0.0	3.2	<0.1	688.9	0.3
	Shrubland	2.0	0.6	147.4	1.4	2,040.2	1.0
	Undifferentiated Upland	0.0	0.0	0.0	0.0	5.4	<.1
Upland Total		159.7	48.5	5,256.4	48.8	92,742.8	43.8
Water	Ditch/Canal	0.4	0.1	12.7	0.1	152.4	0.1
	Lakes/Rivers	4.5	1.4	879.0	8.2	25,692.2	12.1
Water Total		4.9	1.5	891.7	8.3	25,844.6	12.2
Wetland	Bog – Forested	7.8	2.4	353.4	3.3	409.7	0.2
	Fen – Forested	15.4	5.1	1171.2	10.9	25,284.4	11.9
	Fen – Graminoid	10.6	3.4	357.2	3.3	614.6	0.3
	Fen – Shrubby	16.6	4.9	844.7	7.8	8,984.4	4.2
	Marsh	2.1	0.7	108.8	1.0	3,423.8	1.6

Table 6-13: Land cover type existing conditions

Land Cover Class	Cover Type[1]	Project footprint		1 km buffer		15 km buffer	
		ha	%	ha	%	ha	%
	Shallow Open Water	1.9	0.7	107.4	1.0	3,884.4	1.8
	Swamp – forested	3.0	1.0	25.1	0.2	25.1	<0.1
	Swamp – shrubby	1.9	0.6	25.7	0.2	178.5	0.1
	Undifferentiated peatland	0.0	0.0	0.0	0.0	4,231.6	2.0
	Undifferentiated wetland – forested	0.0	0.0	49.6	0.5	12,322.5	5.8
	Dugout	0.0	0.0	0.0	0.0	3.9	<0.1
Wetland Total		59.3	18.7	3043.1	28.2	59,362.8	28.0
Grand Total		329.5	100.0	10,776.7	100.0	211,809.6	100.0

[1] Based on desktop mapping data.

[2] Based on LCC and FRI data.

[3] Totals many not equal sums of individual values due to rounding.

[4] Developed includes human infrastructure, such as dams, and areas of agricultural land.

Native upland vegetation dominates the region. Forested land dominates upland vegetation and makes up over 45% of the project footprint and over 45% of the project region (i.e., 15 km buffer on the final preferred route). The most common forest type within 1 km of the final preferred route is deciduous forest, followed by coniferous and mixedwood forest. The project region (15 km buffer) is dominated by coniferous forest, followed by deciduous forest, and mixedwood forest.

Deciduous forests are dominated by trembling aspen (*Populus tremuloides*) with an understorey of herbaceous species, including common yarrow (*Achillea millefolium*), red baneberry (*Actaea rubra*), and tall meadow rue (*Thalictrum dasycarpum*), and shrubs such as hazel (*Corylus cornuta*). Coniferous forests are dominated either by black spruce (*Picea mariana*), jack pine (*Pinus banksiana*) or white spruce (*Picea glauca*) with an understory of feather mosses. Mixedwood forests include a mixture of both coniferous and deciduous species such as tamarack (*Larix laricina*), trembling aspen, balsam poplar (*Populus balsamifera*), and white spruce.

Shrubland makes up less than 1% of the project footprint and a just over 1% of the project region (15 km buffer). Naturally barren/rock outcrop does not occur within the project footprint but does occur (0.3%) in the region (15 km buffer).

Native grasslands make up 0.2% of the project footprint, but <0.1% of the project region (15 km buffer). There are a few small intact areas of grassland left in Manitoba due to cultivation for agriculture. Native grasslands are important for plant species of conservation concern such as mixed and fescue prairie, which historically covered a large portion of the prairie provinces and the southern portion of the Boreal Plains ecozone in Canada (Joyce and Morgan 1989). It is estimated that 99.5% of tall grass prairie has been lost in Manitoba and what remains is invaded by non-native invasive species (Henderson and Koper 2014).

Riparian areas in Manitoba are defined under *The Water Protection Act* as an area of land on the banks or within a waterbody, which due to the presence of water supports, or in the absence of human intervention would naturally support, an ecosystem that is distinctly different from that of adjacent upland areas.

Based on the land cover mapping for the project, six locally uncommon native vegetation cover types, excluding human made grassland from forest alteration, were identified. These cover types occupy less than 1% of the region.

Three of the locally uncommon cover types are wetlands, including undifferentiated wetland – forested, two are riparian, upland and wetland, and one is an upland cover type, naturally barren/rock outcrop. However, it should be noted that these locally uncommon habitats may be related to the scale at which the land cover mapping was completed. In general, there is a lack of data on the species composition, soils, and terrain to indicate that these habitats are uncommon in the region. Areas of grassland within the region were previously forested areas that have been cleared and are now dominated by native grasses and therefore are not remnant tall grass prairie patches.

Ecological communities of concern

No ecological communities of concern were identified during the 2022 field surveys.

The *Manitoba Endangered Species and Ecosystems Act* (*MESEA*) protects endangered ecosystems including alvars (areas of sparse vegetation on limestone or dolomite bedrock with 10 cm or less soil) and tall grass prairie. The potential for alvars within this region is low (Manitoba Alvar Initiative 2012). All the alvars known to date in Manitoba are in the Interlake Plain region (Manitoba Alvar Initiative 2012). Alvars are vegetation communities that occur on limestone or dolomite bedrock pavement with little to no soil cover (Manitoba Alvar Initiative 2012). Alvars are habitat to plant species of conservation concern including wild white onion (*Allium textile*), Porter's chess (*Bromus porter*), rough fescue (*Festuca hallii*), Gastony's cliffbrake (*Pellaea gastonyi*), dwarf western cliffbrake (*Pellaea glabella* ssp. *occidentalis*), and dense spikemoss (*Selaginella densa*) and a unique vegetation community that make it an ecological community of concern.

The potential for tall grass prairie is also low; however, remnant patches may exist in areas beyond the historical extent (south of Lake Winnipeg to Texas) of the tall grass prairie (Henderson and Koper 2014). Tall grass prairie is dominated by big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*) with other indicator species including yellow Indiangrass (*Sorghastrum nutans*), old switch panicgrass (*Panicum virgatum*), prairie dropseed (*Sporobolus heterolepis*), and Jerusalem artichoke (*Helianthus tuberosus*). All known tallgrass prairie is in southern Manitoba, with the largest remnant patch (2,200 ha) near Tolstoi, MB (Government of Manitoba n.d.).

Species diversity

Plant species of conservation concern

Historical records indicate a single occurrence of one vascular plant occurrence within the project footprint. Table 6-14 lists the species of conservation concern in the region. The documented species of conservation concern include six forbs, four shrubs, one graminoid and one tree. No occurrences of plant species at risk have been documented in the region (MB CDC 2022).

Table 6-14: Historical records of plant species of conservation concern

Form[1]	Common Name	Scientific Name	Provincial S Rank[1]	Number of Occurrences[2]		
				Project footprint	1 km buffer	15 km buffer
Forb	blue cohosh	*Caulophyllum thalictroides*	S2	0	1	1
Forb	hairy sweet cicely	*Osmorhiza claytonii*	S2?	1	3	3
Forb	large-leaved aster	*Eurybia macrophylla*	S1	0	3	8
Forb	northern tansy mustard	*Descurainia sophioides*	S2	0	3	3
Forb	rose pogonia	*Pogonia ophioglossoides*	S1	0	0	1
Forb	sessile-fruited arrowhead	*Sagittaria rigida*	S2?	0	0	2
Graminoid	Fernald's sedge	*Carex merritt-fernaldii*	S1	0	1	4
Tree	black ash	*Fraxinus nigra*	S2	0	3	3
Shrub	alternate-leaved dogwood	*Cornus alternifolia*	S3	0	1	1
Shrub	dwarf bilberry	*Vaccinium cespitosum*	S3	0	2	2
Shrub	hop-hornbeam	*Ostrya virginiana*	S2	0	7	7
Shrub	teaberry	*Gaultheria procumbens*	S3S4	0	1	1
Total				1	25	33

[1]MB CDC 2021

[2]MB CDC 2022

In addition to the historical plant species of conservation concern, 126 vascular plant species of conservation concern are expected to occur in the Lake of the Woods ecoregion (MB CDC 2023b; Appendix F). Two expected plant species of conservation concern in the Lake of Woods ecoregion are species at risk, the endangered Great Plains ladies'-tresses (*Spiranthes magnicamporum*) and the threatened western silvery aster (*Symphyotrichum sericeum*).

A total of 42 locations were surveyed for vascular plant species of conservation concern. A total of 307 vascular plants were identified within the project footprint (Appendix F). Eighteen vascular plant species of conservation concern with 48 occurrences were observed within the region, including 15 forbs, one graminoid and two shrubs (Table 6-15). No plant species at risk were observed. Species of conservation concern occurrences were observed along the final preferred route (Map 6-7).

Three of the species of conservation concern species, are ranked S1/S2, meaning they are at a very high risk of extirpation in Manitoba due to very low population or severe threats to their survival (NatureServe 2023). Fourteen of the plant species of conservation concern occur within the project footprint and 21 are within a 1 km buffer.

Table 6-15: Vascular plant species of conservation concern observed						
Form[1]	Common name	Scientific name	Provincial S rank[1]	Number of Occurrences[2]		
				Project footprint	1 km buffer	15 km buffer
Forb	arrow-leaved tear-thumb	*Persicaria sagittata*	S3	2	2	2
Forb	bog goldenrod	*Solidago uliginosa*	S3	0	1	1
Forb	bracken fern	*Pteridium aquilinum*	S3S4	1	2	3
Forb	clasping twisted-stalk	*Streptopus amplexifolius*	S2?	0	2	2
Forb	common agrimony	*Agrimonia gryposepala*	S1S2	0	2	3
Forb	crested wood fern	*Dryopteris cristata*	S3S4	0	1	1
Forb	hog-peanut	*Amphicarpaea bracteata*	S3S5	1	2	2
Forb	narrow-leaved cow-wheat	*Melampyrum lineare*	S3S5	0	1	1
Forb	pearly everlasting	*Anaphalis margaritacea*	S3S4	2	2	2
Forb	pink lady's-slipper	*Cypripedium acaule*	S3S4	0	1	1
Forb	rough fleabane	*Erigeron strigosus*	S3S5	3	4	4
Forb	sensitive fern	*Onoclea sensibilis*	S3?	2	3	6
Forb	sessile-fruited arrowhead	*Sagittaria rigida*	S2?	0	0	1
Forb	smooth hedge-nettle	*Stachys tenuifolia*	S3	0	0	1
Forb	striped coralroot	*Corallorhiza striata*	S3S4	0	1	1
Graminoid	bladder sedge	*Carex intumescens*	S3	2	8	14
Shrub	alternate-leaved dogwood	*Cornus alternifolia*	S3	0	2	2
Shrub	dwarf bilberry	*Vaccinium cespitosum*	S3	1	1	1
			Total	14	35	48

[1] MB CDC 2021

[2] MB CDC 2022

Four tree species of conservation concern have the potential to occur in the Lake of the Woods ecoregion (Table 6-16). These tree species of conservation concern have the potential to occur in the project region in the locally uncommon wetland and riparian cover types.

Table 6-16: Tree species of conservation concern with the potential to occur in the Lake of the Woods Ecoregion

Common Name	Scientific Name	Provincial S Rank
Black ash	*Fraxinus nigra*	S2S3
Eastern white pine	*Pinus strobus*	S2
Large-tooth aspen	*Populus grandidentata*	S1S2
Red pine	*Pinus resinosa*	S2S3

SOURCE: MB CDC 2023b.

Plants of interest to First Nations and the MMF

Brokenhead Ojibway Nation, Hollow Water First Nation, and Black River First Nation report harvesting wild rice, blueberries, cranberries, Labrador tea, raspberries, saskatoon berries, chokecherries, wild plums, wild ginger, willow, muskeg tea, Seneca root, cedar, aspen, rosehips, wiikenh, and bullrushes, as well as other various flowers, berries, trees, willows, mushrooms, forbs, and grasses used for sustenance and medicinal purposes (BON, BRFN & HWFN 2019; DWA Transmission Project 2022; Elias et al. 1997; LWIC 2017; MMF, n.d.).

Nineteen plants indicated to be of importance to Indigenous groups were observed during field surveys (Table 6-17). The plants are ranked S4 (apparently secure), to S5 (secure), provincially and are expected to be locally common (NatureServe 2023), although some likely have a patchy distribution and are more abundant in localized areas.

Abundance at surveyed sites ranged from 0.1% cover to 30% cover. The tree aspen had the greatest percent cover of plants of importance to Indigenous groups at sites surveyed. Percent cover of most of the observed plants of importance to Indigenous groups equaled 5% or less at the surveyed sites. Most of these species were found in forested areas (deciduous, mixedwood and coniferous forest), and willows and berry species were commonly found adjacent to wetlands.

The most abundant berry species was velvety-leaved blueberry followed by smooth wild strawberry (*Fragaria virginiana*). Velvety-leaved blueberries were abundant along the existing transmission line and under the transmission line towers on the east end of the P3/P4 transmission line right-of-way. A participant noted during the KPI's that Rice Lake, north of the exiting transmission line right-of-way, between Pointe du Bois generating station and Lee River distribution supply centre, and the surrounding areas, is used for wild rice harvesting (Appendix F).

Table 6-17: Plants of importance to Indigenous groups observed during project field surveys

Form	Common name	Scientific name	Provincial S Rank[1]
Tree	trembling aspen	*Populus tremuloides*	S5
Shrub	bog cranberry	*Vaccinium vitis-idaea*	S5
Shrub	Canada plum	*Prunus nigra*	S4
Shrub	chokecherry	*Prunus virginiana*	S5
Shrub	dwarf bilberry	*Vaccinium cespitosum*	S3
Shrub	highbush-cranberry	*Viburnum opulus*	S5
Shrub	Labrador-tea	*Rhododendron groenlandicum*	S5
Shrub	low sweet blueberry	*Vaccinium angustifolium*	S4
Shrub	mooseberry	*Viburnum edule*	S5
Shrub	prickly rose	*Rosa acicularis*	S5
Shrub	red raspberry	*Rubus idaeus*	S5
Shrub	Saskatoon	*Amelanchier alnifolia*	S5
Shrub	small cranberry	*Vaccinium oxycoccos*	S5
Shrub	velvet-leaf blueberry	*Vaccinium myrtilloides*	S5
Forb	American sweetflag	*Acorus americanus*	S4S5
Forb	cloudberry	*Rubus chamaemorus*	S5
Forb	dewberry	*Rubus pubescens*	S5
Forb	stemless raspberry	*Rubus arcticus*	S5
Graminoid	small-fruited bulrush	*Scirpus microcarpus*	S5

1MB CDC 2021

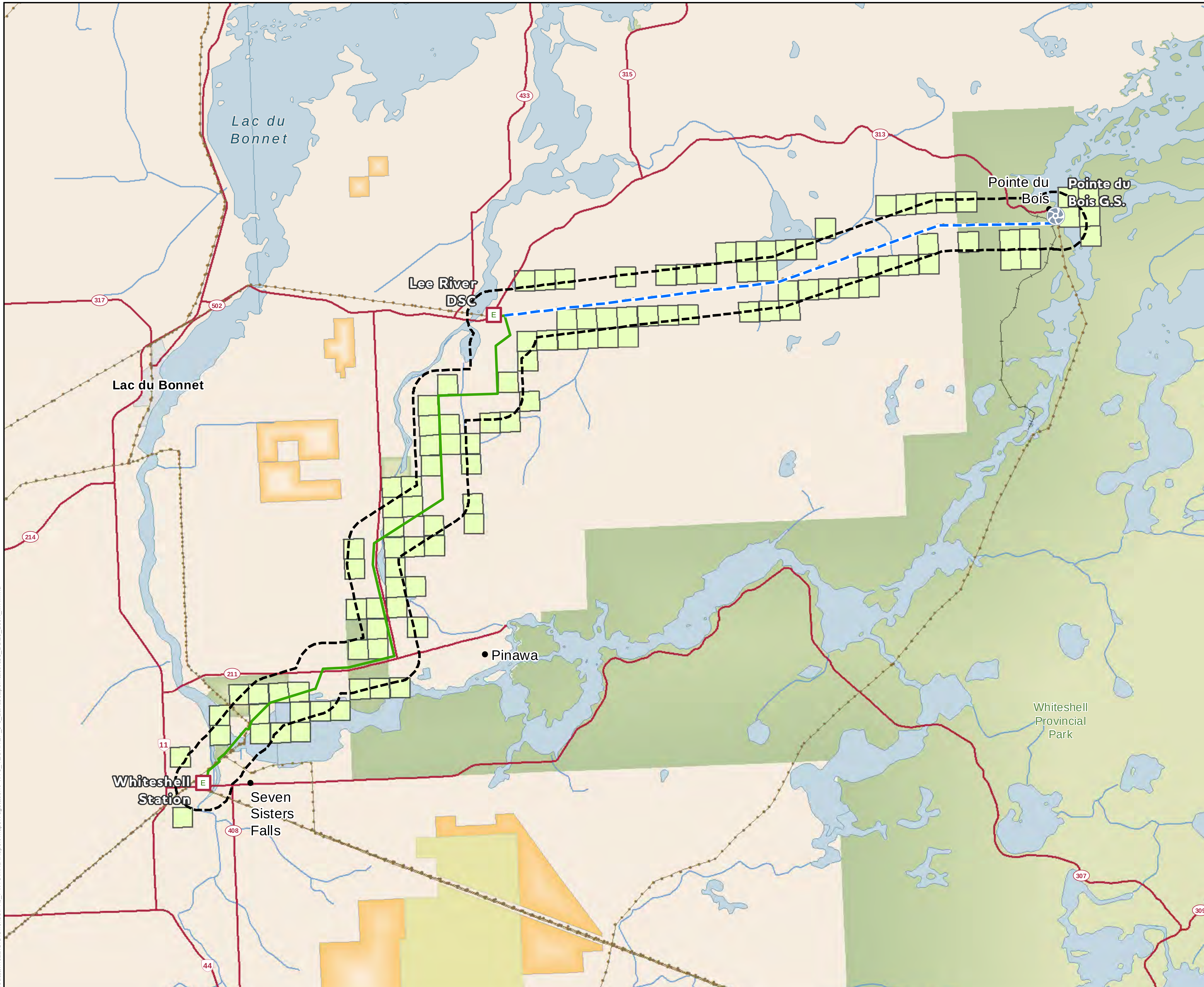
Regulated weeds

Two noxious weeds were observed within the project footprint, Canada thistle (*Cirsium arvense*), and field sow thistle (*Sonchus arvensis*) (Map 6-7). Fourteen occurrences of Canada thistle were found in the region, with a density distribution ranging from 1 (rare) to 9 (several well spaced patches) (Table 6-18). Six occurrences of field sow thistle were observed in the RAA with a density distribution ranging from 2 (few sporadically occurring individual plants) to 5 (several sporadically occurring plants).

Table 6-18: Regulated weeds observed

Common name	Scientific name	Number of occurrences	Number of occurrences	Number of occurrences
		Project footprint	1 km buffer	15 km buffer
Canada thistle	*Cirsium arvense*	6	11	14
Field sow thistle	*Sonchus arvensis*	2	5	6
Total		8	16	20

Feedback received during KPI's indicated orange hawkweed (*Hieracium aurantiacum*) is a concern in the Selkirk District. For more detailed feedback about the KPI's, refer to the Vegetation and Wetlands TDR (Appendix F).



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route
- Pointe du Bois G.S. to Lee River DSC

Assessment
- PDA Buffer 1km

Landscape Intactness
- Below Average Density of High and Low Human Use Features

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

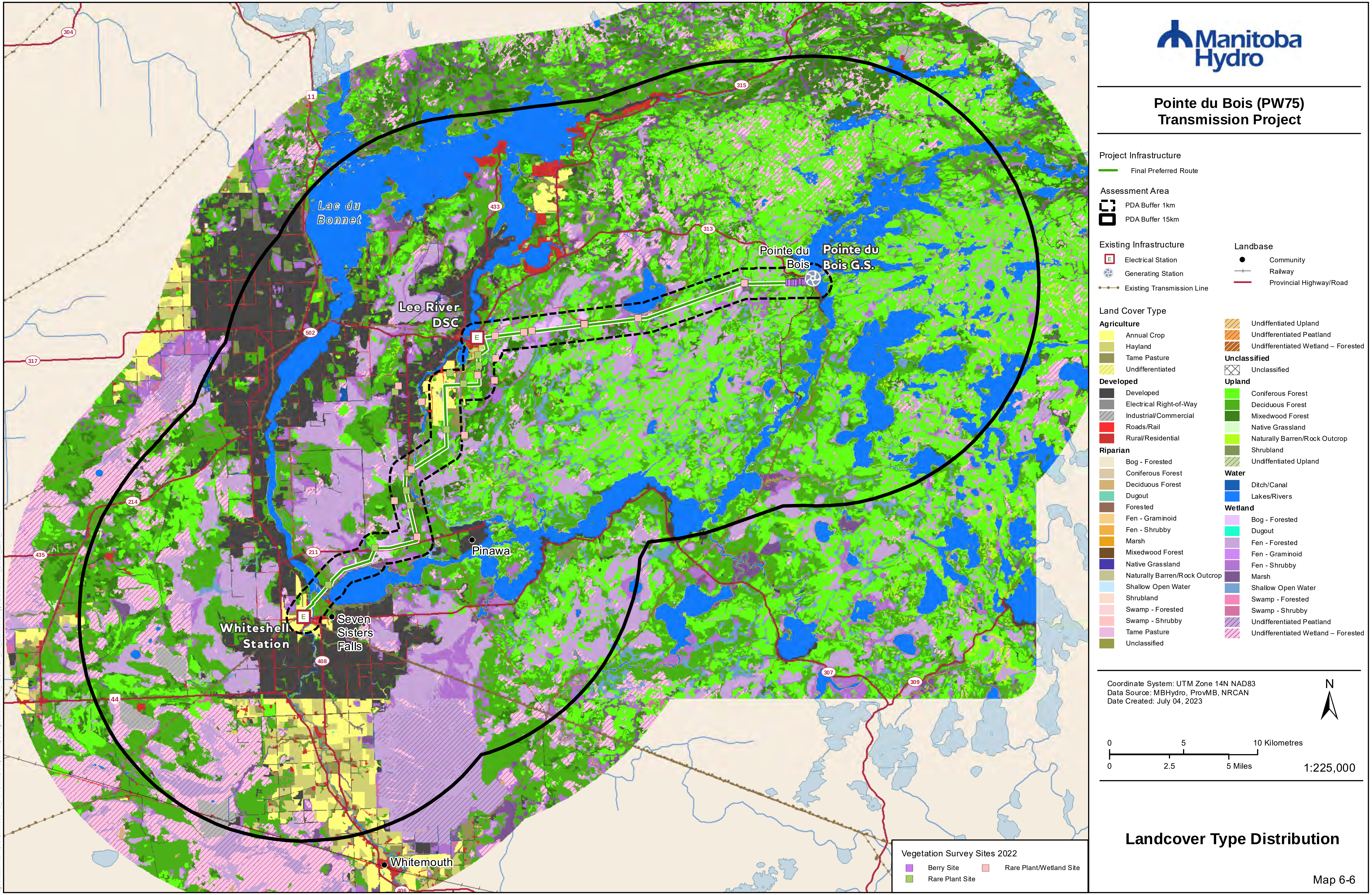
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

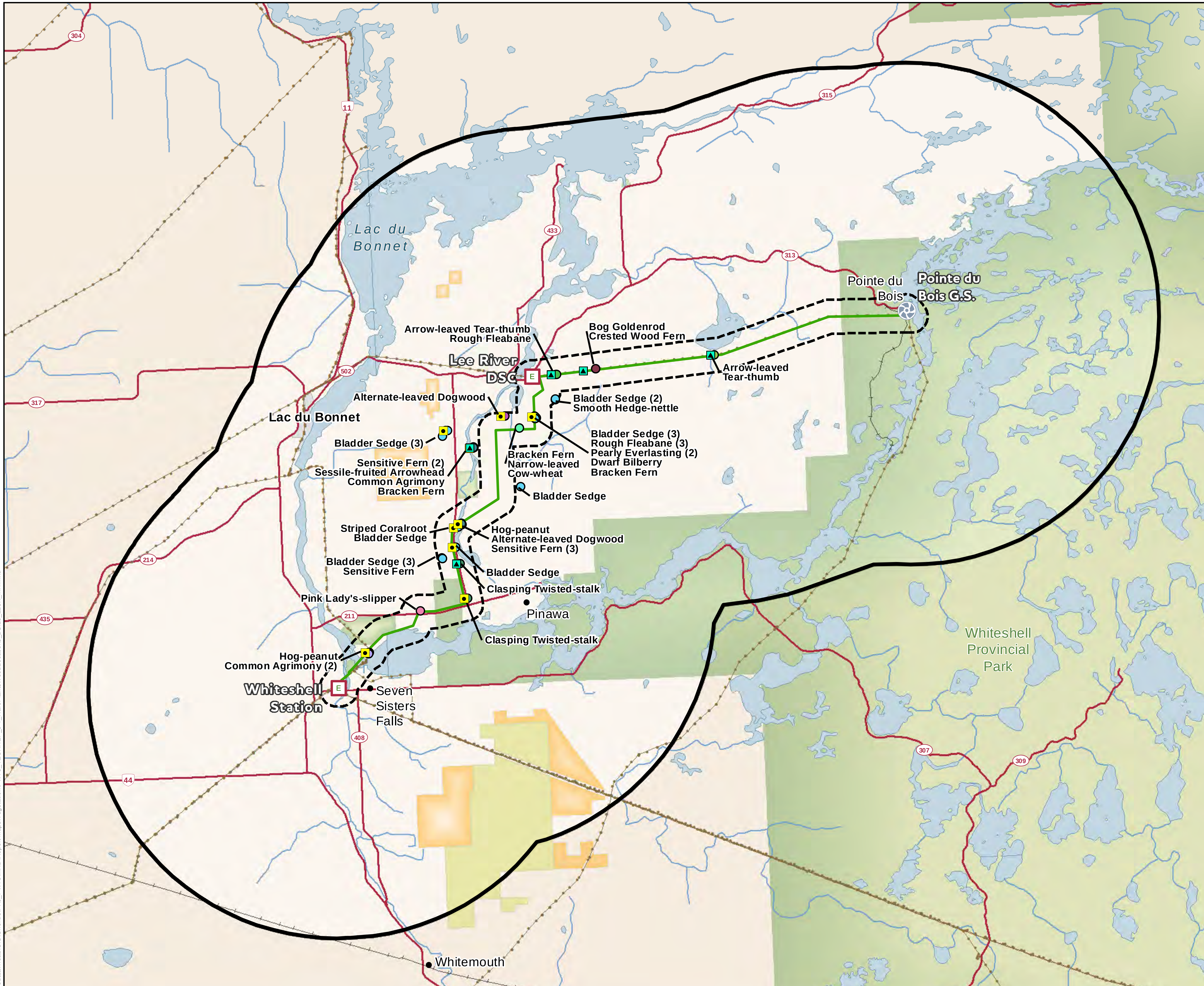
N

0 5 Kilometres
0 1.75 3.5 Miles
1:150,000

Quarter Sections with Below Average Density of Linear Features

Map 6-5


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment Area
PDA Buffer 1km
PDA Buffer 15km
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway/Road
Land Cover Type
Agriculture
Annual Crop
Hayland
Tame Pasture
Undifferentiated
Developed
Developed
Electrical Right-of-Way
Industrial/Commercial
Roads/Rail
Rural/Residential
Riparian
Bog - Forested
Coniferous Forest
Deciduous Forest
Dugout
Forested
Fen - Graminoid
Fen - Shrubby
Marsh
Mixedwood Forest
Native Grassland
Naturally Barren/Rock Outcrop
Shallow Open Water
Shrubland
Swamp - Forested
Swamp - Shrubby
Tame Pasture
Unclassified
Undiffentiated Upland
Undifferentiated Peatland
Undifferentiated Wetland – Forested
Unclassified
Unclassified
Upland
Coniferous Forest
Deciduous Forest
Mixedwood Forest
Native Grassland
Naturally Barren/Rock Outcrop
Shrubland
Undiffentiated Upland
Water
Ditch/Canal
Lakes/Rivers
Wetland
Bog - Forested
Dugout
Fen - Forested
Fen - Graminoid
Fen - Shrubby
Marsh
Shallow Open Water
Swamp - Forested
Swamp - Shrubby
Undifferentiated Peatland
Undifferentiated Wetland – Forested
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0 5 10 Kilometres
0 2.5 5 Miles
1:225,000
Landcover Type Distribution
Map 6-6
Vegetation Survey Sites 2022
Berry Site
Rare Plant/Wetland Site
Rare Plant Site
Lac du Bonnet
Lee River DSC
Pointe du Bois
Pointe du Bois G.S.
Pinawa
Whiteshell Station
Seven Sisters Falls
Whitemouth
304
11
315
433
313
502
317
214
435
211
408
44
406
307
309



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

Final Preferred Route

Assessment Area

PDA Buffer 1km

PDA Buffer 15km

Regulated Weeds

Canada Thistle

Field Sow-thistle

Plant SOCC

- Alternate-leaved Dogwood
- Arrow-leaved Tear-thumb
- Bladder Sedge
- Bog Goldenrod
- Bracken Fern
- Clasping Twisted-stalk
- Common Agrimony
- Crested Wood Fern
- Dwarf Bilberry
- Hog-peanut
- Narrow-leaved Cow-wheat
- Pearly Everlasting
- Pink Lady's-slipper
- Rough Fleabane
- Sensitive Fern
- Sessile-fruited Arrowhead
- Smooth Hedge-nettle
- Striped Coralroot

Existing Infrastructure

Electrical Station

Generating Station

Existing Transmission Line

Landbase

- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres

0 2.5 5 Miles

1:225,000

Locations of Plant Species of Conservation Concern and Regulated Weeds

Map 6-7

6.2.5 Lands

Lands is a broad environmental component that includes terrestrial wildlife (e.g., white-tailed deer, moose, furbearers, and species at risk) and their habitats. Linear infrastructure such as transmission lines have the potential to adversely impact lands primarily during construction but also during operational activities and due to the physical presence of transmission lines and supporting towers. This section presents an existing condition for terrestrial wildlife and species at risk as well as their habitats in the project region.

6.2.5.1 Terrestrial wildlife and wildlife habitat

Terrestrial wildlife and terrestrial wildlife habitats play an important role in the biophysical and socio-economic environment of the project region. Mammals are components of ecological cycles, provide economic benefits from hunting, guiding, and trapping, and provide a source of food and materials.

Methods

Background information on terrestrial wildlife and wildlife habitat was obtained through several sources, including Indigenous peoples, local resource users, personal communications with provincial authorities as well as pertinent reports and peer-reviewed literature, federal and provincial databases, not-for-profit publications, and other data sources.

Key resources used during background reviews to assist in establishing the baseline conditions for terrestrial wildlife and wildlife habitat can be found in the technical data report (Appendix D). Engagement information was obtained through the 2014 EAP's public engagement feedback and technical advisory committee comments and initial feedback from ongoing project engagement. Feedback was used to inform the 2022 field studies.

Overview

Over 50 terrestrial wildlife species (Appendix D) have potential to occur in the project region. Mammal groups include small mammals, aquatic and terrestrial furbearers, large carnivores, and ungulates.

Small mammals include mice, voles, shrews, squirrels, and chipmunks, and are the primary food source for numerous species of carnivores, including American marten (*Martes americana*). Factors that affect habitat selection by small mammals include canopy and shrub cover abundance, elevation, debris, and soil moisture among other factors (Perrin 1979, Mihok et al. 1985, Vickery et al. 1989).

Up to six species of bats could occur in the project region. The little brown myotis (*Myotis lucifugus*), big brown myotis (*Eptesicus fuscus*), and northern long-eared myotis (*Myotis septentrionalis*) are year-round residents. These species can hibernate underground, in caves and crevices, and mines. There are no known bat hibernacula in the project region (Manitoba Conservation Data Centre records).

Aquatic furbearers are medium-sized mammals that rely on water to provide habitat and access to food. Muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), mink (*Mustela vison*), and river otter (*Lontra candensis*) are year-round residents.

Beaver and muskrat require permanent waterbodies with sufficient depth to allow for under ice access to food sources during winter. Permanent waterbodies with little water movement or fluctuation are preferred (Butler 1991; Clark 2000). Mink and river otter require permanent waterbodies to provide habitat and access to food (e.g., fish). River, streams, and beaver ponds provide suitable habitat (Banfield 1987; Melquist and Dronkert 1998). Beaver was the most trapped animal between 1996 and 2012 (Manitoba Conservation and Water Stewardship, unpubl. data).

Terrestrial furbearers spend most of their time and derive most or all their food from terrestrial habitats. They are medium-sized mammals and include species such as American marten, coyote (*Canis latrans*), and lynx (*Lynx canadensis*).

Up to 17 species of terrestrial furbearers could occur in the project region and most are year-round residents that breed in the region. American marten was the second most trapped animal after beaver between 1996 and 2012. Potential American marten habitat is widespread throughout the region (Appendix D, Map 6-8).

Large carnivores found in the project region include black bear (*Ursus americana*), gray wolf (*Canis lupus*), and cougar (*Puma concolor*). The black bear and gray wolf breed in the region, whereas cougars are sparse in eastern Manitoba, and the area is unlikely to have a breeding population.

Large carnivores, particularly the gray wolf, can have serious impacts on ungulate populations (Messier 1994), and is thought to be involved, among other factors, in the decline of the regional moose population.

Ungulates (e.g., white-tailed deer [*Odocoileus virginianus*] and moose [*Alces alces]*) are hoofed mammals that contribute to ecosystem function by consuming plants and are a main prey source for large carnivores. White-tailed deer are expanding their range northward (Whiklo 2023, pers. comm.) and are considered common and widespread in the region.

In Game Hunting Area (GHA) 26, management of this species has focused on measures to decrease deer abundance due to the threat they pose to moose recovery. Deer are a natural host of brainworm (*Parelaphostrongylus tenuis*), a parasite benign to deer but deadly to moose. Management measures include:

- Extending the deer hunting season in GHA 26
- Issuing more deer hunting licenses
- Hunting for white-tailed deer by lodge and non-lodge outfitting
- Allowing for recreational harvest almost anywhere in GHA 26

Moose are not common in the region due to a variety of factors including predation, disease, harvest pressure, climate change and a changing landscape (Black River First Nation 2022; Government of Manitoba 2020).

Population estimates for moose in GHA 26, which overlaps the project region near Pointe du Bois, Lee River, and the Winnipeg River, have been increasing since 2010 when moose conservation closures were implemented in some areas (Black River First Nation 2022; Government of Manitoba 2020; Appendix D, Map 6-9).

Currently, GHA 26 remains closed to licenced moose hunting and portions of the GHA near Happy Lake Road and Translicence Road remain closed to non-licensed hunting (Whiklo 2023, pers. comm.).

Moose prefer early successional forests, shrubs, and wetlands which provide important forage species (Coady 1982; Dussault et al. 2006). Moose will also use mature forest habitat for protection from weather and predators (Coady 1982; Dussault et al. 2006). Potential moose habitat is widespread throughout the region (Map 6-10).

Species at risk and species of conservation concern

Two terrestrial wildlife species at risk have potential to occur in the project region: little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*). Both species of bats were designated as species at risk largely due to declines in parts of Canada from white-nose syndrome, a new fungal disease.

Little brown myotis and northern myotis require different habitats for overwintering hibernacula and maternal roosting sites. Overwintering hibernacula provide prolonged refuge from cold northern winters and are often in limited supply as the internal environmental conditions for hibernacula are relatively restrictive (e.g., caves; COSEWIC 2013). There is no evidence to suggest that there are bat hibernacula in the region.

Little brown myotis and northern myotis generally roost in tall, large diameter snags (i.e., decadent trees) in mature or over-mature forest, in tree cavities, or under bark on mature coniferous trees (COSEWIC 2013). Individuals may travel hundreds of kilometers from overwintering hibernacula to these sites for the breeding season (COSEWIC 2013). During the spring, summer, and fall, little brown myotis and northern myotis forage along forest openings and over waterbodies (COSWEIC 2013).

Sensitive sites for terrestrial wildlife

Mineral licks

One mineral lick was found in the project region during baseline studies, and others may be present. Mineral licks are important to moose and other ungulates for nutrition and antler growth.

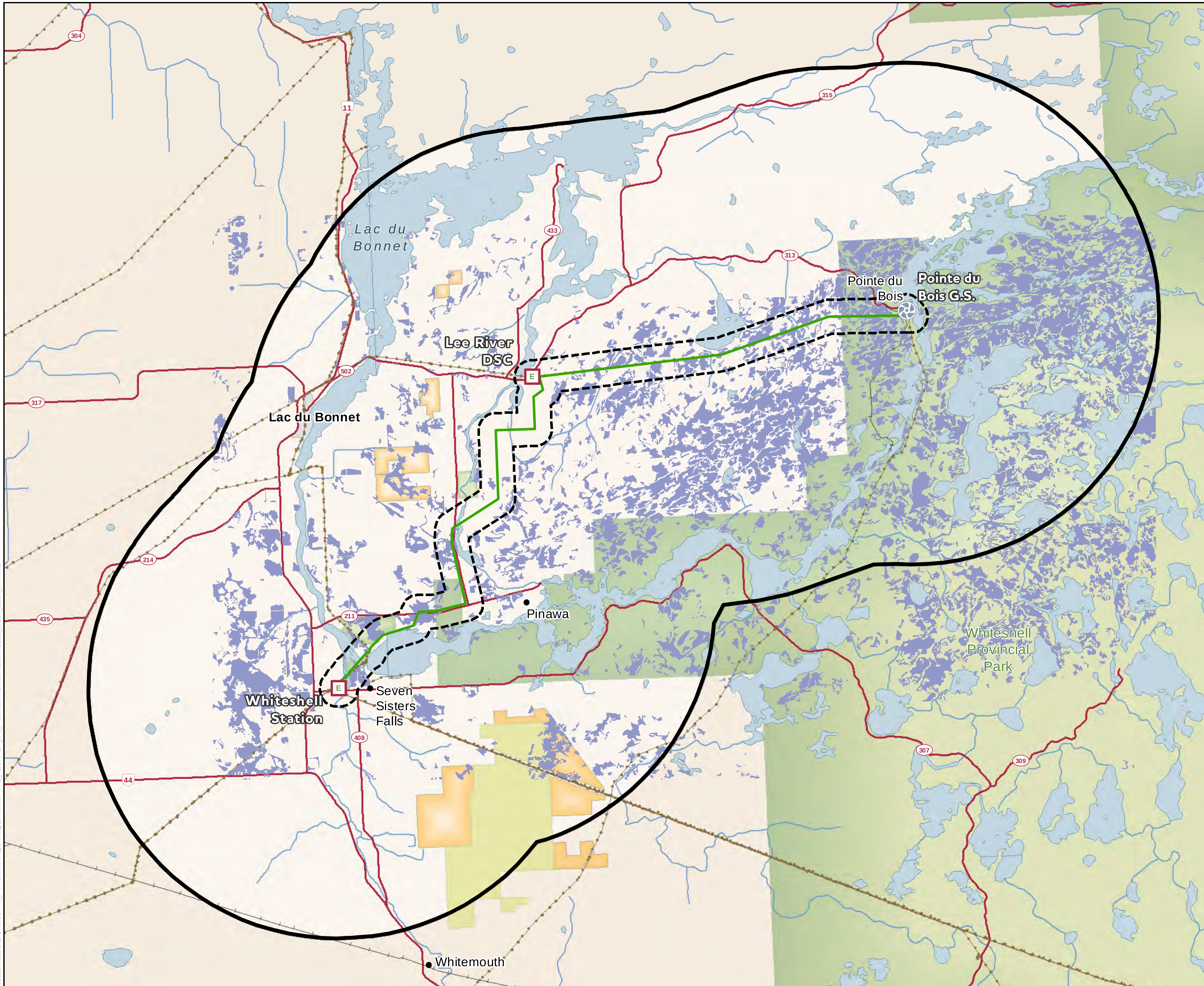
Terrestrial wildlife and habitat of First Nation, Red River Métis and public interest and concern

Ongoing engagement for the project has identified moose and American marten as important terrestrial wildlife species for their ecological and subsistence value.

Through engagement sessions and surveys collected by Manitoba Hydro (Chapter 4.0), First Nations people and Red River Métis citizens reported that the area east of Boggy Creek Road is important habitat for white-tailed deer. Black River First Nation (2022) reported that moose populations in some parts of Manitoba are under increased pressure from predation, disease, increased harvesting pressure, climate change as well as the changing landscape.

The MMF has reported harvesting ruffed grouse, Canada geese, mallard, partridge, ptarmigan, and sharp-tailed grouse in the area (Calliou Group 2016; MMF n.d.). Brokenhead Ojibway Nation, Hollow Water First Nation, and Black River First Nation have also reported the practice of hunting gull eggs on islands in Lake Winnipeg (BON, BR, and HWFN 2019).

Previous and ongoing public comments on the project (Government of Manitoba 2014) indicated concern for adverse effects on mature forest and wetland habitat, including on beavers, and moose, and project-related effects on wildlife habitat including habitat fragmentation and increased human access (e.g., recreational vehicles and hunting).



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- PDA Buffer 1km
- PDA Buffer 15km

Habitat Area
- Potential American Marten Habitat

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

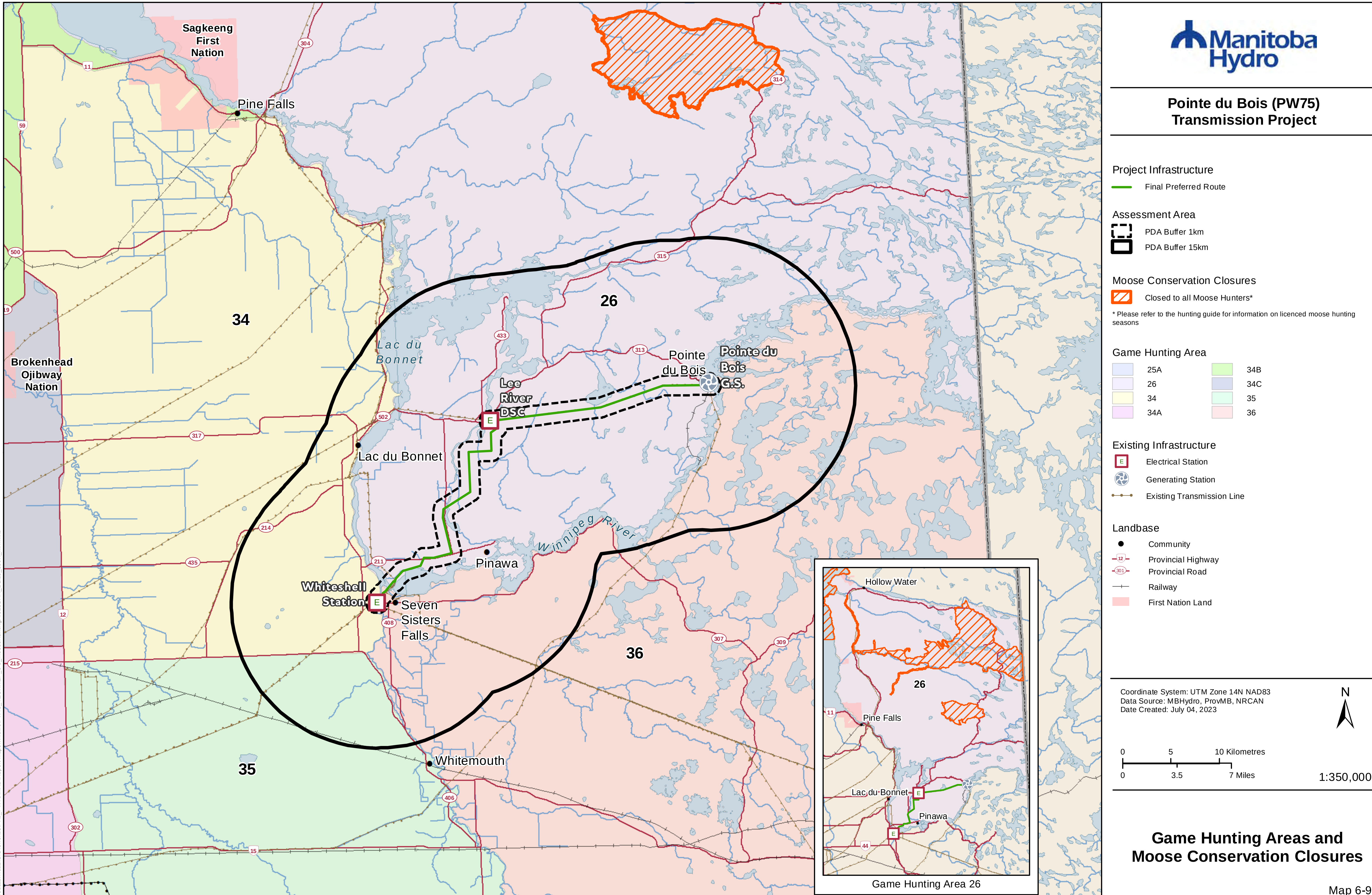
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 2.5 5 Miles
1:225,000

Potential American Marten Habitat

Map 6-8

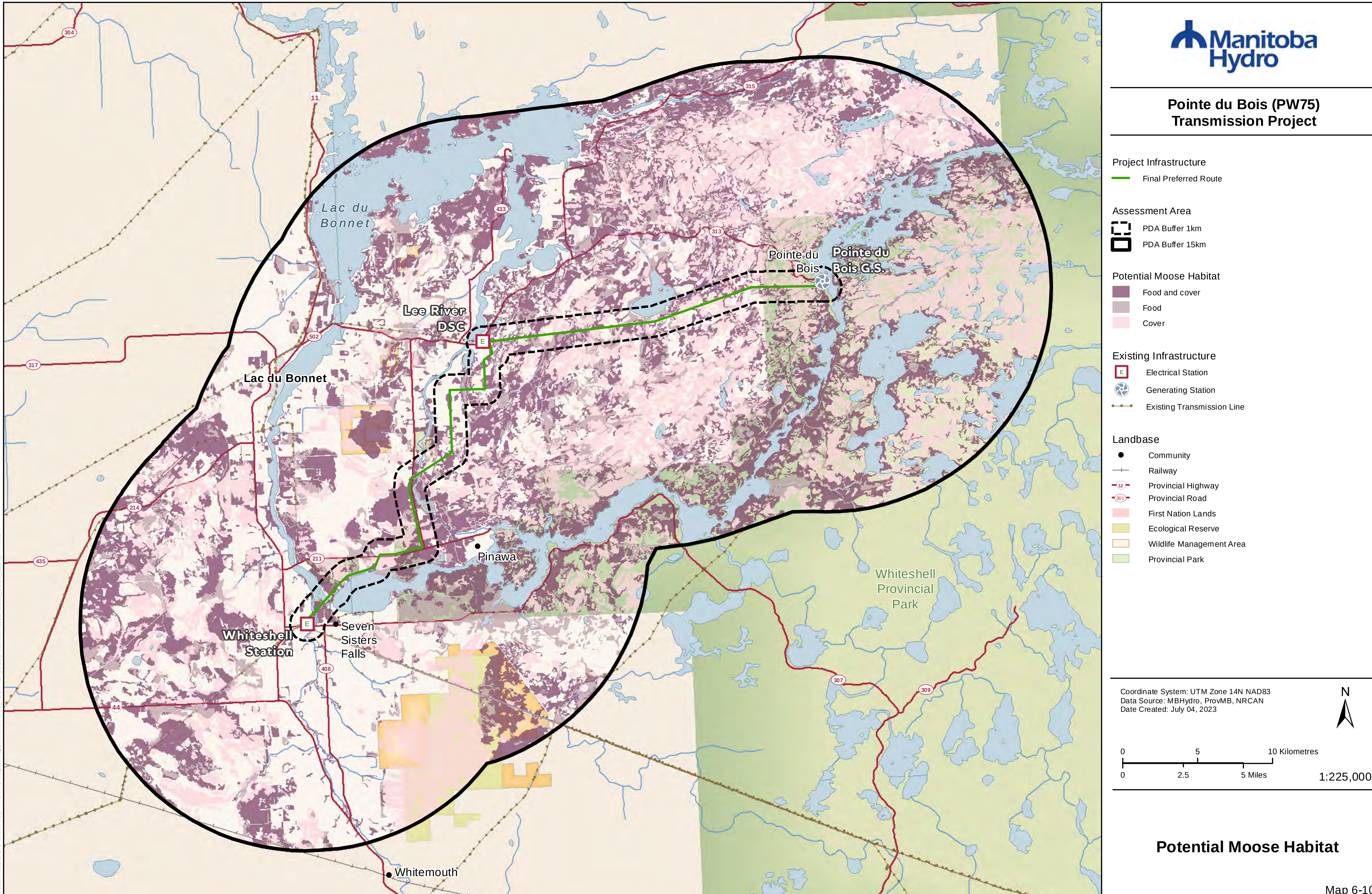


Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Game Hunting Areas and Moose Conservation Closures

Map 6-9


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment Area
PDA Buffer 1km
PDA Buffer 15km
Potential Moose Habitat
Food and cover
Food
Cover
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway
Provincial Road
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0
5
10 Kilometres
0
2.5
5 Miles
1:225,000
Potential Moose Habitat
Map 6-10
Lac du Bonnet
Lac du Bonnet
Lee River DSC
Pointe du Bois
Pointe du Bois G.S.
Pinawa
Whiteshell Station
Seven Sisters Falls
Whiteshell Provincial Park
Whitemouth
304
11
315
433
313
502
317
214
211
435
408
44
307
309
406

6.3 Socio-economic setting

Socioeconomics includes aspects related to infrastructure and services, land and resource use, population, employment, local and regional economies, and well-being.

6.3.1 Infrastructure and services

Infrastructure in the region includes accommodations, provincial trunk highways (PTHs), provincial roads (PRs), railways, airports, transmission lines/stations, health facilities, emergency response services, communications, solid waste disposal sites, and water and sewer services (Map 6-11). Medical services are discussed in Section 6.3.1.8.

6.3.1.1 Accommodation

According to Airbnb listings, as of April 2023, there are approximately 35 listings in the Lac du Bonnet area (17 in Lac du Bonnet, 17 in Lee River, and 1 in Seven Sisters) (Airbnb 2023). These Airbnb listings consisted of private cabins, cottages and homes that can accommodate up to 268 guests in total (each listing can accommodation between 4 and 24 guests) (Airbnb 2023).

A variety of accommodation types are also listed on Trip Advisor, offering approximately 189 rooms in total (see Table 6-19).

Table 6-19:Temporary or rental accommodations listed on trip advisor

Community	Accommodation Type	Number of Accommodation Type	Number of Rooms
Lac du Bonnet	Bed and Breakfast	1	3
	Hotel/Motel	3	24
Pinawa	Bed and Breakfast	2	6
	Hotel/Motel	3	150
	Lodge	1	6*
Seven Sisters	Hotel/Motel	2	Not available
Total		12	189

* = number of cabins/cottages that vary from one- to two-bedroom cabins/cottages

SOURCE: Trip Advisor 2023

In total, according to Airbnb and Trip Advisor, there are approximately 457 rooms available in the project region.

6.3.1.2 Provincial Trunk Highways and Provincial Roads

Several PTHs and PRs traverse the project region, including:

- PTH 11: western portion of the project region, and travelling north-south via Lac du Bonnet, Brookfield to Seven Sisters Falls and PR 307
- PR 211: junction with PTH 11 and Brookfield, east to Pinawa
- PR 307: junction with PTH 11, east through Seven Sisters Falls and Whiteshell Provincial Park to Rennie
- PR 313: junction with PTH 11 (north of Lac du Bonnet), east to Pointe du Bois
- PR 520: junction at PR 313, south to Pinawa
- PR 433: PR 313 north to cottages along Lac du Bonnet

Manitoba highways are generally under the control of Manitoba Transportation and Infrastructure, and are classified as either RTAC routes, or Class A1 or B1 highways, based on maximum gross vehicle weight limits. PTH 11 is an RTAC route (62,500 kg), while other PRs in the project region are B1 highways (47,630 kg). Manitoba Hydro maintains a private access road between the Pointe du Bois Generating Station and Slave Falls Generating Station along the Winnipeg River.

Table 6-20 provides a summary of key road segments in the project region and their estimated current traffic volumes. Most highways with higher volumes are two-lane arterial roads.

Table 6-20: Key provincial road segments and traffic volumes

Road or Highway	Highway Section	Road Type[1]	Existing Average Traffic Volume (veh/day)[2]
PTH 11	Seven Sisters to Lac du Bonnet	Secondary arterial	1,460-2,320
PR 211	PTH 11 to Pinawa	Secondary arterial	1,250-1,450
PR 307	Seven Sisters to Nutimik	Two lane collector (A)	570-1,090
PR 313	Lac du Bonnet to Pointe du Bois	Two lane collector (A)	210-2,290
PR 520	Pinawa to PR 313	Two lane collector (A)	290-320
PR 433	PR 313 to Lee River Falls	Two lane collector (A)	950

[1] Manitoba Transportation and Infrastructure Highways Classification Map

[2] Manitoba Highway Traffic Information System 2019 – annual average traffic per day

Most municipal roads in the municipalities are two-lane, gravel-surfaced, public roads with a numbering system based on the mile grid system. Municipal roads within communities are often paved and named.

6.3.1.3 Electrical Transmission Lines and Generating Stations

Transmission lines and stations, including numerous distribution lines, are maintained by Manitoba Hydro, and are located throughout and beyond the project region. Several transmission lines link to the Pointe du Bois, Slave Falls, and Seven Sisters generating stations and connect to the Lac du Bonnet and Whitemouth Stations. Distribution lines run along the municipal mile road network.

Electrical power is provided to the communities of Seven Sisters, Pinawa and Lac du Bonnet; and cottage subdivisions along the Winnipeg and Lee rivers and in Whiteshell Provincial Park.

6.3.1.4 Rail lines

Railway lines in the project region consist of the Canadian National Railway (CNR) west of the Town of Lac du Bonnet. A former railway line ran to the Pointe du Bois area and down to Slave Falls to serve Manitoba Hydro generating stations. These railway lines have since been abandoned and the stretch between Pointe du Bois and Slave Falls was converted to a private road.

6.3.1.5 Airports

There is one regional airport in the project region, at Lac du Bonnet, adjacent to the Winnipeg River that also accommodates a water aerodrome (i.e., seaplanes).

There is a landowner who owns a recreational plane east of the Lee River DSC and uses a field for landing and taking off.

6.3.1.6 Health services and emergency response

The project region is located within the Interlake-Eastern Regional Health Authority (RHA) district. The area encompasses some 61,000 km^2 extending north of the City of Winnipeg to the 53rd parallel and east to the Ontario border. The Interlake-Eastern RHA services over 133,800 people (Interlake-Eastern RHA 2022). Programs and services in the Interlake-Eastern RHA include allied health, cancer care, dietary, elderly housing, home care, emergency medical services (ambulance), lab and imaging, medical clinics, mental health, personal care homes, primary health care, palliative care, and public health.

Pinawa offers both hospital and primary health care in the Pinawa Primary Health Complex, which has a doctors' office for primary health care and a small hospital with emergency care and beds. There are primary health care centres in Lac du Bonnet and Whitemouth. Ambulance services are offered for the region from both Pinawa and Lac du Bonnet.

6.3.1.7 Police

The Manitoba Royal Canadian Mounted Police (RCMP) provide policing services in partnership with communities. There are RCMP detachments in the communities of Lac du Bonnet and Pinawa which provide the following services (RCMP 2023):

- criminal record checks
- fingerprints
- firearm enquiries
- general information
- non-emergency complaints
- online crime reporting
- special occasion licenses
- vulnerable sector checks

General services are available at the Lac du Bonnet RCMP detachment Monday through Friday and are available at the Pinawa RCMP detachment on Wednesdays (RCMP 2023).

6.3.1.8 Fire

The Lac du Bonnet Fire Department responds to emergencies, including structural fires, motor vehicle fires, motor vehicle incidents, wildland fires, powerline/tree fires, fire alarm activations, mutual aid assist calls, water/ice rescues, off-road vehicle accidents, and ambulance assists.

The Pinawa Volunteer Fire Department provides fire protection services for structural fires, vehicle fires, motor vehicle collisions, hazardous material response, rescue incidents, public assists, fire investigations, assists with medical services, low angle rescue, ground search and rescue, pre-fire planning, precautionary standby, wildfire response, and fire and life safety inspections (Pinawa Manitoba 2023). The department is equipped with one engine (1,250 foaming pump with 1,000 gallons of water and eight MSA G1 SCBA's, one rescue truck (equipped with the Jaws of Life and vehicle extrication equipment), one wildfire response truck (10 psi pump and a 150-gallon tank and wildfire fighting gear), and one Ford F150 4X4 truck (Pinawa Manitoba 2023). The Pinawa Volunteer Fire Department is available to respond to emergencies 24-hours-a-day, 365-days-a-year. The department is dispatched by the communications centre in Brandon, Manitoba.

6.3.1.9 Solid waste management

According to Manitoba Sustainable Development (no date[2]) and LGD of Pinawa (2023), solid waste disposal grounds in and around the project region include:

- the Nutimik Lake Waste Transfer Station, owned and operated by Manitoba Parks and Protected Spaces,
- the 313 Waste Transfer Station, owned and operated by the RM of Lac du Bonnet,
- the Bird River (Coca Cola Falls) Class 3 Waste Disposal Ground, owned and operated by the RM of Alexander, and
- the Pointe du Bois Waste Transfer Station, owned and operated by Manitoba Parks and Protected Spaces, and the Pinawa Landfill in the LGD of Pinawa.

Lac du Bonnet does not have capacity to accept industrial waste and refers commercial, industrial, and large amounts of non-residential solid waste to the Pinawa facility or the larger Libau landfill located in the RM of St. Clements (RM of Lac du Bonnet 2023, pers. comms.). The Libau Landfill has operated since the late 1980s and is designed to accept various types of waste including household waste, commercial waste, and construction and demolition waste (RM of St. Clements 2023). Industrial waste is subject to the approval of Manitoba Environment and Climate and to the prior authorization of council or its representatives (RM of St. Clements 2023). Industrial waste received at the Libau Landfill is subject to a fee (RM of St. Clements 2023).

6.3.1.10 Communication towers

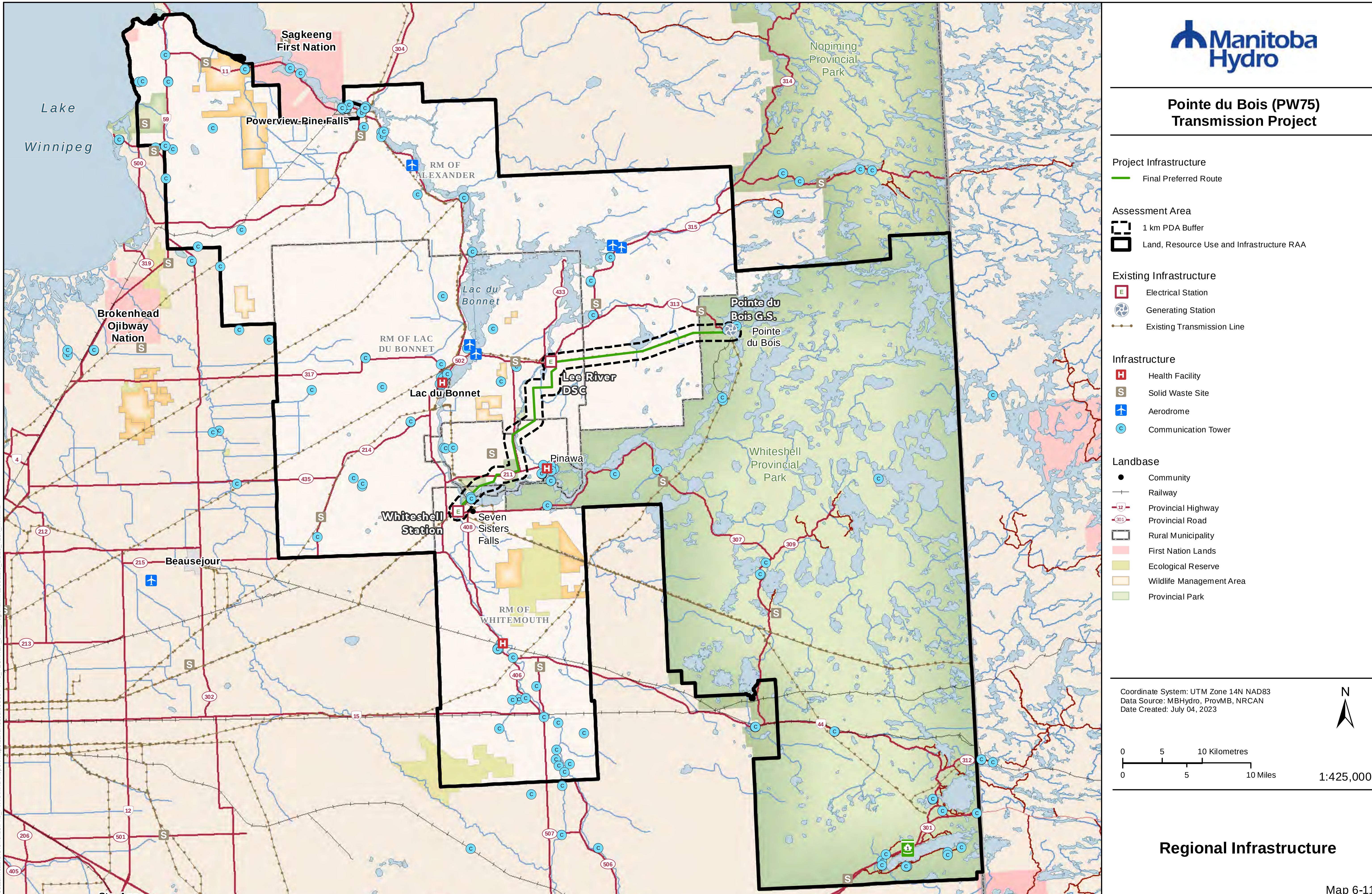
There are both radio and cellular communication towers in the vicinity of Seven Sisters, Pinawa, the Town of Lac du Bonnet, and Pointe du Bois. Other communication towers are located along the Winnipeg River and at lakes within Whiteshell Provincial Park.

6.3.1.11 Oil or gas pipelines

TC Energy's Canadian Mainline gas pipeline runs through the south-east corner of the regional area near Falcon Lake (Canada Energy Regulator 2023). No oil or gas pipelines traverse the area within a 1-km buffer on either side of the proposed transmission line's centreline.

6.3.1.12 Community services

The Town of Lac du Bonnet and Pinawa each offer a range of extensive services (i.e., public water/sewer, electricity, telephone/internet, bank/financial, community centre/arena, post office, garbage, and recycling), as well as emergency (fire, police) and medical services. Seven Sisters has a motel/hotel, curling rink, outdoor ice rink, post office, recreational hall, and a gas bar/convenience store. Both Pointe du Bois and Seven Sisters were established to cater to the development of the generating stations at these locations.


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment Area
1 km PDA Buffer
Land, Resource Use and Infrastructure RAA
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Infrastructure
Health Facility
Solid Waste Site
Aerodrome
Communication Tower
Landbase
Community
Railway
Provincial Highway
Provincial Road
Rural Municipality
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0 5 10 Kilometres
0 5 10 Miles
1:425,000
Regional Infrastructure
Map 6-11
Lake Winnipeg
Sagkeeng First Nation
Powerview-Pine Falls
Nopiming Provincial Park
RM OF ALEXANDER
Lac du Bonnet
RM OF LAC DU BONNET
Pointe du Bois G.S.
Pointe du Bois
Lee River DSC
Brokenhead Ojibway Nation
Pinawa
Whiteshell Provincial Park
Whiteshell Station
Seven Sisters Falls
Beausejour
RM OF WHITEMOUTH
Ste. Anne

6.3.2 Land and resource use

Land refers to terrestrial, riverine, lake and marine ecosystems and land use refers to the use of the land as defined by the resources harvested, the activities undertaken to procure the resource and the locations where the activities occur. For the project area, land and resource use includes the use of the land for industrial (e.g., forestry, mining), commercial (e.g., wild rice harvesting), and recreational and or domestic purposes (e.g., fishing, hunting, trapping, berry picking, wild rice harvesting, and other recreational activities and tourism).

This section focuses on mainstream, non-Indigenous land and resource use. Contemporary land use by First Nations people and Métis citizens is discussed in Section 6.1.4.

6.3.2.1 Land use and property ownership

The transmission line would originate at Pointe du Bois Station in Whiteshell Provincial Park and continue west along the existing P3/P4 transmission line right-of-way to the Lee River area in the RM of Lac du Bonnet. From a point east of Lee River, the transmission line will continue south/southwest through the RM of Lac du Bonnet, LGD of Pinawa to terminate at Whiteshell Station south of Seven Sisters in the RM of Whitemouth (Map 6-12).

Land use and property ownership in the project region is based on land parcels surveyed under the section-township-range system. Land ownership and tenure is a mixture of provincially owned Crown land (e.g., Provincial parks, provincial forests, wildlife management areas, ecological reserves; Map 6-12), federal lands, and private lands. Provincial Crown lands are designated under Order-in-Council and are administered under *The Crown Lands Act*. Privately owned land is concentrated north and west of PR 317, along the Winnipeg River, Lee River, north of PR 211, and along PR 408, south of Seven Sisters. There are no federal lands in the project region.

Whiteshell provincial park is subject to its own master plan. Under the Whiteshell Provincial Park master plan, zoning in the project region is a mixture of extensive recreation zone, intensive recreation zone (encompassing the Pointe du Bois Zone), and Special Areas (Department of Natural Resources 1983).

Extensive Recreation Zones permit all recreation activities and generally forestry and mining operations. Intensive Recreation Zones permit existing cottage subdivisions, campgrounds, day-use areas, commercial services and park maintenance and administrative facilities.

Pointe du Bois is within the Pointe du Bois Intensive Recreation Zone. Special Areas identify biological, geological, or human heritage resources of regional, provincial, or national significance (e.g., bald eagle nesting sites, prehistoric rock petroforms, and representative floral and faunal communities (Department of Natural Resources 1983).

Local government jurisdiction is generally divided between rural municipalities and urban centres (i.e., incorporated cities, towns, villages). Smaller centres (e.g., Seven Sisters) have no independent municipal status.

Municipalities are responsible for a broad range of services related to land use and infrastructure. The municipalities receive their authority for land use development and control from the Province of Manitoba, which retains control over regional services such as PTHs and PRs. In some situations, certain areas of responsibility may be subject to regional authorities represented by planning districts. The following planning districts encompass the project region:

- Winnipeg River Planning District – includes the RM of Alexander and Town of Powerview-Pine Falls.
- Lac du Bonnet Planning District – includes the RM of Lac du Bonnet and the Town of Lac du Bonnet.
- Whitemouth River Planning District – includes the RMs of Reynolds and Whitemouth.

Municipal jurisdictions in the project region have a variety of development controls in place, as noted in Table 6-21.

Table 6-21: Development controls in the project region

Municipality	Development Plan	Zoning By-law
RM of Alexander	Winnipeg River Planning District Development Plan By-law No. 68/10	RM of Alexander Zoning By-law No. 08/20
RM of Lac du Bonnet	Lac du Bonnet Planning District Development Plan By-law No. 98-09	RM of Lac du Bonnet Zoning By-law No. 19-03
Town of Lac du Bonnet	Lac du Bonnet Planning District Development Plan By-law No. 98-09	Town of Lac du Bonnet Zoning By-law No. 13/20
LGD of Pinawa	Local Government District of Pinawa Development Plan By-law 849-19	LGD of Pinawa Zoning By-law No. 887-2021
RM of Reynolds	Whitemouth Reynolds Planning District Development Plan By-law 43/18	RM of Reynolds Zoning By-law No. 7-13 2014
RM of Whitemouth	Whitemouth Reynolds Planning District Development Plan By-law 43/18	RM of Whitemouth Zoning By-law No. 706/20

Under the Winnipeg River Planning District Development Plan By-law No. 68/10, lands in the project region are designed as “Natural Resource Areas”. Under the RM of Alexander Zoning By-law No. 08/20, lands in the project region are zoned “Resource Development Zone”.

The Lac du Bonnet Planning District Development Plan By-law No. 98-09 designates lands in the project region as “Natural Resource” and “Agricultural”. Lands along the Winnipeg and Lee Rivers are generally designated as “Resort,” although some parcels of land along the rivers or near the rivers are designated as “Rural Residential.” Under the Lac du Bonnet Zoning By-law No. 19-03, lands in the project region are generally zoned “RD – Resource Development” and “A40 – Limited Agricultural Zone”. Lands along the Winnipeg and Lee rivers are zoned “SR – Seasonal Resort Zone,” “OS – Open Space Zone,” “SRC – Commercial Seasonal

Recreation Zone," and "RR – Rural Residential Zone." Some areas along highways in the rural municipality are zoned "HC – Highway Commercial Zone." Lands in the Town of Lac du Bonnet are zoned "RG – General Residential Zone," as well as "M – Industrial Zone" and "HC – Highway Commercial Zone" under the Town of Lac du Bonnet Zoning By-law No. 13/20.

The LGD of Pinawa Development Plan By-law 849-19 designates land in the project region as serviced residential, unserviced residential, downtown district, commercial, industrial, institutional, parks and open space, agriculture, natural areas, and provincial park. Under the LGD of Pinawa Zoning By-law No. 887-2021, lands in the project region are generally zone "NA – Natural Areas Zone". The Town of Pinawa is zoned for residential, commercial, light industrial, waste disposal and open space zones. Other zones in the LGD include "MH – Heavy Industrial Zone" which are part of the Atomic Energy of Canada Ltd. (AECL) facility. Areas along the Winnipeg River are zoned "RR – Rural Residential Zone" and "NA – Natural Areas Zone."

Under the Whitemouth-Reynolds Planning District Development Plan By-law 43/18, lands in the RM of Reynolds near the project region are designated as "Crown Land". Lands in the RM of Whitemouth are designated as "Agricultural Area," "Agricultural Limited Area," "Natural Area," "Settlement Centre Policy Area," and "Economic Development Policy Area." The community of Seven Sisters is designated as "P – Principal Centre Policy Area." Whiteshell Station is designated as "RM – Rural Mixed-Use Area." The RM of Whitemouth Zoning By-law No. 706/20 zones lands within the project region as "NA – Natural Area" (encompassing Whitemouth Falls Provincial Park), "OSI – Open Space/ Institutional", "RG – Residential General", "RM – Rural Mixed", "RCI – Rural Commercial/ Industrial", "GD – General Development", "AG – Agriculture General" and "AL – Agricultural Limited".

6.3.2.2 Forestry

The Ministry of Natural Resources and Northern Development (NRND), Forestry and Peatlands Branch, is mandated under *The Forest Act* and *The Forest Health Protection Act* to manage forestry resources for the province of Manitoba. Provincial regulators, such as NRND, require land and resource use to be evaluated for environmental assessments where forest resources may be impacted.

As the project will intersect land with commercial timber value, an assessment of reduced forestry potential will be needed to determine the effect of the net loss of timber resources on the commercial sector via economic indicators like productive forestland, wood supply availability and annual allowable cut (AAC). Characterization of commercial forestry resource use will therefore be related to the project footprint, where clearing is required.

The forest resources of Manitoba are regulated through a system of administrative boundaries. The province is divided into 10 forest sections that are delineated based on commonality of forest characterization. Within these forest sections are several forest management units (FMU) that represent a localized scale of management. The FMU is a management scale administration boundary where forest management planning, resource inventory analysis and allowable harvest limits can be established, for the management of sustainable forest resource use.

The project region falls within FMU 24 except for a small portion in Whiteshell Provincial Park which is under FMU 30. Both FMUs are in the Pineland Forest Section. Commercial timber harvesting is administered by NRND through a Crown land tenure system. Previously established timber sales that overlap the project footprint represent 22.8 ha and encompass three sale commitments located within existing or new rights of way. Commercial timber harvesting in Whiteshell Provincial Park was prohibited by the Manitoba Government in 2009. Map 6-13 displays the FMU boundaries and relevant timber sale areas to the proposed project footprint.

The NRND Forestry and Peatlands Branch determines sustainable limits for tree harvesting on Manitoba Crown land and collects the associated revenues for the use of Crown timber (Government of Manitoba 2022c). Forest harvesting decisions are based on forest management planning and wood supply analysis at the FMU scale, which informs the sustainable quantity of timber that is available for harvest annually (MCWS, 2010). To conduct a wood supply analysis, the province maintains a forest resource inventory (FRI) dataset that is based on imagery from 1996 and was later updated in 2021 (Government of Manitoba 2021).

The FRI is an interpretation of aerial imagery to determine forest cover and site attributes, which can be used for forest resource characterization, including the analyses for volume, wood supply and sustainable harvest limits, known as the annual allowable cut (AAC). Data found within the FRI dataset include spatial and tabular information that is maintained and managed within a publicly available Geographic Information System (GIS) environment that is included in the province's open data platform called Data MB.

6.3.2.3 Forestland productivity

Forestland productivity is a resource description that quantifies the land relative to its capability to produce merchantable wood, regardless of its existing stage of productivity (Government of Manitoba 2021). Productivity is classified using FRI parameters that include non-forested, non-productive, and productive land types. To isolate the inventory data related to the proposed project footprint, the FRI dataset was processed using GIS software. Each of the productivity parameters are characterized according to the following categories, and on the FRI metadata definitions (Government of Manitoba 2021):

- **Productive Forestland:** Includes all forested land capable of producing merchantable wood regardless of its existing stage of productivity, and includes softwood, mixed wood, and hardwood species vegetation cover types.
- **Non-Productive Forestland:** Includes all forested land not capable of producing merchantable timber due to very low productivity and includes the following vegetation cover types: treed muskeg, treed rock, willow/alder, and protection forest.
- **Non-Forested Land:** Includes areas withdrawn from timber production for a long period of time, such as cultivated fields, hay meadows, pastures, settlements, rights-of-way, gravel pits, beaches, wide ditches, summer resorts, bare rock, barren, mines, marsh, and muskeg. Non-forested land includes the following cover types: Barren-bare rock, fields, meadow, unclassified, and waterbodies.

A series of deductions are typically applied to FRI data to refine the forest resource relative to the commercially operable harvesting land base that is used to inform wood supply analysis (MCWS 2010).

Non-productive forestland and non-forested land are not included in the assessment of commercial forestry resources. These productivity classifications are not used in the determination of AAC and wood supply estimates, because the forest resources (if present) are not considered merchantable. Deductions in the productive forestland classification are also required for the operable harvesting land base area to reflect harvest constraints (e.g., buffer zones, areas of special interest, wildlife management areas). No deductions for the productive forestland classification were included in the analysis for baseline conditions.

The productivity calculations also do not include forestland from outside the proposed project footprint. The forest resource reduction attributable to the project will not produce a net-loss to merchantable timber beyond the alignment, hence the consideration of forestland within the proposed project footprint.

Table 6-22 provides the overall productivity classifications, by area and percent total, for the proposed project footprint. The productivity calculations are based on the overall alignment area of 330 ha, of which 289 ha fall under FMU 24 and 41 ha fall under FMU 30. Appendix G provides the data summary used for forest productivity baseline analysis.

Table 6-22: Forest productivity classifications for FMUs 24 & 30

Classification	Area (ha)	Percent Total (%)
Productive	170	52
Non-Productive	37	11
Non-Forested*	123	37
Total	330	100

Source: Resource inventory and volume estimation, Appendix G (Viveiros 2023, pers. comms.)

*Includes non forested land and water

6.3.2.4 Annual allowable cut

The AAC is the sustainable level of harvest, as set by the province, that represents the volume (m^3) of softwood and/or hardwood timber which can be harvested in an FMU on an annual basis (Manitoba Government 2019). The AAC takes into consideration factors that constrain the available wood supply for commercial harvesting. As demands increase for forest resources, there is a reduction in the operable harvesting land base area, which can constrain the available wood supply annually. Therefore, a reduction in the operable harvesting land base area due to forest resource use may impact the overall AAC level for the FMU.

The Wood Supply Analysis Report Forest Management Unit 24 (MCWS 2010) provides the AAC for FMU 24, where the majority of project footprint is located. The NRND Forestry and Peatlands Branch does not manage forests for commercial harvesting purposes within the Whiteshell Provincial Park. As a result, the forested lands within FMU 30 that are traversed by the project footprint are excluded from the commercially operable forest harvest land base, due to its designation as a park. And, for forestland impacted by the project in FMU 30, an AAC level is not available and is not a relevant economic indicator. The AAC for FMU 24 is presented in Table 6-23.

Table 6-23: Annual allowable cut for FMU 24 and 30

FMU	Annual Harvesting Level		
	Softwood (m^3)	Hardwood (m^3)	Total (m^3)
24	160,575	117,985	278,560
30	N/A	N/A	N/A
Total	**160,575**	**117,985**	**278,560**

Source: Resource inventory and volume estimation, Appendix G (Viveiros 2023, pers. comms.) and MCWS (2010).

6.3.2.5 Merchantable timber volume

A modelled estimate of the merchantable timber volume associated with the PDA was provided by the NRND Forestry and Peatlands Branch. Volume estimations are based on resource inventory data relative to the PDA and take into consideration reductions in the inventory (i.e., productivity classification) to adequately represent the operable harvesting land base area. The model output is provided in Table 6-24 with details provided in Appendix G Appendix G.

Table 6-24: Total merchantable timber volume for FMU 24 and 30

FMU	Total Merchantable Timber Volume		Total Area (ha)	
	Softwood (m^3)	Hardwood (m^3)	Total (m^3)	
FMU 24				
Productive	5,341	5,531	10,872	150
Non-Productive	0	0	0	32
Non-Forested*	0	0	0	107
FMU 30				
Productive	1,271	975	2,246	20
Non-Productive	0	0	0	5
Non-Forested*	0	0	0	16
Total	6,611	6,506	13, 117	330

Source: Viveiros (2023, pers. comms)

*Includes non forested land and water

High value forest sites

High value forest areas that would be traversed by the project footprint were identified in both Crown and private land areas based on a review of the FRI dataset. High value forest areas are defined as areas with enhanced silviculture sites; research and monitoring sites; privately managed woodlots; plantations; shelterbelts and productive forest areas. The notable high value sites identified in the FRI included: 25 ha of private land; 13 ha of private productive forest; 7 ha of woodlots; and 1 ha of shelterbelt. These sites are summarized in Table 6-25 and are shown on Map 6-13.

Table 6-25: High value forest sites within the project footprint for FMUs 24 and 30		
High Value Forest Site	Area (ha)	Area (%)
Private Land	25.4	7.7
Private Productive Forest	13.2	4.0
Woodlots	7.2	2.2
Protected Area	1.1	0.3
Total Area within PDA	46.9	14.2
Source: Manitoba Government (2021)		

6.3.2.6 Mining/aggregates

There are numerous mining claims, quarry leases, and quarry withdrawal areas within the project region (Map 6-14). Mining claims are located primarily along the Bird River between the Whiteshell and Nopiming provincial parks. Quarry leases occur within the vicinity of the Pointe du Bois, Slave Falls, and Seven Sisters generating stations, as well as south of Rice Lake, near the Town of Lac du Bonnet, and within Agassiz Provincial Forest (Natural Resources and Northern Development n.d.).

Aggregate resources in the project region include Crown sand and gravel pits and bedrock quarries scattered near Pointe du Bois, PR 313, the Town of Lac du Bonnet, near Pinawa, and concentrated to the southwest in Agassiz Provincial Forest in the RM of Lac du Bonnet (Manitoba Energy and Mines 1988a, b).

6.3.2.7 Hunting and trapping

Although hunting and trapping has historically been practiced by Indigenous groups in the project region (see Section 6.1.3), at present, hunting and trapping opportunities are exercised by both non-Indigenous and Indigenous land users. Hunting opportunities are available on thousands of hectares of provincial forests, some provincial parks, WMAs, and other designated Crown lands, including some leased Crown lands. Whiteshell Provincial Park has areas where hunting of certain species is not allowed. Hunting on private land is allowed with permission from the owner or lawful occupant. Hunting in Manitoba is regulated under The Wildlife Act through the establishment of GHAs. Specifically, GHAs 26, 34, 35, and 36 make up the project region (Map 6-15) (Manitoba Natural Resources and Northern Development 2022b). Game species commonly found in southeastern Manitoba include whitetail deer, black bear, wolf, and coyote. Brokenhead Ojibway Nation, Hollow Water First Nation, and Sagkeeng First Nation have reported that hunting and trapping in the project region is becoming more difficult as lands are converted for development and regulatory barriers are increasing (BON, BR, and HWFN 2019).

Hunting for upland game bird and waterfowl species is regulated through Game Bird Hunting Zones (GBHZ). The project region falls within GBHZ3 and GBHZ4, which cover most of southern Manitoba. Hunting for migratory game birds, like Canada geese and mallard duck and upland game birds such as grouse and partridge is a common activity. Other common game bird species hunted in southern Manitoba include ducks, coots, snipes, snow geese, sandhill cranes, and wild turkey (Manitoba Natural Resources and Northern Development 2022b).

Part of the project region lies within the Métis Recognized Harvesting Area, specifically GHAs 34, 35, and 36 (see Section 6.1.3). This area allows the Métis to harvest on all unoccupied provincial Crown lands, occupied provincial Crown lands (including provincial parks), privately owned lands where permission has been given by the owner or occupant, or First Nation Reserve lands where permission has been given by the Band Council (Manitoba Métis Federation 2013).

The project region encompasses the Lac du Bonnet and Whiteshell Registered Traplines (RTL) of the Eastern RTL District, as well as Open Trapping Zone Area (OTA) Zone 4. Within the Whiteshell RTL there are numerous individual traplines located in the project region (i.e., parts of RTLs 16 to 18, and 21 to 25). Part of the Lac du Bonnet RTL 21, west of Whiteshell Provincial Park, and Whiteshell RTLs 23 and 24 are in the project region (Map 6 15). Furbearer species that can be trapped in RTL areas include beaver, mink, muskrat, river otter, badger, black bear, fisher, red fox, coyote, lynx and bobcat, marten, raccoon, red squirrel, wolf, weasel, and wolverine (Manitoba Natural Resources and Northern Development [MNRND] 2022c). Marten, beaver, and muskrat are the most trapped species in the project region RTLs (MNRND 2023). Trapping of furbearers in OTAs is open for various species under an OTA licence, subject to trapping seasons and restrictions on species that can be trapped. Area prohibitions within the project region include areas of provincial parks closed to trapping, wildlife refuges, and ecological reserves.

6.3.2.8 Bait fishing

Manitoba is proposing a ban of aquatic live bait harvest and use, effective April 1, 2027, including live bait fish and leeches (excluding night crawlers or frogs). This is being undertaken due to the threat of the introduction of aquatic invasive fish species and fish diseases (Government of Manitoba 2021). In Manitoba, live bait fish are already prohibited in most provincial parks and stocked trout waters.

6.3.2.9 Wild rice harvesting

As described in Section 6.1.1, a small group of residual Archaic peoples and new peoples from the south may have been the first to introduce harvesting and dispersal of wild rice into the Canadian Plains. However, the introduction of wild rice in the Winnipeg River region is widely debated, and it has recently been suggested that wild rice may have been introduced into the region during the Holocene era (Boyd and Surrette 2013). This explanation coincides with the shift to sedentary lifestyles during this time, as shown by evidence of the increase of habitation sites in the Winnipeg River region.

Wild rice harvesting in Manitoba is regulated under *The Wild Rice Act*. Wild rice lakes are identified according to the section-township-range system and licences are issued for development, production, or block harvesting. Within the project region, mainly in Whiteshell Provincial Park, there are numerous waterbodies where licences for wild rice harvesting have been issued. Outside of the provincial park, there is a wild rice harvesting area at Rice Lake, west of Pointe du Bois (Map 6-14), with a licensed wild rice harvesting operation which also has a cleaning and drying facility located by Rice Lake (Williams 2023, pers. comms.). According to the provincial Lands and Planning Branch (Methot 2023, pers. comms.), there are two active Wild Rice Permits in the area, one for the operation at Rice Lake, north of the proposed project footprint and the other one for parts of the Pinawa Channel in the vicinity of the proposed transmission line ROW, in the LGD of Pinawa.

6.3.2.10 Parks and recreation

<u>Provincial Parks</u>

The Province of Manitoba developed a park system plan under *The Provincial Parks Act*. The purpose of the plan is to conserve ecosystems and maintain biodiversity, preserve unique and representative natural, cultural and heritage resources, and provide opportunities for outdoor recreation and education in a natural setting. All provincial parks are classified according to their purpose and management and are defined under one of the following classifications:

- Wilderness Parks – remote areas that are set aside to preserve representative areas of an ecoregion.
- Natural Parks – serve to both preserve areas of an ecoregion and accommodate a diversity of recreational opportunities and resource uses.
- Indigenous and Cultural Use Parks – serve to preserve land that has been historically used, and is still used, by Indigenous Peoples and has significance to Indigenous Peoples because of its natural features or cultural importance.
- Recreation Parks – provide outdoor recreation opportunities in a natural setting.
- Heritage Parks – set aside to preserve unique and representative cultural and heritage resources of outstanding provincial significance.

The Provincial Parks Act makes further regulation for establishment of land use categories (LUCs) to describe the activities that are allowed in each park. The LUCs designated under the Act consist of:

- Wilderness – to protect unique natural ecosystems in an undisturbed state and provide recreational opportunities in a pristine environment.
- Backcountry – to protect natural landscapes and provide for nature-oriented recreation in a largely undisturbed environment.
- Resource management – to permit commercial resource development or extraction in a manner that does not compromise the park's main classification.
- Recreational development – to accommodate recreational development.
- Heritage – to protect sites containing a resource or resources of cultural or heritage value.
- Access – provides a point or route of access in a provincial park or a location for a lodge or associated facilities.
- Winter road access – permits the construction and operation of a winter road.
- Indigenous heritage – protects a unique or representative site containing a resource of cultural, spiritual, or heritage significance to Indigenous people.

The park classification system, land use categories, and management plans establish specific objectives for each provincial park in Manitoba (Manitoba Parks and Protected Spaces Branch n.d.).

The project region includes four provincial parks – Whiteshell (natural park), Pinawa Dam (heritage park), Pinawa (recreation park), and Whitemouth Falls (recreation park).

The purpose of Whiteshell Provincial Park is to preserve areas representative of the Lake of the Woods portion of the Manitoba Lowlands Natural Region (Manitoba Sustainable Development n.d.1).

Whiteshell Provincial Park is principally categorized as backcountry, resource management, and recreational development.

Pinawa Dam is largely backcountry and categorized as recreational development.

Most of Whitemouth Falls is categorized as backcountry (Manitoba Parks and Protected Spaces Branch n.d.).

Protected and conserved areas

Areas of Special Interest (ASIs) are candidate protected areas selected to represent the enduring features found within an ecoregion that still need to be captured in Manitoba's protected areas network. Four ASIs are found within the project region – AECL ASI, AECL Addition ASI, Lee River Addition North ASI, and Lee River Addition South ASI. Manitoba's network of protected and conserved areas currently includes parts of provincial and federal designations in Manitoba that meet the criteria for protected areas (e.g., national parks, ecological reserves, provincial parks and reserves, provincial forests, wildlife management areas, national wildlife areas, Indigenous use planning areas), lands owned by municipalities, and private lands owned by land trusts (Manitoba Environment, Climate and Parks n.d.).

Ecological reserves

Ecological Reserves are created to preserve unique and rare examples of plants, animals, and geological features. Ecological Reserves may only be established on Crown land under *The Ecological Reserves Act*. These sites are set aside for ecosystem and biodiversity preservation, research, education, and nature study (Manitoba Environment, Climate and Parks n.d.). There are no Ecological Reserves in the project region. The closest Ecological Reserve is the Whitemouth Bog Ecological Reserve, south of the project region.

Wildlife management areas

The Wildlife Act (Manitoba) provides for the designation of Crown lands as WMAs. Their purpose is for the better management, conservation, and enhancement of the wildlife resource in the province. WMAs provide for a variety of wildlife-related forms of recreation, including birding and wildlife watching. Hunting and trapping are generally permitted in WMAs but may be prohibited or restricted in a few areas. In addition, the use of vehicles, off-road vehicles, watercraft, power boats, or airboats may be restricted in some areas (Natural Resources and Northern Development n.d.). There are two WMAs in the project region – namely the Lee River WMA and the Whitemouth Bog WMA.

Provincial forests

The Province of Manitoba designates and manages Provincial Forests on Crown lands. The forested portion of the province is divided up into forest sections that are further defined by FMUs. *The Forest Act* provides for the establishment of Forest Management Licences (FMLs) to provide a continuous timber supply to the wood industry. The project region falls within the Pineland (FMUs 24, 30 & 31) forest section. There is currently no FML for the project region (Manitoba Agriculture and Resource Development 2021). In 2019, the Government of Manitoba granted an Option Licence Area under *The Forest Act* to area First Nations communities (i.e., Black River First Nation, Brokenhead Ojibway Nation, Hollow Water First Nation, and Sagkeeng Anicinabe First Nation) to explore the potential to renew forestry activities in an area north of the Winnipeg River (Manitoba Agriculture and Resource Development 2021). There is one Provincial Forest within the project region and one adjacent, as follows:

- Whiteshell Provincial Forest – at 3,442 km^2, the Whiteshell Forest Reserve was established by the Province of Manitoba in 1931.
- Agassiz Provincial Forest – at 795 km^2, Agassiz Provincial Forest was established in 1954.

Provincial forests were primarily developed as a source of sustainable timber supply for forestry operations. They are managed for diverse economic, environmental, social, and cultural uses. Provincial forests are popular places for berry picking, mushroom picking, hiking, skiing, snowmobiling, and exploring.

Recreation and tourism

A variety of outdoor recreational activities and tourism venues occur throughout the project region (Map 6-16). Recreational activities and facilities consist of hiking/biking and horseback trails, ATV trails, golf courses, lodges, campgrounds, resorts, parks, recreational angling, boating, and canoeing, cross-country ski trails and snowmobile trails and shelters.

Recreation and tourism are important to the region's economy as a four-season travel destination and as evidenced by the many opportunities for outdoor recreation, fishing, boating, snowmobiling, ice-fishing, and tourist attractions. Communities and individual owners of existing and proposed developments, the public, recreational groups, and commercial operators use the recreational land base as a source of primary income or supplementary income, or for recreational pursuit or a way of life.

The project region is in the Lake of the Woods Natural Region. It is popular for recreation and tourism given its several diverse waterways emanating from the Winnipeg River system and attractive landscapes of the boreal forest (Map 6-16). Due to the network of lakes, rivers, and streams in the project region, popular recreational activities include canoeing, fishing, jet-skiing, kayaking, power boating, sailing, swimming, and water skiing. Other activities include camping, cottaging, lodge stays, hiking, cycling, golfing, berry picking wildlife viewing and birding. During various seasons of the year recreational hunting occurs in compliance with provincial regulations. To the northeast of Seven Sisters and north of PR 211, there is a shooting range and gun club, as well as goose sanctuary owned by the Pinawa Game and Fish Association.

Cottages, campgrounds, waterways, and trails

Cottage development in the project region is apparent near Pointe du Bois in Whiteshell Provincial Park on Crown lease land from the Province of Manitoba. The Winnipeg River system, including the many lakes where the river widens, has been intensively developed for cottaging, particularly near the communities of Lac du Bonnet, Pinawa, and Seven Sisters. Several campgrounds and facilities offer accommodations near Pointe du Bois, including two private campgrounds at Sawmill Bay and Eight Foot Falls.

A Scouts Canada campsite at George Lake is generally accessed via the Eight Foot Falls area, either by canoe or motorboat in summer or snowmobile in winter. Golf courses in the project region include the Pinawa Golf and Country Club (at Pinawa) and the Black Bear Golf Club (northwest of Lac du Bonnet).

Trail systems in the project region include the Trans Canada Trail which traverses eastern Manitoba and goes through Whiteshell Provincial Park and the Pinawa area, and along the Winnipeg River. The trail provides many recreational opportunities as well as ecological experiences. Hiking, jogging, and cycling pursuits occur within the project region, either on the Trans Canada Trail system or on an informal basis by members of the local communities, cottagers, or campers. A system of mountain biking trails has been developed in the vicinity of Boggy Creek, off Belluk Road in the Lee River area, operated as Granite Groove Out. The hand-built 8.5 km figure-eight loop trail sprawls out on large expanses of granite rock overlooking the Lee River (Manitoba Mountain Bike Association 2023). Project engagement feedback regarding transmission line routing through the developed biking trail system encompassing Granite Groove Out was received from mountain bikers.

Self-guiding hiking trails are numerous throughout Whiteshell Provincial Park. Two designated canoe routes have been established in the project region, namely along the Winnipeg River and the Pinawa Channel. The Winnipeg River canoe route includes several canoe campsites along the route and a portage at the Pointe du Bois generating station site. The Pinawa Channel canoe route includes a wayside park and two easy portages. Boating and swimming activities are also prevalent along the Winnipeg River system.

The project region has several designated snowmobile trails to accommodate this popular activity. Snowmobile trails exist both east and west of Lac du Bonnet and the Winnipeg River, and east of Lee River through the LGD of Pinawa, RM of Lac du Bonnet to Seven Sisters. These trails are either groomed and maintained by the Province of Manitoba, in Whiteshell Provincial Park, or various snowmobile clubs. Cross-country skiing is another popular activity in the vicinity of Pinawa and the Whiteshell Provincial Park area. Snowshoeing can generally occur anywhere there is access in the project region.

Lodges and outfitters

Resource Tourism Operators (Outfitters) in Manitoba are licensed by the Department of Natural Resources and Northern Development under *The Resource Tourism Operators Act* and associated Regulation. Outfitting services are those services associated with hunting, angling, and ecotourism activities. There are several lodges and outfitters that operate within the project region, including:

- Big Woods Wilderness Outfitters (GHA 26)
- Pine Island Lodge (Pointe du Bois)
- Trail End Camp (Pointe du Bois)
- Eagle Landing Resort (Pointe du Bois)
- George Lake Outfitters & Eight Foot Falls Campground (Pointe du Bois)
- Jackson's Lodge and Outposts (Lac du Bonnet)
- Hoards Hunting Camps (Pinawa)
- J. & D. Jumbo Outfitting (Pinawa)
- Wilderland Adventure Company (Whiteshell Provincial Park)
- Riverview Lodge (Otter Falls)
- Pinewood Resorts (Dorothy Lake)
- Nutimik Lodge (Nutimik Lake)
- Whiteshell Outfitters (Whiteshell Provincial Park, GHA 36)

Guide outfitters tend to cater to non-resident and non-Indigenous hunters for black bear, white-tailed deer, upland game birds, and waterfowl (Travel Manitoba 2018).

Hunting for white-tailed deer by both lodge and non-lodge outfitters is allowed almost anywhere in GHAs 26, 34 and 36. According to Manitoba Hydro (2014), several black bear outfitter operating areas encompass the project region, specifically:

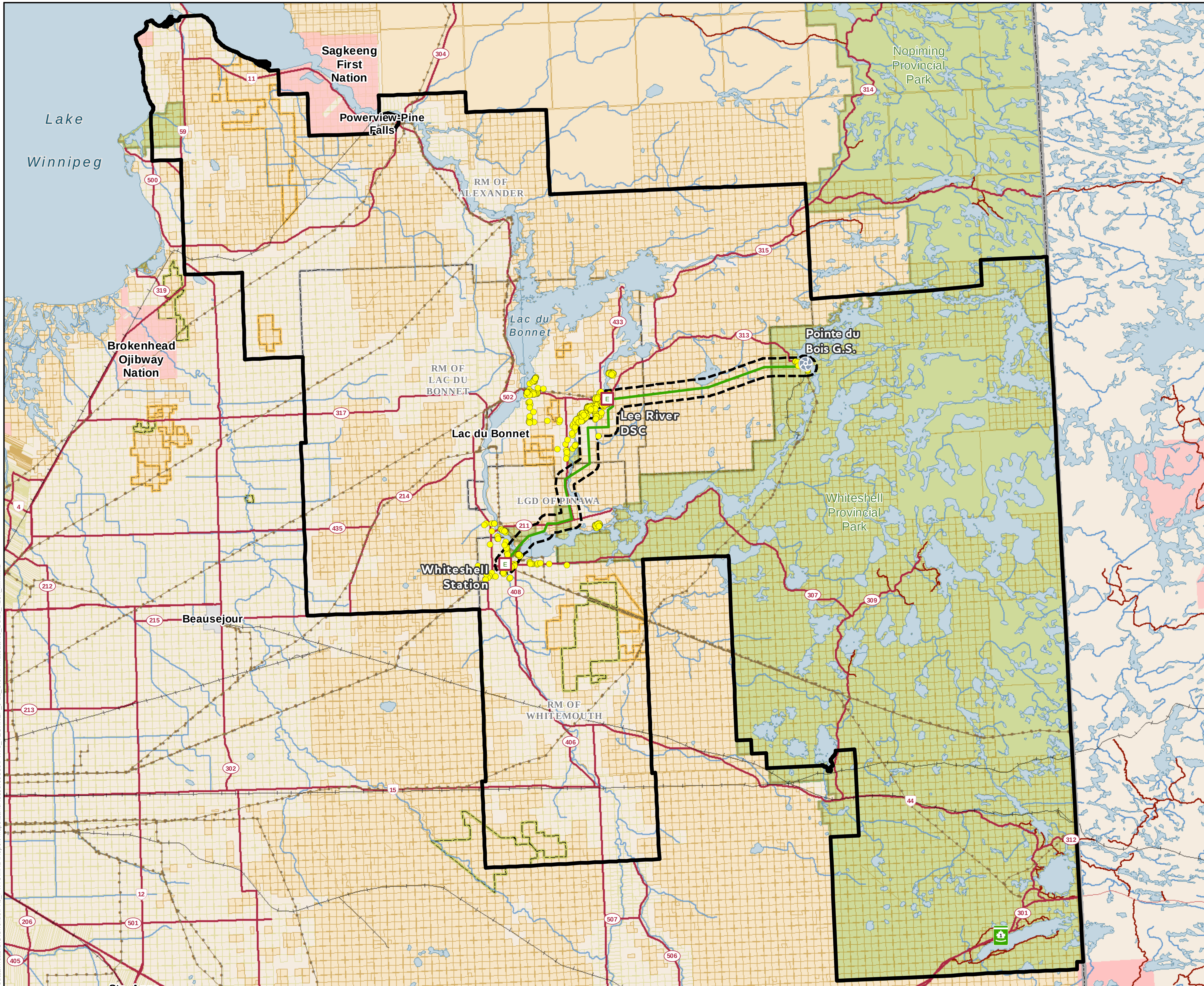
- east and west of Pointe du Bois
- the Horseshoe and Echo lakes area in Whiteshell Provincial Park
- north of Pointe du Bois, east to the Lampfrey Rapids area, and north to the Winnipeg River
- the Pinawa area
- east of Nutimik and Numao lakes and PR 307
- south and west of Tie Creek to the Horseshoe and Big Whiteshell lakes area
- south of the Winnipeg River from Nutimik to Eleanor lakes south of PR 307

Lodges and Outfitters that are members of the Manitoba Lodges and Outfitters Association (MLOA) promote sustainable tourism development for effective management of business operations in the outdoor tourism industry (MLOA 2022).

Sport fishing

The project region is located within the Southern Fishing Division of Manitoba's Fishing Divisions (Province of Manitoba 2022). Watercourses within the region where recreational fishing occurs include the Lee River, Whitemouth River, Winnipeg River, Bird River, Rice Lake, Lac du Bonnet, Pinawa Creek, Natalie Lake, Sylvia Lake, Eleanor Lake, Dorothy Lake, and Nutimik Lake (Mussio Ventures Ltd. 2018).

Sport fish species present include burbot, brown trout, goldeye, northern pike, perch, rainbow trout, smallmouth bass, sturgeon, walleye, and whitefish (Mussio Ventures Ltd. 2018). The Winnipeg River, from the Ontario border to the Pointe du Bois dam, is designated as a High-Quality Management Water, managed for high quality fisheries (Province of Manitoba 2022). A Special Walleye Regulation applies to waterbodies in eastern Manitoba, where walleye between a certain size range, must be released. This area includes Lac du Bonnet, and the southern boundary of Whiteshell Provincial Park and from Lake Winnipeg to the Ontario border (excluding the Winnipeg River from the Pine Falls Dam to Lake Winnipeg).



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

Final Preferred Route

Assessment Area

PDA Buffer 1km

Land, Resource Use and Infrastructure RAA

Ownership

Occupied Dwellings

Crown Land

Private Land

Existing Infrastructure

Electrical Station

Generating Station

Existing Transmission Line

Landbase

Railway

Provincial Highway

Provincial Road

First Nation Lands

Ecological Reserve

Wildlife Management Area

Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

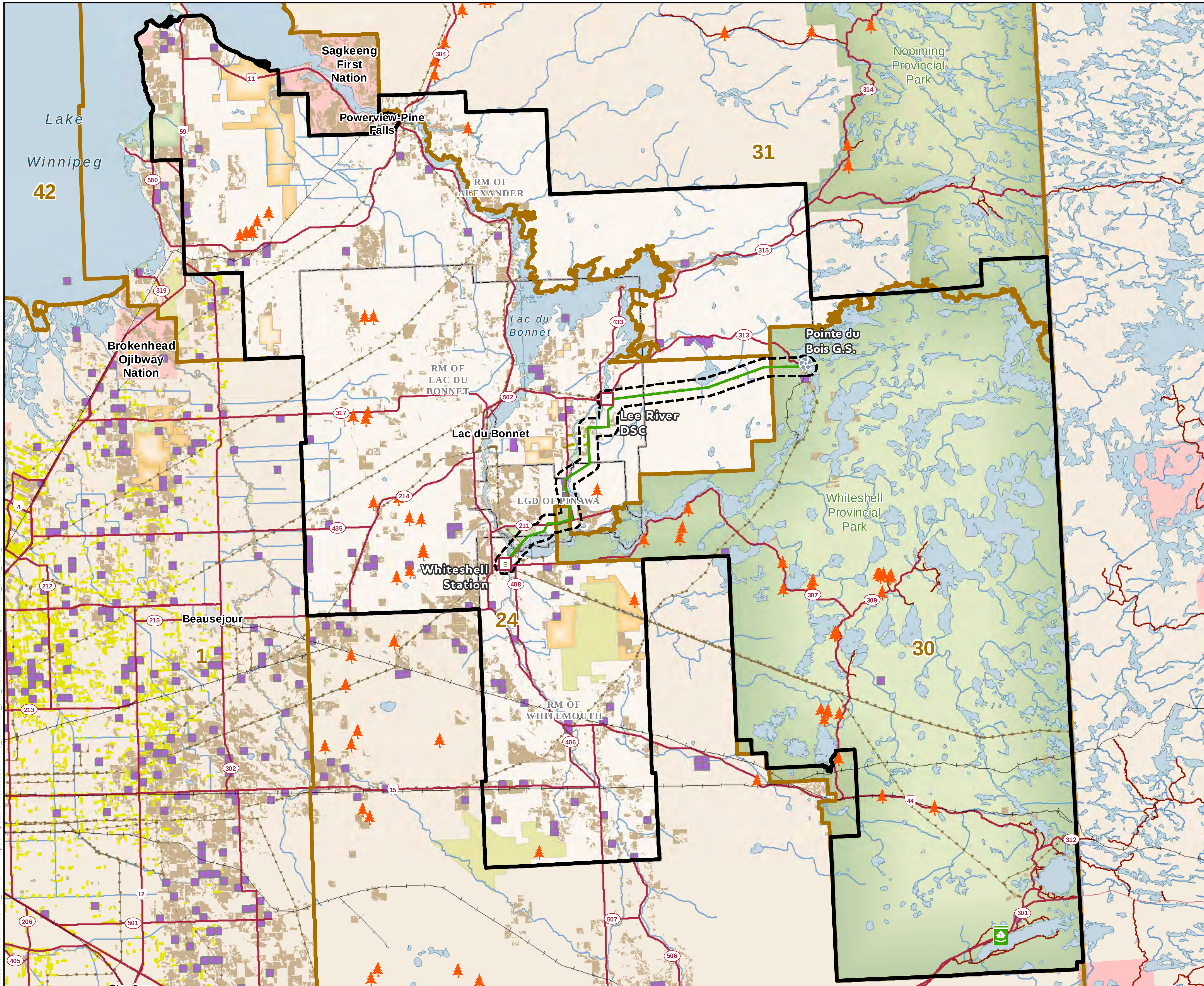
0 5 10 Kilometres

0 5 10 Miles

1:425,000

Crown and Private Lands

Map 6-12



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- PDA Buffer 1 km
- Land, Resource Use and Infrastructure RAA

Productive Forest and High Value Forest Sites
- Permanent Sample Plots
- Forest Management Unit
- MFA Woodlot Locations
- Shelterbelt
- Shelterbelt
- Private Productive Forest

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Railway
- Provincial Highway
- Provincial Road
- Rural Municipality
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

0 5 10 Kilometres
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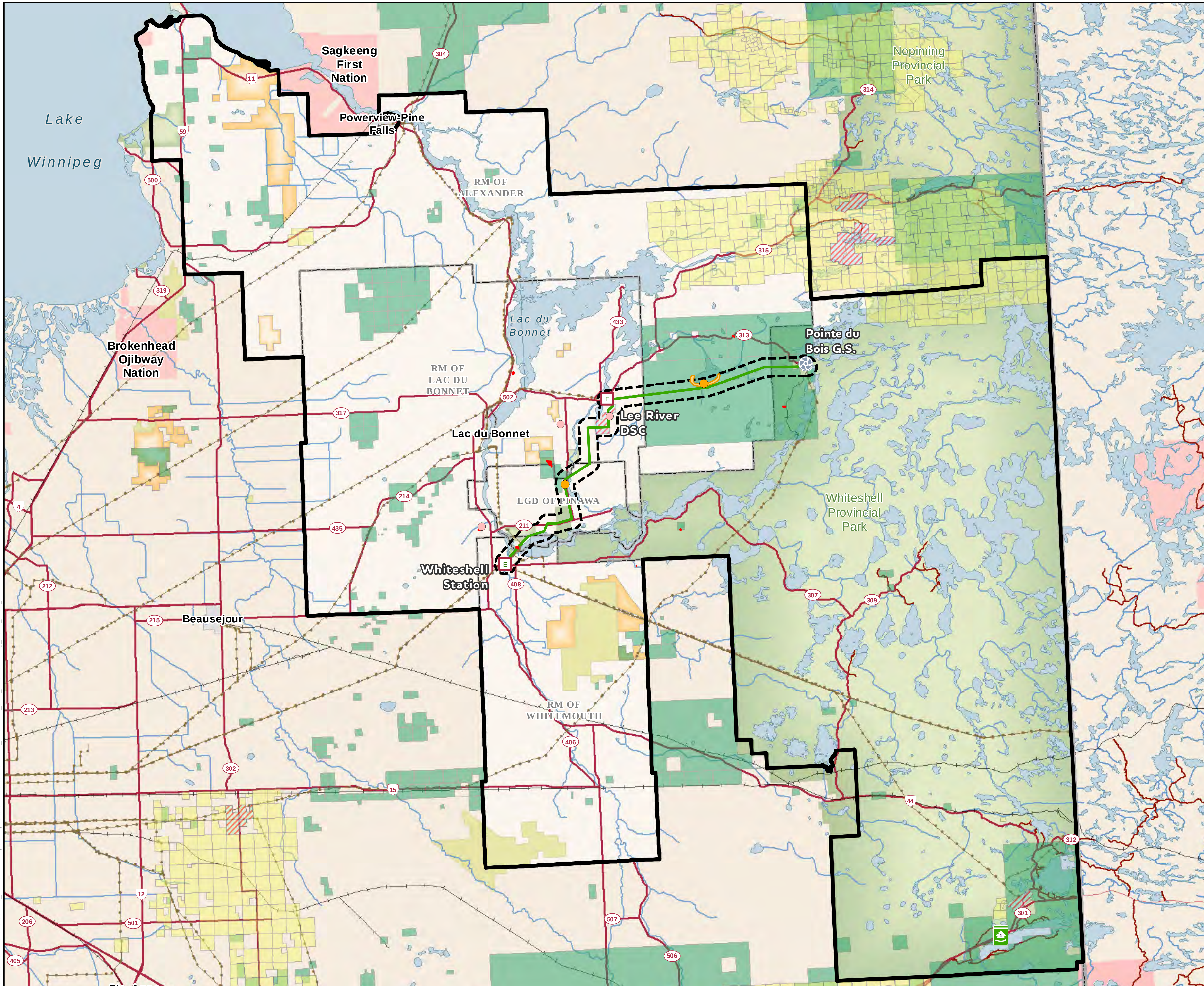
Productive Forest and High Value Forest Sites

Map 6-13



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

- Final Preferred Route

Assessment Area

- PDA Buffer 1 km
- Land, Resource Use and Infrastructure RAA

Wild Rice Features

- Wild Rice Production
- Wild Rice Harvesting Area

Mining Features

- Quarry
- Sand and Gravel
- Mineral Lease
- Mining Claim
- Quarry Withdrawls

Existing Infrastructure

- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Railway
- Provincial Highway
- Provincial Road
- Rural Municipality
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

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0 5 10 Kilometres

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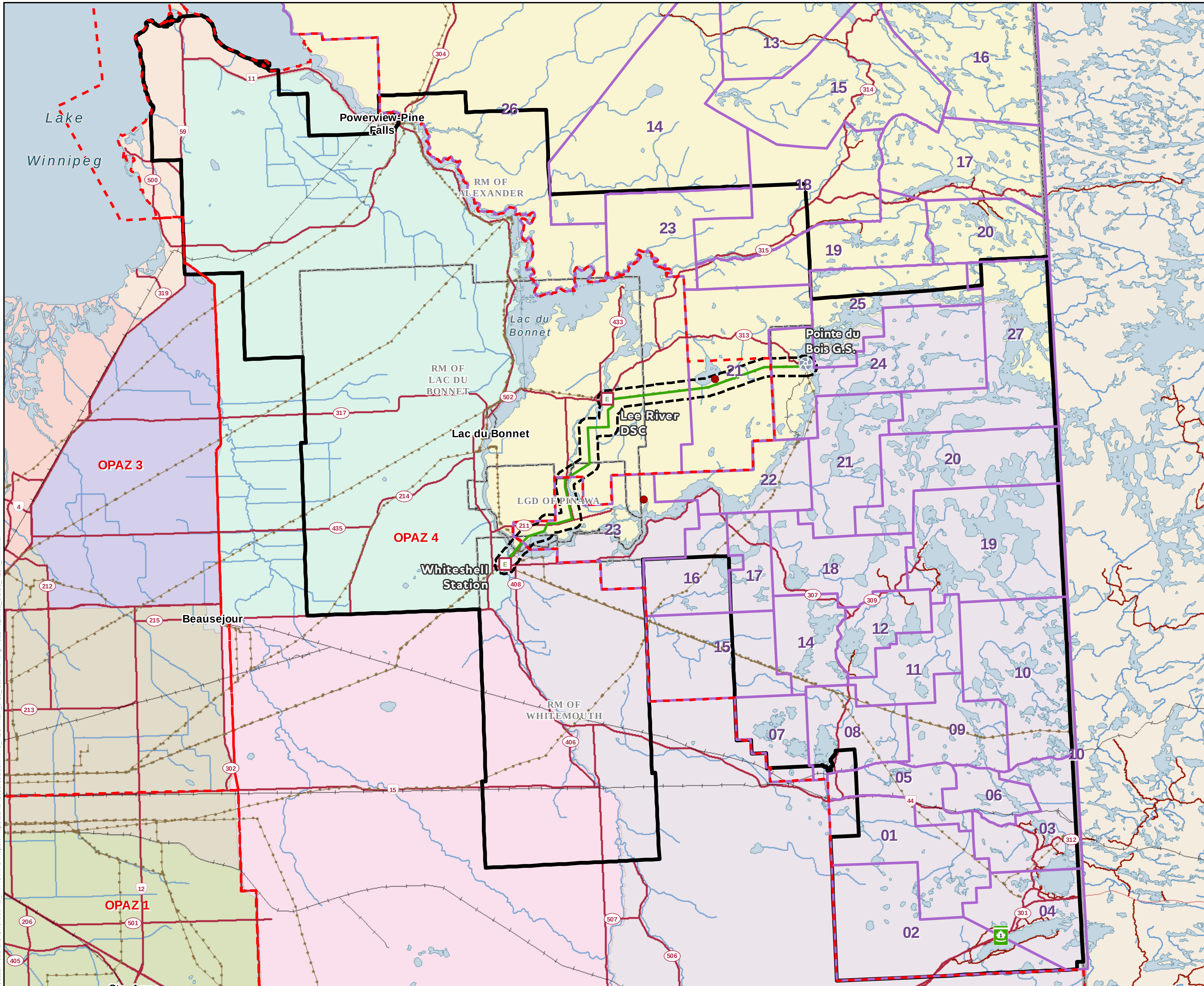
Wild Rice Operations and Mining Aggregates

Map 6-14



Pointe du Bois (PW75) Transmission Project

Project Infrastructure

- Final Preferred Route

Assessment Area

- PDA Buffer 1 km
- Land, Resource Use and Infrastructure RAA

Game Hunting Areas

25A	34B
25B	34C
26	35
34	35A
34A	36

Registered Traplines

- Registered Trapline

Open Trapping Areas

- Open Trapping Area

Trapper Cabins

- Trapper Cabin

Existing Infrastructure

- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Railway
- Provincial Highway
- Provincial Road
- Rural Municipality

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

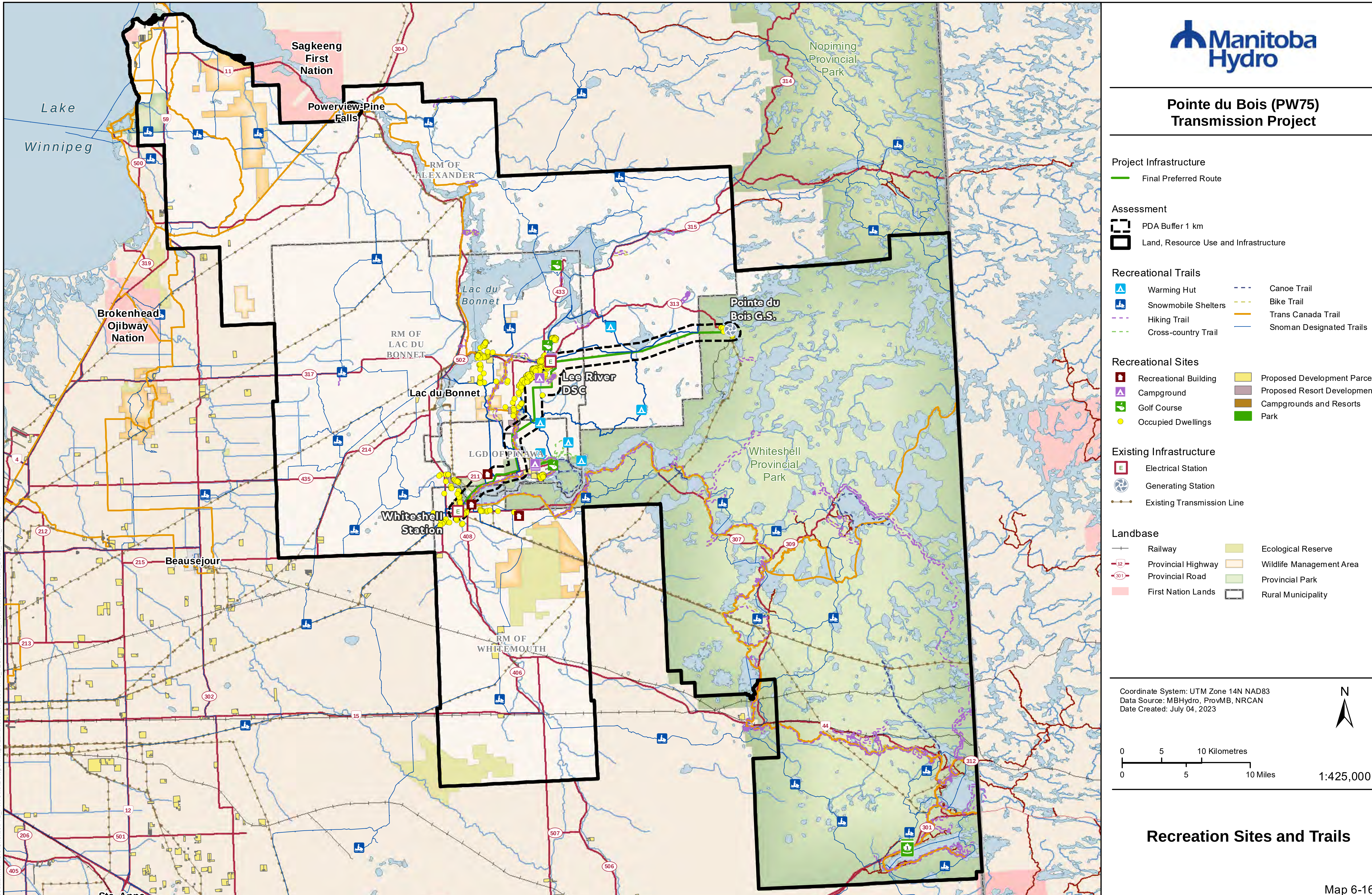
N

0 5 10 Kilometres
0 5 10 Miles

1:425,000

Game Hunting Areas and Traplines

Map 6-15


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment
PDA Buffer 1 km
Land, Resource Use and Infrastructure
Recreational Trails
Warming Hut
Snowmobile Shelters
Hiking Trail
Cross-country Trail
Canoe Trail
Bike Trail
Trans Canada Trail
Snoman Designated Trails
Recreational Sites
Recreational Building
Campground
Golf Course
Occupied Dwellings
Proposed Development Parcel
Proposed Resort Development
Campgrounds and Resorts
Park
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Railway
Provincial Highway
Provincial Road
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Rural Municipality
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0 5 10 Kilometres
0 5 10 Miles
1:425,000
Recreation Sites and Trails
Map 6-16
Lake Winnipeg
Sagkeeng First Nation
Powerview-Pine Falls
Nopiming Provincial Park
RM OF ALEXANDER
Brokenhead Ojibway Nation
Lac du Bonnet
RM OF LAC DU BONNET
Pointe du Bois G.S.
Lee River DSC
Lac du Bonnet
LGD OF PINAWA
Whiteshell Station
Whiteshell Provincial Park
Beausejour
RM OF WHITEMOUTH
Ste. Anne

6.3.3 Agricultural land use

Agriculture refers to the production of crops and livestock and is a prominent land use in Southern Manitoba. While the project region is largely forested, agriculture is present in the western and southwestern portions of the region, near the Winnipeg River.

As outlined in Chapter 4, during Engagement Circle #2 on December 13, 2022, participants indicated the need to distinguish and elaborate more on traditional agriculture, which was part of holistic resource management for Indigenous people, versus focusing only on modern agriculture. Participants mentioned that Indigenous people were practicing agriculture, including growing crops, in the regional area of the project prior to colonial contact. As a result, this report makes a distinction between traditional agriculture and contemporary (typically commercial) agriculture.

6.3.3.1 Traditional/Indigenous agriculture

Traditional agriculture is deemed to encompass pre-colonial contact agricultural activities and on-going agricultural practices by First Nations people and Red River Métis citizens that follow the pre-colonial approaches for agricultural practices.

According to Flynn and Syms (1996), Indigenous people were practicing activities that fall within the realm of agriculture in the Dakotas and Manitoba in the early 1400s. In 1986, Manitoba Museum Curator Dr. Leigh Syms unearthed evidence that corn, beans, squash, and sunflowers were being grown as far north as Lockport during that time. Corn, beans, and squash were traditionally grown close together, with the beans climbing up the corn stalks and the squash helping suppress weeds (Wilson 1987). Raising plants in this manner improved the fertility of the soil as beans harbour special bacteria that turn gaseous nitrogen into a form available to all plants (ammonium or nitrate). Sunflowers, often called the fourth sister, were typically grown along the edges of Indigenous fields, and provided an additional source of fat and protein (Wilson 1987).

Remnants of traditional agriculture in Manitoba include wild rice harvesting, and Rice Lake which is in the project region was identified as an important area for wild rice harvesting during Engagement Circle #3 on March 24, 2023. While some aspects of Indigenous food systems include activities that fall within the definition of agriculture, the use of the term traditional agriculture or Indigenous agriculture is limiting because components of agriculture (e.g., gardening and cropping) are only a portion of what constituted Indigenous food systems (Benoit 2023, pers. comms). This perspective is supported, for example by documented descriptions of the Red River

Métis by Europeans such as Alexander Ross whose 1856 piece in The Red River Settlement: Its Rise, Progress and Present State, who described the Red River Métis as

> *"…They are not, properly speaking, farmers, hunters, or fishermen; but rather confound the three occupations together, and follow them in turn, as whim or circumstances may dictate…"*.

6.3.3.2 Commercial agriculture

Commercial agriculture refers to the contemporary, profit-driven practice of farming which typically involves large-scale production of food crops, non-food products or livestock for widespread distribution to markets. Commercial agriculture generally responds to economic motivations and contributes to the gross domestic product of a country or province.

The occurrence of mainstream agricultural land, including lands seeded to hay and fields under annual cropping, increases in a westerly direction, particularly west of the Lee River distribution supply centre. According to Statistics Canada (2021), there is a total of 178 farms in the three rural municipalities of Alexander, Lac du Bonnet, and Whitemouth that are traversed by the project. Oilseed and grain farms are the most common types of farms and are almost evenly split among the three rural municipalities (Table 6-26). Reported livestock farm types within the project region include beef cattle, hog and pig, dairy cattle, chicken egg and meat-type chicken, apiculture (i.e., beekeeping for honey production), horse, and animal combination farms, which mostly occur in the RM of Whitemouth (Table 6-26).

Table 6-26: Farms within the rural municipalities traversed by the project

Farm Type	Rural Municipality			
	Alexander	Lac du Bonnet	Whitemouth	Total
Soybean farming	5	13	6	24
Oilseed (except soybean) farming	7	1	2	10
Wheat farming	3	0	3	6
Other grain farming	7	13	14	34
Other vegetable (except potato) and melon farming	5	0	2	7
Nursery and tree production	6	2	0	8
Hay farming	5	7	4	16
All other miscellaneous crop farming	2	4	4	10
Beef cattle ranching and farming, including feedlots	4	10	13	27
Hog and pig farming	1	0	5	6
Dairy cattle and milk production	0	0	6	6
Chicken egg production	0	0	10	10
Broiler and other meat-type chicken production	0	0	8	8
Apiculture	0	0	1	1
Horse and other equine production	0	0	1	1
Animal combination farming	1	1	2	4
Total	46	51	81	178

Source: Statistics Canada 2021u

Agricultural capability

The capability of land for agriculture is determined using the Canada Land Inventory (CLI) interpretive system for assessing the effects of climate and soil characteristics on the limitations of land for growing common field crops (CLI 1969). The system classifies mineral soils from Class 1 to class 7 with decreasing potential and increasing limitations (Table 6-27). Classes 1 to 3 represent the prime agricultural land, Class 4 land is marginal for sustained cultivation, Class 5 land is capable of perennial forages and improvement is feasible, Class 6 land can produce native forages and pasture, but improvement is not feasible, and Class 7 land is considered unsuitable for dryland agriculture (Land Resource Unit 1999a).

Table 6-27: Agriculture capability classes

Agriculture capability class	Degree of limitation
Class 1	Soils in this class have no notable limitations in use for crops
Class 2	Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices
Class 3	Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices
Class 4	Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both
Class 5	Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible
Class 6	Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible
Class 7	Soils in this class have no capability for arable culture or permanent pasture
Class 0	Organic soils, which are not rated for agricultural capability

Source: Canada Land Inventory (1969)

The northeastern portion of the project region falls within the Whiteshell Provincial Park which is not classified for agricultural capability. As reported by the Land Resource Unit (1999a, 1999b, and 1999c), an appreciable portion of soils within the project region are organic soils (Table 6-28) which are not classified for agricultural capability (i.e., 30%, 35%, and 52% for the RMs of Alexander, Lac du Bonnet, and Whitemouth, respectively). Organic soils have very limited capability for agriculture in their native undrained state.

Table 6-28: Agriculture capability in the rural municipalities (RMs) of Alexander, Lac du Bonnet, and Whitemouth

Agriculture Capability Class	RM of Alexander	RM of Lac du Bonnet	RM of Whitemouth
Class 1	-	-	-
Class 2	14.8	8.2	19
Class 3	20	28.9	9.1
Class 4	2.2	8.8	9.5
Class 5	11.1	5.6	1.8
Class 6	4.4	3.5	5.9
Class 7	13.7	2.0	2.3
Class 0	30.1	35	51.9
Water	3.9	7.9	0.5
Total[1]	100	100	100

[1]Values might not sum to totals shown because of rounding.
[2]Source: Land Resource Unit, 1999a, 1999b, and 1999c.

As shown in Table 6-28, almost 35% of soils within the RM of Alexander are rated Class 2 and Class 3 with moderate limitations for agricultural capability while approximately 18% of soils within the municipality are rated Class 4, Class 5, and Class 6 which have severe limitations for agricultural capability. The major limitations for the agricultural use of soils in the RM of Alexander are clayey texture, adverse soil structure, inadequate drainage and droughtiness (Land Resource Unit 1999a). Bedrock-dominated terrain covering 14% of the area has no capability for agriculture and is rated Class 7. Surface stones and cobbles, peaty surface soils and potential degradation due to erosion by wind are other important limitations.

Approximately 37% of soils within the RM of Lac du Bonnet are rated Class 2 and Class 3 with moderate limitations for agricultural capability while almost 18% of soils within the municipality are rated Class 4, Class 5, and Class 6 with severe limitations for agricultural capability. The major problems limiting the agricultural use of soils in the RM of Lac du Bonnet is inadequate drainage although surface stone and cobbles, peaty surface soils, droughtiness and potential degradation due to erosion by wind are other important limitations (Land Resource Unit 1999b).

Approximately 28% of soils within the RM of Whitemouth are rated Class 2 and Class 3 with moderate limitations for agricultural capability while almost 17% of soils within the municipality are rated Class 4, Class 5, and Class 6 which have severe limitations for agricultural capability. The major problem limiting the agricultural use of soils in the RM of Whitemouth is inadequate drainage (Land Resource Unit 1999c). Surface stones and cobbles, peaty surface soils and potential degradation due to erosion by wind are other important limitations.

Livestock operations

The project region is host to a wide range of livestock operations including but not limited to:

- beef cattle ranching and farming, including feedlots
- hog and pig farming
- dairy cattle and milk production
- chicken egg production, broiler, and other meat-type chicken production
- beekeeping for honey production, and
- horse and other equine production

As reported by Statistics Canada (2021), the RM of Alexander is host to six livestock farms, with four beef cattle farms, one hog and pig farm, and one animal combination farm.

According to Statistics Canada (2021), there are 11 livestock farms in the RM of Lac du Bonnet. Ten of these are beef cattle farms while one farm is an animal combination farm.

The RM of Whitemouth has the most livestock farms with a total of 46 livestock farms broken down as 10 beef cattle farms, five hog and pig farms, six dairy cattle farms, 18 chicken egg and broiler (and other meat type) chickens, one apiculture farm, one horse and equine, as well two animal combination farms (Statistics Canada 2021).

Centennial farms

There is one Centennial Farm (i.e., continuously occupied by a family for 100 years or more): the Golke Family Farm (PD1238) in NW 21-13-11E, which is immediately south of PR 307, near Whiteshell Station.

Communal agricultural operations

Communal agricultural operations occur throughout Southern Manitoba and their origins are rooted in Hutterite biblical beliefs. On a typical operation, on average, 15 families live and work communally, producing crops, livestock, and manufactured goods for sustenance (Hutterian Brethren, no date). Based on desktop review, two communal agricultural operations occur within the rural municipalities that are traversed by the project:

- Whiteshell Colony is located about 2 km southeast of Whiteshell station, the termination location for new transmission line, in the RM of Whitemouth.
- Brightstone Colony is located approximately 15 km northwest of Lac du Bonnet, in the RM of Lac du Bonnet.

Agricultural Crown land

The project footprint falls within Crown Land District #20 which covers the southeastern part of the province. The province encourages sustainable use of Crown land for multiple uses. Crown lands suitable for agricultural use may be leased for grazing, haying or annual cropping, depending on the authorized use and capability of the land.

Based on project engagement feedback, the project footprint is in the vicinity of three parcels of agricultural Crown land which are leased for pasture east of Pinawa Dam Provincial Park (Erb 2023, pers. comms.).

6.3.3.3 Agricultural biosecurity

Biosecurity means security from transmission of infectious diseases, parasites, and pests (Manitoba Agriculture, no date[a]). Biosecurity can be achieved and maintained through the implementation of measures that are designed to help protect an agricultural operation from the entry and spread of disease-causing pathogens.

Manitoba Hydro understands that adherence to biosecurity protection procedures during its transmission activities, including surveying, construction, and line maintenance, is important to producers in the project regional area. Manitoba Hydro has a corporate policy and standard operating procedure which provide guidance and direction to staff and contractors for the management of agricultural biosecurity risks through diseases, pests, and invasive species which pose a risk to agricultural operations.

Cropland biosecurity

Like most of Southern Manitoba, the primary disease of concern for field crops within the project region is clubroot which affects canola and can substantially reduce canola seed quality and oil content, resulting in economic losses.

Clubroot is caused by *Plasmodiophora brassicae*, a soil-borne pathogen that can be transmitted from field to field through movement of infested soil by both agricultural and non-agricultural equipment, including vehicles. Reported cases of clubroot have been increasing in Manitoba, and Manitoba Agriculture maintains a growing database of soil analytical results for clubroot. What makes clubroot particularly concerning for Manitoba producers is that the pathogen can survive for 10 to 20 years in the absence of a canola crop (Manitoba Agriculture, n.d.[c]). There are no economic control measures through which the disease can be eradicated after a canola-growing field gets infested. However, it is possible to curtail the spread and reduce the incidence and severity of infection, through the implementation of agronomic mitigation practices as well as biosecurity measures.

Based on Manitoba Agriculture's 2022 clubroot distribution map (Figure 6-2), of the three rural municipalities traversed by the project footprint, Alexander has the highest risk of clubroot and has had soil samples with >80,000 spores per gram of soil and or apparent clubroot symptoms observed in fields.

The municipalities of Lac du Bonnet and Whitemouth have had soil samples with 1,000 to 10,000 spores per gram of soil, with no fields in these municipalities exhibiting apparent symptoms of clubroot.

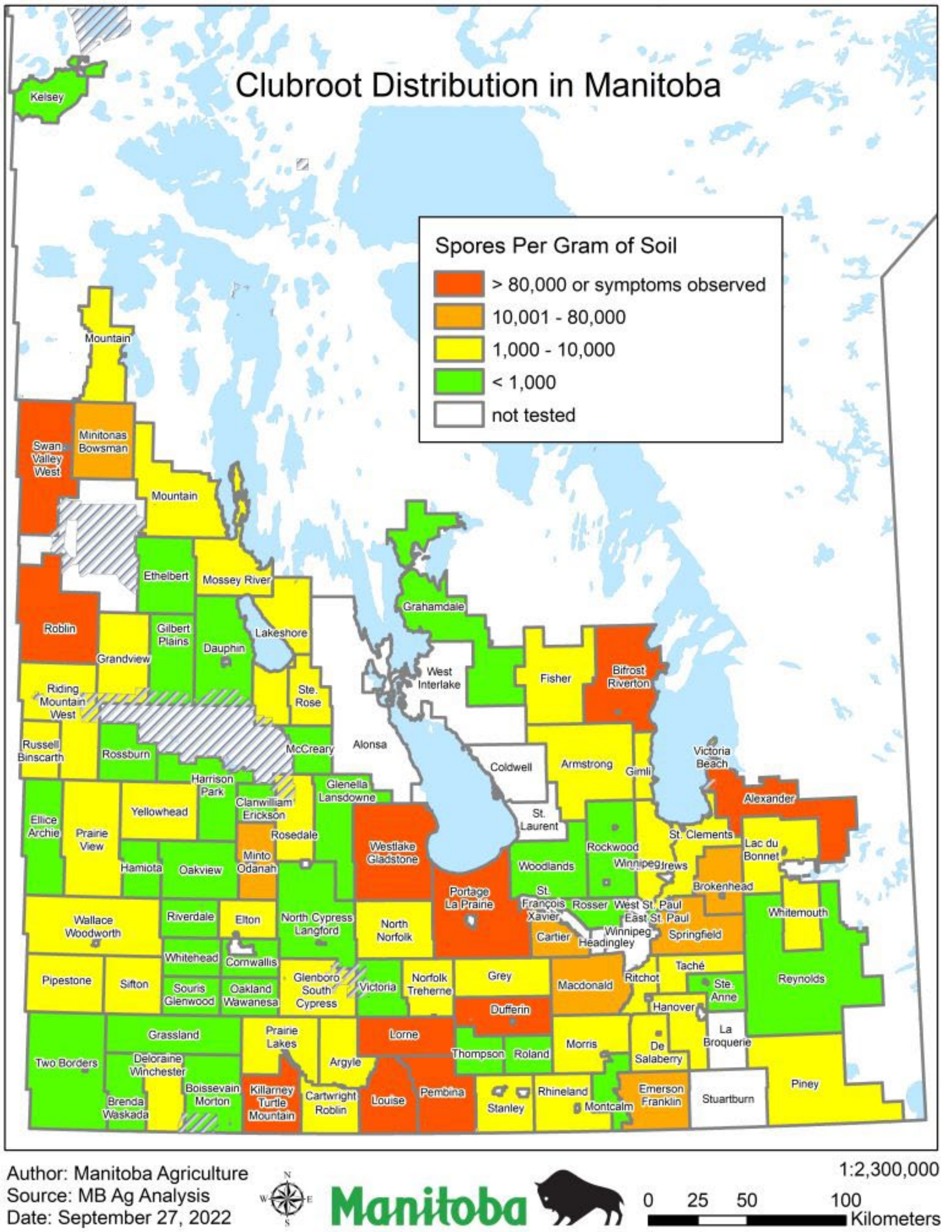


Figure 6-2: Clubroot distribution in Manitoba (2022)

Verticillium stripe is another canola disease which can affect crops in Southern Manitoba. It is caused by Verticillium longisporum and was identified by Manitoba Agriculture staff in 2014 (Manitoba Agriculture, n.d.[c]). Compared to clubroot, Verticillium stripe infection occurs earlier in the season, but symptoms and the reproductive microsclerotia appear much later in the season (Froese 2022a, pers. comms). While the pathogen for Verticillium stripe can be transmitted through movement of soil (i.e., soil borne), it is more ubiquitous than the pathogen for clubroot. It can also be transmitted via stubble and is easily wind-dispersed as fine stubble pieces are shredded during harvest, a characteristic that makes its mitigation challenging (Froese 2022a, pers. comms). Since wind dispersal is so easily done, controlling the spread of Verticillium longisporum through mitigation designed for soil-borne pathogens is not effective (Froese 2022a, pers. comms).

Another soil-borne pest that is of concern in Southern Manitoba is soybean cyst nematode (SCN), a roundworm that can dramatically affect soybean yields and long-term sustainable production. There is no indication that SCN is present in the project area (Froese 2022b, pers. comms).

Livestock biosecurity

Pests and diseases can have lasting adverse impacts on livestock operations through a reduction in livestock health and higher production costs from increased input needs and management costs. The effect of compromised biosecurity would particularly be greater for livestock operations with large numbers of animals contained in proximity within common spaces (e.g., cattle feedlots, intensive poultry, and hog operations).

With a wide range of agricultural operations in the project area, risk to biosecurity is a concern for livestock operations, particularly for beef cattle operations as was raised during the engagement process for the project. As mentioned in Chapter 4, during project engagement, agricultural producers expressed biosecurity concerns related to the increase in potential for trespassing on private property which could increase the likelihood of incidents between people and cattle.

Of concern to cattle operations are diseases like anthrax which is a fatal, contagious, and infectious soil-borne disease that can also affect sheep and other grazing livestock which often die suddenly without showing any signs of disease. Bacillus anthracis, the bacteria which causes anthrax, forms spores that can survive in the soil for decades and get exposed to the soil surface due to flooding, drought, or cultivation-induced changes in soil moisture (Manitoba Agriculture, no dated). Animals become infected by eating contaminated soil or forages and/or breathing in contaminated dust, and through animal-to-animal transmission (Manitoba Agriculture, no date). While anthrax's high-risk areas in Manitoba include the southeast region in which the project falls, the presence and distribution of anthrax and its pathogen in the vicinity of the project footprint is unknown.

For egg chickens, other poultry that are housed indoors, transmission construction or presence does not present a biosecurity concern for operations (Rybuck 2022, pers.

comms). This would likely be the case for other livestock types that are housed indoors like pigs.

6.3.4 Population

Municipalities within the regional area of the project consist of the LGD of Pinawa, RMs of Alexander, Lac du Bonnet (including the Town of Lac du Bonnet), and Whitemouth, and Unorganized Territory Division No. 1 (including Whiteshell Provincial Park). Population characteristics for project region's municipalities are outlined in Table 6-29 (Statistics Canada 2021).

Table 6-29: Population of project region municipalities 2021

Census Subdivision	Population 2021	Population 2016	Population Change	Population Density (sq. km.)	Land Area (sq. km.)
RM of Alexander	3,854	3,333	15.6	2.5	1,560.05
RM of Lac du Bonnet	3,563	3,121	14.2	3.2	1,097.61
Town of Lac du Bonnet	1,064	1,089	-2.3	470.7	2.26
LGD of Pinawa	1,558	1,504	3.6	12.3	126.51
RM of Whitemouth	1,630	1,557	4.7	2.3	697.35
Unorganized Territory Division No. 1	1,380	1,023	34.9	0.3	4,103.28

Source: Statistics Canada 2022a-f.

From 2016 to 2021, the RMs of Alexander, Lac du Bonnet, Whitemouth, LGD of Pinawa, and the Unorganized Territory Division No. 1 experienced population increases. The Unorganized Territory Division No. 1 had the largest population increase at 34.9% (from 1.023 people in 2016 to 1,380 in 2021), followed by the RM of Alexander with 15.6% (3,333 in 2016 to 3,854 in 2021). In contrast, the Town of Lac du Bonnet experienced a population decrease (1.504 to 1,558 between 2016 and

2021). The Town of Lac du Bonnet had the highest population density (470.7 persons per square kilometre).

Table 6-30 provides Statistics Canada data on Indigenous population. Most Indigenous people in the project region are Métis followed by First Nations (Statistics Canada 2022a-g). The percentage of the population that identify as Indigenous was highest in the Town of Lac du Bonnet (31.5%) followed by the RM of Alexander (25.8%) and RM of Lac du Bonnet (15.2%) and was lowest in the Unorganized Territory Division No. 1 (5.1%).

Table 6-30: Indigenous and Non-indigenous population 2021

Census Subdivision	Total Indigenous and Non-Indigenous Population	Indigenous Identity Population*	First Nations	Métis	% Indigenous Identity Population
RM of Alexander	3,854	995	370	615	25.8%
RM of Lac du Bonnet	3,563	540	80	450	15.2%
Town of Lac du Bonnet	1,064	335	85	245	31.5%
LGD of Pinawa	1,558	100	25	70	6.4%
RM of Whitemouth	1,630	175	65	105	10.7%
Unorganized Territory Division No. 1	1,380	70	10	50	5.1%

Source: Statistics Canada 2022a-f

* Indigenous identity includes persons who identify as First Nations (North American Indian), Métis and/or Inuk (Inuit) and/or those who report being Registered or Treaty Indians (that is, registered under the Indian Act of Canada), and/or those who report having membership in a First Nation or Indian band (Statistics Canada 2022a-g).

6.3.5 Employment and economy

The economies of the main population centres in the project region have historically been based on a variety of industrial sources.

Hydro-electric development associated with the generating stations at Pointe du Bois (operational since 1926), Slave Falls (built between 1928 and 1948) and Seven Sisters (operational since 1931) is a key economy and employment driver in the region. The Atomic Energy of Canada Limited (AECL) operated the Whiteshell Laboratories nuclear research facility in Pinawa for years, starting in 1963. The site is in the process of being decommissioned and repurposed.

Primary industries in the region include mining, forestry, and agriculture in the RMs of Alexander, Lac du Bonnet, and Whitemouth. There is substantive recreation and tourism, along with associated cottage development, in the region due to the presence of notable waterbodies such as the Winnipeg River, Lee River and Lac du Bonnet, and proximity to Whiteshell Provincial Park. The Town of Lac du Bonnet serves as a major service centre in the region, providing a range of services including educational institutions, medical services, retail establishment, and banking (Manitoba Hydro 2014).

6.3.5.1 Education

The level of education in the project region for individuals aged 15 years and older is shown in Table 6-31 (Statistics Canada 2022o-v). In 2021, levels of post-secondary education were highest in the RMs of Alexander and Lac du Bonnet, and lowest in the Town of Lac du Bonnet. The RM of Alexander had the highest levels of education related to post-secondary, high school, and bachelor’s degree or higher.

Table 6-31: Education level of total population 15 years and over, 2021

Census Subdivision	Post-Secondary Certificate, Diploma or Degree	High School Diploma or Equivalent	No Certificate, Diploma or Degree	Bachelor’s Degree or Higher
RM of Alexander	1,625	1,170	580	385
RM of Lac du Bonnet	1,335	880	540	340
Town of Lac du Bonnet	450	315	290	155

Table 6-31: Education level of total population 15 years and over, 2021				
LGD of Pinawa	775	390	160	275
RM of Whitemouth	495	330	390	85
Unorganized Territory Division No. 1	585	430	130	185
Manitoba	531,840	326,725	199,845	242,070
Source: Statistics Canada 2022m-s				

6.3.5.2 Employment

The economic profile for the Lac du Bonnet Region, consisting of the Town of Lac du Bonnet, RMs of Lac du Bonnet and Whitemouth, and the LGD of Pinawa, shows that most of the labour force was employed in the tertiary sector (i.e., industries that provide goods and services to business and consumers [e.g., accounting, retail]).

This was followed by jobs funded traditionally by government (e.g., education, healthcare, public administration). Jobs in secondary sectors (e.g., construction and manufacturing, utilities) and primary sectors (e.g., agriculture, forestry, fishing and hunting, mining, and oil and gas) represented a smaller portion of the workforce (Manitoba Economic Development, Investment and Trade 2021a).

The economic profile for the Powerview/Pine Falls Region, encompassing the RMs of Alexander, Powerview-Pine Falls, Victoria Beach, and several First Nations, shows a similar trend, with most of the labour force employed in tertiary sectors, followed by government funded sectors, secondary sectors, and lastly the primary sector (Manitoba Economic Development, Investment and Trade 2021b).

Table 6-32 outlines employment by key occupational industries in the project region based on the latest Statistics Canada (2021) Census information. The top occupational trades in the RMs of Alexander and Lac du Bonnet were trades, transport, and equipment operators, followed by sales and service (for Alexander, Lac du Bonnet), and education, law and social, community and government services. Occupations in business, finance and administration were high in Alexander and Lac du Bonnet. Occupations in natural resources, agriculture, and related production were highest in the RM of Lac du Bonnet, followed by Alexander and Whitemouth.

Table 6-32: Occupational classification in project region, 2021

Occupation – Broad Category	Alexander (RM)	Lac du Bonnet (RM)	Pinawa (LGD)	Whitemouth (RM)	Unorganized Territory Division No. 1	Manitoba
Total Population aged 15 years and over by occupation	1,590	1,390	550	725	405	681,505
All Occupations	1,560	1,365	530	720	405	665,880
Legislative and senior management	25	20	0	0	0	6,440
Business, finance, and administration	215	140	95	95	65	106,520
Natural and applied sciences and related	80	55	70	35	35	39,030
Health	130	70	55	30	25	57,585
Education, law and social, community and government services	180	165	75	60	70	91,725
Art, culture, recreation, and sport	20	0	30	10	15	15,375

Table 6-32: Occupational classification in project region, 2021						
Occupation – Broad Category	Alexander (RM)	Lac du Bonnet (RM)	Pinawa (LGD)	Whitemouth (RM)	Unorganized Territory Division No. 1	Manitoba
Sales and service	360	275	85	160	70	160,900
Trades, transport, and equipment operators and related	385	450	95	195	95	124,140
Natural resources, agriculture, and related production	115	125	0	110	20	29,805
Manufacturing and utilities	60	50	15	30	10	34,355
Source: Statistics Canada 2022g-l						

Table 6-33 provides information on employment and labour force characteristics of the project region. Data is also provided for the Province of Manitoba for comparison. The participation rate ranged from 41.5% in Pinawa to 49.5% in Whitemouth, which is lower than the provincial rate of 64.4%. The employment rate ranged from 33.2% in Unorganized Territory Division No. 1 to 54.1% in Whitemouth. The employment rate for Manitoba was 59.1%. Unemployment rates ranged from 7.3% in Pinawa to 12.2% in Alexander. The rate for Manitoba was 8.3% (Statistics Canada 2022h-n).

Table 6-33: Labour force characteristics in project region, 2021

Characteristic	Alexander (RM)	Lac du Bonnet (RM)	Pinawa (LGD)	Whitemouth (RM)	Unorganized Territory Division No. 1	Manitoba
Total Population aged 15 years and over by labour force status	3,365	2,775	1,325	1,220	1,145	1,058,415
In Labour Force	1,595	1,385	550	725	405	681,505
Employed	1,400	1,260	510	660	380	625,115
Unemployed	195	130	40	70	30	56,390
Not in Labour Force	1,775	1,370	775	490	740	376,905
Participation Rate	47.4	50.3	41.5	59.4	35.4	64.4
Employment Rate	41.6	45.7	38.5	54.1	33.2	59.1
Unemployment Rate	12.2	9.4	7.3	9.7	7.4	8.3

Source: Statistics Canada 2022g-l

6.3.6 Well-being

The Canadian index of well-being defines well-being as "the presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to good living standards, robust health, a sustainable environment, vital communities, an educated populace, balanced time use, high levels of democratic participation, and access to and participation in leisure and culture.” (Canadian Index of Well-Being n.d).

Well-being is influenced by social, economic, and environmental conditions (World Health Organization n.d.) The social determinants of health, defined as the interrelated social, political, and economic circumstances in which people are born, grow up, live and play (NCCDH 2022), contribute to overall physical and mental health status and therefore, influences well-being. Examples of social determinants of health include (NCCDH 2022):

- Disability
- Early child development
- Education
- Employment and working conditions
- Food insecurity
- Gender
- Geography
- Globalization
- Health services
- Housing
- Immigration
- Income and income distribution
- Indigenous ancestry
- Race
- Social inclusion/exclusion
- Social safety net
- Unemployment and job security

Through engagement with Canadian citizens, the CIW has identified eight core domains that contribute to well-being (Canadian Index of Wellbeing 2016):

- Community vitality
- Democratic engagement
- Education
- Environment
- Healthy populations
- Leisure and culture
- Living standards
- Time use

The way in which domains and SDOH interact are complex and do not operate as a list or in isolation (NCCDH 2022). These determinants can influence each other and the intersection of the SDOH and domains can shift and change over time (NCCDH 2022).

Well-being also includes perception, which refers to the process in which sensory stimulation is translated into organized experience (Epstein et al. 2023), and while there are in-depth psychological theories surrounding perception, there is a difference between sensing and perceiving (Epstein et al. 2023).

Health and risk perceptions are a public health concern because it is important to understand how the public makes sense of and interprets scientific research and processes information to formulate their own thoughts, perspectives, and opinions (Fundytus 2019).

Well-being is influenced by perception because stress related to perceived risk (such as EMF exposure and property devaluation) can contribute to adverse health outcomes (assessed in Section 7.14.2).

Perception is also related to aesthetic conditions (e.g., visual quality and noise associated with construction and presence of transmission lines) that can affect private landowners, Indigenous populations, and recreational users. There are evidentiary links between landscapes and health and well-being. For example, exposure to nature can affect attention capacity, coping mechanisms and enhance social ties among neighbours (Sullivan and Chang 2017). Aesthetic perceptions are subjective and may differ among individuals who have differing relationships with the land.

Connections to the land and environmental stewardship are also determinants for Indigenous Peoples health. The First Nation Health Authority states that "land and health are closely intertwined because land is the ultimate nurturer of people. It provides not only physical but emotional and spiritual sustenance, because it inspires and provides beauty; it nurtures our souls." (COBC n.d.). Access to the land, and land use activities can enable knowledge transmission, including the transmission of skills and ecological knowledge (PDAC 2022) (See Section 6.1.5 Important sites and cultural land uses).

6.3.6.1 Health conditions

General health indicators are used to describe population health on a broad level and to compare the health of different population groups. The Interlake-Eastern RHA has rates of many chronic diseases that are higher compared to the Provincial average, including: rates for cancer, hypertension (high blood pressure), diabetes, and childhood asthma (Interlake-Eastern RHA 2020). Chronic conditions, such as diabetes, cancer, and circulatory diseases, are the leading causes of death and disability within the Interlake-Eastern RHA.

Personal health behaviors, such as daily smoking and heavy drinking, can negatively affect health, while physical activity and a healthy diet can beneficially affect health.

The prevalence of daily smokers is lower in the Interlake-Eastern RHA (15%) compared to the Manitoba average of 17%.

In terms of alcohol misuse, the Interlake-Eastern RHA had a lower rate compared to the provincial average. Rates of substance use (alcohol and drugs) were similar between the two (Interlake-Eastern RHA 2020).

Interlake-Eastern rates for physical activity were like the provincial average. The Interlake-Eastern RHA had a much higher rate of fruit and vegetable consumption than the provincial average. Rates of overweight and obesity were similar between the Interlake-Eastern RHA and the province (Interlake-Eastern RHA 2020).

Infectious diseases, also known as communicable diseases, include any disease that can be transmitted form one person to another (e.g., sexually transmitted infections). Sexually transmitted infections (STIs) include chlamydia, gonorrhea, HIV, and syphilis. The rate of chlamydia infection has increased in the Interlake-Eastern RHA but it is lower than the provincial average. The rate of gonorrhea infection is slightly above the provincial average. HIV rates were low in the Interlake-Eastern RHA, like other RHAs, when compared to the Winnipeg RHA with most of the cases. Rates of syphilis increased in the Interlake-Eastern RHA over the 2014 to 2018 reporting period, which was higher than the provincial average (Interlake-Eastern RHA 2020).

Common respiratory infections include asthma, chronic or acute bronchitis, emphysema, or chronic air obstruction. Rates of respiratory disease in the Interlake-Eastern RHA vary with some areas having rates below the provincial average and other areas being substantially higher than the provincial average. The rates of asthma in children have increased in all areas of the Interlake-Eastern RHA and were higher than the provincial average (Interlake-Eastern RHA 2020).

Stress is thought to contribute to the development of many adverse health conditions including heart disease, stroke, high blood pressure, upper respiratory disease, and poor immune response. Exposure to stress can also contribute to behaviors such as smoking, over-consumption of alcohol, and less-healthy eating habits.

Rates of perceived mental health and perceived life stress were similar between the Interlake-Eastern RHA and the Manitoba average. Interlake-Eastern RHA had the highest level indicating that their general health was either very good or excellent. In addition, the Interlake-Eastern RHA had a lower rate of mood and anxiety disorders than the provincial average (Interlake-Eastern RHA 2020).

Injury was the fourth most frequent cause of death in the Interlake-Eastern Health Authority. Injury mortality and injury hospitalization rates for Interlake-Eastern were above the provincial average. The top five most common causes of injury death were suicide, motor vehicle accidents, drowning, falls, and burns and poisonings (Interlake-Eastern RHA 2020). The most common causes of injury hospitalizations were falls, poisoning, suffocation, motor vehicle accident, and from being struck by or against an object (Interlake-Eastern RHA 2020).

The Workers Compensation Board of Manitoba reports annually on workplace injury statistics for Manitoba. Reports provide the time loss injury rate and total injury rate (per 100 full-time equivalents [FTEs]) for the heavy construction sector in Manitoba between 2012 and 2021. Occupational injury rates have been on the decline through this period (Safe Work Manitoba 2023).

The ability to access sufficient safe and healthy food is an important determinant of health. Food insecurity occurs when the quality and/or quantity of food in a household is insufficient and is usually associated with limited financial resources (Interlake-Eastern RHA 2020). The Interlake-Eastern RHA has a slightly lower prevalence of food insecurity (7.8%) compared to Manitoba (9.1%).

6.3.6.2 Community well-being index

The community well-being (CWB) index measures socio-economic wellbeing for individual communities across Canada and is the only published index that provides comparability across all census subdivisions (CSDs, a spatial geography used in Statistics Canada's Census) for which data are available (values are available for the Census reporting years 1981, 1991, 1996, 2001, 2006, 2011, and 2016). The CWB Index focuses on education, labour force activity, income, and housing. As such, the CWB Index score can be viewed as one of many possible measures used to describe levels of community wellbeing within a given area.

CWB Index scores are available for the project region communities. Division No. 1 Unorganized Manitoba had the highest 2016 CWB Index score with 84. The LGD of Pinawa recorded a CWB Index score of 82. The RM of Lac du Bonnet followed with a CWB Index score of 80 while the RM of Alexander had a score of 77. The RM of Whitemouth had the lowest CWB Index score with 75. The Manitoba average score was 78 (Government of Canada 2019). Division No. 1 Unorganized Manitoba, the LGD of Pinawa, and the RM of Lac du Bonnet all had scores higher than the Manitoba average.

6.3.6.3 Community well-being: First Nations and Red River Métis health

Community health and well-being (in addition to infrastructure, housing, services, lifestyle, environmental health, and human health) can also be associated with access to lands and opportunity for First Nation and Red River Métis land and resource use (including fishing, hunting, harvesting, and trapping) which is an essential component of culture (Bell-Sheeter 2004). These aspects of community well-being are tied to cultural vitality, which is inextricably linked to the transmission of knowledge passed on experientially through the practice of First Nation and Red River Métis land and resource use and land management activities.

Development projects have the potential to affect components of the natural environment that are integral to the health and well-being of First Nations individuals and communities, and Red River Métis citizens. Although there are no First Nation reserve lands in the project region, the numbered treaties signed with Canada greatly influenced the ability of Indigenous groups to access the natural environment for traditional land and resource use activities. The signing of the numbered treaties created barriers for First Nations people to carry out land management techniques that are necessary for the maintenance of cultural vitality, land, and food security (Alkon and Norgaard 2009).

Government of Canada, Statistics Canada and the Interlake-Eastern RHA record sizeable First Nation and Red River Métis populations residing in southeastern Manitoba. First Nation communities engaged in the project and their reported population sizes, are described in Table 6-34.

Table 6-34: First Nations population on/off reserve

Community/Place	On-Reserve	Off-Reserve	Total
Brokenhead Ojibway Nation	684	1,536	2,220
Sagkeeng Anicinabe First Nation	3,701	4,719	8,420
Division No. 1 Unorganized	n/a	n/a	70

Source: Government of Canada 2022 Statistics Canada 2022t.

Population data for the Métis population residing with the project region, as documented within the current Interlake-Eastern RHA, as well as the former RHA (North Eastman) and Southeast MMF Region (including South Eastman), is presented in Table 6-35.

Table 6-35: Métis population in project region and surrounding area				
Current Regional Health Authority/MMF Region	Former Regional Health Authority	Population Métis	Population All other Manitobans	Year
Interlake-Eastern	North Eastman	3,470	36,809	2010
Southeast MMF Region1	North and South Eastman	9,837	100,177	2010

Source: Manitoba Centre for Health Policy 2012

[1] encompasses area much larger to the north and south (east side of Lake Winnipeg to Ontario and US border)

Health status of Indigenous populations in Manitoba

To determine how the health of Indigenous people in Manitoba compared to the non-Indigenous population, the First Nations Regional Health Survey (RHS) – a First Nations-governed, national health survey—was conducted by the regional body of the Assembly of First Nation Chiefs for Manitoba. Phase 3 of the RHS gathered data between 2015 and 2016 (Manitoba Centre for Health Policy 2019). It found that Indigenous Peoples in Manitoba experienced lower rates of several chronic conditions, including cancers and circulatory and respiratory diseases. However, rates of digestive, endocrine, and metabolic, mood and anxiety disorders were higher in the Indigenous populations compared to non-Indigenous populations.

Data for Métis health were collected by the Manitoba Centre for Health Policy in collaboration with the Manitoba Métis Federation and are available in *Profile of* Métis *Health Status and Healthcare Utilization in Manitoba: A Population-Based Study (*Manitoba Centre for Health Policy 2012*)*.

For all the health measures included in reporting on the following health indicators: mortality, general health and chronic conditions and health behaviors, some level of variation can be seen. However, premature mortality and total mortality rates are generally higher for the Métis populations compared to the rest of Manitoba, and self-rated health is poorer for the Métis populations compared to the rest of Manitoba. A similar pattern can be observed for rates of chronic conditions and personal health behaviours, with Métis populations experiencing higher rates of chronic conditions and adverse personal health behaviours than other Manitobans.

Illnesses and conditions are disproportionately observed in Indigenous communities, particularly obesity, diabetes, and poor cardiovascular health (Wilk et al. 2017). The effects of colonization, particularly the imposition of residential schools, loss of culture and disconnection from family structures and ways of life have shown correlations to the health and well-being, including physical, mental, emotional, and spiritual wellness of Indigenous people (Wilk et al. 2017).

Diet and nutritional outcomes

Wild foods are important to First Nations people and Red River Métis citizens for nutritional, cultural, and economic reasons. Wild food diets are relatively healthy and have considerable social and cultural value. Data on wild food consumption patterns and food security for Manitoba First Nations are available through the First Nations Food, Nutrition and Environment Study (FNFNES), which examines wild food consumption patterns and levels of contaminants in wild foods for on-reserve populations across Canada based on ecozone.

In Manitoba, three First Nations (including one community engaged in the project [Sagkeeng FN]) participated in the FNFNES. Indigenous communities in the boreal shield ecozone had a high consumption of animal food sources, with 70% consuming animal-sourced and 30% consuming plant-sourced foods. The food that was consumed the most (by number of days) in the Boreal Shield ecozone was moose meat (20.4), followed by walleye (14.8) and blueberries (9.9).

Of households reporting in the Boreal Shield ecozone, 76% reported that they would like to consume more wild foods (Chan *et al*. 2019). These data highlight the importance of subsistence foods as part of the diet of Indigenous communities (both First Nations and Métis) in the region.

The most common wild food consumed by the Red River Métis consisted of land-based animals (23%), followed by freshwater fish (20%), and berries and wild vegetation (12%). Bannock was consumed by 16% of the Métis population (Statistics Canada 2010).

After the implementation of Treaties, the Federal Government provided colonized agricultural training and resources to reserve communities, in addition to food products, to communities unable to access harvestable goods due to restrictions placed on Indigenous peoples living on reserve lands. However, due to high-food costs, many Indigenous residents cannot not afford healthy, perishable food. Due to inaccessible healthy and traditional food sources, reliance on heavily processed, sugary, and preserved foods has led to a notable increase in diet-related health issues in Indigenous communities, such as diabetes (Rudolph and MacLachlan 2013).

7.0 Assessment of potential effects

The potential for interaction between project activities (described in Chapter 2.0) and each VC was considered for the construction, operation, and decommissioning phases of the project. The identification of potential interactions between project activities and individual VCs was indicated in Table 5-1 and is described for each valued component in the subsections below.

As described in Chapter 5.0, the environmental assessment has been organized around the principle of Manito Aki Inakonigaawin (Grand Council Treaty #3 2022) and what we heard at engagement circles in Pinawa on August 24, 2022, at South Beach Casino & Resort at Brokenhead Ojibway Nation on December 13, 2022 and March 24, 2023 and at Pinewood Lodge near Seven Sisters Falls, on May 24, 2022 and intends to reflect the approach, valued environmental and cultural elements, and effects pathways identified by First Nation representatives, Red River Métis representatives, and other community representatives who participated in the engagement circles.

The engagement circles had participants from Black River First Nation, Grand Council Treaty #3, Manitoba Métis Federation (MMF), Peguis First Nation, Brokenhead Ojibway Nation, and Sagkeeng First Nation (See Chapter 4.0 for details).

7.1 Assessment overview

As described in Chapter 5.0 the assessment for each valued components involved the following:

- Scoping the assessment
- Describing project – valued component interactions
- Determining suitable mitigation
- Assessing residual effects
- Summarizing residual effects
- Assessing cumulative effects
- Determining significance of residual cumulative effects
- Developing follow-up and monitoring

7.2 Harvesting and important sites

The project is proposed on Treaty 1 and Treaty 3 lands, the traditional territories of the Anishinaabe, Anishininiwag and Cree peoples, and the homeland of the Red River Métis. The project is in an area of the province that is of historical and contemporary interest to the Manitoba Métis Federation (MMF) and its citizens. This area is also known in Anishinaabemowin as Manito Ahbee, a word meaning where the Creator sits and is recognized and honoured by Indigenous peoples across Turtle Island (North America) as a sacred place for all people.

The value and history of the project area, the potential of the project to interact with important sites and resources and having appropriate processes in place to respect important sites and resources have been raised as issues of high importance through project engagement (Chapter 4.0).

This section will consider potential effects of the project on interests identified by First Nations people and Red River Métis citizens who participated in project engagement. Based on engagement on this project, engagement on past projects, and existing literature, Manitoba Hydro identified two valued components directly related to matters considered important to rights-bearing communities:

1. Harvesting
2. Important sites

Through this section, we also aim to demonstrate the interconnectivity between components of the environment by describing how impacts to other valued components assessed throughout this report may also impact harvesting and important sites.

7.2.1 Scope of the assessment

Manitoba Hydro chose to use harvesting as a valued component because it can broadly capture the diverse ways by which different cultural groups practice harvesting activities. On past projects, the MMF has communicated concerns that assessments should consider Métis specific valued components with one of MMF’s suggested valued components being harvesting.

For the purposes of this assessment, harvesting includes hunting, fishing, trapping, and the gathering of plants (including wood). Harvesting includes the practice of harvesting, the resulting knowledge gained from taking part in harvesting, harvesting success, and the harvesting experience integral to distinct First Nation and Métis cultures. These are important traditional practices for many First Nations people and Red River Métis citizens and can be central to providing food and income for one’s family, as well as supporting the transfer of culture, traditions, and knowledge in the present and for future generations.

Manitoba Hydro chose important sites as a valued component because the value and history of the project area, the potential of the project to encounter heritage resources, and having appropriate processes in place to respect heritage resources and other areas of cultural importance were raised as key issues during project engagement.

We acknowledge that the importance of the area goes beyond history. As shared by Sagkeeng Anicinabe First Nation, members have an ancestral connection to the land in the project area, which is part of their Aboriginal Title territory going back to time immemorial.

For the purposes of this assessment, important sites are tangible and intangible sites considered important to First Nations peoples and Red River Métis citizens such as sites or objects of cultural, historical, spiritual, or sacred importance. We will also consider general land types and interests such as unoccupied Crown land and land for Treaty Land Entitlement opportunities. In this assessment, important sites also include the practice of ceremony, and the places ceremony may occur.

The UNESCO definition of intangible cultural heritage includes the traditions and living expressions that are transmitted from one generation to the next. Intangible cultural heritage manifests through five domains: oral traditions and expressions, performing arts, social practices and rituals, community knowledge and traditional craftsmanship (UNESCO 2023).

It is important to note that this section may discuss important sites that overlap with Section 7.3, which considers heritage resources as defined by the Province of Manitoba. However, the scope of the assessment of project effects on important sites presented in this section is broader and culturally specific, considering effects to any sites understood to be important to First Nations people and Red River Métis citizens.

During the engagement circles and through engagement on past projects, we have heard concerns regarding traditional approaches to environmental assessment. We heard that Western science often misses consideration of important connections in the environment and the impacts that may result from these connections by separating the environment into small pieces and assessing them as if they function in isolation. As a result, mitigation of predicted impacts to one component of the environment may cause unintended impacts to connected aspects of the environment.

Engaged First Nations people and Red River Métis citizens have recommended that the environment be considered holistically with attention paid to the interconnectivity between all parts of the environment.

We heard that humans are an integral part of the environment and that you cannot properly manage the impacts to the environment without considering how humans interact with the environment. Sagkeeng Anicinabe First Nation has shared that

"Sagkeeng sees our Nation as part of the environment and as such, our rights and future generations are intrinsically linked to the health and protection of the environment. An impact to the environment is an impact to our future generations and our rights." (Sagkeeng Anicinabe First Nation 2023)

To address the above-mentioned gap, this section draws from the assessments of other valued components throughout this report to consider how the project may impact harvesting and important sites both directly at the individual component level and by way of impacts to other interconnected components of the environment.

The assessment of effects on harvesting and important sites is informed by predicted residual effects on the following other valued components:

- Heritage resources (Section 7.3)
- Birds and bird habitat (Section 7.4)
- Fish and fish habitat (Section 7.5)
- Wetlands (Section 7.6)
- Vegetation (see Section 7.8)
- Terrestrial wildlife and habitat (Section 7.9)
- Well-being (Section 7.14)

Therefore, existing conditions described for each of the historical and cultural setting, the environmental setting, and the socio-economic setting in Chapter 6.0 are all relevant to understanding the baseline for the assessment of effects on harvesting and important sites because of the project.

7.2.1.1 Regulatory and policy setting

The Constitution Act s. 35, Part II (1982)

Section 35 of the Constitution Act, 1982, recognizes and affirms the existing Aboriginal and treaty rights of the Indigenous peoples of Canada. Among these rights is the right to harvest, which has been recognized by Canadian courts as an inherent Aboriginal right. The right to harvest includes Indigenous hunting/trapping, fishing, and gathering resources for subsistence and cultural purposes. The right is based on historic and continued use and occupation of the land by Indigenous peoples, which has been recognized and affirmed by the Canadian government.

Sagkeeng Anicinabe First Nation noted their definition of rights captures past, present, and future use, and includes but is not limited to:

- Governance and Stewardship
- Wildlife, Wildlife Habitat, Harvesting
- Plants, Plant Ecosystems, Plant Harvesting

- Tangible Culture
- Intangible Culture
- Water
- Fish and Fishing

Section 35 states that: "The existing Aboriginal and treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed. In this Act, "Aboriginal peoples of Canada" includes the Indian, Inuit and Métis peoples of Canada."

Manitoba Environment and Climate of Manitoba Environment and Climate (MEC) recognizes the Indigenous right to harvest. Its environmental assessment and project licensing process requires consultation and engagement with Indigenous communities. As the proponent, we are undertaking engagement on the project. Our engagement process is separate from the section 35 Crown consultation process that may be initiated by the Province of Manitoba, who has not delegated their duty to consult to Manitoba Hydro. We understand that the Crown may rely on the feedback received through our engagement activities to inform their consultation process. We sought to achieve meaningful engagement that may support the fulfillment of their duty.

Traditional activities and practices included within this chapter reflect traditional activities and practices that the Courts have expressly recognized would potentially be constitutionally protected under section 35 of the Canadian Constitution Act, 1982. The authors of this chapter did not try to distinguish whether activities, customs and practices shared by First Nations or the MMF met the test to be constitutionally protected. If an activity, practice or custom was shared with Manitoba Hydro and understood to be important, it was considered relevant to this assessment.

7.2.1.2 Consideration of issues raised during engagement

Manitoba Hydro has engaged First Nations people and Red River Métis citizens that may be affected by or interested in the project. Detailed information regarding these engagement activities is presented in Chapter 4.0. First Nations people and Red River Métis citizens shared information, expressed concerns, and provided project-specific data and comments related to harvesting and important sites, including harvesting (gathering), hunting, trapping, fishing, cultural continuity and use of culturally important places. This shared information has been integrated and considered throughout the assessment.

In particular, the following information obtained through engagement with First Nations people and Red River Métis citizens that may be affected by or interested in the project has been integrated into the assessment of effects on harvesting and important sites:

- Identification of interactions between the project and rights-based harvesting, including potential effects on access to harvesting and important sites, practices, and economic opportunities
- Identification of culturally important sites and areas that may interact with the project
- Consideration of the potential for cumulative effects, including the impacts of past and ongoing development in the area, on the ability to exercise Indigenous rights to harvest and conduct cultural practices, including avoidance and enjoyment of place
- Identification of mitigation measures to reduce potential adverse effects of the Project on the ability to exercise Indigenous rights
- Monitoring and follow-up to confirm that mitigation measures are effective and that any unforeseen effects will be addressed

This assessment of harvesting and important sites also draws information from engagement on past projects and a review of publicly available information about Indigenous land and resource use and areas important to affected First Nations people and Red River Métis citizens throughout and sometimes beyond the regional assessment area.

7.2.1.3 Potential effects, pathways, and measurable parameters

This section describes the types of potential effects the project may have on harvesting and important sites, the pathways through which these effects may occur, and the parameters that will be used to measure changes to harvesting and important sites.

The identified types of effects that the project may cause to harvesting and important sites are as follows:

- Change in access to harvesting areas and important sites
- Changes to harvested resources
- Changes to important sites
- Change in the experience of harvesting and visiting important sites

Characterizing the potential effects of the project on harvesting and important sites includes parameters that can be used to evaluate each type of predicted effect. Ideally, these parameters are measurable and quantifiable. However, some effects on harvesting and important sites lack defined parameters to measure effects and are therefore evaluated qualitatively based on information about harvesting and important sites received during project engagement. Potential effects, effects pathways, and the measurable parameters used to characterize and assess effects on harvesting and important sites are provided in Table 7-1.

Table 7-1: Potential effects, effects pathways, and measurable parameters for harvesting and important sites

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in access to harvesting areas and important sites	Direct loss of access during construction due to access restrictions on the right-of-way, which may include physical deterrents or obstructions (e.g., fences or gates) Intermittent loss of access to local areas of the right-of-way during periodic maintenance activities throughout operation of the project Increased access to the area (by Indigenous and non-Indigenous people) as a result of the presence of the right-of-way Permanent loss of access to the footprint of the transmission tower structures	Presence of important sites and travel routes within or proximal to the PDA Duration of disruptions to access (e.g., length of construction period, frequency of maintenance activities) Feedback from First Nations people and Métis citizens about predicted impacts to access
Changes to harvested resources	Disruption and altered movement of wildlife and bird species away from the right-of-way during construction Removal, fragmentation, and alteration of habitat of	Residual effect conclusions on birds and bird habitat, fish and habitat, wetlands, vegetation, and terrestrial wildlife and habitat

Table 7-1: Potential effects, effects pathways, and measurable parameters for harvesting and important sites

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
	harvested species due to clearing the right-of-way The presence of the line posing a direct risk for bird-wire collisions Disruption of fish habitat Removal of vegetation, which may include traditional plants and medicines along the right-of-way During operations, alteration and disruption to plants and medicines during vegetation maintenance activities on the right-of-way	Feedback from First Nations people and Métis citizens about predicted impacts to harvested resources
Changes to important sites	Potential disruption of unknown important sites (e.g., heritage and cultural resources) during construction, particularly during activities involving ground disturbance Effects to the surrounding environment at known important sites in the vicinity of the right-of-way Potential impacts to the ability for Treaty Land Entitlement to be fulfilled due to the project occupying Crown land that	Residual effect conclusions on heritage resources (Section 7.3) Feedback from First Nations people and Métis citizens about predicted impacts to important sites Reports of heritage resources and other cultural resources found during pre-construction field work or construction activities

Table 7-1: Potential effects, effects pathways, and measurable parameters for harvesting and important sites

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
	may otherwise be available for selection	
Change in the experience of harvesting and visiting important sites	Increased noise or changes in the types of noise during construction Periodic changes to noise during operations and maintenance activities Decreased preference or enjoyment visiting the area due to concerns about health and safety associated with construction and the presence of the transmission line (e.g., air quality, corona discharge, herbicide use, EMF)	Feedback from First Nations people and Métis citizens about predicted impacts to the experience of harvesting and visiting important sites

7.2.1.4 Boundaries

Spatial Boundaries

The spatial boundaries for the assessment of effects to harvesting and important sites are the same as those used for the assessment of effects to terrestrial wildlife and wildlife habitat (Map 7-1), which is the valued component in this report with the broadest assessment areas as follows:

- Project Development Area (PDA): The PDA is the footprint of the project including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances.
- Local Assessment Area (LAA): The LAA is a 1 km buffer on either side of the final preferred route, which is intended to characterize indirect effects of noise and

aesthetic quality on the experience of harvesting and enjoyment of important sites.

- Regional Assessment Area (RAA): The RAA is a 15 km buffer on either side of the final preferred route, which is used to capture information on a broader scale and to provide regional context.

Temporal Boundaries

The project construction schedule is provided in the project description (Section 2.5). The project effects on harvesting and important sites are being assessed over the life cycle of the project's construction, operation and maintenance, and decommissioning phases. The phases of the project life cycle are as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

In addition, temporal boundaries for harvesting consider the past, current, and future use of lands within the project's spatial boundaries. Current use is defined as within the last 25 years, or one generation. The definition of past use is limited only by the living memory of knowledge holders who provided information considered in this assessment. Future use considers the ability for First Nations people and Red River Métis citizens to continue to occupy and use lands and resources for harvesting beyond the life of the project.

Historical temporal boundaries for important sites consider the existing database of previously recorded sites and general cultural chronologies for southern Manitoba. The heritage resources historical temporal boundary spans a time of approximately 8,200 to 75 years before present (B.P.) (Nielson et al 1996; Thorleifson 1996). This timeframe corresponds to the period when glacial Lake Agassiz drained, and the environment became conducive to human habitation. Seventy-five years ago, or the end of the Second World War, was selected as the upper historical temporal boundary specific to the RAA as this is the upper date recognized by the Historic Resources Branch for a site to be recorded in the provincial inventory.

7.2.1.5 Residual effects characterization

Table 7-33-2 presents definitions for the characterization of residual environmental effects on harvesting and important sites. The characterizations describe the potential residual effects that remain after mitigation measures have been implemented.

Table 7-2: Characterization of residual effects on harvesting and important sites

Characterization	Description	Quantitative measure or definition of qualitative categories
Direction	Describes the long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to harvesting and important sites relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to harvesting and important sites relative to baseline. **Neutral –** no net change in measurable parameters for harvesting and important sites relative to baseline.
Magnitude	The predicted amount (degree or intensity) of change in measurable parameters or in the VC relative to existing conditions	**Negligible –** no measurable change to harvesting or importance sites is predicted **Low –** it is predicted that the manner in which rights-based activities are performed in the LAA may be affected (e.g., timing, locations), but it is not anticipated that the ability to undertake rights-based activities in the RAA will be definably affected; no impacts to specific known locations of important sites are predicted, but alterations to the landscape have low potential to encounter unknown sites.

Table 7-2: Characterization of residual effects on harvesting and important sites

Characterization	Description	Quantitative measure or definition of qualitative categories
		Moderate – it is predicted that there will be disruption to the ability to perform rights-based activities in the LAA, but it is not anticipated that the ability to undertake rights-based activities in the RAA will be definably affected; no impacts to specific known locations of important sites are predicted, but alterations to the landscape have high potential to encounter unknown sites. **High** – it is predicted that there will be a definable change in the ability to perform rights-based activities in the RAA that exceeds guidelines or established threshold of acceptable change; it is known that important sites will be directly impacted
Geographic extent	The geographic area in which a residual effect is expected to occur	**PDA –** residual effects are restricted to the project footprint (right-of-way) **LAA (local) -** residual effects extend beyond the PDA but remain within the LAA **RAA (regional) –** residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC	**No sensitivity -** Effect does not occur during critical time period related to harvesting or important sites (e.g., preferred times for

Table 7-2: Characterization of residual effects on harvesting and important sites		
Characterization	Description	Quantitative measure or definition of qualitative categories
		harvesting or cultural activities) or timing does not affect the VC **Moderate sensitivity -** Effect may occur during a period of lower sensitivity (e.g., winter when important sites and vegetation are less likely to be disturbed) **High sensitivity -** Effect occurs during a critical time period related to harvesting (e.g., preferred harvesting times) or important sites (e.g., cultural or ceremonial activities that take place at specific times of the year)
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase **Medium-term –** the residual effect extends through to completion of post-construction reclamation **Long-term -** the residual effect extends for the life of the Project
Frequency	Identifies how often the residual effect occurs	**Single event** – occurs once **Sporadic/intermittent events –** occurs without a predictable pattern (set schedule) during the project phase or life cycle **Multiple regular events –** occurs at regular intervals

Table 7-2: Characterization of residual effects on harvesting and important sites		
Characterization	Description	Quantitative measure or definition of qualitative categories
		Continuous – occurs continuously during the project phase or life cycle
Reversibility	Pertains to whether and how likely a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed or returned to baseline conditions

7.2.1.6 Significance definition

The severity of the project's residual effects on harvesting and important sites will vary between cultural groups. Affected First Nation peoples and Red River Métis citizens will perceive the significance of these effects differently.

Every Nation is different, uses the land differently, has different connections to different places, and views future use of the area differently.

Recognizing the variation, significant adverse effects for harvesting and important sites will be considered as a long-term loss of availability of harvested resources or access to important sites, to a point where use and/or access is critically reduced or eliminated.

It is important to note that even if effects to individual components of the environment are deemed not significant, there could still be effects to harvesting and important sites overall because of the presence of the project and due to perceived effects or stress caused by the project.

7.2.1.7 Conservative approach

This assessment conservatively assumes that harvesting and important sites have the potential to occur within the project region, even if participating First Nations people and Red River Métis citizens did not specifically identify harvesting or site-specific uses. In assessing potential effects on harvesting and important sites, this assessment uses a conservative approach that recognises that a lack of information regarding harvesting and important sites for a specific area or activity does not necessarily represent a lack of cultural use for that area, especially where no project-specific information is available. The assessment also assumes that harvested species identified as being present in the project region could be hunted, trapped, fished, or gathered by First Nations people and Métis citizens.

7.2.2 Project interactions with harvesting and important sites

Table 7-3 identifies, for each potential effect, the physical activities that might interact with harvesting and important sites and result in the identified effect. Anticipated interactions between project activities and the potential effects are identified with a check mark and are discussed in detail in Sections 7.2.3.2, 7.2.3.3, 7.2.3.4, and 7.2.3.5, including the effects pathways, mitigations, and residual effects. Justification for no effect (indicated by a dash) is provided following the table.

Table 7-3: Project interactions with harvesting and important sites

Project activity	Effects			
	Change in access to harvesting areas and important sites	Changes to harvested resources	Changes to important sites	Change in the experience of harvesting and visiting important sites
Transmission Line Construction				
Mobilization and staff presence	✓	✓	✓	✓
Vehicle and equipment use	✓	✓	✓	✓
Right-of-way clearing	✓	✓	✓	✓
Watercourse crossings	✓	✓	✓	✓
Marshalling / fly yards	✓	✓	✓	✓

Table 7-3: Project interactions with harvesting and important sites

Project activity	Effects			
	Change in access to harvesting areas and important sites	Changes to harvested resources	Changes to important sites	Change in the experience of harvesting and visiting important sites
Transmission tower construction	✓	✓	✓	✓
Implodes	✓	✓	✓	✓
Helicopter use	✓	✓	✓	✓
Clean-up and demobilization	✓	✓	✓	✓
Station modification				
Mobilization and staff presence	-	✓	-	-
Vehicle and equipment use	-	✓	-	-
Marshalling / fly yard (Pointe du Bois station)	-	✓	✓	-
Realignment of access road (Pointe du Bois station)	-	✓	✓	-
Site preparation (Pointe du Bois station)	-	-	-	-

Table 7-3: Project interactions with harvesting and important sites

Project activity	Effects			
	Change in access to harvesting areas and important sites	Changes to harvested resources	Changes to important sites	Change in the experience of harvesting and visiting important sites
Station footprint expansion (Pointe du Bois station)	-	-	✓	-
Installation of electrical equipment	-	-	-	-
Clean-up and demobilization	-	✓	✓	-
Transmission Line and Station Operation and Maintenance				
Transmission line and station presence	✓	✓	✓	✓
Vehicle and equipment use	✓	✓	✓	✓
Inspection and maintenance	✓	✓	✓	✓
Vegetation management	✓	✓	✓	✓
Decommissioning				
Mobilization and staff presence	✓	✓	✓	✓
Vehicle and equipment use	✓	✓	✓	✓

Table 7-3: Project interactions with harvesting and important sites

Project activity	Effects			
	Change in access to harvesting areas and important sites	Changes to harvested resources	Changes to important sites	Change in the experience of harvesting and visiting important sites
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	✓	✓
Rehabilitation	✓	✓	✓	✓
Clean-up and demobilization	✓	✓	✓	✓

✓= Potential interaction

– = No interaction

Station modifications are not anticipated to interact with changes to access to harvesting areas and important sites or changes to the experience of harvesting and visiting important sites because the work will be occurring in developed areas and in areas where sensory disturbances are already present. Station modification activities within developed areas are also not anticipated to effect changes to the abundance of harvested resources but may effect changes to important sites if ground disturbance is involved.

7.2.3 Assessment of residual environmental effects on harvesting and important sites

7.2.3.1 Analytical assessment techniques

The general approach to assessing potential environmental effects on harvesting and important sites follows the sequence and methods outlined in Chapter 5.0, which was informed by First Nations people and Red River Métis citizens through project engagement.

For each of the four effects identified in 7.2.1.3, the assessment of residual effects on harvesting and important sites is organized to describe the pathways by which the project may cause the effect followed by a discussion of mitigations we are proposing to reduce or eliminate the effect and the assessment of residual effects following application of the proposed mitigation measures.

The assessment draws on information shared by First Nations people and Red River Métis citizens during project engagement, and residual effects on other valued components assessed throughout this report that may affect harvesting and important sites.

7.2.3.2 Change in access to harvesting areas and important sites

The project has the potential to affect access to harvesting areas and important sites during construction, operations, and maintenance, which may limit the ability to harvest and practice other cultural activities in certain locations at certain times. Access, in this context, refers to whether and how people can physically visit an area.

The pathways predicted to result in a change in access to harvesting areas and important sites are described below followed by mitigation measures and characterizations about residual effects to access.

Project pathways

During construction, access to the right-of-way is prohibited. This restriction directly prevents access to harvesting areas, important sites, or access points that may be located along the right-of-way for the duration of active construction in an area. Physical barriers (i.e., gates, fences) may be in place during this time to prevent and deter access to the area. This access restriction is intended to protect human health and safety while construction activities are underway. Once construction is complete, access permissions will return to those in existence prior to construction.

Active transmission line construction work will generally take place under frozen ground conditions (which may extend into the spring), except for the work at Pointe du Bois and Whiteshell stations, which can occur year-round.

Temporary road closures or traffic disruptions may also temporarily restrict access areas adjacent to the right-of-way within the LAA during construction.

The temporary loss of access to harvesting areas and important sites along the right-of-way during construction may result in First Nations people and Red River Métis citizens having to travel further and spend more time and energy to access locations that where they can practice rights-based activities. The access restrictions may also interrupt opportunities for knowledge transmission that occurs through harvesting and visiting important sites in the area.

While the transmission of knowledge is passed experientially through hunting, trapping, fishing, and harvesting, it is also important for Sagkeeng Anicinabe First Nation members to access important spiritual and gathering sites such as temporary and permanent habitation sites and camps, which are used during Indigenous land and resource use activities. For example, Sagkeeng members reported using a day camp while hunting moose and trapping small game. Campsites are also used by Sagkeeng members when harvesting wild rice. Sagkeeng members also identified several permanent habitation sites, which are used when collecting wild rice, blueberries, and other medicinal plants. There are also several permanent habitation sites used while fishing and temporary habitation sites that are accessed during canoe trips. Terrestrial trails throughout the Winnipeg River region are also of importance to Sagkeeng members, as they provide access to sites and areas, including harvesting areas that are important for the practice of Indigenous land and resource use activities (Sagkeeng Anicinabe First Nation, 2023).

Sagkeeng Anicinabe First Nation identified 145 important cultural sites within the PDA, including burial sites, gathering places, permanent habitation sites, sacred sites, spiritual sites, teaching areas used for the transmission of knowledge, as well as some temporary habitation sites and terrestrial trails. Sagkeeng Anicinabe First Nation also identified 200 site-specific values within the LAA and 583 site-specific values in the RAA. Sagkeeng Anicinabe First Nation identified concern for sites specifically along the waterways of the Winnipeg River, up into Lac du Bonnet, along the Pinawa Channel and towards Pointe Du Bois (Sagkeeng Anicinabe First Nation, 2023).

Peguis First Nation reported concerns about potential effects to several important known sites, including some extremely important petroforms at Tie Creek and the sites at Whitemouth Falls, as well as sites along the ROW from Whiteshell Station to Pointe du Bois, including sites around Rice Lake (PCSPI, 2023).

Peguis First Nation also shared concern about potential effects to major travel routes and resource collection sites along the right-of-way from Pointe du Bois to Whiteshell Station in areas where the project traverses existing or historical waterways, including the Lee River and access to Rice Lake. Sites around Rice Lake are also important travel ways to access additional harvesting sites and important areas, which may be interrupted or traversed by the project along the ROW (PSCPI, 2023).

The presence of the important sites and travel routes mentioned above within or proximal to the PDA illustrates that restrictions to access may directly affect the ability to practice rights-based activities during construction.

During operations and maintenance, access permissions on the PDA (right-of-way) will be similar to those in place prior to construction. In other words, if an area traversed by the project was previously accessible to rights-holders (e.g., Crown land), it will again be accessible during operations and maintenance. However, during maintenance activities, there will be intermittent localized access restrictions to the right-of-way resulting in the temporary suspension of harvesting activities or visiting important sites in the right-of-way.

Sagkeeng Anicinabe First Nation reported that project effects would occur in a context of existing, long-term, multi-source, and large-scale adverse impacts on Sagkeeng Anicinabe First Nation territory, rights, and interests, as identified by Sagkeeng Anicinabe First Nation members, including alienation from traditional harvesting and gathering areas and the disruption and contamination of culturally important species as a result of industrial and recreational activity after construction (Sagkeeng Anicinabe First Nation, 2023).

Sagkeeng Anicinabe First Nation noted that this alienation and disruption is largely the result of Manitoba Hydro's previous and ongoing projects (Sagkeeng Anicinabe First Nation 2023). Manitoba Hydro looks forward to continuing to work together with Sagkeeng Anicinabe First Nation moving forward.

Disruptions to access during construction and periodically through operations and maintenance have the potential to contribute to alienation from the land in the PDA.

The area of the footprints of tower structures will be permanently inaccessible for harvesting or for use as an important site because the footprints will be occupied by the tower throughout operations.

During operations and maintenance, the new right-of-way may result in increased access to the area by people who may not have previously visited the PDA. Routine inspections and maintenance will result in periodic increases in access to the PDA by Manitoba Hydro crews.

Although access permissions to the right-of-way will be the same following construction as they were prior to construction, the presence of the right-of-way and any new access trails will make the PDA easier to access. As a result, the project may create opportunities for First Nations people and Red River Métis citizens to practice rights-based activities in areas that were previously more remote and difficult to access. However, increased access to the PDA is likely to also include increased non-Indigenous access, which can negatively affect the practice of rights-based activities. This increased access may include foot traffic as well as the use of ATVs and snowmobiles. The use of the ATVs and other recreational vehicles can also result in the erosion of travel ways and tranquility along access routes.

Participants at the engagement circles identified increased access to the area as an effects pathway of concern. We heard concerns that access by more non-Indigenous hunters and trappers that may increase pressure on the natural resources available for rights-based harvesting and increase disruption to important sites. We also heard that development of the right-of-way and changes to existing access and trails may alter predator-prey relationships and may transport different plant communities into an area, which has a ripple effect on the areas surrounding the access routes. Effects of the project on wildlife and vegetation are discussed in Sections 7.4, 7.5, 7.6, 7.7, 7.8, and 7.9.

Peguis First Nation shared that increased pedestrian access to Whitemouth Falls Provincial Park has contributed to erosion out of the banks where increased foot traffic continues to damage the soil (PSCPI 2023).

A mitigation recommendation related to access shared by Peguis First Nation was that the PDA be accessed by existing roads and cleared areas used for agricultural purposes to minimize environmental impacts.

Concerns about increased access to the PDA were also shared by private landowners and other interested parties through the public engagement process.

Mitigation

The primary mitigation measure for reducing adverse effects to known harvesting areas and important sites overall is the routing process. Mitigating effects to harvesting and important sites can be achieved by routing within the existing right-of-way between Pointe du Bois and Lee River and adjacent to other pre-disturbed areas (e.g., PR 520 and PR 211), thereby reducing the creation of new access routes. Manitoba Hydro reviewed available geospatial data and considered harvesting areas and important sites, including Crown land and locations identified by engaged First Nations people and Métis citizens, during the routing process. The final preferred route avoids several areas of key concern identified during engagement such as a large tract of forested Crown land in the northern part of the project area east of Lee River DSC (alternative route segment 2).

Project-specific mitigation measures to avoid or reduce the potential effects of the project on access to harvesting areas and important sites are described below. Several of these mitigations overlap with mitigations recommended through First Nation and Métis engagement (marked with an *).

- Manitoba Hydro will provide notifications to FNMEP audiences prior to construction start.

- During construction activities, informational signs and warning markers will be used to identify active construction sites.
- *Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the access management plan described in Section 11.7.5.1
- *Vegetation maintenance and inspection activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan described in Section 11.7.5.1

Residual effects

After mitigation, predicted residual effects on access to harvesting areas and important sites include:

- Restricted localized access to the PDA during active construction resulting in temporary suspension of rights-based harvesting activities and access to important sites
- Intermittent localized access restrictions to the PDA during maintenance activities resulting in temporary suspension of rights-based harvesting activities and access to important sites
- Creation of new access or alteration to access routes bringing increased traffic to the area through operations and maintenance
- First Nations people and Red River Métis citizens having to travel further and spend more time and energy to access locations that where they can practice rights-based activities, during construction
- Interruption in opportunities for Indigenous Knowledge transmission that occurs through harvesting and visiting important sites in the area during periods of time when access is restricted

Following the implementation of mitigation, the residual effects of the project on access to harvesting areas and important sites have been characterized as follows:

- Direction: adverse
- Magnitude: moderate during construction when the PDA will be inaccessible for the duration of active construction; low during operations and maintenance when there will be occasional and temporary access restrictions and potential effects related to increased access by non-Indigenous people who were not previously accessing the area
- Geographic extent: LAA

    - Access restrictions and increased access will directly affect the PDA, but if restrictions make existing travel routes inaccessible effects to access may extend to the LAA
- Timing: no sensitivity; peak periods during which access may be of concern are not known
- Duration: long-term
- Frequency: continuous during construction, intermittent during operations and maintenance
- Change: reversible

7.2.3.3 Changes to harvested resources

The project has the potential to change harvested resources available in the project area during construction and operations and maintenance, which may limit the ability for First Nations people and Red River Métis citizens to exercise rights-based harvesting. Changes to harvested resources may include impacts to the abundance or types of culturally important plants, medicines, wildlife, birds, of other natural resources harvested by First Nations people or Métis citizens.

The pathways predicted to result in a change to harvested resources are described below followed by mitigation measures and conclusions about the residual effects of the project on harvested resources after mitigations are applied.

Project pathways

Throughout construction, increased activity in the area may cause disruption to harvested resources including birds, wildlife, fish, traditional plants, and medicines.

During construction, activities such as mobilization, vehicle use, clearing of the right-of-way, tower assembly, and conductor stringing (e.g., implodes, helicopter use), and the associated sensory disturbances (e.g., noise, dust) may result in wildlife and bird species important to harvesters avoiding the area, altering their movement, or breeding patterns. Wildlife tend to avoid areas where active construction is taking place, subsequently influencing their abundance and availability in preferred and/or predictable harvesting locations known to First Nations people and Red River Métis citizens in the area.

Clearing and grubbing to establish the right-of-way will result in the fragmentation or removal of bird and wildlife habitats in certain areas of the PDA, reducing habitat intactness and connectivity. Habitat reduction has potential to affect wildlife movement between mating areas, overwintering grounds, and dispersal corridors. This loss of habitat will continue through operations and maintenance.

Fragmenting forested areas may present a barrier for some species that reduce their risk of predation by avoiding open areas.

Wildlife and birds with harvesting values may be affected by the presence of the transmission line and the right-of-way through operations and maintenance. For example, the presence of the transmission line may lead to an increase in the mortality of grassland birds and small mammals in the local area as transmission lines provide perching areas for predatory birds. The transmission line may also result in an increased risk of bird mortality due to bird-wire collisions.

Of particular importance, increased access along the right-of-way by non-indigenous resource users and/or predators may result in a change to predator-prey relationships and harvest pressure on certain bird species (e.g., ruffed grouse, sandhill crane, waterfowl) that may be of interest to First Nations and Métis land users in the project region.

Wetland loss will be restricted to transmission tower footprints, new access and, if present, in the Pointe du Bois station expansion area.

Moose were shared to be of particular importance and interest to engaged First Nations people and Métis citizens. Positive changes along cleared areas of the right-of-way will include the re-establishment of vegetation into habitats for species such as white-tailed deer and moose that prefer food sources such as grasses and early successional trees and shrubs (Banfield 1974; Bramble and Byrnes 1982; Batrzke et al. 2014). Habitat fragmentation may also reduce patch size that is important in maintaining biodiversity (Environment Canada 2013b).

Operation and maintenance will continue to have an influence on wildlife and wildlife habitat through increased bird collisions, periodic disturbances associated with maintenance activities, including noise and activity associated with vegetation management (See Section 7.9 Wildlife). Of particular concern, the project has the potential to increase bird collision risk where the transmission line crosses or is adjacent to watercourses or waterbodies that concentrate large-bodied birds (e.g., Rice Lake, Pinawa Channel, Winnipeg River, Whitemouth River) or are located between roosting (i.e., resting), foraging, or breeding sites. In these areas, waterbirds, especially ducks and geese, are particularly vulnerable to collisions due to their daily movement patterns, which peak during low light periods around sunrise and sunset (Savereno, et al. 1996)

During the engagement circles, we heard concerns about effects on wildlife in the right-of-way, specifically the potential to effect moose and deer through several pathways including increased access to large game by non-indigenous harvesters. We heard concerns about the presence of wildlife in the project area being disrupted due to noise and fragmentation of habitat resulting from clearing and maintaining the right-of-way and the presence of the line. We heard that the creation of new right-of-way can affect different species in different ways, potentially increasing movement and presence along the PDA for species that prefer shorter vegetation and increasing avoidance of the PDA by others. With alterations to wildlife movement, there is potential to increase the spread of diseases.

Through engagement, we heard about the importance of inclusion of Indigenous Knowledge in understanding the effects on the natural environment, including the effects on wildlife, and that there is interest in First Nation and Métis monitoring opportunities. The interest in monitoring is broad and includes particular interest in monitoring project effects on wildlife, birds, and vegetation.

The abundance of fish may be affected by changes to fish habitat during construction at watercourse crossings where temporary vehicle, equipment, and/or personnel crossings are required. Temporary water crossings (e.g., ice bridges / snow fills) have the potential to temporarily restrict fish movement and temporarily alter fish habitat. Fish may be temporarily restricted/blocked from moving up or down stream by barriers of instream works. This may limit availability of harvestable fish during construction.

During construction, vegetation clearing and grubbing to establish the right-of-way is the primary pathway to a direct and measurable change to vegetation in the PDA. Clearing the right-of-way will disrupt and remove traditional plants and medicines along the right-of-way. Equipment and vehicle movement during mobilization and demobilization and the establishment of marshalling yards can cause physical damage to or decrease the quality of traditional use plants. These activities also have the potential to introduce or spread invasive and non-native plant species, causing changes in vegetation community composition within the project area. Invasive and non-native species can aggressively invade disturbed areas and may outcompete native plant species, including any traditional use plants. Heavy equipment and vehicle use on access roads may alter vegetation communities due to soil compaction, rutting and admixing. The areas and types of vegetation and habitat that will be cleared are described in detail in Sections 7.8 (Vegetation) and 7.9 (Terrestrial wildlife and habitat).

Timing of construction activity will target winter when soils are frozen or dry and plants are dormant and less sensitive to activity to limit project effects on vegetation and wildlife. Sensitive areas will not be treated with herbicides, such as specific sites used for gathering berries and harvesting other types of plant and traditional foods, which have been identified and shared with Manitoba Hydro through Indigenous Knowledge. Rare and/or important plants will be flagged for avoidance, and where unavoidable potential mitigations including seed harvesting, or salvaging and transplanting portions of sod, collecting cuttings or transplanting whole plants will be used to minimize project effects on availability of harvesting.

Changes in environmental conditions (e.g., light, soil moisture) along the right-of-way resulting from the removal of trees and tall shrubs will also alter the abundance of plants important to First Nations and Métis citizens. Some plants will decrease in abundance and others will increase. Indirect loss of plants of importance to First Nations and Red River Métis citizens may also occur from the introduction or establishment of regulated weeds and non-native invasive species.

During operations and maintenance, vegetation will be impacted during periodic vegetation management activities. Manitoba Hydro's integrated vegetation management approach aims to reduce impacts to the environment during maintenance events. Herbicides are used to target tall growing species, leaving shorter species such as hazel, alder and lower growing shrubs and grasses to flourish. They are not applied indiscriminately. By encouraging lower growing plants, taller trees are less likely to grow and affect the transmission line.

During the engagement circles we heard feedback about the importance of harvestable plants in the area. Participants expressed concerns about the collection of wood, seeds, and rare plants that will be removed as part of project construction, as well as protocols for protecting sacred areas and rare plants. We heard that medicines such as chaga and mushrooms, which will be disrupted during construction vegetation removal.

Potential chaga host tree species are likely to be lost during vegetation clearing and as the right-of-way will be maintained as a grassland or shrubland, and it is likely that chaga will not be able to re-establish for the life of the project.

During engagement, we have also heard concerns about potential project effects on moose and deer including increased access to large game, which may also affect the balance of predator and prey relationships long-term. Concerns were raised about continued effects of fragmentation, influencing movement of wildlife, and spread of diseases which have potential to affect wildlife health and availability in the long-term. Black River First Nation shared concerns about potential project effects to environmental health, including the potential for future generations to experience the effects of long-term environmental degradation.

Through engagement, Peguis First Nation indicated that the new transmission line, which includes areas along PR 211, is also an area where a section of marshland meets raised forest. Peguis First Nation is concerned that project activities could affect the availability of wildlife in this area, which is used for spotting game.

Sagkeeng Anicinabe First Nation (2023) reported that moose, as well as other small game, are of concern as critical harvesting sites, as well as calving areas will be disrupted by the Project. Indirect effects on wildlife, including moose and small game of importance to Sagkeeng Anicinabe First Nation, (Sagkeeng Anicinabe First Nation, 2023; See Section 6.1.5 Important sites and cultural land uses, existing conditions), may also occur through construction-related sensory disturbances (e.g., noise, light, ground disturbance) that may cause change in wildlife movement, and avoidance of impacted area(s) during construction.

Peguis First Nation reported that the Lee River, which will be crossed by the project, is a potential camping and medicine picking area. Peguis First Nation also reported that the preferred route immediately east of the Lee River distribution supply centre, will traverse camping, hunting, and harvesting sites, and will potentially change the availability and abundance of harvestable plants and wildlife in those areas. Direct loss of important plants can limit the availability of important harvesting resources in the project region.

As Stated in Section 7.14, connections to the land and environmental stewardship are also determinants for Indigenous peoples' health. Therefore, potential loss of available harvestable species can have health and well-being implications for First Nations people and Red River Métis citizens if experiencing a loss of available resources resulting from the project.

The pathways discussed above draw from the predicted residual effects to the following valued components, which we understand to be connected and relevant to a holistic discussion about impacts through its predicted effects on interconnected components of the environment: Birds and bird habitat, Fish and fish habitat, Wetlands, Vegetation, and Wildlife and wildlife habitat (Sections 7.4, 7.5, 7.6, 7.8, 7.9).

During the FNMEP, we heard the following mitigation recommendations related to concerns about potential effects to harvested resources:

- Monitoring of project effects through monitoring species health, which is affected by all changes in the environment. Birds are often the first ones to get affected and can therefore act as a good indicator of how the environment is responding (disease, etc.)
- Knowledge keepers should be involved in all aspects of monitoring
- Assess potential effects on wildlife movement such as avoidance, which can affect predator-prey relationships
- Medicines such as chaga/mushrooms should be transplanted if they are in areas that will be disrupted

- Allow seeds and plants be collected in advance of construction
- Avoid any clearing of natural areas to reduce environmental impacts as much as possible
- Use existing roads and cleared areas used for agricultural purposes to reduce the environmental impacts to a minimum
- Plant trees to compensate or offset for any project clearing of forested areas

Mitigations

Project effects on landscape intactness cannot be fully avoided given the abundance of native upland vegetation in the project region. However, potential project effects have been reduced by selecting a route that partially runs parallel to existing linear features or within existing utility corridors.

Project-specific mitigation measures to avoid or reduce the potential effects of the project on harvested resources are described below. These mitigations are in addition to mitigation measures focused on reducing effects to harvested resources including wildlife, birds, fish, and vegetation identified in Sections 7.4.6, 7.5.6, 7.8.3, and 7.9.3. Several of these mitigations overlap with mitigations recommended through First Nation and Métis engagement (marked with an *).

- Environmentally sensitive sites, features, and areas, such as important traditional plant and medicine locations, will be identified and mapped before clearing
- Include sensitive sites identified through the FNMEP in the Environmental Protection Plan
- Sensitive locations specifically identified in the environmental protection plan may be subject to special mitigations such as avoidance of herbicides at specific locations used for gathering berries and harvesting other types of traditional plants and medicines
- *Provide opportunities for involvement from First Nations people and Red River Métis citizens in monitoring during the construction and operation phases of the project
- Manitoba Hydro will provide notification through the FNMEP prior to construction start and prior to starting implodes, given the potential for temporary displacement of wildlife.

Residual effects

After mitigation, predicted residual effects on harvested resources include:

- Changes in the abundance and types of harvesting resources available due to predicted residual effects of the project on wildlife, birds, fish, vegetation, and wetlands
- A potential change in harvesting success rate and the amount of time and effort required for First Nations and Red River Métis citizens to carry out harvesting activities due to changes in the abundance and composition of harvested resources
- Potential social and economic effects on First Nations people and Red River Métis citizens due to changes in the availability of harvested resources

Following the implementation of mitigation, the residual effects of the project on harvested resources have been characterized as follows:

- Direction: adverse overall; may be positive for certain species during operations that may prefer the new composition of the revegetated right-of-way
- Magnitude: moderate during construction, low during operations
- Geographic extent: LAA
- Timing: high sensitivity
- Duration: long-term
- Frequency: continuous
- Change: irreversible

7.2.3.4 Changes to important sites

The project has the potential to change important sites during construction and operations and maintenance, which may disrupt or effect the integrity of important sites. Changes to important sites includes the alteration or disruption of any landscape of feature considered important by First Nations people or Métis citizens.

For the purposes of this assessment, important sites are tangible and intangible sites considered important to First Nations peoples and Red River Métis citizens such as sites or objects of cultural, historical, spiritual, or sacred importance. We will also consider general land types and interests such as unoccupied Crown land and land for Treaty Land Entitlement opportunities. In this assessment, important sites also include the practice of ceremony, and the places ceremony may occur.

The pathways predicted to result in a change to important sites are described below followed by mitigation measures and conclusions about the residual effects of the project on important sites after mitigations are applied.

Project pathways

During construction, there is potential for unknown important sites to be disturbed or uncovered during activities that involve ground disturbance primarily associated with construction of the right-of-way such as the mobilization of equipment, right-of-way clearing, installation of tower foundations, developing and using access routes, creating, and using marshalling/fly yards, and transmission tower construction.

During the FNMEP, we heard concerns about the archaeological field methods that will be followed for the project as well as the importance of having clear plans in place that specify how heritage findings must be addressed if found during construction. There is concern that work crews constructing the project may not be able to identify or notice heritage resources or other cultural sites if they see them and may damage them unknowingly.

Through engagement, we learned about certain important sites in the project area. Both Peguis First Nation and Sagkeeng Anicinabe First Nation provided reports sharing several important sites along the PDA and within the LAA and RAA. At the engagement circles, participants also shared locations of concern, illustrating them on maps of the alternative route segments and the preferred route. Some examples of these important sites are broadly included below. For confidentiality reasons, specific location information has not been included in many cases. More important sites were described in Section 6.1.4 (Contemporary land use).

Peguis First Nation shared concerns about potential destruction of and access to petroform sites, noting that there is potential for unknown petroforms sites to exist along and surrounding the right-of-way from Whiteshell Station to Pointe du Bois, as well as around Rice Lake (PSCPI 2023). Peguis First Nation also shared concern about burials located around Whitemouth Falls and Seven Sisters Damn which have potential to be affected by the Whiteshell station at the southern terminus of the line (PSCPI 2023).

Sagkeeng members reported that there are several locations in the Winnipeg River region that are identified as important cultural and spiritual areas, including a birth place, burial sites dating back 3,500-3,700 years, several ceremonial sites, multiple gathering sites (some sites for collecting silver), an old tree planting site at the old Pointe Du Bois dam, an old Sagkeeng village site, a petroform dating back to 3000 years ago, locations with arrowheads, petroglyphs and multiple sacred and spiritual sites and place names. Sagkeeng members also reported permanent and temporary habitation sites and areas where experiential learning and knowledge transfer through hunting, trapping, fishing and harvesting occurs, highlighting the importance of Sagkeeng members maintaining access to these sites and areas for the transmission of knowledge and teachings.

The potential for the project to change important sites is substantially diminished during the operations and maintenance phase as ground disturbance is anticipated to be very low. Potential effects during operations are generally related to maintenance activities, including vehicle usage related to line or tower repairs and vegetation management. Vehicle traffic can create ruts and expose important sites that were previously undisturbed. Vegetation clearing in areas previously not disturbed by construction for maintenance of tower sites have a potential to expose heritage resources.

The construction of the project will take place partially on Crown land. We understand that Crown land is of particular importance to First Nations people and Red River Métis citizens as areas available for practicing rights-based activities. We have also heard concerns that the project may impact the ability for First Nations with unfulfilled Treaty Land Entitlement agreements to fulfill their entitlements due to a decreased availability in eligible land. No part of the right-of-way crosses reserve lands, any TLE selections, or Addition to Reserve selections. There are TLE selections in the broader region and communities with TLE selections were scoped in for engagement through the FNMEP.

Through the First Nation and Métis engagement program, the following mitigations measures related to important sites were recommended:

- Develop protocols for protecting sacred areas and rare plants with input and feedback from First Nation and Métis audiences
- Avoid any clearing of natural areas to reduce environmental impacts as much as possible (Peguis First Nation)
- Use existing roads and cleared areas used for agricultural purposes to reduce the environmental impacts to a minimum (Peguis First Nation)

Black River First Nation recommended that they would like there to be an opportunity to lay down tobacco before cutting trees for widening the right-of-way.

Sagkeeng Anicinabe First Nation requested their inclusion in archaeological investigation work associated with the project. There will be heritage workshops and opportunities to participate in archaeological work.

Peguis First Nation recommended the following mitigations related to important sites:

- Conduct an Archaeological Investigation along the right-of-way in three stages:

  - Drone-based survey, using LiDAR and thermal imaging to scan areas of interest in much greater resolution and with more detail than the imagery currently available
  - Pedestrian survey of the entire right-of-way
  - Subsurface testing, i.e., test-pitting (typically in areas where the right-of-way crosses known palaeochannels and ancient shorelines)
- Section of line that runs near Whitemouth falls from the dam to the station requiring new construction must be subject to subsurface investigation in the form of extensive pit testing.
- Construction should not take place in undisturbed ground, and even disturbed soils should be subject to monitoring during construction.
- Petroform sites must be preserved as they are, without disturbance of any kind.
- All construction work that takes place will be accompanied by trained monitors who will have the power to stop work should heritage remains be discovered or known heritage becomes at risk (PSCPI 2023).

In engagement on past projects, Peguis First Nation has recommended that a plain language version of the CHRPP be prepared. We are in the process of developing a new CHRPP that will incorporate feedback we have heard from First Nations and the Manitoba Métis Federation.

Mitigation

The primary mitigation measure for reducing adverse effects to known important sites is the routing process. Manitoba Hydro reviewed available geospatial data regarding heritage sites and considered important sites identified through engagement during the routing process. We understand that both Crown and private land contribute to the fulfillment of TLE agreements in Manitoba. The potential effects of routing on both Crown and private lands were considered during the routing process. We reviewed TLE selections and Addition to Reserve selections through mapping provided by the Province of Manitoba. Any TLE selections within the project area were identified as areas of least preference during the transmission line routing process. No part of the right-of-way crosses reserve lands or any TLE selections or Addition to Reserve selections.

Project-specific mitigation measures to avoid or reduce the potential effects of the project on important sites are described below. These mitigations are in addition to all the mitigation recommended in Section 7.3.3 (Heritage resources). Several of these mitigations overlap with mitigations recommended through First Nation and Métis engagement (marked with an *).

- Environmentally sensitive sites, features, and areas, such as important heritage or cultural sites, will be identified and mapped before clearing.
- *Lay down tobacco before cutting trees for widening the right-of-way (Black River First Nation).
- *Include sensitive sites identified through the FNMEP in the EPP, both in sites already identified and sites that may be identified at a future date (Sagkeeng Anicinabe First Nation, 2023)
- The Construction Environmental Protection Plan (CEnvPP) and the Cultural and Heritage Resources Protection Plan (CHRRP) will provide a detailed plan for follow up and monitoring known and discovered important sites during the construction phase.
- Implementation of a cultural heritage resources protection plan during pre-construction, construction, and operation activities of the project.
- Manitoba Hydro will notify engaged First Nations, the MMF, and Grand Council Treaty #3 about heritage or cultural resources that are discovered during construction or operations of the project. We have heard feedback that some communities would like to share feedback on a chance find procedure for the project.
- Manitoba Hydro will reach out to FNMEP participants to arrange a ceremony or ceremonies at times that work for those interested and engagement project.
- Manitoba Hydro will support opportunities for representatives from engaged First Nations and the MMF to participate in monitoring related to important sites during relevant pre-construction and construction activities.

Residual effects

As concluded in Section 7.3 (Heritage resources), the project will decrease the number of heritage resources in the PDA by causing ground disturbances. As mentioned, this chapter looks considers a broader range of important sites that we understand to be valued by First Nations people and Métis citizens.

We recognize there is the potential for the project to encounter important sites during development throughout the PDA, whether locations of concern have been shared through engagement.

After mitigation, predicted residual effects on important sites include:

- Unknown heritage sites and values of the land may be impacted
- Concerns may remain about the process for protecting important sites, including heritage resources
- Decrease in the desirability of land in the RAA for TLE selection

- Changes to vegetation cover of areas of Crown land traversed by the PDA

Following the implementation of mitigation, the residual effects of the project on important sites have been characterized as follows:

- Direction: adverse
- Magnitude: moderate during construction; low during operations and maintenance when ground disturbance is low, and activities are infrequent
- Geographic extent: PDA in relation to direct effects to important sites; effects related to perceived quality effects to important sites such as Crown land with potential for TLE selection, may extend to the RAA
- Timing: moderate sensitivity
- Duration: long-term
- Frequency: continuous during construction; intermittent during operations and maintenance
- Change: irreversible

7.2.3.5 Change to the experience of harvesting and visiting important sites

The project has the potential to affect the experience of harvesting and visiting important sites in the project area during construction and operations and maintenance. Experience, in this context, refers to how the area looks, sounds, and feels.

It is important to acknowledge that changes to access and availability discussed above in Sections 7.2.3.2, 7.2.3.3, and 7.2.3.4 inherently effect experience of harvesting and visiting important sites. This section will focus on additional pathways through which experience and enjoyment may be affected by the project.

The pathways predicted to result in a change in the experience of harvesting and visiting important sites in the project area are described below followed by mitigation measures and conclusions about the residual effects to experience after mitigation has been implemented.

<u>Project pathways</u>

The project may affect the experience of First Nations people and Red River Métis citizens harvesting and visiting important sites in the project areas through project activities that cause noise, changes to visual aesthetics, and stress about the presence of the project. First Nations peoples and Red River Métis citizens have shared that these alterations to the land and sensory disturbances, both visual and auditory, can change traditional harvesting experiences and decrease preference for harvesting on lands around transmission line developments.

Throughout construction, there will be an increase in noise or change in the types of noise in the project area resulting from activities such as the mobilization of equipment, right-of-way clearing, installation of tower foundations, developing and using access routes, creating, and using marshalling/fly yards, and transmission tower construction.

Sensory disturbances from construction activities are expected to be short-term. During operations and maintenance, the noise generated is expected to be far less than during the construction phase. Noise associated with maintenance activities will be intermittent and temporary and contained mostly within the PDA. During these activities, increased traffic, noise, and other sensory and environmental conditions will change experience and enjoyment of place.

During construction, vegetation clearing and grubbing of the right-of-way is the primary pathway for a direct and measurable change in aesthetics, which may indirectly effect change in experience of harvesting and enjoyment of place. Areas intersected by the Project areas may be altered so as the area is no longer accessible, available, or appropriate for intended cultural use activities.

Once the project is in operation, the auditory experience of harvesters and First Nations people and Red River Métis citizens visiting important sites may change in areas very close to the transmission line due to the potential for the presence of corona discharge, which is a hissing or crackling noise that sometimes occurs with high voltage transmission lines.

Sagkeeng Anicinabe First Nation shared concerns about noise-related impacts to target species along transmission lines, that would impact harvesting activities (Sagkeeng Anicinabe First Nation, 2023).

Some individuals may choose to no longer use a harvesting area because they find the sound unpleasant, as some prefer to harvest

> “where it is quiet … where there is no development” (Manitoba Métis Federation, Birtle MLUOS, 2017).

The visual experience of harvesting and visiting important sites will also change due to the presence of new cleared right-of-way and the transmission lines. The loss of vegetation associated with clearing the right-of-way and the presence of the new transmission line will result in changes related to aesthetic conditions of the PDA and LAA. Aesthetic conditions include visual qualities and auditory disturbance (noise).

Visual qualities resulting from the project may be perceived differently by different individuals and may depend on:

- The physical relationship of the viewer and the transmission line (distance and line of sight).
- The activity of the viewer (e.g., living in the area, driving through, sightseeing).
- The contrast between the transmission line and the surrounding environment.

Changes to aesthetic conditions may affect First Nations people and Red River Métis citizens sense of place, defined as peaceful enjoyment of lands and waters without sensory disturbances, stress, or harassment, and their emotional and spiritual attachment to culturally important places. To experience a sense of place it is critical to have the ability to enjoy the surroundings without sensory disturbances, stress, or harassment (Cedar 2022).

Following construction, the right-of-way will be reclaimed. However, vegetation will be maintained in a different state than before construction so there will be an ongoing change to the appearance of the area through operations and maintenance.

The experience of the area for harvesters and those visiting important sites may also be altered by changes to real or perceived health concerns and stress associated with the presence of the project.

Sagkeeng Anicinabe First Nation noted there would be a loss of use of preferred areas for hunting and trapping due to safety concerns and restrictions on access. Sagkeeng Anicinabe First Nation also shared that contamination from development in the area has changed the quality of animals harvested by Sagkeeng members (Sagkeeng Anicinabe First Nation, 2023).

During construction and during periodic maintenance activities through the operations phase, there may be a localized change to air quality, including the generation of dust (from disturbed soils becoming airborne) and increased emissions (particulate matter) from vehicles and machinery. This will be most pronounced during clearing of the right-of-way, foundation installation, and tower erection, and conductor stringing, but are expected to be minor, resulting in temporary, short-term reductions in local air quality in areas close to construction sites that are unlikely to result in exceedances of Manitoba’s Ambient Air Quality Guidelines.

First Nations people and Red River Métis citizens may choose to avoid sites because of concerns over the access and safety of resources, which has the potential to affect cultural continuity and knowledge transfer. Herbicides will not be used during the construction phase of the project, so there is no measurable deposition pathway for change to traditional food quality because of construction phase activities. Dust generated during construction activities is expected to be minimal, localized, and short-term in nature. While dust may have a temporary physical effect on vegetation close to the construction area (via smothering), dust is not considered to be a meaningful pathway for a change in traditional food quality. However, the implications of perceived environmental health (including safety of traditional food consumption) for local First Nations people and Métis citizens, is unknown.

Herbicides are an important tool in integrated vegetation management used to reduce impacts to the environment during maintenance events. Herbicides are not used indiscriminately. Herbicides are used to target tall growing species, leaving shorter species such as hazel, alder and lower growing shrubs and grasses to flourish. By encouraging lower growing plants, taller trees are less likely to grow. Herbicides can be applied to individual tree stems or the foliage depending on the density of trees in the area. We do not apply herbicides annually to a right-of-way. Generally, herbicides are applied at a 5-to-8-year interval. The herbicides used by Manitoba Hydro are themselves selective and only affect broadleaf plants (e.g., *trembling aspen* and *balsam poplar*) leaving other nearby trees and plants to grow and thrive. Manitoba Hydro uses herbicide formulations that present negligible risk to humans, fish, aquatic invertebrates, terrestrial insects, mammals, and birds. If specific location of concern is shared, we can consider specific protection measures under the Environmental Protection Plan to protect locations, features, areas, activities, or facilities that are ecologically, socially, or culturally important or sensitive sites from herbicide use.

Some people also choose to not use the immediate area under transmission lines due to their understanding that the sound created by transmission lines is unsafe. A similar change in individual preferences may occur with harvesters who share concerns related to electromagnetic fields (EMF) or a change in the visual landscape.

The perception of risk from EMF and associated stress related to EMF concerns may negatively impact the experience of visiting an important site.

Through engagement, we heard concerns about transmission lines creating increased accessibility to the public, which can result in illegal hunting and trespassing.

Loss or diminishment of experience of harvesting and important sites during construction may have long-term implications on cultural vitality of First Nations and Métis citizens, because of loss or diminished opportunity for the intergenerational transmission of cultural and Indigenous Knowledge.

Experience and enjoyment important sites, including petroforms, burials, habitation sites and access ways may be affected by continued project operation and maintenance activities along the right-of-way and around Rice Lake, as reported by Peguis First Nation (PSCPI 2023).

Potential loss of access to and availability of important sites can have underlying implications for the cultural vitality of First Nations people and Red River Métis citizens long-term, especially in areas where the experiential intergenerational transmission of knowledge and cultural use activities are no longer possible.

Changes to experience and enjoyment while harvesting or visiting important sites may cause effects to the health and well-being First Nations people and Métis citizens.

As stated in Section 7.14, connections to the land and environmental stewardship are also determinants for Indigenous Peoples' health. Therefore, potential diminishment of harvesting experiences and enjoyment of place can have underlying health implications for First Nations people and Métis citizens' if experiencing a loss or diminishment of enjoyment during project construction. Human relationships with the land are both directly and indirectly connected to health and well-being, and access to a functioning ecosystem available for harvesting and important sites is determinant for human health and well-being.

Additional discussion on changes to aesthetics and auditory disturbances resulting from the project and how they relate to human health is included in Section 7.14 Well-being (human health).

Mitigation

We had some ability to mitigate effects to experience of harvesting and vising important sites through the routing process. Areas, where the presence of the transmission line would be most disruptive to the experiences of First Nations people and Métis citizens, were considered through the routing process indirectly through First Nations people and Red River Métis citizens sharing feedback about locations of concern and routing preferences. Aligning portions of the final preferred route with an existing right-of-way and adjacent to other existing sources of anthropogenic disturbance (e.g., PR 520 and PR 211) helps minimize some effects to experience relative to route options.

Project effects on aesthetics cannot be fully avoided given the abundance of native upland vegetation in the project region. However, potential project effects have been reduced by selecting a route located parallel to existing linear features or within existing utility corridors.

Project-specific mitigation measures to avoid or reduce the potential effects of the project on the experience of harvesting and visiting important sites are described below. These mitigations are in addition to all the mitigation recommended in Section 7.14 (Well-being). Several of these mitigations overlap with mitigations recommended through First Nation and Métis engagement (marked with an *).

- Mud, dust, and vehicle emissions will be managed in a manner that allows for safe and continuous public activities near construction sites
- Conducting construction activities as per applicable noise bylaws
- Continuing to address concerns related to EMF and providing factual, science-based information to concerned individuals and organizations
- Except for reflective bird diverters at areas of high bird-wire collision potential, non-reflective galvanized tower materials are used to reduce the visual contrast with background
- Where practical, towers will be sited to limit their visibility from viewpoints of concern identified through engagement
- Efforts will be made during the design process to locate transmission towers to reduce visual interference in areas identified during engagement
- Manitoba Hydro will develop an approach for inclusion of Indigenous content in the project tender package (e.g., cultural awareness training and hiring provisions)
- Manitoba Hydro will provide notification through the FNMEP prior to construction start and any implode use

Residual effects

After mitigation, predicted residual effects on experience of harvesting and visiting important sites include:

- Changes to the visual appearance of the project area
- Increased noise during construction and during maintenance activities
- Concerns about the perceived safety of harvesting and visiting the PDA due to concerns about EMF, herbicide use, and the safety of foods harvested in the PDA
- Effects to mental health due to the presence of the line and the experience of other project effects and perceived health risks

Following the implementation of mitigation measures described above, residual effects for change in experience of harvesting and visiting important sites are characterized by the following:

- Direction: adverse
- Magnitude: moderate

- Geographic extent: LAA
- Timing: timing sensitivity will vary depending on the nature of the activities
- Duration: long-term
- Frequency: continuous
- Change: irreversible

7.2.4 Summary of residual effects

This section summarizes the project effects analysis for change in access to harvesting areas and important sites, changes to harvested resources, changes to important sites, and change to the experience of harvesting and visiting important sites.

Table 7-4: Project residual effects on harvesting and important sites

	Residual effects characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in access to harvesting areas and important sites	A	M/L	LAA	n/a	LT	C/IR	R
Change in harvested resources	A	M/L	LAA	HS	LT	C	I
Change in important sites	A	M/L	PDA/ RAA	MS	LT	C/IR	I
Change in experience of harvesting and visiting important sites	A	M	LAA	n/a	LT	C	I

KEY

Project Phase C: Construction O: Operation D: Decommissioning	Geographic Extent: PDA: Project Development Area	Frequency: S: Single event IR: Irregular event R: Regular event

Table 7-4: Project residual effects on harvesting and important sites

Residual effects characterization								
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility	
Direction: P: Positive A: Adverse N: Neutral Magnitude: N: Negligible L: Low M: Moderate H: High		LAA: Local Assessment Area RAA: Regional Assessment Area Timing NS: No sensitivity MS: Moderate sensitivity HS: High sensitivity Duration: ST: Short-term MT: Medium-term LT: Long-term N/A: Not applicable			C: Continuous Reversibility: R: Reversible I: Irreversible			

characterizes the environmental effects of the project on harvesting and important sites using criteria defined in Table 7-2 (Section 7.2.1.5). The determination of significance is discussed in Section 7.2.1.6. The project will decrease access, change harvesting areas, important sites, and experience of harvesting and visiting important sites in the PDA extending to the LAA and in some cases the RAA through various direct and indirect pathways such as vegetation removal and alteration, as well as through sensory disturbances.

Table 7-4: Project residual effects on harvesting and important sites

Project Phase	Residual effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in access to harvesting areas and important sites	A	M/L	LAA	n/a	LT	C/IR	R
Change in harvested resources	A	M/L	LAA	HS	LT	C	I
Change in important sites	A	M/L	PDA/ RAA	MS	LT	C/IR	I
Change in experience of harvesting and visiting important sites	A	M	LAA	n/a	LT	C	I

KEY

Project Phase C: Construction O: Operation D: Decommissioning Direction: P: Positive A: Adverse N: Neutral Magnitude: N: Negligible L: Low M: Moderate H: High	Geographic Extent: PDA: Project Development Area LAA: Local Assessment Area RAA: Regional Assessment Area Timing NS: No sensitivity MS: Moderate sensitivity HS: High sensitivity Duration: ST: Short-term	Frequency: S: Single event IR: Irregular event R: Regular event C: Continuous Reversibility: R: Reversible I: Irreversible

Table 7-4: Project residual effects on harvesting and important sites

Residual effects characterization							
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
		MT: Medium-term LT: Long-term N/A: Not applicable					

7.2.5 Assessment of cumulative effects on harvesting and important sites

The RAA and broader surrounding region have changed substantially since colonialism in terms of the physical landscape and the ability of First Nations people and Red River Métis citizens to practice rights-based activities in the area. Today, the RAA supports a broad range of land uses: agricultural, residential, recreational, and industrial development; and infrastructure, including rail lines, provincial highways, roads, pipelines, and various transmission lines. Other sites, including generating stations along the Winnipeg River (e.g., Pointe du Bois, Slave Falls, Seven Sisters), water treatment facilities, wastewater treatment facilities, and research facilities (e.g., Whiteshell Laboratories) are also situated within the RAA. These developments continue to have lasting effects on the practice of right-based activities in the RAA.

Through engagement, understanding potential cumulative effects was identified as an area of concern and interest. We heard concerns that more development may mean less land and resources that future generations will have for sustenance and activities that support cultural continuity. We also heard that there is a need to look further into the future, so we don't repeat mistakes of the past that continue to cause harm today.

Sagkeeng Anicinabe First Nation has shared that their "rights and future generations are intrinsically linked to the health of the environment" and that "An impact to the environment is an impact to our future generations and our rights." (Sagkeeng Anicinabe First Nation 2023).

Sagkeeng Anicinabe First Nation shared that during a meeting held with their Community Liaison Committee meeting on January 9, 2023, participants spoke to a context of ongoing cumulative impacts to Sagkeeng rights due to historic and existing Hydro developments, from which they continuously feel ongoing impacts such as fluctuating water levels, erosion, loss of land and access, etc. This demonstrates the lack of trust members have with the proponent and province given the existing impacts they've already experienced from Hydro works (Sagkeeng Anicinabe First Nation, 2023).

In our assessment, we consider effects to rights-based activities, not effects to rights themselves. We understand that there are broader issues that are not project-specific but are related to Manitoba Hydro and the Crown, and we encourage continued communication with Sagkeeng Anicinabe First Nation on these issues.

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC; and
- a residual effect could interact with residual effects of other past, present, or reasonably foreseeable future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

In the case of harvesting and important sites relating to the project, both conditions apply. As presented in the summary of residual effects Section 7.2.4, we anticipate the project will result in residual effects to access to harvesting areas and important sites, changes to harvested resources, changes to important sites, and changes to the experience of harvesting and visiting important sites. Therefore, a cumulative effects assessment follows.

Section 6.1 describes the historical and cultural setting of the project, including past and current development and use of the area. The timeline graphic in Section 6.1.2 provides an overview of past events that have affected the land and relationship between First Nations people and Red River Métis citizens with the land, while Section 6.1.3 and Section 6.1.4 discuss the contemporary landscape of First Nation and Métis land use.

Sagkeeng Anicinabe First Nation shared that "changes to the physical landscape of Sagkeeng's territory have accompanied significant changes to the cultural landscape of Anicinabe people" (Sagkeeng Anicinabe First Nation, 2023, s4.3).

This section builds on the setting presented in Section 6.1 and considers reasonably foreseeable future physical activities to assess cumulative effects on harvesting and important sites.

7.2.5.1 Project residual effects likely to interact cumulatively

Table 7-5 presents the project and physical activities inclusion list, which identifies other projects and physical activities that might act cumulatively with the project. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-1: Interactions with the potential to contribute to cumulative effects

Other Projects and Physical Activities with Potential for Cumulative Effects	Effects			
	Change in access to harvesting areas and important sites	Changes to harvesting areas	Changes to important sites	Change in the experience of harvesting and visiting important sites
Existing/Ongoing Project Activities				
Agriculture (crop and livestock)	✓	✓	✓	✓
Non-Indigenous Resource Use (hunting, trapping, fishing)	✓	✓	✓	✓
Recreational Activities (increase foot traffic for canoeing, hiking, ATVing, snowmobiles etc.)	✓	✓	✓	✓
Infrastructure (existing rail lines, provincial highways and roads, pipelines, water treatment facilities etc.)	✓	✓	✓	✓
Transmission lines (P3/P4 and R1/R2 from Pointe du Bois; S2 at Slave Lake; SK1, SG12, SR3, SW1,SW2,SW3,SW4, ST5,ST6 at Seven Sisters, Whiteshell, McArthur Falls, Star Lake and Transcona; K21W,K22W at Whiteshell)	✓	✓	✓	✓
Nuclear Power (Whiteshell Laboratories)	✓	✓	✓	✓
Project-Related Physical Activities				

Table 7-5: Interactions with the potential to contribute to cumulative effects

Other Projects and Physical Activities with Potential for Cumulative Effects	Effects: Change in access to harvesting areas and important sites	Effects: Changes to harvesting areas	Effects: Changes to important sites	Effects: Change in the experience of harvesting and visiting important sites
Construction-related vegetation, wetland and wildlife habitat removal	✓	✓	✓	✓
Operations and maintenance of ROW (herbicide/weed treatment, vegetation maintenance)	✓	✓	✓	✓
Future Project and Activities				
Slave Falls Generating Station (Slave Falls 7-Bay Sluiceway Life Extension Project)	✓	✓	✓	✓
Nuclear Power (Whiteshell Laboratories) - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	-	-	-	-

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– = Interactions between the residual effects of other projects and residual effects of the project are not expected.

Project effects that are not likely to interact cumulatively with residual effects of other projects and activities (no check mark in Table 7-5) are not discussed further. The assessment of the cumulative effects that are likely to result from the project in combination with other projects and physical activities are discussed in subsequent sections.

7.2.5.2 Cumulative effects pathways for change in access to harvesting areas and important sites

Many of the past and current projects and activities in the RAA (Table 7-5) have contributed to a change in access to harvesting areas and important sites in the RAA. The primary pathways of these effects are through permanent removal of areas previously accessed for harvesting and practicing other rights-based activities, by imposing access restrictions, and by altering access routes that affect who may access the area and how the area is accessed.

The project has the potential to contribute cumulatively to changes in access in the RAA through the residual effects identified in Section 7.2.3.2, mainly the localized access restrictions to the PDA during construction, intermittent localized access restrictions to the PDA during operations and maintenance, and the potential creation of new access or alteration to access routes bringing increased traffic to the area through operations and maintenance.

Future projects and activities have the potential to interact cumulatively with the project if their activities result in loss of access to important trails, travel ways that further reduce connectivity and access to harvesting and important sites.

We understand that hindrance to access to land used for right-based activities can contribute to long-term implications on the health, well-being, and cultural vitality of First Nations people and Métis citizens.

7.2.5.3 Mitigation for cumulative effects on change in access to harvesting areas and important sites

Mitigation measures that will help avoid, reduce, or eliminate project environmental effects on change in access to harvesting areas and important sites were presented in Section 7.2.3.2. These measures will also reduce the cumulative effects on access to harvesting areas and important sites. Additional mitigation measures proposed to reduce the cumulative environmental effects on change in bird habitat availability include the following:

- Manitoba Hydro has considered the existing setting of the project and cumulative effects assessment to include all effects to harvesting and important sites since prior to colonialism (i.e. the historical temporal limit of the assessment has been expanded to provide a more robust historical and cultural context that traditional assessments).

- Manitoba Hydro will continue to consider feedback related to mitigation for how the project contributes cumulatively to changes to access to harvesting areas and important sites in the RAA.
- For Manitoba Hydro projects occurring in the same geographic area, coordinate access requirements to reduce the need to construct additional access roads in areas of harvesting importance or known important sites.

7.2.5.4 Cumulative effects pathways for changes to harvested resources

Past and current projects and activities in the RAA (Table 5-2) have contributed to changes to harvested resources in the RAA. The primary pathways of these effects are loss of land appropriate for harvesting (including Crown land), fragmentation of wildlife and bird habitat, disruption of fish habitat, changes in the abundance of natural resources important for sustenance and cultural use activities including wildlife, bird, fish, traditional, plants, and medicines of cultural importance.

The project has the potential to contribute cumulatively to changes to harvested resources in the RAA through the residual effects identified in Section 7.2.3.3, mainly changes in the abundance and types of harvesting resources available and the associated potential change in harvesting success rate and the amount of time and effort required for First Nations and Red River Métis citizens to carry out harvesting activities.

Future projects and activities in the RAA have the potential to interact cumulatively with the project if their activities result in the removal or alteration of a harvested resource through:

- development and fragmentation of intact patches of vegetation or wetlands resulting in a decrease in abundance and availability of culturally important wildlife species and birds
- vegetation removal that reduces availability of traditional plant species and medicines
- an increase in the density of linear features (e.g., access roads, rights-of-way)
- changes in environmental conditions (e.g., light, soil moisture) that may result in residual effects on wetlands, plant diversity, abundance, and availability
- indirect loss of plants of importance to First Nations peoples and Red River Métis citizens from the introduction or establishment of regulated weeds and non-native invasive species

Potential future projects in the RAA may result in additional loss of available harvestable species and important sites, which can have indirect underlying health implications for First Nations people and Red River Métis citizens if experiencing a loss of available resources during and after the project.

We understand that disruption to harvested resources can result in indirect underlying health implications for First Nations people and Red River Métis citizens who may rely on the availability of wildlife, bird, fish, traditional plants, and medicines in the RAA for sustenance and cultural purposes critical to well-being.

7.2.5.5 Mitigation for cumulative effects on changes to harvested resources

Mitigation measures that will help avoid, reduce, or eliminate project effects on changes to harvested resources were presented in Section 7.2.3.3. These measures will also reduce the cumulative effects on changes to harvested resources. Additional mitigation measures proposed to reduce the cumulative environmental effects on changes to harvested resources include the following:

- Manitoba Hydro has considered the existing setting of the project and cumulative effects assessment to include all effects to harvesting and important sites since prior to colonialism (i.e., the historical temporal limit of the assessment has been expanded to provide a more robust historical and cultural context that traditional assessments).
- Manitoba Hydro will continue to consider feedback related to mitigation for how the project contributes cumulatively to changes to access to harvested resources in the RAA.
- Based on the FNMEP and experience on past projects, Manitoba Hydro will further discuss interests in First Nation and Métis monitoring with First Nations and the MMF.

7.2.5.6 Cumulative effects pathways for changes to important sites

For the purposes of this assessment, important sites have been defined as tangible and intangible sites considered important to First Nations peoples and Red River Métis citizens such as sites or objects of cultural, historical, spiritual, or sacred importance and other sites such as unoccupied Crown land and land for Treaty Land Entitlement opportunities. In this assessment, important sites also include the practice of ceremony, and the places ceremony may occur.

Past and current projects and activities in the RAA (Table 5-2) have contributed to changes to important sites. The primary pathways of these effects are physical disruption of sites or objects important to First Nations people and Red River Métis citizens through the disturbance of ground (soil) or landscape features, the development of Crown land that would have otherwise been available for fulfillment of Treaty Land Entitlement, and the alteration of other important sites so that they are no longer culturally appropriate for former cultural or ceremonial uses.

The project has the potential to contribute cumulatively to changes to important sites in the RAA through the residual effects identified in Section 7.2.3.4, mainly that unknown sites of heritage and cultural resources or other cultural sites may be encountered by the project (mainly through vegetation clearing and activities involving ground disturbance) and that the presence of the project may decrease the desirability of land in the RAA for Treaty Land Entitlement selection or for ceremonial use. The assessment of residual project effects on heritage resources specifically (Section 7.3) determined that the project will decrease the number of heritage resources in the PDA by causing ground disturbances.

Future projects and activities in the RAA have the potential to interact cumulatively with the project if their activities include ground disturbance, the alteration to vegetation or landscape, or the development of Crown land otherwise been available for fulfillment of Treaty Land Entitlement.

7.2.5.7 Mitigation for cumulative effects on changes to important sites

Active monitoring of project potential effects on important sites, in particular heritage resources, will occur during construction as described in the mitigation measures committed to in Section 7.3 (Heritage resources). Any effects will be addressed through implementation of the mitigation measures documented in the project specific Construction Environmental Protection Plan and the Culture and Heritage Resources Protection Plan. In addition, other proponents in the project area are also responsible for reporting project activities to Manitoba Environment and Climate and the Historic Resources Branch. These regulators can inform Manitoba Hydro if it appears that there are unanticipated adverse cumulative effects occurring. The Historic Resources Branch also reviews land-based developments through the heritage resource impact assessment program as mandated by the Heritage Resources Act. Therefore, additional mitigation for cumulative effects is addressed by the provincial regulators as they determine whether future projects will require heritage investigations.

Mitigation measures that will help avoid, reduce, or eliminate project effects on changes to important sites were presented in Section 7.2.3.4. These measures will also reduce the cumulative effects on changes to important sites. Additional mitigation measures proposed to reduce the cumulative environmental effects on changes to important sites include the following:

- Manitoba Hydro has considered the existing setting of the project and cumulative effects assessment to include all effects to harvesting and important sites since prior to colonialism (i.e., the historical temporal limit of the assessment has been expanded to provide a more robust historical and cultural context that traditional assessments).
- Manitoba Hydro will continue to consider feedback related to mitigation for how the project contributes cumulatively to changes to important sites in the RAA.
- Based on the FNMEP and experience on past projects, Manitoba Hydro will further discuss interests in First Nation and Métis monitoring with First Nations and the MMF.
- Manitoba Hydro will support opportunities for representatives from engaged First Nations and the MMF to participate in monitoring related to important sites during relevant pre-construction and construction activities.

7.2.5.8 Cumulative effects pathways for change to the experience of harvesting and visiting important sites

Past and current projects and activities in the RAA have contributed to changes to the experience of harvesting and visiting important sites in the RAA. The primary pathways of these effects are sensory (auditory and visual) disruption of the landscape and a decreased preference or sense of comfort with practising rights-based activities in the vicinity of the project or activity resulting from various concerns and perceived risks.

The project has the potential to contribute cumulatively to changes to the experience of harvesting and visiting important sites in the RAA through the residual effects identified in Section 7.2.3.5, mainly through the creation of noise, changes to the visual appearance of the landscape, and concerns about safety resulting from the presence of the line (e.g., EMF, corona discharge, herbicide use). Any residual cumulative effects to access to harvesting areas and important sites or the availability/presence of harvested resources and important sites discussed above will also inherently influence the experience of harvesting or visiting important sites. For example, reduced access or availability of resources may result in First Nations people and Red River Métis citizens having to travel further and invest more time to harvest than they would have before the project.

Future projects and activities in the RAA have the potential to interact cumulatively with the project if their activities result in additional sensory alteration of the landscape or if they create additional concerns and stress for First Nations people and Red River Métis citizens that may decrease preference for harvesting or visiting important sites in the area.

As stated in Section 7.14, connections to the land and environmental stewardship are also determinants for human health and well-being. Changes to the landscape, including aesthetics, noise (increase traffic, pedestrians) and environmental conditions (air quality, water quality) may also have long-term implications for the health and well-being of First Nations people and Métis citizens.

7.2.5.9 Mitigation for cumulative effects on change to the experience of harvesting and visiting important sites

Mitigation measures that will help avoid, reduce, or eliminate project effects on changes to the experience of harvesting and visiting important sites were presented in Section 7.2.3.5. These measures will also reduce the cumulative effects on changes to the experience of harvesting and visiting important sites. Additional mitigation measures proposed to reduce the cumulative environmental effects on changes to the experience of harvesting and visiting important sites include the following:

- Manitoba Hydro will continue to consider feedback related to mitigation for how the project contributes cumulatively to changes to the experience of harvesting and visiting important sites in the RAA.

7.2.5.10 Summary of cumulative effects

This section summarizes the cumulative effects analysis for change to harvesting and important sites. Table 7-6 summarizes Manitoba Hydro's interpretation of potential residual cumulative effects on important sites due to the D83W project and other current and future projects on harvesting and important sites.

Table 7-6: Residual cumulative effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effects on changes to access to harvesting areas and important sites							

Table 7-6: Residual cumulative effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect	A	L	PDA	MS	LT	IR	R
Contribution from the Project to the Residual Cumulative Effect	The Project will contribute to loss of access to harvesting areas and important sites, although on a temporary basis. This includes physical barriers (gates, fences) blocking access to harvesting and important sites (including petroforms, burials and cultural sites) temporarily during active construction and occasionally for maintenance activities during operations. Access to harvestable resources may increase due to widening of ROW (i.e., species drawn to fragmented areas/edge effects), which may be a positive effect on access for First Nations people and Red River Métis citizens if resources are not also affected by increased pressure and access from non-indigenous land users.						
Residual cumulative effect on changes to harvested resources							
Residual cumulative effect	*A*	L	LAA	MS	ST	C	R
Contribution from the Project to the Residual Cumulative Effect	The Project will contribute to changes to harvested resources including wildlife, birds, traditional plants, and medicines of cultural importance. In areas where vegetation (wetland, grass, forest) is removed, altered, or reclaimed in a different state there be long-term, irreversible effects on the availability of harvested resources, which may extend into portions of the LAA.						
Residual cumulative effect on changes to important sites							
Residual cumulative effect	A	L	PDA	MS	LT	IR	I

Table 7-6: Residual cumulative effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Contribution from the Project to the Residual Cumulative Effect	The project will contribute to changes to important sites through physical disruption of sites or objects important to First Nations people and Métis citizens during ground and landscape disturbance and the development of Crown land that may have otherwise been available for Treaty Land Entitlement selection.						
Residual cumulative effect on changes to the experience of harvesting and visiting important sites							
Residual cumulative effect	*A*	L	LAA	NS	LT	C	I
Contribution from the Project to the Residual Cumulative Effect	The project will contribute to changes to the experience of harvesting and visiting important sites in the RAA by causing sensory disruption (auditory and visual) and effecting the desirability of the LAA for rights-based activities.						

Table 7-6: Residual cumulative effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

KEY

Direction:
P: Positive
A: Adverse
N: Neutral

***Magnitude**:*
NMC: No Measurable Change
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area

Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

N/A: Not applicable

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous

Reversibility:
R: Reversible
I: Irreversible

7.2.6 Determination of significance

It is important to understand the full context of impacts to First Nation and Métis values and ways of life, over time. Manitoba Hydro understands that views on how to understand and describe cumulative effects may differ based on cultural backgrounds and preferences. Through the FNMEP, Manitoba Hydro understood that in addition to the physical activities, a more inclusive list of projects, policies, legislation, and world events contribute to how cumulative effects are experienced by First Nation people and Métis Citizens in the area.

A robust discussion of how residual effects on harvesting and important sites are likely to interact cumulatively with other physical activities occurring in the regional assessment area is included in Section 7.2.4. After considering the project's residual effects, and the overlap with existing and future projects, Manitoba Hydro concludes that the project will not result in significant effects to the biophysical or human environment.

We recognize that different nations, or individuals may place different values on different rights-based activities and that it would not be appropriate to assume that the residual effects will impact all First Nations people and Red River Métis citizens in a similar manner.

Manitoba Hydro is committed to continue sharing information with landowners, Indigenous communities, the public and committed to continue working with interested parties through implementation of the environmental protection program.

7.2.7 Prediction confidence

Prediction confidence in the assessment of effects on harvesting and important sites is low. This prediction confidence assignment reflects the available information regarding harvesting and important sites by affected First Nations and Red River Métis citizens during project engagement and a review of publicly available literature containing information about harvesting and important sites in the project area. We are aware that there is likely harvesting activity and important sites throughout the RAA that we are not yet aware of and have considered this assumption in this assessment.

If additional engagement information is received, it will be reviewed against the results of this assessment and incorporated in the regulatory process and project planning as appropriate. Prediction confidence also reflects the understanding of applicable mitigation measures and reliance on assessments of other VCs of relevance to harvesting and important sites. Given the qualitative and subjective nature of assessing harvesting and important sites, specifically the experience of harvesting and enjoyment of place, the views of First Nations people and Red River Métis citizens may differ from the findings of this assessment.

7.2.8 Follow-up and monitoring

Manitoba Hydro will continue to work with interested First Nations and the MMF to mitigate the above noted effects. The Environmental Protection Program (EPP) is a framework for implementation, management, monitoring and evaluation of protection activities in keeping with environmental effects identified in environmental assessments, regulatory requirements, and public expectations. The EPP prescribes measures and practices to avoid and reduce adverse environmental effects (e.g., wildlife reduced risk timing windows, setbacks and buffers for sensitive habitat).

Manitoba Hydro will provide opportunities for First Nations and the Manitoba Métis Federation to identify additional sensitive sites to help inform the EPP.

Manitoba Hydro will reach out to First Nations and the MMF to invite them to observe construction activities at a frequency commensurate with construction activities and will reach out to arrange pre- and post-construction ceremonies for those interested.

7.3 Heritage resources

Heritage resources are defined in the *Heritage Resources Act* (Government of Manitoba 1986) as "a heritage site, a heritage object, and any work or assembly of works of nature or of human endeavor that is of value for its archaeological, paleontological, pre-historic, historic, cultural, natural scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof."

Non-forensic human remains are also defined within the *Heritage Resources Act* as "remains of human bodies that in the opinion of the minister have heritage significance and that are situated or discovered outside a recognized cemetery or burial ground in respect of which there is some manner of identifying the persons buried therein."

Heritage resources are managed by Manitoba's Historic Resources Branch of Culture, Heritage, and Tourism. Any development that has the potential to disturb heritage resources requires a Heritage Resource Impact Assessment (HRIA) to determine location, size, and mitigation procedures for any potential heritage resources. Human remains that have become exposed through human activity such as development or forces of nature such as erosion fall under the purview of the Historic Resources Branch of Sport, Culture and Heritage.

The treatment of human remains is detailed and regulated within the *Policy Respecting the Reporting, Exhumation and Reburial of Found Human Remains* of 1987. If the human remains are determined to be forensic in nature, then *The Fatality Inquiries Act* of 1990 takes precedence and the remains fall under the jurisdiction of the corresponding police force.

7.3.1 Scope of the assessment

7.3.1.1 Regulatory and policy setting

The assessment of potential Project-related effects on heritage resources are governed by:

- *Heritage Resources Act* (Government of Manitoba 1986) is administered by the Historic Resources Branch (HRB) of Culture, Heritage, and Tourism. The act states that if the potential to adversely affect heritage resources in a project area is identified, further investigation as a Heritage Resource Impact Assessment (HRIA) is usually required.
- *Managing Our Heritage Resources Impact Assessment* (Government of Manitoba 1990) describes the requirement of an HRIA. It states that an HRIA is a "written evaluation of the effect that a proposed development project may have upon heritage resources or human remains at a site. The assessment outlines the project, describes the cultural and natural context of the development, identifies the impact of the project, and recommends ways to avoid or lessen its impact on heritage resources or human remains."
- The *Policy Respecting the Reporting, Exhumation and Reburial of Found Human Remains* (Manitoba, 1987) along with the *Heritage Resources Act* (Government of Manitoba 1986) governs the treatment of non-forensic human remains.

7.3.1.2 Consideration of issues raised during engagement

Project engagement introduced several comments and concerns with the development regarding heritage resources as follows:

Peguis First Nation noted the importance of the Lee River as a transportation route. The Lee River was a heavily used site as it was not as dangerous as the Winnipeg River to travel on, so the Lee River distribution supply center area has high archaeological potential. If the line crosses the river, Peguis First Nation noted that intensive testing would be required for each bank.

The construction of lay down yards, access roads, and other infrastructure along the project concerned Peguis First Nation with a particular importance around the Lee River distribution supply centre and it was expressed that monitoring may be required around this area. The construction of lay down yards, access roads and other infrastructure will occur with the transmission line component, but the locations are unknown at this point.

Peguis First Nation expressed that intensive heritage testing will be required along section 1 and 2 of the transmission line where it needs to be widened as this likely would not have been tested in the past. A question regarding the selection of the project archaeologist was raised. It was noted that the heritage work conducted by the project archaeologist should be thought of as archaeology and First Nations and Métis groups working together from the beginning of the project in terms of monitoring. This would include having First Nations participate as part of the HRIA by assisting with unknown site identification and helping with trust moving forward.

During the in-person meeting at engagement circle 1, a question was raised regarding whether protocols for protecting sacred areas and rare plants exists. Field studies are conducted in the project area to survey rare plants. First Nations and Métis groups were contacted to understand sacred areas and sacred areas are considered during routing and protected during the project.

A concern at engagement circle 1 was raised by multiple participants regarding the waterways in the study area. There were concerns shared that the waterways were a highway for Indigenous peoples and likely will have multiple archaeological sites. It was noted that the archaeological study of the area should include in-depth interviews with Elders and Knowledge Holders to provide a more complete understanding of the cultural landscape. They shared that the interviews should be conducted by the respective communities. The high archaeological potential of line segments 13, 17, and 28 was noted as they traverse rivers. There were concerns shared that the project has the potential to impact heritage resources at these sections of the line.

A public participant noted that the project has the potential to impact harvesting sites and resources. The lands offer traditional sustenance such as berries, mushrooms, medicinal plants, as well as the heritage resources. Manitoba Hydro heard that Indigenous people ought to be listened to protect the cultural sites important to them.

During engagement circle 2, concerns were raised regarding the regulatory process and there was a request for a TLRU study. The concerns regarded the archaeological field methods followed for the project such as the shovel test totals and sample sizes. A preference was also expressed to gather as much information as possible about culture and heritage about the relationship Indigenous people have with the land to augment the tangible cultural heritage.

A concern at engagement circle 2 was also expressed about the potential project effects on important heritage sites/heritage resources. This includes the potential to affect burials along the Lee River as there are known burials in the area and spiritual sites such as Manito Ahbee (the place where the Creator sits), Bannock Point and other petroforms. A recommendation was made to use non-invasive land assessment tools with the numerous heritage resources present within the area. The area has appreciable LiDAR which was conducted with a drone and provides a non-invasive way to check the area for petroforms due to the rocks being highly visible from the accumulated heat. It should be noted that the Winnipeg River is a connector between many different topics/components of the environment and the impact to traditional land use should considered.

A concern was expressed about having clear guidance developed about how heritage findings must be addressed if found during construction. There is a concern that construction workers won't be able to identify heritage resources. This will lead to heritage resources being destroyed.

Seymourville expressed concern regarding the impacts and mitigative procedures for heritage resources. The concern includes the archaeological/cultural survey being implemented, the use of ground penetrating radar, the high archaeological potential of waterways, and the procedures when heritage resources are discovered during construction. Every project includes a Cultural and Heritage Resources Protection Plan (CHRPP) that outlines the procedures and processes to be followed in the event of a "find" during construction.

7.3.1.3 Potential effects, pathways, and measurable parameters

Heritage resources are non-renewable and once disturbed can never be returned to their original context. A potential adverse effect on heritage resources is disturbing them from their *in-situ* context.

Disturbance includes displacement from the original context to complete destruction. A disturbed heritage resource has been displaced from its *in-situ* context and some to all information about the heritage object has been lost. A heritage resource disturbed to a minor extent can retain information such as typology and association with a complex or culture if it is diagnostic. However, detailed information such as association with other heritage objects from the area and stratigraphic deposition can be lost. The extreme end of disturbing a heritage object can result in the destruction of the object. When a heritage resource is destroyed, no further information can be collected. Potential effects, effects pathways, and the measurable parameters used to characterize and assess effects on heritage resources are provided in Table 7-7.

Table 7-7: Potential effects, effects pathways, and measurable parameters for heritage resources

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Disturbance of heritage resources from their *in-situ* context	Ground disturbance through construction, installation, and maintenance activities	Number of heritage resources altered/lost because of Project activities.

7.3.1.4 Spatial boundaries

The spatial boundaries for the environmental assessment consist of the project development area (PDA), local assessment area (LAA), and regional assessment area (RAA). Valued component specific details for heritage resources are described below.

- PDA: is defined as the footprint of the proposed project as described in section 2.0, including the transmission line right-of-way, station expansion footprint, any additional areas such as fly yards or marshalling yards, and access road allowances.
- LAA: Represents the area where direct and indirect or secondary effects of construction, operation and maintenance are most pronounced or identifiable. For heritage resources, it consists of a 2 km buffer around the transmission line right of way (1km from the centreline on either side of the right of way) and other project components. The LAA generally covers an area that encompasses the basic field management unit, a quarter section or an area measuring 800 m x 800 m. However, this unit was doubled for heritage resources to encapsulate noteworthy sites that would be narrowly missed by a 500 m buffer.
- RAA: Encompasses the area where PW75 project specific environmental effects overlap with those of past, present, and reasonably foreseeable future projects and activities. It is used to provide regional context and is the area used for assessing the project's contribution to cumulative effects. It consists of a 10 km buffer around the transmission line right of way (5 km from the centreline on either side of the right of way) and other project components.

7.3.1.5 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.3.1.6 Residual effects characterization

Table 7-8 provides the definitions used to characterize the residual effects on heritage resources.

Table 7-8: Characterization of residual effects on heritage resources

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to heritage resources relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to heritage resources relative to baseline. **Neutral –** no net change in measurable parameters for the heritage resources relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**No Measurable Change –** no disturbance of heritage resources. **Low –** minimal number of heritage resources impacted with minor disturbances during the project relative to the current number of heritage sites located within the LAA.

Table 7-8: Characterization of residual effects on heritage resources

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Moderate – moderate number of heritage resources impacted with minor disturbances or low number of heritage resources impacted during the project relative to the current number of heritage sites located within the LAA. **High –** high number of heritage resources impacted during the project relative to the current number of heritage resources located within the LAA.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA –** residual effects extend into the LAA **RAA –** residual effects extend into the RAA
Timing	Not applicable for heritage resources	
Duration	Not applicable for heritage resources, any impacts to heritage resources cannot be undone	
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule **Multiple regular event –** occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

7.3.1.7 Significance definition

The threshold beyond which a residual effect is considered significant for heritage resources is the destruction of the heritage resource. The destruction of the object is considered the extreme end of the potential effect. Once a heritage object is destroyed, no further information can be learnt about that heritage resource.

7.3.2 Project interactions with heritage resources

Table 7-9 identifies, for each potential effect, the physical activities that might interact with the VC and result in the identified effect.

Table 7-9: Project interactions with heritage resources

Project activity	Effect
	Disturbance of heritage resources from their *in situ* context
Transmission Line Construction	
Mobilization and staff presence	✓
Vehicle and equipment use	✓
Right-of-way clearing	✓
Watercourse crossings	✓
Marshalling / fly yards	✓
Transmission tower construction	✓
Implodes	–
Helicopter use	–
Clean-up and demobilization	✓
Station Modification	
Mobilization and staff presence	✓
Vehicle and equipment use	✓
Marshalling / fly yard (Pointe du Bois station)	✓
Realignment of access road (Pointe du Bois station)	✓
Site preparation (Pointe du Bois station)	✓
Station footprint expansion (Pointe du Bois station)	✓
Installation of electrical equipment	–
Clean-up and demobilization	✓
Transmission Line and Station Operation and Maintenance	
Transmission line and station presence	–
Vehicle and equipment use	✓

Table 7-9: Project interactions with heritage resources

Project activity	Effect: Disturbance of heritage resources from their *in situ* context
Inspection and maintenance	–
Vegetation management	–
Decommissioning	
Mobilization and staff presence	✓
Vehicle and equipment use	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓
Rehabilitation	–
Clean-up and demobilization	✓

✓ = Potential interaction
– = No interaction

7.3.3 Assessment of residual environmental effects on heritage resources

7.3.3.1 Analytical assessment techniques

Archaeological site data is managed and protected by the HRB. The number of documented sites potentially affected by the project is determined by mapping registered site locations and comparing that to the project footprint. The results of this qualitative review determined that there are 16 recorded heritage sites within 1 km of the proposed transmission ROW of which 6 are burials.

Possible effects to potential heritage resources were determined by reviewing archival maps, photos, LiDAR, and mapping potential locations (*e.g.,* types of landforms, nearness to documented heritage resources, proximity to water) and comparing potential sites to the project footprint. The likely hood of an area or property to contain heritage resources is known as the archaeological potential and is affected by the above examples. The more of those factors are present within an area, the greater the archaeological potential of an area and the greater the risk of disturbance.

7.3.3.2 Disturbance of heritage resources

Project pathways

The LAA and RAA have been previously impacted by hydroelectric development of the Winnipeg River and through settlement and agriculture. Despite development, the area is culturally rich with 103 documented archaeological sites within 5 km of the final preferred route and therefore, the potential for finding heritage resources is high.

The high potential for heritage resources means that ground disturbance activities have an increased potentially to disturb heritage resources. Disturbance of heritage resources can occur during mobilization, construction, maintenance, and decommissioning activities. Interactions with heritage resources can occur during the project specified interactions outlined in Table 7-9. The generalized project-effect pathways are:

- The movement of staff, equipment, vehicles, and materials during mobilization and construction has the potential to disturb heritage resources predominantly on the surface and displace them from their original context.
- Construction adjacent to waterways with noted high archaeological potential has a greater probability to disturb heritage resources.
- Construction activities including the construction of marshalling and fly yards, transmission towers, realignment of the access road at Pointe du Bois Station, site preparation and footprint expansion of the Pointe du Bois Station have the potential to disturb heritage resources both on the surface and subsurface.
- Maintenance activities requiring ground disturbances can alter heritage resources on both the surface and subsurface.
- Decommissioning activities such as asset removal and reclamation of disturbed areas requires ground disturbances, however, effects are limited to previously undisturbed areas.

Mitigation

Potential effects can be avoided through implementation of effective mitigation measures including general environmental protection measures, beneficial management practices, standard operating procedures, environmental protection plans, and environmental restoration plans.

It is standard practice for Manitoba Hydro to implement a cultural and heritage resource protection plan (Section 11.7.4.4) as mitigation. Mitigation measures include the following:

- Implementation of a cultural heritage resources protection plan during pre-construction, construction, and operation activities of the project.
- Placement of protective barriers around heritage resource sites inadvertently found during construction so the area can be protected while work proceeds.
- Collection or salvage excavation of known heritage resource sites, or a portion thereof, that cannot be avoided.
- Investigation, pre-construction, by a professional archaeologist in areas close to known heritage resource sites.
- Investigation, pre-construction, by a professional archaeologist in heritage sensitive areas such as sites identified as being culturally sensitive by First Nation and Métis, extant buildings or building foundations, stone features, burial sites, and any other heritage resources sites as defined by The *Heritage Resources Act* (1986).
- Evaluation of any route change or added development.
- Education of construction contractors for the appropriate protocol if heritage resources, or objects thought to be heritage resources, are uncovered.

Residual effects

After mitigation, the residual effect on heritage resources by the project is a decrease in the number of heritage resources from ground disturbance activities. The area is culturally rich. The number of documented sites increases the likelihood of disturbing unknown heritage resources, but the implementation of mitigation should lower the likelihood of an effect.

7.3.4 Summary of residual effects

The project will decrease the number of heritage resources in the PDA by causing ground disturbances. Table 7-10 characterizes the residual effect on heritage resources.

Table 7-10: Project residual effects on heritage resources

Residual Effects Characterization							
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
C	A	L	PDA	N/A	N/A	IR	I
O	A	L	PDA	N/A	N/A	IR	I
D	A	L	PDA	N/A	N/A	IR	I

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning
Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
NC: Negligible
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area
Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

N/A: Not applicable

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible

7.3.5 Assessment of cumulative effects on heritage resources

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably foreseeable future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

There are no predicted cumulative effects on heritage resources as there are no foreseeable projects occurring within the PDA.

7.3.6 Determination of significance

The residual effect on the heritage resources is predicted to be not significant. The mitigation measures are specifically implemented to avoid the significance threshold. The HRIA conducted prior to construction activities is meant to identify heritage resources within the PDA and then mitigate the potential effect through salvage excavation or monitoring. The monitoring of ground disturbance activities during the construction phase within areas of high archaeological potential is meant to mitigate any heritage resources disturbed during that phase of the project. These are standard measures applied to other Manitoba Hydro projects and have been successful in avoiding the significance threshold.

7.3.7 Prediction confidence

The prediction confidence in the final determination of significance is high based on:

- The quantity and quality of data available
- Professional judgement and experience with similar projects
- Effectiveness of mitigation measures, which reflect best industry practices

The level of confidence in the effectiveness of the mitigation measures is high based on past project experience (e.g., Manitoba-Minnesota transmission project, Wuskwatim transmission project, Bipole III transmission project).

It should be noted that this prediction of confidence does not consider Indigenous views of importance of heritage resources. This does not consider the difference between an important spiritual site for Indigenous people such as a Thunderbird Nest site and an isolated find. They are all valued the same for this assessment as the measurable parameter for the potential effect is number of heritage sites altered/lost.

More generally, the importance of difference between heritage resources is not considered. An example is that a burial is a more important heritage resource than an isolated lithic find. Also, this does not consider whether there is a cluster of heritage resources located within an area which creates an increased archaeological potential to find further heritage resources within an area. A lack of heritage resources within an area may be indicative of a lack of archaeological survey rather than a lack of heritage resources.

7.3.8 Follow-up and monitoring

Due to confidence in predictions, and monitoring results from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected effects, the EPP (Chapter 11.0) will outline monitoring steps to ensure appropriate follow-up.

7.4 Birds and bird habitat

7.4.1 Scope of the assessment

Birds and bird habitat is an important area of assessment because it provides ecological, aesthetic, recreational, economic, and cultural value to stakeholders, the public, Indigenous communities, local businesses, and government agencies.

Having access to birds and bird habitat is important to communities, particularly resource users that practice traditional and recreational hunting and trapping activities throughout the region.

This section builds on baseline conditions for birds and bird habitat and assesses the effects of project activities on birds and bird habitat from construction, and operation and maintenance of the project, as well as an assessment of cumulative effects on birds and bird habitat.

7.4.1.1 Regulatory and policy setting

The following is a list of the regulatory requirements, policies, and guidance considered in the assessment of effects on birds and bird habitat.

<u>Federal regulations and policy</u>

Species at Risk Act (SARA)

The SARA provides protection for species at risk in Canada. The legislation provides a framework to facilitate recovery of species listed as threatened, endangered, or extirpated and to prevent species listed as special concern from becoming threatened or endangered. species at risk and their habitats are protected under SARA which prohibits:

- The killing, harming, or harassing of endangered or threatened species at risk
- The destruction of critical habitat of and endangered or threatened species at risk

Project construction and operation is subject to SARA. Of the over 280 bird species potentially inhabiting the RAA, 16 are species at risk and 4 are species of conservation concern (Appendix D).

Migratory Birds Convention Act (MBCA)

The MBCA (1994) and associated regulations (Migratory Birds Regulations [MBR], 2022) provide for the protection of migratory birds, their eggs, and their nests. It applies to most native bird species.

Provincial regulations and policy

The Endangered Species and Ecosystems Act (ESEA)

The ESEA provides protection to threatened and endangered ecosystems and plant and animal species at risk in Manitoba. The ESEA facilitates the management and development of recovery strategies for threatened, endangered, and extirpated or extinct species to prevent further declines and promote recovery. ESEA-listed species are those that "are of ecological, educational, esthetic, historical, medical, recreational and scientific value to Manitoba and the residents of Manitoba" (Government of Manitoba 2019).

The Wildlife Act

The Wildlife Act provides general provisions for regulating the activities relating to the take and trade of wild animals in Manitoba. A "wild animal" is defined as "an animal or bird of a species or type listed in Schedule A or declared by the regulations to be a wild animal", and includes select amphibian, reptile and mammal species and most bird species (including those not protected under the MBCA) known to exist in Manitoba.

7.4.1.2 Consideration of issues raised during engagement

Previous public comments on the project (Government of Manitoba 2014) indicated concern for adverse effects on mature forest and wetland habitat, including on the goose breeding ponds along PR 211 approximately 6 km west of Pinawa. As a result, field surveys in 2022 focused on the new proposed alternate route segments and portions of the PDA underrepresented in data collection in 2013, including mature forest and wetland habitats, and the goose breeding ponds.

Through project engagement and surveys collected by Manitoba Hydro, concerns raised regarding potential project-related effects to birds and bird habitat related to habitat fragmentation, changes to biodiversity, and increased human access (e.g., recreational vehicles and hunting).

Project engagement identified the following wildlife areas of interest:

- Great gray owl (*Strix nebulosa*) habitat along PR 211, near the junction with PR 520
- Grouse habitat south of Belluk Road and east of Boggy Creek Road

7.4.1.3 Spatial boundaries

The following spatial boundaries are used to assess effects to birds and bird habitat (Map 7-1):

- Project development area (PDA): The PDA is the footprint of the project including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances as described in Chapter 2.0.
- Local assessment area (LAA): The LAA is a 1-km buffer on either side of the final preferred route, which is based on measurable effects of noise on wildlife (e.g., Benitez-Lopez et al. 2010; Shannon et al. 2016), while also considering maximum recommended setback distances for sensitive habitat features (MB CDC 2021) This is also consistent with boundaries used for other recent transmission line projects in Manitoba (Manitoba Hydro 2015).
- Regional assessment area (RAA): The RAA is a 15-km buffer of the final preferred route used to capture information on a broader scale and to provide regional context. A 15 km buffer is consistent with other recent transmission line projects in Manitoba (Manitoba Hydro 2015). The RAA is used to assess cumulative effects and the significance of project-specific effects on terrestrial wildlife species (e.g., birds, mammals, amphibians, and reptiles). The RAA encompasses the home ranges or dispersal distances of most wide-ranging species potentially affected by the project, including black bear (*Ursus americanus*; 5 to 25 km^2 for female bears [Government of British Columbia 2001]), white-tailed deer (*Odocoileus virginianus*; 89 km^2 [Lesage et al. 2000]), and non-migratory moose (*Alces alces*; 97 km^2 [Hauge and Keith 1981).

7.4.1.4 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions

- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.4.2 Potential effects, pathways, and measurable parameters

Table 7-11 summarizes the potential environmental effects of the project on birds and bird habitat, the pathways by which they may affect birds and bird habitat, and the measurable parameters for evaluating effects.

Table 7-11: Potential effects, effects pathways and measurable parameters for birds and bird habitat

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
Change in habitat	Direct and/or indirect loss or alteration of habitat due to vegetation clearing, ground disturbance, sensory disturbance and/or fragmentation and edge effects	Amount (ha) of bird habitat (wetland, shrub, forest, native and tame grassland) directly altered by the project, including for species of interest: Ruffed grouse Sandhill crane Amount (ha) of bird habitat for provincially and federally-listed SAR Change in habitat intactness (number and size of core areas, length of linear features/km^2)
Change in mortality risk	Direct change in mortality risk due to vegetation clearing activities, vehicle and/or line-strike collisions, human-wildlife conflicts, and indirect change in mortality risk due to predation and harvest pressure.	Total area (ha) of PDA that overlaps or parallels lakes, rivers and/or wetlands having potential to concentrate birds Change in habitat intactness (number and size of core areas, length of linear features/km^2)

7.4.3 Residual effects characterization

Table 7-12 presents definitions for the characterization of residual environmental effects on birds and bird habitat. The criteria describe the potential residual effects that remain after mitigation measures have been implemented.

Table 7-12: Characterization of residual effects on birds and bird habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to birds and bird habitat relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to birds and bird habitat relative to baseline. **Neutral –** no net change in measurable parameters for bird and bird habitat relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**Change in Habitat[1]** **Low** – Project changes less than 10% of bird habitat in the LAA, or less than 5% of habitat for bird species at risk and species of conservation concern in the LAA **Moderate** – Project changes 10-20% of general bird habitat in the LAA, or 5-10% of habitat for bird species at risk and species of conservation concern in the LAA **High** – Project changes more than 20% of bird habitat in LAA, or more than 10% of habitat for bird species at risk and species of conservation concern in the LAA **Change in Mortality Risk** **Negligible** – a measurable change in the abundance of birds in the LAA is not anticipated **Low** – a measurable change in the abundance of birds in the LAA is not anticipated, although temporary local shifts in distributions in the LAA might occur **Moderate** – a measurable change in the abundance and/or distribution of birds in the LAA might occur, but a measurable change on the abundance of birds in the RAA is not anticipated **High** – a measurable change in the abundance and/or distribution of birds in the RAA might occur
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA –** residual effects extend into the LAA **RAA –** residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	**No sensitivity -** Effect does not occur during critical life stage (e.g., outside bird nesting periods) or timing does not affect the VC. **Moderate sensitivity -** Effect may occur during a lower sensitive period of a critical life stage; for many species this is the start (e.g., several days prior to nesting for birds) or end (e.g., periods when birds have fledged but remain in proximity to their nest) of the critical period. **High sensitivity -** Effect occurs during a critical life stage (e.g., bird nesting periods).
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase **Medium-term –** the residual effect extends through to completion of post-construction reclamation **Long-term -** the residual effect extends for the life of the project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event – occurs once **Multiple irregular event** – occurs at no set schedule **Multiple regular event** – occurs at regular intervals **Continuous –** occurs continuously

Table 7-12: Characterization of residual effects on birds and bird habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed or returned to baseline conditions

[1] Based on benchmarks used for other recent EAs (KHLP 2012; Nalcor 2012; JRP 2014, Manitoba Hydro 2015)

7.4.4 Significance definition

A significant adverse residual effect on birds and bird habitat is defined as one that threatens the long-term persistence or viability of a bird species in the RAA, including effects that are contrary or inconsistent with the goals, objectives, and activities of recovery strategies, action plans, and management plans.

7.4.5 Project interactions with birds and bird habitat

Table 7-13-13 identifies, for each potential effect, the physical activities that might interact with birds or bird habitat, including focal species, and result in the identified effect.

Anticipated interactions between project activities and the potential effects are identified in Table 7-13 with a check mark and are discussed in detail in Section 7.4.5, in the context of effects pathways, standard and project-specific mitigation, and residual effects. Justification for no effect (indicated by a dash) is provided following the table.

The potential interactions between project activities and birds and bird habitat were considered for the construction, operation and maintenance, and decommissioning phases of the project.

The identification of project activities and their potential interactions was based on engagement with interested parties, the professional judgment of technical specialists involved in the assessment, and a review of existing conditions.

Table 7-13: Project interactions with birds and bird habitat

Project activity	Effects	
	Change in habitat	Change in mortality risk
Transmission line construction		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Right-of-way clearing	✓	✓
Watercourse crossings	✓	✓

Table 7-13: Project interactions with birds and bird habitat

Project activity	Effects	
	Change in habitat	Change in mortality risk
Marshalling / fly yards	✓	✓
Transmission tower construction	✓	-
Implodes	✓	-
Helicopter use	✓	-
Clean-up and demobilization	✓	✓
Station modification		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Marshalling / fly yard (Pointe du Bois station)	✓	✓
Realignment of access road (Pointe du Bois station)	✓	✓
Site preparation (Pointe du Bois station)	✓	✓
Station footprint expansion (Pointe du Bois station)	✓	✓
Installation of electrical equipment	-	-
Clean-up and demobilization	✓	✓
Transmission line and station operation and maintenance		
Transmission line and station presence	✓	✓
Vehicle and equipment use	✓	✓

Table 7-13: Project interactions with birds and bird habitat		
Project activity	Effects	
	Change in habitat	Change in mortality risk
Inspection and maintenance	✓	✓
Vegetation management	✓	✓
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓
Rehabilitation	✓	✓
Clean-up and demobilization	✓	✓

✓ = Potential interaction

– = No interaction

Installation of electrical equipment will occur on existing transmission stations (e.g., Lee River distribution supply centre, Whiteshell Station) or on previously disturbed land for the Pointe du Bois Station expansion and is not expected to interact with change in habitat or mortality risk for the lifetime of the project as there is no pathway for these activities to affect birds and bird habitat.

Transmission tower construction, implodes, and helicopter use are not expected to cause a change in mortality risk. Transmission tower construction will be conducted on previously cleared land and there are no pathways for these activities to cause wildlife fatalities.

7.4.6 Assessment of residual environmental effects

7.4.6.1 Analytical assessment techniques

The general approach to assessing potential environmental effects on birds and bird habitat follows the sequence and methods outlined in Chapter 5.0.

Change in habitat was assessed by overlaying the PDA with existing land cover data to quantify how much bird habitat would be directly affected by the project. Change in habitat for species at risk was quantified by comparing direct changes in the amount of potentially suitable habitat available for each species (Appendix D) to baseline conditions.

Change in habitat for species of conservation concern are represented by other species at risk with similar habitat requirements (e.g., pine warbler [*Setophaga pinus*] represented by Canada warbler). Indirect change in habitat (i.e., sensory disturbance) was assessed qualitatively as the area of reduced habitat effectiveness adjacent to the PDA.

Indirect change in habitat due to edge effects and/or sensory disturbance are anticipated within the LAA (i.e., up to 1 km from the PDA). Potential effects are considered as a whole, inclusive of all seasonal requirements for birds (e.g., primary nesting or migration periods).

Change in mortality risk was assessed qualitatively through changes in direct (e.g., transmission line strikes, vehicle collisions, human-wildlife conflict) and indirect (e.g., changes in predator-prey interactions and harvest pressure) sources of mortality. The qualitative assessment included a combination of literature review, landscape assessment, and professional judgment to predict the mortality risks to birds.

7.4.6.2 Change in habitat

<u>Construction</u>

Project pathways

During construction, vegetation clearing and grubbing of the ROW is the primary pathway for a direct and measurable change in bird habitat. ROW clearing will result in the loss of forest habitats in the PDA (grassland and wetland habitat will remain relatively intact outside of tower footprints).

Many forest-dependent birds (e.g., Canada warbler, eastern whip-poor-will, ruffed grouse) will lose some habitat during ROW clearing.

Indirect effects on habitat are those that reduce the effectiveness of existing or remaining habitat for birds. Indirect effects may occur through construction-related sensory disturbances (e.g., noise, light) causing temporary displacement of some birds from otherwise suitable habitat adjacent to the PDA. Such activity may be associated with ROW clearing, mobilizing staff and equipment (including access route and bypass trail development), watercourse crossing, transmission tower construction and conductor stringing (e.g., implodes, helicopter use), and upgrade work at the Pointe du Bois Station. These activities could disrupt and displace some birds within the LAA.

Clearing of the ROW has potential to fragment habitat and create edge effects (i.e., bird avoidance of the edge of cleared areas). Some species, such as ruffed grouse, are drawn to edges for the diversity of habitats that form. Other species such as eastern whip-poor-will and common nighthawk prefer open forest habitat and use forest edges and clearings for breeding and foraging.

Core areas larger than 200 ha are important for bird species and ecosystem function (Environment Canada 2013). Habitat fragmentation may reduce patch size that is important in maintaining biodiversity (Environment Canada 2013). Change in habitat intactness because of project activity is shown on Map 7-2 and discussed in detail in Section 7.8.3.2 and Table 7-42.

Edge effects can also include changes in microclimate (e.g., Murcia 1995), vegetation structure (e.g., Harper et al. 2005), nest predation (e.g., Paton 1994), community structure (e.g., Schmiegelow et al. 1997), or behavioral responses of birds (e.g., Machtans 2006).

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project on bird habitat during construction include the following:

- Environmentally sensitive sites, features and areas will be identified and mapped before clearing.
    - Trees containing large nests of sticks and areas where active animal dens or burrows are encountered within the ROW will be buffered and left undisturbed until unoccupied.
    - Wildlife features (i.e., stick nests, and pileated woodpecker nest cavities) will be identified and mitigation applied such as buffers and/or setbacks prior to clearing.
- Artificial structures for nesting may be provided if unoccupied nests must be removed.

- Clearing activities will not be carried out during the reduced risk timing windows for wildlife species without additional mitigation measures such as pre-clearing nest sweeps. Construction activities will be carried out in the winter, and will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Natural low growing shrub and grass vegetated buffer areas of 30 m will be delineated around wetlands and riparian zones.
- Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas located at least 100 m from the ordinary high-water mark of a waterbody, riparian area, or wetland, unless approved by a Manitoba Hydro environmental officer, where additional mitigation measures will apply.
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
- The erosion and sediment control management plan (Section 11.7.5.5) will be implemented by the contractor.
- Clearing wastes and other construction debris or waste will not be placed in wetland areas.
- Rehabilitation plans will include objectives for restoration of natural conditions, erosion protection, sediment control, non-native and invasive plant species management, wildlife habitat restoration and restoration of aesthetic values as required.

Residual effects

Removal of vegetation (i.e., trees, shrubs) will result in a direct, long-term change in 201.7 ha of bird habitat in the LAA (Section 7.8.3.2, Table 7-43Table 7-42). The amount of treed and/or shrubby habitat removed is approximately 2.5% of the total amount of treed and shrubby habitat in LAA, and 2.3% of the total amount of potential bird habitat (wetland, shrub, forest, native and tame grassland, riparian) in the LAA (Section 7.8.3.2, Table 7-423).

Approximately 115 ha (3.6% of total potential ruffed grouse habitat in LAA) of ruffed grouse habitat and 66.3 ha (2.1% of total potential sandhill crane habitat in LAA) of sandhill crane habitat will be traversed by the ROW. The amount of bird species at risk habitat potentially affected by the ROW is presented in Table 7-14.

Table 7-14: Potential change in bird species at risk habitat relative to the LAA

Common Name	Scientific Name	Habitat in PDA (ha)	Habitat in LAA (ha)	% Change Relative to LAA
Yellow Rail	*Coturnicops noveboracensis*	11.4	422.2	2.7
Least Bittern	*Ixobrychus exilis*	0.0	0.1	0.0
Horned Grebe	*Podiceps auratus*	0.4	15.9	2.6
Short-Eared Owl	*Asio flammeus*	8.5	238.6	3.6
Common Nighthawk	*Chordeiles minor*	0.3	17.4	1.9
Red-headed Woodpecker	*Melanerpes erythrocephalus*	9.6	375.1	2.6
Eastern Whip-poor-will	*Antrostomus vociferous*	68.6	1843.5	3.7
Olive-sided Flycatcher	*Contopus cooperi*	89.2	2895.2	3.1
Golden-winged Warbler	*Vermivora chrysoptera*	0.6	63.5	1.0
Canada Warbler	*Cardellina canadensis*	2.7	91.8	3.0
Barn Swallow	*Hirundo rustica*	16.5	345.3	4.8
Eastern Wood-Peewee	*Contopus virens*	64.6	1757.0	3.7
Rusty Blackbird	*Euphagus carolinus*	2.2	122.9	1.8

NOTE: The ROW will become grass and shrub-dominated habitat for birds where it traverses forest; wetland habitat traversed by ROW will remain as wetland

Vegetation clearing and grubbing outside of the primary migratory bird breeding window in areas supporting birds and bird habitat will reduce the indirect effects on bird and bird habitat. Some disruption of year-round resident species, such as the great gray owl and ruffed grouse may occur during winter clearing activities. Important great gray owl habitat identified at Whitemouth Falls Provincial Park during public engagement was avoided during route selection.

Removal of trees will reduce habitat for some forest dwelling species (e.g., ruffed grouse, Canada warbler, bald eagle), but as a result will increase modified bird habitat for other species, particularly open-habitat and forest edge species including species at risk such as common nighthawk (*Chordeiles minor*) and eastern whip-poor-will (*Antrostomus vociferus*).

Some raptor species may benefit from the creation of edge habitat. Foraging efficiency can be greater along forest edges due to the presence of perches and increased visibility of prey. For example, the creation of open areas may provide foraging habitat and perches for some species like great gray owl (Duncan and Hayward 1994; Duncan 1997).

Forest areas cleared along the ROW will eventually regenerate to modified bird habitat consisting of shrub, herb, and grass dominated plant community. For most birds, the change in the availability of habitat will be minimal, especially for grassland and wetland species such as sandhill crane.

An indirect loss or alteration of bird habitat is expected through sensory disturbance, habitat fragmentation, and edge effects that can result in habitat avoidance and reduced habitat effectiveness for birds in areas adjacent to the PDA. Sensory disturbance (i.e., noise and artificial light) emitted during construction is expected to cease immediately following the conclusion of construction activities.

Construction of the project (including the salvage of P3/P4 Pointe du Bois to Lee River transmission line) will increase the density of linear features (e.g., access roads, ROW) in the RAA by less than 1%. This increase is primarily attributed to ROW clearing along the forested portion of the final preferred route extending through the edge of a large, intact habitat patch (from Lee River to Whiteshell Station). Within this area, ROW clearing will have indirect effects on habitat by fragmenting forest, reducing intactness of forest patches, and increasing edge habitat.

Overall, the residual effects for construction-related change in habitat availability is expected to be low in magnitude, as the final preferred route is predominantly aligned with an existing ROW and adjacent to existing sources of anthropogenic disturbance (e.g., PR 520).

Following the implementation of mitigation measures described above, residual effects for change in habitat during construction are characterized by the following:

- Direction is adverse:
  - There will be direct and indirect habitat loss or alteration during construction.
- Magnitude is low:
  - Construction of the project will result in a 2.3% change in bird habitat in the LAA (Section 7.8.3.3, Table 7-43) and a 0.87% increase in linear disturbance. The combined direct loss of natural wildlife habitat is low (i.e., <10% of the LAA) based on magnitude criteria presented in 7.1-2.
- Geographic extent is the LAA:
  - Direct habitat loss will be confined to the PDA; however, indirect effects (i.e., sensory disturbance, edge effects) will extend into the LAA.
- Timing is no sensitivity:
  - Construction of the project will occur outside the critical life stages (e.g., primary bird nesting period) of migratory and resident bird species in the LAA.
- Duration is short-term to long-term (depending on habitat type and project component):
  - Direct (i.e., habitat loss) and indirect effects (i.e., edge effects) on habitat availability due to clearing and alteration will be permanent because the effects will extend for the lifetime of the project.
  - Indirect effects on habitat availability associated with sensory disturbance from ROW clearing, construction of transmission infrastructure and station upgrades and expansion will be short-term.
- Frequency is a single event:
  - Sensory disturbance associated with ROW clearing, construction of transmission infrastructure and station upgrades and expansion will occur multiple times at irregular intervals. Habitat alteration will primarily occur once during ROW clearing.
- Change is reversible:
  - Direct (i.e., habitat loss) and indirect effects (i.e., edge effects) on habitat availability due to clearing and alteration are reversible after the life of the project (i.e., with natural regeneration of ROW vegetation).
  - Indirect effects on habitat availability associated with sensory disturbance from ROW clearing, construction of transmission infrastructure and station upgrades and expansion are reversible once activity has ended.

Operation

Project pathways

Although changes to habitat availability will be most pronounced during construction, the operation phase will continue to have an influence on birds and bird habitat through periodic disturbance (e.g., noise) and habitat alteration (e.g., reduction in cover habitat) associated with maintenance and inspection activities.

Positive changes along cleared areas of the ROW during the operation phase will be the re-establishment of vegetation, as parts of the ROW will become more attractive to open-forest and shrub-land species that prefer edge habitats such as common nighthawk and eastern whip-poor-will (Banfield 1974; Bramble and Brynes 1982; Bartzke et al. 2014).

Vegetation management (i.e., for controlling noxious or restricted weeds and managing woody vegetation along the ROW), and use of all-terrain vehicles (ATVs) and snowmobiles for transmission line inspection, could temporarily reduce the effectiveness of bird habitat by causing some bird species (e.g., ruffed grouse, golden-winged warbler, eastern whip-poor-will) to avoid the ROW and adjacent areas until the disturbance has ceased.

Travel along the ROW by resource users, hunters and other recreational users is expected based on the existing use of transmission line corridors in the RAA.

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project to change in habitat during operation includes the following:

- Natural low growing shrub and grass vegetated buffer areas of 30 m will be delineated around wetlands and riparian zones.

Residual effects

During operation, residual effects on birds and bird habitat associated with sensory disturbance from equipment used during ROW vegetation management and inspections are not expected to have much of an effect on birds as transmission line inspection will occur once or twice a year outside of the primary migratory bird breeding window. Vegetation management activities will be repeated over a longer cycle (every five to seven years as required) and will involve the use of less invasive and less destructive techniques to control woody vegetation than initial clearing.

Based on observed use of other existing transmission lines (e.g., Manitoba-Minnesota Transmission Project), use of ATVs and other recreational vehicles may occur year-round on portions of the ROW. Shrubby vegetation will be maintained on the ROW where possible to impede ATV access and limit disturbance to birds and bird habitat; this may also reduce the risk of ATV-triggered wildfires.

The direct (via ROW clearing) and indirect (due to sensory disturbance and edge effects) change in habitat availability that occurred during construction will persist during operation; however, the magnitude of effects are expected to lessen as vegetation will re-establish and provide habitat for species that use open forest habitat and/or edge habitat (e.g., ruffed grouse, golden-winged warbler, common nighthawk and eastern whip-poor-will).

Following the implementation of mitigation measures described above, residual effects for change in habitat during operation are characterized by the following:

- Direction is adverse and positive:
  - There will be an adverse indirect effect on bird use of ROW and adjacent habitat due to sensory disturbance associated with vegetation maintenance activities and recreational vehicle use.
  - There will be positive direct habitat gain for forest edge, grassland and shrubland/open habitat bird species as vegetation naturally regenerates along the ROW.
- Magnitude is low:
  - Indirect effects of sensory disturbance on birds are unlikely to have a measurable effect on the abundance of birds in the LAA; however, temporary local shifts in bird distribution might occur in the PDA and adjacent areas.
- Geographic extent is the LAA:
  - ROW vegetation maintenance is limited to the PDA; however, the effects of sensory disturbance can extend into the LAA.
- Timing is moderate sensitivity:
  - Operation of the project will occur during critical life stages (e.g., primary bird nesting period) of migratory and resident bird species in the LAA.
- Duration is short-term to long-term:
  - Indirect effects on ROW and edge habitat due to sensory disturbance (i.e., bird avoidance) will be short-term, as most birds using these areas will return once sensory disturbance ceases.
  - ROW vegetation will be managed as open habitat over the long-term.
- Frequency is at multiple, irregular intervals:
  - Sensory disturbance from vegetation management, ROW inspections, and recreational vehicle use will occur multiple times at irregular intervals.

- Change is reversible:
  - Indirect effects on ROW and edge habitat due to sensory disturbance (i.e., bird avoidance) will be short-term and reverse once activity has ended.
  - The effects of vegetation management along the ROW are reversible after the life of the project with natural regeneration of ROW vegetation.

7.4.6.3 Change in mortality risk

Construction

Project pathways

During construction, the primary pathways for direct changes in bird mortality risk are associated with vegetation clearing in the PDA and collisions with project-related transportation in the LAA. ROW clearing will involve vegetation removal and soil disturbance, which could result in mortality of nests and nesting birds if conducted during the bird nesting period (April 25 to August 14). Project-related transportation and heavy equipment also have the potential to crush or collide with birds.

An increase in construction traffic, particularly during peak periods of workforce movement (e.g., between shifts) and during peak periods of materials delivery will result in a greater potential for bird/vehicle collisions and mortality along roads and ROW. Species most at risk include migratory birds such as songbirds and non-migratory birds such as owls and ruffed grouse that hunt or forage in open areas.

Changes in predator-prey interactions, nest parasitism, and harvest pressure are expected to be the primary pathways through which indirect changes in mortality risk to birds will occur during construction. Construction of the ROW will fragment habitat and increase edge habitat. Abrupt edges between forest and open areas can increase avian predation rates by both mammalian and avian predators (Chalfoun et al. 2002). Ground and shrub-nesting forest birds such as ruffed grouse and Canada warbler are particularly vulnerable to nest predation by small mammals and other birds (*e.g.*, American crow [*Corvus brachyrhynchos*] and blue jay [*Cyanocitta cristata*]) in fragmented forests (Hannon and Cotteril 1998; Burke and Nol 2000; Kubel and Yahner 2008; Weidinger and Kocvara 2010). Ruffed grouse are especially vulnerable to predation and harvest mortality because they are attracted to forage opportunities in edge habitat (Sharp 1963). Sensory disturbance from construction may also cause an indirect increase in mortality risk due to disturbance to birds, resulting in behavioural changes (e.g., flushing) that may increase chances of predation from exposure (Habib et al. 2007).

Clearing of the ROW and creation of forest edge habitat could lead to increased nest parasitism of shrub nesting birds such as Canada warbler by brown-headed cowbirds ([*Molothrus ater*]; Rich et al. 1994; Burke and Nol 2000; Falk et al. 2011). Nest parasitism rates of forest interior species can be as high as 30% in fragmented forest landscapes (Burke and Nol 2000). High rates of nest parasitism, in combination with nest predation rates, can effectively limit songbird populations from reaching replacement rates (Burke and Nol 2000).

Ruffed grouse, and to a lesser extent sandhill crane, are popular gamebird species commonly hunted in Manitoba. Ruffed grouse and sandhill crane mortality could increase during operation because of improved access to their preferred habitats by hunters.

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project on bird mortality risk during construction includes the following:

- Wildlife features (i.e., stick nests, Pileated woodpecker nest cavities) will be identified in CEnvPP and mitigation applied such as buffers and/or setbacks prior to clearing.
- Clearing activities will not be carried out during the reduced risk timing windows for birds (April 25 to August 14) without additional mitigation measures such as pre-clearing nest sweeps.
- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing.
- Trees containing large nests of sticks and areas where active animal dens or burrows are encountered within the ROW will be buffered and left undisturbed until unoccupied.
- Artificial structures for nesting may be provided if unoccupied nests must be removed.
- Natural low growing shrub and grass vegetated buffer areas of 30 m will be delineated around wetlands and riparian zones.
- Hunting and harvesting of wildlife, or possession of firearms by project staff will not be permitted while working on the project sites.

Residual effects

Most construction-related mortality risks to birds in the LAA were mitigated during the planning and routing process by grouping the ROW with existing infrastructure (e.g., established transmission line route (PW75) for 23 km between the Lee River distribution supply centre and Point du Bois distribution supply centre, road allowance along PR520 and PR211) to the extent possible, and avoiding large tracts of intact habitat (e.g., forests, wetlands), and protected areas, including Canada warbler critical habitat. Where the project does traverse natural habitat, mitigation measures (e.g., clearing outside of the sensitive bird breeding period [April 25 to August 14]), applying setbacks and buffers to active nests, controlling project vehicle speeds on the ROW) will be implemented to reduce mortality risk to birds during construction.

The potential for increased predation risk to bird nests and brood parasitism are expected to persist through the operation phase but may lessen as nesting cover (e.g., shrubs and herbs) re-establishes along the ROW. Changes in predator-prey dynamics and hunting pressure is anticipated to be minimal during construction due to limits on public access.

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during construction are characterized by the following:

- Direction is adverse:
  - There will be an increase in mortality risk to birds during construction.
- Magnitude is low:
  - With mitigation, the change in mortality risk is anticipated to be low. The project is not anticipated to have population level effects on birds.
- Geographic extent is the LAA:
  - Direct change in mortality risk will be confined to the PDA; however, indirect effects (i.e., potential for increased predation risk along forest edges) will extend into the LAA.
- Timing is no sensitivity:
  - ROW clearing will occur outside the critical life stages (e.g., primary bird nesting period) of migratory and resident bird species in the LAA.

- Duration is short-term:
  - Bird mortality risk will be elevated during the construction period.
- Frequency is a multiple, irregular event:
  - Change in mortality risk will vary throughout the construction period.
- Change is reversible:
  - Increased bird mortality risk due to presence of project vehicles will cease once construction activity has ended. Indirect effects associated with increased predation risk along forest edges are expected to lessen during the operation phase and are reversible after the life of the project (i.e., with natural regeneration of ROW vegetation).

Operation

Project pathways

The primary pathways that may result in a change in wildlife mortality risk during the operation phase are bird collisions with transmission wires, vehicle collisions and mortality associated with ROW inspections and vegetation management, and increased access that may increase harvest pressure or predation.

Collisions with transmission lines are among the top causes of human-related bird mortality in Canada (Calvert et al. 2013). The degree of mortality risk is influenced by several factors relating to transmission line design, location, and mitigation, as well as physical characteristics of the bird (species, size), and flight behaviour (flocking, aerial courtship displays (Avian Power Line Interaction Committee 2012). Larger-bodied species such as waterfowl (e.g., geese, ducks, sandhill crane) and raptors (e.g., bald eagle) can have difficulty performing evasive manoeuvres to avoid transmission lines and structures (Bevanger 1998).

The project has the potential to increase bird collision risk where the transmission line crosses or is adjacent to watercourses or waterbodies that concentrate large-bodied birds (e.g., Rice Lake, Pinawa Channel, Winnipeg River, Whitemouth River) or are located between roosting (i.e., resting), foraging, or breeding sites. In these areas, waterbirds, especially ducks and geese, are particularly vulnerable to collisions due to their daily movement patterns, which peak during low light periods around sunrise and sunset (Savereno et al. 1996).

Vegetation management and transmission line inspection could increase direct mortality risk to birds from collisions with vehicles or equipment. Nest mortality could also occur from herbicide application and/or the clearing of brush or small patches of trees during vegetation management of the ROW.

During operation, presence of transmission towers may increase the availability of perching structures for raptors, potentially resulting in an increase in mortality risk to birds, small mammals, and other prey species (Lammers and Collopy 2007).

Increased access along the ROW by resource users and/or predators may result in an indirect change to mortality risk, such as shifts in predator-prey relationships and harvest pressure on certain bird species (e.g., ruffed grouse, sandhill crane, waterfowl). Recreational users (e.g., ATVs, snowmobiles) may also frequent the ROW, increasing bird collision risk and/or destruction of nests.

Mitigation

- To reduce the potential for collisions with wires following wire installation, bird diverters will be placed at environmentally sensitive sites.
- Hunting and harvesting of wildlife, or possession of firearms by project staff will not be permitted while working on the project sites.
- Vegetation maintenance and inspection vehicles will travel at reduced speeds while on ROW.
- Vegetation maintenance and inspection activities will be restricted to established roads, trails and cleared construction areas in accordance with the Access Management Plan (Section 11.7.5.1).

Residual effects

During operation, mortality risk to birds is expected to increase with the presence of overhead transmission lines, particularly in areas where birds congregate (e.g., Rice Lake, Pinawa Channel, Winnipeg River, Whitemouth River). Increase in mortality risk from the project can be mitigated by adding bird deflectors/diverters to overhead wires at high collision risk sites such as Rice Lake, Pinawa Channel, Winnipeg River, and Whitemouth River. Applying bird deflectors/diverters to shield wires has been shown to reduce bird mortality rates by 50% to 80% (Jenkins et al. 2010; APLIC 2012). With mitigation, residual effects for change in mortality risk during operation due to line strikes is expected to be low in magnitude.

Vegetation maintenance and inspections will occur outside of the primary migratory bird breeding period, when possible, to reduce mortality risk to nesting birds during operation. Mortality risk to resident bird species such as ruffed grouse that are slow-moving and attracted to edge habitat (Sharp 1963) is expected to be mitigated by reduced vegetation maintenance vehicle speeds.

Changes in predator-prey interactions, nest parasitism, and increased access and harvest pressure that occurred during construction will persist during operation. However, this effect is expected to lessen as the ROW naturally revegetates with grassland and shrub species, increasing cover habitat and softening the transition between the ROW edge and forest habitat. As a result, access opportunities for hunters and recreational use will decrease. It is expected that any increased mortality because of increased access will be small relative to bird populations in the LAA, including for ruffed grouse and sandhill crane.

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during operation are characterized by the following:

- Direction is adverse:
  - There will be increased mortality risk.
- Magnitude is low:
  - The LAA supports few areas, such as lakes and open water wetlands, having potential to concentrate birds. Where sensitive areas occur, mitigation measures (i.e., bird flight deflectors) will be implemented to reduce collision risk to birds. The change in hunter and predator access resulting from the project is anticipated to be low as the project will marginally contribute to the existing level of fragmentation in the RAA (0.87% change from existing levels).
- Geographic extent is the LAA:
  - Increased mortality risk will be confined to the PDA; however, indirect effects on mortality risk (i.e., increased predation due to increased forest edge) will extend into the LAA.
- Timing is moderate sensitivity:
  - Operation of the project will occur during critical life stages (e.g., primary bird nesting period) of migratory and resident bird species in the LAA, however, potential disturbance such as vegetation management and transmission inspections will be scheduled outside of the primary breeding bird nesting period.
- Duration is long-term:
  - The collision risk with overhead lines will persist for the life of the project.
- Frequency is continuous:
  - Change in mortality risk will occur throughout the operation period.

- Change is reversible:
  - Factors contributing to a change in wildlife mortality risk are reversible after the life of the project (i.e., with the removal of overhead wires and natural regeneration of ROW vegetation)

7.4.7 Summary of residual effects

This section summarizes the project effects analysis for change in bird habitat availability and change in mortality risk. Table 7-15 characterizes the environmental effects of the project on birds and bird habitat.

Table 7-15: Project residual effects on birds and bird habitat

Project phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
	Residual effects characterization						
Change in habitat							
Construction	A	L	LAA	NS	ST/LT	S/IR	R
Operation	A/P	L	LAA	MS	ST/LT	IR	R
Change in mortality risk							
Construction	A	L	LAA	NS	ST	IR	R
Operation	A	L	LAA	MS	LT	C	R

Project Phase
C: Construction
O: Operation
D: Decommissioning
Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
N: Negligible
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area
Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible

N/A: Not applicable

7.4.8 Assessment of cumulative effects on birds and bird habitat

Native vegetation abundance in the RAA has been reduced by past land use activities, including agriculture and other human infrastructure such as roads and electrical transmission lines. Some of these projects and activities have fragmented habitat and changed vegetation communities and species diversity. Currently agricultural land occupies 3.4% of the RAA and developed land occupies 11.1%.

The project will have residual effects on birds and bird habitat, including habitat availability and mortality risk, that will act cumulatively with residual effects of other past, present, and reasonably foreseeable future physical activities.

7.4.8.1 Project residual effects likely to interact cumulatively

Table 7-16 presents the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-16: Interactions with the potential to contribute to cumulative effects

Other projects and physical activities with potential for cumulative effects	Birds and bird habitat	
	Change in habitat	Change in mortality risk
Past and present physical activities and resource use		
Agriculture	✓	✓
Domestic resource use (e.g., hunting, fishing, trapping)	✓	✓
Recreational activities (e.g., canoeing, snowmobiling)	✓	✓
Infrastructure projects (roads, rail, utilities)	✓	✓
Generating stations (Point de Bois, Slave Falls)	✓	✓
Transmission lines	✓	✓
Nuclear power (i.e., Whiteshell Laboratories)	✓	✓
Other industrial and processing development/facilities	✓	✓
Project-related physical activities	✓	✓
Future physical activities		
Slave Falls Generating Station	–	✓
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor [Pinawa Demonstration Reactor]	–	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– = Interactions between the residual effects of other projects and residual effects of the project are not expected.

Effects identified in Table 7-16 as not likely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further. Future upgrades of the Slave Falls Generating Station will not have an overlapping effect on bird and bird habitat affected by the project as upgrades will occur within an existing disturbed footprint. The Slave Falls Generating Station will require a reduction in water levels on the Winnipeg River, approximately 10 km upstream (north) of the generating station, and this may temporarily alter existing shoreline bird habitat; however, there is no spatial overlap with project effects. Effects to birds and bird habitat from the project will be restricted to the ROW and approximately 1 km beyond the ROW (i.e., where indirect effects may occur). Cumulative effects from the Whiteshell Laboratories Pinawa Demonstration Reactor are not expected as disturbance will be located within existing disturbed areas. Other developments, such as processing facilities and waste management, may contribute to cumulative effects to wetlands in the RAA, but details on future projects is not publicly available.

7.4.8.2 Cumulative effects pathways for change in habitat availability

All past and current projects and activities listed in Table 7-16 have contributed to a change in birds and bird habitat availability through clearing and conversion of natural wildlife habitat within parts of the RAA. Existing infrastructure, generating stations, transmission lines, nuclear power and other industrial and processing developments have contributed to direct (i.e., habitat loss or alteration) and indirect changes (e.g., habitat avoidance due to disturbance or edge effects) in wildlife habitat availability. The primary pathways of these effects are through land clearing and/or operation-related disturbances (e.g., noise). Domestic resource use and recreational activities make small contributions to changes in bird habitat availability directly through the creation and use of all-terrain vehicle (ATV) and snowmobile trails and indirectly due to noise disturbance.

7.4.8.3 Mitigation for cumulative effects for change in habitat availability

Mitigation measures that will help avoid, reduce, or eliminate project environmental effects on change in bird habitat availability were presented in Section 7.4.6.2. Additional mitigation measures proposed to reduce the cumulative environmental effects on change in bird habitat availability include the following:

- For Manitoba Hydro projects occurring in the same geographic area, coordinate access requirements to reduce the need to construct additional access roads in areas of bird habitat.

7.4.8.4 Cumulative effects for change in habitat availability

Land clearing is one of the key factors affecting the availability of bird habitat in the RAA. Approximately 14.5% of the RAA has been modified by agriculture and development. Construction of the project and decommissioning of P3/P4 (Pointe due Bois to Lee River segment) will increase the density of linear features (e.g., access roads, ROW) in the RAA by less than 1%. Decommissioning P3/P4 (Lee River to Winnipeg) may have a short-term indirect effect on birds due to sensory disturbance but overall will benefit birds by reducing landscape level fragmentation and increasing habitat availability.

7.4.8.5 Cumulative effects pathways for change in mortality risk

All past and current activities have contributed to a change in mortality risk for birds inhabiting the RAA. Agricultural practices contribute to bird mortality via hazards associated with the operation of farming equipment, roads and highways elevate mortality risk to birds through bird-vehicle collisions, and overhead wires (e.g., transmission lines) elevate risk through bird-wire collisions. Operation of generating stations, power plants, and other facilities have vehicle traffic that contributes to bird mortality risk. Domestic resource use, such as hunting, has and continues to be an activity that increases bird mortality risk throughout the RAA.

Future developments including Slave Falls Generating Station modifications, decommissioning of P3/P4 (Lee River to Winnipeg) transmission line and construction of Pinawa Demonstration Reactor may have residual effects on bird mortality risk that interact with the project's residual effects. The primary pathway for these interactions is through collision with project construction and/or operation vehicles.

7.4.8.6 Mitigation for cumulative effects for change in mortality risk

To reduce potential bird mortality risk, existing trails and roads will be used to access the P3/P4 ROW to the extent possible. The mitigation measures suggested for cumulative effects for change in habitat availability (Section 7.4.6.3) are also applicable for the cumulative effects for change in mortality risk.

7.4.8.7 Cumulative effects for change in mortality risk

The modified landscape of the RAA has already been and continues to be a source of mortality risk to birds due to ongoing agriculture, recreational use, resource use, and presence of roads, traffic, and transmission projects. Increased traffic associated with decommissioning P3/P4 transmission lines, the Slave Falls Generating Station project, and the nuclear power project may elevate bird mortality risk through bird-vehicle interactions.

The cumulative effect for change in bird mortality risk is adverse as mortality risk will increase for some birds in areas of the RAA; however, the magnitude of this effect is low as some of the projects are in disturbed areas. Residual cumulative effects of change in mortality risk will be continuous yet reversible upon completion of P3/P4 decommissioning, power plant construction, and generating station upgrades.

7.4.8.8 Summary of cumulative effects

This section summarizes the cumulative effects analysis for change in bird habitat availability and change in mortality risk. Table 7-17 characterizes the cumulative environmental effects of the project and other current and future projects and activities on birds and bird habitat.

Table 7-17: Residual cumulative effects on birds and bird habitat

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect on change in habitat availability							
Residual cumulative effect	A	L	RAA	MS	LT	C	R
Contribution from the project to the residual cumulative effect	When current and reasonably foreseeable future project effects on bird habitat are considered, the project's contributions to direct change in habitat availability will be low in magnitude. Contributions of indirect effects on habitat availability are also expected to be small due to winter construction. Furthermore, routing has avoided large tracts of intact habitat (e.g., forests, wetlands), and protected areas. Indirect effects on habitat resulting from						

	construction noise and activity are expected to be localized and short-term						
Residual cumulative effect on change in mortality risk							
Residual cumulative effect	A	L	RAA	MS	LT	C	R
Contribution from the project to the residual cumulative effect	When current and future project effects on bird habitat are considered, the project's contribution to direct change in mortality risk will be low in magnitude. Project routing has avoided large tracts of intact habitat (e.g., forests, wetlands), and protected areas. To reduce mortality risk to birds, ROW clearing will occur outside of the sensitive breeding windows for birds and bird flight diverters will be installed at high collision risk sites. To the extent possible, existing roads and trails will be used to access the PDA during construction						

KEY

Direction:

P: Positive

A: Adverse

N: Neutral

Magnitude:

NMC: No Measurable Change

L: Low

M: Moderate

H: High

Geographic Extent:

PDA: Project Development Area

LAA: Local Assessment Area

RAA: Regional Assessment Area

Timing

NS: No sensitivity

MS: Moderate sensitivity

HS: High sensitivity

Duration:

ST: Short-term

MT: Medium-term

LT: Long-term

Frequency:

S: Single event

IR: Irregular event

R: Regular event

C: Continuous

Reversibility:

R: Reversible

I: Irreversible

N/A: Not applicable

7.4.9 Determination of significance

With mitigation, the residual project effects on birds and bird habitat are predicted to be not significant. Residual effects are not expected to threaten the long-term persistence or viability of birds and bird habitat within the RAA, nor are they expected to diminish conservation efforts for the survival, management, and recovery of species at risk and species of conservation concern.

The project will result in the loss or alteration of 201.7 ha (2.3%) of bird habitat within the LAA. Clearing of the PDA will result in the direct loss or alteration of some species at risk habitat but will not affect critical habitat of any listed species.

The anticipated change in habitat within the LAA is predicted to result in a low magnitude project residual effect on bird habitat. Indirect loss or alteration of habitat resulting from sensory disturbance and edge effects are generally expected to be minor and generally limited to the LAA.

During operation, the PDA will become naturalized, providing habitat for a variety of open forest and grassland bird species, including ruffed grouse, and species at risk such as golden-winged warbler, common nighthawk, and eastern whip-poor-will.

Fragmentation effects are also expected to be small. With salvage of P3/P4 (Pointe du Bois to Lee River), the project will contribute 0.013 km/km^2 of new linear disturbance (approximately 0.87% increase above existing conditions).

The project may increase in bird mortality risk within the LAA, primarily through increased project-related traffic. Traffic-related mortality risk will be managed by conducting vegetation clearing outside the migratory bird breeding period (i.e., in the winter) and implementing road safety measures such as speed limits and signage. The application of bird flight diverters will reduce mortality risk in areas that concentrate birds (i.e., at river crossings).

7.4.10 Prediction confidence

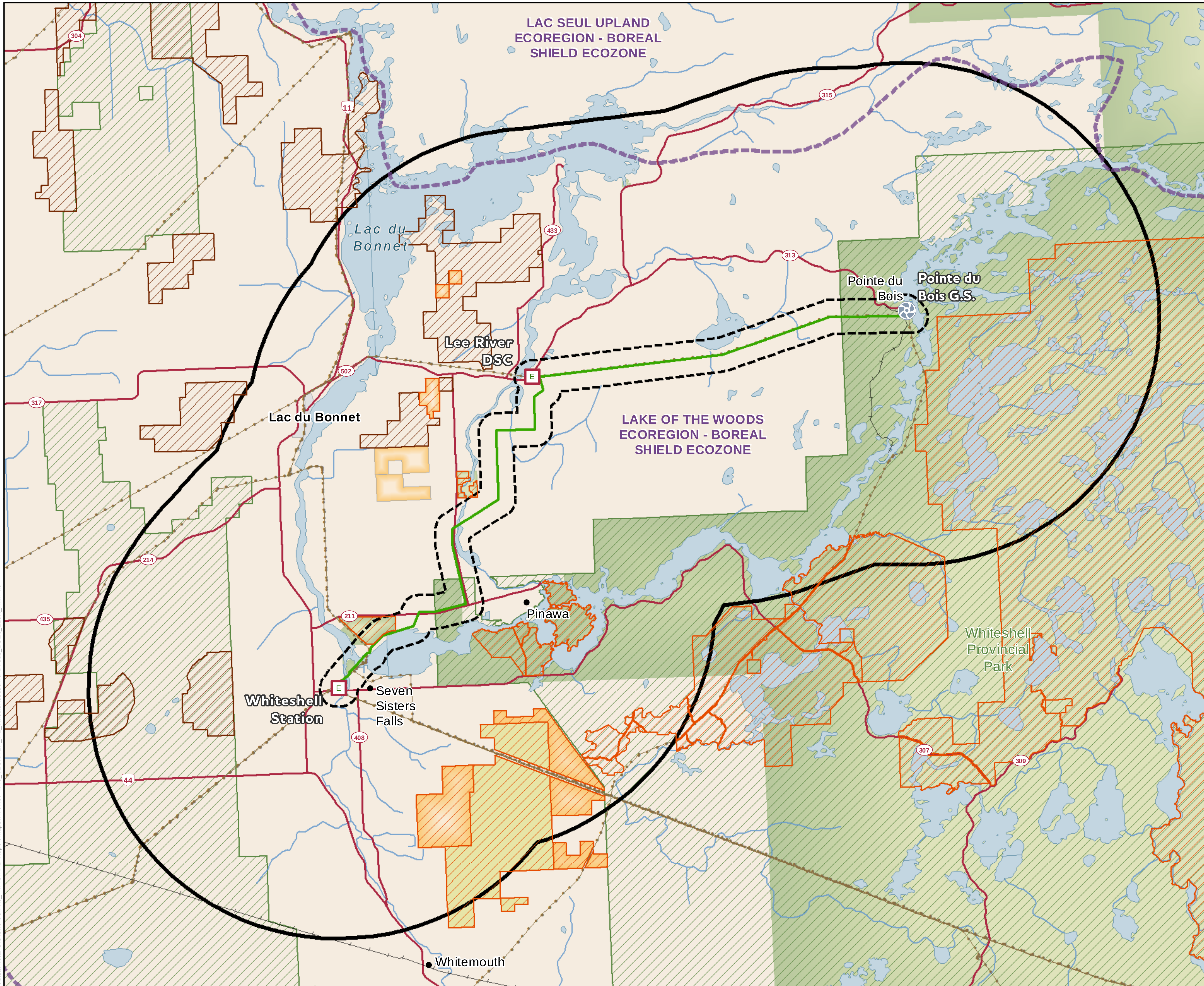
The prediction confidence in the final determination of significance is considered high. This level of confidence is based on:

- The quantity and quality of data available
- Professional judgement and experience with similar projects
- Effectiveness of mitigation measures, which reflect best industry practices

Overall, only a small amount of bird habitat will be lost or altered relative to the RAA and most adverse effects on mortality risk to birds were mitigated during the planning and routing process. Where the project does traverse natural habitat, mitigation measures (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on birds and bird habitat. The level of confidence in the effectiveness of the mitigation measures is high based on past project experience (e.g., Manitoba-Minnesota transmission project, Wuskwatim transmission project, Bipole III transmission project).

7.4.11 Follow-up and monitoring

Due to confidence in predictions, and monitoring results from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, the EPP (Section 11.0) will outline monitoring steps to ensure appropriate rehabilitation and follow-up.



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure

- Final Preferred Route

Assessment Area

- Wildlife LAA (PDA Buffer 1km)
- Wildlife RAA (PDA Buffer 15km)

Existing Infrastructure

- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park
- Provincial Forest
- Protected Area
- Area of Special Interest
- Ecoregion

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

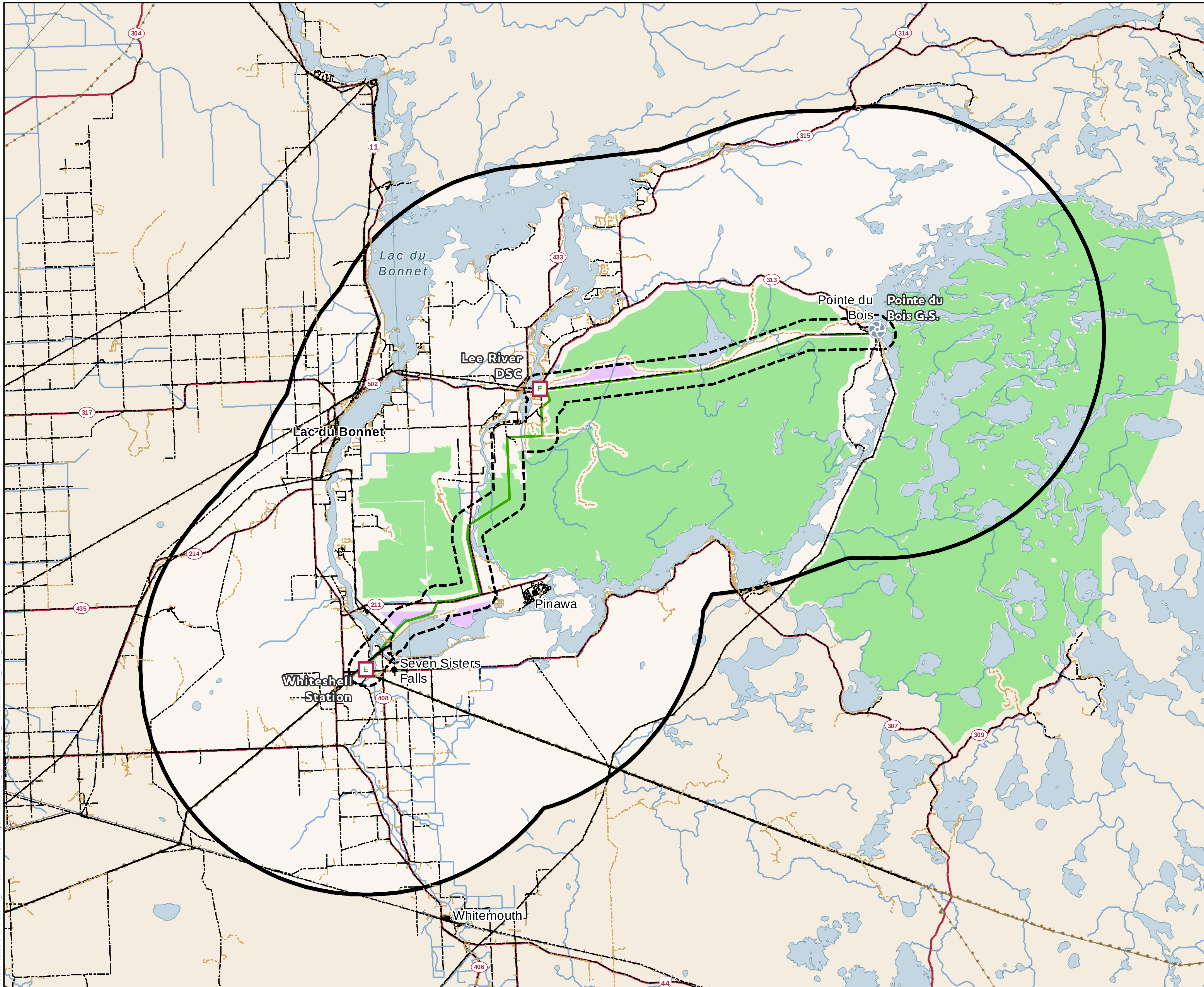
N

0 5 10 Kilometres
0 2.5 5 Miles

1:225,000

Spatial Boundaries for Wildlife and Wildlife Habitat

Map 7-1



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- PDA Buffer 1km
- PDA Buffer 15km

Core Area Size
- Between 200 and 1,000 ha
- Larger than 1,000 ha

Linear Features
- Low Use Linear Feature
- High Use Linear Feature

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 3 6 Miles

1:250,000

Habitat Intactness

Map 7-2

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7.5 Fish and fish habitat

7.5.1 Scope of the assessment

Fish and fish habitat are a valued component because they provide ecological, economical, recreational, and cultural value to stakeholders and resource users and fulfill essential functions that support healthy aquatic environments.

Building on the condition of the existing aquatic environment described in Section 0, this section introduces the regulatory setting for the project, assesses potential project interactions and residual effects on fish and fish habitat, outlines mitigations for managing residual effects, and discusses cumulative effects of the project with existing and future anthropogenic disturbance in the project region.

7.5.1.1 Regulatory and policy setting

<u>Federal regulations and policy</u>

Fisheries Act (1985)

One purpose of the *Fisheries Act* is to provide for the protection of all life stages and species of fish and their habitat (including benthic invertebrates). The *Fisheries Act* includes a prohibition against causing harmful alteration, disruption, or destruction (HADD) of fish habitat and death of fish by means other than fishing, it includes provisions for flow and passage and the introduction of a deleterious substance, and a framework for regulatory decision-making. The Fisheries Protection Policy Statement (2019) outlines how Fisheries and Oceans Canada (DFO) implements the fish and fish habitat protection provisions,

Species at Risk Act (2003)

The federal *Species at Risk Act* (SARA) provides the basis for the protection of species at risk in Canada. This applies to aquatic organisms that listed under Schedule 1 and their critical habitat. The aim of the legislation is to prevent the extirpation or extinction of species, provide recovery strategies for extirpated, endangered, and threatened species, and to manage species of special concern so they do not become threatened or endangered.

Provincial regulations and policy

Manitoba Endangered Species and Ecosystems Act (2018)

Within the framework of the Accord for the Protection of Species at Risk in Canada signed between the federal government and the provinces and territories, the *Manitoba Endangered Species and Ecosystems Act* (MESEA) provides additional protections in complement to SARA at the provincial level for 'Endangered' and 'Threatened' species in the province of Manitoba.

MESEA effectively allows the province to develop and implement plans and protected areas for the conservation of species and ecosystems at risk where they occur on provincial crown lands. The purposes of this Act are:

a) to ensure the protection and to enhance the survival of endangered and threatened species in the province
b) to enable the reintroduction of extirpated species into the province
c) to designate species as 'Endangered', 'Threatened', 'Extinct' or 'Extirpated' or 'Special Concern' at the provincial level

Manitoba Water Protection Act (2005)

The *Water Protection Act* applies to work undertaken in and around Manitoba waterbodies to manage Manitoba's water resources, balancing Manitoba's economic and social needs while sustaining and conserving aquatic environments. The Act provides provisions for the protection of surface water, including surface water quality through the *Manitoba Water Quality Standards, Objectives and Guidelines* (2011). The Canadian Council of the Ministers of the Environment (CCME) maintains guidelines for the protection of aquatic life for several key parameters of water quality. These guidelines are generally accepted in environmental assessment to mitigate project activities such that these guidelines are not exceeded, where it is technically and economically feasible.

7.5.1.2 Consideration of issues raised during engagement

Concerns for fish and fish habitat were raised during project engagement. As there is no instream work proposed, indirect concerns related to degradation of riparian habitat can be extrapolated from concerns broadly relating to the environment, including concerns over the potential for degradation of riparian habitats along right-of-way approaches to watercourse crossings and surface water quality at localized scales.

Concerns were raised during the March 2023 engagement circle (Section 4.2.9) relating to potential project impacts on lake sturgeon associated with proposed works at the Pointe du Bois Generating Station or the crossing over the Winnipeg River near Seven Sisters Generating Station.

7.5.1.3 Spatial Boundaries

The spatial boundaries for the environmental assessment consist of the Project Development Area (PDA) and local and regional assessment areas (i.e., LAA, RAA, respectively), as described below:

PDA: Footprint of the proposed project as described in Chapter 2.0, including the transmission line right-of-way, any additional areas such as borrow pits, marshalling yards and access road allowances.

LAA: Extends 100 m upstream and 300 m downstream from the closest point of the transmission line centreline to the watercourse crossing, and 30 m up-bank from the high-water mark. The 30 m distance is listed in Table A-1 of the Canada Energy Regulator Filing Manual (Canada Energy Regulator 2020) and is recommended as an acceptable distance to protect the riparian area and to buffer effects that construction could have on fish and fish habitat (Alberta Environment and Sustainable Resource Development 2012). Where critical habitat for species at risk is present (i.e., WC-31), a 50 m setback from the high-water mark is recommended (Government of Manitoba 2008) and was considered in fish habitat assessments conducted for the project (Appendix E).

The LAA represents the area where direct effects on fish and fish habitat would be most pronounced or identifiable.

The Government of Manitoba does not provide guidance on the spatial study area boundaries related to transmission line construction. Therefore, the boundaries were derived from the Alberta Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body (Alberta Environment 2001); (Alberta Environment and Sustainable Resource Development 2013). The Code of Practice guidelines establish an expected zone of impact for watercourse crossings. The zone of impact is the area of direct disturbance at the watercourse crossing site (i.e., the PDA) plus the area where 90% of the sediment potentially generated during construction would be deposited.

RAA: The regional assessment area encompasses the PDA and the boundaries of the Winnipeg River watershed, from the Pointe du Bois generating station to the Whiteshell substation near Seven Sisters (Map 6-1). This RAA includes the sub-watersheds of the Whitemouth and Lee Rivers that contribute to the overall catchment of the Winnipeg River within the PDA and are included to encompass regional aquatic ecosystem health.

7.5.1.4 Temporal Boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.5.2 Potential effects, pathways, and measurable parameters

Potential effects on fish and fish habitat were identified based on the project description, planned construction activities and those watercourses crossed by the final preferred route.

In total, 32 watercourse crossings were identified along the final preferred route. Five of these crossings have high-quality, complex fish habitat. For the 23 crossings where high-quality, complex fish habitat is not expected, a precautionary approach was used and all water crossings identified were assumed to provide at least marginal habitat for some species known to tolerate harsh environments (e.g., low dissolved oxygen, high water temperatures).

Potential effects, effect pathways and measurable parameters used to evaluate effects on fish and fish habitat are provided in Table 7-18.

Table 7-18: Potential effects, effects pathways and measurable parameters for fish and fish habitat

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
Change in fish habitat (including habitat and residences	Construction activity on land adjacent to waterbodies supporting fish habitat resulting in changes to bank stability, loss of riparian habitat, sedimentation, or increased erosion potential	Areal extent (m^2) based on fish habitat type and quality (riparian areas, and habitat functionality)

Table 7-18: Potential effects, effects pathways and measurable parameters for fish and fish habitat

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
for species at risk)		Assessment at WC-31 (Whitemouth River) will include review of the potential for destruction of critical habitat, as defined under SARA.
Change in fish mortality risk	Mobilization and transport of sediment resulting in fish mortality from gill abrasion and/or limited foraging ability, or mortality of fish eggs Change in timing, duration, and frequency of flow (e.g., ice bridges and snow fill, temporary water diversion) resulting in fish mortality by stranding, entraining or impinging fish, or by preventing access to spawning areas Entry of a deleterious substance into a waterbody through spills from vehicles, equipment, or containers	Direct mortality of fish estimated by species, numbers, and age classes killed

7.5.3 Residual effects characterization

Residual effects are characterized according to the direction, magnitude, geographic extent, timing, duration, frequency, and reversibility of potential measurable impacts on, or the qualitative change to fish and fish habitat. These parameters are described below in Table 7-19 and provide the basis for evaluating residual effects associated with the project.

Table 7-19: Characterization of residual effects on fish and fish habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to fish and fish habitat relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to fish and fish habitat relative to baseline. **Neutral –** no net change in measurable parameters for the fish and fish habitat relative to baseline.
Magnitude	The amount of change in measurable parameters relative to existing conditions	**Negligible –** no measurable change in the effect can be noted. **Low –** a measurable change to fish and fish habitat that is within applicable guidelines, legislated requirements and/or federal and provincial management objectives, or that does not affect the sustainability and productivity of fish populations **Moderate –** Measurable change in fish and fish habitat that is not within applicable guidelines, legislated requirements and/or federal and provincial management objectives but does not affect sustainability and productivity of fish populations **High –** Measurable change in fish and fish habitat that is not within applicable guidelines, legislated requirements and/or federal and provincial management objectives, and that is

Table 7-19: Characterization of residual effects on fish and fish habitat		
Characterization	Description	Quantitative measure or definition of qualitative categories
		likely to affect sustainability and productivity of fish populations
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA –** residual effects extend into the LAA **RAA –** residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to fish and fish habitat.	**No sensitivity -** Effect does not occur during sensitive life stage (e.g., outside fish spawning periods) or timing does not affect fish and fish habitat. **Moderate sensitivity -** Effect may occur during a lower sensitivity period of a critical life stage; for many species this is the start or end of the critical period (e.g., several days before the spawning period, or after eggs have hatched and fry are mobile). **High sensitivity -** Effect occurs during a critical life stage (e.g., spawning period)
Duration	The time required until the measurable parameter returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** Effects that generally are limited to the construction phase of the project (i.e., less than two years) or the recovery cycle of a biological component **Medium-term –** Effects that extend throughout the construction phases of the project or that occur within one or two generations of recovery cycles

Table 7-19: Characterization of residual effects on fish and fish habitat		
Characterization	Description	Quantitative measure or definition of qualitative categories
		Long-term – Effects that extend greater than 50 years, or are permanent, or that extend for two or more generations of recovery cycles
Frequency	Identifies how often the residual effect occurs and how often during the Project or in a specific phase of the Project	Single event – occurs once **Multiple irregular event –** occurs at no set schedule **Multiple regular event –** occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

7.5.4 Significance definition

A significant adverse residual effect on fish and fish habitat is one that, following the application of avoidance and mitigation measures, results in:

- The harmful alteration disruption or destruction of fish habitat that is likely, and cannot be offset or
- Fish mortality that threatens the long-term productivity or sustainability of the relevant fishery or
- Effects that are inconsistent with the goals, objectives or activities of legislation, recovery strategies, action plans and management plans for any species at risk or species of conservation concern

7.5.5 Project interactions with fish and fish habitat

Table 7-20 identifies which project activities have the potential to impact fish and fish habitat and result in the identified environmental effect. These interactions are indicated by checkmarks and discussed in the context of effect pathways, standard and project-specific mitigations, and residual effects.

Table 7-20: Project interactions with fish and fish habitat

Project activity	Effects: Change in fish habitat	Effects: Change in fish mortality risk
Transmission line construction		
Mobilization and staff presence	–	–
Vehicle and equipment use	-	-
Right-of-way clearing	✓	✓
Watercourse crossings	✓	✓
Marshalling / fly yards	-	-
Transmission tower construction	-	-
Implodes	-	-
Helicopter use	-	-
Clean-up and demobilization	-	-
Station modification		
Mobilization and staff presence	-	-
Vehicle and equipment use	-	-
Marshalling / fly yard (Pointe du Bois station)	-	-
Realignment of access road (Pointe du Bois station)	-	-
Site preparation (Pointe du Bois station)	-	-
Station footprint expansion (Pointe du Bois station)	-	-

Table 7-20: Project interactions with fish and fish habitat

Project activity	Effects	
	Change in fish habitat	Change in fish mortality risk
Installation of electrical equipment	-	-
Clean-up and demobilization	-	-
Transmission Line and Station Operation and Maintenance		
Transmission line and station presence	-	-
Vehicle and equipment use	-	✓
Inspection and maintenance	-	-
Vegetation management	✓	✓
Decommissioning		
Mobilization and staff presence	-	-
Vehicle and equipment use	-	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	-	-
Rehabilitation	✓	-
Clean-up and demobilization	-	-

✓ = Potential interaction

– = No interaction

The transmission line will span fish bearing waterbodies. The Whitemouth River crossing (WC-31) will have a footprint within critical habitat. In addition, activities near water, such as vegetation clearing, construction within riparian zone, and temporary vehicle or equipment crossings (e.g., ice bridges), have the potential to affect fish habitat.

7.5.5.1 Change in fish habitat

Fish habitat could be affected by

- Right-of-way clearing,
- Temporary water crossings,
- Vegetation management
- Rehabilitation

Right-of-way clearing involves the removal of trees within the riparian zone which can affect adjacent fish habitat (e.g., increased erosion, decrease in shade).

The 50 m riparian buffer on either bank at the Whitemouth River is considered critical habitat for carmine shiner (Government of Manitoba 2008). Clearing of riparian vegetation at the Whitemouth River will alter this critical habitat for Carmine shiner.

Temporary vehicle crossings to support construction activities may be required. Crossing structures with a footprint below the high-water mark have the potential to temporarily alter fish habitat availability (e.g., temporary loss within crossing footprint) and quality (e.g., change in substrate, change in benthic invertebrate availability). Ice bridges and snow fill have the potential to alter downstream flows which can alter fish habitat and affect mortality risk.

Vegetation management has the potential to affect adjacent fish habitat as it will be above the high-water mark but within riparian habitat.

Ongoing vegetation management within carmine shiner critical habitat will result in temporary changes for the duration of operation and maintenance activities.

Rehabilitation has the potential to have a positive effect on fish habitat. After decommissioning, the banks will be allowed to revegetate. Over time larger trees will develop and provide various habitat functions.

7.5.5.2 Change in fish mortality

Fish mortality can be caused by:

- Right-of-way clearing
- Temporary water crossings
- Vegetation management

Fish mortality can be caused by work in riparian areas (e.g., riparian vegetation clearing, temporary vehicle crossings) which can increase the potential for erosion and sedimentation which can have lethal or sublethal effects on fish.

These activities also have the potential to deposit deleterious substances (e.g., hydrocarbons, herbicides) into adjacent waterbodies which can cause direct mortality.

Fish mortality can occur because of work below the high-water mark (e.g., ice bridges and snowfills) that presents risks of causing physical injury to fish (e.g., entrainment), or fish stranding in unsuitable habitat (e.g., low dissolved oxygen, high sediment load, bottom-freezing in winter, disconnected pools of water) leading to fish mortality.

Vehicle and equipment use operating near watercourses can increase erosion and sedimentation and/or introduce deleterious substances into the watercourse.

7.5.6 Assessment of residual environmental effects

7.5.6.1 Analytical assessment techniques

The general approach to assessing potential environmental effects on fish and fish habitat follows the sequence and methods outlined in Chapter 5.0.

<u>Change in fish habitat</u>

Effects on fish habitat are estimated by changes to the riparian area which may result in changes to habitat quality.

Generally, a 30 m riparian area is considered as part of fish habitat. The 30 m distance is listed in the Canada Energy Regulator Filing Manual (Canada Energy Regulator 2020) and is recommended as an acceptable distance to protect the riparian area and to buffer effects that construction could have on fish and fish habitat (Alberta Environment and Sustainable Resource Development 2012).

<u>Change in fish mortality</u>

Changes to fish mortality are estimated qualitatively based on activities that may have lethal effects on fish. These effects can include direct effects (e.g., destruction of fish and/or eggs, entrainment, or impingement of fish from water withdrawal activities related to ice bridge construction) or indirect effects (e.g., mobilization and transport of sediment which leads to mortality (e.g., gill abrasion, reduced foraging ability, mortality of eggs) or the release of a deleterious substance into a waterbody through spills from vehicles, equipment, or storage containers that result in mortality. Direct mortality is quantitatively measured *in situ* and is not estimated herein.

The proposed works were qualitatively evaluated using DFO’s pathways of effects (DFO 2018) to assess the potential project-related effects. This approach identifies the potential project-related effects that may occur because of the proposed project, evaluates site-specific measures and mitigation, and evaluates if residual effects could result. The project works were evaluated based on DFO's *Measures to Protect Fish and Fish Habitat* (2019) and pathways of effects (2018).

7.5.6.2 Change in fish habitat

Project pathways

Fish habitat may be affected during project construction at watercourse crossings where temporary vehicle, equipment, and/or personnel crossings are required. The design for these crossings is unknown; however, ice bridges and snow fill may be used or other crossing structures (e.g., culvert, clear-span bridge).

Structures with a footprint below the high-water mark (e.g., culvert) will temporarily affect fish habitat for the duration of construction.

Works and footprints above the high-water mark may interact with fish and fish habitat through alteration of riparian areas. Vegetation clearing along the right-of-way at watercourse crossings is required to accommodate construction of the transmission line and access to construction sites.

Post-construction, trees and understory vegetation are cleared to allow for safe and reliable operations. Selective clearing of danger trees may also be necessary beyond the right-of-way where there is a risk of trees falling onto the conductor.

Vegetation clearing to support construction and vegetation management during operation will be above the high-water mark and will indirectly interact with fish and fish habitat through alteration to riparian areas which can affect ecosystem function while not directly altering fish habitat.

Clearing of riparian vegetation, particularly the tree canopy that overhangs watercourses, could reduce cover for fish, reduce shade (which moderates surface water temperature; especially in smaller streams; Larson and Larson 1996) and reduce the available habitat for invertebrates (e.g., insects) or other organisms that are a food source for fish (Wootton 2012; Bonacina et al. 2022).

Increases in water temperature can reduce egg and larval survival in species with lower thermal tolerance thresholds (Taranger and Hansen 2008; Whitney et al. 2013; Rogers et al. 2022) and increase the incidence and spread of infections (Matvienko et al. 2020; Sformo et al. 2021); however, the proposed narrow width of alteration to riparian areas is unlikely to alter water temperature.

Mitigation

Standard industry practices and avoidance measures, along with specific mitigation, will be implemented during construction of the project to reduce or eliminate environmental effects on fish habitat.

DFO's Code of Practice for ice bridges and snow fills (DFO 2022b) and clear span bridges (DFO 2022c) will be followed to avoid non-compliance with the *Fisheries Act*.

To further reduce potential effects, the following mitigation measures will be applied during construction:

- Construction activities surrounding watercourses will take place within reduced risk timing windows. Reduced risk windows for watercourse crossings are based on the Manitoba restricted activity timing windows for the Protection of Fish and Fish Habitat (DFO 2013b).
- Designating a buffer zone, at least 30 m from the ordinary high-water mark (Figure 7-1), around all waterbodies, which limits riparian vegetation removal to trees and tall shrubs:
  - This buffer will extend at the Whitemouth River crossing (WC-31) to 50 m due to the critical habitat present for the endangered carmine shiner.
- Designating machine-free zones, seven (7) m from the ordinary high-water mark, in riparian areas.
- Marking sensitive areas prior to clearing.
- Maintaining or promoting the growth of shrub species in riparian areas.
- Keeping root systems intact during tree removal (thereby not disturbing the soil).
- Implementing erosion and sediment control measures where required for sensitive sites.
- Work crews will be trained in spill prevention.
- Handling petroleum and allied products in compliance with the requirements of Manitoba Regulation 188/2001.
- Storing petroleum and other products more than 100 m from the ordinary highwater mark of watercourses.
- Maintaining machinery to be in good working order and free of leaks.
- Having emergency spill kits on site.
- Using only licensed applicators when herbicides are used.
- Siting marshalling yards and borrow sites at least 30 m from watercourses to avoid interaction with fish and fish habitat.
- Disturbance to waterbodies and riparian areas will be rehabilitated upon completion of construction activities.
- Existing trails, roads and cut lines will be used as access routes.

- New access will be designed and developed to avoid damage to fish habitat.
- Aggregate materials will not be removed from the bed or bank of any watercourse or waterway.
- If minor rutting is likely to occur, watercourse bank and bed protection methods (e.g., construction mats) should be used provided they do not constrict flows or block fish passage.
- Where possible, transmission line approaches and crossings will be perpendicular to the watercourse and will avoid unstable features such as meander bends, braided watercourses, and active floodplains.
- All waste materials (slash) will be stabilized above the HWM to prevent entry into the watercourse.

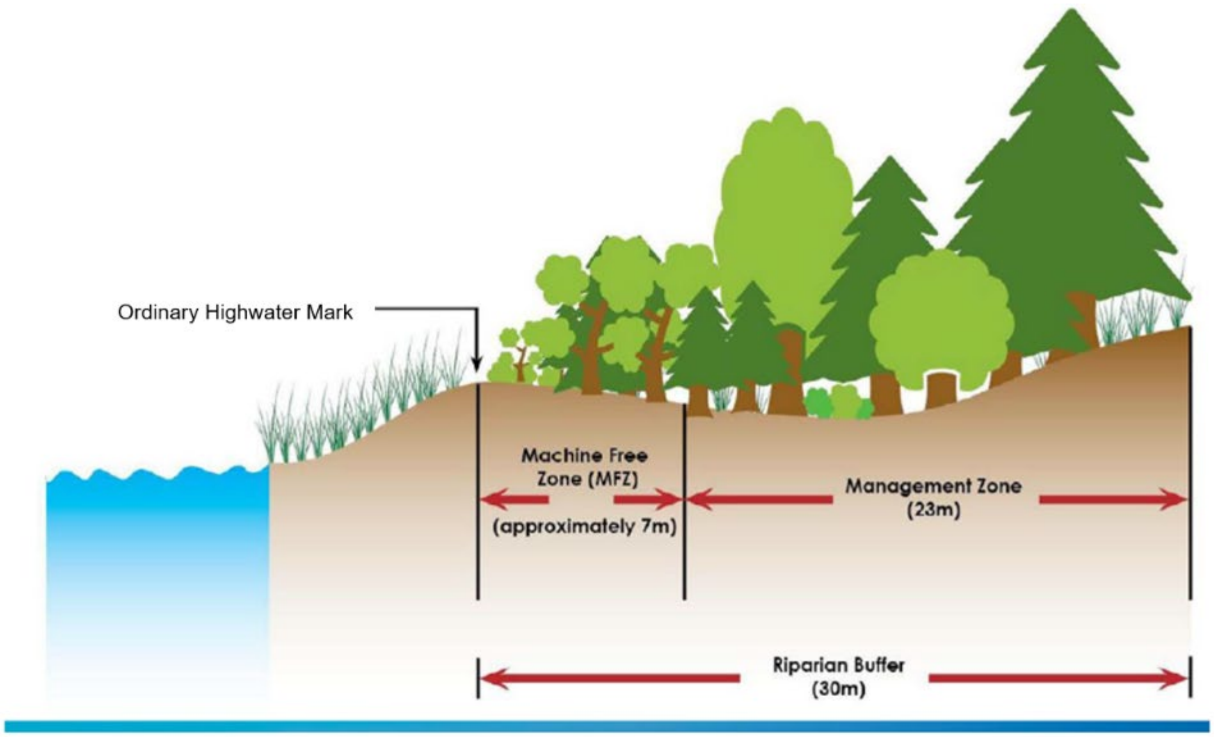


Figure 7-1: Riparian buffers and machine free zones

The following mitigation measures will be applied during operation and maintenance:

- All waste materials (slash) will be stabilized above the HWM to prevent entry into the watercourse
- In riparian areas, vegetation will be maintained in a way that leaves root systems intact

- Riparian vegetation maintenance will be conducted by a method that limits watercourse bank disturbance, and if rutting or erosion is likely, appropriate bank protection measures will be implemented prior to machinery use
- Only chemicals approved by the Pesticide Use Permit will be used
- Application of herbicides will adhere to appropriate general mitigation measures and all chemical applications will be conducted by a certified licensed applicator
- Herbicides will not be applied, other than backpack applications or handgun spot applications, within 30 meters of open water areas
- Herbicides will not be applied to open water or to areas where fish habitat may be affected
- If minor rutting is likely to occur, watercourse bank and bed protection methods (e.g., construction mats) will be used provided they do not constrict flows or block fish passage

Residual effects

At watercourse crossings with potential to support fish habitat, it is expected that with the implementation of proposed mitigation measures, residual project effects on fish habitat will be associated with project construction. These effects are expected to be a result of a decrease in riparian cover.

At the Whitemouth River, with the implementation of proposed mitigation measures, residual effects are not expected if clearing of riparian vegetation and placement of towers within a 50 m critical habitat buffer can be avoided.

Following the application of mitigation measures, the residual effects on fish habitat are deemed not significant.

7.5.6.3 Change in fish mortality risk

Project pathways

Vehicle and equipment use operating near watercourses can cause rutting and soil compaction, especially in saturated floodplains directly adjacent to watercourses. Compacted soils can channelize flow and reduce infiltration of surface water, which may increase erosion and locally alter flow regimes. This can introduce sediment into watercourses and have sub-lethal effects on fish.

Petrochemicals such as gasoline and diesel fuels, oil, lubricants, and hydraulic fluids can leak from machinery and be inadvertently released through maintenance and refueling activities or through accidental spills.

When this occurs near a watercourse, these deleterious substances can directly and indirectly affect fish through direct toxicity or indirectly by affecting trophic food webs (e.g., productivity of sensitive invertebrates that are food for fish).

Further, many hydrocarbons (e.g., polycyclic aromatic hydrocarbons; PAH) are persistent and will remain in the environment for extended periods of time, either bound to sediment or bioaccumulating in aquatic organisms (Jesus et al. 2022).

Equipment used for the application of herbicides may inadvertently introduce contaminants to aquatic ecosystems if care is not taken in their proper application. Herbicides may impact the growth of aquatic plants (i.e., macrophytes) and riparian vegetation and impair the ecosystem functions they provide (Newbold 1975).

Reductions in riparian vegetative cover can lead to increases in erosion and sedimentation through reduced root stabilization of soils and reduced buffering of runoff (Wenger 1999). Increased erosion and sediment transport to watercourses can alter substrate composition (i.e., siltation of aquatic habitat) and impact forage availability through turbidity-related reductions in algae and aquatic invertebrate production (Henley et al. 2000). Sediment deposition in fish spawning habitat can reduce the overall quality of the habitat for fish species that rely on coarse substrates to spawn, and thereby reduce the overall amount of suitable high-quality spawning habitats in impacted watercourses (Fudge et al. 2011).

Suspended sediment in watercourses can have effects that are detrimental to fish health depending on the sediment load. High concentrations of sediment can cause fish mortality and impair fitness through gill abrasion (Sutherland and Meyer 2007; Wong et al. 2013; Suedel et al. 2017) and smothering of eggs (Fudge and Bodaly 1984; Fudge et al. 2011; Suedel et al. 2017).

At lower concentrations, behavioural effects such as increased avoidance reactions (i.e., flight response) may correlate to increased stress and energy expenditure (Sutherland et al. 2008). At higher sublethal concentrations, reduced visual and olfactory acuity may also impact foraging ability and predator/prey interactions (Newcombe and Jensen 1996; Weis and Candelmo 2012).

Silt and clay resulting from erosion on land can also modify the pH of waterbodies and transport pollutants such as pesticides and other contaminants (e.g., petrochemicals) from adjacent lands into waterways. These contaminants may be directly toxic to fish or may bioaccumulate and impair normal physiological processes in adult fish and reduce egg and larval survival (Honda and Suzuki 2020; Kim et al. 2021).

Mitigation

Standard industry practices and avoidance measures, along with specific mitigation, will be implemented during construction of the project to reduce or eliminate environmental effects on fish mortality. To further reduce potential effects, the following mitigation measures will be applied during construction:

- Appropriate erosion and sediment control measures will be implemented to mitigate sediment introduction into watercourses
- Contractor will be restricted to established roads and trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1)
- Construction activities surrounding watercourses will take place within reduced risk timing windows
- Slash/debris piles will be adequately stabilized and stored above the high-water mark
- Project personnel will be prohibited from fishing at project locations or along rights-of-way
- Fuel storage and equipment servicing areas will be located a minimum of 100 m away from the ordinary high-water mark of any watercourse
- Machinery operation will take place outside the water in a manner that limits disturbance to the watercourse shorelines and riparian vegetation
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks
- Equipment or machinery will not be washed in, or within 100 m, of watercourses
- An emergency spill kit will be available on site in case of fluid leaks or spills from machinery
- Use only clean ice/snow for construction of an ice/snowfill or ice bridge. Approaches to the bridge should be constructed with compacted snow and ice of sufficient thickness to protect the watercourse channel and banks. Sand, gravel, and soils are not to be used for ice bridge approaches

The following mitigation measures will be applied during operation and maintenance:

- Herbicides are to be applied in accordance with a Pesticide Use Permit and Pesticide Application Requirements for Manitoba Hydro Employees and Contractors Publication
- Only chemicals approved by the Pesticide Use Permit are to be used

- Application of herbicides will adhere to appropriate general mitigation measures and all chemical applications will be conducted by a licensed applicator
- Herbicides will not be applied, other than backpack applications or handgun spot applications, within 30 meters of open water areas
- Herbicides will not be applied to open water or to areas where fish habitat may be affected

Residual effects

With the application of mitigation measures, residual effects to fish mortality are predicted to be not significant. Direct mortality is not anticipated as work and footprints above the high-water mark do not interact directly with fish. Installation of effective erosion and sediment control measures will effectively mitigate the potential for lethal and sublethal effects on fish and eggs in waterbodies within the PDA and LAA. Risks of fish mortality associated with construction and vehicle use of ice bridges and snow fills used for temporary water crossings are expected to be mitigated by adhering to the DFO code of practice for Ice bridges and snow fills (DFO 2022b) and the interim code of practice for End-of-pipe fish protection screens for small water intakes in freshwater (DFO 2020) if water withdrawal is required.

7.5.7 Summary of residual effects

This section summarizes the project effects analysis for change in bird habitat availability and change in mortality risk. Table 7-21 characterizes the environmental effects of the project on fish and fish habitat.

Table 7-21: Project residual effects on fish and fish habitat

Residual project effect	Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
	Residual effects characterization							
Change in fish habitat	C/O	A	L	LAA	MS	MT	IR	R
Change in fish habitat	D	P	L	LAA	MS	MT	S	R
Change in fish mortality risk	C/O/D	A	N	LAA	NS	ST	IR	I

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning
Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
N: Negligible
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area
Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

N/A: Not applicable

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible

7.5.8 Assessment of cumulative effects on fish and fish habitat

Within the RAA, there is a mixture of agricultural, industrial, municipal, and recreational activities. This section identifies potential activities that may contribute to the cumulative effects with this project and assesses these effects. Some fish habitat in the RAA has been altered by past activities including agriculture, recreational activities, and infrastructure projects which are in or adjacent to waterbodies.

7.5.8.1 Project residual effects with the potential to interact cumulatively

Table 7-22 presents the project and physical activities inclusion list which identifies other project and physical activities that might act cumulatively with the project. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, an effects assessment is carried out.

Table 7-22: Interactions with the potential to contribute to cumulative effects

Other Projects and Physical Activities with Potential for Cumulative Effects	Change in Fish Habitat
Past and Present Physical Activities and Resource Use	
Agriculture	✓
Domestic Resource Use	✓
Recreational Activities	✓
Infrastructure (Water/Wastewater treatment)	✓
Generating Stations	✓
Transmission Lines	✓
Nuclear Power	-
Other Industrial Processing Developments/Facilities	-
Future Physical Activities	
Infrastructure (Water/Wastewater treatment)	✓
Slave Falls Generating Station Sluiceway Life Extension Project	–

Table 7-22: Interactions with the potential to contribute to cumulative effects

Other Projects and Physical Activities with Potential for Cumulative Effects	Change in Fish Habitat
Nuclear Power	–
Other Industrial Processing Developments/Facilities	-
Waste Management	-

✓ Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– Interactions between the residual effects of other projects and residual effects of the project are not expected.

Effects identified in Table 7-22 which are not likely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further.

The project is not expected to have residual effects on fish mortality and therefore do not interact cumulatively with other projects and physical activities and are not assessed further.

Future upgrades to the Slave Falls Generating Station will not have an overlap with expected project effects; however, changes in flow regimes may affect habitat upstream and downstream of Slave Falls but should not interact with the project.

Future transmission projects may interact cumulatively with the project if there are watercourse crossings that are beyond the project right-of-way on previously undisturbed areas with intact fish habitat.

Other developments, such as water/wastewater treatment facilities, may contribute to cumulative effects on fish habitat in the RAA, but details on these projects are not publicly available.

7.5.8.2 Cumulative effects pathways

Present and future activities have the potential to result in temporary or permanent loss of fish habitat or temporary or permanent alteration of fish habitat due to:

- placement of temporary and permanent structures below the high-water mark
- clearing of riparian vegetation
- clearing of the right-of-way and construction of new access points

- temporary and permanent crossings over watercourses

Ongoing agriculture along the route may interact cumulatively with the project through the introduction of increased sediment or contaminant transport through runoff to watercourses. Sediment and nutrients can affect fish habitat through changes to substrate (i.e., introduction of fine material) and promote primary production (i.e., eutrophication).

Cumulative effects are possible through widening of or clearing for new rights-of-way. Removal of riparian vegetation can increase water temperature, limit overhead cover for resident fish, and limit terrestrial input of organic material and terrestrial invertebrates (i.e., food source). In addition, clearing within a 50 m buffer at the Whitemouth River crossing may further impact carmine shiner critical habitat.

Clearing of new right-of-way or construction of new access points can interact cumulatively with potential changes in fish habitat. Increased access and vehicle traffic (e.g., off-highway vehicles) to previously inaccessible land along the new right-of-way from the Lee River distribution supply centre to Seven Sister generating station could also increase the risks of bank erosion, rutting and sedimentation and the introduction of deleterious substances (e.g., petrochemicals) thereby degrading fish habitat.

7.5.8.3 Mitigation for cumulative effects

Project mitigation measures, including working above the high-water mark, working outside of restricted activity timing windows, installation and maintenance of erosion and sediment controls, and reclamation of disturbed areas, will help mitigate residual effects on fish habitat and fish mortality risk. It is expected that other future projects will implement similar measures as many are standard industry best practices and align with the provincial and federal regulatory framework. In addition, the footprint of the project is relatively small, which should reduce cumulative effects.

7.5.8.4 Contribution of the project to cumulative effects

Potential changes to fish habitat through vegetation removal will temporarily alter fish habitat until vegetation is re-established. Temporary alteration of fish habitat is expected from placement of instream structures (i.e., ice/snow bridges). Potential cumulative effects on fish habitat are expected to be low in magnitude and will occur within the LAA.

7.5.8.5 Summary of cumulative effects

Table 7-23 summarizes the expected cumulative effects of past, present, and reasonably foreseeable future projects and activities with the residual effects anticipated for the PW75 project on fish habitat.

Table 7-23: Residual cumulative effects on fish and fish habitat

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual Cumulative Effect in change to fish habitat							
Residual cumulative effect	A	L	LAA	MS	MT	IR	R
Contribution from the Project to the Residual Cumulative Effect	The project's contribution to direct changes in fish habitat will be low in magnitude when current and reasonably foreseeable future project effects on fish habitat are considered. Loss of riparian habitat is expected to be temporary once reclamation efforts are complete and vegetation has established.						

KEY

Direction:
P: Positive
A: Adverse
N: Neutral

Magnitude:
NMC: No Measurable Change
L: Low
M: Moderate
H: High
N/A: Not applicable

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area

Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous

Reversibility:
R: Reversible
I: Irreversible

7.5.9 Determination of significance

With the implementation of mitigation measures described herein, residual project effects on fish and fish habitat are predicted to be not significant. Residual project effects are unlikely to result in a permanent footprint below the high-water mark or exceed applicable water quality guidelines. No temporary footprint is anticipated as works will be completed in the dry.

At the Whitemouth River, there is potential for residual effects resulting in temporary disturbance to riparian vegetation through clearing and maintenance in critical habitat for carmine shiner. Residual effects are anticipated to be related to riparian clearing; however, post-construction restoration of riparian vegetation can reverse the effects of habitat disturbance and reduce the potential for erosion (Reid and Anderson 1999; Polvi et al. 2014).

7.5.10 Prediction confidence

The level of confidence in this prediction is high based on the amount of baseline information available, the nature of the proposed works which include little to no work below the high-water mark, and the effectiveness of Manitoba Hydro's planned mitigation measures.

7.5.11 Follow-up and monitoring

A comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, or if works below the high-water mark and within riparian critical habitat buffers are anticipated, the EPP will outline monitoring steps to ensure appropriate rehabilitation and follow-up (Chapter 11.0).

7.6 Wetlands

Potential project effects on wetlands, including wetland function, are addressed in this section.

Wetlands are areas saturated with water long enough to support aquatic processes indicated by soils lacking oxygen, dominance of wetland dependant plants and biological activity associated with low oxygen (National Wetlands Working Group 1988; Burton and Tiner 2009). Wetlands support plants and assemblages of plants unique from uplands (National Wetlands Working Group 1997; Lichvar et al. 2012) and are important habitat for wildlife.

Wetland loss is estimated to equal 40% to 70% in the prairie pothole region of Manitoba (Government of Manitoba 2017). The Government of Manitoba has recently revised the *Water Rights Act* and *Sustainable Watersheds Act* to help conserve and improve wetlands in Manitoba.

7.6.1 Scope of the assessment

The Project environmental assessment for wetlands is in accordance with the requirements described in provincial guidance documents and federal guidance where appropriate.

7.6.1.1 Regulatory and policy setting

Relevant federal and provincial legislation and policies for effects to wetlands are described below. Other legislation relevant for changes to wetland plants (e.g., weeds and species of conservation concern) and wildlife habitat are discussed in Sections 7.7 (amphibians and reptiles), 7.8 (vegetation), and 0 (terrestrial wildlife).

Federal regulations and policy

Species at Risk Act (SARA)

The purpose of the *SARA* is to prevent the extinction or extirpation of species, provide for the recovery of endangered or threatened species, and prevent other species from becoming at risk through proper management (Government of Canada 2002).

The status of species is assessed and designated by the Committee on the Status of Endangered Wildlife Species in Canada (COSEWIC).

SARA applies to the following:

- Species listed as Extirpated, Endangered, or Threatened under Schedule 1
- Critical habitat designated under the SARA species recovery plans
- Commitments under the National Accord for the Protection of Species at Risk (SAR) (Government of Canada 1996)
- Activities under the Habitat Stewardship Program for species at risk (Government of Canada 2014)

Project construction and operation is subject to the *SARA*. Federally listed species at risk are likely to occur near the project, including near or in wetlands.

Federal Policy on Wetland Conservation

The purpose of the Federal Policy on Wetland Conservation (Government of Canada 1991) is to conserve wetlands to sustain ecological and socio-economic functions.

Conservation and sustainment of wetland functions is targeted through enhancement and rehabilitation, securement, maintenance, and utilization. The Federal Policy on Wetland Conservation applies to wetlands on federal lands and waters and those that receive federal funding, and when permits under other federal regulations are required for effects to environmental resources dependent on wetlands (e.g., disturbance of nests, disturbance of fish).

Provincial regulations and policy

Manitoba Water Rights Act

The Manitoba *Water Rights Act*, and water rights regulations, regulate the alteration and drainage of water in waterbodies, including wetlands, and alteration of wetland condition and wetland extent.

Manitoba Sustainable Watersheds Act

The Manitoba *Sustainable Watersheds Act* regulates watershed districts formed to manage water within the various watersheds of the province. The *Act* was amended in 2017 to strengthen water management requirements and improve project planning and enforcement. No watershed districts are intersected by the Project. The closest watershed is the Northeast Red Watershed District (Manitoba Association of Watersheds).

The Environment Act

A pesticide use permit is required before a herbicide program is implemented. The permit is issued under *The Environment Act*.

7.6.1.2 Consideration of issues raised during engagement

Engagement feedback, including the 2014 environmental assessment report, and discussion with representatives of Manitoba Environment and Climate (Ginette Caillier pers. comm.) indicated effects to wetlands are a concern.

A reduction in the contribution of wetlands or wetland function for managing climate change was expressed as a concern along with concerns about fragmenting currently contiguous, intact areas of wetland wildlife habitat. The potential need to compensate for project effects to wetlands was also raised.

Black River First Nation raised concerns about herbicide use along the right-of-way and suggested having community members employed to clear these areas prior to construction.

Concerns were raised regarding herbicide use and participants requested that Manitoba Hydro not use herbicides along the right-of-way for vegetation management.

Mitigation was suggested to harvest plants and seeds for reclamation prior to construction. In addition, Indigenous groups would like the opportunity to harvest medicinal plants prior to construction.

7.6.1.3 Potential effects, pathways, and measurable parameters

The wetland assessment is focused on project effects with potential to alter wetland abundance and function. Potential effect pathways and measurable parameters used to assess potential effects on wetlands are provided in Table 7-24.

Table 7-24: Potential effects, effects pathways and measurable parameters for wetlands

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
Change in wetland abundance	Direct loss of wetlands arising from vegetation clearing and ground disturbance	Area (ha) of wetland types lost Spatial distribution of wetland types lost
Change in wetland function	Direct and indirect alteration of wetland plant composition and structure from vegetation clearing, ground disturbance and introduction or establishment of regulated weeds and non-native invasive species, or plant disease and pests Altered wetland hydrology or water quality	Area (ha) of wetland types lost or altered Qualitative assessment of altered hydrology and water quality

7.6.1.4 Spatial boundaries

The following spatial boundaries are used to assess effects to wetlands (Map 7-3):

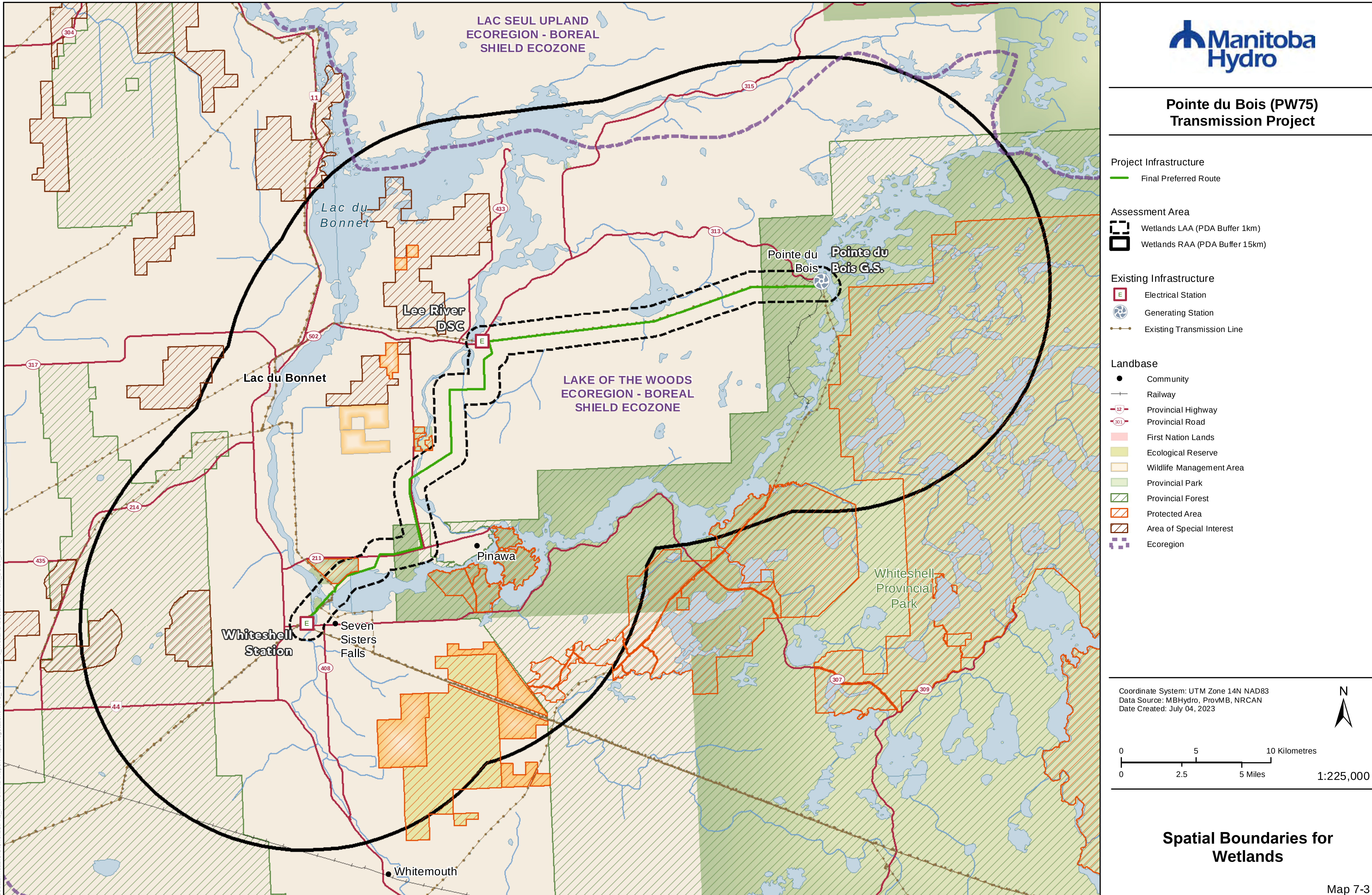
- Project Development Area (PDA): The PDA is the footprint of the project including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances as described in Chapter 2.0.

- Local Assessment Area (LAA): a 1-km buffer either side of the final preferred route, used to evaluate measurable effects on wetlands. The LAA was chosen so it is large enough to encompass tracts of intact wetland greater than 200 ha as they are important in supporting biodiversity (Environment Canada 2013). This is also consistent with LAA boundaries used by wildlife and for other recent transmission line projects in Manitoba (Manitoba Hydro 2014).
- Regional Assessment Area: (RAA): a 15-km buffer of the final preferred route, used to capture information on a broader area to provide regional context, consistent with other recent transmission line projects in Manitoba (Manitoba Hydro 2015). Wetland information in the RAA is also used to support the wildlife assessment and captures the home range of the most wide-ranging wildlife species.

7.6.1.5 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.


Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment Area
Wetlands LAA (PDA Buffer 1km)
Wetlands RAA (PDA Buffer 15km)
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway
Provincial Road
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Provincial Forest
Protected Area
Area of Special Interest
Ecoregion
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0 5 10 Kilometres
0 2.5 5 Miles
1:225,000
Spatial Boundaries for Wetlands
Map 7-3
LAC SEUL UPLAND ECOREGION - BOREAL SHIELD ECOZONE
LAKE OF THE WOODS ECOREGION - BOREAL SHIELD ECOZONE
Lac du Bonnet
Lac du Bonnet
Lee River DSC
Pointe du Bois
Pointe du Bois G.S.
Pinawa
Whiteshell Station
Seven Sisters Falls
Whitemouth
Whiteshell Provincial Park
304
11
315
433
313
502
317
214
435
211
408
44
307
309
406

7.6.1.6 Residual effects characterization

Table 7-25 presents definitions for residual environmental effects on wetlands.

Table 7-25: Characterization of residual effects on wetlands

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters in a direction beneficial to wetlands and wetland function relative to baseline. Adverse – a residual effect that moves measurable parameters in a direction detrimental to wetlands and wetland function relative to baseline. Neutral – no net change in measurable parameters for the wetlands and wetland function relative to baseline.
Magnitude	The amount of change in measurable parameters or the wetlands relative to existing conditions	No Measurable Change – no measurable change in the effect can be noted. Low – a measurable change in wetlands, but unlikely to affect sustainability in the LAA and no effect on wetland ecological community of conservation concern (ECCC), wetland dependent plant species of conservation of concern (species of conservation concern) and no loss of wetland function. Moderate – measurable change affecting the sustainability of

Table 7-25: Characterization of residual effects on wetlands		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		wetland, wetland ECCC or wetland dependent plant species of conservation concern in the LAA, but unlikely to affect sustainability in the RAA. Loss of wetland function limited to the LAA. High – measurable change affecting the sustainability of wetlands, wetland ECCC or wetland dependent plant species of conservation concern in the RAA. Loss of wetland function in the RAA.
Geographic Extent	The geographic area in which a residual effect occurs	PDA – residual effects are restricted to the PDA LAA – residual effects extend into the LAA RAA – residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the wetlands.	Moderate sensitivity - Effect occurs during winter when wetlands are dry or frozen, including soils, and plants are dormant and less sensitive to activity. High sensitivity - Effect occurs during spring or summer when wetlands are flooded or soils are saturated, and plants are actively growing or flowering.

Table 7-25: Characterization of residual effects on wetlands		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Duration	The time required until the measurable parameter or the wetland returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – the residual effect is restricted to the construction phase Medium-term – the residual effect extends through to completion of post-construction reclamation Long-term – the residual effect extends beyond the life of the Project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event Multiple irregular event – occurs at no set schedule Multiple regular event – occurs at regular intervals Continuous – occurs continuously
Reversibility	Pertains to whether a measurable parameter or the wetland can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed

7.6.1.7 Significance definition

A significant adverse residual effect on wetlands is one that, following the application of avoidance and mitigation measures threatens the long-term persistence or viability of wetland communities or wetland dependent species, including those of cultural or traditional importance, or results in complete removal of a particular function from an assessment area (PDA, LAA, or RAA).

7.6.2 Project interactions with wetlands

Table 7-26 identifies, for each potential effect, the physical activities that might interact with the VC and result in the identified effect.

Table 7-26: Project interactions with wetlands

Project activity	Effects	
	Change in wetland abundance and distribution	Change in wetland function
Transmission Line Construction		
Mobilization and staff presence	-	-
Vehicle and equipment use	–	✓
Right-of-way clearing	–	✓
Watercourse crossings	–	✓
Marshalling / fly yards	✓	✓
Transmission tower construction	✓	✓
Implodes	–	–
Helicopter use	–	–
Clean-up and demobilization	–	✓
Station Modification		
Mobilization and staff presence	–	✓
Vehicle and equipment use	✓	✓
Marshalling / fly yard (Pointe du Bois station)	✓	✓
Realignment of access road (Pointe du Bois station)	✓	✓
Site preparation (Pointe du Bois station)	✓	✓

Table 7-26: Project interactions with wetlands		
Project activity	Effects	
	Change in wetland abundance and distribution	Change in wetland function
Station footprint expansion (Pointe du Bois station)	✓	✓
Installation of electrical equipment	–	–
Clean-up and demobilization	✓	✓
Transmission Line and Station Operation and Maintenance		
Transmission line and station presence	–	–
Vehicle and equipment use	–	✓
Inspection and maintenance	–	✓
Vegetation management	–	✓
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	–	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	–	✓
Rehabilitation	–	✓
Clean-up and demobilization	–	✓

✓ = Potential interaction

– = No interaction

Change in wetland abundance could be affected by marshalling / fly yards, access routes, and transmission tower construction. These activities will require vegetation clearing and ground disturbance.

Electrical transmission structure foundation footprints equal 3 m^2 for self-supporting suspension structures and 4 m^2 for self supporting angle and dead-end structures. Transmission structures are generally placed beyond wetland boundaries or on wetland edges, when possible, but full wetland avoidance is not expected.

Marshalling / fly yards and camps will be in areas of existing disturbance where possible, but some locations may be in areas of natural vegetation and disturbance to wetlands may occur.

A change in wetland abundance is also expected for decommissioning of the existing P3/P4 transmission line, and is included under the transmission tower construction activity, and clean-up and demobilization; however, changes are likely positive as these areas will be rehabilitated.

Some new access may be required, including potentially through wetlands. Wetland areas intersected by new access routes are assumed temporarily lost due to ground modification needed to permit safe travel of vehicles and equipment; however, access for transmission line construction will generally be within the ROW and during winter. Access to the right-of-way will typically be from adjacent or intersecting roadways or existing trails. The number and location of marshalling yards will be determined once the project has received the required regulatory approvals, but these will either be on frozen ground or will avoid wetlands.

A change in wetland abundance is not expected for vehicle and equipment use, right-of-way clearing, watercourse crossings, and helicopter use during construction as wetland area will be retained. Clearing will alter vegetation, and potentially hydrology conditions but low wetland vegetation (i.e., herbaceous/graminoid plants and low shrubs) and wetland hydrology (e.g., surface water flow paths) will be retained.

No potential changes to wetland abundance are expected from station modifications. Pointe du Bois station expansion will not occur in wetland areas.

Changes from mobilization and staff presence are not expected as existing roads will be used to access station construction areas and staff will be located at camps established for transmission line construction.

No change in wetland abundance is expected during transmission line and station operation and maintenance as disturbance will be limited to periodic inspection by ground and air and full vegetation removal will not occur. Hydrology patterns will also be maintained.

Changes in wetland function could occur during all stages of the project. Changes are most likely to occur during transmission line construction and station modification due to the removal of vegetation layers (e.g., trees and shrubs), including for vehicle access, and right-of-way clearing.

Changes to wetland function are not expected for implodes and helicopter use during transmission line construction; installation of electrical equipment during station modification; and transmission line and station presence during transmission line and station operation and maintenance as vegetation removal is included under other activities.

Vegetation and wetland hydrology will be re-established and maintained following completion of project construction. Water flow paths will not be further altered during operation. Vegetation maintenance will only be conducted for structural layers which could interfere with the safe operation of the transmission line. No additional vegetation removal will occur at the stations following construction. Additional change in wetland function may occur during decommissioning from increased vehicle use, and possible development of new access routes and camps.

7.6.3 Assessment of residual environmental effects on wetlands

7.6.3.1 Analytical assessment techniques

Changes to wetland abundance are estimated by comparing changes in area and location of wetlands and wetland types (e.g., bog – forested, fen – shrubby) in the LAA due to construction, operation, and maintenance, and decommissioning of the project, following application of mitigation. Changes in wetland function are quantified for changes in wetland habitat from changes in plant structure due to the removal of trees and tall shrubs and are qualitatively evaluated for potential changes to hydrology and biogeochemistry. Following recommendations of Noble et al. (2011), wetland function assessment includes consideration of current wetland condition, the extent of wetlands, connectivity between wetlands, alteration of surrounding uplands potentially contributing drainage to wetlands and other associated stressors such as soil compaction and weed introduction and spread.

Construction and operations phases are assessed for potential residual effects, compared to existing conditions, following the application of mitigation.

Landcover and tree composition information in the source data sets, and details visible in air photographs in the LAA, were used to re-classify areas to wetland type and cover type (Table 7-27); however, the available information did not always support identification of smaller features such as swamps or bog islands contained in larger wetland complexes.

Table 7-27: Existing wetland abundance in the LAA and RAA

Wetland Type	Cover Type	LAA		RAA	
		Area (ha)	% Area	Area (ha)	% Area
Bog	Bog - Forested	353.4	3.3	409.7	0.2
Fen	Fen - Forested	1,171.3	10.9	25,284.4	11.9
	Fen - Graminoid	357.2	3.3	614.6	0.3
	Fen - Shrubby	844.7	7.8	8,984.4	4.2
	Sub-total	2,373.2	0.2	34,883.3	0.2
Swamp	Swamp - Forested	25.1	0.2	25.1	<0.1
	Swamp - Shrubby	25.7	0.2	178.5	0.1
	Sub-total	50.7	0.0	203.6	0.0
Marsh	Marsh	108.8	1.0	3,423.8	1.6
Shallow Open Water	Shallow Open Water	108.7	1.0	3913.1	1.8
Undifferentiated Wetland	Undifferentiated Wetland – Peatland	0.0	0.0	4,231.6	2.0
	Undifferentiated Wetland – Forested	49.6	0.5	12,322.5	5.8
	Sub-total	49.6	0.5	16,554.1	
Dugout	Dugout	0.0	0.0	3.9	0.0
Wetland Total		3,044.5	28.3	75,945.4	28.0

7.6.3.2 Change in wetland abundance

Project pathways

Wetland abundance, and, potentially, spatial distribution, will be affected during construction. Wetlands are intersected by the final preferred route of the transmission line and may be intersected by marshalling / fly yards, new access routes and expansion and access at the Pointe du Bois station. Wetland loss will be restricted to electrical transmission structures, new access and, if present, in the Pointe du Bois station expansion area. Wetlands are abundant in the LAA, occupying 28.2% of the LAA (3,043.1 ha), and although there is some flexibility in the spacing of transmission structures, full wetland avoidance is likely not possible. Marshalling / fly yards, camps, and new ROW access routes will avoid wetlands whenever possible. Marshalling / yards, camps, and new ROW access routes will be graded and leveled as needed. Unavoidable wetland areas intersected by marshalling / fly yards and new ROW access routes not required for transmission line operation and maintenance will be rehabilitated following construction.

Trees and shrubs within the transmission ROW portion of the PDA and new marshalling / fly yards will be removed and full vegetation removal will occur at electrical transmission structure locations, new access routes and within the expansion area of the Pointe du Bois Station. Project effects to wetlands from the alteration of wetland conditions due to the removal of trees and shrubs, and associated indirect effects from project construction, operation, and maintenance are expected and are discussed in the change to wetland function section (section 7.6.3.3).

Mitigation

Standard industry and project-specific mitigation measures will be used during construction and operation to help avoid and manage potential effects to wetlands. The final transmission route considered environmental effects, including wetlands, but existing wetland abundance and spatial extent prevent full wetland avoidance. To help further reduce potential effects to wetlands the following mitigation measures will be used:

- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed during ROW clearing

- Riparian buffers shall be a minimum of 30 m and increased in size based on slope of land entering waterway (Section 11.7.4). Within these buffers, shrub and herbaceous understory vegetation will be maintained along with trees that do not violate Manitoba Hydro vegetation clearance requirements
- Surface water runoff will be directed away from disturbed and erosion-prone areas but not directly into waterbodies
- Natural drainage patterns and flows will be maintained to the extent possible
- Clearing methods that do not disturb soil will be employed in areas that have to be cleared within the 30 m buffer zone
- Erosion protection and sediment control measures will be implemented prior to grading, in accordance with the erosion and sediment control plan (Section 11.7.5.5). Grading will be directed away from wetlands. Stockpiled materials from grubbing will not block natural drainage patterns
- Temporary berms, cross ditches or silt fences will be installed between wetlands and disturbed areas when deemed necessary by the environmental inspector. Subsoil and topsoil material will be replaced, and pre-construction contours and drainage patterns will be re-established within wetland boundaries as soon as possible following construction
- Vehicle, equipment and machinery maintenance and repairs will be conducted in designated areas located at least 100 m from the normal high-water mark of a waterbody, riparian area, or wetland, unless approved by a Manitoba Hydro environmental officer, where additional mitigations measures will apply
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil, and fluid leaks, and will be immediately shutdown and repaired if any leaks are found. All machinery working near watercourses will be kept clean and free of leaks
- Environmental protection measures for working in and around wetlands will be reviewed with the contractor and employees prior to commencement of any construction activities.
- Disturbed wetland areas along transmission line rights-of-way will be rehabilitated in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
    - The plan will include objectives for the restoration of natural conditions, wildlife habitat and aesthetic values, and for erosion protection, sediment control, non-native and invasive plant species management, as required.

Residual effects

The PDA will intersect 61.6 ha of wetland beyond the existing P3/P4 electrical transmission line right-of-way (18.7% of the PDA) (Table 7-28; Map 6-3).

Wetlands intersected by the PDA include bogs, fens, swamps, marshes, and shallow open water wetlands. Most of the PDA intersects with wetlands are with bog and fen wetlands, including forested, shrubby and graminoid types; however, the greatest percentage intersected, relative to existing abundance in the LAA, is swamp – forested wetlands, 13.0% of existing area of this wetland type in the LAA (3.2 ha intersected).

Changes in wetland vegetation from the project will include the clearing of trees and shrubs along the right-of-way, and full vegetation removal at transmission structures, along new access routes, and at marshalling / fly yards and camps if wetland avoidance is not possible. No wetlands are intersected by the planned Pointe du Bois Station upgrade.

Trees and tall shrubs will be cut to ground level within the right-of-way and grubbing will be limited to tower foundation sites and the right-of-way centerline trail to reduce root damage. Low shrubs and groundcover vegetation (i.e., forbs, graminoids and ferns and fern allies) may be damaged or removed due to ground disturbance from vehicle traffic. Damage and loss of groundcover vegetation will be greater in wetland areas if soils are not frozen when accessed; particularly in bogs, fens, and swamps with deep organic soils (i.e., peat).

Additional wetland areas along the existing P3/P4 electrical transmission line will also be intersected by the right-of-way, including shrubby and graminoid fens, marshes and shallow open water wetlands, and low shrubs and groundcover vegetation may be damaged or lost by vehicle traffic. Tree and tall shrub removal will not occur along the existing P3/P4 right-of-way as it has been maintained in a graminoid/low shrub condition.

No wetland type or individual wetlands will be lost in the LAA because of the project; however, a larger percentage of the swamp – forest wetland type, an uncommon wetland cover type in the LAA, is intersected. Swamp - forest may also support locally uncommon habitats (section 7.6.3.3). Alteration of wetlands from intersection with the PDA will range from 1.4% of existing area for the fen – forested wetland cover type, to 13.0% for swamp - forested wetland cover type (Table 7-28). The size of individual wetlands intersected by the PDA may be reduced due to temporary infilling due to unavoidable intersects with marshalling / fly yards and new right-of-way access routes, but the wetlands extend beyond the PDA and will be retained following construction.

Three wetland plant species of conservation concern, bladder sedge (*Carex intumescens*), arrow-leaved tear-thumb (*Persicaria sagittate*), and sensitive fern (*Onoclea sensibilis*), will be affected by the PDA. In addition, eight plant species of conservation concern observed during field surveys beyond the PDA occur in wetlands (Appendix F) and one of the plant species at risk present in the ecoregion intersected by the RAA occurs in wetlands, Great Plains ladies'-tresses (*Spiranthes magnicamporum*). Residual effects to wetland vegetation may affect the abundance and distribution of undocumented occurrences of these species.

Seven plants and groups of plants (e.g., willow) of importance to Indigenous groups occur in wetlands, including wild rice (*Zizania* spp.), blueberries (*Vaccinium* spp.), cranberries (*Vaccinium* spp.), Labrador tea (*Rhododendron groenlandicum*), willow (*Salix* spp.), wiikenh (sweet flag [*Acorus americanus*]), and bullrushes (*Bolboschoenus* spp., *Schoenoplectus* spp. *Scirpus* spp.). The abundance of the plants will be reduced in wetland areas cleared or modified. The plants will not be lost from the LAA as they are provincially common species.

Changes to wetland abundance will persist through operation and maintenance. Tree and shrub growth will be controlled to maintain safe operation with trees and shrubs not permitted to grow taller than 2 m. Regenerating trees and shrubs will be periodically cut, or herbicide applied to manage growth. However, no additional wetland loss is expected during operations and maintenance. Wetland abundance will increase following decommissioning and rehabilitation of project disturbances in wetlands.

Areas of wetland loss at transmission structure locations will be present for the life of the project. Wetland areas disturbed by marshalling /fly yards, camps and new access routes will be rehabilitated following completion of construction and wetland conditions re-established.

Table 7-28: Change in wetland abundance from project construction

Wetland Type	Cover Type	Existing Conditions LAA		PDA[1]		Post-Construction Area in the LAA[2]		Post-Construction Area in the RAA[2]	
		Area (ha)	% Area	Area (ha)	% Area	Area (ha)	% Change	Area (ha)	% Change
Bog	Bog - Forested	353.4	3.3	7.8	2.4	345.6	-2.2	401.9	-1.9
Fen	Fen - Forested	1,171.3	10.9	16.9	5.1	1,154.4	-1.4	25,267.5	-0.1
	Fen - Graminoid	357.2	3.3	11.2	3.4	346.1	-3.1	603.4	-1.8
	Fen - Shrubby	844.7	7.8	16.1	4.9	828.7	-1.9	8,968.3	-0.2
	Sub-total	2,373.2	0.2	44.2	<0.1	2,329.0	-1.9	34,839.2	-0.1
Swamp	Swamp - Forested	25.1	0.2	3.2	1.0	21.8	-13.0	21.8	-13.0
	Swamp - Shrubby	25.7	0.2	1.9	0.6	23.8	-7.3	176.6	-1.1
	Sub-total	50.8	<0.1	5.1	<0.1	45.6	-10.1	198.4	-2.5
Marsh	Marsh	108.82	1.0	2.4	0.7	106.4	-2.2	3,421.4	-0.1
Shallow Open Water	Shallow Open Water	107.36	1.0	2.2	0.7	105.2	-3.2	3,882.2	-0.8

Table 7-28: Change in wetland abundance from project construction

Undifferentiated Wetland	Undifferentiated Wetland – Peatland	0.0	0.0	0.0	0.0	0.0	0.0	4,231.6	<0.1
	Undifferentiated Wetland – Forested	49.6	0.5	0.0	0.0	49.6	0.0	12,322.5	<0.1
	Sub-total	49.6	<0.1	0.0	0.0	49.6	0.0	16,554.1	<0.1
Wetland Total		3,043.1	28.2	61.6	18.7	2,981.5	-2.1	59,297.3	-0.2

[1] PDA includes the construction area of the new PW75 electrical transmission line, salvage of the existing P3/P4 line and expansion area of the Pointe du Boise sub-station. No wetlands are intersected by the Pointe du Bois sub-station expansion area.

[2] Although a reduction in areas is indicated, reduction in wetland area will be limited to temporary infilling from unavoidable intersects with marshalling / fly yards and new ROW access routes.

As wetland abundance will be reduced by the project, effects are considered adverse. The magnitude of effect is moderate. Although no wetland cover type, or wetlands, are lost from the LAA, the project will cause a 13.0% reduction in the abundance of forested swamps by the removal of trees and tall shrubs in the PDA.

This wetland type is uncommon in the LAA and likely includes wetland ecological communities of conservation concern. Although forested swamps have not been identified in the RAA beyond the LAA, this is likely an artifact of the provincial Forestry Resource Inventory mapping used for the RAA. The Forest Resource Inventory mapping in the RAA was re-classed to wetland cover type to better align with the project mapping revised for the LAA and further review would likely identify forested swamps beyond the LAA (See Section 0 for more information).

Forested swamps often occur at the margins of peatlands, such as fens (Halsey et al. 1997) which are abundant in the RAA.

The geographic extent of wetland loss is the PDA, timing is high sensitivity as some activities may occur in the spring and summer when wetland soils and vegetation may be most affected, and duration is long-term as wetland loss will extend for the life of the project. Effect frequency will be a single event as loss will occur during construction. The loss of wetland abundance is considered reversible following the removal of structures at the end of the project life and reclamation of wetland areas.

7.6.3.3 Change in wetland function

Project pathways

In addition to loss of wetland area, the project may also alter the function of remaining wetland areas.

The project will alter wetland community plant structure along the right-of-way, trees and tall shrubs will be removed, and will likely alter wetland plant community composition (i.e., relative abundance of the different plants present), water conditions, including the frequency, duration and depth of surface water, and the accumulation of organic matter. These changes may occur along the right-of-way, and at marshalling / fly yards and new access routes intersecting wetlands or close to wetlands.

No changes to wetland function are expected with the Pointe du Bois Station expansion as no wetlands are intersected and the closest wetland is approximately 500 m west of the station and west of an existing road (Map 6-3).

Removal of trees, and possibly shrubs, may alter wetland water levels due to changes in evapotranspiration. Tree volume can affect the depth to water table in wetlands

(Sarkkola et al. 2010) and changes in water levels can alter the composition of other wetland plants, including vascular plants (Campbell et al. 2016) and bryophytes (i.e., mosses, horworts and liverworts) (Borkenhagen and Cooper 2018). Pinder et al. (2014) also found increased nutrient levels in wetland water outflows associated with tree mortality from increased water levels.

Mitigation

In addition to the mitigation measures identified for reducing potential effects to wetland abundance (Section 7.6.3.2), the following measures will be used to reduce potential changes in wetland function.

- Grubbing will not be permitted within 2 m of standing timber to prevent damage to root systems and to limit the occurrence of blow down
- Only water and approved dust suppression products will be used to control dust on access roads, where required. Oil or petroleum products will not be used
- Approach grades to waterbodies will be reduced to limit disturbance to riparian areas
- Non-herbicide methods such as hand cutting, mechanical cutting or winter shearing will be used to clear the transmission line right-of-way and other sites. If herbicides are required to control vegetation growth, such as noxious/invasive weeds during construction, all applicable permits, and provincial regulations (The Manitoba Noxious Weeds Act) will be followed
- Trees will be felled toward the middle of rights-of-way or cleared areas to avoid damaging standing trees. Trees will not be felled into waterbodies. Danger trees will be flagged or marked for removal using methods that do not damage soils and adjacent vegetation
- Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the Access Management Plan (Section 11.7.5.1)
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
    - The plan will include objectives for the restoration of natural conditions including in wetlands, wildlife habitat and aesthetic values, and for erosion protection, sediment control, non-native and invasive plant species management, as required

Residual effects

Potential residual effects on wetland function will largely be alteration of habitat because of tree and shrub removal along the right-of-way, damage to low shrubs, groundcover vegetation and soils from vehicle and equipment traffic, and vegetation removal at marshalling / fly yards, camp sites and new access routes where full wetland avoidance is not possible.

Trees and shrubs will be removed from 45.9 ha of forested and shrubby wetland along the ROW (1.9% of the existing area in the LAA) (Table 7-28). This change will alter the plant structure of the wetlands, along with physical conditions of light level, temperature, and moisture, and potentially plant composition.

Equipment and vehicle traffic may compact peat and mineral soils if crossings occur when soils are not frozen. Soil compaction, if it occurs, will likely further alter wetland moisture conditions and plant composition.

The strength of change in plant composition from altered wetland physical conditions is not known; however, vascular plant abundance will likely increase, and bryophyte abundance decrease in wetland areas directly disturbed by the project. Bryophyte composition in peatlands is correlated to moisture conditions, as well as other factors such as water chemistry (Vitt 2013; Graham et al. 2016) and shifts in bryophyte composition have been observed with decreased moisture (Miller et al 2015).

Changes will also likely extend into adjacent wetland areas beyond the PDA. Abib et al. (2019) observed change in tree heights and cover out to 50 m from seismic lines, with the greatest affect occurring within 5 m. Although seismic lines differ from transmission rights-of-way (e.g., width, degree of vegetation alteration or removal), tree and shrub removal are common to both.

Edge effects on plant composition from other human disturbances have also been documented (Harper et al. 2005). Effects to adjacent undisturbed wetland vegetation tend to decrease bryophyte cover and forb richness and increase forb abundance (Harper et al 2015). Effects also tend to decrease with time. 112.4 ha of wetland, including 51.6 ha treed and 29.5 ha shrub, occur within 50 m of the ROW (Table 7-29).

Table 7-29: Wetland area where indirect effects most expected

Wetland Type	Cover Type	Area (ha)
Bog	Bog - Forested	12.8
Fen	Fen - Forested	35.6
	Fen - Graminoid	22.7
	Fen - Shrubby	28.1
	Sub-total	86.5
Swamp	Swamp - Forested	3.1
	Swamp - Shrubby	2.4
	Sub-total	9.7
Marsh	Marsh	4.2
Shallow Open Water	Shallow Open Water	5.5
Undifferentiated Wetland	Undifferentiated Wetland – Peatland	0.0
	Undifferentiated Wetland – Forested	0.5
	Sub-total	0.5
Total		115.0

NOTE: Wetland area within 50 m used to quantify area at greatest risk of alteration in physical conditions and plant composition following findings of Abib et al. (2019).

Of the three documented wetland plant species of conservation concern in the PDA, arrow-leaved tear-thumb occurs in shade to part shade and bladder sedge and sensitive fern occur in shade to sunny locations (Minnesota Wildflowers 2023). Altered light conditions near the PDA may reduce the abundance of undocumented occurrences of arrow-leaved tear-thumb near the PDA and would likely not affect undocumented occurrences of bladder sedge and sensitive fern.

The abundance of wetland dependent plants of importance to Indigenous groups will be altered by residual effects to wetland function. Some species will likely increase in abundance, such as blueberries, and others will likely decrease, due to altered wetland physical and vegetation conditions. The plants will not be lost from the LAA or RAA as they are provincially common species.

Changes in wetland physical conditions may also support invasion or increased abundance of weeds. The two weeds observed in the RAA during field surveys, Canada thistle (*Cirsium arvense*), and field sow thistle (*Sonchus arvensis*), are tolerant of wetland conditions and may establish in wetland areas with vegetation and soils damage by the project or where conditions are made drier, particularly near wetland edges.

Canada thistle and field sow thistle are listed as a facultative and facultative upland species in regions of the United States comparable to the RAA (United States Department of Agriculture 2023). Facultative plants occur in wetlands and non-wetlands. Facultative upland plants usually occur in non-wetlands but may occur in wetlands. The two weed species are more likely to establish in marshes or swamps than fens or bogs. The species commonly occur in marshes (Zouhar 2001) and were observed in naturally vegetated uplands, swamps, marshes, and the existing transmission right-of-way. The more consistent soil saturation and low oxygen levels of fens and bogs is expected to limit establishment in these wetland types.

Changes in surface water and groundwater flows are not expected. Alteration of topography will be limited to electrical structure locations, marshalling / fly yards, camps, and new access routes. Surface water flow paths, including inlets, outlets, and watercourses, will be maintained, and the ground will be recontoured to match the surrounding topography at new electrical transmission structures and salvaged P3/P4 structure locations.

Geotechnical assessments were conducted at planned structure locations in 2023 and included evaluation of groundwater conditions. Changes in groundwater inputs and outputs in wetlands are not expected.

Changes to wetland function will persist through the life of the project. Wetland vegetation will be maintained for the life of the project and may be periodically disturbed by vehicles during maintenance activities.

Wetland function will increase following decommissioning and rehabilitation of project disturbances in wetlands.

Potential residual effects to wetland function are considered adverse, moderate in magnitude, limited to the LAA, potentially high sensitivity timing, long-term in duration, but reversible.

Effect magnitude will be moderate as changes in wetland function will affect swamp wetland types which are uncommon in the LAA and potentially supporting ECCC. Effects will extend beyond the PDA but are not expected to extend beyond the LAA. Timing sensitivity is high as operation and maintenance activities may occur during the spring and summer when wetland soils and vegetation may be most affected. Timing sensitivity is low for construction as activity will occur during the winter when soils are frozen or dry and plants are dormant. Effects will extend for the life of the project until decommissioning and rehabilitation.

7.6.4 Summary of residual effects

Table 7-30 summarizes the residual environmental effects on wetlands during construction, operations and maintenance and decommissioning.

Table 7-30: Project residual effects on wetlands

Residual Project Effect	Residual Effects Characterization							
	Project phase	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Change in Wetland Abundance and Distribution	C	A	M	LAA	H	L	S	R
	D	P	L	PDA	M	N/A	S	N/A
Change in Wetland Function	C	A	M	LAA	L	L	C	R
	O	A	M	LAA	H	L	MI	R
	D	P	L	LAA	M	N/A	S	N/A

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning

Direction:
P: Positive
A: Adverse
N: Neutral

Magnitude:
NMC: No Measurable Change
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area

Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous

Reversibility:
R: Reversible
I: Irreversible
N/A: Not applicable

7.6.5 Assessment of cumulative effects on wetlands

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- The project has residual effects on the VC
- The residual effects could act cumulatively with residual effects of other past, present, or reasonably foreseeable future physical activities

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

The project will have residual effects on wetlands, both abundance and function and is expected to act cumulatively with residual effects of other past, present, and reasonably foreseeable future physical activities.

Wetland abundance in the RAA has likely been reduced by past land use activities, including agriculture, residential development, and other human infrastructure such as roads, rail, and electrical transmission lines. Some of these features have also likely reduced the function of retained wetland areas due to alteration of vegetation structure and composition and changes in hydrology and nutrient run-off and from surrounding land use. Agricultural land occupies 3.4% of the RAA and developed land occupies 11.1%. The project will reduce wetland abundance in the RAA by 0.1% (94.1 ha) and potentially up to 13.0% of existing swamp – forested (3.3 ha).

7.6.5.1 Project residual effects likely to interact cumulatively

Table 7-31 presents the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with project residual effects on wetlands. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-31: Interactions with the potential to contribute to cumulative effects	
Other projects and physical activities with potential for cumulative effects	VC
Past and present physical activities and resource use	
Agriculture	✓
Forestry	✓
Mining (including peat mining)	✓
Domestic Resource Use (e.g., hunting, fishing, trapping)	✓
Recreational Activities (e.g., canoeing, snowmobiling)	✓
Infrastructure Projects (roads, rail, utilities)	✓
Generating Stations (Point de Bois, Slave Falls)	✓
Transmission Lines	✓
Nuclear Power (i.e., Whiteshell Laboratories)	✓
Other Industrial and Processing Development/Facilities	✓
Project-Related Physical Activities	✓
Future physical activities	
Slave Falls Generating Station	–
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor [Pinawa Demonstration Reactor]	–

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– = Interactions between the residual effects of other projects and residual effects of the project are not expected.

Future upgrades of the Slave Falls Generating Station will not have an overlapping effect on wetlands affected by the project. The Slave Falls Generating Station upgrades will occur within the existing disturbance footprint and will not require vegetation removal. The Slave Falls Generating Station will require a reduction in water levels on the Winnipeg River, approximately 10 km upstream (north) of the generating station, and this may temporarily alter existing wetland conditions adjacent to the river; however, no wetlands will be affected by both projects. Effects to wetlands from the project will be restricted to the right-of-way and approximately 50 m beyond the right-of-way. Cumulative effects from the Whiteshell Laboratories Pinawa Demonstration Reactor are not expected as disturbance will be located within existing disturbed areas.

7.6.5.2 Cumulative effect pathways

Present and future activities have the potential to results in the loss of wetlands due to infilling or drainage and alteration or loss of wetland function due to the alteration of vegetation, hydrology, and biogeochemistry. Past projects have likely resulted in the loss of wetlands; for example, the conversion of native vegetation to agriculture, and altered wetland function, including from altered nutrient inputs, waterflows and competition from introduced weeds and other non-native invasive plants. Transmission line decommissioning can cause both negative and positive effects. Decommissioning activities may result in similar disturbance related effects as those identified during the project. Once decommissioning is complete, reclamation of the right-of-way may increase the abundance and function of wetlands.

7.6.5.3 Mitigation for cumulative effects

Mitigation, including maintaining natural drainage patterns and flows to the extent possible, erosion protection and sediment control, and reclamation of temporary disturbances will help reduce residual effects to wetlands.

Other future projects are expected to implement similar standard mitigation measures and avoid or minimize effects to wetlands as appropriate. Future requirements under provincial initiatives such as the Manitoba *Sustainable Watersheds Act*, are also expected to support wetland management.

7.6.5.4 Residual cumulative effects

Damage to wetland conditions, including the removal or temporary alteration of vegetation and function, will likely occur during removal of the P3/P4 line Lee River to Winnipeg section. Vehicle and equipment will need to access the existing right-of-way and salvage existing electrical transmission towers. Excavations will also likely be conducted at each tower. Vehicle and equipment movement accessing the right-of-way and along the right-of-way may disturb wetland conditions. Wetland vegetation removal and alteration has not been quantified, but disturbed areas will likely be a few meters at each tower and in unavoidable portions of access routes intersecting wetlands where mitigation is not completely effective. Altered wetland function will likely be limited to altered habitat from damaged vegetation and is expected to be temporary. Vegetation is expected to grow in from adjacent undisturbed areas within a year or two of project completion. Reclamation at structure locations is also expected to improve conditions.

7.6.5.5 Summary of cumulative effects

In summary, the project, in combination with other future projects, will have a small contribution to cumulative effects on wetlands. Project routing took a balanced approach to reduce potential change to wetlands and further opportunities to reduce effects will be examined when identifying new access routes, marshalling/ fly yards and structure locations. Given the expected incremental contribution of the P3/P4 line removal combined with the small project residual effect, cumulative effects on wetlands are expected to be low in magnitude and are not expected to affect wetland sustainability. Effects will occur within the LAA.

7.6.6 Determination of significance

A significant adverse residual effect on wetlands is one that, following the application of avoidance and mitigation measures threatens the long-term persistence or viability of wetland communities or wetland dependent species, including those of cultural or traditional importance, or results in a loss of wetland function.

Residual effects and the project contribution to cumulative effects, following application of mitigation, are predicted to be not significant. Although the project will reduce wetland abundance, potentially reducing the size of wetlands at tower locations and altering the class of some wetlands, the project will only reduce wetland abundance by 0.2% of existing conditions. Indirect effects will extend over a larger area due to changes in light and moisture conditions. The area affected is also small in relation to wetland area in the LAA and RAA (0.4 ha out of 3,044.5 in the LAA and 59,391.4 ha in the RAA). No wetland type or individual wetlands will be lost in the LAA because of the project. Effects to swamp – forested wetlands could equal 13.0%; however, the abundance of this wetland class is likely underestimated. The abundance of wetland plants of importance to Indigenous groups will also be reduced, but the plants will not be lost from the LAA as they are provincially common species.

7.6.7 Prediction confidence

Prediction confidence for wetlands and wetland function is moderate. Wetlands were mapped at a scale allowing identification of individual wetlands and associated types with characteristic vegetation structure and composition (e.g., bog – forested, fen – shrubby, fen – graminoid), and was reviewed and modified using current land use information and subsequently evaluated in the field.

The mapping also supports assessment of wetland function, supporting quantification of changes in wetland habitat (e.g., structure). Quantitative assessment of potential changes in wetland hydrology and nutrient conditions is limited by available data, and studies on the effect of electrical transmission lines on wetland functions. Effects are, however, expected to be limited based on studies of edge effects to wetlands from other linear developments.

Effects conclusions for wetland plants of importance to Indigenous groups and wetland plant species of conservation concern may be underestimated. Publicly available regional data sets on plant abundance by community type are not available for the RAA, or the Lake of the Woods ecoregion, and this limits the understanding of the regional and local abundance of plants of importance to Indigenous groups.

7.6.8 Follow-up and monitoring

Due to confidence in predictions, and monitoring results from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, the EPP will outline monitoring steps to ensure appropriate rehabilitation and follow-up (Section 11.0).

7.7 Amphibians and reptiles

Amphibians and reptiles and their habitat are important because they provide ecological, aesthetic, recreational, economic, and cultural value to Indigenous communities, stakeholders, the public, local businesses, and government agencies.

Amphibians and reptiles favouring wetland habitat for part, or all their life cycle may be vulnerable to changes in habitat availability. Some species of amphibians and reptiles move into upland habitats for part or all their life cycle and may be vulnerable to increased mortality risk as they move across the landscape during construction.

Up to 14 species of amphibians and reptiles can be found in the RAA (Appendix D). Amphibians generally live and breed in or near water, and include salamanders, frogs, and toads. The northern leopard frog (*Lithobates pipiens*) is considered widespread, abundant, and secure throughout its range in Manitoba (MB CDC 2021). However, it is federally listed as a species of special concern under the Species at Risk Act (SARA) due to habitat loss and degradation, particularly in western Canada.

Reptiles, which occur in aquatic and terrestrial habitats and in the RAA, include turtles and snakes. The snapping turtle (*Chelydra serpentina*) is found in the RAA and is considered uncommon throughout its range or in the province (MB CDC 2021). It is listed under SARA as a species of special concern due to reproductive loss because of adult mortality.

7.7.1 Scope of the assessment

This section builds on baseline conditions for amphibians and reptiles and their habitat (i.e., wetlands, uplands) and assesses the effects of project activities on amphibians and reptiles from construction, operation and maintenance, and decommissioning of the project, as well as an assessment of cumulative effects on amphibians and reptiles.

7.7.1.1 Regulatory and policy setting

The following is a list of the regulatory requirements, policies, and guidance that were considered in the assessment of effects on amphibians and reptiles.

<u>Federal regulations and policy</u>

Species at Risk Act (SARA)

The SARA provides protection for Species at Risk (SAR) in Canada. The legislation provides a framework to facilitate recovery of species listed as threatened, endangered, or extirpated and to prevent species listed as special concern from becoming threatened or endangered. species at risk and their habitats are protected under SARA which prohibits:

- The killing, harming, or harassing of endangered or threatened species at risk (sections 32 and 36)
- The destruction of critical habitat of endangered or threatened species at risk (sections 58, 60, and 61)

Project construction and operation is subject to SARA. Of the 14 amphibian and reptile species potentially inhabiting the RAA, two are listed under SARA and/or The Committee on the Status of Endangered Wildlife in Canada.

Provincial regulations and policies

The Endangered Species and Ecosystems Act (ESEA)

The ESEA provides protection to threatened and endangered ecosystems and plant and animal species at risk in Manitoba. The ESEA facilitates the management and development of recovery strategies for threatened, endangered, and extirpated or extinct species to prevent further declines and promote recovery. ESEA-listed species are those that "are of ecological, educational, esthetic, historical, medical, recreational and scientific value to Manitoba and the residents of Manitoba" (Government of Manitoba 2019a).

The Wildlife Act

The Wildlife Act provides general provisions for regulating the activities relating to the take and trade of wild animals in Manitoba. A "wild animal" is defined as "an animal or bird of a species or type listed in Schedule A or declared by the regulations to be a wild animal", and includes select amphibian, reptile and mammal species and most bird species known to exist in Manitoba.

7.7.1.2 Consideration of issues raised during engagement

Issues specific to amphibians and reptiles in the RAA were not raised through consultation with regulators, stakeholders, community members or Indigenous groups.

7.7.1.3 Potential effects, pathways, and measurable parameters

Table 7-32 summarizes the potential environmental effects of the project on amphibians and reptiles, the pathways by which the project may affect amphibians and reptiles, and the measurable parameters for evaluating effects.

Table 7-32: Potential effects, effects pathways and measurable parameters for amphibians and reptiles

Potential effect	Pathway	Measurable parameter
Change in habitat	Direct and/or indirect loss or alteration of habitat due to vegetation clearing, ground disturbance, sensory disturbance and/or edge effects	Amount (ha) of amphibian and reptile habitat (e.g., (wetlands) directly altered by the project
Change in mortality risk	Direct change in mortality risk due to vegetation clearing activities, vehicle collisions, human-wildlife conflicts, and indirect change in mortality risk due to predation.	Total area (ha) of PDA that intersects potential amphibian and reptile habitat (e.g., wetland)

7.7.1.4 Spatial boundaries

The following spatial boundaries are used to assess effects on amphibians and reptiles and their habitat (Map 7-1):

- **Project Development Area (PDA):** The PDA is the footprint of the proposed project as described in Chapter 2.0, including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances.
- **Local Assessment Area (LAA):** The LAA is a 1-km buffer on either side of the final preferred route, which is based on measurable effects of noise on wildlife (e.g., Benitez-Lopez et al. 2010; Shannon et al. 2016), while also considering maximum recommended setback distances for sensitive habitat features (MB CDC 2021). This is also consistent with LAA boundaries used for other recent transmission line projects in Manitoba (Manitoba Hydro 2015).
- **Regional Assessment Area (RAA):** The RAA is a 15-km buffer of the final preferred route used to capture information on a broader scale and to provide regional context. A 15-km buffer encompasses the home ranges or dispersal distances of most wide-ranging species potentially affected by the project and is consistent with other recent transmission line projects in Manitoba (Manitoba Hydro 2015). The RAA is used to assess cumulative effects and the significance of project-specific effects on terrestrial wildlife species (e.g., birds, mammals, amphibians, and reptiles).

7.7.1.5 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.7.1.6 Residual effects characterization

Table 7-33 presents definitions for the characterization of residual environmental effects on amphibians and reptiles. The criteria describe the potential residual effects that remain after mitigation measures have been implemented.

Table 7-33: Characterization of residual effects on amphibians and reptiles

Characterization		Quantitative measure or definition of qualitative categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters in a direction beneficial to amphibians and reptiles relative to baseline Adverse – a residual effect that moves measurable parameters in a direction detrimental to reptiles and amphibians Neutral – no net change in measurable parameters for amphibians and reptiles relative to baseline
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	Change in Habitat[1] Negligible – no measurable change in habitat for amphibians and reptiles, including SAR Low – Project changes less than 10% of amphibian and reptile habitat in the LAA, or

Table 7-33: Characterization of residual effects on amphibians and reptiles

Characterization		Quantitative measure or definition of qualitative categories
		less than 5% of habitat for amphibian and reptile species at risk in the LAA Moderate – Project changes 10-20% of amphibian and reptile habitat in the LAA, or 5-10% of habitat for amphibian and reptile species at risk in the LAA High – Project changes more than 20% of amphibian and reptile habitat in LAA, or more than 10% of habitat for amphibian and reptile species at risk in the LAA Change in Mortality Risk Negligible – a measurable change in the abundance of amphibians and reptiles in the LAA is not anticipated Low – a measurable change in the abundance of amphibians and reptiles in the LAA is not anticipated, although temporary local shifts in distributions in the LAA might occur Moderate – a measurable change in the abundance and/or distribution of amphibians and reptiles in the LAA might occur, but a measurable change on the abundance of amphibians and reptiles in the RAA is not anticipated High – a measurable change in the abundance and/or distribution of amphibians and reptiles in the RAA might occur
Geographic extent	The geographic area in which a residual effect occurs	PDA – residual effects are restricted to the PDA LAA – residual effects extend into the LAA

Table 7-33: Characterization of residual effects on amphibians and reptiles		
Characterization		Quantitative measure or definition of qualitative categories
		RAA – residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC	No sensitivity - Effect does not occur during critical life stage (e.g., effect occurs outside amphibian and reptile breeding periods) or timing does not affect the VC Moderate sensitivity - Effect may occur during a lower sensitive period of a critical life stage; for many species this is the start or end of the critical period High sensitivity - Effect occurs during a critical life stage (e.g., bird nesting periods)
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – the residual effect is restricted to the construction phase Medium-term – the residual effect extends through to completion of post-construction reclamation Long-term - the residual effect extends for the life of the project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event – occurs once Multiple irregular event – occurs at no set schedule Multiple regular event – occurs at regular intervals Continuous – occurs continuously

Table 7-33: Characterization of residual effects on amphibians and reptiles		
Characterization		Quantitative measure or definition of qualitative categories
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed or returned to baseline conditions

[1] Based on benchmarks used for other recent EAs (KHLP 2012; Nalcor 2012; JRP 2014, Manitoba Hydro 2015)

7.7.1.7 Significance definition

A significant adverse residual effect on amphibians and reptiles is defined as one that threatens the long-term persistence or viability of an amphibian or reptile species in the RAA, including effects that are contrary or inconsistent with the goals, objectives, and activities of recovery strategies, action plans, and management plans.

7.7.2 Project interactions with amphibians and reptiles

Table 7-34 identifies, for each potential effect, the physical activities that might interact with amphibians and reptiles and result in the identified effect.

Anticipated interactions between project activities and the potential effects are identified with a check mark and are discussed in detail in Section 7.7.3, in the context of effects pathways, standard and project-specific mitigation, and residual effects. Justification for no effect (indicated by a dash) is provided following the table.

The potential interactions between project activities and amphibians and reptiles were considered for the construction, operation, and decommissioning phases of the project.

The identification of project activities and their potential interactions was based on engagement with interested parties, the professional judgment of technical specialists involved in the assessment, and a review of existing conditions. The selection of interactions is informed by the potential effects and effects pathways for each VC.

Table 7-34: Project interactions with amphibians and reptiles

Project activity	Change in habitat	Change in mortality risk
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Right-of-way clearing	✓	✓
Watercourse crossings	✓	✓
Marshalling / fly yards	✓	✓
Transmission tower construction	✓	-
Implodes	✓	-
Helicopter use	✓	-
Clean-up and demobilization	✓	✓
Station modification		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Marshalling / fly yard (Pointe du Bois station)	✓	✓
Realignment of access road (Pointe du Bois station)	✓	✓
Site preparation (Pointe du Bois station)	✓	✓
Station footprint expansion (Pointe du Bois station)	-	✓
Installation of electrical equipment	-	-
Clean-up and demobilization	✓	✓

Table 7-34: Project interactions with amphibians and reptiles

Project activity	Change in habitat	Change in mortality risk
Transmission line and station operation and maintenance		
Transmission line and station presence	✓	✓
Vehicle and equipment use	✓	✓
Inspection and maintenance	✓	✓
Vegetation management	✓	✓
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓
Rehabilitation	✓	✓
Clean-up and demobilization	✓	✓

Installation of electrical equipment will occur on existing transmission stations (e.g., Lee River distribution supply centre, Pointe du Bois station) and is not expected to interact with change in habitat or mortality risk for the lifetime of the project as there is no pathway for these activities to affect amphibians and reptiles.

Transmission tower construction, implodes, and helicopter use are not expected to cause a change in mortality risk because tower construction activities will be conducted on previously cleared land and there are no pathways for these activities to cause wildlife fatalities.

7.7.3 Assessment of residual environmental effects

7.7.3.1 Analytical assessment techniques

The general approach to assessing potential environmental effects on amphibians and reptiles and their habitat follows the sequence and methods outlined in Chapter 5.0.

Change in habitat was assessed by quantifying direct changes in the amount of wetland habitat available for amphibians and reptiles with and without the project. Direct change in habitat (i.e., habitat loss or alteration) was calculated as the portion of wetlands overlapped by the PDA. Direct effects on amphibian and reptile habitat are anticipated to occur within the PDA (primarily at the tower sites). PDA overlap with northern leopard frog breeding habitat was also calculated.

Indirect change in habitat (i.e., habitat avoidance due to sensory disturbance) was assessed qualitatively as the area of reduced habitat effectiveness adjacent to the PDA. Indirect effects on habitat are confined to the LAA. Potential effects are considered as a whole, inclusive of all seasonal requirements for amphibians and reptiles (e.g., primary breeding periods).

Change in mortality risk was assessed qualitatively by identifying areas of the PDA having potential to concentrate reptiles and amphibians including northern leopard frog during the breeding period.

7.7.3.2 Change in habitat

<u>Construction</u>

Project pathways

During construction, vegetation clearing and grubbing of the right-of-way is the primary activity that will result in a direct and measurable change in amphibian and reptile habitat. Clearing in wetlands will be limited to transmission structures (i.e., tower footprint) and the centre line.

Wetlands are abundant in the LAA, occupying 28.24% of the LAA (3,043.13 ha), and although there is some flexibility in the spacing of transmission structures, full wetland avoidance is likely not possible. Marshalling/fly yards, camps, and new right-of-way access routes will avoid wetlands whenever possible. No wetlands will be intersected by the Pointe du Bois Station expansion.

Sensory disturbance is not anticipated to affect reptiles and amphibians due to the timing of construction activities (i.e., winter) coinciding with periods of reptile and amphibian dormancy.

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects on amphibian and reptile habitat during construction include the following:

Wildlife features (i.e., amphibian breeding ponds) will be identified in the construction environmental protection plan (as outlined in Chapter 11.0) and mitigation applied, such as buffers and/or setbacks prior to clearing. Specific mitigation for amphibians and reptiles includes:

- Clearing activities will not be carried out during the sensitive timing windows for wildlife species without additional mitigation measures such as wetland setbacks. Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1)
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing
- Natural low growing shrub and grass vegetated buffers of 30 m will be delineated around wetlands and waterways
- Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas located at least 100 m from the ordinary high-water mark of a waterbody, riparian area or wetland, unless approved by a Manitoba Hydro environmental officer, where additional mitigations measures will apply
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
- Erosion protection and sediment control measures will be implemented in accordance with the erosion protection and sediment control management plan (Section 11.7.5.5).
- Clearing wastes and other construction debris or waste will not be placed in wetland areas.
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6).
    - The plan will include objectives for the restoration of natural conditions, wildlife habitat and aesthetic values, and for erosion protection, sediment control, non-native and invasive plant species management, as required

- Vegetation maintenance and inspection vehicles will travel at reduced speeds while on the ROW.

Residual effects

Most adverse effects on amphibians and reptiles and their habitat in the LAA were mitigated during the planning and routing process by following existing infrastructure (e.g., established transmission line route [PW75] for approximately 23 km between the Lee River distribution supply centre and Pointe du Bois station, following road allowances along PR 520 and PR 211) to the extent possible, and through consideration of large tracts of intact habitat (e.g., wetlands), and protected areas.

Where the project does traverse natural habitat, mitigation measures (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on northern leopard frog, other amphibians, and reptiles.

Overall, loss of amphibian and reptile habitat is anticipated to be small and localized to the tower foundation footprints. Unavoidable wetland areas intersected by marshalling/fly yards and new access routes not required for transmission line operation and maintenance will be rehabilitated following construction.

Following the implementation of mitigation measures described above, residual effects for change in habitat during construction are characterized by the following:

- Direction is adverse:
    - There will be direct and indirect loss or alteration of amphibian and reptile habitat during construction.
- Magnitude is low:
    - Construction of the project will result in a 2.0% change in amphibian and reptile habitat in the LAA. The magnitude of this change is low (i.e., <10% change in potential amphibian and reptile habitat in the LAA). For northern leopard frog, the magnitude of change in habitat (<0.5% of potential northern leopard frog habitat in the LAA) is also considered low. Indirect effects associated with sensory disturbance are anticipated to be negligible due to timing of constructing during amphibian and reptile winter dormancy period.
- Geographic extent is the LAA:
    - Direct habitat loss will be confined to the PDA; however, indirect effects (e.g., sensory disturbance) will extend into the LAA.

- Timing is no sensitivity:
  - Clearing and construction of the transmission line will occur outside of the breeding period of amphibians and reptiles (i.e., during the winter, frozen conditions).
- Duration is short-term to long-term (depending on project component):
  - Direct effects (i.e., habitat loss) on habitat availability due to clearing and alteration will be permanent because the effects will extend for the lifetime of the project.
  - Indirect effects on habitat availability associated with sensory disturbance from ROW clearing, construction of transmission infrastructure and station upgrades and expansion will be short-term.
- Frequency is a single event:
  - Sensory disturbance associated with ROW clearing will primarily occur once. Habitat alteration will primarily occur once during ROW clearing.
- Change is reversible:
  - Direct effects (e.g., habitat loss) on habitat availability due to clearing and alteration are reversible after the life of the project (e.g., with natural regeneration of ROW vegetation).
  - Indirect effects on habitat availability associated with sensory disturbance from ROW clearing are reversible once activity has ended.

Operation

Project pathways

No additional direct loss of amphibian and reptile habitat is anticipated during operation. Although changes to habitat availability will be most pronounced during construction, the operation phase could continue to have an indirect influence on amphibian and reptile habitat use through periodic disturbance associated with maintenance activities. Noise and activity associated with vegetation management in the PDA (i.e., for controlling noxious or restricted weeds and managing woody vegetation along the ROW), and use of all-terrain vehicles (ATVs) for transmission line inspection, could reduce the effectiveness of habitat by causing some species to avoid the right-of-way and/or adjacent areas until the disturbance has ceased.

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project to change in habitat during operation include the following:

- Natural low growing shrub and grass vegetated buffer areas of 30 m will be delineated around wetlands and riparian zones.
- Vegetation clearing will not be carried out during the sensitive timing windows for wildlife species (CenvPP) without additional mitigation measures such as wetland setbacks.
- Vegetation maintenance and inspection activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas located at least 100 m from the ordinary high-water mark of a waterbody, riparian area or wetland, unless approved by a Manitoba Hydro environmental officer, where additional mitigations measures will apply.
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
- Vegetation maintenance and inspection vehicles will travel at reduced speeds while on the right-of-way.

Mitigation measures provided for the protection of wetlands will also protect amphibians and reptiles (Section 7.6.3.2).

Residual effects

During operation, residual effects on amphibians and reptiles associated with sensory disturbance from equipment used during vegetation management and inspections will have a low residual effect on amphibians and reptiles as transmission line inspection will occur once or twice a year outside of the primary amphibian and reptile breeding window. Vegetation management activities will be repeated over a longer cycle (every five to seven years as required) and will involve the use of less invasive and less destructive techniques than initial clearing to control woody vegetation.

Based on observed use of other existing transmission lines (e.g., MMTP), use of ATVs and other recreational vehicles may occur year-round on portions of the right-of-way. Shrubby vegetation will be maintained where possible to impede ATV access and limit disturbance to amphibians and reptiles. This may also reduce the risk of ATV-triggered wildfires which can have a direct affect on amphibian and reptile habitat.

Following the implementation of mitigation measures described above, residual effects for change in habitat during operation are characterized by the following:

- Direction is adverse:
  - There may be indirect loss of habitat along parts of the ROW due to sensory disturbance. Noise and activity may reduce habitat effectiveness for some species.
- Magnitude is negligible:
  - Indirect effects of sensory disturbance on amphibians and reptiles, including northern leopard frog and snapping turtle, will not be measurable during operation.
- Geographic extent is the LAA:
  - ROW vegetation maintenance is limited to the PDA. However, sensory disturbance could affect amphibians and reptiles just beyond the PDA.
- Timing is moderate sensitivity:
  - Operation of the project will occur during critical life stages (e.g., primary breeding period) of amphibian and reptile species; however, potential disturbance such as vegetation management and transmission inspections will be scheduled outside of the primary breeding period.
- Duration is short-term:
  - Indirect effects on amphibians and reptiles due to sensory disturbance will be short-term (i.e., minutes, hours), as most amphibians and reptiles using wetland habitats on the ROW will return to normal activities once disturbance ceases.
- Frequency is at multiple, irregular intervals:
  - Sensory disturbance from vegetation management, ROW inspections, and recreational vehicle use will occur multiple times at irregular intervals.
- Change is reversible:
  - Indirect effects on ROW and edge habitat due to sensory disturbance (i.e., wildlife avoidance) will be short-term and reversed once activity has ended. The effects of vegetation management along the ROW are reversible after the life of the project with natural regeneration of ROW vegetation.

7.7.3.3 Change in mortality risk

Construction

During construction, heavy equipment used during vegetation clearing and construction of the transmission line may elevate mortality risk by crushing overwintering amphibians and reptiles inhabiting the right-of-way. Vegetation removal could increase mortality risk to amphibians and reptiles by exposing those living in the leaf litter or burrowing/hibernating in the soil.

An increase in construction traffic, particularly during peak periods of workforce movement (e.g., between shifts) and during peak periods of materials delivery will result in a greater potential for amphibian and reptile/vehicle collisions and mortality where roads, access routes, and/or the right-of-way traverse or parallel wetlands, particularly marsh and shallow open water wetlands that have potential to support northern leopard frog. Construction equipment at water crossings has the potential to increase mortality risk to northern leopard frog and snapping turtle moving in and out of rivers (i.e., overwintering habitats).

Predation risk may increase for amphibians and reptiles inhabiting wetlands on the right-of-way or moving across the right-of-way due to loss of vegetative escape cover and increase in habitat fragmentation and edge habitat. Use of the transmission line right-of-way by predators such as raccoon (*Procyon lotor*) and red fox (*Vulpes vulpes*) could result in an increase in northern leopard frog mortality or result in the predation of common snapping turtle eggs or young in the PDA. However, construction noise and activity may reduce predation risk by causing predators to avoid parts of the PDA.

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project to mortality risk during construction includes the following:

- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Clearing and construction activities will not be carried out during reduced risk timing windows for amphibians and reptiles without additional mitigation.
- Machinery operation will take place outside the water in a manner that limits disturbance to the watercourse shorelines and riparian vegetation.
- Selective clearing by feller-bunchers and hand clearing, particularly in environmentally sensitive areas.

Residual effects

Winter clearing and construction will reduce potential mortality risk to reptiles and amphibians because species will be dormant and primarily concentrated at wetlands. Although the right-of-way traverses 61.60 ha of wetland habitat, only 4.6 ha (marsh and shallow open water) has high potential to support amphibians and reptiles in the

PDA and only 0.7 ha is considered potential northern leopard frog breeding habitat. Selective clearing by feller bunches and hand clearing in sensitive wetland areas will reduce mortality risk to amphibians and reptiles hibernating in the peripheries of marsh and shallow open water wetlands.

Following the implementation of mitigation measures, residual effects for change in mortality risk during construction are characterized by the following:

- Direction is adverse:
  - There will be an increase in mortality risk during construction.
- Magnitude is low:
  - With mitigation, the change in mortality risk is anticipated to be low. The project is not anticipated to have population level effects on amphibians and reptiles.
- Geographic extent is the LAA:
  - Direct change in mortality risk will be confined to the PDA.
- Timing is no sensitivity:
  - Construction of the project stations will occur year-round; however, stations lack primary amphibian and reptile habitat. Line construction will be limited to winter months and vegetation clearing will occur outside the critical life stages (e.g., primary breeding period) of amphibian and reptile species in the LAA.
- Duration is short-term:
  - Direct changes in wildlife mortality risk will be elevated during the construction period.
- Frequency is a multiple, irregular event:
  - Change in mortality risk will vary throughout the construction period.
- Change is reversible:
  - Direct change to wildlife mortality risk is reversible with removal of project personnel and equipment. Indirect effects associated with increased predation risk along edge habitat are expected to lessen during the operation phase and are reversible after the life of the project (i.e., with natural regeneration of ROW vegetation).

Operation

Project pathways

The primary pathways that may result in a change in amphibian and reptile mortality risk during the operation phase are associated with right-of-way inspections and vegetation management (e.g., herbicide application), vehicle and equipment use (potentially crushing amphibians and reptiles), and right-of-way presence (potentially improving predator access).

Vegetation management using herbicide has the potential to increase mortality risk to amphibians and reptiles, particularly in areas where they breed and/or overwinter (e.g., marsh, shallow open water, and deep waterbodies such as rivers and lakes). Vehicles and equipment used during vegetation management, transmission line inspection, and/or by recreational users could result in a direct mortality risk to northern leopard frog and snapping turtle, and other less mobile amphibians and reptiles where the right-of-way overlaps with wetland and/or riparian areas.

Right-of-way presence could improve predator access to amphibian and reptile habitats (e.g., wetlands and riparian areas), and transmission towers located near wetlands may increase the availability of perching structures for raptors, potentially resulting in an increase in mortality risk for snakes (Lammers and Collopy 2007).

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project to mortality risk during operation includes the following:

- Vegetation clearing will not be carried out during the sensitive timing windows for wildlife species (CenvPP) without additional mitigation measures.
- Herbicides will not be applied, other than backpack applications or handgun spot applications, within 30 metres of open water areas.
- Vegetation maintenance and inspection vehicles will travel at reduced speeds while on right-of-way.

Residual effects

Mortality risk to amphibians and reptiles during the operation phase is expected to be low, as any additional vegetation clearing will occur outside of the sensitive timing windows for wildlife species. Herbicide application setbacks from open water areas will reduce mortality risk to northern leopard frog and snapping turtle that may congregate near deep, overwintering waterbodies (e.g., rivers) in the fall. Vegetation maintenance and inspection vehicle speeds are expected to be slow and controlled, reducing the risk of collisions with slow-moving amphibians and reptiles attracted to edge habitat to thermoregulate (Klauber 1939; Sullivan 1981; Ashley and Robinson 1996).

Changes in amphibian and reptile predation risk due to the presence of the right-of-way are expected to lessen as it naturally regenerates with grassland and shrub species, increasing cover habitat and softening the transition between the edge and forest habitat. As cover regenerates, access by recreational vehicles will also decrease.

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during operation are characterized by the following:

- Direction is adverse:
  - There will be increased mortality risk.
- Magnitude is low:
  - Habitat modeling indicates 18.70% (61.60 ha) of the PDA overlaps with wetland habitats, and only 2% (4.6 ha) of the marsh and open wetland habitat available in the LAA (216.2 ha) is considered high potential amphibian and reptile habitat (i.e., marsh and shallow open water).
- Geographic extent is the PDA.
- Timing is moderate sensitivity:
  - Operation of the project will occur during critical life stages (e.g., primary breeding period) of amphibian and reptile species; however, vegetation clearing will be scheduled outside of the primary amphibian and reptile period.
- Duration is medium-term:
  - Vegetation maintenance and inspections will occur for the life of the project; however, the effect of change in mortality risk is expected not be measurable.
- Frequency is continuous:
  - Change in mortality risk will occur throughout the operation period.
- Change is reversible:
  - Factors contributing to a change in amphibian and reptile mortality risk are reversible after the life of the project (i.e., with the removal of transmission towers and natural regeneration of ROW vegetation).

7.7.4 Summary of residual effects

This section summarizes the project effects analysis for change in amphibian and reptile habitat availability and change in mortality risk. Table 7-35 characterizes the environmental effects of the project on amphibians and reptiles.

Table 7-35: Project residual effects on amphibians and reptiles

Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in habitat							
Construction	A	L	LAA	NS	ST/LT	S	R
Operation	A	N	LAA	MS	ST	IR	R
Change in mortality risk							
Construction	A	L	LAA	NS	ST	IR	R
Operation	A	L	PDA	MS	MT	C	R

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning
Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
N: Negligible
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area
Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible

N/A: Not applicable

•

7.7.5 Assessment of cumulative effects on amphibians and reptiles

Native vegetation abundance in the RAA has been reduced by past land use activities, including agriculture and other human infrastructure such as roads and electrical transmission lines. Some of these projects and activities have fragmented habitat and changed vegetation communities and species diversity. Currently agricultural land occupies 3.4% of the RAA and developed land occupies 11.1%.

The project will have residual effects on amphibians and reptiles, including habitat availability and mortality risk, that will act cumulatively with residual effects of other past, present, and reasonably foreseeable future physical activities.

7.7.5.1 Project residual effects likely to interact cumulatively

Table 7-36 presents the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-36: Interactions with the potential to contribute to cumulative effects

Other projects and physical activities with potential for cumulative effects	Amphibians and reptiles	
	Change in habitat	Change in mortality risk
Past and present physical activities and resource use		
Agriculture	✓	✓
Domestic resource use (e.g., hunting, fishing, trapping)	–	✓
Recreational activities (e.g., canoeing, snowmobiling)	–	✓
Infrastructure projects (roads, rail, utilities)	✓	✓
Generating stations (Point de Bois, Slave Falls)	✓	✓
Transmission lines	✓	✓
Nuclear power (i.e., Whiteshell Laboratories)	✓	✓
Other industrial and processing development/facilities	✓	✓
Project-related physical activities	✓	✓
Future physical activities		
Slave Falls Generating Station	–	✓
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor [Pinawa Demonstration Reactor]	–	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– = Interactions between the residual effects of other projects and residual effects of the project are not expected.

Effects identified in Table 7-36 as not likely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further. Future upgrades of the Slave Falls Generating Station will not have an overlapping effect on amphibians and reptiles as they will occur within an existing disturbed footprint. The Slave Falls Generating Station will require a reduction in water levels on the Winnipeg River, approximately 10 km upstream (north) of the generating station, and this may temporarily alter existing shoreline habitat; however, there is no spatial overlap with project effects.

Effects to amphibian and reptile habitat from the project will be restricted to the ROW and approximately 1 km beyond the ROW (i.e., where indirect effects may occur). Cumulative effects from the Whiteshell Laboratories Pinawa Demonstration Reactor are not expected as disturbance will be located within existing disturbed areas. Other developments, such as processing facilities and waste management, may contribute to cumulative effects to wetlands in the RAA, but details on future projects is not publicly available.

7.7.5.2 Cumulative effects pathways for change in habitat availability

All past and current projects and activities listed in Table 7-36 have contributed to a change in amphibian and reptile habitat availability through clearing and conversion of natural wildlife habitat within parts of the RAA.

Agriculture, existing infrastructure, generating stations, transmission lines, nuclear power and other industrial and processing developments have contributed to direct (i.e., habitat loss or alteration) and indirect changes (e.g., habitat avoidance due to disturbance or edge effects) in wildlife habitat availability. The primary pathways of these effects are through land clearing, draining wetlands, and/or operation-related disturbances (e.g., noise).

None of the known future projects in the RAA (Table 7-36) have the potential to interact cumulatively with the project affect amphibians and reptiles.

7.7.5.3 Cumulative effects pathways for change in mortality risk

All past and current activities have contributed to a change in mortality risk for amphibians and reptiles inhabiting the RAA. Agricultural practices contribute to amphibian and reptile mortality via hazards associated with the operation of farming equipment, roads and highways elevate mortality risk to amphibians and reptiles through amphibian and reptile-vehicle collisions. Operation of generating stations, power plants, and other facilities have vehicle traffic that contributes to amphibian and reptile mortality risk.

Future developments including Slave Falls Generating Station modifications, decommissioning of P3/P4 transmission line and construction of Pinawa Demonstration Reactor may have residual effects on amphibian and reptile mortality risk that interact with the project's residual effects. The primary pathway for these interactions is through collision with project-related vehicles.

7.7.5.4 Mitigation for cumulative effects for change in mortality risk

To reduce potential amphibian and reptile mortality risk, existing trails and roads will be used to access the P3/P4 ROW to the extent possible. The mitigation measures suggested for cumulative effects for change in amphibian mortality risk (Section 7.4.6.3.3) are also applicable for the cumulative effects for change in mortality risk.

7.7.5.5 Cumulative effects for change in mortality risk

The modified landscape of the RAA has already been and continues to be a source of mortality risk to amphibians and reptiles due to ongoing agriculture and presence of roads, and traffic. Increased traffic associated with, the Slave Falls Generating Station project, and the nuclear power project may elevate amphibian and reptile mortality risk through amphibian and reptile-vehicle interactions. Mortality risk associated with decommissioning P3/P4 transmission line is not expected if timing of activities occurs in the winter.

The cumulative effect for change in amphibian and reptile mortality risk is adverse and low in magnitude. Residual cumulative effects of change in mortality risk will be irregular yet reversible upon completion of power plant construction and generating station upgrades.

7.7.5.6 Summary of cumulative effects

This section summarizes the cumulative effects analysis for change in amphibian and reptile habitat availability and change in mortality risk. Table 7-37 characterizes the cumulative environmental effects of the project and other current and future projects and activities on amphibian and reptile habitat.

Table 7-37: Residual cumulative effects on amphibian and reptile habitat							
Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect on change in mortality risk							
Residual cumulative effect	A	L	RAA	LS	LT	IR	R
Contribution from the project to the residual cumulative effect	When current and future project effects on amphibians and reptiles are considered, the project's contribution to direct change in mortality risk will be low in magnitude. Amphibian and reptile mortality is reduced by winter ROW clearing and winter construction when amphibians and reptiles are dormant. Mortality risk exists during operation when ROW may be used by recreation and/or resource users, and maintenance vehicles.						

KEY

Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
NMC: No Measurable Change
L: Low
M: Moderate
H: High

N/A: Not applicable

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area
Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible

7.7.6 Determination of significance

With mitigation, the residual project effects on amphibians and reptiles are predicted to be not significant. Residual effects are not expected to threaten the long-term persistence or viability of amphibians and reptiles within the RAA, nor are they expected to diminish conservation efforts for the survival, management, and recovery of species at risk including northern leopard frog.

The project will result in the loss or alteration of less than 2.02% of amphibian and reptile habitat within the LAA. Clearing of the PDA will result in the direct loss or alteration of 0.7 ha (<1%) of northern leopard frog habitat in the LAA. The anticipated change in habitat loss or alteration in the LAA is predicted to result in a low magnitude project residual effect on amphibians and reptiles. Indirect loss or alteration of habitat resulting from sensory disturbance and edge effects are generally expected to be negligible and limited to the LAA.

Fragmentation effects are also expected to be low magnitude, as the project will contribute 0.013 km/km^2 of new linear disturbance (approximately 0.87% increase above existing conditions). Amphibians and reptiles can be vulnerable to increased edge effects.

The project may increase amphibian and reptile mortality during winter clearing and construction, however hand clearing around wetlands will reduce this risk. During operation, use of the ROW by resource and recreational users, including project maintenance vehicles, may elevate mortality risk to amphibians and reptiles. Overall, measurable changes in the abundance of amphibians and reptiles in the PDA are not expected.

7.7.7 Prediction confidence

The prediction confidence in the final determination of significance is considered high. This level of confidence is based on:

- The quantity and quality of data available.
- Professional judgement and experience with similar projects.
- Effectiveness of mitigation measures, which reflect best industry practices.

Overall, only a small amount of amphibian and reptile habitat (i.e., wetlands) will be lost or altered relative to the RAA and most adverse effects on mortality risk to amphibians and reptiles were mitigated during the planning and routing process. Where the project does traverse natural habitat, mitigation measures (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on amphibians and reptiles. The level of confidence in the effectiveness of the mitigation measures is high based on past project experience (e.g., Manitoba-Minnesota Transmission Project, Wuskwatim Transmission Project, Bipole III Transmission Project).

7.7.8 Follow-up and monitoring

Due to confidence in predictions, and monitoring results from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, the EPP will outline monitoring steps to ensure appropriate rehabilitation and follow-up (Chapter 11.0).

7.8 Vegetation

Potential effects on vegetation, including landscape intactness, community diversity, and species diversity are addressed in this section. Native upland vegetation is important to the function of natural ecosystems. It helps maintain biodiversity, provide habitat for wildlife and traditionally used species, and supports human activities including recreation and hunting.

Native upland vegetation includes forest, shrubland, and grassland communities. species of conservation concern may occur in these areas. Through the public and Indigenous engagement program, as well as communications with representatives from Manitoba Environment and Climate, interest in preserving native upland vegetation was expressed.

Effects to vegetation are regulated provincially and federally. Provincial regulations include *The Endangered Species and Ecosystems Act*, which protects species at risk and endangered and threatened ecosystems in Manitoba. The federal *Species at Risk Act* protects species at risk and their critical habitat in Canada.

7.8.1 Scope of the assessment

The environmental assessment for vegetation is in accordance with the requirements described in the provincial guidance documents.

7.8.1.1 Regulatory and policy setting

The following is a list of the regulatory requirements, policies, and guidance that were considered in the assessment of effects on vegetation. Other legislation relevant for changes to wetland plants and wetland communities are discussed in Section 7.6 (Wetlands).

Federal regulations and policy

The Species at Risk Act (SARA)

The purpose of *SARA* is to prevent the extinction or extirpation of species, provide for the recovery of endangered or threatened species, and prevent other species from becoming at risk through proper management (Government of Canada 2002).

The status of species is assessed and designated by the Committee on the Status of Endangered Wildlife Species in Canada (COSEWIC).

SARA applies to the following:

- Species listed as Extirpated, Endangered, or Threatened under Schedule 1.
- Critical habitat designated under *SARA* species recovery plans.
- Commitments under the National Accord for the Protection of Species at Risk (SAR) (Government of Canada 1996).
- Activities under the Habitat Stewardship program for species at risk (Government of Canada 2014).

Project construction, operation and maintenance, and decommissioning are subject to SARA. Federally listed species at risk may occur within the region as two expected plant species of conservation concern in the Lake of Woods ecoregion are species at risk, the endangered Great Plains ladies'-tresses (*Spiranthes magnicamporum*) and the threatened western silvery aster (*Symphyotrichum sericeum*).

Provincial regulations and policies

The Conservation Agreements Act

The *Conservation Agreements Act* allows landowners and conservation groups to voluntarily protect natural areas, wildlife or fish habitat, or plant and animal species on private lands through conservation agreements. Agreements can be established with conservation agencies such as Manitoba Habitat Heritage Corporation, Ducks Unlimited Canada, or the Nature Conservancy of Canada. Limitations on development activities are based on the features to be protected. Specifically, drainage of wetlands, conversion of grasslands and clearing of wooded areas may be restricted.

The Endangered Species and Ecosystems Act

In Manitoba, plant species of conservation concern with legislated protection include species listed federally under SARA as well as species listed as endangered, threatened, or extirpated under the Manitoba *Endangered Species and Ecosystems*

Act (MESEA). It is prohibited to kill, injure, possess, or disturb endangered and threatened species or re-introduce extirpated species, and destroy, disturb or interfere with the habitat of endangered and threatened species or locations where previously extirpated species have been reintroduced. Alvars and all native grass prairie are also protected under the MESEA. Ecosystem preservation zones may also be designated under the MESEA and activities in these areas may be restricted.

Species of conservation concern in Manitoba are ranked for rarity by the Manitoba Conservation Data Centre (MBCDC). species of conservation concern ranked S1, S2, or S3 (or any combination) by the MBCDC not listed under the MESEA are not protected; however, they are important contributors to biodiversity in Manitoba and are considered rare or uncommon in the province.

Ecological Reserves Act

Unique, rare, and representative natural features, including habitats, geological features and ecosystems, and modified ecosystems offering opportunities for research may be designated as ecological reserves under the Manitoba *Ecological Reserves Act*. Areas are designated as ecological reserve by the Government of Manitoba and access and use of these areas requires prior approval.

The Environmental Act

A pesticide use permit is required before an herbicide program is implemented. The permit is issued under *The Environment Act*.

The Forest Act

Timber and forestry related matters are regulated under *The Forest Act*. The management use and conservation of forest on Crown land as well as afforestation (establishing forest on land with no previous forest cover), reforestation, and tree preservation and tree improvement are regulated under the *Act*. In addition, the gathering of wild plants and cutting of hay on Crown lands is administered under the *Act*.

The Forest Health Protection Act

Forest threats including insects, diseases, and organisms set out in Schedule A and invasive forest threats (set out in Schedule B) are regulated through *The Forest Health Protection Act*. Schedule A includes Dutch elm disease, dwarf mistletoe, and emerald ash borer. Schedule 2 includes oak wilt, sudden oak death, and mountain pine beetle. Programs to protect and promote the health of trees and forests in Manitoba, such as the Dutch Elm Disease Management Program, are administered under the *Act*. The Forestry and Peatlands Management Branch monitors for forest insects and diseases such as Dutch elm disease and emerald ash borer.

The Noxious Weeds Act

Non-native invasive plants are regulated under *The Noxious Weeds Act*. Ninety noxious weeds are listed in the Noxious Weeds Regulations including those that are a threat to agricultural and natural areas. *The Noxious Weeds Act* designates three tiers of noxious weeds. Tier 1 species are those that are considered to have the most potential for negative effects though they may not yet be present in Manitoba. Under the *Act*, Tier 1 species must be destroyed or eradicated immediately upon discovery. Tier 2 species are already established in Manitoba and have been observed to spread easily. Tier 2 species infestations under five acres must be eradicated; whereas infestations larger than five acres must be controlled and kept from spreading. Tier 3 species are all other designated species that do not require immediate control unless the spread of the occurrence poses a threat to the economy, environment, or the well-being of residents. It should be noted that Tier 3 lists common and showy milkweed (*Asclepias syriaca* and *A. speciosa*) that are native plant species and are not considered weeds in this assessment.

The Invasive Species Council of Manitoba has created an Early Detection and Rapid Response list and placed invasive species into two categories: Category 1 and Category 2 (Invasive Species Council of Manitoba 2016). Category 1 species are those that are not yet known to be present in Manitoba or if so, only in cultivation and are listed as a Manitoba noxious weed with the capability of establishing in Manitoba with a pathway of introduction (e.g., spotted knapweed [*Centaurea stoebe*]). The criteria for Category 2 invasive plants are species that occur in Manitoba and are capable of further invasive spread (e.g., invasive phragmites [*Phragmites australis* subsp. *australis*]). Observations of these species are to be reported to the Invasive Species Council of Manitoba and uploaded to the Early Detection and Distribution Mapping System for the Prairie Region (Manitoba and Saskatchewan). Eradication is the first management option if a Category 1 or 2 species is detected and if feasible. Otherwise, containment and control programs are recommended.

The Wildfires Act

The burning of land, timber and debris is regulated under the *Manitoba Wildfires Act*. A burning permit is required for outdoor fires in certain areas of Manitoba. Fires must not be started if conditions could lead to the fire burning out of control and controls must be in place prior to burning material, including a minimum 6 m wide strip of land free of inflammable material, or covered by snow or water. Burning material also cannot be placed where it could cause a fire to spread and burning must be supervised until the fire is out.

7.8.1.2 Consideration of issues raised during engagement

Public and Indigenous feedback on the project, including the 2014 environmental assessment report (Manitoba Hydro 2014), and discussions from the key person interviews (municipalities intersected by the PDA, Manitoba Weed Supervisor Association, and Manitoba Environment, Climate and Parks water resource officers) indicated effects to vegetation are a concern.

Concerns were raised regarding the potential for loss of intact native vegetation, loss of biodiversity, increased habitat fragmentation, loss of plants of importance to Indigenous groups, negative effects of herbicide application, biosecurity concerns, and the loss of berry harvesting areas.

Black River First Nation, Hollow Water First Nation, and Norway House Cree Nation have expressed concerns about environmental impacts, specifically impacts to the terrestrial environment. Black River First Nation indicated concerns about what is left for future generations.

During project engagement, a concern was raised regarding vegetation removal in areas of intact native vegetation including the loss of forests, loss of biodiversity, and increased habitat fragmentation. It was suggested by multiple participants including that routing should follow existing disturbances such as roads or trails and avoid areas of large intact forest.

In addition, there was a concern regarding increased access to undisturbed forested areas due to construction and the potential for additional disturbance due to the presence of the project. Participants raised concerns regarding recreational use of off-road vehicles, potential spread of non-native invasive species into undisturbed habitat, and the potential for additional development due to increased access.

Norway House Cree Nation expressed concerns about the loss of forested areas and suggested that loss of trees due to vegetation clearing should be compensated for at a ratio of 3 trees planted:1 tree lost. Compensation for the loss of forested areas was also raised during public engagement.

During engagement circle 2, a concern was raised regarding the historical loss of plants of importance for Indigenous groups including chaga and have indicated chaga should be transplanted if they are disrupted. Also, a public participant indicated a concern of impacts to harvesting sites and land resources as they offer traditional substances such as berries, mushrooms, as well as historical heritage.

Black River First Nation raised concerns about herbicide use along the right-of-way and suggested having community members employed to clear these areas prior to construction. General concerns were raised regarding herbicide use and participants requested that Manitoba Hydro not use herbicides along the right-of-way for vegetation management.

Concerns were raised regarding biosecurity and the potential for increased disease transmission due to the project.

Pointe du Bois Cottagers Association raised a concern about the impacts to berry picking locations particularly on the P3/P4 line. Specifically, they are concerned about vegetation management including herbicide application at the berry picking locations.

Several mitigation measures were suggested including

- To plant the right-of-way with staghorn sumac to provide wildlife habitat
- To harvest plants and seeds for reclamation prior to construction
- To harvest medicinal plants prior to construction
- To transplant medicinal plants and chaga (i.e., host-plants birch and trembling aspen) if they cannot be avoided during vegetation clearing

7.8.1.3 Potential effects, pathways, and measurable parameters

The focus of this assessment is on effects that have the potential to affect vegetation. Potential environmental effects, the effect pathway, and measurable parameters used to assess potential effects on vegetation are provided in Table 7-38. The assessment uses a diversity approach, assessing changes in landscape intactness, community diversity and species diversity. The abundance of different landcover features and species along with the number or area are assessed at each level.

Table 7-38: Potential effects, effects pathways and measurable parameters for vegetation

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in landscape intactness	Direct loss or fragmentation of large intact areas of native vegetation from vegetation	Number of native vegetation patches

Table 7-38: Potential effects, effects pathways and measurable parameters for vegetation

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
	clearing and ground disturbance	Number of large "intact" patches of native vegetation Mean patch area (ha) of native vegetation Density of linear features
Change in community diversity	Direct loss or alteration of native vegetation communities arising from vegetation clearing and ground disturbance Indirect alteration of native vegetation communities from the introduction or establishment of regulated weeds and non-native invasive species	Area (ha) of upland native vegetation communities and spatial distribution Area (ha) of ECCC lost or altered Qualitative assessment of potential for regulated weeds or non-native invasive species introduction and spread in upland native vegetation communities
Change in species diversity	Direct loss of plant species of conservation concern or plants of importance to Indigenous groups from vegetation clearing and ground disturbance Indirect loss of species of conservation concern or plants of importance to Indigenous groups from the introduction or establishment of regulated weeds and non-native invasive species	Number, abundance, and spatial distribution of species of conservation concern occurrences or plants of importance to Indigenous groups Area (ha) of species at risk critical habitat loss or altered Qualitative assessment of potential for regulated weeds, and non-native invasive species to alter the abundance and spatial distribution of species of

Table 7-38: Potential effects, effects pathways and measurable parameters for vegetation

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
	Indirect effects on plant species of conservation concern or plants of importance to Indigenous groups from herbicide application to control the spread of regulated weeds and ROW maintenance	conservation concern and plants of importance to Indigenous groups

7.8.1.4 Spatial boundaries

The following spatial boundaries are used to assess effects to vegetation (Map 7-4):

- **Project Development Area (PDA)**: The PDA is the footprint of the project including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances as described in Chapter 2.0.
- **Local Assessment Area (LAA)**: a 1-km buffer each side of the final preferred route PDA, which is used to evaluate measurable effects on vegetation. The LAA was chosen so it is large enough to encompass tracts of intact native upland vegetation greater than 200 ha as they are important in supporting biodiversity (Environment Canada 2013). This is also consistent with LAA boundaries used by wildlife and for other recent transmission line projects in Manitoba (Manitoba Hydro 2015). The total area of the LAA is 10,776.7 ha.
- **Regional Assessment Area (RAA)**: a 15-km buffer of the final preferred route PDA is used to capture information on a broader area to provide regional context, which is consistent with other recent transmission line projects in Manitoba (Manitoba Hydro 2015). Vegetation information in the RAA is also used to support the wildlife assessment and captures the home range of the most wide-ranging wildlife species (Section 7.9.1.4 Terrestrial Wildlife and Wildlife Habitat). The total area of the RAA is 211,809.6 ha.

7.8.1.5 Temporal Boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions.
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.8.1.6 Residual Effects Characterization

Table 7-39 presents definitions for residual environmental effects on vegetation.

Table 7-39: Characterization of residual effects on vegetation

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to vegetation relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental vegetation relative to baseline. **Neutral –** no net change in measurable parameters for the vegetation relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**Negligible –** no measurable change in the effect can be noted. **Low –** a measurable change in upland native plant communities, but unlikely to affect sustainability in the LAA and no effect on ECCC and plant species of conservation concern.

Table 7-39: Characterization of residual effects on vegetation		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Moderate – measurable change affecting the sustainability of upland native plant communities or ECCC and plant species of conservation concern in the LAA, but unlikely to affect sustainability in the RAA. **High –** measurable change affecting the sustainability of upland native plant communities or ECCC or plant species of conservation concern in the RAA.
Geographic extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA –** residual effects extend into the LAA **RAA –** residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	**Moderate sensitivity -** Effect occurs during winter when plants are dormant and less sensitive to activity. **High sensitivity -** Effect occurs during spring or summer when plants are actively growing, or flowering and ground is thawed.
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –**the residual effect extends through to completion of post-construction reclamation. **Long-term –** the residual effect extends beyond the life of the project

Table 7-39: Characterization of residual effects on vegetation

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule **Multiple regular event –** occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

7.8.1.7 Significance Definition

A significant adverse residual effect on vegetation is one that, following the application of avoidance and mitigation measures threatens the long-term persistence or viability of plant communities or species, including those of cultural or traditional importance.

7.8.2 Project interactions with vegetation

Table 7-40: identifies, for each potential effect, the physical activities that might interact with the VC and result in the identified effect.

Table 7-40: Project interactions with vegetation

Project activity	Effects		
	Change in landscape intactness	Change in community diversity	Change in species diversity
Transmission line construction			
Mobilization and staff presence	✓	✓	✓

Table 7-40: Project interactions with vegetation			
Project activity	Effects		
	Change in landscape intactness	Change in community diversity	Change in species diversity
Vehicle and equipment use	–	✓	✓
Right-of-way clearing	✓	✓	✓
Watercourse crossings	–	✓	✓
Marshalling yards/ fly yards	✓	✓	✓
Transmission tower construction	–	✓	✓
Implodes	–	–	–
Helicopter use	–	–	-
Clean-up and demobilization	–	✓	–
Station modification			
Mobilization and staff presence	–	✓	✓
Vehicle and equipment use	–	✓	✓
Marshalling / fly yard (Pointe du Bois station)	✓	✓	✓
Realignment of access road (Pointe du Bois station)	✓	✓	✓
Site preparation (Pointe du Bois station)	–	✓	✓
Station footprint expansion (Pointe du Bois station)	✓	✓	✓
Installation of electrical equipment	–	–	–
Clean-up and demobilization	–	✓	✓
Transmission line and station operation and maintenance			
Transmission line and station presence	–	–	–
Vehicle and equipment use	–	✓	✓
Inspection and maintenance	–	–	–

Table 7-40: Project interactions with vegetation

Project activity	Effects		
	Change in landscape intactness	Change in community diversity	Change in species diversity
Vegetation management	–	✓	✓
Decommissioning			
Mobilization and staff presence	–	✓	✓
Vehicle and equipment use	–	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	–	–	✓
Rehabilitation	✓	✓	✓
Clean-up and demobilization	–	✓	✓

✓ = Potential interaction
– = No interaction

Most effects on vegetation will occur during transmission line construction and station modifications due to right-of-way clearing, expansion of the Pointe du Bois station, and clearing of the marshaling / fly yards and camps. These activities will require vegetation clearing and ground disturbance. The specific locations of the marshalling / fly yards, and camps have not been determined but will be in areas of existing disturbance, where possible. Mobilization of workers will use existing roads and trails where possible, but some new access may be required. Upland native habitat areas intersected by new access routes are assumed temporarily lost due to ground modification needed to permit safe travel of vehicles and equipment; however, access for transmission line construction will generally be within the right-of-way. New areas of clearing will reduce landscape intactness and alter the abundance and distribution of communities and plant species.

Construction will involve clearing of trees and shrubs to ground level along the right-of-way. Other vegetation ground cover including low shrubs, forbs, and graminoids, may be removed or damaged during ground disturbance. Removal of trees and tall shrubs may alter the species composition in the upland native vegetation communities due to changes in light and moisture conditions. However, the low vegetation will be allowed to recover during operation. The ROW will be maintained to limit tree and shrub growth for safe electrical line operation. Regenerating trees and tall shrubs will be controlled through periodic mechanical or manual cutting or herbicide application and maintained at a height less than 2 m.

No change in vegetation, including landscape diversity, community diversity and species diversity, is expected from implodes, helicopter use, installation of electrical equipment, and transmission line and station presence. Helicopters will not affect vegetation as required landing locations will be in existing airfields or already cleared areas of marshalling / fly yards and the right-of-way. Implodes will not require vegetation removal, and vegetation alteration beyond right-of-way and station clearing will not occur for the installation of the transmission line or installation of electrical equipment at the stations.

Effects on landscape intactness are not expected during transmission line and station operation and maintenance as additional vegetation clearing is not planned. Additional alteration may occur to community and species diversity from vehicle and equipment use along the right-of-way and vegetation management.

During decommissioning, additional disturbance to community and species diversity may occur from damage to vegetation from vehicle and equipment use and ground disturbance during tower removal. Landscape intactness will not be adversely affected as no new vegetation clearing will be required. Most effects during decommissioning are expected to be positive as disturbed areas will be rehabilitated.

7.8.3 Assessment of residual environmental effects on vegetation

7.8.3.1 Analytical assessment techniques

Changes to vegetation are evaluated in the LAA following the application of mitigation. Changes to landscape intactness were calculated by comparing the changes in linear feature density (km/km^2) and core area of native vegetation cover types.

Changes in community diversity were estimated by comparing changes in landcover classes and cover types and potential alteration in plant composition from the introduction or spread of regulated weeds.

Change to species diversity were assessed by evaluating potential changes to species of conservation concern and plants of importance to Indigenous groups. Changes to known species of conservation concern occurrences are quantified and alteration of supporting cover types from the introduction and spread of regulated weeds and non-native invasive plant species were qualitatively estimated.

Changes to plants of importance to Indigenous groups were assessed by quantifying the change in supporting cover types and qualitatively estimating changes to cover type conditions from the spread of regulated weeds and non-native invasive plant species.

7.8.3.2 Change in landscape intactness

Project pathways

Landscape intactness of native vegetation will likely be altered during construction. Large intact patches of native vegetation are intersected by the final preferred route and may be intersected by marshalling / fly yards, new access routes.

Vegetation will be removed during clearing. Following construction, the right-of-way will be reclaimed; however, vegetation will be maintained in a different state than prior to construction with graminoid or shrub landcover instead of forest.

Trees and shrubs will be removed and the composition of retained low shrubs, forbs, graminoids and non-vascular plants may differ due to altered light, moisture, and temperature conditions. Shade tolerant species may decrease in abundance and light tolerant species may increase. Also, ecosystem functions could be altered as there will be fewer larger trees sequestering carbon and intercepting rainfall.

Mitigation

Effects on landscape intactness cannot be fully avoided given the abundance of native upland vegetation in the PDA, LAA, and RAA. Potential project effects have been reduced by selecting a final preferred route adjacent to existing linear features or within existing utility corridors.

In addition to transmission line routing, the development of an access management plan (Section 11.7.5.1) considered the use of existing access routes where possible to further reduce fragmentation effects from the project during construction.

Mitigation measures to reduce potential effects on landscape intactness will include the following.

- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed.

- Sensitive areas will be clearly marked with stakes and/or flagging tape prior to clearing.
- Necessary work permit(s) will be obtained, as required under *The Crown Lands Act, The Provincial Parks Act* and *The Forest Act* for work on Crown, designated and provincial forest land, respectively.
- Windrows of grubbed materials will be piled at least 15 m from standing timber.
- Grubbing will not be permitted within 2 m of standing timber to prevent damage to root systems and to limit the occurrence of blow down.
- Grubbing will be limited within the right-of-way to reduce root damage, except at tower foundation sites and centerline trail.
- Only water and approved dust suppression products will be used to control dust on access roads, where required. Oil or petroleum products will not be used.
- Weed control along access roads and trails, at temporary construction camps, marshalling yards and borrow sites will be conducted in accordance with the Rehabilitation and invasive species management plan (Section 11.7.5.6).
- Approach grades to waterbodies will be reduced to limit disturbance to riparian areas.
- Non-herbicide methods such as hand cutting, mechanical cutting or winter shearing will be used to clear the transmission line right-of-way and other sites. If herbicides are required to control vegetation growth, such as noxious/invasive weeds during construction, all applicable permits, and provincial regulations (*The Noxious Weed Act*) will be followed.
- Trees will be felled toward the middle of rights-of-way or cleared areas to avoid damaging standing trees. Trees will not be felled into waterbodies. Danger trees will be flagged or marked for removal using methods that do not damage soils and adjacent vegetation.
- Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the Rehabilitation and Invasive Species Management Plan.
- The Rehabilitation and Invasive Species Management Plan will include objectives for the reclamation of natural conditions, wildlife habitat and aesthetic values, and for erosion protection, sediment control, non-native and invasive plant species management, as required.

Residual effects

The PDA will increase linear feature density in the LAA by a total of 0.464 km/km^2 and by an average of 1.577 by quarter section (Table 7-41). This change equals an increase of 12% in the overall LAA and a 77.0% increase in the average density by quarter section. The maximum density of linear features at the quarter section level increases by 6.457 km/km^2, an increase of 51%.

The increase in average density of linear features and maximum density is because of the intersection of quarter sections with below average density of high and low human use features by the portion of the final preferred route not paralleling the PW75 established route. Changes in linear density of low use features (e.g., cutlines, electrical ROW, trails) are the greatest, equalling 20% for overall total density and 87% by quarter section. There is no change in the linear feature density along PW75 established route portion of the project transmission line as this is an existing right-of-way.

Construction will decrease the number of core areas in the LAA by 30 (4%) including 14 upland, 8 wetland, and 8 riparian core areas (Table 7-42). Deciduous forest is the most impacted by the project with a loss of 8 core areas in the LAA post-construction followed by riparian wetlands, shrubby fens, coniferous forest, mixedwood forests, and riparian upland areas.

The maximum core area size is also reduced for some landcover types, for example, the maximum core area is reduced by 21.2 ha in deciduous forest from 354.4 ha to 333.2 ha. Changes in the maximum core area size equal 1% or less of existing conditions. The largest percent change in maximum core area size relative to existing conditions will be to shrubby swamps, a reduction of 1% (10.3 ha to 4.8 ha). Average core area is also altered, with the greatest reduction occurring to shrubby swamps, 0.6% relative to existing conditions (a change of 3.1 ha).

Forested core areas larger than 200 ha are important for wildlife species and ecosystem function (Environment Canada 2013). There are eight core areas larger than 200 ha in the LAA post-construction, which is a change of one core area (forested fen) from pre-construction.

Retention of core areas of grassland 50 ha or larger is also recommended by Environment Canada (2013). There are no native grassland core areas larger than 50 ha in the LAA.

Conservation targets are not available for shrub and wetland core areas, and as such 50 ha is used as a target as they may be affected by disturbance similarly to grasslands. There is one forested bog and 17 fen core areas (i.e., 10 forested fens, six shrubby fens, and one graminoid fen) larger than 50 ha. These areas are not affected by project construction.

Table 7-41: Change in linear feature density (km/km²) in the LAA

Degree of human use	Existing Conditions in LAA					Post-Construction in LAA					Change – Post-Construction in LAA				
	Total density[1]	Quarter section density				Total density[1]	Quarter section density				Total density[1]	Quarter section density			
		Mean	Minimum	Maximum	SD[2]		Mean	Minimum	Maximum	SD[2]		Mean	Minimum	Maximum	SD[2]
High Use	1.357	1.149	0.001	8.406	1.494	1.357	1.800	0.051	8.406	1.560	0.000	0.651	0.050	0.000	0.066
Low Use	2.379	1.411	0.001	8.402	1.69	2.842	2.633	0.002	11.433	2.092	0.463	1.222	0.001	3.031	0.402
Total	3.736	2.049	0.001	12.690	2.605	4.200	3.626	0.002	19.147	3.048	0.464	1.577	0.001	6.457	0.443

[1] Total density is for the overall LAA and is not calculated by quarter section.

[2] SD = Standard deviation.

Table 7-42: Change in native core areas from project construction

Land cover class	Cover type	Pre-construction in LAA				Post-construction in LAA				Change – post-construction in LAA			
		Number of core areas[1]	Mean core area size (ha)	Maximum core area size (ha)	SD[2] core area size	Number of core areas[1]	Mean core area size (ha)	Maximum core area size (ha)	SD[2] core area size	Number of core areas[1]	Mean core area size (ha)	Maximum core area size (ha)	SD[2] core area size
Upland	Coniferous Forest	152	17.3	302.2	36.2	149	17.2	302.2	36.5	-3.0	-0.2	0.0	0.3
	Deciduous Forest	146	15.6	354.4	47.9	138	15.3	333.2	44.5	-8.0	-0.3	-21.2	-3.3
	Mixedwood Forest	37	18.6	119.9	30.7	34	20.0	118.7	31.4	-3.0	1.4	-1.1	0.7
	Native Grassland	1	7.0	7.0	-	1	3.7	3.7	-	0.0	-3.3	-3.3	-
	Naturally Barren/ Rock Outcrop	1	1.1	1.1	-	1	1.1	1.1	-	0.0	0.0	0.0	-
	Shrubland	14	4.0	13.3	3.4	14	4.0	13.3	3.4	0.0	0.0	0.0	0.0
	Upland Total	351	16.1	354.4	40.3	337	16.0	333.2	38.8	-14.0	-0.1	-21.2	-1.5
Wetland	Bog – Forested	19	13.4	77.2	18.2	19	12.8	77.2	18.4	0.0	-0.5	0.0	0.1
	Fen – Forested	70	32.9	346.2	71.7	69	33.1	346.2	71.9	-1.0	0.2	0.0	0.2
	Fen – Graminoid	37	13.2	191.8	31.6	36	13.2	191.2	31.8	-1.0	-0.1	-0.6	0.2
	Fen – Shrubby	77	14.6	140.6	26.0	73	14.9	140.6	26.5	-4.0	0.3	0.0	0.5
	Marsh	21	5.9	44.6	10.5	21	5.9	44.6	10.4	0.0	-0.1	0.0	0.0
	Shallow Open Water	26	3.6	28.9	5.9	25	3.5	28.9	5.9	-1.0	-0.1	0.0	0.0
	Swamp – Forested	4	4.1	9.7	3.8	4	4.0	9.2	3.5	0.0	-0.1	-0.6	-0.3
	Swamp – Shrubby	3	5.7	10.3	4.7	3	2.6	4.8	2.0	0.0	-3.1	-5.5	-2.6
	Undifferentiated Wetland – Forested	14	9.0	36.0	11.3	13	9.7	36.0	11.5	-1.0	0.6	0.0	0.2

Table 7-42: Change in native core areas from project construction

Land cover class	Cover type	Pre-construction in LAA				Post-construction in LAA				Change – post-construction in LAA			
		Number of core areas[1]	Mean core area size (ha)	Maximum core area size (ha)	SD[2] core area size	Number of core areas[1]	Mean core area size (ha)	Maximum core area size (ha)	SD[2] core area size	Number of core areas[1]	Mean core area size (ha)	Maximum core area size (ha)	SD[2] core area size
	Wetland Total	271	16.8	346.2	42.2	263	16.9	346.2	42.7	-8.0	0.1	0.0	0.5
Riparian	Upland	27	1.3	10.3	2.1	24	1.3	10.3	2.2	-3.0	0.0	0.0	0.1
	Wetland	31	2.5	18.3	4.1	26	2.6	18.3	4.5	-5.0	0.1	0.0	0.4
	Riparian Total	58	2.0	18.3	3.3	50	2.0	18.3	3.6	-8.0	0.1	0.0	0.3
Grand Total		680	15.2	354.4	39.5	650	15.3	346.2	39.1	-30.0	0.1	-8.1	-0.4

[1] Core areas = Patch size minus disturbance. Patch size was determined by merging adjacent individual polygons in the land cover mapping having the same top level land cover class (e.g., forest) into a single polygon. Core area is the area remaining after removing human development plus either a 200 m buffer for transmission lines, dykes, trails, and cutlines; or a 500 m buffer for other linear features (e.g., roads) from the patch. A 200 m buffer was chosen as those developments have a lower degree of human use.

[2] SD = standard deviation

7.8.3.3 Change in community diversity

<u>Project pathways</u>

Upland native vegetation communities will be affected during construction. There are 159.7 ha of upland native vegetation communities intersected by the PDA. Vegetation will be removed during vegetation clearing and ground disturbance in the PDA. Loss of native upland vegetation will be restricted to transmission structures and new access. The upland native vegetation community along the right-of-way will be altered in areas of forested land and maintained as either shrubland or grassland during operations. Forests are abundant in the LAA, occupying 47.3% (5,097.0 ha) including 2,169.7 ha of deciduous forest, 1,897.7 ha of coniferous forest, and 1,029.5 ha of mixedwood forest.

There are no known areas of alvars or tallgrass prairie ECCC's within the PDA, LAA, or RAA.

Areas of grassland within the PDA were previously forested areas that have been cleared and are now dominated by native grasses. However, naturally barren/rock outcrop, an uncommon cover type in the LAA, may be present in the PDA. As these naturally barren/rock outcrop areas are small, more may be present on the landscape than were captured at the scale of the land cover mapping. Marshalling/fly yards and new access routes will avoid ECCC whenever possible.

Indirect effects to upland native vegetation communities may occur from the introduction or establishment of regulated weeds and non-native invasive species and edge effects.

Vehicle and heavy equipment use during construction could cause indirect effects to native vegetation communities through edge effects, including the introduction or spread of non-native species and alteration of plant composition from soil disturbance.

Regulated weeds and non-native invasive species may be spread by recreational vehicle use from increased access along the cleared right-of-way. Effects from non-native invasive species may extend up to 1000 m in prairie ecosystems (Henderson 2011). Edge effects including damage to trees and other vegetation, changes to vegetation community structure and species composition, and changes in evaporation, nutrient cycling, and decomposition can extend on average 20 m and up to 250 m in boreal forest ecosystems (Harper et al. 2005, Harper et al. 2015).

Community diversity may be indirectly affected during construction from dust deposition from vehicle and equipment use. Dust deposition may cause a change in species composition in upland native vegetation communities (Farmer 1993).

The right-of-way will be reclaimed or left for natural regeneration (e.g., forested land) following construction. However, native vegetation communities will be maintained with a different community structure (i.e., graminoid or shrub cover) instead of forested. Areas prone to erosion or invasion of regulated weeds or non-native invasive species will be reclaimed using regional native grass species, where appropriate.

Mitigation

Transmission line routing considered and avoided native vegetation communities to the degree possible. The final preferred route is adjacent to existing linear features or within existing utility corridors.

Standard industry and project-specific mitigation measures will be used during construction and operation and maintenance to help avoid and manage potential effects to vegetation community diversity. The following mitigation measures will be used:

- All equipment must arrive on site clean and free of soil or vegetation debris
- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed during clearing
- Buffers and sensitive areas (where applicable) will be clearly marked with stakes and/or flagging tape prior to clearing
- Necessary work permit(s) will be obtained, as required under *The Crown Lands Act, The Provincial Parks Act* and *The Forest Act* for work on Crown, designated and provincial forest land, respectively
- Windrows of grubbed materials will be piled at least 15 m from standing timber
- Grubbing will not be permitted within 2 m of standing timber to prevent damage to root systems and to limit the occurrence of blow down
- Grubbing will be limited within the ROW to reduce root damage, except at tower foundation sites and centerline trail
- Only water and approved dust suppression products will be used to control dust on access roads, where required. Oil or petroleum products will not be used
- Large areas identified as having regulated weeds or non-native invasive plant species occurrences prior to the start of construction will be mapped. Weed

control along access roads and trails will be conducted in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)

- Equipment will be cleaned before moving from locations with identified invasive weed infestation. Manitoba Hydro employees and contractors will follow the Biosecurity Management Plan (Section 11.7.5.2) to prevent the spread of invasive weeds
- Weed control along access roads and trails, at temporary construction camps, marshalling yards and borrow sites will be conducted in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
- Approach grades to waterbodies will be reduced to limit disturbance to riparian areas
- Non-herbicide methods such as hand cutting, mechanical cutting or winter shearing will be used to clear the transmission line right-of-way and other sites. If herbicides are required to control vegetation growth, such as noxious/invasive weeds during construction, all applicable permits, and provincial regulations (*The Noxious Weed Act*) will be followed
- Trees will be felled toward the middle of rights-of-way or cleared areas to avoid damaging standing trees. Trees will not be felled into waterbodies. Danger trees will be flagged or marked for removal using methods that do not damage soils and adjacent vegetation
- Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1)
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
- The rehabilitation and invasive species management plan (Section 11.7.5.6) includes objectives for the reclamation of natural conditions, wildlife habitat and aesthetic values, and for erosion protection, sediment control, non-native and invasive plant species management
- Where appropriate, regional native grass mixtures will be used to assist revegetation of disturbed areas to control erosion and prevent invasion of non-native species. The mixtures will not contain non-native or invasive species

Residual effects

Vegetation clearing will alter 159.8 ha (-3.0%) of upland native vegetation cover types within the LAA including 5.9 ha along the existing ROW (Table 7-43). Upland native vegetation cover types intersected by the PDA include coniferous, deciduous, and mixedwood forest, native grassland, and shrubland. Deciduous forest is the most abundant along the PDA with 66.8 ha (-3.1%) removed during vegetation clearing. Vegetation clearing will alter 6.1 ha (-3.4%) of riparian areas within the LAA. In addition, there are 61.6 ha of wetlands intersected by the PDA. Wetlands are assessed in Section 7.6.

Table 7-43: Change in community diversity from project construction

Landcover class	Cover type	Existing conditions LAA		PDA		Post-construction area in the LAA	
		Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change
Agriculture	Annual Crop	653.4	6.1	11.0	3.3	642.2	-1.7
	Hayland	63.3	0.6	1.0	0.3	60.1	-5.2
	Tame Pasture	127.6	1.2	4.7	1.4	122.9	-3.7
Agriculture Total		844.4	7.8	16.7	5.0	825.2	-2.3
Developed	Developed	110.3	1.0	6.4	2.0	103.8	-5.9
	Electrical Right-of-Way	82.2	0.8	64.6	19.6	347.2	322.2
	Industrial/Commercial	52.9	0.5	3.8	1.2	49.1	-7.2
	Roads/Rail	174.8	1.6	4.4	0.9	171.7	-1.8
	Rural/Residential	134.9	1.3	0.0	0.0	134.9	0.0
Developed Total		555.1	5.2	79.2	23.7	806.6	45.3
Riparian	Upland	100.0	0.9	2.8	1.0	96.7	-3.2
	Wetland	82.6	0.8	2. 9	0.9	80.0	-3.5

Table 7-43: Change in community diversity from project construction

Landcover class	Cover type	Existing conditions LAA		PDA		Post-construction area in the LAA	
		Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change
Riparian Total		182.8	1.7	5.7	1.9	176.7	-3.4
Upland	Coniferous Forest	1,897.7	17.6	39.6	12.8	1,855.5	-2.2
	Deciduous Forest	2,169.7	20.1	66.2	20.3	2,103.0	-3.1
	Mixedwood Forest	1,029.5	9.6	46.4	14.6	981.3	-4.7
	Native Grassland	8.7	0.1	0.4	0.2	8.2	-6.7
	Naturally Barren/Rock Outcrop	3.2	<0.1	0.0	0.0	3.2	0.0
	Shrubland	147.5	1.4	2.0	0.6	145.5	-1.3
Upland Total		5,256.4	48.8	154.6	48.5	5,096.6	-3.0
Wetland	Bog - Forested	353.4	3.3	7.8	2.4	345.6	-2.2
	Fen - Forested	1,171.3	10.9	15.4	5.1	1,154.4	-1.4
	Fen - Graminoid	357.2	3.3	10.6	3.4	346.1	-3.1

Table 7-43: Change in community diversity from project construction

Landcover class	Cover type	Existing conditions LAA		PDA		Post-construction area in the LAA	
		Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change
	Fen - Shrubby	844.7	7.8	16.6	4.9	828.7	-1.9
	Marsh	108.8	1.0	2.1	0.7	106.4	-2.2
	Shallow Open Water	107.4	1.0	1.9	0.7	105.2	-2.0
	Swamp - Forested	25.1	0.2	3.0	1.0	21.8	-12.9
	Swamp - Shrubby	25.7	0.2	1.9	0.6	23.8	-7.4
	Undifferentiated Wetland – Forested	49.6	0.5	0.0	0.0	49.6	0.0
Wetland Total		3,043.1	28.2	59.3	18.7	2,981.5	-2.0
Water	Ditch/Canal	12.7	0.1	0.4	0.1	12.3	-3.2
	Lakes/Rivers	879.0	8.2	4.6	1.4	874.45	-0.5
Water Total		891.7	8.3	5.0	1.5	886.8	-0.6
Unclassified	Unclassified	3.3	0.0	0.0	0.0	3.3	0.0

Table 7-43: Change in community diversity from project construction

Landcover class	Cover type	Existing conditions LAA		PDA		Post-construction area in the LAA	
		Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change
Unclassified Total		3.3	0.0	0.0	0.0	3.3	0.0
Grand Total		10,776.7	100.0	329.5	-	10,776.7	-

No upland native vegetation community will be lost in the LAA because of the project. The PDA largely avoids locally uncommon habitats including, low shrub on mineral, and tall vegetation on mineral soils and naturally barren / rock outcrops potentially containing ECCC (Table 7-43).

Some locally uncommon habitats are intersected by the PDA including 1.2 ha of balsam fir dominant on mineral, 0.9 ha of black spruce mixedwood on mineral, and 0.6 ha of grassland.

It should be noted that the grassland observed and mapped in the PDA and LAA was previously cleared forest and not remnant patches of native grassland. The area of grassland has potential to increase after construction as some parts of the ROW will be reclaimed to grassland. Effects to unidentified ECCC including alvar and tall grass prairie are not expected.

The extent of change to riparian areas includes a loss or alteration of 6.1 ha of both upland and wetland native vegetation communities. Riparian areas include some locally uncommon habitats that will be altered or lost, including 0.1 ha of black spruce dominant on shallow peatland, 0.3 ha of grassland, and 0.3 ha of barren on bedrock outcrop.

Indirect effects on upland native vegetation cover types will be from edge effects and the introduction and spread of regulated weeds and non-native invasive species into the LAA. Edge effects may cause changes in the upland native vegetation community structure, species composition, and function up to 250 m from the edge of the right-of-way (Harper et al. 2005, 2015). Regulated weeds and non-native species may cause changes in the upland native vegetation communities by out-competing native species and thus changing community structure from within 30 m of the PDA out to 1,000 m (Kembel et al. 2008; Henderson 2011; Rai and Singh 2020).

Effects on community diversity are adverse and moderate in magnitude because no upland native vegetation cover type will be lost within the LAA. Thirteen percent of the current land cover in the LAA has been previously disturbed by development and agriculture and after project construction the LAA will consist of 15.1 % developed and agricultural land with the remaining 84.9% representing native vegetation communities and water (Table 7-43).

The loss in area of upland native vegetation cover types will persist for the life of the project for the transmission structures and the stations. Upland native vegetation communities will be rehabilitated following completion of construction for access routes, and marshalling / fly yards, and camps.

As upland native vegetation community abundance will be reduced by the project, effects are adverse.

The magnitude is moderate as there will be a reduction in the abundance of locally uncommon habitats including riparian areas containing black spruce dominant on shallow peatland, grassland, and barren on bedrock outcrop. These habitat types are likely present in the RAA; however, they have not been identified beyond the LAA. This is an artifact of the provincial Forest Resource Inventory mapping used for the RAA.

The geographic extent of upland native vegetation community loss is the PDA but indirect effects to function and structure will extend into the LAA.

Timing sensitivity is low for construction as activity will occur during the winter when soils are frozen or dry and plants are dormant. The timing is high sensitivity for operation and maintenance as some activities may occur in the spring and summer when vegetation may be most affected.

The duration is long-term as community diversity loss will extend beyond the life of the Project.

Direct effect frequency for construction will be a single event as loss will occur during vegetation clearing. The frequency for operation and maintenance effects will be irregular events.

Upland native vegetation will increase following project decommissioning and rehabilitation of project disturbances in upland native vegetation.

The loss of upland native vegetation community abundance is considered reversible following the removal of structures at the end of the Project and reclamation of the upland native vegetation areas.

7.8.3.4 Change in species diversity

Project pathways

The project may change the number and spatial distribution of plant species of conservation concern occurrences or plants of importance to First Nations people and Red River Métis citizens and increase the number of occurrences of regulated weeds and non-native invasive plants. Changes may occur from vegetation clearing, ground disturbance, and vegetation management (herbicide usage, mowing).

Ground disturbance will primarily occur at tower locations and the Pointe du Bois station expansion area but may also occur from vehicle and equipment use. Loss may also occur at marshalling / fly yards and camps if located in areas of native vegetation or wetlands. Vehicle and equipment use may also crush species of conservation concern and plants of importance to First Nations people and Métis citizens.

Plant species of conservation concern are generally found in native upland and wetland areas. Some, however, can occur in human modified areas, including plant species of conservation concern observed during field surveys (i.e., pearly everlasting [*Anaphalis margaritacea*] and rough fleabane [*Erigeron strigosus*]). The PDA currently includes 159.7 ha (48.5%) native upland and 61.6 ha (18.7%) of wetland.

Additional areas of modified upland and wetland are also present along existing rights-of-way. Although the tree and tall shrub cover has been removed from existing rights-of-way, native low shrub, forb, and graminoid species were observed during field surveys.

Direct loss of plant species of conservation concern and plants of importance to First Nations people and Red River Métis citizens may occur at tower locations and marshalling / fly yards and camps overlapping native upland and wetlands.

Species of conservation concern occurring beyond tower locations, but in the right-of-way may persist, but are assumed lost as post-construction environmental conditions may not be appropriate for the plants to grow and reproduce. Changes in environmental conditions (e.g., light, soil moisture) along the right-of-way from the removal of trees and tall shrubs will also alter the abundance of plants of importance for First Nations people and Métis citizens. Some plants will decrease in abundance and others will increase.

Indirect loss of plant species of conservation concern and plants of importance to First Nations people and Red River Métis citizens may occur from the introduction or establishment of regulated weeds and non-native invasive species.

Vegetation clearing, ground disturbance and alteration of environmental conditions from the removal of trees and tall shrubs will increase opportunities for weed and non-native invasive species establishment and spread. Physical disturbances such as removal of soil and vegetation have been shown to encourage the establishment of non-native species (Hansen et al. 2005; Sumners and Archibold 2007). Also, vehicle and equipment use on the right-of-way and trails may spread weed and non-native-invasive species seeds or vegetative plant material and further disturb soils.

Competition from weeds and non-native invasive species may change the abundance and distribution of plant species of conservation concern and plants of importance to First Nations people and Métis citizens.

Following construction, the right-of-way will be monitored and managed; however, vegetation establishment may be in a different state prior to construction, with graminoid or shrub landcover maintained instead of forest. These changes have the potential to affect plant species of conservation concern and plants of importance to First Nations people and Métis citizens.

Mitigation

In addition to the mitigation measures identified for reducing potential effects to community diversity (Section 7.8.3.3), the following measures will be used to reduce potential changes in species diversity:

- If previously unidentified plant species at risk or species of conservation concern are found on the right-of-way prior to or during construction, the occurrences will be flagged for avoidance.
- All equipment must arrive at the ROW or project site clean and free of soil or vegetation debris and shall be kept in good working order and free of fuel, oil, or fluid leaks. Machinery that is found to be leaking any fuel, oil or other fluids will be removed off the work site immediately for repair.
- Species at risk and critical habitat will be protected in accordance with provincial and federal legislation and provincial and federal guidelines.
- A 30 m setback distance will be applied to known species at risk and a 10 m buffer will be applied to species of conservation concern occurrences within the PDA.
- Setbacks and buffers along the ROW will be clearly identified by signage or flagging prior to construction, and signage or flagging will be maintained during construction to alert crews to the presence of the setback.
- Final tower siting will avoid confirmed locations of species of conservation concern, if possible
- If avoidance of plant species of conservation concern is not possible, regulators will be contacted to determine the most appropriate mitigation action. This could include harvesting seed from the PDA, salvaging and transplanting portions of sod, collecting cuttings or transplanting whole plants.
- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion, where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed during ROW clearing.
- Environmentally sensitive sites, features and areas will be identified and mapped prior to clearing and form part of the environmental protection program (Chapter 12).
- The contractor will be restricted to established roads and trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1)

- The contractor will follow the erosion and sediment control management plan (Section 11.7.5.5)
- Weed control along access roads and trails will be in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
- Where appropriate, regional native grass mixtures will be used to help revegetate disturbed areas to control erosion or prevent invasion of non-native species. The mixtures will not contain non-native or invasive species.
- Large areas identified as having weed or non-native invasive plant species occurrences prior to the start of construction will be mapped. Weed control along access roads and trails will be conducted in accordance with the rehabilitation and invasive species management plan (Section 11.7.5.6)
- Equipment will be cleaned before moving from locations with identified invasive weed infestation. Manitoba Hydro employees and contractors will follow the Biosecurity Management Plan (Section 11.7.5.2) to prevent the spread of invasive weeds.
- Where appropriate, regional native grass mixtures will be used to assist revegetation of disturbed areas to control erosion and prevent invasion of non-native species. The mixtures will not contain non-native or invasive species.

Herbicides used by Manitoba Hydro on ROWs are formulated to target woody vegetation and broad-leafed plants while leaving grasses largely unaffected.

In addition to the planned limited and infrequent use of herbicides, Manitoba Hydro has established several other herbicide uses and application practices that will limit the potential for herbicides to enter the food chain and alter the quality of traditional foods. These include not treating sensitive areas with herbicides, such as those used for gathering berries and harvesting other types of traditional plant and animal country foods, that have been identified through engagement or traditional knowledge reports

In addition to the restrictions and mitigation measures outlined on the product labels, Manitoba Hydro's detailed vegetation management plan limits the use of herbicides. In areas where agricultural activities do not occur on the ROW, Manitoba Hydro's vegetation management goal is the establishment of a self-sustaining, low-growing plant community along the ROW. This would consist of a well-established plant community of bushes and shrubs that would out-compete tree seedlings for available light, nutrients and water and hinder the growth of trees that could threaten the security and operation of the transmission line. The use of mechanical equipment or manual clearing for vegetation control is generally non-selective and removes the beneficial low-growing plants in addition to trees. Manitoba Hydro considers that selective herbicide application is a more effective means of controlling aspens and other fast-growing trees while encouraging the establishment of bushes and shrubs, than the use of mechanical equipment or manual clearing (Manitoba Clean Environment Commission [CEC} 2013). Over time, developing healthy communities of bushes and shrubs on the ROW, coupled with the selective use of herbicides, will decrease the number of tall fast-growing trees within the ROW. This, in turn, will decrease the need for regular application of herbicide and could increase the time between required herbicide treatments to periods of 15 years or more (Manitoba CEC 2013).

Residual effects

Plant species of conservation concern

Eight vascular plant species of conservation concern are present in the PDA at fourteen different locations. The plant species of conservation concern consist of six forbs, one shrub and one graminoid. In addition, one historical forb plant species of conservation concern has been documented in the PDA, hairy sweet cicely (*Osmorhiza claytonia*). This species was not identified in the PDA during field surveys.

Two species at risk are expected in the Lake of Woods ecoregion, the endangered Great Plains ladies'-tresses (*Spiranthes magnicamporum*) and the threatened western silvery aster (*Symphyotrichum sericeum*).

Great Plains ladies'-tresses is a perennial forb found in meadows of tall grass prairie and it also colonizes disturbed areas (e.g., roadside ditches, abandoned fields; Manitoba Orchid Society 2012).

Western silvery aster is a perennial forb that is expected to occur in tall-grass and dry prairies, open dry upland sites, dry banks, and occasionally open woods (Government of Canada 2022).

Five of the plant species of conservation concern observed in the PDA during field surveys and the previously documented historical plant species of conservation concern have been observed elsewhere in the LAA (see Section 6.2.4.3). Three species of conservation concern, arrow-leaved tear-thumb (*Persicaria sagittata*), pearly everlasting (*Anaphalis margaritacea*), and dwarf bilberry (*Vaccinium cespitosum*), have only been observed in the PDA and may be lost following construction. Species at risk occurrences have not been documented in the RAA in historical records (MB CDC 2022) and none were observed during field surveys.

Undocumented vascular plant species of conservation concern may be present in the PDA. These may be lost due to the project, particularly at proposed transmission line structures where ground disturbance and vegetation removal will occur.

Shrub species of conservation concern and shade tolerant forbs and grasses are at a higher risk of loss due to the clearing of trees and shrubs along the ROW and damage from vehicle and equipment use.

Five of the identified species of conservation concern species including one shrub (Dwarf bilberry [*Vaccinium cespitosum*]), one graminoid (bladder sedge [*Carex intumescens*]) and three forbs will be lost from disturbance in the PDA as they are dependent on forested habitat:

- Dwarf bilberry occurs in openings with conifer forest on sandy soils and grows with other *Vaccinium* species (USDA 2023).
- Bladder sedge (*Carex intumescens)* is found in dry-mesic to wet coniferous, mixed wood, and deciduous forests (Flora of North America 2020).
- Sensitive fern (*Onoclea sensibilis*) is a forb found in open swamps, marshes, or low woods, sunny or shaded locations (Flora of North America 2020).
- Pearly everlasting (*Anaphalis margaritacea*) is a forb that occurs in dry woods, often with aspen or mixed conifers (Flora of North America 2020).
- Bracken fern (*Pteridium aquilinum*) is a forb that occurs in forest edges, meadows, woodlands, and open forests.
- Arrow-leaved tear-thumb (*Persicaria sagittate*) is a forb that is found in moist shaded sites, meadows, pastures, dens, swamps, shorelines and streams (Flora of North America 2020).

The remaining three identified species of conservation concern species (rough fleabane [*Erigeron strigosus*], hog-penut (*Amphicarpaea bracteate*) and bracken fern [*Pteridium aquilinum*]) are found in open prairies, roadsides, pastures, and prairie ravines (Appendix F).

Forested habitat makes up 157.2 ha (47.7%), wetland comprises 61.6ha (18.7%) and shrubland comprises 2.0 ha (0.6%) of the PDA. It is expected that there will be a 4,939.8 ha (-3.1%) loss of forested habitat, a 145.5 ha (-1.3%) loss of shrubland and a 2,981.5 ha (-2.0%) loss of wetland habitat in the LAA from construction.

Vegetation clearing will decrease the area of native upland and wetland habitat available for plant species of conservation concern but will not result in the loss of supporting habitat types from the LAA.

Plant species of conservation concern occurrences that persist following construction may also be affected during operation and maintenance. Periodic vehicle and equipment use, and recreational vehicle use, may damage plant species of conservation concern or disturb soils. Effects are expected to be greater during construction as surviving plants will be capable of tolerating the environmental conditions present following ROW preparation.

Two noxious weed species were observed in the PDA during field surveys, Canada thistle (*Cirsium arvense*), and field sow thistle (*Sonchus arvensis*) (Appendix F).

Canada thistle occurs in a wide range of upland and riparian communities (Zouhar 2001) and can occur in wetlands (United States Department of Agriculture 2023). Canada thistle is tolerant of shaded areas but grows best in open areas (Zouhar 2001).

Field sow thistle occurs in a wide range of communities, including riparian areas and wetlands, but is most often found in moist open saline habitats (McWilliams 2004; Alberta Invasive Species Council 2023).

These species may compete with plant species of conservation concern on the ROW and in adjacent open or forested areas with higher light levels. Henderson (2011) suggests species of conservation concern may be indirectly affected by competition of regulated and non-native invasive weeds up to 1 km; however, this applies more to open grassland areas.

Sumner and Archibold (2007) found few weed species can invade mature forest and abundance is typically low.

Manual/mechanical and biological treatments are Manitoba Hydro’s preferred methods for controlling weeds and non-native invasive plants and will be used over chemical methods when possible. Herbicide application will be used when other control options are not viable, such as areas of existing high weed abundance, or mechanical and biological methods are not practical. Mechanical control and herbicide application may result in damage to plant species of conservation concern if present in the same location.

As the project will reduce the abundance of plant species of conservation concern and potentially result in the local loss of three species of conservation concern, residual effects direction is adverse.

Magnitude is high as known plant species of conservation concern occurrence may be lost from the LAA and potentially from the RAA. Undocumented plant species of conservation concern occurrences may be affected but supporting vegetation and wetland cover types will be retained.

The geographical extent for potential residual effects extends to the LAA as environmental conditions in adjoining native upland and wetland areas may be altered and weeds may spread beyond the PDA.

Timing sensitivity is moderate for construction as activity will target winter when soils are frozen or dry and plants are dormant and less sensitive to activity. Timing sensitivity is high for operations and maintenance as activities may occur during the spring, summer, or fall when soils are thawed and potentially wet and plants are actively growing.

Effects are long-term and irreversible because the PDA will be maintained in a new condition for the life of the project and the low populations and potentially widely dispersed locations of plant species of conservation concern that could limit re-establishment.

Frequency will be a single event during construction and will be continuous irregular events during operation when vegetation management is required.

Plants of importance to Indigenous groups

During engagement, chaga and berries were mentioned as plants of importance to Indigenous groups. Chaga is a fungus that is commonly found on living birch and poplar trees (Marles et al 2000).

No specific surveys for the local abundance of chaga were completed; however, balsam poplar, trembling aspen, and paper birch were observed during field surveys in mixedwood and deciduous forest (Appendix F).

The project will alter the area of vegetation communities that support berries and chaga (e.g., deciduous forest, mixedwood forest, wetland and shrubland). These vegetation communities may be lost along the ROW where tree and shrub removal will occur and other vegetation may be damaged by vehicle movement, and at proposed transmission line structures where ground disturbance will occur. The changes in landcover from construction in the PDA will result in a loss of 66.7 ha (20.3%) of deciduous forest, 48.2 ha (14.6%) of mixedwood forest, 61.6 ha (18.7%) of wetlands, and 2.0 ha (0.6%) of shrubland. Potential chaga host tree species are likely to be lost during vegetation clearing.

Plants of importance to Indigenous groups may also be indirectly affected by competition of regulated weeds and non-native invasive species as their effects on vegetation communities may extend up to 1 km from disturbance (Henderson 2009). The two noxious weed species observed in the PDA are tolerant of high light levels and may increase in abundance along the ROW following construction. The plants are not expected to invade adjacent undisturbed forested areas following the findings of Sumner and Archibold (2007).

During operation and maintenance, plants of importance to Indigenous groups may change in abundance and distribution depending on the species. Species that are tolerant of high light conditions such as velvet-leaf blueberry may increase whereas shade tolerant species may decrease. Twenty-seven species of berry producing plants were observed at 42 sites during the 2022 field surveys. Of these species observed, seven are not tolerant of high sunlight, including beaked hazelnut (*Corylus cornuta*), bristly black currant (*Ribes lacustre*), highbush-cranberry (*Viburnum opulus*), mooseberry (*Viburnum edule*), red raspberry (*Rubus idaeus*), and wild red currant (*Ribes triste*) (USDA 2022). These berry producing species are likely to decrease in abundance and distribution within the LAA with vegetation clearing.

As trees will not be allowed to grow on the ROW, chaga is expected to be lost along the ROW for the life of the project. The ROW will be maintained as a grassland or shrubland and therefore, host trees will not be able to re-establish in the PDA.

The application of herbicides may have a perceived negative effect on plants of importance to Indigenous groups. Manitoba Hydro has committed to not using herbicide in sensitive areas such as berry harvesting locations along the ROW.

Manual/mechanical and biological treatments are Manitoba Hydro's preferred methods for controlling weeds and non-native invasive plants and will be used over chemical methods when possible. Herbicide application will be used when other control options are not viable, such as areas of existing high weed abundance, or mechanical and biological methods are not practical. Mechanical control and herbicide application may result in damage to plants of importance to Indigenous groups if present in the same location as control efforts. Weed and non-native invasive plant control measures will only occur on the ROW and with station footprints.

Potential residual effects on plants of importance to Indigenous groups are characterized as adverse because known plants of importance to Indigenous groups will result in a loss abundance.

Magnitude is characterized as moderate as known vegetation communities that supports plants of importance to Indigenous groups will be lost in the LAA.

The geographical extent extends to the LAA as environmental conditions in adjoining native upland and wetland areas may be altered and weeds may spread beyond the PDA.

Timing sensitivity is moderate for construction as activity will target winter when soils are frozen or dry and plants are dormant and less sensitive to activity. Timing sensitivity is high for operations and maintenance as activities may occur during the spring, summer, or fall when soils are thawed and potentially wet and plants are actively growing.

The residual effects will unlikely affect the sustainability of vegetation in the RAA as the land cover is dominated by coniferous forest. These effects are considered irreversible over the long term because after completion of construction, disturbance (vegetation management) will continue to persist after construction for the duration of the project.

Frequency will be a single event during construction and will be continuous irregular events during operation when vegetation management is required.

Post construction, vegetation communities will be different from the existing conditions. These changes in land cover will alter the abundance of upland and wetland dependent species and the new communities will likely be grassland and shrubland that may support plant species of importance to Indigenous groups. Post construction a positive increase may occur in berry abundance as a study has shown after linear disturbances (e.g., corridor used for seismic exploration of oil and gas) an increase in vegetation cover of velvety-leaved blueberry (Dawe et al 2017).

7.8.4 Summary of residual effects

Most effects will occur during construction due to the removal of vegetation along the ROW. Effects during construction are expected to be adverse, moderate in magnitude and infrequent except during operation. The geographic extent of effects community diversity and species diversity extends to the LAA due to the loss of upland native vegetation habitat and edge effects of regulated and non-native invasive weeds.

Table 7-44: Project residual effects on vegetation

Residual effect	Residual effects characterization							
	Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in Landscape intactness	C	A	M	LAA	HS	LT	S	R
Change in Community Diversity	C	A	M	LAA	MS	LT	S	R
	O	A	M	LAA	HS	LT	IR	R
Change in Species Diversity – Plant species of conservation concern	C	A	H	LAA	MS	LT	S	I
	O	A	L	LAA	HS	LT	IR	I
Change in Species Diversity – Plants of Importance to Indigenous Groups	C	A	M	LAA	MS	LT	S	I
	O	A	L	LAA	HS	LT	IR	I

KEY

See Table 7-39 for detailed definitions.	Geographic Extent:	Frequency:
Project Phase	PDA: Project Development Area	S: Single event
C: Construction	LAA: Local Assessment Area	IR: Irregular event
O: Operation	RAA: Regional Assessment Area	R: Regular event
D: Decommissioning	Timing	C: Continuous
Direction:	NS: No sensitivity	Reversibility:
P: Positive	MS: Moderate sensitivity	R: Reversible
A: Adverse	HS: High sensitivity	I: Irreversible
N: Neutral	Duration:	
Magnitude:	ST: Short-term	
N: Negligible	MT: Medium-term	
L: Low	LT: Long-term	
M: Moderate	N/A: Not applicable	
H: High		

7.8.5 Assessment of cumulative effects on vegetation

The project will have residual effects on vegetation including landscape intactness, community diversity, and species diversity as it is expected to act cumulatively with residual effects of other past, present, and reasonably foreseeable future physical activities.

Native vegetation abundance in the RAA has likely been reduced by past land use activities, including agriculture, residential development, and other human infrastructure such as roads, rail, forestry activities, peat mines and quarries, and electrical transmission lines. Some of these features have also likely increased fragmentation, changed vegetation communities and species diversity due to alteration of vegetation structure and composition and changes in hydrology and nutrient run-off and from surrounding land use. Agricultural land occupies 3.4% of the RAA and developed land occupies 11.1%.

7.8.5.1 Project residual effects likely to interact cumulatively

Table 7-45 presents the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project and vegetation. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-45: Interactions with the potential to contribute to cumulative effects	
Other projects and physical activities with potential for cumulative effects	Vegetation VC
Past and present physical activities and resource use	
Agriculture	✓
Forestry	✓
Domestic Resource Use (e.g., hunting, fishing, trapping)	✓
Recreational Activities (e.g., canoeing, snowmobiling)	✓
Infrastructure Projects (roads, rail, utilities)	✓
Generating Stations (Point de Bois, Slave Falls)	✓
Transmission Lines	✓
Nuclear Power (i.e., Whiteshell Laboratories)	✓
Other Industrial and Processing Development/Facilities	✓
Project-Related Physical Activities	✓
Future physical activities	
Slave Falls Generating Station	✓
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor [Pinawa Demonstration Reactor]	–

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– = Interactions between the residual effects of other projects and residual effects of the project are not expected.

The assessment of the cumulative effects likely to result from the project in combination with other projects and physical activities are discussed in subsequent sections.

Cumulative effects from the Whiteshell Laboratories Pinawa Demonstration Reactor are not expected as disturbance will be located within existing disturbed areas.

Other developments, such as processing facilities and waste management, may contribute to cumulative effects to wetlands in the RAA, but details on future projects is not publicly available.

7.8.5.2 Cumulative effect pathways

Future projects in the RAA (Table 7-45) have the potential to interact cumulatively with the project if their plans include the development of facilities in areas of native vegetation. Cumulative effects arising from future activities have similar effects pathways as effects arising from the project, including fragmentation, loss of native upland vegetation communities, and loss of plant species of conservation concern with vegetation clearing.

The nature and extent of cumulative effects will likely differ depending on the project. Transmission line decommissioning can cause both negative and positive effects. Decommissioning activities may result in similar disturbance related effects as those identified during the project. Once decommissioning is complete, reclamation of the ROW may increase the abundance and distribution of native vegetation communities. Development within another existing generating station site will not cause fragmentation or remove any native vegetation communities and therefore have mostly indirect effects on vegetation.

7.8.5.3 Mitigation for cumulative effects

Project mitigation measures, including equipment arriving clean and free of soil or vegetation debris, vegetation clearing during dry or frozen conditions, and reclamation of temporary disturbances will help reduce project residual effects to native vegetation. Other future projects are expected to implement similar standard mitigation measures and avoid or minimize effects to native vegetation as appropriate.

7.8.5.4 Cumulative effects

Vegetation clearing is one of the key factors affecting the native vegetation in the RAA. Approximately 14.5% of the RAA has been modified by agriculture and development. Construction of the project will increase the density of linear features (e.g., access roads, ROW) in the RAA by 1% (from approximately 1.5 km/km^2 to 1.52 km/km^2).

Future upgrades of the Slave Falls Generating Station may have an overlapping effect on riparian vegetation. The Slave Falls Generating Station upgrades will occur within the existing disturbance footprint and will not require vegetation removal; however, water levels on the Winnipeg River will be temporarily reduced by 1 to 2 m, approximately 10 km upstream (north) of the generating station. This change in water levels may temporarily alter existing riparian vegetation conditions. No riparian areas directly affected by the project overlap with the riparian areas potentially affected by the Slave Falls Generating Station, but areas of indirect may overlap near the Point du Bois Station. The interaction of the projects may alter plant composition and promote the introduction or spread of weeds. Other disturbances are present at the Point du Bois Station, including roads and private residences, and therefore conditions in cumulatively affected areas have likely been altered some from natural conditions.

7.8.5.5 Summary of cumulative effects

In summary, this project, in combination with other future projects, will have small contributions to cumulative effects on native vegetation. Project routing took a balanced approach to reduce potential change in landscape intactness, native upland vegetation communities, and species diversity. Many of the future projects are in previously disturbed, modified habitats. There are no known reasonably foreseeable projects or activities that would increase fragmentation effects on large (>200 ha) patches of forested land. Mitigation measures implemented for the project will help manage the risk of weed introduction and spread and measures to reduce effects to species of conservation concern will be explored.

7.8.6 Determination of significance

A significant adverse residual effect on vegetation is one that, following the application of avoidance and mitigation measures threatens the long-term persistence or viability of plant communities or species, including those of cultural or traditional importance.

Project residual effects and the project contribution to cumulative effects, following application of mitigation measures, are predicted to be not significant. Although the project will increase fragmentation on the landscape, reducing the number and size of some large intact core areas, the project will only reduce the number of core areas by 4.4% from existing conditions. Vegetation clearing will alter 5,096.6 ha (-3.0%) of native upland vegetation communities and plant species of conservation concern habitat within the LAA, but no cover types will be lost. Vegetation clearing may result in the loss of known plant species of conservation concern occurrences, especially those that required forested habitat.

Indirect effects will extend over a larger area due to changes in light and moisture conditions, the area affected is also small in relation to native vegetation communities in the LAA and RAA. No native vegetation communities will be lost in the LAA because of the Project. The abundance of plants of interest to Indigenous groups will also be reduced, but the plants will not be lost from the LAA as they are provincially common species.

7.8.7 Prediction confidence

Prediction confidence for vegetation is moderate. Vegetation types were mapped at a scale allowing identification of individual cover types with characteristic vegetation structure and composition (e.g., deciduous forest, coniferous forest), and were reviewed and modified using current land use information and subsequently evaluated in the field. However, the mapping did not account for the age of the land cover types (e.g., forest stands) based on fire history. The mapping also supports assessment of landscape intactness and community diversity supporting quantification of changes in fragmentation (e.g., linear feature density, core areas). Areas mapped as grassland are not native grassland but are areas of forest that have been previously cleared.

Effects conclusions for plants of interest to Indigenous groups and plant species of conservation concern may be underestimated. Publicly available regional data sets on plant abundance by community type are not available for the RAA, or the Lake of the Woods ecoregion, and this limits the understanding of the regional and local abundance of plants of importance to Indigenous groups.

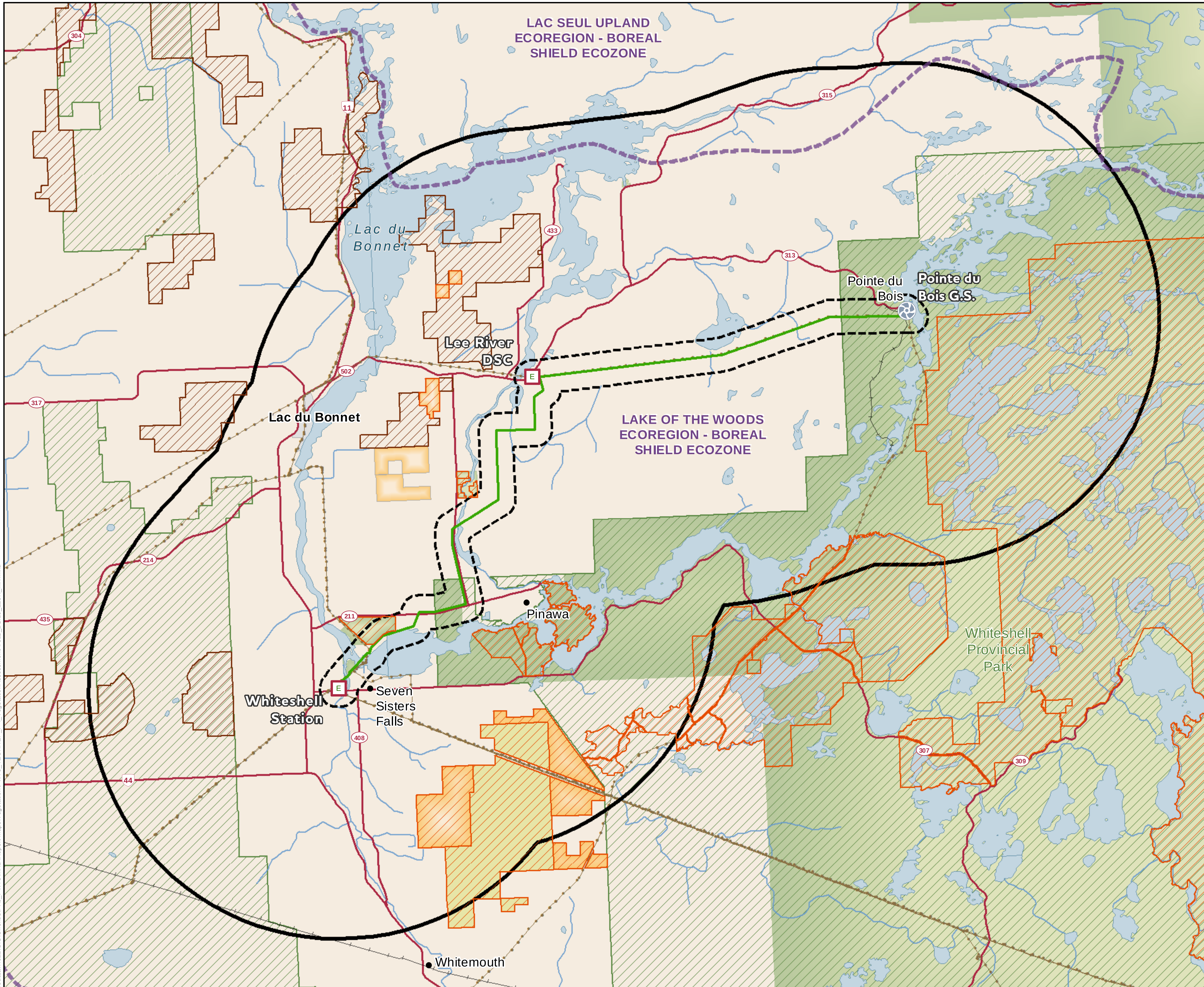
The abundance of plant species of conservation concern is largely unknown except for the occurrences of species of conservation concern observed during field surveys in the PDA, LAA and RAA. Moreover, plant species of conservation concern are difficult to detect (e.g., unsurveyed areas, imperfect detection, survey timing, seasonal changes) and undocumented plant species of conservation concern occurrences may be affected by vegetation clearing but supporting vegetation and wetland cover types will be retained in the LAA. Therefore, it is difficult to determine the magnitude of effects from the project due to the high level of uncertainty regarding potential vascular plant species of conservation concern occurrences in the non-surveyed areas.

7.8.8 Follow-up and monitoring

Due to confidence in predictions, and monitoring results from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, the EPP will outline monitoring steps to ensure appropriate rehabilitation and follow-up.

Manitoba Hydro

Pointe du Bois (PW75) Transmission Project



Project Infrastructure

- Final Preferred Route

Assessment Area

- Vegetation LAA (PDA Buffer 1km)
- Vegetation RAA (PDA Buffer 15km)

Existing Infrastructure

- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase

- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park
- Provincial Forest
- Protected Area
- Area of Special Interest
- Ecoregion

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 2.5 5 Miles

1:225,000

Spatial Boundaries for Vegetation

Map 7-4

7.9 Terrestrial wildlife and habitat

Terrestrial wildlife and wildlife habitat play an important role in the biophysical and socio-economic environments of the project. Terrestrial wildlife are components of ecological cycles, provide economic benefits from hunting, guiding, and trapping, and provide a source of food and materials. Over 50 terrestrial wildlife species could range into the project region and include small mammals, aquatic and terrestrial furbearers, large carnivores, and ungulates (Appendix D).

7.9.1 Scope of the assessment

This section builds on baseline conditions for terrestrial wildlife and wildlife habitat and assesses the effects of project activities from construction, and operation and maintenance of the project, as well as an assessment of cumulative effects on terrestrial wildlife and wildlife habitat.

7.9.1.1 Regulatory and policy setting

The following is a list of the regulatory requirements, policies, and guidance considered in the assessment of effects on terrestrial wildlife and wildlife habitat.

<u>Federal regulations and policy</u>

Species at Risk Act (SARA)

The *SARA* provides protection for species at risk in Canada. The legislation provides a framework to facilitate recovery of species listed as threatened, endangered, or extirpated and to prevent species listed as special concern from becoming threatened or endangered. Species at risk and their habitats are protected under *SARA* which prohibits:

1) the killing, harming, or harassing of endangered or threatened species at risk (sections 32 and 36); and

2) the destruction of critical habitat of and endangered or threatened species at risk (sections 58, 60, and 61).

Project construction and operation is subject to *SARA*. Of the over 50 terrestrial wildlife species that could be found in the project region, two are listed by SARA: little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*).

Provincial regulations and policies

The Endangered Species and Ecosystems Act (ESEA)

The *ESEA* provides protection to threatened and endangered ecosystems and plant and animal species at risk in Manitoba. The *ESEA* facilitates the management and development of recovery strategies for threatened, endangered, and extirpated or extinct species to prevent further declines and promote recovery. *ESEA*-listed species are those that "are of ecological, educational, aesthetic, historical, medical, recreational and scientific value to Manitoba and the residents of Manitoba" (Government of Manitoba 2019).

The Wildlife Act

The Wildlife Act provides general provisions for regulating the activities relating to the take and trade of wild animals in Manitoba. A "wild animal" is defined as "an animal or bird of a species or type listed in Schedule A or declared by the regulations to be a wild animal", and includes select amphibian, reptile and mammal species and most bird species (including many not protected under the *MBCA*) known to exist in Manitoba.

7.9.1.2 Consideration of issues raised during engagement

Ongoing First Nation and Métis engagement for the project has identified moose and American marten as important terrestrial wildlife species for their ecological and subsistence value.

Through public engagement sessions and surveys conducted by Manitoba Hydro, First Nation and Métis reported that the area east of Boggy Creek Road is important habitat for white-tailed deer.

Black River First Nation (2022) reported that moose populations in some parts of Manitoba are under increased pressure from predation, disease, increased harvesting pressure, climate change as well as the changing landscape.

The MMF, Brokenhead Ojibway Nation, Hollow Water First Nation, Peguis First Nation, and Black River First Nation have reported hunting and trapping within the project region for wildlife including moose, deer, elk, rabbits, geese, ducks, coyote, chipmunk, porcupine, bobcat, otter, marten, fisher, muskrat, lynx, fox, weasel, mink, muskrat, beaver, and historically bison.

Previous (Government of Manitoba 2014) and ongoing public comments on the project indicated concern for adverse effects on mature forest and wetland habitat, including on beavers, and moose, and project-related effects on wildlife habitat including habitat fragmentation and increased human access (e.g., recreational vehicles and hunting).

7.9.1.3 Potential effects, pathways, and measurable parameters

The focus of this assessment is on effects that have the potential to affect wildlife and wildlife habitat. Potential environmental effects, the effect pathway, and measurable parameters are provided in Table 7-46.

Table 7-46: Potential effects, effects pathways and measurable parameters for terrestrial wildlife and wildlife habitat

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
Change in habitat	Direct and/or indirect loss or alteration of habitat due to vegetation clearing, ground disturbance, sensory disturbance and/or fragmentation and edge effects	Amount (ha) of terrestrial wildlife habitat (wetland, shrub, forest, native and tame grassland) directly altered by the project, including for species of interest: • Moose • American marten • Bats Change in habitat intactness (number and size of core areas, length of linear features/km^2)
Change in mortality risk	Direct change in mortality risk due to vegetation clearing activities, vehicle collisions, human-wildlife conflicts, and indirect change in mortality risk due to predation and harvest pressure	Total area (ha) of PDA that intersects terrestrial wildlife habitat (i.e., wetland, native and tame grassland, forest) within the LAA Change in habitat intactness (number and size of core areas, length of linear features/km^2)

7.9.1.4 Spatial boundaries

The following spatial boundaries are used to assess effects to terrestrial wildlife and wildlife habitat (Map 7-1):

- **Project Development Area (PDA)**: The PDA is the footprint of the proposed project as described in section 2.0, including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances.
- **Local Assessment Area (LAA)**: The LAA is a 1-km buffer on either side of the final preferred route, which is based on measurable effects of noise on wildlife (e.g., Benitez-Lopez et al. 2010; Shannon et al. 2016), while also considering maximum recommended setback distances for sensitive habitat features (MB CDC 2021). This is also consistent with LAA boundaries used for other recent transmission line projects in Manitoba (Manitoba Hydro 2015).
- **Regional Assessment Area (RAA)**: The RAA is a 15-km buffer of the final preferred route used to capture information on a broader scale and to provide regional context A 15 km buffer is consistent with other recent transmission line projects in Manitoba (Manitoba Hydro 2015). The RAA is used to assess cumulative effects and the significance of project-specific effects on terrestrial wildlife species (e.g., birds, mammals, amphibians, and reptiles). The RAA encompasses the home ranges or dispersal distances of most wide-ranging species potentially affected by the project, including black bear (*Ursus americanus*; 5 to 25 km^2 for female bears [Government of British Columbia 2001]), white-tailed deer (*Odocoileus virginianus*; 89 km^2 [Lesage et al. 2000]), and non-migratory moose (*Alces alces*; 97 km^2 [Hauge and Keith 1981).

7.9.1.5 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.9.1.6 Residual effects characterization

Table 7-47 presents definitions for the characterization of residual environmental effects on terrestrial wildlife and wildlife habitat. The criteria describe the potential residual effects that remain after mitigation measures have been implemented.

Table 7-47: Characterization of residual effects on terrestrial wildlife and wildlife habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to terrestrial wildlife and habitat relative to baseline **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to terrestrial wildlife and habitat relative to baseline **Neutral –** no net change in measurable parameters for terrestrial wildlife and habitat relative to baseline
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	Change in Habitat[1] **Negligible** – no measurable change in habitat for terrestrial wildlife, including species at risk and species of conservation concern **Low** – Project changes less than 10% of terrestrial wildlife habitat in the LAA, or less than 5% of habitat for species at risk and species of conservation concern in the LAA

Table 7-47: Characterization of residual effects on terrestrial wildlife and wildlife habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
		Moderate – Project changes 10-20% of terrestrial wildlife habitat in the LAA, or 5-10% of habitat for species at risk and species of conservation concern in the LAA **High** – Project changes more than 20% of terrestrial wildlife habitat in LAA, or more than 10% of habitat for species at risk and species of conservation concern in the LAA Change in Mortality Risk **Negligible** – a measurable change in the abundance of terrestrial wildlife in the LAA is not anticipated **Low** – a measurable change in the abundance of terrestrial wildlife in the LAA is not anticipated, although temporary local shifts in distributions in the LAA might occur **Moderate** – a measurable change in the abundance and/or distribution of terrestrial wildlife in the LAA might occur, but a measurable change on the abundance of terrestrial wildlife in the RAA is not anticipated **High** – a measurable change in the abundance and/or distribution of

Table 7-47: Characterization of residual effects on terrestrial wildlife and wildlife habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
		terrestrial wildlife in the RAA might occur
Geographic extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA –** residual effects extend into the LAA **RAA –** residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC	**No sensitivity -** Effect does not occur during critical life stage (e.g., outside the calving season for moose) or timing does not affect the VC **Moderate sensitivity -** Effect may occur during a lower sensitive period of a critical life stage; for many species this is the start (e.g., several weeks prior to calving season) or end (e.g., periods when calves are mobile but remain dependant) of the critical period. **High sensitivity -** Effect occurs during a critical life stage (e.g., calving season)
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no	**Short-term –** the residual effect is restricted to the construction phase

Table 7-47: Characterization of residual effects on terrestrial wildlife and wildlife habitat

Characterization	Description	Quantitative measure or definition of qualitative categories
	longer be measured or otherwise perceived	**Medium-term –** the residual effect extends through to completion of post-construction reclamation **Long-term -** the residual effect extends for the life of the Project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event – occurs once **Multiple irregular event** – occurs at no set schedule **Multiple regular event** – occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed or returned to baseline conditions

7.9.1.7 Significance definition

A significant adverse residual effect on terrestrial wildlife and wildlife habitat is defined as one that threatens the long-term persistence or viability of a terrestrial wildlife species in the RAA, including effects that are contrary or inconsistent with the goals, objectives, and activities of recovery strategies, action plans, and management plans.

7.9.2 Project interactions with terrestrial wildlife and wildlife habitat

Anticipated interactions between project activities and the potential effects are identified in Table 7-48 with a check mark and are discussed in detail in Section 7.9.3, in the context of effects pathways, standard and project-specific mitigation, and residual effects. Justification for no effect (indicated by a dash) is provided following the table.

Project activities for each phase are described in detail in Section 2.1.

The potential interactions between project activities and terrestrial wildlife and wildlife habitat were considered for the construction and operation and maintenance phases of the project.

The identification of project activities and their potential interactions was based on engagement with interested parties, the professional judgment of technical specialists involved in the assessment, and a review of existing conditions. The selection of interactions is informed by the potential effects and effects pathways for the VC.

Table 7-48: Project interactions with terrestrial wildlife and wildlife habitat

Project activity	Effects	
	Change in habitat	Change in mortality risk
Transmission line construction		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Right-of-way clearing	✓	✓
Watercourse crossings	✓	-
Marshalling / fly yards	✓	✓
Transmission tower construction	✓	-
Implodes	✓	-
Helicopter use	✓	-
Clean-up and demobilization	✓	✓
Station modification		

Table 7-48: Project interactions with terrestrial wildlife and wildlife habitat		
Project activity	Effects	
	Change in habitat	Change in mortality risk
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Marshalling / fly yard (Pointe du Bois station)	✓	✓
Realignment of access road (Pointe du Bois station)	✓	✓
Site preparation (Pointe du Bois station)	✓	✓
Station footprint expansion (Pointe du Bois station)	✓	✓
Installation of electrical equipment	-	-
Clean-up and demobilization	✓	✓
Transmission line and station operation and maintenance		
Transmission line and station presence	✓	✓
Vehicle and equipment use	✓	✓
Inspection and maintenance	✓	✓
Vegetation management	✓	✓
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓
Rehabilitation	✓	✓

Table 7-48: Project interactions with terrestrial wildlife and wildlife habitat

Project activity	Effects	
	Change in habitat	Change in mortality risk
Clean-up and demobilization	✓	✓

✓ = Potential interaction

– = No interaction

Installation of electrical equipment will occur on existing transmission stations (e.g., Lee River distribution supply centre, Pointe du Bois station) and is not expected to interact with change in habitat or mortality risk for the lifetime of the project as there is no pathway for these activities to affect terrestrial wildlife or wildlife habitat.

Transmission tower construction, implodes, and helicopter use are not expected to cause a change in mortality risk. Transmission tower construction will be conducted on previously cleared land and there are no pathways for these activities to cause wildlife fatalities.

7.9.3 Assessment of residual environmental effects on terrestrial wildlife and wildlife habitat

7.9.3.1 Analytical assessment techniques

The general approach to assessing potential environmental effects on terrestrial wildlife and habitat follows the sequence and methods outlined in Chapter 5.0.

Change in habitat was assessed by overlaying the PDA with existing land cover data to quantify how much terrestrial wildlife habitat would be directly affected by the project and quantified by comparing direct changes in the amount of habitat available for each species to baseline conditions.

Indirect change in habitat (i.e., sensory disturbance) was assessed qualitatively as the area of reduced habitat effectiveness adjacent to the PDA. Indirect change in habitat due to edge effects and/or sensory disturbance are anticipated to occur within the LAA (i.e., up to 1 km from the PDA). Potential effects are considered as a whole, inclusive of all seasonal requirements for terrestrial wildlife (e.g., calving season).

Change in mortality risk was assessed qualitatively through change in direct (i.e., total area of PDA that intersects forest, wetland, and grassland habitat) and indirect (i.e., change in habitat intactness) parameters with potential to result in wildlife mortality through vehicle collisions, human-wildlife conflicts, changes in predator-prey dynamics, and harvest pressure. The qualitative assessment included a combination of literature review, landscape assessment, and professional judgment to predict the mortality risks to terrestrial wildlife.

7.9.3.2 Change in habitat

Construction

Project pathways

During construction, vegetation clearing and grubbing of the ROW is the primary pathway for a direct and measurable change in terrestrial wildlife habitat. ROW clearing will result in the loss of forest habitats in the PDA (grassland and wetland habitat will remain relatively intact outside of towers location).

Habitat intactness may be reduced along segments of the ROW by dividing large habitat patches into smaller patches. This may result in reduced connectivity between wildlife mating areas, overwintering grounds, and dispersal corridors. Habitat connectivity between patches is important in maintaining local and regional wildlife movements. Fragmenting forested areas may present a barrier for some species that reduce their risk of predation by avoiding open areas (e.g., American marten [Kurki et al. 1998], some species of mice and voles [Storm and Choate 2012]).

Construction of the ROW has potential to fragment habitat and create edge effects. Some species, such as moose, could be drawn to edges for the diversity of habitats that form (e.g., browsing, travel corridors). Habitat fragmentation may reduce patch size that is important in maintaining biodiversity (Environment Canada 2013). Change in habitat intactness because of project activity is discussed in detail in Section 7.8.3.2.

Indirect effects on habitat are those that reduce the effectiveness of existing or remaining habitat for terrestrial wildlife. Indirect effects may occur through construction-related sensory disturbances (e.g., noise, light) causing temporary displacement of some terrestrial wildlife from otherwise suitable habitat adjacent to the PDA. Such activity may be associated with ROW clearing, mobilizing staff and equipment (including access route and bypass trail development), watercourse crossing, transmission tower construction and conductor stringing (e.g., implodes, helicopter use), and upgrade work at the Pointe du Bois Station. These activities could disrupt and displace some terrestrial wildlife within the LAA.

No known bat hibernacula are present in the RAA and as a result, sensory disturbances near these features are not anticipated.

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project on terrestrial wildlife and habitat during construction include the following:

- Wildlife features (i.e., mineral licks) will be identified and mitigation applied such as buffers and/or setbacks prior to clearing.
- Clearing activities will not be carried out during the sensitive timing windows for wildlife species without additional mitigation measures.
- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing.
- Trees in areas where active animal dens or burrows are encountered within the ROW will be buffered and left undisturbed until unoccupied.
- Natural low growing shrub and grass vegetated buffer areas of 30 m will be delineated around wetlands and watercourses.
- Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas at least 100 m from the ordinary high-water mark of a waterbody or wetland, unless approved by a Manitoba Hydro environmental officer, where additional mitigations measures will apply.
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
- The contractor will follow the erosion and sediment control management plan (Section 11.7.5.5).
- Clearing wastes and other construction debris or waste will not be placed in wetland areas.
- Rehabilitation plans will include objectives for restoration of natural conditions, erosion protection, sediment control, non-native and invasive plant species management, wildlife habitat restoration and restoration of aesthetic values as required.

Residual effects

Most construction-related change in habitat was mitigated during the planning and routing process by aligning the final preferred route with an existing ROW (i.e., PW75) and adjacent to existing sources of anthropogenic disturbance (e.g., PR 520 and PR 211).

The PDA will traverse 224.5 ha of terrestrial wildlife habitat (forest, shrubland, riparian, wetland, tame and native grassland) (Table 7-49). Removal of trees and shrubs in the PDA will result in a direct, long-term change in 201.7 ha of treed and shrub-dominated habitat in the LAA (section 7.8.3.3). The amount of treed and shrub habitat removed is approximately 2.5% of the total amount of treed and shrub-dominated habitat in LAA, and 2.3% of the total amount of potential terrestrial wildlife habitat in the LAA (8,606.4 ha; Table 7-49).

Table 7-49: Change in broad land cover types used by terrestrial wildlife in the LAA

Landcover type	Existing conditions LAA		PDA		Post-construction area in the LAA		Terrestrial wildlife species associated with broad land cover type
	Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change	
Forest	5,096.9	47.3	152.2	46.2	4,944.7	3.1%	Little brown myotis, northern myotis, white-tailed deer, moose, grey wolf, black bear, rabbit, American marten, lynx, weasel, red squirrel
Shrubland	147.5	1.4	2	0.6	145.5	1.4%	White-tailed deer,

Table 7-49: Change in broad land cover types used by terrestrial wildlife in the LAA

Landcover type	Existing conditions LAA		PDA		Post-construction area in the LAA		Terrestrial wildlife species associated with broad land cover type
	Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change	
							moose, rabbit
Grassland	136.3	1.3	5.3	1.6	131.1	4.0%	Coyote, red fox, American badger
Wetland	3043.1	28.2	59.3	18	2,981.5	2.0%	Moose, black bear, white-tailed deer, beaver, muskrat, mink, river otter
Riparian	182.6	1.7	5.7	1.7	176.7	3.3%	Moose, white-tailed deer, beaver, muskrat, mink, river otter

Two species at risk species (little brown myotis and northern myotis) and two species of interest (American marten and moose) have potential to occur in the RAA. The direct change in habitat for each species in the LAA is presented in Table 7-50.

Table 7-50: Change in habitat for species at risk and species of interest with potential to occur in the RAA

Species		Habitat association	Existing conditions LAA	PDA	Post-construction area in the LAA	
Common name	Scientific name		Area (ha)	Area (ha)	Area (ha)	% Change
Little brown myotis	*Myotis lucifugus*	Mature forest (potential maternity roost habitat)	1607.1	47.6	1552.2	-3.2%
Northern myotis	*Myotis septentrional*	Mature forest	1607.1	47.6	1552.2	-3.2%
American marten	*Martes americana*	Mature coniferous and mixedwood forest	2368.5	63.5	2305	-2.7
Moose	*Alces alces*	Young and mature forest types, wetlands	6616.5	244.1	6372.3	-3.7

Removal of trees will reduce habitat for some forest dwelling species (e.g., American marten, bats) but as a result will increase modified wildlife habitat for other species. Forest areas cleared along the ROW will eventually regenerate to modified habitat consisting of new growth trees, shrub, herb, and grass dominated plant community. Some wildlife species may benefit from the creation of these habitats. Open-habitat and forest edges may be used as travel corridors by grey wolf, provide grazing and browsing opportunities for white-tailed deer, moose, and foraging opportunities for bats.

Construction of the project will increase the density of linear features (e.g., access roads, ROW) in the RAA by less than 1%. This increase is primarily attributed to ROW clearing along the forested portion of the final preferred route extending through the edge of a large, intact habitat patch (Map 7-2). Within this area, ROW clearing will have indirect effects on habitat by fragmenting forest, reducing landscape intactness, and increasing edge habitat. See Section 7.8.3.2 for a detailed description of residual effects on landscape intactness.

For some species (e.g., denning black bears), habitat avoidance and reduced habitat effectiveness due to sensory disturbance and fragmentation effects during construction can extend upwards of 1 km from the PDA. Sensory disturbance is expected to cease immediately following the conclusion of construction activities.

Following the implementation of mitigation measures described above, residual effects for change in habitat during construction are characterized by the following:

- Direction is adverse:
    - There will be direct and indirect habitat loss or alteration during construction.
- Magnitude is low:
    - Construction of the project will result in a 1.7% change in wildlife habitat in the LAA (Table 7-) and a 0.87% increase in linear disturbance. The combined direct loss of natural wildlife habitat is low (i.e., <10% of the LAA) based on magnitude criteria presented in Table 7-50.
- Geographic extent is the LAA:
    - Direct habitat loss will be confined to the PDA; however, indirect effects (i.e., sensory disturbance, edge effects) will extend into the LAA.
- Timing is low sensitivity:
    - Construction of the project will occur in the winter when many species are dormant or overwintering outside the RAA and will avoid the sensitive spring and summer breeding periods of most terrestrial wildlife species.
- Duration is short-term to long-term (depending on habitat type and project component):
    - Direct (i.e., habitat loss) and indirect effects (i.e., edge effects) on habitat availability due to clearing and alteration will be permanent because the effects will extend for the lifetime of the project.

- Indirect effects on habitat availability associated with sensory disturbance from ROW clearing, construction of transmission infrastructure and station upgrades and expansion will be short-term.

- Frequency is a single and irregular event:
  - Habitat alteration will primarily occur once during ROW clearing.
  - Sensory disturbance associated with ROW clearing, construction of transmission infrastructure and station upgrades and expansion will occur multiple times at irregular intervals.
- Change is reversible:
  - Direct (i.e., habitat loss) and indirect effects (i.e., edge effects) on habitat availability due to clearing and alteration are reversible after the life of the project (i.e., with natural regeneration of ROW vegetation).
  - Indirect effects on habitat availability associated with sensory disturbance from ROW clearing, construction of transmission infrastructure and station upgrades and expansion are reversible once activity has ended.

Operation

Project pathways

Potential pathways for operation-related effects on terrestrial wildlife in the LAA were mitigated during the planning and routing process by aligning the final preferred route with an existing ROW (i.e., PW75) and adjacent to existing sources of anthropogenic disturbance (e.g., PR 520 and PR 211) to reduce habitat fragmentation and maintain intactness.

Although changes to habitat availability will be most pronounced during construction, operation and maintenance will continue to have an influence on terrestrial wildlife and wildlife habitat through the presence of the ROW (e.g., habitat avoidance due to increased predation and hunter access) and periodic disturbances associated with vegetation maintenance and inspection activities.

Positive changes along cleared areas of the ROW during the operation phase will be the re-establishment of vegetation, as parts of the ROW will become foraging habitats for species like white-tailed deer and moose that prefer food sources such as grasses and early successional trees and shrubs (Banfield 1974; Bramble and Brynes 1982; Bartzke et al. 2014). However, based on local moose collaring data and habitat selection modelling, moose avoid areas within 300 m to 500 m of linear features (Kingdon 2023, pers. comm.). For some species of small mammal, this new habitat may lead to localized increases in abundance (e.g., least chipmunk [*Tamias minimus*]; Storm and Choate 2012), which can in turn can lead to an increase in the abundance of medium-sized predators that prey on these species (e.g., American marten) (Kurki et al. 1998).

American marten typically remain within 100 m of forest cover and edges for security when not dispersing (e.g., Hargis and McCollough 1984, Slough 1989, Lofroth and Steventon 1990). Despite this, marten have been shown to disperse through large expanses (10 km to 20 km) of non-forested habitats (Buskirk 2002) and forestry management guidelines for marten suggest avoiding the creation of gaps between core habitat areas of 1 km to 2 km (Watt et al. 1996).

The ROW may benefit larger sized predators (e.g., grey wolf) by increasing access to prey foods and increasing travel efficiency in heavily forested areas where access is limited and snowmobiles provide a packed snow base (Latham et al. 2011a, 2011b). An increased use of linear features by predators has been observed with a corresponding avoidance of linear features by ungulates species (e.g., moose, white-tailed deer; Latham et al. 2011b). Some evidence suggests that ungulates such as moose and white-tailed deer moved quicker when travelling across or along transmission lines, likely in response to associating linear features with increased mortality risk (DeMars et al. 2019; Dickie et al. 2019).

Vegetation management (i.e., for controlling noxious or restricted weeds and managing woody vegetation along the ROW), and use of all-terrain vehicles (ATVs) and snowmobiles for transmission line inspection, could temporarily reduce the effectiveness of terrestrial wildlife habitat by causing some species (e.g., white-tailed deer, moose) to avoid the ROW and adjacent areas until the disturbance has ceased.

Travel along the ROW by resource users, hunters and other recreational users is expected based on the existing use of transmission line corridors in the project region. Increased access to previously remote areas could potentially negatively affect the recovery of moose in the RAA by reducing and/or fragmenting potential moose habitat and increasing predator and human access (Whiklo 2023, pers. comm.).

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project to change in habitat during operation and maintenance includes the following:

- Natural low growing shrub and grass vegetated buffer areas of 30 m will be established around wetlands and waterbodies.

- Vegetation clearing activities will not be carried out during the reduced risk timing windows for wildlife species without additional mitigation measures.
- Vehicle, equipment and machinery maintenance and repairs will be carried out in designated areas located at least 100 m from the ordinary high-water mark of a waterbody or wetland, unless approved by a Manitoba Hydro environmental officer, where additional mitigations measures will apply.
- Vehicle, equipment, and machinery operators will perform a daily inspection for fuel, oil and fluid leaks and will immediately shutdown and repair any leaks found. All machinery working near watercourses will be kept clean and free of leaks.
- Manitoba Hydro will not support the development of a new designated recreational snowmobile trail along the ROW.

Residual effects

During operation, residual effects on terrestrial wildlife and wildlife habitat associated with sensory disturbance from equipment used during ROW vegetation management and inspections are not expected to have much of an effect on terrestrial wildlife as transmission line inspection will occur once or twice a year outside of critical life stages for wildlife (e.g., moose calving). Vegetation management activities will be repeated over a longer cycle (every five to seven years as required) and will involve the use of less invasive and less destructive techniques (i.e., herbicide) to control woody vegetation than initial clearing.

Based on observed use of other existing transmission lines (e.g., Manitoba-Minnesota Transmission Project), use of ATVs and other recreational vehicles may occur year-round on portions of the ROW. Shrubby vegetation will be maintained on the ROW where possible to impede ATV access and limit disturbance to wildlife.

The direct (via ROW clearing) and indirect (due to sensory disturbance) change in habitat availability that occurred during construction will persist during operation; however, the magnitude of effects are expected to lessen as vegetation will re-establish and provide habitat for species that use open forest habitat and/or edge habitat (e.g., white-tailed deer, bats).

Following the implementation of mitigation measures described above, residual effects for change in habitat during operation are characterized by the following:

- Direction is adverse and positive:
  - There will be an adverse indirect effect on wildlife use of ROW and adjacent habitat due to sensory disturbance associated with vegetation maintenance activities and recreational vehicle use.

    - The presence of the ROW could have an adverse effect on moose due to their avoidance of linear features (Kingdon 2023, pers. comm.).
    - There will be positive direct habitat gain for forest edge, grassland, and shrubland/open habitat for some wildlife species as vegetation naturally regenerates along the ROW.
- Magnitude is low:
    - Indirect effects of sensory disturbance on wildlife are unlikely to have a measurable effect on the abundance of wildlife in the LAA; however, temporary local shifts in wildlife distributions might occur in the PDA and adjacent areas.
- Geographic extent is the LAA:
    - ROW vegetation maintenance is limited to the PDA; however, the effects of sensory disturbance can extend into the LAA.
- Timing is moderate sensitivity:
    - Operation of the project will occur during sensitive timing windows (e.g., ungulate calving season) of wildlife species in the LAA, however, potential disturbance such as vegetation management and transmission inspections will be scheduled outside of sensitive timing windows.
- Duration is short-term to long-term:
    - Indirect effects on ROW and edge habitat due to sensory disturbance (i.e., avoidance) will be short-term, as most wildlife using these areas will return once sensory disturbance ceases.
    - ROW vegetation will be managed as open habitat over the long-term.
- Frequency is at multiple, irregular intervals:
    - Sensory disturbance from vegetation management, ROW inspections, and recreational vehicle use will occur multiple times at irregular intervals.
- Change is reversible:
    - Indirect effects on ROW and edge habitat due to sensory disturbance (i.e., avoidance) will be short-term and reverse once activity has ended.
    - The effects of vegetation management along the ROW are reversible after the life of the project with natural regeneration of ROW vegetation.

7.9.3.3 Change in mortality risk

Construction

Project pathways

During construction, the primary pathways for direct changes in terrestrial wildlife mortality risk are associated with vegetation clearing in the PDA and collisions with project-related transportation in the LAA.

Clearing of the ROW will involve vegetation removal and soil disturbance, which could result in an increased mortality risk for less mobile wildlife species such as small mammals living in the leaf litter or burrowing/hibernating in the soil. Heavy equipment used during clearing has the potential to destroy habitat used by denning mammals such as black bear and American marten. Black bear and American marten are known to den within the RAA and therefore have potential to overwinter within the PDA. Project-related transportation and heavy equipment have the potential to collide with wildlife (e.g., white-tailed deer) inhabiting the LAA.

Human-wildlife encounters or conflicts (e.g., food waste, garbage) may occur at site facilities that can lead to wildlife mortality through trapping of rodents or destroying larger problem wildlife species such as black bear or red fox.

Changes in predator-prey interactions and harvest pressure are expected to be the primary pathways through which indirect changes in mortality risk to terrestrial wildlife will occur during construction. Construction of the ROW will fragment habitat and increase edge habitat (Section 7.8.3.2). The ROW may benefit predators (e.g., grey wolf) by increasing access to prey foods and increasing travel efficiency in heavily forested areas where access is limited (Latham et al. 2011a, 2011b).

Habitat fragmentation could indirectly affect moose by attracting and facilitating movement of white-tailed deer into areas not previously occupied (Manitoba Model Forest 2011). When deer occupy moose habitat, there is high potential for deer to transmit disease to moose, such as brainworm and liver fluke parasites. The brainworm parasite, which is known to occur in the project region, is harmless to deer but fatal to moose (Schimtz and Nudds 1994; Manitoba Model Forest 2011). Liver flukes can also contribute to mortality if moose are in a weakened state (Lankester and Samuel 2007; Manitoba Model Forest 2011).

Mitigation

Project-specific mitigation measures to avoid or reduce the potential effects of the project on terrestrial wildlife mortality risk during construction includes the following:

- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).
- Clearing activities will not be carried out during sensitive timing windows for wildlife species without additional mitigation.
- Trees containing large nests of sticks and areas where active animal dens or burrows are encountered will be buffered and left undisturbed until unoccupied.
- Hunting and harvesting of wildlife, or possession of firearms by project staff will not be permitted while working on the project sites.

Residual effects

Most construction-related mortality risks to terrestrial wildlife in the LAA were mitigated during the planning and routing process by aligning the final preferred route with an existing ROW (i.e., PW75) and adjacent to existing sources of anthropogenic disturbance (e.g., PR 520 and PR 211).

Where the project does traverse natural habitat, mitigation measures (e.g., clearing outside of critical life stages [e.g., summer moose calving], applying setbacks and buffers to denning sites, controlling project vehicle speeds on the ROW) will be implemented to reduce mortality risk to terrestrial wildlife during construction.

However, clearing of the ROW presents some residual risk to resident wildlife, particularly small mammals with limited dispersal capabilities, and furbearers that use dens or burrows. Hibernating bears are particularly vulnerable to disturbance by construction activities, which can lead to indirect mortality if denning disturbance occurs. Overall, with the implementation of mitigation measures described above the change in mortality risk for small mammals, furbearers, and hibernating bears is considered low.

Increased terrestrial wildlife mortality from hunting is not anticipated to increase during construction because licensed moose hunting is currently closed in the area (Map 6-9), and most game species are likely to avoid the ROW during construction. Mortality from vehicle collisions is not anticipated to increase because traffic volumes are expected to be within the normal variation for highways in the LAA.

Mortality risk to black bears may increase for individuals denning in the PDA, however, the risk is expected to be low because most of the final preferred route is aligned with an existing ROW and black bear tend to select denning sites 1 km to 2 km from human activity (Linnell et al. 2000).

Mortality risk to moose from the spread of diseases carried by white-tailed deer (e.g., brainwork, liver flukes) is not anticipated to increase because of the project. White-tailed deer, and the occurrence of brainworm, is already common and widespread in the project region. Moose are uncommon in the project region, in part due to disease, but also a variety of other factors including predation, harvest pressure, climate change and a changing landscape (Black River First Nation 2022) (Government of Manitoba 2020).

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during construction are characterized by the following:

- Direction is adverse:
  - There will be an increase in mortality risk to terrestrial wildlife during construction.
- Magnitude is low:
  - With mitigation, the change in mortality risk is anticipated to be low. The project is not anticipated to have population level effects on terrestrial wildlife.
- Geographic extent is the LAA:
  - Direct change in mortality risk will be confined to the PDA; however, indirect effects (i.e., potential for increased predation) will extend into the LAA.
- Timing is low sensitivity:
  - Construction of the project transmission line will occur in the winter when many species are dormant or overwintering outside the RAA (e.g., bats) and will avoid the sensitive timing windows for most terrestrial wildlife species.
- Duration is short-term:
  - Terrestrial wildlife mortality risk will be elevated during the construction period.
- Frequency is a multiple, irregular event:
  - Change in mortality risk will vary throughout the construction period.
- Change is reversible:
  - Increased terrestrial wildlife mortality risk due to presence of project vehicles will cease once construction activity has ended.

Operation

Project pathways

The primary pathways that may result in a change in terrestrial wildlife mortality risk during the operation phase are increased access associated with the presence of the ROW that may increase harvest pressure or predation, and vehicle collisions and mortality associated with ROW inspections and vegetation management.

Increased access along the ROW by resource users and/or predators may result in an indirect change to mortality risk, such as shifts in predator-prey relationships and harvest pressure on certain terrestrial wildlife species (e.g., moose, white-tailed deer, black bear, grey wolf).

Vegetation management and transmission line inspection could increase direct mortality risk to terrestrial wildlife from collisions with vehicles or equipment.

Mitigation

- Areas where active animal dens or burrows are encountered will be buffered and left undisturbed until unoccupied.
- Hunting and harvesting of wildlife, or possession of firearms by project staff will not be permitted while working on the project sites (e.g., during inspections or vegetation maintenance).
- Vegetation clearing activities will not be carried out during the sensitive timing windows for wildlife species without additional mitigation measures such as pre-clearing nest sweeps.
- Vegetation maintenance and inspection vehicles will travel at reduced speeds while on ROW.
- Vegetation maintenance and inspection activities will be restricted to established roads, trails and cleared construction areas in accordance with the access management plan (Section 11.7.5.1).

Residual effects

During operation, mortality risk to terrestrial wildlife is expected to increase due to hunting and predation. Grey wolves often use linear features on the landscape as a travel corridor, which increases their ability to search for prey (e.g., white-tailed deer, moose) and reduces the amount of effort required to find prey (Kunkel and Pletscher 2003). Mortality risk associated with improved access by hunters and predators was reduced by routing the final preferred route along existing linear features. However, increased mortality risk could occur in areas where core habitat is traversed.

Construction of the project will increase the density of linear features (e.g., access roads, ROW) in the RAA by less than 1%. This increase is primarily attributed to ROW clearing along the forested portion of the final preferred route extending through the edge of a large, intact habitat patch east of Pinawa channel and south of Belluk Road (Map 7-2).

Increased access to the ROW for hunters could contribute to terrestrial wildlife mortality, including for white-tailed deer and big game species like black bear and grey wolf (James and Stuart-Smith 2000). Licensed moose hunting is currently closed in the area, however, improved access to moose habitat provided by the ROW could result in increased moose harvest from subsistence and illegal hunting. During operation the ROW will naturally revegetate with grassland and shrub species, increasing cover habitat and softening the transition between the ROW edge and forest habitat. As a result, access opportunities for hunters will decrease. Furthermore, most access trails maintained during the construction phase are expected to be decommissioned to prevent access to the ROW.

Vegetation clearing will occur outside of sensitive timing windows for terrestrial wildlife to reduce mortality risk to terrestrial wildlife. Mortality risk due to vehicle collisions during vegetation maintenance and inspections is expected to be mitigated by reduced vegetation maintenance vehicle speeds.

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during operation are characterized by the following:

- Direction is adverse:
    - There will be increased mortality risk.
- Magnitude is low:
    - The change in hunter and predator access resulting from the project is anticipated to be low as the project will marginally contribute to the existing level of fragmentation in the RAA (1.02% change from existing levels).
- Geographic extent is the LAA:
    - Increased mortality risk will be confined to the PDA; however, indirect effects on mortality risk (i.e., hunting pressure) will extend into the LAA.
- Timing is moderate sensitivity:
    - Operation of the project will occur during sensitive timing windows (e.g., ungulate calving) of terrestrial wildlife in the LAA, however, potential disturbance such as vegetation management and transmission inspections will be scheduled outside of these sensitive periods.

- Duration is long-term:
    - The mortality risk associated with increased access will persist for the life of the project.
- Frequency is continuous:
    - Change in mortality risk will occur throughout the operation period.
- Change is reversible:
    - Factors contributing to a change in wildlife mortality risk are reversible after the life of the project (i.e., natural regeneration of ROW vegetation),

7.9.4 Summary of residual effects

This section summarizes the project effects analysis for change in terrestrial wildlife habitat availability and change in mortality risk. Table 7-51 characterizes the environmental effects of the project on terrestrial wildlife and wildlife habitat.

Table 7-51: Project residual effects on terrestrial wildlife and habitat

Project Phase	Residual effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in habitat							
Construction	A	L	LAA	LS	ST/LT	S	R
Operation	A/P	L	LAA	MS	ST/LT	IR	R
Change in mortality risk							
Construction	A	L	LAA	LS	ST	IR	R
Operation	A	L	LAA	MS	LT	C	R

KEY

Project Phase

C: Construction

O: Operation

D: Decommissioning

Direction:

P: Positive

A: Adverse

N: Neutral

Magnitude:

N: Negligible

L: Low

M: Moderate

H: High

Geographic Extent:

PDA: Project Development Area

LAA: Local Assessment Area

RAA: Regional Assessment Area

Timing

LS: Low sensitivity

MS: Moderate sensitivity

HS: High sensitivity

Duration:

ST: Short-term

MT: Medium-term

LT: Long-term

Frequency:

S: Single event

IR: Irregular event

R: Regular event

C: Continuous

Reversibility:

R: Reversible

I: Irreversible

N/A: Not applicable

7.9.5 Assessment of cumulative effects on terrestrial wildlife and wildlife habitat

Native vegetation abundance in the RAA has been reduced by past land use activities, including agriculture and other human infrastructure such as roads and electrical transmission lines. Some of these projects and activities have fragmented habitat and changed vegetation communities and species diversity. Currently agricultural land occupies 3.4% of the RAA and developed land occupies 11.1% (Section 6.2.4.3 Vegetation).

The project will have residual effects on terrestrial wildlife and wildlife habitat, including habitat availability and mortality risk, which will act cumulatively with residual effects of other past, present, and reasonably foreseeable future physical activities.

7.9.5.1 Project residual effects likely to interact cumulatively

Table 7-52 presents the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-52: Interactions with the potential to contribute to cumulative effects

Other projects and physical activities with potential for cumulative effects	Terrestrial wildlife and habitat	
	Change in habitat	Change in mortality risk
Past and present physical activities and resource use		
Agriculture	✓	✓
Domestic Resource Use (e.g., hunting, fishing, trapping)	✓	✓
Recreational Activities (e.g., canoeing, snowmobiling)	✓	✓
Infrastructure Projects (roads, rail, utilities)	✓	✓
Generating Stations (Point de Bois, Slave Falls)	✓	✓
Transmission Lines	✓	✓
Nuclear Power (i.e., Whiteshell Laboratories)	✓	✓
Other Industrial and Processing Development/Facilities	✓	✓
Project-related physical activities	✓	✓
Future physical activities		
Slave Falls Generating Station	–	✓
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor [Pinawa Demonstration Reactor]	–	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual effects.

– = Interactions between the residual effects of other projects and residual effects of the project are not expected.

Effects identified in Table 7-52 as not likely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further. Future upgrades of the Slave Falls Generating Station will not have an overlapping effect on terrestrial wildlife and wildlife habitat affected by the project as upgrades will occur within an existing disturbed footprint. The Slave Falls Generating Station will require a reduction in water levels on the Winnipeg River, approximately 10 km upstream (north) of the generating station, and this may temporarily alter existing shoreline habitat; however, there is no spatial overlap with project effects. Effects to terrestrial wildlife and wildlife habitat from the project will be restricted to the ROW and approximately 1 km beyond the ROW (i.e., where indirect effects may occur). Cumulative effects from the Whiteshell Laboratories Pinawa Demonstration Reactor are not expected as disturbance will be located within existing disturbed areas. Other developments, such as processing facilities and waste management, may contribute to cumulative effects, but details on future projects are not publicly available.

7.9.5.2 Cumulative effects pathways for change in habitat availability

All past and current projects and activities have contributed to a change in terrestrial wildlife and wildlife habitat availability through clearing and conversion of natural habitat within parts of the RAA. Existing infrastructure, generating stations, transmission lines, nuclear power and other industrial and processing developments have contributed to direct (i.e., habitat loss or alteration) and indirect changes (e.g., habitat avoidance due to disturbance or edge effects) in wildlife habitat availability. The primary pathways of these effects are through land clearing and/or operation-related disturbances (e.g., noise).

Domestic resource use and recreational activities make small contributions to changes in wildlife habitat availability directly through the creation and use of all-terrain vehicle (ATV) and snowmobile trails and indirectly due to noise disturbance.

Future projects in the RAA having potential to interact cumulatively with project effects include the decommissioning of P3/P4 transmission line (Lee River to Winnipeg). Potential cumulative effects on terrestrial wildlife and wildlife habitat are associated with positive, direct gain in habitat and temporary indirect habitat loss due to sensory disturbance caused by human activity and equipment. Wildlife may temporarily avoid the area of P3/P4 until decommissioning of the line is complete. Over time, part of the P3/P4 ROW will naturally revegetate with trees and shrubs, increasing the availability of wildlife habitat.

7.9.5.3 Mitigation for cumulative effects for change in habitat availability

Mitigation measures that will help avoid, reduce, or eliminate project environmental effects on change in terrestrial wildlife habitat availability were presented in Section 7.8.3.2. Additional mitigation measures proposed to reduce the cumulative environmental effects on change in terrestrial wildlife habitat availability include the following:

- For Manitoba Hydro projects occurring in the same geographic area, coordinate access requirements to reduce the need to construct additional access roads in areas of terrestrial wildlife habitat.

7.9.5.4 Cumulative effects for change in habitat availability

Land clearing is one of the key factors affecting the availability of terrestrial wildlife habitat in the RAA. Approximately 15% of the RAA has been modified by agriculture and development. Construction of the project and decommissioning of P3/P4 (Pointe due Bois to Lee River segment) will increase the density of linear features (e.g., access roads, ROW) in the RAA by less than 1%. Decommissioning P3/P4 (Lee River to Winnipeg) may have a short-term indirect affect on terrestrial wildlife due to sensory disturbance but overall will benefit birds over time by reducing landscape level fragmentation and increasing habitat availability.

7.9.5.5 Cumulative effects pathways for change in mortality risk

All past and current activities have contributed to a change in mortality risk for terrestrial wildlife inhabiting the RAA. Agricultural practices contribute to terrestrial wildlife mortality via hazards associated with the operation of farming equipment, roads and highways elevate mortality risk to terrestrial wildlife through wildlife-vehicle collisions, and transmission lines elevate mortality risk through increased access for resource users and predators. Operation of generating stations, power plants, and other facilities have vehicle traffic that contributes to mortality risk. Domestic resource use, such as hunting, has and continues to be an activity that increases terrestrial wildlife mortality risk throughout the RAA.

Future developments including Slave Falls Generating Station modifications, decommissioning of P3/P4 (Lee River to Winnipeg) transmission line and construction of Pinawa Demonstration Reactor may have residual effects on terrestrial wildlife mortality risk that interact with the project's residual effects. The primary pathway for these interactions is through collision with project construction and/or operation vehicles.

7.9.5.6 Mitigation for cumulative effects for change in mortality risk

To reduce potential terrestrial wildlife mortality risk, existing trails and roads will be used to access the P3/P4 ROW to the extent possible. The mitigation measures suggested for cumulative effects for change in habitat availability (Section 7.8.5.3) are also applicable for the cumulative effects for change in mortality risk.

7.9.5.7 Cumulative effects for change in mortality risk

The modified landscape of the RAA has already been and continues to be a source of mortality risk to terrestrial wildlife due to ongoing agriculture, recreational use, resource use, and presence of roads, traffic, and transmission projects. Increased traffic associated with decommissioning P3/P4 transmission lines, the Slave Falls Generating Station project, and the nuclear power project may elevate terrestrial wildlife mortality risk through wildlife-vehicle interactions.

The cumulative effect for change in terrestrial wildlife mortality risk is adverse as mortality risk will increase for some terrestrial wildlife in areas of the RAA; however, the magnitude of this effect is low as some of the projects in disturbed areas. Residual cumulative effects of change in mortality risk will be continuous yet reversible upon completion of P3/P4 decommissioning, power plant construction, and generating station upgrades.

7.9.5.8 Summary of cumulative effects

This section summarizes the cumulative effects analysis for change in terrestrial wildlife habitat availability and change in mortality risk. Table 7-53 characterizes the cumulative environmental effects of the project and other current and future projects and activities on terrestrial wildlife and wildlife habitat.

Table 7-53: Residual cumulative effects on terrestrial wildlife and habitat

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect on change in habitat availability							
Residual cumulative effect	A	L	RAA	MS	ST	C	R
Contribution from the project to the residual cumulative effect	When current and reasonably foreseeable future project effects on terrestrial wildlife habitat are considered, the project's contributions to direct change in habitat availability will be low in magnitude. Contributions of indirect effects on habitat availability are also expected to be small due to winter construction. Furthermore, routing has avoided large tracts of intact habitat (e.g., forests, wetlands), and protected areas. Indirect effects on habitat resulting from construction noise and activity are expected to be localized and short-term.						
Residual cumulative effect on change in mortality risk							
Residual cumulative effect	A	L	RAA	MS	ST	C	R
Contribution from the Project to the Residual Cumulative Effect	When current and future project effects on terrestrial wildlife habitat are considered, the project's contribution to direct change in mortality risk will be low in magnitude. Project routing has avoided large tracts of intact habitat (e.g., forests, wetlands), and protected areas. To reduce mortality risk to wildlife, ROW clearing will occur in the winter. To the extent possible, existing roads and trails will be used to access the PDA during construction.						
KEY							
Direction:	Geographic Extent:				Frequency:		

Table 7-53: Residual cumulative effects on terrestrial wildlife and habitat

P: Positive	PDA: Project Development Area	S: Single event
A: Adverse	LAA: Local Assessment Area	IR: Irregular event
N: Neutral	RAA: Regional Assessment Area	R: Regular event
Magnitude:	Timing	C: Continuous
NMC: No Measurable Change	NS: No sensitivity	Reversibility:
	MS: Moderate sensitivity	R: Reversible
L: Low	HS: High sensitivity	I: Irreversible
M: Moderate	Duration:	
H: High	ST: Short-term	N/A: Not applicable
	MT: Medium-term	
	LT: Long-term	

7.9.6 Determination of significance

With mitigation, the residual project effects on terrestrial wildlife and habitat are predicted to be not significant. Residual effects are not expected to threaten the long-term persistence or viability of terrestrial wildlife and habitat within the project region, nor are they expected to diminish conservation efforts for the survival, management, and recovery of species at risk and species of conservation concern.

The project will result in the loss or alteration of approximately 250 ha (<3%) of terrestrial wildlife habitat within the LAA. The anticipated change in habitat within the LAA is predicted to result in a low magnitude effect on terrestrial wildlife habitat, including for species at risk and species of interest. The project will result in a loss or alteration of 50 ha (3%) of little brown myotis and northern myotis habitat, 240 ha (4%) of moose habitat, and 64 ha (3%) of American marten habitat in the LAA. Indirect loss or alteration of habitat resulting from sensory disturbance and edge effects are generally expected to be minor and limited to the LAA. During operation, the PDA will become naturalized, providing habitat for a variety of species, including moose, white-tailed deer, small mammals.

Fragmentation effects are also expected to be small, as the project will contribute 0.02 km/km^2 of new linear disturbance in the RAA (less than 1% increase above existing conditions [from approximately 1.5 km/km^2 to 1.51 km/km^2]).

The project may contribute to a small increase in wildlife mortality within the LAA, primarily through increased project-related traffic. Traffic-related mortality risk will be managed by conducting vegetation removal in the winter and implementing road safety measures such as speed limits and signage.

Increased access along the ROW during construction and operation are not expected to result measurable changes in the abundance of terrestrial wildlife, including moose.

7.9.7 Prediction confidence

The prediction confidence in the final determination of significance is considered high. This level of confidence is based on:

- The quantity and quality of data available.
- Professional judgement and experience with similar projects.
- Effectiveness of mitigation measures, which reflect best industry practices.

Overall, only a small amount of terrestrial wildlife habitat will be lost or altered relative to the RAA and most adverse effects on mortality risk to wildlife were mitigated during the planning and routing process. Where the project does traverse natural habitat, mitigation measures (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on terrestrial wildlife and habitat. The level of confidence in the effectiveness of the mitigation measures is high based the results of baseline studies and past project experience (*e.g.,* Manitoba-Minnesota Transmission Project, Wuskwatim Transmission Project, Bipole III Transmission Project).

7.9.8 Follow-up and monitoring

Due to confidence in predictions, and monitoring results from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, the EPP will outline monitoring steps to ensure appropriate rehabilitation and follow-up.

7.10 Infrastructure and services

Infrastructure and services refer to the physical structures and facilities (e.g., highways, railways, and water) and services (e.g., emergency response and health care) that are needed for the operation of a society. Infrastructure and services was selected as a valued component (VC) because the project has the potential to increase the demand for, or interfere with, local and regional infrastructure and services, which could directly affect landowners, Indigenous people, communities, and the public.

7.10.1 Scope of the assessment

This section assesses the effects of project activities during construction, operation and decommissioning on infrastructure and services from project activities and influx of workers in the region. An assessment of cumulative effects on infrastructure and services is also presented.

7.10.2 Scope of the assessment

The selection of infrastructure and services as a VC is based on regulatory considerations and feedback from Indigenous groups and organizations, and non-Indigenous stakeholders (e.g., local communities, property owners, cottage owners and the public). The assessment of project effects on infrastructure and services considers the following:

- Accommodation
- Traffic and transportation
- Health and emergency response services
- Solid waste management facilities

This assessment of project effects on infrastructure and services has been shaped by Manitoba Hydro's experience with other transmission line assessments (e.g., the Pointe du Bois Transmission Project (2014), the Manitoba-Minnesota Transmission Project (MMTP), and the Dorsey to Wash'ake Mayzoon Transmission Project). Manitoba Hydro conducted a multi-staged route selection process coupled with project engagement activities, which took into consideration many qualitative and quantitative factors, such as Natural (e.g., forest, wetlands); Built (e.g., residences, agricultural land use); Engineering (e.g., cost, accessibility); and Simple average (i.e., treating all three perspectives equally) that were used to determine the final proposed route (see Chapter 3, Route Selection).

Project engagement was undertaken with various audiences to identify potential issues, concerns, and interests. Most of the questions and concerns about infrastructure and services related to potential wear and tear on local roads; increased traffic; and accommodation for workers (e.g., work camps, local rental accommodations). Increased ATV use in new rights-of-way during operations was also a concern and is addressed in Section 7.11 (Land and resource use). Project engagement activities also informed the selection of mitigation measures with an aim to avoid or reduce effects on infrastructure and services.

The project scope includes regulatory and policy setting; issues raised during engagement; applicable boundaries (spatial and temporal); potential effects, effects pathways and measurable parameters; and residual effects characterization and significance determination.

7.10.2.1 Regulatory and policy setting

Relevant provincial legislation, regulations, policies, and agreements considered in the assessment of effects for infrastructure and services include:

- *Manitoba Hydro Act* (C.C.S.M. c. H190)
- *The Highway Traffic Ac*t (C.C.S.M. c. H60)
- *The Planning Act* (C.CS.M. c. P80)
- Applicable Regional Municipality By-Laws

As previously indicated, the project requires a provincial licence for a Class II development under *The Environment Act* (Manitoba). The existing and new right-of-way is on provincial Crown land. Manitoba Hydro will apply for work permits from Manitoba Natural Resources and Northern Development (MNRND) for project activities occurring on provincial Crown lands.

The Manitoba Hydro Act

The purposes of the Act are to:

> "...provide for the continuance of a supply of power adequate to the needs of the province and to engage in and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of power and, in addition, are (a) to provide and market products, services and expertise related to the development, generation, transmission, distribution, supply and end-use of power, within and outside the province; and (b) to market and supply power to persons outside the province on terms and conditions acceptable to the board" (*The Manitoba Hydro Act*, C.C.S.M. c. H190).

Section 23(1) of the Act allows Manitoba Hydro to construct, operate, and maintain its infrastructure anywhere on, under, over, across, or along public highways, streets, lanes, or other public places. This Act supersedes municipal level powers granted under legislation such as *The Planning Act* (C.C.S.M. c. P80) and *The Municipal Act* (C.C.S.M. c. M225).

The Highway Traffic Act

Regulates everything that has to do with highway and road traffic, such as vehicle registration and license plates; license requirements for highway driving; vehicles and equipment standards; control of traffic, speed, rules of the road, bicycles; accidents; and prohibitions, offences, and penalties.

The Planning Act and Provincial Planning Regulation

Administered in cooperation by Manitoba Municipal Relations and the associated municipal councils, *The Planning Act* (C.C.S.M. c. P80) provides a framework for land use planning strategies at the provincial, regional, and local scale. The Provincial Planning Regulation, M.R. 81/2011 provides a framework to guide development planning. Requirements of the Act and its regulations do not apply to the Crown or Crown agencies. Manitoba Hydro notes that, as a Crown Corporation, they are not directly subject to the legislative provisions and are generally exempt from them in terms of development planning.

Municipal jurisdictions must adopt development plans and zoning bylaws to guide land and resource use planning decisions within their respective boundaries under *The Planning Act* (C.C.S.M. c. P80). A development plan is a bylaw that outlines the long-term vision and goals of a community to guide development within the planning area of a municipality or planning district. A zoning bylaw is a tool used by the planning authority to implement development plan policies and typically represents what is on the ground. Zoning bylaws are guided by and conform to the development plans. Zoning works by regulating the use of land and location of buildings and structures (Manitoba Municipal Relations 2023). Municipal jurisdictions have a variety of development controls in place along the proposed ROW. Land use development controls based on applicable development plans and zoning bylaws are described further in Section 6.3.2.1.

Manitoba Hydro is cognizant that neither *The Planning Act* (C.C.S.M. c. P80), nor its Regulations, apply to the Crown or Crown agencies. However, it does seek to work cooperatively with the municipalities when planning, designing, constructing, and operating and maintaining its projects to limit the extent of possible interactions with their developments and plans.

By-laws of interest in the project region include:

- RM of Alexander: *By-law No. 05/22 Waste Disposal Ground Fees and Regulations*: Regulates the deposit of waste on public or private property; regulates and controls the use of solid waste disposal facilities; and establishes fees to be charged for the delivery of waste to the solid waste disposal facility.
- RM of Alexander: *By-law No. 01/21 Public Behaviour*: Regulates public order (i.e., public behavior) for the safety, health protection and well-being of people, and the safety and protection of property.
- RM of Lac du Bonnet: *By-law No 13-21 Solid Waste Disposal Facilities:* regulates disposal of solid wastes on public and private properties; established standards and fees at solid waste disposal facilities.
- RM of Whitemouth: *Whitemouth Reynolds Planning District Development Plan By-law 43/18*: Summarizes the Planning District's vision, goals, and policies, prepared in accordance with the provisions of *The Planning Act* (C.C.S.M. c. P80) and the *Provincial Planning Regulation* (MR 81/2011). As per the Provincial Planning Regulation, its purpose is "to set out the plans and policies of the planning district respecting its purposes and its physical, social, environmental and economic objectives; through maps and statements of objectives, direct sustainable land use and development in the planning district; set out measures for implementing the plan; and include such other matters as the minister or board considers advisable" (p. 1).
- LGD of Pinawa: *Development Plan By-law 849/19*: Per the Provincial Planning Regulation, its purpose is to set out development policies and plans and physical, social, environmental, and economic objectives; direct sustainable land use; and include matters as the minister or board considers advisable" (p. 2).

7.10.2.2 Consideration of issues raised during engagement

Questions, concerns, and interests about the project regarding infrastructure and services were identified during project engagement and are summarized in the following sub-sections.

Engagement with First Nation peoples and Métis citizens

Throughout the engagement process with First Nations and Métis, Manitoba Hydro received comments about infrastructure and services, as follows:

- Hollow Water First Nation shared a concern about the lack of electrical capacity for community growth and the high cost of electricity and electrical infrastructure.

- Norway House Cree Nation asked if there will be opportunities due to the project for Manitoba Hydro to help the development of their traditional land, which is located above the Granite Hills Golf Club on the north shore of Lac du Bonnet.

During the four engagement circles that were held as part of project engagement, First Nation and Métis individuals asked the following questions:

- Will there be temporary (camp) accommodations set up for the construction work in the area?
- Will workers be housed in the project area?
- Why is Manitoba Hydro not building the line along the existing right-of-way corridor and then south along the highway, instead of through new habitat?
- Will there be an increase (rise) in the water levels of the Winnipeg River due to the upgrades planned for the Pointe du Bois Generating Station?
- Why is the Pointe du Bois Generating Station being refurbished?
- Does the existing line south of Winnipeg River lack capacity?
- Will electricity from the project be exported to the US?
- Will the cost of water go up due to the project?

Public engagement

Manitoba Hydro also received the following questions and concerns regarding infrastructure and services:

- Pointe du Bois Cottagers Association members were concerned about potential impacts to provincial road (PR) 313 due to the project.
- Pointe du Bois Cottagers Association was interested in knowing how local workers can acquire work on the project.
- Whiteshell Cottage Association asked if power would be turned off at any time during construction.

Other questions and concerns expressed during engagement activities, as follows:

- How might this project affect the road to Pointe du Bois? Will this affect traffic?
- Can Manitoba Hydro widen the existing right-of-way or follow existing roads (e.g., PR 520)?
- Can landowners build on or around the right-of-way once an easement agreement is signed with Manitoba Hydro?
- It was suggested that Manitoba Hydro is wasting money on Pointe du Bois station, because it is old and cannot produce substantial power. Suggested a better connection to power from new infrastructure in Manitoba, given the appreciable

environmental and social cost that comes with the project, but with small electrical output.
- Will there be changes to other generating stations along the Winnipeg River as part of the unit replacement?
- Will electricity be exported to Minnesota?
- Concerns about security and human threats associated with transmission lines were expressed and that they are best "hidden in plain sight" along a road such as PR 520 where if they go down, they can be more easily repaired than lines in the woods.
- Concerns that lots cannot be subdivided if power transmission lines are located on them.

Manitoba Hydro addressed the above-noted questions and provided the following information about the project:

- Workers will be accommodated either in local hotels, motels, Airbnbs, and cottages and/or in temporary workers' camps.
- The routing considered multiple factors, including existing rights-of-way, and arrived at the option that is now being proposed (see Chapter 3, Route Selection).
- The project will increase the road traffic in the area, but it will be minor compared to previous projects (such as the construction of the spillway). Current traffic estimates are 3-4 trucks per day. Manitoba Hydro does not expect the project to affect the condition of the road to Pointe du Bois. Manitoba Hydro is investing ~$100,000 to repair a portion of the road in the community of Pointe du Bois.
- Water levels on the Winnipeg River will not rise.
- Pointe du Bois generator station needs refurbishment because it is old and in need of repair.
- No power will be lost in the region during construction.
- Engineering details about the transmission lines and generating stations were provided.
- Any tenders for work on the Pointe du Bois Renewable Energy Project (PREP) will be an open bid on the government contract system (called "MERX"). Manitoba Hydro will encourage contractors to use local services, such as accommodations for work crew.
- Landowners cannot build in the right-of-way.
- Manitoba Hydro noted that while the provincial power grid is interconnected, the project's primary purpose is to reinvest into the Pointe du Bois generating station and to improve power reliability to Lee River and Lac du Bonnet areas.
- Electricity will not be exported to the United States.

Municipal government engagement

Manitoba Hydro engaged with the RMs of Whitemouth, Alexander, and Lac du Bonnet, and the LGD of Pinawa.

The RM of Lac du Bonnet asked about:

- The potential impact of the project on local businesses compared to the Pointe du Bois Spillway project.
- Housing for the workforce in the community, and
- Impacts of heavy trucks on the roads.

Manitoba Hydro responded to the RM of Lac du Bonnet indicating that:

- The workforce for this project is much smaller than the one for the spillway project,
- The workforce will be accommodated in suitable local accommodations and in mobile construction camps, and
- Roads will be assessed prior to construction and repaired to original conditions if any damage is done.

The LGD of Pinawa expressed concerns about transportation infrastructure, particularly issues related to heavy turbines being transported across the bridges along the Lee River and Pinawa Channel. Manitoba Hydro said that the turbines are approximately 240,000 pounds each and the transportation routes will be chosen by the tendered contractor and transporter.

The LGD of Pinawa also asked about potential damage to PR 520 (which is gravel) by heavy transport trucks. Manitoba Hydro said that PR 520 will see an increased amount of traffic due to the project, but all trucks will comply with all provincial regulations and load restrictions. Transmission line construction is anticipated to take place primarily during the winter months when the road base is frozen which will limit the amount of rutting and other damages that an unpaved road is susceptible to. Manitoba Hydro staff will routinely monitor the condition of the provincial and municipal roads being used during construction and if condition of any road begins to deteriorate, they will work with the contractors and municipalities and province to address the damage. Large equipment and construction vehicles used for the work at the Pointe du Bois station will likely be transported along Highway 11 and PR 307, to minimize impacts to PR 520.

7.10.2.3 Potential effects, pathways, and measurable parameters

The potential project effects on infrastructure and services, along with effects pathways and measurable parameters are provided in Table 7-54. Potential effects can be both direct and indirect. Direct effects involve a direct cause-effect relationship between the project and particular infrastructure and services. For example, there may be an increased demand for short-term accommodation from project workers. Indirect effects involve a pathway through an intermediate pathway component. For example, an indirect effect is the potential limited availability of short-term accommodation for tourists and visitors in the area due to increased demand from project workers.

Table 7-54: Potential effects, effects pathways and measurable parameters for infrastructure and services

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in accommodations	Influx of workers during construction and operations may increase demand for accommodations in the regional area, affecting inventory levels for residents and tourists May have positive effects for accommodation owners who can rent during the low tourist season	Availability of accommodations (e.g., inventory levels for hotels, motels, Airbnbs, cabins and cottages) Vacancy rates
Change in traffic and transportation infrastructure	Construction and operation of the project may increase demand on traffic infrastructure in the region, including road and air, potentially increasing travel times, affecting road conditions and causing (or being involved in) collisions	Current capacity of local and regional highways and roads Daily road traffic volume, incidents, and air traffic volumes Change in conditions of roads and highways due to heavy loads carried by trucks
Change in health services and	Demand for health services and emergency response services may be affected by	Number of workers for each phase (construction,

Table 7-54: Potential effects, effects pathways and measurable parameters for infrastructure and services

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
emergency response	project activities and project-related influx of workers, especially during construction	operations, and decommissioning) Capacity of health care and emergency response services
Change in solid waste management facilities	Increased pressure on solid waste facilities that may be caused by project activities, especially to decommission the existing ROW	Tonnage of waste materials generated by the project that will be disposed in local / regional facilities Capacity of solid waste management (landfill) facility

7.10.2.4 Spatial boundaries

Spatial boundaries for the assessment of potential effects considered the geographic extent over which project activities may affect infrastructure and services. These are described below and shown in Map 7-5.

Project development area (PDA): Encompasses the proposed project footprint as described in Chapter 2.0 (Project description) and is the anticipated area of physical disturbance associated with the construction, operation, maintenance, and decommissioning of the PW75 transmission line, Pointe du Bois Station and Whiteshell Station.

Local assessment area (LAA): The LAA encompasses communities with the greatest potential to experience effects (positive or adverse) of direct project demand for infrastructure and services and effects of Project-related changes in population (i.e., influx of workers). It includes the PDA and the boundaries of the municipalities traversed by the PDA. Municipalities within the regional area consist of the Local Government District (LGD) of Pinawa, RM of Alexander, RM of Lac du Bonnet, RM of Whitemouth, and the towns of Lac du Bonnet and Pinawa.

Regional assessment area (RAA): The RAA is the same as the LAA, which encompasses a sufficiently broad area for assessing cumulative effects, including the incremental effects of the project.

7.10.2.5 Temporal boundaries

Subject to regulatory approval, construction of the project will start in Fall 2024 and end in Spring 2026.

The transmission line will be constructed in four main phases, i.e., clearing, foundations, towers assembly and conductor stringing, under frozen ground conditions. Transmission line construction for the Pointe du Bois to Lee River DSC segment would occur during the winter periods of December 2024 to March 2026, and that for the Lee River DSC to Whiteshell station segment would occur during December 2025 to March 2026. Once the new transmission line is connected to the Lee River distribution supply centre and the two stations, the existing P3/P4 transmission lines in the existing right-of-way between Pointe du Bois and Lee River DSC will be removed and salvaged (scheduled for 2026).

Work at the Pointe du Bois and Whiteshell stations will occur year-round as access is not seasonal. Work at both stations will start in Fall 2024, continuing to March 2026.

The PW75 transmission line is anticipated to be in service in 2026 and will have a service life of at least 75 years.

The temporal boundaries for this assessment of project effects on infrastructure and services are:

- Construction – Fall 2024 to Spring 2026
- Operation – 75 years
- Decommissioning – 2 years

7.10.2.6 Residual effects characterization

Residual effects are socio-economic effects that remain after the application of mitigation measures. Characterization of residual effects is based on the criteria in Table 7-55.

Table 7-55: Characterization of residual effects on infrastructure and services		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters in a direction beneficial to infrastructure and services relative to baseline. Adverse – a residual effect that moves measurable parameters in a direction detrimental to infrastructure and services relative to baseline. Neutral – no net change in measurable parameters for infrastructure and services relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	Negligible – no measurable change in the effect can be noted. Low – a measurable change in infrastructure and services capacity, but services can take place at similar levels as under baseline conditions Moderate – measurable change in infrastructure and services capacity that is greater than low, but services can take place at similar levels as under baseline conditions High – measurable change in infrastructure and services capacity, such services and capacity cannot take place at

Table 7-55: Characterization of residual effects on infrastructure and services		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		similar levels as under baseline conditions
Geographic Extent	The geographic area in which a residual effect occurs	PDA – residual effects are restricted to the PDA LAA – residual effects extend into the LAA RAA – residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	Not applicable – seasonal aspects are unlikely to affect infrastructure and services Applicable – seasonal aspects may affect infrastructure and services
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – the residual effect is restricted to the construction phase Medium-term – the residual effect extends to more than the construction phase and through operation phase Long-term – the residual effect extends beyond the life of the project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event Multiple irregular event – occurs at no set schedule Multiple regular event – occurs at regular intervals

Table 7-55: Characterization of residual effects on infrastructure and services

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Continuous – occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed

7.10.2.7 Significance definition

An adverse residual effect on infrastructure and services is considered significant if, even with the application of mitigation and management measures, it widely disrupts, restricts, or degrades present infrastructure and services to a point where activities cannot continue at or near baseline levels.

7.10.3 Project interactions with infrastructure and services

Some project activities can place demands on infrastructure and services, such as via waste disposal and road use. Project interactions with infrastructure and services can also result from the influx of workers into the project area. The anticipated number of people coming into the area to work on the various project is as follows.

7.10.3.1 Construction phase

As previously discussed, work at the two stations is anticipated to begin in fall 2024 and the project would be in service in spring 2026. Six to 40 workers will be working on the Pointe du Bois Station Expansion. The expected construction workforce for the Whiteshell Station equipment additions will range from six people at the start, during civil construction and end of the project, to a maximum of 20 people when civil, overhead line and electrical construction crews are overlapping on site.

Transmission line construction will occur under frozen ground conditions (assumed to be December 2024 to March 2025 and December 2025 to March 2026), for a total of approximately 8 months. PW75 construction workforce will range from about 45 workers monthly during mobilization and de-mobilization phases, to a maximum of 112 per month during peak construction periods.

Total possible peak workers combined (i.e., the two stations plus transmission line build) is 172, assuming the peak labour force for the teams working at the stations overlaps with the peak workforce working on the transmission lines. This peak labour force of 172 would only be during frozen ground conditions (about four months per year). Peak labour force in the other three seasons is 60 workers (combined) at the two stations.

Assuming group transportation is utilized during construction, the worst-case scenario is two people per vehicle. At peak construction during frozen ground conditions, there could be approximately 86 project-related vehicles for workers, plus an estimated three to four trucks per day during construction to transport goods and materials, or 90 vehicles per day.

Regarding air traffic and transportation (helicopters and planes), Manitoba Hydro will not use the regional aerodrome in Lac du Bonnet. Contractors may choose to use helicopters to transport towers from a main assembly location to the right-of-way construction site. Therefore, there will be no interactions between the project and the aerodrome, and air traffic volumes and potential effects on the aerodrome are not carried further in the assessment.

Operations phase

Few new workers will be employed during operations because the sub-stations are not staffed on a continual basis. However, there will be a few individuals working at the stations to conduct the following tasks:

- Routine inspections and maintenance operations.
- Weeding at the station sites for operating reliability of equipment.
- Safety personnel working within the stations.

The transmission line will require:

- Regular scheduled inspection and maintenance which includes air patrols, ground patrols (e.g., snowmobile, flex-track, road vehicles) to occur once per year by ground and up to three times per year by air.
- Non-scheduled maintenance by air or ground if unexpected repairs are required.

Table 7-56 below identifies that two project activities - mobilization of workforce and vehicle use – may interact with infrastructure and services and potentially result in identified effects. It is anticipated that the mobilization of the workforce during construction could potentially affect accommodations, traffic and transportation infrastructure, health services, and solid waste management facilities. Vehicle and equipment use could affect traffic and transportation infrastructure.

During operations, few people will be mobilized to work full time at the stations; and no people will work full time along the transmission line. Scheduled maintenance and inspections will occur a few times a year. Given the small number of people who will be in the field at any given time during operations and travelling both by vehicle and by air, it is assessed that there will be no notable interactions with infrastructure and services during operations (see Table 7-56). Therefore, an assessment of infrastructure and services during operations is not carried forward in this report.

The decommissioning phase will take place in approximately 75 years, or more, and is so far in the future that it is not assessed in this report; however, Manitoba Hydro will create decommissioning plans and follow relevant regulatory requirements leading up to and throughout decommissioning. It is anticipated that during decommissioning, there will be interactions with infrastructure and services as indicated in Table 7-56.

Table 7-56: Project interactions with infrastructure and services

Project activity	Effects			
	Change in accommodation availability	Change in traffic and transportation infrastructure	Change in health services and emergency response	Change in capacity of solid waste facilities
Transmission line construction				
Mobilization and staff presence	✓	✓	✓	✓
Vehicle and equipment use	-	✓	-	-
Right-of-way clearing	-	-	-	✓
Watercourse crossings	-	-	-	-
Marshalling / fly yards	-	-	-	-

Table 7-56: Project interactions with infrastructure and services

Project activity	Effects			
	Change in accommodation availability	Change in traffic and transportation infrastructure	Change in health services and emergency response	Change in capacity of solid waste facilities
Transmission tower construction	-	-	-	-
Implodes	-	-	-	-
Helicopter use	-	-	-	-
Clean-up and demobilization	-	-	-	✓
Stations modifications				
Mobilization and staff presence	✓	✓	✓	✓
Vehicle and equipment use	-	✓	-	-
Marshalling / fly yard (Pointe du Bois station)	-	-	-	-
Realignment of access road (Pointe du Bois station)	-	✓	-	-
Site preparation (Pointe du Bois station)	-	-	-	✓

Table 7-56: Project interactions with infrastructure and services

Project activity	Effects			
	Change in accommodation availability	Change in traffic and transportation infrastructure	Change in health services and emergency response	Change in capacity of solid waste facilities
Station footprint expansion (Pointe du Bois station)	-	-	-	-
Installation of electrical equipment	-	-	-	-
Clean up and demobilization	-	-	-	✓
Operation and maintenance				
Transmission line and station presence	-	-	-	-
Vehicle and equipment use	-	-	-	-
Inspection and maintenance	-	-	-	-
Vegetation management	-	-	-	-
Decommissioning*				
Mobilization and staff presence	✓	✓	✓	✓
Vehicle and equipment use	-	✓	-	-

Table 7-56: Project interactions with infrastructure and services

Project activity	Effects			
	Change in accommodation availability	Change in traffic and transportation infrastructure	Change in health services and emergency response	Change in capacity of solid waste facilities
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	-	-	-	✓
Rehabilitation	-	-	-	-
Clean-up and demobilization	-	-	-	✓

✓ = Potential interaction

– = No interactions

* Includes the decommissioning of the proposed PW75 transmission line and associated infrastructure at the Pointe du Bois and Whiteshell stations, as well as the decommissioning of the existing P3/P4 transmission lines which will be salvaged once the portion of the PW75 transmission line from Pointe du Bois to the Lee River distribution supply centre is constructed.

7.10.4 Assessment of residual environmental effects on infrastructure and services

The overall environmental effects assessment methods are presented in Chapter 5. This section presents the specific techniques used to assess potential project effects on infrastructure and services.

7.10.4.1 Analytical assessment techniques

Consideration of project effects on infrastructure and services is based on secondary research and baseline information (see Section 6.3.1), information gathered through project engagement, project description (see Chapter 2), an understanding of project interactions and mitigations, and professional judgement. The following sections provide an assessment of the effects (i.e., change in accommodation, traffic and transportation, health services and emergency response, and solid waste management facilities). Effects are assessed for the construction of the transmission lines and stations modifications.

As previously mentioned, the mobilization of the very small workforce during operations will not affect the capacity of infrastructure and services, and therefore interactions are scoped out and an assessment of potential effects during operations is not carried forward.

Decommissioning of the PW75 transmission line is anticipated in 2098, at the earliest. Because effects cannot be accurately assessed that far out in the future, decommissioning is scoped out and not assessed for infrastructure and services.

7.10.4.2 Change in Accommodations

The assessment of effects on accommodations considers the following:

- Change in the availability of accommodations in the LAA/RAA.

Project pathways

The influx of workers may affect the availability of rental accommodations available for local and non-local individuals (e.g., tourists) in the LAA/RAA.

Accommodation availability

Accommodation may be affected by the influx of workers during construction. As discussed in Section 7.13.4, assessment of residual effects on economic opportunities, while there is sufficient supply of skilled labour within the LAA/RAA to address labour demands of the project it anticipated that a percentage of the project's workforce will be composed of non-local workers. Therefore, some but not all of the workforce, will likely live in the LAA/RAA. This assessment is conservative, as it is based on the scenario where all workers will require accommodation.

There are numerous options available to accommodate non-resident construction workers for the transmission line construction and for the Pointe du Bois and Whiteshell stations modification work. Non-resident clearing and construction workers will be housed in temporary accommodations available in local communities, and where not available, workers will be housed in mobile construction camps (e.g., sleeper units, a wash car, cooking and eating trailers, offices, and a machine/parts shop). The camps will be placed along the right-of-way or in pre-disturbed locations. Camp size could be in the range of 10 to as many as 100 workers, but will vary according to the activity, contract size and labour force requirements.

As discussed in Section 6.3.1.1, according to Airbnb and Trip Advisor (April 2023), there are approximately 457 temporary accommodations rooms available in the LAA/RAA, indicating sufficient available accommodation for the workforce in the project area, especially if some of the workers live in the area and do not require accommodation.

Mitigations

The following mitigation measures will be implemented to reduce demands on temporary accommodations:

- Workers will be hired locally or regionally, whenever possible.
- Mobile construction camp(s) will be used to house workers where temporary accommodations within communities are not available.
- As part of project engagement activities, Manitoba Hydro will continue to engage with and share project information with local governments, service providers, and businesses.

Residual effects

Given the current supply of accommodations and the fact that the bulk of the labour force would be involved in building the transmission line during frozen ground conditions (typically non-peak tourist season) it is expected that the accommodation supply will exceed demand and adverse residual effects on accommodation will be low.

- If Manitoba Hydro uses work camps, residual adverse effects on regional accommodation will be low. The direction of effects will be neutral to adverse if local accommodations are primarily used during the low tourist-season. Magnitude is anticipated to be low and geographic extent will be limited to the LAA/RAA. Timing is applicable with moderate sensitivity because construction of the transmission is planned for frozen ground conditions and would not coincide with peak tourist season during the warmer months. Duration is short term and frequency is continuous, with the effect reversible once construction is completed.

7.10.4.3 Change in traffic and transportation infrastructure

The assessment of potential project effects on traffic and transportation infrastructure focuses on the movement of workers, materials, and equipment to and from the project site along the provincial trunk highways (PTHs) and provincial roads (PRs). The following pathways may result in effects on traffic and transportation infrastructure during the construction phase:

- Change in vehicle traffic volumes.
- Change in transportation infrastructure.

Project pathways

Pathways for changes in traffic volume include the construction and operation of the project which may increase demand on road traffic infrastructure in the region, potentially increasing travel times, affecting road conditions and causing (or being involved in) collisions.

Traffic volume effects

During transmission line construction and stations modifications, it is anticipated that vehicles will originate from Winnipeg or other communities in the LAA/RAA. There is no single preferred transportation route along the highways and roads, and contractors will choose the route at their discretion. As described in Section 6.3.1, one PTH and several PRs traverse the project region, including:

- PTH 11: West of the project region, and travelling north-south via Lac du Bonnet, Brookfield to Seven Sisters Falls and PR 307
- PR 211: Junction with PTH 11 and Brookfield, east to Pinawa
- PR 307: Junction with PTH 11, east through Seven Sisters Falls and Whiteshell Provincial Park to Rennie
- PR 313: Junction with PTH 11 (north of Lac du Bonnet), east to Pointe du Bois
- PR 520: Junction at PR 313, south to Pinawa
- PR 433: PR 313 north to cottages along Lac du Bonnet

The transmission line right-of-way crosses PR 520 south of the Pinawa Dam Provincial Park and PR 211 north of Natalie Lake. There will also be traffic on PR 313 closer to Pointe du Bois.

There is potential for direct effects from an increase in road traffic due to up to 90 project-related vehicles (e.g., cars, vans, trucks) per day that will be needed to transport workers, materials, and equipment to both project accommodations and work sites.

Transportation Infrastructure Effects

There is a potential for an interaction or effect from the following:

- An increase in vehicles on the road from project-related traffic
- A change in the type and weight of vehicles that will be on the road (e.g., construction materials and equipment)
- An increase in utilization (e.g., wear and tear) of roads

Mitigations

The following mitigation measures will be implemented to reduce adverse road traffic effects:

- Group transportation (e.g., buses, crew vans) will be utilized to transport workers between camp(s) and the worksites, and between temporary accommodations in nearby communities and the worksites.
- Manitoba Hydro will work with local authorities to address any damages to roads that occur because of the project.
- All materials transported by truck will be compliant with any weight restrictions or permit requirements, spring road restrictions, or geometric constraints set out by Manitoba Transportation and Infrastructure or municipal governments.
- An emergency response plan will be developed. As part of the development and implementation, Manitoba Hydro will work with local emergency responders to maintain appropriate emergency response times.
- Project personnel will be made aware of the emergency response plan and designated staff will receive training in emergency response. Among other elements, the plan will address handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response, and vehicle collisions.
- As part of project engagement, Manitoba Hydro will continue to engage with and share project information with local governments, service providers, and/or businesses.

The following mitigations will be implemented to reduce interference with transportation infrastructure.

- The project design will meet or exceed standards for setbacks and overhead clearance, including:
    - CAN/CSA-C22.3 No. 1-10 “Overhead Systems” which outlines electrical and safety clearances including road, pipeline, and rail crossing clearances.

- Manitoba Hydro will obtain the following permits, as required, from the following entities:
    - Pipeline and railway companies: Crossing agreements are required for transmission line crossings of pipelines and railways.

<u>Residual effects</u>

The following provides an assessment of the residual effects on traffic volume and transportation infrastructure after taking into consideration the mitigation measures outline above.

Traffic volume effects

As estimated above, the conservative scenario comprises up to 90 project vehicles or 180 daily trips (coming and going to site) on the roads and highway during peak construction during the winter months, when the bulk of the labour force are working on the PW75 transmission line. However, given the mitigation that crews will be transported by groups in vans and/or buses, there will likely be less than 90 project related vehicles per day using roadways in the LAA. In addition, crews will be working at a number of work sites so project traffic will be dispersed. Finally, project work will be spread out temporally, lessening project-related traffic at any given time (i.e., work for Pointe du Bois to Lee River DSC transmission line segment will span December 2024 to March 2025; work for Lee River DSC to Whiteshell station transmission line segment will span December 2025 to March 2026; and work at the two stations will occur throughout the year from December 2024 to March 2026).

As described in baseline information provided in Section 6.3.1.2, provincial trunk highways and provincial roads, current volumes are outlined in Table 7-57.

Table 7-57: Current traffic volumes in RAA		
Highway route	Highway section	Current volume of vehicles/day for annual average daily traffic
PTH 11	Seven Sisters to Lac du Bonnet	1,460 - 2,320
PR 211	PTH 11 to Pinawa	1,250 - 1,450
PR 307	Seven Sisters to Nutimik	570 - 1,090
PR 313	Lac du Bonnet to Pointe du Bois	210 - 2,290
PR 520	Pinawa to PR 313	290 - 320
PR 433	PR 313 to Lee River Falls	950

Sources:

[1] Manitoba Infrastructure Highways Classification Map

[2] Manitoba Highway Traffic Information System 2019

Given the use of group transportation (i.e., vans, buses), dispersed crews working along the ROW and stations, and because the bulk of the work is taking place during the winter months, it is anticipated that roadways within the LAA will be able to accommodate the incremental project-related demand. Thus, the project is predicted to have a low magnitude effect on traffic volume. The geographic extent of effects on traffic volume is the LAA/RAA. Timing is applicable, with most workers to be deployed and travelling during frozen ground conditions, when traffic is anticipated to be less than during the summer tourist season. Duration is short-term, with frequency as multiple regular events. Effects are reversible.

Transportation infrastructure effects

As discussed above, with the application of mitigation measures, project-related vehicle traffic is predicted to be less than the worst-case scenario of up to 90 vehicles per day during project construction. To avoid or limit damage to roadways, all transport loads will comply with weight restrictions. If roadway damage does occur, Manitoba Hydro will address the damage and discuss it with local authorities. Given these factors, it is anticipated that direction of effects on transportation infrastructure will be neutral to adverse. Magnitude is anticipated to be low due to the relatively low number of project vehicles using roadways within the LAA/RAA, which is the geographic extent of the effects. Timing is applicable since most of the transmission line work will occur only during period of frozen ground conditions, over the two-year (i.e., short-term) construction period. Effects could potentially occur as multiple irregular events, and will be reversible, given that Manitoba Hydro will address project-related roadway damage.

7.10.4.4 Assessment of change in health services and emergency response

The assessment of change in health services and emergency response focuses on:

- Change in capacity of health and emergency response services during construction.

Pathways

The pathways for change in health services and emergency response are the influx of project-related workers and project activities which can affect the demand for local health and emergency response services.

Capacity of health and emergency response services effects

There is potential for the presence of the temporary workforce to place additional demand on available capacity of local health and emergency response facilities in the RAA. It is assumed that some of the workforce will be hired locally and therefore would already be accessing local health care facilities and emergency response services.

Mitigations

Manitoba Hydro will implement the following measures to mitigate potential effects on health care services and infrastructure:

- An emergency response plan will be developed for the project. As part of the development and implementation, Manitoba Hydro will work with local emergency responders to maintain appropriate emergency response times.
- Project personnel will be made aware of the emergency response plan and designated staff will receive emergency response plan training. The emergency response plan will address aspects like handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. The plan will describe response measures for major medical emergencies and include procedures for emergency response coordination with local emergency response personnel and local medical facilities.

- First aid supplies and facilities will be provided on-site and personnel will be trained on first aid to deal with minor injuries.
- Liaising with the Interlake-Eastern Regional Health Authority will be done regarding the possibility of coordinating primary care services with the mobile clinic in the region.
- Coordination of emergency response plan implementation with local agencies (including RCMP, emergency preparedness, hospitals, and air ambulances).
- Maintenance of firefighting trained workers and fire suppression systems at construction sites and camp.
- As part of project engagement, Manitoba Hydro will continue to engage with and share project information with local governments, service providers, and/or businesses.
- The project will provide basic first aid on-site, and could use STARS (i.e., air ambulance) in cases of emergency to provide emergency transport to hospitals in Winnipeg.

Residual effects

Potential effects on health and emergency response services will be mitigated by numerous factors. Manitoba Hydro and their contractors will comply with standard safety procedures (e.g., handling and storage of materials, driving safety and spill response) to mitigate potential incidents. First aid supplies and facilities will be provided on-site, to limit use of local health facilities for minor injuries. The project may deploy a mobile clinic to the region to provide primary care health services, which will also limit demands on local health facilities. An emergency response plan will be developed, and project personnel will be trained in its execution. In case of an emergency, Manitoba Hydro will work with local emergency response teams, to coordinate the response. The project's proximity to Winnipeg also allows the project to bypass local facilities and largely use medical and emergency response services based in the city, as required. STARS is also an option to medi-vac anyone who has a serious injury to Winnipeg.

Given the application of the proposed mitigation measures, and proximity of the project to Winnipeg, it is anticipated that residual effects on health and emergency response services within the LAA/RAA will be neutral to adverse in direction, and of low magnitude. Timing is applicable with moderate sensitivity due to seasonality of the construction period on PW75. Duration will be short term with construction over a two- year period. Frequency could occur on multiple irregular events because workers could require medical services at any time during the construction period. Incremental demands on health and emergency response services could occur over the two-year construction period (i.e., short-term), but this incremental demand will cease (i.e., the effect is reversible) once construction is completed.

7.10.4.5 Assessment of change in capacity of solid waste management facilities

Manitoba Hydro will implement the following measures to mitigate potential effects on health care services and infrastructure:

- An emergency response plan will be developed for the project. As part of the development and implementation, Manitoba Hydro will work with local emergency responders to maintain appropriate emergency response times.
- Project personnel will be made aware of the emergency response plan and designated staff will receive emergency response plan training. The emergency response plan will address aspects like handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response and vehicle accidents. The plan will describe response measures for major medical emergencies and include procedures for emergency response coordination with local emergency response personnel and local medical facilities.
- First aid supplies and facilities will be provided on-site and personnel will be trained on first aid to deal with minor injuries.
- Liaising with the Interlake-Eastern Regional Health Authority will be done regarding the possibility of coordinating primary care services with the mobile clinic in the region.
- Coordination of emergency response plan implementation with local agencies (including RCMP, emergency preparedness, hospitals, and air ambulances).
- Maintenance of firefighting trained workers and fire suppression systems at construction sites and camp.
- As part of project engagement, Manitoba Hydro will continue to engage with and share project information with local governments, service providers, and/or businesses.
- The project will provide basic first aid on-site, and could use STARS (i.e., air ambulance) in cases of emergency to provide emergency transport to hospitals in Winnipeg.

Residual effects

Potential effects on health and emergency response services will be mitigated by numerous factors. Manitoba Hydro and their contractors will comply with standard safety procedures (e.g., handling and storage of materials, driving safety and spill response) to mitigate potential incidents. First aid supplies and facilities will be provided on-site, to limit use of local health facilities for minor injuries. The project may deploy a mobile clinic to the region to provide primary care health services, which will also limit demands on local health facilities. An emergency response plan will be developed, and project personnel will be trained in its execution. In case of an emergency, Manitoba Hydro will work with local emergency response teams, to coordinate the response. The project's proximity to Winnipeg also allows the project to bypass local facilities and largely use medical and emergency response services based in the city, as required. STARS is also an option to medi-vac anyone who has a serious injury to Winnipeg.

Given the application of the proposed mitigation measures, and proximity of the project to Winnipeg, it is anticipated that residual effects on health and emergency response services within the LAA/RAA will be neutral to adverse in direction, and of low magnitude. Timing is applicable with moderate sensitivity due to seasonality of the construction period on PW75. Duration will be short term with construction over a two- year period. Frequency could occur on multiple irregular events because workers could require medical services at any time during the construction period. Incremental demands on health and emergency response services could occur over the two-year construction period (i.e., short-term), but this incremental demand will cease (i.e., the effect is reversible) once construction is completed.

7.10.5 Summary of residual effects

A summary of residual environmental effects that are likely to occur on infrastructure and services due to project activities is provided in Table 7-58.

Table 7-58: Project residual effects on infrastructure and services likely to occur on infrastructure residual effects characterization

Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in Accommodation							
C	N-A	L	LAA, RAA	MS	Short term	Continuous	Reversible
Change in Traffic and Transportation							
Traffic Volume Effects							
C	N	L	LAA, RAA	MS	ST	IR	R
Transportation Infrastructure Effects							
C	N-A	L	LAA, RAA	MS	ST	IR	R
Change in Health Services and Emergency Response							
C	N-A	L	LAA, RAA	MS	ST	IR	R
Change in Solid Waste Management Facilities							
C	N	N	LAA, RAA	NS	ST	C	N/A

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning
Direction:
P: Positive

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:

Table 7-58: Project residual effects on infrastructure and services likely to occur on infrastructure residual effects characterization

Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

A: Adverse *N: Neutral* ***Magnitude:*** *NMC: No Measurable Change* *L: Low* *M: Moderate* *H: High*	*RAA: Regional Assessment Area* ***Timing*** *NS: No sensitivity* *MS: Moderate sensitivity* *HS: High sensitivity* ***Duration:*** *ST: Short-term* *MT: Medium-term* *LT: Long-term*	*R: Reversible* *I: Irreversible* *N/A: Not applicable*

7.10.6 Assessment of cumulative effects on infrastructure and services

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC
- the residual effects could act cumulatively with residual effects of other past, present, or reasonably foreseeable future physical activities

If either condition is not met, further assessment of cumulative effects for a particular VC is not warranted because the project does not interact cumulatively with other projects or activities.

7.10.7 Project residual effects likely to interact cumulatively

Table 7-59 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact infrastructure and services. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

A potential cumulative effects assessment on solid waste facilities in the RAA is not carried forward because the project will cause no measurable change.

Table 7-59: Potential cumulative environmental effects on infrastructure and services

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects		
	Change to transportation infrastructure	Change to health services	Change in accommodation
Existing/Ongoing Projects and Activities			
Agriculture (crop and livestock production)	-	-	-
Domestic Resource Use (hunting, trapping, fishing)	-	-	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	-	-
Infrastructure (I.e., provincial trunk highways, provincial roads,	-	-	-
Generating Stations (Pointe du Bois, Slave Falls, Seven Sisters)	-	-	-
Transmission Lines			
P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines) (since	-	-	-
R1 and R2 (Pointe du Bois to Slave Falls) 115-kV transmission lines	-	-	-

Table 7-59: Potential cumulative environmental effects on infrastructure and services

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects		
	Change to transportation infrastructure	Change to health services	Change in accommodation
S2 (Slave Falls to Stafford) 115-kV transmission line	-	-	-
SK1 (Seven Sisters to Star Lake) 115-kV transmission line	-	-	-
SG12 (Great Falls to Seven Sisters) 115-kV transmission line	-	-	-
SR3 (Seven Sisters to McArthur Falls) 115-kV transmission line	-	-	-
SW1, SW2, SW3 and SW4 (Seven Sisters to Whiteshell) 115-kV transmission lines	-	-	-
ST5 and ST6 (Seven Sisters to Transcona) 115-kV transmission lines	-	-	-
K21W and K22W (Whiteshell to Kenora) 230-kV transmission line	-	-	-
Nuclear Power (Whiteshell Laboratories)	-	-	-
Future Projects and Activities			

Table 7-59: Potential cumulative environmental effects on infrastructure and services

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects		
	Change to transportation infrastructure	Change to health services	Change in accommodation
Slave Falls Generating Station (Slave Falls 7-Bay Sluiceway Life Extension Project)	✓	✓	✓
Nuclear Power (Whiteshell Laboratories) - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	✓	✓	✓

"✓" = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

"–" = Interactions between the residual effects of other projects and those of the project residual effects are not expected.

The assessment of cumulative effects that are likely to result from the project in combination with other projects and physical activities follows in the sections below.

Existing projects and activities have been underway over the past several decades, from the 1850s until present day. Agricultural production, domestic resource use, recreational activities, road and highway infrastructure and Pointe du Bois (1911), Seven Sisters (1931) and Slave Falls (1948). The transmission lines were built between 1920 and 1972. The labour and traffic volumes associated with these projects have been taken into account in the residual effects assessment above, and therefore do not create new, cumulative effects.

Two reasonably foreseeable future projects at two existing developments within the LAA/RAA could interact cumulatively both temporally and spatially with the project, the Slave Falls Sluiceway Extension Project, and StarCore Nuclear's Pinawa Demonstration Reactor. A summary description of these projects is as follows:

- The Slave Falls 7-Bay Sluiceway Life Extension Project at Manitoba Hydro's Slave Falls generating station is anticipated to start in August 2024 and end in 2027. This project involves the repair of the concrete in one of the generating station's sluiceway piers, which is in poor condition (Manitoba Hydro 2022). Up to eight people are expected on-site during this project and up to four vehicles would be used by staff to access and leave the site. The station is accessible by a private MH road from Pointe du Bois. The concrete work is intended to be seasonal (warmer months), however, work could extend into the winter months if there is a delay in schedule. Because of its small workforce, this project is predicted to have negligible cumulative effects on the infrastructure and services in the region.
- StarCore Nuclear's Pinawa Demonstration Reactor project would create 265 full-time continuing jobs; 450 spinoff jobs; 2,400 man-years of construction work; and inject $600 million into the Eastern Manitoba economy over the first 10 years of this 25-year project (Starcore Nuclear n.d.). Construction is anticipated to start in 2026 and overlap temporally with the construction of the project, which is scheduled to end in March 2026. Should the Pinawa Demonstration Reactor project be delayed, and construction starts after March 2026, this future project would not interact cumulatively with the project.

7.10.7.1 Cumulative effects assessment for change in accommodation

Pathways

The addition of the Pinawa Demonstration Reactor could lead to a change in accommodation demand due to the influx of workers into the LAA/RAA. The PW 75 project in combination with the Pinawa Demonstration Reactor may affect accommodation in the RAA, depending on the reactor project's workforce accommodation plans. Given the large labour force required for the Pinawa Demonstration Reactor and depending on the mitigation strategies employed by that project, there could be cumulative adverse effect on hotels, motels, AirBnB, and other temporary rental accommodations, where tourist and other businesses may compete to find space at elevated prices.

Mitigations

Manitoba Hydro will hire local and regional labour where possible as much as possible and provide mobile camps where rental accommodations are not available. Mitigations for the Pinawa Demonstrator Reactor are not known.

Residual cumulative effects

The direction of the residual cumulative effects on accommodation are expected to be neutral to adverse, assuming that temporary rental accommodations are used. The magnitude will be low if work camps are used extensively, and moderate if a mix of work camps and rental accommodations are used. Geographic extent is the LAA/RAA. Timing is applicable with moderate sensitivity based on seasonality of the PW75 transmission line build, and potential overlap at the end of PW75 with the Pinawa Demonstration Reactor in early 2026. Duration is short term. Frequency is continuous during the overlap period in early 2026 and effects are expected to be reversible.

7.10.7.2 Cumulative effects assessment for change in traffic and transportation infrastructure

Pathways

The large work force required for the Pinawa Demonstration Reactor combined with the relatively small work force for PW75 may affect traffic volumes and transportation infrastructure. The pathways are:

- Increased traffic.
- A change in the type of vehicles on the road, including heavy load vehicles.
- Increased road and highway utilization, resulting in wear and tear.

Mitigations

Implementation of the mitigation measures described in Section 7.11.3.3 will reduce the project's effects on traffic and transportation infrastructure. While it is assumed that the Pinawa Demonstrator Reactor personnel and contractors will comply with all traffic and transportation laws (e.g., regulations for heavy loads, speed limits), other mitigation measures of that project are unknown (such as work camp usage and number of vehicles, use of buses, etc.).

Residual cumulative effects

Give the relatively low number of project-related truck and vehicle traffic; the fact that the projects may not overlap for a long period of time; and the time of year (low season with few tourists), the magnitude of project-related cumulative effects is predicted to be low and the direction neutral to adverse. The geographic extent is the LAA/RAA. Timing is applicable with moderate sensitivity due to seasonality of the work and duration is short term. Frequency is anticipated to be irregular event(s) if damage is done to roads, and reversible.

7.10.7.3 Cumulative effects assessment for change in capacity of health and emergency response services effects

There is potential for the influx of workers for PW 75 in combination with the labour force for the Pinawa Demonstration Reactor to affect the capacity of local health and emergency response facilities in the RAA.

Current capacity of the health and emergency response services in the RAA are unknown. However, given that that project site is so close to Winnipeg, it is assumed that any serious injuries and ailments will be transferred to the city as needed.

Mitigations

Implementation of the mitigation measures described in Section 7.10.4 will reduce project-related cumulative effects on health and emergency response services. Mitigation measures for the Pinawa Demonstrator Reactor are unknown.

Residual cumulative effects

Cumulative effects on health and emergency services may be adverse should the increase in service demands strain available capacity (see Table 7-60). The direction is adverse. Magnitude is predicted to be low to moderate for easily treatable health conditions (e.g., colds, flus) based on the large workforce for the Pinawa Demonstration Reactor project, but for serious injuries, magnitude could range from high if using local facilities, to low if serious cases are medi-evacuated to Winnipeg's hospitals. The geographic extent is the LAA/RAA. Timing is applicable with moderate sensitivity. Duration is short term for three months in early 2026 when the two projects are predicted to overlap. Frequency is assessed as irregular event(s), with reversible effects.

Table 7-60: Summary of Residual Cumulative Effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in accommodation							
Residual cumulative effect	N - A	L - M	LAA/ RAA	MS	ST	C	R
Contribution from the Project to the Residual Cumulative Effect	The project's contribution to socio-economic effects is anticipated to be neutral to potentially adverse for accommodations in the LAA/RAA in early 2026.						
Change in traffic and transportation infrastructure							
Residual cumulative effect	N - A	L	LAA/ RAA	MS	ST	IR	R
Contribution from the Project to the Residual Cumulative Effect	The project's contribution to effects on traffic and transportation could be low to adverse.						
Change in health and emergency response effects							
Residual cumulative effect	A	L-H	LAA/R AA	MS	ST	IR	R
Contribution from the Project to the Residual Cumulative Effect	The project's contribution to cumulative socio-economic effects could potentially be adverse, depending on the capacity of the health and emergency response services at the time that the project is constructed.						

KEY **Direction:** P: Positive	**Geographic Extent:**	**Frequency:** S: Single event

Table 7-60: Summary of Residual Cumulative Effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

A: Adverse N: Neutral **Magnitude:** N: Negligible L: Low M: Moderate H: High	PDA: Project Development Area LAA: Local Assessment Area RAA: Regional Assessment Area **Timing** NS: No sensitivity MS: Moderate sensitivity HS: High sensitivity **Duration:** ST: Short-term MT: Medium-term LT: Long-term	IR: Irregular event R: Regular event C: Continuous **Reversibility:** R: Reversible I: Irreversible N/A: Not applicable

7.10.7.4 Determination of significance

An adverse residual effect on infrastructure and services is considered significant if, even with the application of mitigation and management measures, it widely disrupts, restricts, or degrades present infrastructure and services to a point where activities cannot continue at or near baseline levels.

It is predicted that effects on accommodations will be not significant both because project demand will be limited by hiring workers within the LAA where applicable, and because project demand on temporary accommodations will mostly occur during the winter periods and will not coincide with the summer peak tourism season.

While the project will add traffic to local roadways, this will occur mostly during the low season, and with the application of mitigation measures, project related traffic effects are predicted to be of low magnitude, and not adversely affect roadway function within the LAA/RAA.

The relatively small workforce associated with the project is not predicted to impair the delivery of health and emergency services within the LAA/RAA due to the availability of substantial health infrastructure in the nearby City of Winnipeg.

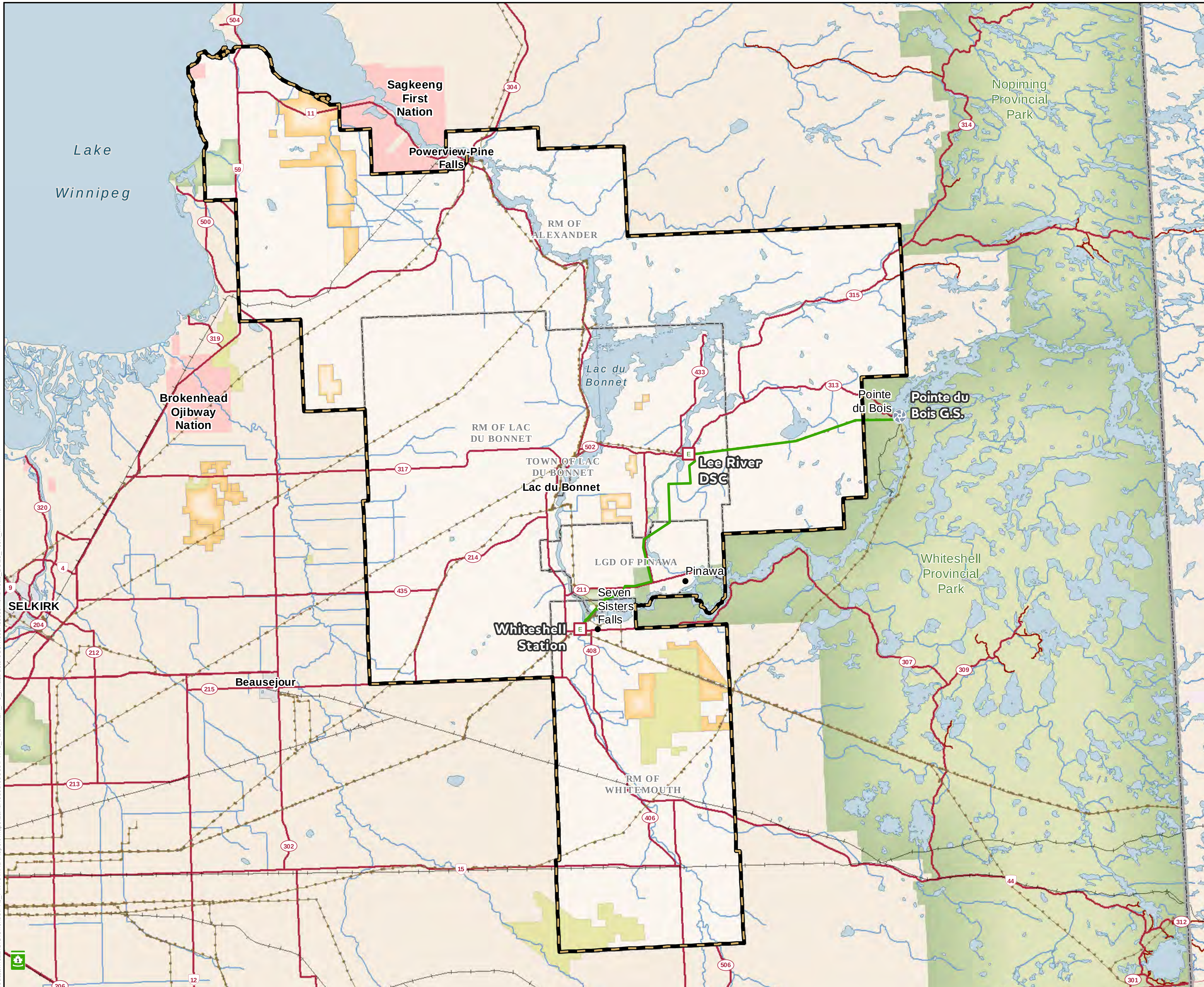
7.10.7.5 Prediction confidence

Prediction confidence is based on the information compiled during desktop-based data compilation and an understanding of project activities, location, and schedule.

There is a moderate degree of confidence in the assessment predictions for accommodation, traffic and transportation, and health and emergency services based on the data collected for this assessment and understanding of project pathways and effects from comparable projects.

7.10.7.6 Follow-up and monitoring

Manitoba Hydro has not identified any follow-up plans that pertain to infrastructure and services.



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- Infrastructure and Services LAA
- Infrastructure and Services RAA

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- Rural Municipality
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 5 10 Miles

1:400,000

Spatial Boundaries for Infrastructure and Services

Map 7-5

7.11 Land and resource use

Land and resource use refers to the various purposes for which land and resources are used. While agriculture is a type of land and resource use, this section excludes the consideration of project effects to commercial agriculture because this aspect of land and resource use is assessed separately in Section 7.12.

Land and resource use was selected as a valued component (VC) because of regulatory considerations and its importance to communities, property owners, resource users (e.g., hunters and trappers, commercial operators, harvesters, and the public), and other stakeholders. For this assessment, land and resource use covers the following topic areas:

- Property and residences – land tenure and property ownership (e.g., private, Crown land, municipal-owned land, land survey patterns [section-township-range, river lot]), residential development, proposed residential development (i.e., private subdivisions), private property value; industrial developments; and development and zoning controls
- Designated lands and protected areas – protected areas, proposed protected areas, Areas of Special Interest (ASIs), ecological reserves, provincial parks, provincial forests, wildlife management areas (WMAs), heritage rivers, non-governmental conservation lands, First Nation reserves and treaty land entitlements
- Recreation and tourism – trails (hiking, biking, snowmobile, all-terrain vehicles [ATVs]), waysides/picnic sites, campgrounds, golf courses, recreational facilities, lodges, attractions/museums and tourism sites, canoeing/navigation
- Mining – quarry and aggregate sites/leases, permits, withdrawal areas
- Forestry – productive forest land, high value forest sites, private woodlots, shelterbelts
- Hunting and trapping and wild rice harvesting practised by non-Indigenous people composed of activities within open trapping areas, game hunting areas, game bird hunting zones, wild rice production areas, and sport/recreational fishing. Hunting and trapping practised and plant gathering by First Nation and Métis is covered in Section 7.2.

This section assesses the effects of project activities during construction, operation and decommissioning on non-Indigenous land and resource use, drawing from the baseline conditions described in Section 6.3.2. An assessment of cumulative effects on infrastructure and services is also presented.

7.11.1 Scope of the assessment

This assessment of project effects on land and resource use has been influenced by Manitoba Hydro's experience with other recent transmission line assessments, e.g., the Manitoba-Minnesota Transmission Project (MMTP), and the Dorsey to Wash'ake Mayzoon Transmission (D83W) Project.

As was done for the MMTP and D83W projects, a multi-stage route selection process was undertaken for the project and resulted in the consideration of numerous qualitative and quantitative factors (including land and resource use interests) and the selection of a route that attempted to balance interests. Also, like what was done for the MMTP and D83W projects, and is described in Chapter 4, engagement activities were phased in a manner that sought to capture feedback at different stages of the project's design planning to identify potential issues and concerns for land and resource use.

Like MMTP, for the current project, access management was identified as an issue of concern during project engagement with landowners expressing concerns about increased access to their properties that are adjacent to the right-of-way. As part of the construction environmental protection plan for the project, Manitoba Hydro will develop and implement an access management plan to limit unauthorized backcountry access, educate stakeholders and decommission and rehabilitate access routes created by the project.

7.11.1.1 Regulatory and policy setting

Relevant provincial legislation, regulation, policy, and agreements considered in the assessment of environmental effects for land and resource use include

- *The Environment Act* (C.C.S.M. c. E125), Pesticides Regulation, M.R. 94/88
- *The Forest Act* (C.C.S.M. c. F150)
- *The Mines and Minerals Act* (C.C.S.M. c. M162)
- *The Provincial Parks Act* (C.C.S.M. c. P20)
- *The Wild Rice Act* (C.C.S.M. c. W140)
- *The Manitoba Hydro Act* (C.C.S.M. c. H190)
- *The Planning Act* (C.C.S.M. c. P80)
- The Forest Damage Appraisal and Valuation (FDAV) Policy

Approximately 42 km of the existing and new ROW is on provincial Crown land. It is Manitoba Hydro's intention to apply for work permits from Manitoba Natural Resources and Northern Development (MNRND) for project activities occurring on provincial Crown lands.

The Forest Act

Administered by the MNRND Forestry Branch, *The Forest Act* (C.C.S.M. c. F150) was established to manage provincial Crown forests by setting forest harvest levels; monitor forest management activities; ensure forests are regenerated; provide protection from insects and disease; and collect revenue for use of Crown timber.

Permits are issued under the Act for activities such as commercial timber harvesting, general forestry and operating, Christmas tree cutting, personal use (fuelwood), timber permits and timber sale. It is Manitoba Hydro's intention to apply for a permit to cut down timber for the project on provincial Crown land under the Act. Approximately 7.6 km of the ROW crosses through Whiteshell Provincial Forest.

Manitoba Natural Resources and Northern Development's FDAV policy also applies to the project. It outlines the parameters for calculating financial compensation to the Crown due to (i) the removal for the removal of timber and (ii) the effect on high value silviculture investments on productive Crown forestlands.

The Mines and Minerals Act

Administered by the Mines Branch, *The Mines and Minerals Act* (C.C.S.M. c. M162) governs the disposition of mineral rights (permits, claims and leases), exploration, development and production of the province's non-fuel mineral resources and the rehabilitation of mines and quarries. A quarry permit or quarry lease is first obtained to commence production of a quarry mineral (including aggregate) that is on Crown property or private land.

Permits to obtain quarry minerals (aggregate) are not anticipated to be required for the project. If Manitoba Hydro subsequently determines that such materials are required, details on borrow sources (e.g., locations; quantities) will be provided in permit application to the Mines Branch.

The Provincial Parks Act

Administered by the Parks Branch of MNRND, *The Provincial Parks Act* (C.C.S.M. c. P20) was established to protect natural lands and the quality of life; manage existing and future provincial parks so representative examples of natural and cultural heritage are conserved; and allow economic opportunities to contribute to the protection of the province's natural regions.

The Act provides for the designation and management of provincial parks as part of a system plan. The system plan sets out proposed boundaries, classifications, and land use categories of provincial parks. Provincial Park classifications include wilderness park, natural park, recreation park or heritage park. Land in provincial parks is categorized into one or more of the following land use categories: wilderness, backcountry, resource management, recreational development, heritage, or access. An access category can accommodate certain types of existing and future infrastructure, including transmission lines and ROW. The ROW crosses through Whiteshell Provincial Park west and south of PR 520 for 6.0 km (approx.).

The Wild Rice Act

Administered by the Real Estate Services Branch, *The Wild Rice Act* (C.C.S.M. c. W140) applies to wild rice growing or grown or proposed to be grown by natural means or methods on Crown land. There are some exceptions including wild rice growing by domestic means on Crown land; wild rice growing on private land; or any lease for development or production of harvesting of wild rice issued under *The Crown Lands Act*.

The Act provides for the establishment of a Development licence and a Production licence. Subject to a permit, within an area of Crown land designated for the purpose of harvesting wild rice, a person without a licence can engage in harvesting within the area specified in a permit. Provision is also made for areas designated for manual harvesting without a licence or permit in areas of Crown land.

The Planning Act and Provincial Planning Regulation

Administered in cooperation by Manitoba Municipal Relations and the associated municipal councils, *The Planning Act* (C.C.S.M. c. P80) provides a framework for land use planning strategies at the provincial, regional, and local scale. The Provincial Planning Regulation, M.R. 81/2011 provides a framework to guide development planning. Requirements of the Act and its regulations do not apply to the Crown or Crown agencies. Manitoba Hydro notes that, as a Crown Corporation, they are not directly subject to the legislative provisions and are generally exempt from them in terms of development planning.

The Manitoba Hydro Act

The purposes of the Act are to:

… provide for the continuance of a supply of power adequate to the needs of the province and to engage in and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of power and, in addition, are (a) to provide and market products, services and expertise related to the development, generation, transmission, distribution, supply and end-use of power, within and outside the province; and (b) to market and supply power to persons outside the province on terms and conditions acceptable to the board (*The Manitoba Hydro Act*, C.C.S.M. c. H190).

Section 23(1) of the Act allows Manitoba Hydro to construct, operate, and maintain its infrastructure anywhere on, under, over, across, or along public highways, streets, lanes, or other public places. This Act supersedes municipal level powers granted under legislation such as *The Planning Act* (C.C.S.M. c. P80) and *The Municipal Act* (C.C.S.M. c. M225).

Municipal

Municipal jurisdictions must adopt development plans and zoning bylaws to guide land and resource use planning decisions within their respective boundaries under *The Planning Act* (C.C.S.M. c. P80). A development plan is a bylaw that outlines the long-term vision and goals of a community to guide development within the planning area of a municipality or planning district. A zoning bylaw is a tool used by the planning authority to implement development plan policies and typically represents what is on the ground. Zoning bylaws are guided by and conform to the development plans. Zoning works by regulating the use of land and location of buildings and structures (Manitoba Municipal Relations 2023). Municipal jurisdictions have a variety of development controls in place along the proposed ROW. Land use development controls based on applicable development plans and zoning bylaws are described further in Section 6.3.2.1.

Manitoba Hydro is cognizant that neither *The Planning Act* (C.C.S.M. c. P80), nor its Regulations, apply to the Crown or Crown agencies. However, it does seek to work cooperatively with municipalities when planning, designing, constructing, and operating and maintaining its projects to limit the extent of possible interactions with their developments and plans.

Federal

Overhead transmission lines are of potential interest to Transport Canada under the *Canadian Navigable Waters Act* (R.S.C. 1985, c. N-22) (CNWA). The purpose of the CNWA is to regulate works and obstructions that risk interfering with the public right of navigation in navigable waters. The CNWA requires owners who propose to construct or place a work in a waterway apply or prepare a Notice to the Minister, unless the works meet the criteria set out in a Minor Works Order. Works meeting the assessment criteria are classed designated works under the CNWA and are subject to specific terms and conditions for construction. Classes of work that are considered for their effect to navigation as established by the Order include Aerial Cables – Power and Telecommunication. This class of work can proceed without Notice under the CNWA if they comply with requirements of the Minor Works Order (Transport Canada 2023). Navigation is also protected in Canada (i.e., the right to use navigable waters as a highway) for non-scheduled navigable waters not listed in the Act. Permanent non-scheduled waterbody crossings where navigation is possible (e.g., by canoe/kayak) include Boggy Creek and Pinawa Channel.

No other relevant federal legislation, policy or agreements related to acquiring permits are considered in the land and resource use environmental assessment. No federal lands are affected by the project.

7.11.1.2 Consideration of issues raised during engagement

As part of project engagement, Manitoba Hydro shared information and documented concerns throughout both processes (see Chapter 4 for more information).

Key issues regarding land and resource use identified through this process and the sections in the Environment Act Proposal (EAP) where they are addressed are summarized in the following subsections.

<u>Engagement with First Nations and Métis</u>

Throughout the engagement process with First Nations and Métis, Manitoba Hydro received comments and land and resource use.

Hollow Water First Nation shared that they consider the Pointe du Bois Renewable Project Area (PREP) as being within their traditional territory and that they have land in the Pointe du Bois area along the Lee River. This area is where Hollow Water First Nation has an outstanding claim.

Norway House Cree Nation identified the potential for the Project to impact trail access. Norway House Cree Nation indicated that the Pointe du Bois area is used for recreational purposes such as snowmobiling.

Sagkeeng Anicinabe First Nation shared with Manitoba Hydro their dissatisfaction that private landowners receive compensation for project effects while rightsholders have not received anything for projects affecting treaty lands.

The Manitoba Métis Federation shared that it would be interested in discussing with Manitoba Hydro a Crown land offset plan that is more distinction based. This approach would recognize that the Métis have a different type of use and preferences for land that would specifically benefit the Métis.

Public Engagement

In addition to the feedback received during the First Nations and Métis engagement process, Manitoba Hydro received numerous comments about land and resource use during the alternative route segments and preferred route phases of engagement.

The following is a summary of feedback received regarding interests and concerns with respect to land and resource use:

- Concern about overuse and damage to the provincial dock at the Pointe du Bois campground
- Potential effects to private property, including land disturbance, increase in access, and aesthetic/perception concerns
- Effects on Crown land leased for agricultural purposes (discussed in Section 7.12, commercial agriculture)
- Potential effects on private property including trespassers and damage to land, increased access and increased recreational traffic
- Potential effects to private property including impacts to property value
- Loss of land and aesthetic effects and compensation for easements
- Potential for trespassing, litter and illegal hunting, use of right-of-way by all-terrain vehicle
- Potential project effects to visual aesthetics, enjoyment of place, enjoyment of land (land use)
- Potential project effects on recreational trails and trail access (e.g., ski trails, TransCanada Trail, mountain biking trails)
- Potential project effects on nearby cottages
- Potential for partnering with SnoMan and local trail associations to make synergistic use of a transmission line through Crown land
- Potential project effects on land use and development (i.e., proposed lot subdivision)
- Potential project effects to private property and risks related to proximity of towers (e.g., cabins, seasonal areas)
- Potential project effects to important tourism destinations (i.e., Lac du Bonnet and surrounding areas)
- Potential project effects to trails, recreational areas, maintaining natural beauty of the Whiteshell
- Routing through populated areas will have a negative effect on the community

Concerns and issues raised in relation to land and resource use also informed the selection of effects addressed in this section (Table 7-61).

Visual quality effects related to aesthetics, tranquility, and connection to the land are discussed in Section 7.14 (Well-being). Concerns regarding the presence of the line and potential impairment to residences and future residential development are discussed in this section as it relates to perception and land and recreational use.

Provincial government engagement

Manitoba Environment Climate and Parks (Lands Branch) discussed with Manitoba Hydro permitting requirements for the project. The Lands Branch wanted to know if the existing right-of-way currently occupied by Transmission Lines P3/P4 is owned by Manitoba Hydro. Manitoba Hydro responded that the right-of-way for the P3/P4 transmission lines is owned by the Crown. Furthermore, Manitoba Hydro would seek an easement from the Lands Branch for widening the existing right-of-way. Manitoba Hydro proposes to widen the right-of-way by 38 m immediately south of the existing right-of-way.

7.11.1.3 Potential effects, pathways, and measurable parameters

The potential environmental effects, effects pathways, measurable parameters used in the assessment of effects on land and resource use, are provided in Table 7-61.

Table 7-61: Potential effects, effects pathways and measurable parameters for land and resource use

Potential effect	Effect pathway	Measurable parameters
Change in property	Clearing of the right-of-way (ROW), structure assembly and installation, creation of access can cause disturbance and nuisance effects on property Presence of the line can impair future residential development, aesthetics	Distance to dwellings (m) Number of dwellings and residential developments in proximity Change in property value
Change in designated lands and recreation	Clearing of the ROW, structure assembly and installation, creation of access can cause disturbance effects	Conflict with designated lands, change in area (ha) of current use

Table 7-61: Potential effects, effects pathways and measurable parameters for land and resource use

Potential effect	Effect pathway	Measurable parameters
	Presence of line can impair use, aesthetics	Number of areas/sites in proximity to the project
Change in resource use (forestry, mining/ aggregates, hunting and trapping)	Clearing of the ROW, structure assembly and installation can reduce annual allowable cut (AAC), standing timber, and cause disturbance to high value forest sites Creation of access can cause disruption effects on operations, presence of line can result in interference effects, disruption to harvesting (non-traditional) success or lead to pressure on resources (trapping/ hunting) Presence of transmission line can impair aesthetics	Area withdrawn from commercial forest production (ha), volume (m3), silviculture areas affected (ha), number of sites/woodlot areas affected (ha), shelterbelts, private forestland affected (ha) Change/restriction of resource use; number of sites in proximity Change or disruption affecting resource use (ha); sensory disturbance affecting harvest (non-traditional)

The project can directly and indirectly affect land and resource uses. Direct effects involve a direct cause-effect relationship between the project and the land-use in question. For example, right-of-way clearing reduces the amount of forested land and forestry potential in the local assessment area (LAA).

Indirect effects involve a pathway through an intermediate (i.e., pathway) component. For example, right-of-way clearing may change wildlife habitat characteristics in the LAA and potentially affect the quantity of game animals for hunting.

7.11.1.4 Spatial boundaries

The following spatial boundaries are used to assess residual and cumulative environmental effects of the project on land and resource use (Map 7-6):

- **Project development area (PDA):** The PDA is the footprint of the proposed project as described in section 2.0, including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances.
- **Local assessment area (LAA):** includes the PDA and a 1.0 km buffer on either side of the centre line of the PDA for the existing and new right-of-way segments as well as around the Pointe du Bois and Whiteshell stations. The LAA for the transmission line and station components covers an area where effects on land and resource use are likely to be most prevalent based on the spatial scoping of the following components that relate to land and resource use and encompassing spatial scoping for terrestrial wildlife and habitat (Section 7.9).
- **Regional assessment area (RAA):** includes the PDA and LAA and the boundaries of all rural municipalities (RMs) traversed by the PDA. From north to south, the RMs included are Alexander, Lac du Bonnet, Local Government District (LGD) of Pinawa, Whitemouth, and Unorganized Territory Division No. 1 (including part of Whiteshell Provincial Park and Pointe du Bois Station area). Effects of other projects and activities occurring within the RAA that have potential to act cumulatively with the project are assessed based on the RAA.

7.11.1.5 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.11.1.6 Residual effects characterization

Residual environmental effects are socio-economic effects that remain after the application of mitigation measures. Characterization of residual effects is based on the criteria in Table 7-62. All criteria except context are relevant for both positive and adverse effects. Context is not relevant for positive effects because, regardless of current condition, positive effects will result in improvement of land and resource use conditions.

Table 7-62: Characterization of residual effects on land and resource use		
Characterization	Description	Quantitative measure or definition of qualitative categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters in a direction beneficial to land uses relative to baseline Adverse – a residual effect that moves measurable parameters in a direction detrimental to land uses relative to baseline Neutral – no net change in measurable parameters for land uses relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	No Measurable Change – no measurable change in the effect can be noted. Low – a measurable change in land and resource use capacity, but land and resource use activities can take place at similar levels as under baseline conditions Moderate – measurable change in land and resource use capacity that is greater than low, but land and resource activities take place at similar levels as under baseline conditions High – measurable change in land and resource use capacity, such that land and resource activities cannot take place at similar levels as under baseline conditions
Geographic Extent	The geographic area in which a	PDA – residual effects are restricted to the PDA LAA – residual effects extend into the LAA

Table 7-62: Characterization of residual effects on land and resource use		
Characterization	Description	Quantitative measure or definition of qualitative categories
	residual effect occurs	RAA – residual effects extend into the RAA
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	Not applicable – seasonal aspects are unlikely to affect land and resource use Applicable – seasonal aspects may affect land and resource use
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – the residual effect is restricted to the construction phase (28 months) Medium-term – the residual effect extends to more than the construction phase and through operation phase (75 years) Long-term – the residual effect extends beyond the life of the project (>75 years)
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event Multiple irregular event – occurs at no set schedule Multiple regular event – occurs at regular intervals Continuous – occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed

Table 7-62: Characterization of residual effects on land and resource use		
Characterization	Description	Quantitative measure or definition of qualitative categories
	condition after the project activity ceases	

7.11.1.7 Significance definition

For this assessment, adverse residual environmental effects on land and resource use are considered significant if the proposed use of land for the project widely disrupts, restricts, or degrades present land uses to a point where activities cannot continue at or near baseline levels.

7.11.2 Project interactions with land and resource use

Table 7-63 identifies, for each potential effect, the physical activities that might interact with land and resource use and result in the identified effect.

Table 7-63: Project interactions with land and resource use

Project activity	Effects		
	Change in property	Change in designated lands and recreation	Change in resource use
Transmission Line Construction			
Mobilization and staff presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Right-of-way clearing	✓	✓	✓
Watercourse crossings	✓	✓	✓

Table 7-63: Project interactions with land and resource use

Project activity	Effects		
	Change in property	Change in designated lands and recreation	Change in resource use
Marshalling / fly yards	✓	✓	✓
Transmission tower construction	✓	✓	✓
Implodes	✓	✓	✓
Helicopter use	✓	✓	✓
Clean-up and demobilization	✓	✓	✓
Station Modification			
Mobilization and staff presence	✓	-	-
Vehicle and equipment use	✓	-	-
Marshalling / fly yard (Pointe du Bois Station)	✓	-	-
Realignment of access road (Pointe du Bois Station	✓	-	-
Site preparation (Pointe du Bois Station)	✓	-	-
Station footprint expansion (Pointe du Bois Station)	✓	-	-

Table 7-63: Project interactions with land and resource use

Project activity	Effects		
	Change in property	Change in designated lands and recreation	Change in resource use
Installation of electrical equipment	✓	-	-
Clean-up and demobilization	✓	-	-
Transmission line and station operation and maintenance			
Transmission line and station presence	✓	✓	✓
Vehicle and equipment use	✓	-	-
Inspection patrols	✓	-	-
Vegetation management	-	✓	✓
Decommissioning*	✓	✓	✓
Mobilization and staff presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	✓
Rehabilitation	✓	✓	✓

Table 7-63: Project interactions with land and resource use

Project activity	Effects		
	Change in property	Change in designated lands and recreation	Change in resource use
Clean-up and demobilization	✓	✓	✓

✓ = Potential interaction

– = No interaction

* Includes the decommissioning of the proposed PW75 transmission line and associated infrastructure at the Pointe du Bois and Whiteshell stations, as well as the decommissioning of the existing P3/P4 transmission lines which will be salvaged once the portion of the PW75 transmission line from Whiteshell Station to the Lee River distribution supply centre is constructed.

It is anticipated that the transmission line construction activities will interact with land and resource use. Project construction has the potential to cause disturbance or disruption to residences, create nuisance, damage property, or affect property value.

The creation of a cleared right-of-way could increase access to property and create additional opportunities for land use.

Project construction has the potential to conflict with development potential and disturb designated lands or result in the loss of potential designated area lands.

There is potential to affect productive forestland (through the removal of the AAC) and disturb high valued forest sites or private land forests (woodlots, shelterbelts).

Clearing of the right-of-way, structure assembly and installation, and creation of access can cause disruption effects on mining/aggregate operations and the presence of line can result in interference with mining/aggregate operations.

Project construction can disrupt or intrude on recreational areas/tourism activities and disturb or disrupt local resource use (hunting, trapping, and wild rice harvesting) due to disruption to harvesting success because of sensory disturbance or increased pressure on the resource from the creation of new access.

The following components or activities are not anticipated to interact with land and resource use:

- Mobilization and staff presence during construction will not affect forestry or mining resource use activities because vehicles will primarily use the existing road network to access marshalling/fly yards and the right-of-way and will not affect these resources.
- Station expansion – during construction, station expansion at Pointe du Bois Station will not interact with recreational land use or resource use activities as it will occur within an already developed property adjacent to the existing station.
- Station operations – station operations will not interact with recreational land use or resource use activities, because there will be no further ground disturbance within the PDA (i.e., station footprint).
- Inspection patrols – during operations, inspection patrols occur infrequently and will not interfere with other land uses occurring on or near the right-of-way.
- Vegetation management – during operations, vegetation management will not affect land use activities.

7.11.3 Assessment of residual environmental effects on land and resource use

The overall environmental effects methods are presented in Chapter 5.0 (Environmental assessment methods). This section presents the specific techniques used to carry out the assessment for land and resource use.

7.11.3.1 Analytical assessment techniques

Techniques used to carry out the assessment on land and resource use include spatial analysis to quantify the extent of land and resource use activity in the PDA, LAA and RAA (i.e., residential development, designated lands, timber harvesting, mining, and quarrying, trapping, guiding, hunting, and wild rice harvesting). Consideration of the nature of project effects on land and resource use also relied on factual and anecdotal information from secondary research, provincial data and input gathered through project engagement, an understanding of project interactions and mitigation, information collected from other VCs, and professional judgement.

The assessment of potential project effects on land and resource use activities considered the interactions and relationship between the land and resource use VC and other socio-economic and biophysical VCs. For example, residual effects on wildlife and fish species and habitats are important considerations for commercial harvesting and recreational hunting and fishing activities.

Geographic Information System (GIS) spatial analysis was used to quantify the extent of interaction with land available for land and resource use associated with the project.

Development plans, zoning by-laws and provincial land use policies were reviewed to evaluate development potential and controls within the RAA. Land use designations and zoning districts were identified and summarized from applicable development plans and zoning by-laws. The designations and zones were reviewed for analysis purposes to inform land use development within the RAA. The lower potential lands for development are generally made up of agricultural lands and other general uses. Higher potential lands for development tend to correspond to urban lands (e.g., settlement areas) where small lot development is permitted. Some areas, such as provincial forests and Crown lands, have no municipal zoning (Manitoba Municipal Relations 2023).

Data on provincial Crown productive forest land values were collected and analyzed to assess potential project effects on productive forest land area, merchantable timber, and AAC using forest resource inventory (FRI). Data on high-value forest sites, including enhanced silviculture sites and research and monitoring sites, and private forest land values in the PDA, were collected and analyzed to assess effects on high-value forest sites.

7.11.3.2 Assessment of change in property

The assessment of change in property focuses on three effects:

1) the disturbance and nuisance effects on residences (e.g., noise),
2) change in property value (e.g., damage to property; decrease in property value; visual aesthetics), and
3) conflict with land development potential.

<u>Pathways for change in property</u>

The assessment of environmental effects on property and residences considers the following:

- Project construction and operation and maintenance activities (e.g., construction noise, dust, operational noise emission, creation of access along the right-of-way) could result in disturbance and nuisance effects to property and residences.
- Potential for adversely affecting property value during operation and maintenance (e.g., damage to property; decrease in property value; visual aesthetics).
- Potential to conflict with development potential of land due to project construction and project presence during operation and maintenance.

Disturbance and nuisance effects

Transmission line construction

Potential effects during transmission line construction include noise disturbance, vibration, dust, and damage to property associated with access on the right-of-way, aesthetics, and project-related interference on roads and community infrastructure.

There is some potential for an interaction or effect from noise and vibration due to construction related activities and from creation of new access along the right-of-way.

Potential receptors sensitive to noise, vibration and dust include residences, schools, hospitals, and places of worship. Noise sources within the PDA are anticipated to be typical of construction activities for transmission lines in rural areas and will include some temporary noise disturbances (e.g., movement of equipment, splicing of conductors).

Potential effects include disturbance and annoyance to community residents because of heavy equipment operated nearby. For splicing of conductors, Manitoba Hydro uses implosives to join the conductors together. When used, the sound produced constitutes a short and very loud bang.

Transmission line operation and maintenance

Project operation and maintenance has the potential to affect residents and property owners through noise generation and visual aesthetic changes.

Station modifications

Station modifications are required to facilitate the project at Whiteshell Station and Pointe du Bois Station. Upgrades at both stations include additional equipment to terminate the new line. Station modifications and equipment additions for Whiteshell station will be on existing Manitoba Hydro owned property. At Pointe du Bois Station, expansion is required but will be on previously disturbed land adjacent to the existing station (see Figure 2-6, Chapter 2).

The nearest receptors to the Whiteshell Station are residences located approximately 150 m to the south, while the nearest receptors to the Pointe du Bois Station are cabins at Eagle Nest Landing, located approximately 1.2 km to the northwest. Approximately 0.2 ha of Crown-owned land will be required for the expansion of the Pointe du Bois Station to accommodate the transmission line.

Property value

Transmission line operation and maintenance

The physical presence of transmission line infrastructure could affect the value of residential property near the right-of-way. Factors that can influence property values include change in aesthetics; real or perceived nuisances and health risks; real or perceived change in the use and enjoyment of the property; and distance from the property to the transmission line.

Station modifications

There are no anticipated project-related effects on property located adjacent to the Whiteshell station because the modifications to this station will occur within an existing Manitoba Hydro owned property. At the Pointe du Bois Station, Manitoba Hydro will require approximately 0.2 ha of Crown-owned land for the expansion within a developed area.

Development potential

The development of a cleared right-of-way for a transmission line could reduce development potential due to fragmentation of lots. The transmission line could also result in less interest in wanting to buy a lot or build a residence near the line, thus lowering the development potential of land or land nearby. These changes could influence development in localized areas adjacent to the project or potentially affect the location of future developments within the RAA.

Mitigation

Transmission line routing considered the occurrence of homes within the right-of-way, proximity to homes, number of proposed residential developments potentially affected and the development potential of land. No residences will require relocation. Six rural residential/resort subdivisions are located within the project LAA in the RM of Lac du Bonnet at Lee River. The final preferred route affects 143 lots or parcels of land: 38 along the existing right-of-way; one for the Pointe du Bois station expansion; 107 along the new ROW; and 10 for the stations (i.e., Pointe du Bois switchyard and powerhouse, Lee River DSC, and Whiteshell Station), all with a low potential for development based on their agricultural designations and zoning. Private land ownership along the existing and new rights-of-way and at the station sites encompasses approximately 25 ha. Crown land parcels within the right-of-way PDA total approximately 278 ha and 8,907 ha of Crown land are encompassed within the LAA.

During construction, Manitoba Hydro will provide residents and property owners information and updates on ongoing and planned construction activities. For private land parcels occurring within the PDA that will need to be accessed for right-of-way purposes, Manitoba Hydro will pay lease payments for easements on private property based on the current land values escalated to 150% of fair market value.

The effect of project activities can be reduced through scheduling and logistics planning (e.g., use of implosives during daytime hours during the week). Mitigation measures of potential project effects on property and residential development include the following:

- Construction activities and equipment will be managed to avoid damage and disturbance to adjacent properties, structures, and operations.
- Mud, dust, and vehicle emissions will be managed in a manner that considers the safe and continuous public activities near construction sites where applicable.
- Noisy construction activities where noise and vibration may cause disturbance and stress in built-up areas will be limited to daylight hours.
- A communication protocol will be developed to notify affected parties of blasting operations and conductor splicing. Affected parties may include Manitoba Environment and Climate, RCMP, municipalities, landowners, and resource users.
- Implode compression conductor splicing will be limited on weekends and after normal working hours in residential areas.
- Manitoba Hydro will provide the contractor with a stakeholder list with names, organizations and contact information for the purpose of contacting stakeholders as necessary.
- Construction and operation and maintenance personnel will undertake activities in such a way to avoid affecting neighbouring properties, structures, or operations. In the unlikely event that a landowner incurs damages, they may be eligible for compensation through Manitoba Hydro’s existing compensation policies.

Residual effects

Construction phase

Transmission line routing for the project considered interactions with residences and residential development. The route avoids built-up areas around Lee River and Pinawa Channel area, including rural residential areas occurring to the south and west. The final preferred route right-of-way also avoids existing schools, hospitals, and churches.

While overlap between the proposed new transmission line right-of-way and residential communities was reduced through the routing process, it was not possible to avoid all residential areas. Residences located within 100 m of the PDA have the highest potential to be affected by the transmission line due to proximity to the right-of-way. Three residences are located within 100 m of the PDA. However, none of the residences located within the PDA will need to be relocated.

By adopting mitigation measures, the project will be constructed to limit possible disturbance and annoyance to residents and interference with residential development. Given the low number of residences located near the proposed transmission line right-of-way (i.e., three residences within 100 m of the PDA), in consideration of mitigation measures, the project will have a low to moderate nuisance or disturbance effect on residences or other receptors. Nuisance or disturbance will be short-term over the construction period as equipment is moved along the right-of-way. Therefore, nearby residents will not be affected for prolonged periods.

Existing noise levels in the RAA will be typical of rural and urban settings. Noise in rural areas may be due to traffic, aircraft, harvesting activities, and recreational activities. Noise levels in urban areas may be higher, associated with high traffic, industrial, or commercial areas.

Research analysis of maximum noise level generated during the construction phase of a project from combined construction equipment sources is suggested to be 89 dBA at 15 m from noise sources; implosive sleeve instantaneous discharges are expected to generate 110 dBA during splicing of conductors (Stantec 2015). Analysis for another transmission line project indicated that at 480 m from noise sources within the PDA, construction activities were expected to generate 59 dBA (like indoor conversation), exclusive of implosives used for tower stringing activities (Stantec 2015). Occupied residences located within the LAA will, on occasion, experience noise generated by construction activities. Noise levels during the night will remain unchanged from the existing conditions, because construction activities related to the assembly and installation of towers will only occur during the day.

Using zoning and development plans, the development potential of land was evaluated. Areas with the least development potential (i.e., preferred for transmission line routing) were evaluated as low, while areas with high development potential were evaluated as high. There is one proposed development parcel within the new right-of-way (approximately 1.9 ha). An additional 12 development parcels, totaling approximately 118 ha) are in the LAA. The potential for intensification of private land development within the PDA is primarily low-medium based upon the applicable zoning for land use. Pockets of medium to high development potential are in two areas adjacent to the PDA, including the Lee River/Pinawa Channel area and at Seven Sisters. The project will have a low to moderate effect on overall land development potential depending on location.

Operation and maintenance phase

Project operation and maintenance has the potential to affect residents and property owners through visual aesthetic changes and noise generation. Residual effects are expected to be associated with changes in visual quality on rural residences due to the visibility of the transmission line once it is operational.

Operation and maintenance activities have low potential for affecting property value. Research is inconclusive as to whether the presence or proximity to transmission lines adversely affects real estate values. Effects that have been observed tend to diminish with distance from the transmission line and disappear with time (PRA 2015; Manitoba Hydro 2022). Effects on property value were also varied and depended on the location and visibility of transmission towers to properties, although some studies found no such evidence (PRA 2015; Manitoba Hydro 2022).

Previous research and analysis found mixed results on the effect of transmission lines on property values. Some evidence suggested a negative effect on assessed property values that was small and decreased with distance while other evidence suggested no negative effect on sales prices (PRA 2015; Manitoba Hydro 2022). In consideration of the low number of residences and private land parcels that could be affected, the results of property research and analysis and mitigation options, the project is anticipated to have a low effect on property values. To the extent that any effects occur on property values, they are anticipated to diminish over time and will be spatially limited to the LAA.

Decommissioning phase

During decommissioning activities, no new interactions with property and residences, including those associated with access, are anticipated. Rehabilitation activities will be conducted to achieve desired end land uses for both existing and new right-of-way sections. Decommissioning activities will aim to promote the reestablishment of vegetation (i.e., to promote a natural appearance) and animal habitats along the right-of-way. The right-of-way will be open to the public after final decommissioning.

Summary

With the implementation of mitigation measures, residual effects from the project on property are anticipated to be of low to moderate magnitude given the low number of residences located near the proposed right-of-way. Manitoba Hydro acknowledges that the effect of the transmission line on private land and residences may be considerable from the perspective of the individual landowner. However, the project will affect a very small proportion of the developable land within the RAA and will not substantially alter land development patterns overall. Effects will be short- to medium-term, continuous and occur during the construction and operation and maintenance phases. In addition, the project effects on property values though mixed will be low, small, or non-existent, and if present, are anticipated to decrease with distance from the transmission line and decrease or disappear over time and will vary depending on the location and visibility of transmission towers to properties.

7.11.3.3 Assessment of change in designated lands and recreation

The assessment of change in designated lands and recreation focuses on two potential effects: change in designated lands and change in recreation. Issues and concerns associated with these effects are project disturbances (e.g., due to proximity, noise, or visual intrusion, that may affect ecological integrity or other values related to designated areas; and disruption/intrusion to recreation and tourism activities, sites, and areas).

During transmission line routing, areas of least preference were identified and considered when developing alternative routes. Areas considered for avoidance included existing and proposed ecological reserves, protected areas, legally protected wildlife management areas, and First Nation Reserves and treaty land entitlement lands. Transmission line routing also considered proximity to campgrounds, picnic areas and recreational sites (e.g., golf courses, skiing areas), lodges, campgrounds, resorts, cottages, and recreation sites/trails.

Pathways for change in designated lands and recreation use

The following project interactions that can affect designated lands and recreation use are discussed in this section:

- Project construction activities, including site preparation (e.g., clearing the right-of-way), access to the right-of-way, the establishment of marshalling yards for the storage of materials and equipment and transmission line construction (e.g., foundations, structure assembly, stringing of conductors) could affect designated lands and established recreational activities.

- Potential for adversely affecting established recreational activities and visual aesthetic values (e.g., recreational user's quality of experience due to transmission line operation and visual presence).

Designated lands and recreation

<u>Transmission line construction</u>

Construction (e.g., clearing the right-of-way, access to right-of-way and transmission line construction [towers, conductor stringing]) can disturb and interfere with designated lands and recreation areas within the PDA due to nuisance disturbance (e.g., noise, dust) and damage to property and visual intrusion.

Such disturbances can adversely affect the recreational experience of visitors. Businesses reliant on visitor experience for their revenues, such as guide-outfitters, could also be affected (Joro Consultants 2011; Manitoba Hydro 2014). Positive effects could result from the creation of new access, potentially opening additional areas for recreating. For example, the new access created by the right-of-way could lead to an increase in use of areas by ATVs and snowmobiles (Joro Consultants Inc. 2011).

Land clearing for right-of-way and other project activities can also lead to loss of land available for future protection.

Transmission line construction can diminish or disturb recreational activities in the LAA. Land clearing for right-of-way construction may physically interfere with recreational activities temporarily and may temporarily disrupt recreationalists from accessing preferred areas if there is construction occurring near these areas. Nuisance effects (*e.g.,* project-related noise, dust and reduced visual quality) may affect the experience of recreationalists.

During construction there is potential for increased fishing in waterbodies along the PDA by the project's workforce. This effect could be compounded by the creation of new access roads or trails associated with the project.

Possible effects mechanisms related to navigation are short-term interference while the transmission line is strung across navigable waters. Navigation on permanent non-scheduled waterbody crossings where navigation is possible (*e.g.,* by canoe/kayak) is protected under the *Canadian Navigable Waters Act* (CNWA). This could include such waterbodies as Boggy Creek and Pinawa Channel.

Transmission line operation and maintenance

The application of herbicides as part of right-of-way maintenance can affect parks and recreation areas by affecting vegetation and wildlife.

There is potential for visual quality concerns for recreational venues along the PDA, such as mountain biking trails. Through project engagement, concerns were raised about right-of-way clearing and potential property damage due to increased access along the right-of-way by recreational vehicle users, such as ATVs operating in the area.

Mitigation

Transmission line routing included the consideration of recreation and tourism. No lodges, campgrounds, resorts, or cottages are traversed by the final preferred route. Mitigation measures of potential project effects on designated lands and recreational activities and access include the following:

- Clearing and disturbance will be limited to defined rights-of-way and associated access routes.
- Existing access roads, trails or cut lines will be used to the extent possible. Permission to use existing resource roads will be obtained, where applicable.
- Canadian Standard Association stream crossing clearance guidelines will be adhered to for the construction and operation and maintenance of the transmission lines.
- Where applicable, provisions of the *Canadian Navigable Waters Act* related to the "Minor Works Order" for classes of work related to Aerial Cables – Power and Telecommunication will be adhered to. Manitoba Hydro will submit the location of transmission line crossings for review to Transport Canada to determine the effects on navigation.

Residual effects

Construction phase

Designated lands

The final preferred route crosses parcels of Crown land along the existing and new right-of-way segments as well as near and or at the stations. Crown lands, including agricultural Crown land and provincial forest parcels, are crossed by the final preferred route in the RMs of Alexander, Lac du Bonnet and the LGD of Pinawa.

The final preferred route runs through and adjacent to one designated provincial park – Whiteshell Provincial Park, at and near Pointe du Bois. The PDA encompasses approximately 40.2 ha of the park. Manitoba Hydro has had discussions with the provincial parks branch about routing the transmission line through the park. The parks branch did not express concerns regarding the project.

The Pointe du Bois station expansion will involve 0.2 ha of provincial Crown land, as it is situated within Whiteshell Provincial Park. Manitoba Hydro would seek an easement from the provincial lands branch to accommodate the required expanded station footprint and transmission line right-of-way connection.

The existing right-of-way, within which the P3/P4 transmission lines between Pointe du Bois Station and the Lee River area are located, will need to be widened by approximately 38 m to the south. Manitoba Hydro will seek to obtain an easement from the lands branch for the widened right-of-way.

Other provincial parks near the PDA include Pinawa Dam (heritage park), Pinawa (recreation park), and Whitemouth Falls (recreation park). No existing protected areas, ecological reserves, wildlife management areas, or Areas of Special Interest are traversed by the project.

No existing First Nation Reserve land, trust lands, treaty land entitlement, or private purchase conservation lands are crossed or directly affected by the final preferred route. First Nations still have outstanding entitlement in the province under Manitoba's Treaty Land Entitlement Process, including Brokenhead Ojibway Nation. Sagkeeng Anicinabe First Nation maintains a land claim to the Government of Manitoba to seek redress for impacts from hydro-electric development on the Winnipeg River System on their traditional territory, including a portion if not all the RAA.

Given the low number of designated lands and protected areas affected by the PDA, project disturbance of designated lands and protected areas is predicted to be of low magnitude. No removal of these lands is expected over the construction period.

Recreational use

The final preferred route of the transmission line crosses several designated snowmobile trails, hiking trails (e.g., Pinawa/Natalie Lake, Seven Sisters Falls), and active mountain biking trails (e.g., Granite Groove Out). Several additional snowmobile trails traverse the LAA, and there is one snowmobile shelter/warming hut in the LAA. The TransCanada Trail is not affected by the project. During project engagement, concerns were raised by mountain bikers about the transmission line right-of-way affecting the trail network that has been established and affecting the aesthetics/ views in the area (see Chapter 4). Suggestions were made to relocate the transmission line right-of-way further to the east or have the transmission line routed to the northwest along Belluk Road.

The final preferred route does not traverse campgrounds, resort areas or cottages, or golf courses. Two campgrounds and two recreational sites (one of which is a gun range) are in the LAA. There are two known proposed resort developments, one near Lee River DSC and covering about 0.6 ha, and the other located within the existing right-of-way and covering <0.1 ha. Three additional proposed resort developments, encompassing a total of 208 ha, are in the LAA.

The project crosses Boggy Creek and the Pinawa Channel in the LGD of Pinawa and RM of Lac du Bonnet. Both waterways are non-Scheduled Water bodies under the *Canadian Navigable Waters Act* (CNWA). The CNWA protects the public right of navigation in non-scheduled navigable waters through the regulation of works and obstructions (including transmission lines) that risk interfering with navigation. In addition, there is one designated canoe route on the Winnipeg River within the LAA. No issues related to the navigational use of inland waters by boats or snowmobiles are anticipated.

Manitoba Hydro has developed an access management plan (Section 11.7.5.1.1) to maximize construction vehicle use of existing roads and trails, rather than disturbing new areas. Recreational activities such as hiking, mountain biking, and snowmobiling may be disturbed during construction, but this disruption is expected to be temporary and short-term.

During the construction phase, the presence of workers and equipment in the LAA will generate noise, dust, and a visual presence. This may detract from the recreational experience causing tourists/recreational users to reduce or stop their use of areas near project work sites during periods of construction activity. In addition, access to some areas will be restricted at certain times by the nature of the work undertaken or for safety reasons (e.g., during use of implosives for conductor stringing).

Recreational activities such as fishing, hunting, and trapping may be disturbed during construction, but this disruption is expected to be temporary and short-term.

With the adoption of mitigation measures, the project will be constructed to limit possible disturbance and disruption to recreational uses. In consideration of mitigation measures, the project will have a low disturbance effect on recreational areas and activities. Disturbance or disruption will be temporary and short-term during the construction period.

Modifications to the Whiteshell station will occur within existing Manitoba Hydro-owned property. Therefore, the project will not affect designated lands, protected areas, recreational areas, and activities. There is potential for project-related effects from the Pointe du Bois Station expansion and for the new transmission line connection. The expansion will involve 0.2 ha of provincial Crown land, as it is situated within Whiteshell Provincial Park. To this end, Manitoba Hydro would seek an easement from the provincial lands branch to accommodate the required expanded station footprint and transmission line right-of-way connection.

Operation and maintenance phase

Project operation and maintenance has the potential to affect recreational users through noise generation, disturbance, and changes in visual quality.

Except for Whiteshell Provincial Park, project operation and maintenance will not affect protected areas, provincial parks, or conservation lands. The right-of-way will cross parts of Whiteshell Provincial Park for approximately 6.0 km. Project operation is not expected to interfere with recreational use of Whiteshell Provincial Park due to the limited nature of operational activities. Therefore, project effects on recreation are of low magnitude, restricted to part of the PDA and will be of medium-term duration.

During project operation and maintenance, potential interactions with recreational use/activities will be limited, except during vegetation management and from the presence and visibility of the transmission line. The potential for interaction with recreational use relates to effects on visual quality from the line’s presence and could occur because of vegetation management activities (e.g., herbicide use) undertaken within the right-of-way. Although potentially adverse for some users, some recreational users (e.g., snowmobilers) may have a preference to use cleared transmission line rights-of-way due to the ease of access created. The presence of a transmission line at the mountain biking trail network may affect visual quality, affecting the experience of bikers.

The final preferred route, except for Whiteshell Provincial Park, avoids recreational parks and sites. Portions of two recreational trails associated with Granite Groove Out mountain biking are located along the final preferred route. The Granite Groove Out Trail network is located off Belluk Road, approximately 1.5 km south of the Lee River DSC, near the former Atomic Energy of Canada Limited site. Potential interactions due to project operation and maintenance activities consist of vegetation management along the right-of-way (e.g., herbicide use for weed control) and the physical presence of the transmission line affecting visual quality.

The potential effects of transmission line operation on sport fishing are predicted to be similar or reduced compared to those experienced during the construction phase. Increased access can lead to an increase in fish harvest from waterbodies along the transmission line resulting in greater pressure on the resource. The transmission line follows, or is near, existing linear facilities through more than half of its length and crosses a few water bodies; therefore, access to water bodies will not be substantially increased. Given the small workforce size involved in the operation and maintenance phase, adverse effects on sport fishing from that workforce are not anticipated.

Decommissioning phase

Following the operation phase, the transmission line ROW will be restored to a condition that will provide opportunities for other land uses, such as recreational uses. Decommissioning activities may cause disruption (e.g., through sensory and/or nuisance effects) but may ultimately restore access for recreational activities. The ROW would be open to the public after final decommissioning, and recreational activities, such as, biking and snowmobiling may be permitted.

<u>Summary</u>

With the implementation of mitigation measures, residual effects from the project on designated lands and recreation are anticipated to be of low magnitude and short- to medium term in duration. The project will affect a small portion of designated lands (i.e., 41 ha of Whiteshell Provincial Park) for the transmission line ROW and Pointe du Bois station expansion. Seasonal aspects of timing sensitivity with respect to recreation activities, including recreational canoeing, were considered because recreational activities are affected by timing. There are numerous recreational opportunities available across the landscape and as such the area is likely adaptable to some change in land use. Effects will be short to medium term and continuous and occur during the construction and operation and maintenance phases.

7.11.3.4 Assessment of change in resource use

This section includes an assessment of:

- Forestry
- Mining/aggregates
- Hunting / trapping and wild rice harvesting

Forestry

The assessment of change in forested areas focuses on two potential effects: effects on commercial forests and effects on high value forest sites. Issues and concerns associated with these effects include the removal of productive forestland from the land base (i.e., reduction in potential AAC); and reduction in areas of high value forest sites (e.g., woodlots, shelterbelts, plantations, private forestland).

Pathways for change in forestry

Transmission line construction

The assessment of project effects on productive forestland and high value forest sites is based on the potential loss and removal of timber volumes, and reduction in forested areas due to ROW clearing during project construction. Vegetation management conducted during operation and maintenance is considered in terms of preventing the regrowth of merchantable forests.

Productive forestland

The construction phase of the transmission line, primarily through clearing to establish the ROW, will remove productive forestland within the PDA through the removal of timber volumes currently growing on productive forestlands. Site access to the ROW also has the potential to affect productive forestland and high value forest sites. The reduction in productive forestland from the forest area will affect the determination of sustainable harvest levels.

High value forest Sites

The construction phase of the project will affect woodlot plan areas, private land shelterbelts and private natural forestland within the PDA through a reduction of the timber resources of these high value forest sites. A reduction in woodlot plan areas will affect the various uses and values for which they are managed, such as timber harvesting, non-timber forest products, wildlife, recreation, or aesthetics.

Shelterbelts established on agricultural fields are predominantly for wind and erosion control while shelterbelts around farmsteads and rural residences are for environmental and aesthetic purposes. Private natural forestland areas within the PDA will be affected for the duration of the project. Like woodlot plan areas, private land forest areas may be managed for economic, environmental, and social values.

Station modifications

Modifications to the Whiteshell station will occur within an existing Manitoba Hydro owned property, and therefore there are no anticipated project-related effects on property located adjacent to the station. At the Pointe du Bois Station, Manitoba Hydro will require approximately 0.2 ha of land for the needed station expansion within a developed area.

Operation and maintenance

Previously forested sections within the PDA will remain cleared and unavailable for commercial forestry throughout project operation. The project may increase wildlife viewing opportunities in woodlot plan areas and private land forest areas through increased line of sight and increase the proportion of forest edge, which will favour some wildlife species and increase foraging opportunities within the PDA (Section 7.9). However, the linear opening in the forest cover and the presence of the transmission towers and line may reduce the aesthetic value of woodlots and private land forest area.

Because modifications to Whiteshell station will occur within existing Manitoba Hydro-owned property, there will be no potential project-related effects on resource use during operation and maintenance. The station will continue to operate as it currently does. Similarly, operation and maintenance at the Pointe du Bois station will not affect resource use.

Mitigation

Mitigation measures for potential project effects on productive forestland and high value forest sites include the following:

- Existing access roads, trails or cut lines will be used to the extent possible. Permission to use existing resource roads will be obtained, where applicable.
- All elm (*Ulmus americana*) wood will be burnt, chipped immediately or disposed of at approved municipal disposal sites to prevent the spread of Dutch Elm Disease (Manitoba Government 2013).
- Locations of tree improvement sites, private managed woodlots and shelterbelts will be identified in the Construction Environmental Protection Plan for the line to limit damage from construction activities (e.g., errant construction equipment).
- Farmsteads and rural residences with shelterbelts established for aesthetic and environmental values affected by project activities will be compensated by Manitoba Hydro.

- Manitoba Hydro will re-establish shelterbelts outside of the ROW where possible in such areas affected.
- Clearing and disturbance will be limited to defined rights-of-way and associated access routes.

Manitoba Hydro will support the forest damage appraisal and evaluation that will be undertaken by the Forestry and Peatlands Branch to determine compensation due to Crown for the removal of timber and the effect on high value silviculture investments on productive Crown forestlands prior to project clearing and construction.

Residual effects

Construction phase

Project construction has the potential to disturb or interfere with resource use activities (e.g., forestry) within the PDA. Effects may include loss to productive areas and damage to areas and sites.

The final preferred route avoids enhanced silviculture sites and research and monitoring sites (i.e., permanent sample plots). As such, there are no anticipated adverse effects resulting from the construction or operation and maintenance phases of the project on these types of forested areas.

Productive forestland

Project construction would affect 150 ha of productive forestland in FMU 24. While there are 20 ha of productive forestland in FMU 30, the productive forestland loss is not considered relevant to commercial forestry use. The forestland in FMU 30 is not included in lands managed for commercial timber harvesting. The loss of productive forestland (including high value forest sites) in FMU 24 represents approximately 5,341 m^3 of softwood and 5,531 m^3 of hardwood and affects both productive forestland and high value forest sites. Within FMU 30, the loss of productive forestland (including high value forest sites) represents approximately 1,271 m^3 of softwood and 975 m^3 of hardwood. In addition to the productive forestland evaluated in the PDA, some additional clearing may be required for access development, borrow/deposition areas or bypass routes necessitated by terrain features encountered during ROW clearing. The locations of these areas are currently unknown; however, they would be localized and small in area.

The productive forestland area occupied by the Project represents the portion of the forest loss that is deemed to be commercially viable and relevant to the current sustainable harvest limit for FMU 24. The reduction in productive forestland within

FMU 24 represents 130 m3/ha/year and is a reduction of 3.33% of the softwood AAC. Similarly, the loss of productive forestland related to hardwood represents 204 m^3/ha/year and is a reduction of 4.69% of the hardwood AAC in FMU 24. The project will affect a limited portion of commercial forest area and is not anticipated to constrain annual commercial harvesting within FMU 24. Productive forestland loss related to FMU 30 will not result in an impact to the commercial sector, but does represent a small damage loss for remediation, by removal of 20 ha, or 2,246 m^3 of productive forestland timber resources. Therefore, the effects on the commercial forest are considered low magnitude and are restricted to the PDA. The loss of commercial forest area is a single event that will endure throughout the life of the project due to ROW maintenance. This loss of commercial forest area (i.e., standing timber) will have a relatively small effect on productive forestland, for which compensation would be provided as mitigation.

Given that the project will result in a reduction in AAC of 3.33% for softwood and 4.69% for hardwood within FMU 24, the effect on the commercial forestry is of low magnitude. The reduction in AAC will be a single event and as the ROW will remain clear and will endure for the duration of the project. The reduction of AAC levels will have a small effect on productive forestland, as compensation is provided for mitigation.

<u>High value forest sites</u>

The high value forest sites assessed consist of enhanced silviculture sites, research and monitoring sites and private forestland values of woodlot plans, shelterbelts, and private land natural forest areas.

The construction of the project will not affect enhanced silviculture sites, or research and monitoring sites (i.e., permanent sample plots) as none are located within the PDA.

Right-of-way clearing will reduce one woodlot plan area in NE19-14-2E and SE19-14-2E along the ROW on the west side of PR 520 in the LGD of Pinawa by 7.2 ha total. The effect on woodlot plan areas will be of low magnitude in the PDA. The reduction in woodlot plan areas will be a single event and will endure for the life of the Project. The change in value and quality of affected woodlots represents a small area and is of moderate resilience. Some woodlot management practices can continue through operation and maintenance.

Project construction will affect 25 ha within identified private land forest areas within the PDA. There will be no effect on private land forest areas at the RAA or LAA level but may be more prominent at the individual landowner level within the PDA. The decline in private land forest areas is of low magnitude in the PDA. The reduction in private land forest areas will be a single event and, as the ROW will remain clear, will endure for the duration of the project. The removal of private land forest areas is small and limited to the PDA.

The construction phase will affect 13 ha of the 37,346 ha of privately owned productive forestland in the RAA. The project will result in a decline of 0.03% of private productive forestland within the RAA, or 4.0% of total land within the PDA. As the project will result in a limited decline of the private productive forestland, the effect will be of low magnitude and limited to the PDA. The decline in private and municipal productive forestland will occur as a single event at the time of construction. The loss is small, and the overall land use of the remaining forested areas would be maintained.

The construction phase will affect 1 ha of shelterbelt area found within the PDA, representing 0.3% of the PDA. As the project will result in the decline of 0.3% of shelterbelt land in the PDA, the effect will be of low magnitude and limited to the PDA. The decline in shelterbelt area will occur as a single event at the time of construction. The loss is small, and the overall land use of the remaining forested areas would be maintained.

Operation and maintenance phase

Project operation and maintenance activities are not expected to affect commercial forestry use as the trees would have been removed from the ROW during construction. As the ROW clearing will be maintained throughout the life of the project forestry uses will be negligible.

Decommissioning phase

Decommissioning will allow for ROW and site rehabilitation and reforestation. Decommissioning and the resultant reforestation will have a low magnitude effect on productive forest land and AAC levels within the PDA related to FMU 24. The project effects are considered reversible because the compensation that will be provided by Manitoba Hydro per the Forest Damage Appraisal and Valuation Policy will provide funds for reforestation activities to take place once the project is decommissioned.

Summary

With the implementation of mitigation measures, including compensation, residual effects from the project are anticipated to be of low magnitude. A 150-ha reduction of commercial forest area within FMU 24, resulting in the reduction of the AAC by

3.33% for softwood and 4.69% for hardwood within FMU 24 are both small in relation to the total commercial forest area and total available AAC. The reduction in woodlot plan area consists of 7.2 ha within the PDA. Reduction of private productive forestland corresponds to only 0.03% of the RAA's total private productive forestland, or 4% of the overall PDA. A loss of 1% for shelterbelt land is also anticipated, in addition, to a 25-ha decline in private land areas.

The loss of commercial forest area and reduction of AAC levels will have a small effect on productive forestland. The reduction in area related to the change in value and quality of affected woodlots represents a small area. The removal of private land areas (i.e., shelterbelts) is also small but may be of higher importance at the individual landowner level. The loss of private and municipal productive forestland is small, and the overall land use functionality of the remaining forested areas is maintained. Effects will be long-term due to area or site loss, limited to a single event and occur during the construction and operation and maintenance phases.

Mining/aggregates

The assessment of change in mining and aggregates focuses on change in mining/aggregate extraction that could result from the project.

Transmission line routing considered and reduced potential effects on mineral interests to the extent possible.

Pathways for change in mining/aggregates

Potential pathways for affecting mining/aggregates operations include area lost due to construction of ROWs and marshalling yards, disturbance, and interference with resource extraction activities due to ROW proximity and issues related to increased accessibility along the ROW during operation and maintenance.

Transmission line construction

There is potential for directly affecting mining interests through disruption and disturbance of the resource, and area loss during project construction.

The project could reduce the development potential of mineral areas and aggregate deposits. Project access along the ROW could also affect quarrying operation due to temporary disturbance activities.

Transmission line operation and maintenance

During the operation and maintenance phase, there is potential for interference with current or future planned facility operations and the ability to develop mineral areas (e.g., quarry or aggregate deposits) for future commercial extraction due to transmission line presence. Operational limitations for an operator in relation to transmission line proximity could cause a reduction in the amount of material excavated due to protection buffers (e.g., setback distance from transmission towers) implemented by Manitoba Hydro to protect its infrastructure.

Increased access along cleared ROW or other access points could result in increased mineral development activity. However, other factors would contribute to new commercial mineral development, including the nature of the resource itself, market conditions and regulatory controls. An increase in access opportunities is unlikely to affect mineral development as the area of new access is small on a regional scale.

Mitigation

Mitigation measures of potential project effects on mining and aggregates include the following:

- Manitoba Hydro will contact local resource users to the extent feasible and practical prior to project start-up.
- Existing access road, roads, trails or cut lines will be used to the extent possible.
- Permission to use existing resource roads will be obtained, where applicable.
- Clearing and disturbance will be limited to defined rights-of-way and associated access routes.
- Manitoba Hydro will work with mining/quarry operators to determine if blasting mats or other mitigation measures are required during quarry operations within or adjacent to the ROW.

Residual effects

Construction phase

Project construction has the potential to disturb or interfere with mining activities in the LAA by disturbing areas and potentially disrupting current/future operations/ extraction activities. Transmission line routing considered potential effects on mineral interests.

There is one mineral lease (21 ha) encompassed within the PDA south of the Lee River DSC and one quarry withdrawal area (53 ha) along the existing ROW west of Pointe du Bois. The project LAA encompasses one quarry site and nine sand and gravel pits and one mineral lease (411 ha) along, and in the vicinity of, PR 520 through the RM of Lac du Bonnet and LGD of Pinawa. There are two quarry withdrawal areas in the PDA (i.e., 66 ha) and two quarry withdrawal areas (4.067 ha) in the LAA, one encompassing the existing ROW west of Pointe du Bois, and the other in the RM of Lac du Bonnet and LGD of Pinawa, west of PR 520 and the PDA ROW. There are no mining claims within the PDA or LAA.

Mining activities and dispositions in the RAA correspond to a total area of approximately 85,522 ha. The project footprint's (i.e., PDA) overlap with the mining activities and dispositions represents approximately 0.4% of the total area of actual or potential mining activities in the RAA.

The extent to which the project could affect existing operations relates to direct effects on mining interests through disruption and disturbance to the resource and area loss during project construction and potential for interference with current or future planned operations and the ability to develop mineral areas for future commercial extraction from transmission line presence. Given the low number of mineral dispositions and aggregate deposits affected by the final preferred route, the effect is anticipated to be low in magnitude for the PDA. The area affected by the clearing of the ROW and construction activities will be continuous for the period of construction and short term in duration. The creation of the ROW and any access trails may in fact have a beneficial effect for some related activities, such as mineral exploration, by providing additional access into some areas. Access to the mining areas/aggregate deposits by those not associated with project construction will be limited.

Operation and maintenance phase

Except at tower locations and subject to clearance or set-back restrictions, mining resource use activities will be able to occur adjacent or near the PDA throughout project operation. Project-related changes in access would likewise be maintained throughout the project life.

Decommissioning phase

Decommissioning will occur after the end of the project life for the transmission line. Most of the PDA will be rehabilitated and the land base at the end of decommissioning activities will be returned to as close to pre-development topography as possible after structures are removed. The ROW will be allowed to revegetate. No further residual effect is anticipated.

Summary

With the implementation of mitigation measures, residual effects from the project on mining/ aggregate extraction are anticipated to be of low magnitude. Project disturbance effects on mining/aggregate extraction represents a small area (approx. 0.4%) of the total area for mining activities within the RAA. The disturbance on, or interference with, mining/ aggregate extraction will have a small effect on potential extraction activities. The area related to affected sites represents a small area overall. Effects will be short- to medium-term, regular/continuous and occur during the construction and operation and maintenance phases (e.g., transmission line presence).

Hunting and trapping and wild rice harvesting

The assessment of change in hunting and trapping focuses on the potential for reduction in trapping and hunting activities (e.g., harvesting success) and damage to equipment (e.g., traps) from increased access, that could result from the project.

Pathways for change in hunting and trapping and wild rice harvesting

Potential project pathways for affecting hunting and trapping and wild rice harvesting include areas lost due to construction of the ROW and marshalling yards, direct disturbance of hunting and trapping activities due to project-related noise and activity related disturbances and reduction in harvesting success due to sensory disturbance from increased access and workers in the area affecting the presence of target species. This also includes effects of increased access in the areas of wild rice production. The new ROW may benefit hunters and trappers and wild rice harvesters by increasing access, particularly in areas that were previously remote and difficult to access.

Transmission line construction

There is potential for hunting and trapping activities to be adversely affected by temporary nuisances (e.g., noise, traffic) and activity-related sensory disturbances during project clearing and construction that could temporarily displace some wildlife (see Section 7.9). This could result in a reduction of hunting and trapping success rates through disruption to animals and furbearers. During construction activities, terrestrial furbearers may leave an area because of sensory and habitat disturbance which can result in a temporary decline in trapping productivity (Eagle Vision Resources and Joro Consultants Inc. 2011). However, animals normally return to an area after construction is completed and disturbances have ceased (Joro Consultants Inc. 2011). Trappers will benefit by being able to use the new ROWs for travelling and setting traps thus accessing previously unexploited areas and wildlife (Joro Consultants Inc. 2011). However, the project could also create undesired access to resources, which could affect the resource or experiences of trappers who use a particular area.

Wild rice harvesting areas may be temporarily disturbed by construction activities. The Project may also result in increased access to wild rice harvesting areas. Access will be addressed through the development of an Access Management Plan.

The presence of construction workers could increase the competition for species harvested by local hunters and trappers. The creation of new access trails for line construction and operation and maintenance can result in an increase in hunter access. An increase in access may be viewed as a benefit to some hunters, while increased access may deter others who prefer more of an undisturbed natural setting. The presence of the ROW may also provide increased hunting opportunities in designated hunting areas, resulting in a benefit to hunting activity. Additional access opportunities could result in negative local effects on some wildlife populations in previously underused areas that may lead to overharvesting in a particular area (Manitoba Hydro 2010; Joro Consultants Inc. 2011). Increased access along the ROW during construction could lead to incidents of vandalism with respect to hunting stations and trapping equipment.

Transmission line operation and maintenance

The presence of the project ROW can result in undesired access to resources during the operation and maintenance phase potentially resulting in an increase in hunting pressure. Pressure on wild rice harvesting has the potential to increase due to the creation of additional access for others that previously would not have accessed the areas. However, the area traversed by the ROW is already fragmented to some extent by various sources of access. The existence of the ROW and the resultant potential for increased access could also lead to incidents of vandalism with respect to hunting stations and trapping equipment. Potential effects from project presence can also affect a resource user's quality of experience on the landscape. An Access Management Plan will be developed to mitigate the potential for increased access pressure on wild rice harvesting areas.

Mitigation

Mitigation measures of potential project effects on hunting and trapping include the following:

- Manitoba Hydro will contact lodge operators, outfitters, and recreational resource user associations to the extent feasible and practical prior to project start-up.

- Hunting and harvesting of wildlife, or possession of firearms by project staff will not be permitted while working on project sites.
- Existing access road and trails will be used to the extent possible.
- Clearing and disturbance will be limited to defined rights-of-way and associated access routes.
- Construction activities will be conducted to prevent any unnecessary damage outside of the required ROWs and other disturbed or developed areas.
- Access will be managed through the development of Access Management Plan.

Residual effects

Construction phase

Project clearing and construction will span several hunting seasons for deer, moose, wolf, coyote, grouse, gray partridge, and migratory birds, and eight seasons for black bear and wild turkey. The project's construction phase will also span several trapping seasons in RTLs #21 (Lac du Bonnet), RTLs # 23 and #24 (Whiteshell) and Open Trapping Zone 4 for most furbearer species, excluding black bear.

With respect to the final preferred route, the concern of increased access for hunting and trapping is not anticipated to be an issue in southern Manitoba due to the prevalence of existing access routes. Big game hunting areas crossed by the final preferred route include GHAs 26, 34, and 36. The project crosses a game bird hunting zone, GBHZ 4, which stretches the entire portion of southern Manitoba from the border with Saskatchewan to the border with Ontario. There are no operating lodges located in immediate proximity to the final preferred route.

Project clearing and construction activities (e.g., ROW clearing, access, tower installation, conductor stringing) may result in temporary sensory disturbance (e.g., construction noise) and nuisance effects (e.g., traffic) displacing big game and reducing the hunting success rates in proximity to the ROW. The creation of undesired access to resources could also affect the experience qualities for hunters using a particular area.

The presence of a construction workforce could lead to increased competition for wildlife resources that are of interest to hunters and trappers in the LAA. However, workers will be prohibited from bringing hunting gear to the sites to limit competition for wildlife species of value to resource users. The residual effect during construction in the PDA is expected to be of low magnitude, continuous and short-term in duration.

The project will pass through parts of the LAA that are used by established commercial outfitting operations. No lodges or camps are located within the LAA, but several are in the RAA. There may be potential for disturbance of bears during construction activities if clearing or construction occurred during the hunting season. The effects on outfitting operations during construction in the PDA will be of low magnitude, continuous and short-term in duration.

There is one trapper's cabin within the LAA, approximately 553 m north of the existing transmission line ROW at Rice Lake. The final preferred route crosses three RTLs (#21 [Lac du Bonnet] and #23 and #24 [Whiteshell] and Open Trapping Area Zone 4 in eastern Manitoba. Construction activities may temporarily displace furbearers from areas in proximity to the ROW due to sensory disturbance (e.g., construction noise) and disrupt trapping activity. During construction, potential disturbance effects on trapping activity in the LAA would include changes to the availability of wildlife resources of interest to trappers due to wildlife disturbance and mortality risk. The results of a furbearer trapping pilot study undertaken as part of the Wuskwatim Trappers Monitoring Program has suggested that considerably more furbearers are caught closer to a transmission line than in traps set further away (Manitoba Hydro 2011). These findings conflict with literature that suggests furbearers generally avoid sites of disturbance (e.g., presence of transmission line) (Eagle Vision Resources and Joro Consultants Inc. 2011). Furthermore, positive effects can occur for a group when its access to the resource or trapping area is improved. Anticipated effects in any one area are low based on the overall affected area within the LAA compared to the total area available for open trapping, limited to the PDA and short-term in duration.

The Project will pass through the LAA where there are two wild rice production areas with permits. The first is at Rice Lake west of Pointe du Bois, and the second is located along the Pinawa Channel east of PR 520 in the LGD of Pinawa. Neither of these wild rice production areas are anticipated within the PDA. The potential for disruption or disturbance to wild rice production during construction is negligible in magnitude, continuous and short-term in duration.

Operation and maintenance phase

Except for periods where routine maintenance and vegetation management occurs in the PDA, resource harvesting (e.g., hunting, trapping, wild rice harvesting) will be able to continue uninterrupted in or near the project ROW throughout its operating life. These disturbances will only occur irregularly, but at least on annual basis, if required, over the operation and maintenance life of the project. They will be low magnitude and medium-term in duration as the presence of the transmission line will be continuous over the life of the project.

Decommissioning phase

During project decommissioning, no new residual effects on areas or access for hunting, outfitting, trapping, and wild rice harvesting are expected. Decommissioning activities will require a small workforce, less than during construction, resulting in less pressure on resources. Project decommissioning can result in disturbance effects on hunters, outfitters, and trappers related to the availability of big game and furbearers of interest in the LAA, and sensory disturbance to land and resource users, including wild rice harvesters.

Summary

With the implementation of mitigation measures, residual effects of the project on hunting, trapping, and outfitting are anticipated to be of low magnitude and negligible for wild rice harvesting. Physical project disturbance effects on hunting (i.e., GHAs), registered traplines (i.e., RTLs) and open trapping (i.e., OTAs) represent approximately <0.1% of the total area for hunting and trapping activities in the RAA. No physical project disturbance effects on wild rice harvesting areas are anticipated. The related change in the affected land base represents a small area. As there are numerous opportunities to participate in hunting and trapping activities throughout the RAA, the area is likely more resilient to change. Effects will be short- to medium-term, regular/continuous and occur during the construction and operation and maintenance phases.

7.11.4 Summary of residual effects

A summary of residual environmental effects that are likely to occur on land and resource use, because of the project, is provided in Table 7-64.

Table 7-64: Project residual effects on land and resource use

Residual Effects Characterization							
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in Property							
C, O, D	A	L-M	PDA/ LAA	NS	ST-MT	C	R
Change in Designated Lands and Recreation							
C, O, D	A	L	PDA	MS	ST-MT	C	R
Change in Resource Use							
Productive Forested Areas							
C, D	A	L	PDA	NS	LT	S	R
High Value Forest Sites							
C, D	A	L	PDA	NS	LT	S	R
Mining/Aggregates							
C, O, D	A	L	PDA	NS	ST-MT	R/C	R
Hunting and Trapping and Wild Rice Harvesting							
C, O, D	A	N-L	PDA	NS	ST-MT	R/C	R

KEY

Project Phase:	Geographic Extent:	Frequency:
C: Construction	PDA: Project Development Area	S: Single event
O: Operation	LAA: Local Assessment Area	

Table 7-64: Project residual effects on land and resource use

Residual Effects Characterization							
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

D: Decommissioning

Direction:

P: Positive

A: Adverse

N: Neutral

Magnitude:

N: Negligible

L: Low

M: Moderate

H: High

RAA: Regional Assessment Area

Timing

NS: No sensitivity

MS: Moderate sensitivity

HS: High sensitivity

Duration:

ST: Short-term

MT: Medium-term

LT: Long-term

IR: Irregular event

R: Regular event

C: Continuous

Reversibility:

R: Reversible

I: Irreversible

N/A: Not applicable

7.11.5 Assessment of cumulative effects on land and resource use

Since the 1850s, southern Manitoba has undergone substantive agricultural, recreational, and industrial development. Today, the area contains a broad range of land use types including agricultural, residential, recreational, and industrial. Infrastructure, including existing rail lines, provincial trunk highways, provincial roads, pipelines, and various transmission lines (66-kV, 115-kV, 230-kV) traverse the RAA. Other developments like generating stations on the Winnipeg River (e.g., Pointe du Bois, Slave Falls, Seven Sisters), water treatment facilities, wastewater treatment facilities, and research facilities (e.g., Whiteshell Laboratories), are also found within the RAA. The project increases transmission line interaction with land and resource use.

7.11.5.1 Project residual effects likely to interact cumulatively

Table 7-65 displays the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project.

Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-65: Potential cumulative environmental effects on land and resource use

Other projects and physical activities with potential for cumulative environmental effects	Potential Cumulative Environmental Effects		
	Change to property	Change to designated lands and recreation	Change to resource use
Existing/Ongoing Projects and Activities			
Agriculture (crop and livestock production)	✓	✓	✓
Domestic Resource Use (hunting, trapping, fishing)	-	✓	✓
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	✓	✓
Infrastructure (existing rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities	✓	✓	✓
Generating Stations (Pointe du Bois, Slave Falls, Seven Sisters)	✓	✓	✓
Transmission Lines			
P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines	✓	✓	✓
R1 and R2 (Pointe du Bois to Slave Falls) 115-kV transmission lines	✓	✓	✓
S2 (Slave Falls to Stafford) 115-kV transmission line	✓	✓	✓

Table 7-65: Potential cumulative environmental effects on land and resource use

Other projects and physical activities with potential for cumulative environmental effects	Potential Cumulative Environmental Effects		
	Change to property	Change to designated lands and recreation	Change to resource use
SK1 (Seven Sisters to Star Lake) 115-kV transmission line	✓	✓	✓
SG12 (Great Falls to Seven Sisters) 115-kV transmission line	✓	✓	✓
SR3 (Seven Sisters to McArthur Falls) 115-kV transmission line	✓	✓	✓
SW1, SW2, SW3 and SW4 (Seven Sisters to Whiteshell) 115-kV transmission lines	✓	✓	✓
ST5 and ST6 (Seven Sisters to Transcona) 115-kV transmission lines	✓	✓	✓
K21W and K22W (Whiteshell to Kenora) 230-kV transmission line	✓	✓	✓
Nuclear Power (Whiteshell Laboratories)	✓	✓	✓
Future Projects and Activities			
Slave Falls Generating Station (Slave Falls 7-Bay Sluiceway Life Extension Project)	-	✓	✓
Nuclear Power (Whiteshell Laboratories) - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	✓	-	-

Table 7-65: Potential cumulative environmental effects on land and resource use

Other projects and physical activities with potential for cumulative environmental effects	Potential Cumulative Environmental Effects		
	Change to property	Change to designated lands and recreation	Change to resource use
✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.			
– = Interactions between the residual effects of other projects and those of the project residual effects are not expected.			

Effects identified in Table 7-65 that are unlikely to interact cumulatively with residual effects of other projects and physical activities (no check mark) and are not discussed further. The assessment of the cumulative effects that are likely to result from the project in combination with other projects and physical activities are discussed in subsequent sections.

7.11.5.2 Cumulative effects assessment for cumulative change in property

Future projects in the RAA (see Table 7-65) have the potential to interact cumulatively with the project if their plans include the development of facilities in areas of existing residences, residential development, including effects on property value. Cumulative effects arising from future activities have similar effects pathways as effects arising from the project, including disturbance and nuisance effects on residences (i.e., noise, dust), residential development (i.e., proximity) and change in property (i.e., presence).

The nature and extent of cumulative effects will likely differ depending on the project. For example, an underground nuclear power research facility has little visible infrastructure outside of its immediate footprint and thus could be expected to have less effects on land and resource use values related to visual quality than a linear development such as transmission lines. Transmission line decommissioning can cause both negative and positive effects. Decommissioning activities may result in similar nuisance related effects as those identified during the project. Once decommissioning is complete, accessibility to the ROW may be improved with the removal of infrastructure. Development within another existing generating station site could have similar disturbance effects as those identified during the project (i.e., substation at a generating station site).

Mitigation for cumulative effects for cumulative change in property

Implementation of the mitigation measures described in Section 7.11.3.2 will reduce the project's contribution to cumulative effects on residences and property. Proponents of other projects may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effects

Less than a quarter of the RAA (approximately 12%) has been disturbed from agricultural land use, industrial development (i.e., sand and gravel, forest cut blocks/forest fire), residential development, and linear features (i.e., roads, trails, rail lines).

Future projects proposed within the RAA that spatially and temporally overlap with the project (Table 7-65) can contribute to cumulative nuisance effects. In areas of overlap, cumulative nuisance effects may extend for a longer duration or be of higher magnitude than in the project case alone.

Construction of the Pinawa Demonstration Reactor project is anticipated to start in 2026 and overlap temporally with the tail end of the construction of the project. While the construction periods of projects identified in Table 7-65 overlap with the project, there is low likelihood that synergistic cumulative effects will occur because construction activity for linear developments like transmission lines generally occupies a particular area only for a relatively short period of time. However, there is a moderate potential for non-synergistic cumulative effects occurring over a broader area.

Potential effects associated with a change in property (e.g., property value) are primarily related to the operation and maintenance phase from the presence of infrastructure. Based on literature review, Manitoba Hydro's ongoing monitoring of property sales along an existing transmission line ROW and the PRA study (2015, unpublished draft), effects on property value are anticipated to be low magnitude because of the project in combination with other projects. Cumulative effects on property value are not anticipated for the Whiteshell Laboratories Demonstration Reactor project, because that project will take place within an already developed and disturbed area where an existing non-operational nuclear research facility exists.

A summary of the characterization of the cumulative effects on change in property/development potential, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7-66. With the addition of project effects and those of other projects, cumulative effects from the alteration of the associated footprints for these infrastructure projects would be over the medium term and low-moderate in magnitude. The project's contribution to cumulative environmental effects is not anticipated to result in a change that widely disrupts continued residential land and property use or potential development overall within the RAA.

7.11.5.3 Cumulative effects assessment for cumulative change in designated lands and recreation

Future projects in the RAA (Table 7-65) have the potential to interact cumulatively with the project where their plans include the development of facilities in or adjacent to designated lands and recreational areas. Cumulative effects arising from future activities have similar effects mechanisms as effects arising from the project, including disturbance/conflict with designated lands and disturbance with recreational opportunities, activities, and access.

The nature and extent of cumulative effects will likely differ depending on the project. For example, an underground nuclear power research facility has little visible infrastructure outside of its immediate footprint and thus could be expected to have fewer effects on designated land and recreation than linear transmission lines. Transmission line decommissioning can cause both negative and positive effects. Decommissioning activities may result in similar nuisance related effects as those identified during the project. Once decommissioning is complete, accessibility to the ROW may be improved with the removal of infrastructure and could facilitate recreational use (e.g., snowmobiling).

Mitigation for cumulative effects for cumulative change in designated lands and recreation

Implementation of the mitigation measures described in Section 7.11.3.3 will reduce the effects on designated lands and recreation. Proponents of other projects may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effects

Portions of the land in the RAA have already been disturbed due to agricultural land use and industrial and residential development.

Approximately 475,293 ha of the RAA is occupied by Crown land, agro-Crown lands, provincial parks, and provincial forests. There is potential for designated lands to be affected if the effects of the project act cumulatively with those of other projects that overlap spatially within the RAA. Within the RAA, the disturbance of designated lands from the PDA will result in conflicts with 40 ha, or approximately <0.01% of the area in the RAA.

There is potential for the effects of the project to act cumulatively with the effects of other projects. The future projects proposed within the RAA (Table 7-65) have the potential to cause disruption and disturbance effects during the project construction or decommissioning. While the construction/reclamation periods of other identified projects overlap with the project, the spatial disruption is additive as opposed to being synergistic. As the likelihood of two similar projects being built/dismantled near each other at the same time is limited, there is limited potential for disturbance-related synergistic effects.

It is anticipated that there will be some cumulative overlap from the project with other projects (e.g., Slave Falls Generating Station [sluicebay life extension] and P3/P4 66 kV transmission line decommissioning projects). The resultant disturbance is limited to an area encompassing an existing station site and existing ROW). There is limited potential in the RAA overall for cumulative effects on recreation. Cumulative effects on designated lands and recreation are not anticipated for the Whiteshell Laboratories Demonstration Reactor project, because the project will take place within an already developed and disturbed area where an existing non-operational nuclear research facility exists.

A summary of the characterization of the cumulative effects on change in designated lands and recreation, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7-66. The cumulative effects from the alteration of the associated footprints for the cumulative infrastructure projects would therefore be of low-moderate in magnitude and medium term.

The project's contribution to cumulative environmental effects is not anticipated to result in a change that widely disrupts continued land and resource use. Similarly, the project's cumulative effects contribution is not expected to degrade present land use activities within the RAA that are not mitigated.

7.11.5.4 Cumulative effects assessment for cumulative change in resource use

Land clearing will result in some productive forestlands being removed from the available land base of FMU 24 and FMU 30 for the duration of the project. However, this effect is limited to the PDA, and commercial forestry impacts are limited to the

PDA in FMU 24. The total volume of timber to be removed from productive forestland in FMU 24 and FMU 30 is estimated to be 6,612 m3 of softwood and 6,506 m3 of hardwood. The project will reduce the productive commercial forest capacity within FMU 24 by 3.33% of the softwood AAC and 4.69% of the hardwood AAC. Manitoba Hydro will reimburse the Crown through the application of the FDAV Guideline (Manitoba Conservation 2002) to mitigate the project effect on Crown timber and silvicultural investments. Upon decommissioning of the project, the PDA area can be returned to the original status, ownership and reincorporated into the available land base for the determination of the AAC within FMU 24, and non-commercial use in FMU 30.

Future resource use projects in the RAA (Table 7-65) have the potential to interact cumulatively with the project if plans include the development of facilities in high value forest sites, mining areas, and hunting and trapping areas.

Cumulative effects arising from future activities have similar effects mechanisms as effects arising from the project, including disturbance or interference effects on mining activities, damage to areas and sites, as well as access. Projects that can affect mining and aggregates include linear developments that involve land reclamation. Some current and future projects occur in areas that are currently not used for mining or aggregate extraction. Projects near developed areas will likely not affect mining and aggregate extraction as these activities often occur further away from developments. Other developments may occur in areas that are previously disturbed, and which provide little or no mineral/aggregate value.

Cumulative effects arising from future activities have similar effects mechanisms as effects arising from the project, including disturbance or interference effects on hunting and trapping due to noise disturbance, damage to areas and sites, visual aesthetics, as well as change in access and loss of wildlife habitat. Projects that can affect hunting and trapping include linear developments that involve land reclamation (decommissioning), developments that may increase or reroute traffic and developments that may result in direct mortality to wildlife (e.g., from bird collisions). Projects near developed areas will likely not affect hunting and trapping as these activities often occur further away from developments. Other developments may occur in areas that are previously disturbed, and which provide little or no wildlife habitat (e.g., atomic research facility, generating station).

Mitigation for cumulative effects for cumulative change in resource use

Implementation of the mitigation measures described in Section 7.11.3.4 will reduce the effects on high value forest sites, mining/aggregates, and hunting and trapping. As well, mitigation designed to reduce the effects on wildlife will also benefit hunting and trapping (Section 7.9). Proponents of other projects may adopt other mitigation measures to mitigate their own project effects.

Residual cumulative effects

Forestry

As was discussed in Section 7.11.3.4, the project overlaps with high value forest sites consisting of woodlot plans, shelterbelts, and private land natural forest areas. Approximately 37,346 ha of the RAA is occupied by private productive forestlands (excluding woodlots and shelterbelts). It is not anticipated that the effects of the project on these high value forest sites could act cumulatively with the effects of other future projects in the RAA. Within the RAA, the disturbance of woodlots, and private land forest areas from the project (PDA) will result in conflicts with 32 ha, or approximately 0.08% of the area of these sites in the RAA.

The future projects proposed within the RAA (Table 7-65) do not have the potential to remove productive forestland from the land base (i.e., reduction in potential AAC) and reduce areas of high value forest sites (e.g., woodlots, shelterbelts, plantations, private forestland) during the construction phase. As such, there is no potential for disruption-related cumulative effects.

Mining/aggregates

Portions of the land in the RAA have already been disturbed due to agricultural, industrial, and residential land use and development. The project does not substantially overlap with mining activities. Mining activities in the RAA correspond to an area totaling approximately 85,522 ha. The project overlap (329 ha) represents 0.4% of the total area of mining activities in the RAA.

The future projects proposed within the RAA (Table 7-65) have the potential to cause disruption and disturbance effects during the construction/decommissioning phase. While the construction/decommissioning periods of other identified projects overlap with the project, there is low likelihood of synergistic cumulative effects occurring. The spatial disruption is more additive given that the likelihood of two projects being built/dismantled near each other at the same time is limited, thereby resulting in limited potential for disturbance or interference-related synergistic effects.

There is minimal spatial overlap between the project and mineral dispositions (i.e., private quarry permit, quarry withdrawals, aggregate deposits) in the RAA. Cumulative effects on resource use are not anticipated for the Whiteshell Laboratories Demonstration Reactor project, because the project will take place within an already developed and disturbed area where an existing non-operational nuclear research facility exists.

A summary of the characterization of the cumulative effects on change in mining activities, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7-65. With the addition of project effects and those of other projects, cumulative effects from the alteration of the associated footprints for these infrastructure projects would be medium term and low in magnitude. The project's contribution to cumulative environmental effects is not anticipated to result in a change that widely disrupts continued land use or reduces the quality of sites or degrades present land use activities within the RAA that is not mitigated.

Hunting and trapping and wild rice harvesting

Game Hunting Areas (25A, 26, 34, 34B, 34C, 36) and RTLs (Lac du Bonnet, Whiteshell) and Open Trapping Area (OTA) Zone 4 encompass the entire RAA, totaling an area of approximately 635,801 ha. Of this total, the project intersects approximately 329 ha, or <0.1% of the game hunting areas and registered traplines and open trapping zone area. There is no direct physical disturbance or overlap with wild rice harvesting areas, therefore there is no cumulative effect.

The future projects proposed within the RAA (Table 7-65) have the potential to cause disruption and disturbance effects during the construction/decommissioning phase. While the construction periods of other identified future projects overlap with the project, there is low likelihood of synergistic cumulative effects occurring. The spatial disruption is more additive given that the likelihood of two future projects being built/dismantled near each other at the same time is limited, thereby resulting in limited potential for disturbance-related synergistic effects.

It is anticipated that there could be some cumulative overlap with the addition of project effects and those of other future projects like the Slave Falls Generating Station's Slave Falls 7-bay sluiceway life extension project. There is minimal spatial overlap between the projects and GHAs 26, 34 and 36 in the RM of Lac du Bonnet and Whiteshell Provincial Park. Similarly, there is limited spatial overlap between the projects and RTLs #21, #23, and #24 (RM of Lac du Bonnet and Whiteshell Provincial Park) and OTA 4 (RM of Lac du Bonnet). Cumulative effects on resource use are not anticipated for the Whiteshell Laboratories Demonstration Reactor project, as the project is expected to take place within an already developed and disturbed area where an existing non-operational nuclear research facility exists. There are no future projects that have the potential to overlap cumulatively with wild rice harvesting areas.

A summary of the characterization of the cumulative effects on change in hunting and trapping areas, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7-66. With the addition of project effects and those of other projects, cumulative effects from the alteration of the associated footprints for these infrastructure projects would be medium term and low in magnitude. The project's contribution to cumulative environmental effects is not anticipated to measurably result in a change that widely disrupts continued land use or reduces the quality of sites or degrades present land use activities within the RAA that is not mitigated.

7.11.5.5 Summary of cumulative effects

Table 7-66 summarizes cumulative environmental effects on land and resource use.

While the project will have a cumulative environmental effect, with the implementation of mitigation measures, cumulative effects are anticipated to be of low-moderate magnitude. Cumulative effects are anticipated to occur throughout the RAA. Cumulative effects will be medium-term to long-term, occurring on a continuous basis or as a single event.

Table 7-66: Residual cumulative effects

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect of change in property							
Residual cumulative effect	A	L/M	RAA	NS	MT	C	R
Contribution from the project to the residual cumulative effect	The project will result in a conflict or disruption to property for the medium-term. These effects will be limited to the PDA in extent.						
Residual cumulative effect of change in designated lands and recreation							
Residual cumulative effect	A	L/M	RAA	MS	MT	C	R

Table 7-66: Residual cumulative effects

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Contribution from the project to the residual cumulative effect	The project will result in a conflict or disruption to designated lands and recreation areas for the medium-term. These effects will be limited to the PDA in extent.						
Residual cumulative effect of change in resource use							
Residual cumulative effect	A	L	RAA	NS	LT/ MT	S/C	R
Contribution from the project to the residual cumulative effect	The project will result in loss of productive forestland and result in conflict or disruption to high value forest sites for life of the project. These effects will be limited to the PDA in extent. The project will result in a conflict or disruption to mining activities and hunting and trapping areas for the medium-term. These effects will be limited to the PDA in extent.						

KEY

Direction:

P: Positive

A: Adverse

N: Neutral

Magnitude:

N: Negligible

L: Low

Geographic Extent:

PDA: Project Development Area

LAA: Local Assessment Area

RAA: Regional Assessment Area

Timing

NS: No sensitivity

Frequency:

S: Single event

IR: Irregular event

R: Regular event

C: Continuous

Reversibility:

R: Reversible

Table 7-66: Residual cumulative effects

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

M: Moderate	MS: Moderate sensitivity	I: Irreversible
H: High	HS: High sensitivity	N/A: Not applicable
	Duration:	
	ST: Short-term	
	MT: Medium-term	
	LT: Long-term	

The project's contribution to cumulative environmental effects is a result of conflict or disruption to property, designated lands and recreation, mining and aggregates, and hunting and trapping for the medium-term. In addition, the project's contribution to these effects will result in the loss of productive forestland and conflict or disruption to high value forest sites throughout the life of the project. These cumulative effects will be limited to the PDA in extent. The project's contribution to the cumulative effects is not expected to:

- Change or disrupt continued land and property use
- Change or disrupt designated land and recreation land use within the RAA or degrade present land use activities
- Change or disrupt forestry activities or the quality of forestry sites in the RAA
- Degrade the quality of mining/aggregate extraction activities in the RAA
- Disrupt hunting and trapping activities in the RAA through the reduction or degradation of hunting and trapping sites and wild rice harvesting areas.

7.11.6 Determination of significance

With the application of mitigation measures, residual effects of the project on land and resource use, due to change in property, designated lands and recreation, and resource use (forestry, mining/aggregates, hunting and trapping, wild rice harvesting) are anticipated to be not significant. With the application of mitigation measures identified in Section 7.11.3, the project will not restrict or degrade rural residential development to a point where it cannot continue at current levels. The project will not affect provincially protected lands. It will cross Whiteshell Provincial Park through part of the park designated as "resource management" that allows for recreational opportunities and will not otherwise affect the functioning of this park. Residual project effects on resource use, including forestry, mining, hunting, trapping, and wild rice harvesting have been deemed to be of negligible to low magnitude following mitigation. The project will not disrupt, restrict, or degrade any of these land uses to a point where they cannot continue at or near baseline levels.

7.11.7 Prediction confidence

There is a moderate to high degree of confidence in the predicted effects of construction and operation and maintenance of the project on land and resource use. The prediction confidence is based on information collected as part of desktop-based data compilation, GIS data analyses and understanding of project activities and locations. Drawing from the multiphase engagement approach with various audiences, there is good understanding of the issues and concerns related to land and resource use, and these issues and concerns have been addressed in this assessment. While some of the desktop data were limited in terms of availability (e.g., incomplete fur harvest data) or scale (e.g., big game and game bird hunting areas and open trapping area data to support harvest evaluation), the associated environmental effects mechanisms are well-understood. Manitoba Hydro's considerable experience with the construction and operation and maintenance of other similar transmission lines in the province is also well-understood. Many of the effects analyzed were supported through quantification. The mitigation measures identified in Section 7.11.3 are standard practice and have been implemented on previously completed transmission projects. Finally, the significance conclusion is based upon a well-founded understanding of the land and resource use context within the project RAA.

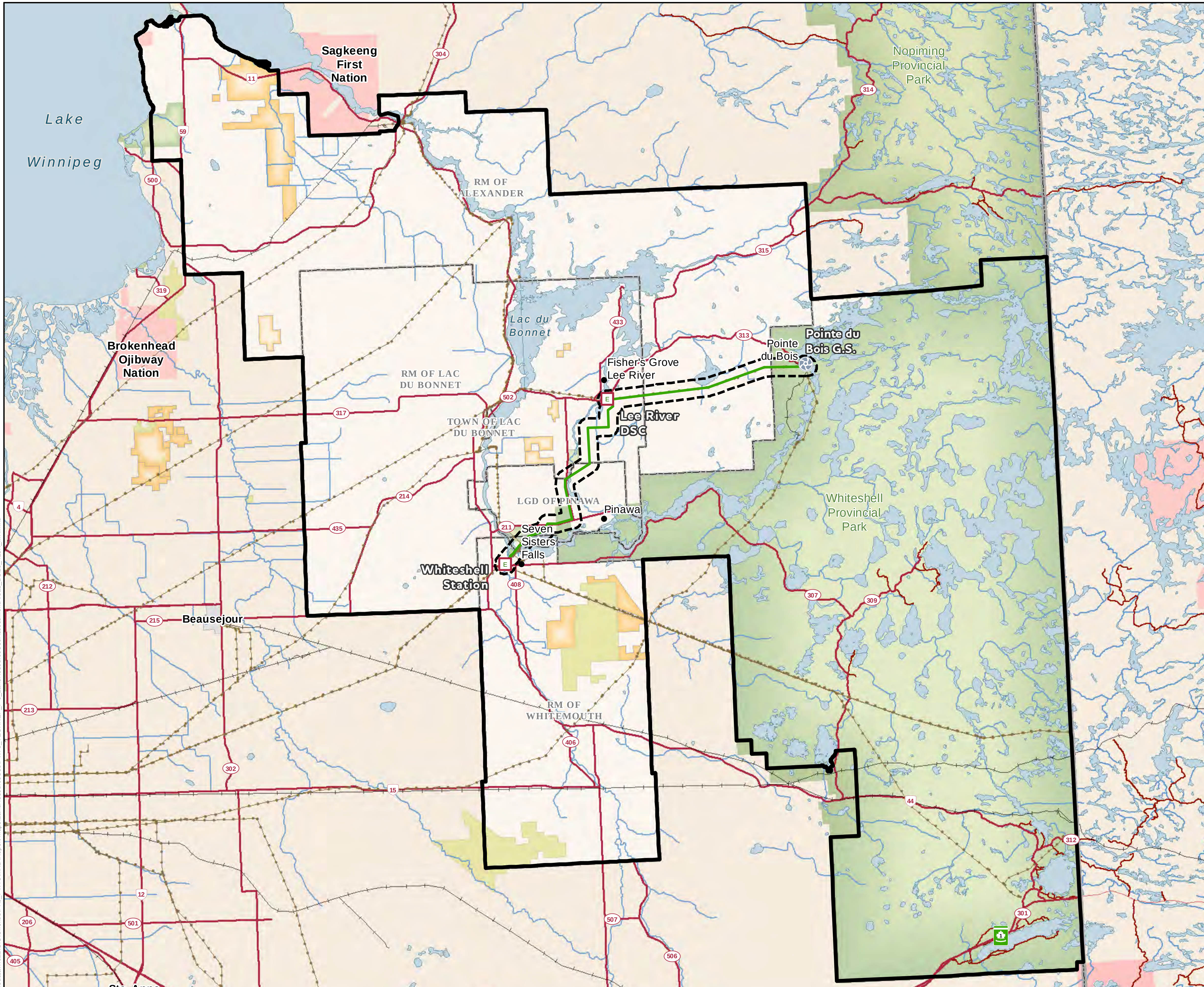
The prediction confidence with respect to cumulative effects is moderate given the lack of spatial context available for the assessment of cumulative effects.

7.11.8 Follow-up and monitoring

Manitoba Hydro's practice is to develop project-specific environmental protection plans where the mitigation measures are stipulated for construction and operation and maintenance activities. These measures are regularly reviewed for their effectiveness as part of a process of adaptive management in project monitoring and follow-up.

Land and resource use activities within the RAA are the subject of ongoing planning, management, regulatory enforcement, and monitoring by provincial and municipal governments. This includes monitoring and the collection of information on, for example, municipal land use, hunting and angling activity and development for the purpose of licensing, enforcement, and resource management. Manitoba Hydro has provided and will continue to provide project information to relevant agencies and organizations as required and requested.

Potential follow-up related to land and resource use may involve flagging environmentally sensitive sites (e.g., residences, high value forest sites). Sensitive sites for land and resource are identified in Section 6.3.2.5.



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- Land and Resource Use LAA
- Land and Resource Use RAA

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- Rural Municipality
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

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0 5 10 Kilometres
0 5 10 Miles

1:425,000

Spatial Boundaries for Land and Resource Use

Map 7-6

7.12 Commercial agriculture

Commercial agriculture refers to the for-profit production of crops and livestock and is the dominant agricultural practice in the project area. Given the location of the project and the wide range of agricultural land uses reported for the region, project components and activities could affect commercial agriculture.

Concerns were raised about the potential for effects on commercial agriculture due to the project during project engagement (e.g., during discussions with landowners and through key person interviews with provincial government staff and producer representative organizations).

Commercial agriculture was selected as a valued component because unmitigated effects from project activities during construction like right-of-way clearing and tower construction, and the presence of the project could reduce the amount of land available for agriculture, degrade the quality of land used to support agriculture, and interfere with agricultural activities.

The naming and definition of this VC was influenced by feedback from Engagement Circle #2 during which participants indicated the need for a distinction to be made between traditional/Indigenous agriculture and profit-driven mainstream agriculture, when discussing potential impacts to agriculture.

Commercial agriculture within the project area includes:

- production of annual and perennial crops (i.e., row crops, other specialty crops, grains, oil seeds, hay, and forages),
- application of fertilizers, manure, soil amendments and pesticides,
- raising of livestock (i.e., hogs and pigs, dairy cattle, beef cattle, horses, and poultry), and livestock grazing,
- production of honey, and
- storage, use or disposal of organic wastes for farm purposes.

This section assesses the potential effects of project construction, operation and maintenance, and decommissioning activities on commercial agriculture. An assessment of cumulative effects on commercial agriculture is also presented.

7.12.1 Scope of the assessment

This assessment of project effects on commercial agriculture has been influenced by Manitoba Hydro's experience with other recent transmission line assessments, e.g., the Manitoba-Minnesota Transmission Project (MMTP), and the Dorsey to Wash'ake Mayzoon Transmission (D83W) Project. The technical advisory committee comments for the initial *Environment Act* Proposal that was filed for provincial regulatory review in 2014 for the Pointe du Bois Transmission Project also influenced the assessment of project effects on commercial agriculture (Government of Manitoba 2014). While this section builds upon the baseline conditions for commercial agriculture presented in Section 6.3.3, additional baseline data pertinent to the assessment of project effects on commercial agriculture is also included in this section.

7.12.1.1 Regulatory and policy setting

The following provincial laws, and associated regulations, policies, and guidelines, as well as Manitoba Hydro's policies were considered for assessing project effects to commercial agriculture.

<u>Provincial regulation and policies</u>

The Noxious Weeds Act

The Noxious Weeds Act categorizes 90 plant species as noxious weeds and specifies that they must be eradicated or controlled. The Act is relevant to this assessment of project effects because noxious weeds could be introduced to previously unaffected agricultural lands as a result of project activities. The listed weeds are designated into one of three tiers based on prevalence, distribution, and invasiveness. Tier 1 species are those that are considered to have the most potential for negative effects though they may not yet be present in Manitoba. Under the Act, Tier 1 species must be destroyed or eradicated immediately upon discovery. Tier 2 includes those species that are already established in Manitoba and have been observed to spread easily. Tier 2 species infestations under five acres must be eradicated while infestations larger than five acres must be controlled and kept from spreading. Tier 3 species are all other designated species that do not require immediate control unless the spread of the occurrence poses a threat to the economy, environment, or the well-being of residents.

There is no legislation directly governing biosecurity with respect to clubroot and other soil-borne diseases. However, section 5(10) of the Act which requires the cleaning of equipment following the use of that equipment in an area where a noxious weed is present, also reduces the transfer of soil-borne diseases like clubroot in addition to noxious weeds.

Biosecurity Protocols

In pursuit of reducing the movement of pests in crop production areas, Manitoba Agriculture has developed biosecurity protocols for different end users, including landowners, agricultural service providers, utility companies, and researchers

(Manitoba Agriculture, n.d.[a]). Biosecurity Management on Agricultural Land for the Energy and Transportation Industries is the protocol that applies to transmission line projects. This protocol's objective is to prevent the spread of soil-borne pests such as weeds, protists, and nematodes in agricultural soils by limiting soil movement between fields and across right of ways (Manitoba Agriculture, n.d.[b]).

The biosecurity protocols are relevant to this assessment of project effects because they show the importance of biosecurity for agricultural operations and provide strategies for maintaining and enhancing biosecurity.

Agricultural Considerations for Hydro Transmission Projects in Agro-Manitoba

Manitoba Agriculture's Agri-Ecosystems and Land Management Section developed a document entitled "*Agricultural Considerations for Hydro Transmission Projects in Agro-Manitoba*" which outlines agricultural considerations for hydro transmission projects in agricultural areas of the province (Manitoba Agriculture 2021). In the noted document, the following potential impacts to and concerns for agricultural land and activities due to hydro transmission projects are outlined.

- The footprint of transmission towers removes land from agricultural production. This loss of land may be considerable over the length of the transmission line and may impact production economics, especially in areas of high value crop production. In municipalities where livestock production is dominant and the land base for manure application is limited, the loss of land to the tower footprint can have a negative impact on manure management planning.
- Hydro transmission development on agricultural lands can affect land management activities including a landowner's ability to:
  - irrigate high value crops (e.g., potato acres, vegetables)
  - use aerial application for weed and pest management
  - access fields with farm equipment
  - apply liquid manure (including limiting the total area of land available to spread manure)
- There is some concern with liability and financial obligation if damage to towers result from machinery hooking onto or hitting the tower during normal farming practices.
- Additional management considerations are necessary for the tower footprint including weed control and preventing the spread of noxious weeds.
- The spread of disease (crop and animal) and noxious weeds is of greatest concern during the construction and maintenance phases of transmission line projects as

equipment and personnel move from tower to tower and field to field. Proper sanitation of equipment before entering another farm unit is critical.

- The spread of clubroot which affects canola is of particular concern given the longevity of the clubroot pathogen in soil (i.e., 10 to 20 years in the absence of a canola crop).
- Noxious weeds can also be spread when plant material and soil containing weed seeds are transported from field to field.
- For livestock operations with earthen and/or liquid manure storage, manure application can involve use of a dragline system where manure is pumped from the storage structure across fields through a conduit (pipe) and applied with equipment to surrounding fields. With boosters in place, a drag line system can apply manure within an area of up to five-mile radius. Having hydro towers on fields where manure is being applied adds additional obstructions manure applicators will have to work around.
- Livestock biosecurity is of concern to livestock producers due to the potential spread of disease via equipment and people moving from field to field. Proper equipment and personal clothing and equipment sanitation is necessary to limit the spread of disease. Biosecurity protocols should be in place to minimize potential for disease spread.
- There are also producer concerns regarding the potential for stray voltage to contact livestock barns or surface water sources used to water barns.
- Potential for damage on leased Agricultural Crown lands where infrastructure investments and improvements have been made, e.g., fencing and hay crops, where personnel may be crossing to construct new transmission lines or when conducting maintenance type activities.

The agricultural considerations for hydro transmission projects in Agro-Manitoba are relevant to this assessment of project effects because they outline potential impacts to and concerns for agricultural operations due to transmission line construction and operation.

Municipal guidance

Land use planning in the rural municipalities traversed by the project is guided under provincial land use policies and governed under *The Planning Act*. Each of the rural municipalities traversed by the project has a zoning by-law that regulates the development and use of the land, buildings, and structures (including agricultural uses).

Manitoba Hydro policies

Manitoba Hydro's agricultural biosecurity policy and procedure

Manitoba Hydro understands that compromised biosecurity is of concern to agricultural producers across the province. The company recognizes that its staff and contractors have the potential to affect agricultural biosecurity through construction and maintenance activities that require access to agricultural land. Our agricultural biosecurity policy addresses the need to prevent the introduction and spread of diseases, pests and invasive plant species on agricultural land and livestock operations (Manitoba Hydro 2023a).

Manitoba Hydro's agricultural biosecurity standard operating procedure (SOP) (Manitoba Hydro 2023b) includes the following:

- Training of Staff and Contractors - all employees, subsidiaries and contractors who are required to perform work in livestock and agricultural settings are trained in Manitoba Hydro's agricultural biosecurity policy and the biosecurity SOP. Employees must be trained in this procedure every three years.
- Guidance for working in livestock settings and crop settings including assessing biosecurity risks, where a landowner or producer does not have an established protocol.

Like the provincial Biosecurity Management on Agricultural Land for the Energy and Transportation Industries protocol (Manitoba Agriculture, n.d.[a]), the biosecurity SOP:

- seeks to prevent the spread of soil-borne in agricultural soils by limiting soil movement between fields and across rights of way, and
- provides mitigation measures that are focused on cleaning techniques and reducing exposure to biosecurity risk, e.g., not working under very wet conditions.

However, Manitoba Agriculture (n.d.[a]) presents multisector biosecurity guidance while the Manitoba Hydro SOP is specific to how our activities may interact with agricultural lands.

Landowner compensation

Where property easements need to be acquired, Manitoba Hydro will seek to identify, contact, and communicate with the landowner in a timely manner. Manitoba Hydro will mitigate project effects on agriculture to the extent practical. However, residual project effects due to construction and operation activities are anticipated and relate to the physical presence of project structures and conductors. Effects may include temporary and permanent loss of land, damage to crops and property, ongoing nuisance to farmers, and direct and indirect effects on property use. Landowners and producers are compensated for these residual effects.

Four types of compensation are available to affected landowners:

Land Compensation

Land Compensation is a one-time payment to landowners who grant an easement for a transmission line right-of-way. It is based on the:

- total land area (acres) of easement required,
- current market value of the land (per acre), and
- easement compensation factor, which is determined based on the size and type of the transmission line. For 115 kV transmission lines, Manitoba Hydro's compensation factor is 150% of current market value.

Construction Damage Compensation

Construction Damage Compensation is provided to landowners who experience damage to their property due to construction, operation, and maintenance of the transmission line. A one-time payment for construction damage is negotiated on a case-by-case basis. Manitoba Hydro will:

- compensate or be responsible for repairing, to the satisfaction of the landowner, any damage to a landowner's property, and
- compensate a landowner for damages such as the reapplication of topsoil or rejuvenation of compacted topsoil where the remedial work requires farm machinery and the landowner's expertise.

If crops were in place prior to construction of the transmission line, the crop owner will be compensated for financial loss due to damage. This compensation generally considers the most recent average value of the harvested crop reported by Manitoba Agricultural Services Corporation [MASC].

Structure Impact Compensation

Structure Impact Compensation is a one-time payment to landowners for tower placement on land classified as agricultural. Manitoba Hydro prepares a compensation schedule semi-annually based on current data provided by MASC. Structure Impact Compensation considers:

- crop losses on lands permanently removed from production
- reduced productivity in an area of overlap around each tower structure

- additional time required to manoeuvre farm machinery around each structure
- double application of seed, fertilizer and weed control in the area of overlap around each tower structure

Structure Impact Compensation also takes into consideration:

- the four types of agricultural lands, i.e., natural hayland, seeded hayland, cereal crop land and right-of-way crop land
- the type of tower structure constructed on the land
- the location of the tower structure in relation to property lines

Manitoba Hydro provides compensation for best use potential on structure-related payments if the best use potential can be demonstrated.

Ancillary Damage Compensation

Ancillary Damage Compensation is a one-time payment that applies where Manitoba Hydro's use of the right-of-way directly or indirectly affects property use. Ancillary damage compensation is negotiated. Landowners may be compensated for:

- agricultural effects (e.g., effects on irrigation and aerial spraying activities)
- constraint effects, such as restricted access to adjacent lands

7.12.1.2 Consideration of issues raised during engagement

Project engagement (Chapter 4) actively sought to provide opportunities for concerned and interested parties to provide commercial agriculture related feedback about the project. Key person interviews were also conducted with agricultural producer representative groups and relevant provincial staff to focus the review of the project and its potential effects on commercial agricultural operations in the project region.

Concerns raised during project engagement primarily pertained to the potential for increased access to commercial agricultural land which could result in compromised biosecurity for cattle operations that are traversed by or are adjacent to the transmission line right-of-way. Manitoba Hydro maintains and implements a biosecurity standard operating procedure for protecting biosecurity on agricultural land through reducing the potential for the introduction and proliferation of invasive plant species, and crop and livestock diseases (Manitoba Hydro 2023).

As part of building our understanding of potential project effects to commercial agriculture, we engaged with key producer-representative groups and provincial agricultural staff.

- Manitoba Egg Farmers indicated having two member operations in the southwestern portion of the RAA in the RM of Whitemouth but the closest of these operations is approximately 4.5 km south of Whiteshell Station (Rybuck 2022, pers. comms.).
  - Their concerns regarding transmission line projects include disruption of farm operations or activities, noise impacts, and increased traffic during construction.
  - As egg chickens are housed indoors, transmission line construction or presence does not present a biosecurity concern for egg operations. However, if an operation also produces crops, then there could be potential for compromised crop biosecurity for that side of the operation (Rybuck 2022, pers. comms.).
- Manitoba Beekeepers Association did not indicate having member operations in the project region. According to Statistics Canada (2021), one apiculture farm was reported for the RM of Whitemouth in 2021 Agriculture Census.
  - Regarding transmission line projects, they have no concerns for apiculture if beekeepers have access to the transmission line right of ways (Steppler 2022, pers. comms.).
- Dairy Farmers of Manitoba indicated having seven member operations in the RM of Whitemouth (Wiens 2022 and Kyle 2023, pers. comms.). Wiens (2022) also indicated that:
  - Transmission lines create obstacles on the field that need to be worked around, and if towers are too close to the dairy facilities, there cause concerns for tingle voltage impacts to cows.
  - Tower-spotting is an effective mitigation which allows dairy farmers to identify where transmission line will have reduced effects on cows.
  - Ongoing communication before and during construction will be helpful to keep producers aware of easement areas and timing so they can plan their operations as best as they can. Producers want to feel heard.
- Manitoba Beef Producers (Callum and Cousins 2022, pers. comms.) indicated having members in the project area and expressed the following concerns regarding potential project impacts to beef cattle operations:
  - Loss of land, e.g., clump of trees, or structures
  - Disrupted access and impacts to cattle movement throughout grazing season or calving activities

    - Increased nuisance, use of large equipment could be limited
    - Health and safety concerns e.g., stray voltage impacts, disease transmission and compromised biosecurity (particularly spore-based diseases when previously undisturbed soils are disturbed)
    - Introduction of invasive weeds
    - Increased potential for wild boars to move into more livestock areas
- Manitoba Pork Council indicated they did not have member operations in the proposed transmission line and did not provide any concerns with the project (Thorlacius 2022, pers. comms.). According to Stats Canada's 2021 Census for Agriculture, there are 2 hog operations in the RM of Alexander and five hog operations in the RM of Whitemouth. Based on Manitoba Pork's noted feedback, we assume that these hog operations are outside the immediate vicinity of the project footprint.
- Provincial staff supporting oilseed production, apiculture, and agricultural land use planning were engaged to discuss agricultural land use within the project region and potential project impacts to commercial agriculture.
- The risk for clubroot appears to be relatively high for fields in the RM of Alexander based on reported soil analytical results and observable symptoms (Manitoba Agriculture 2022). However, there have been no fields reported from land adjacent to or crossed by the proposed transmission routes (Froese 2022, pers. comms.).
    - Froese (2022, pers. comms.) indicated the following transmission line-related concerns for oilseed production:
        - Impacts to landscape accessibility via low-hanging wires, poorly planned routing (i.e., Crossing over the middle of a field, instead of along the edge).
        - Introduction of soil-borne pests into fields due to poorly cleaned and sanitized equipment.
    - Besides clubroot, another soil-borne pest of concern for oilseed production is soybean cyst nematode (SCN), a roundworm that can dramatically affect soybean yields and long-term sustainable production, but there is no indication that SCN is present in the project area (Froese 2022, pers. comms.).
- According to the provincial apiarist, there are five bee operations including one commercial operation and four non-commercial operations in each of the RMs of Alexander and Lac du Bonnet, as well as eight non-commercial operations in the RM of Whitemouth (Micholson 2022, pers. comms.). A commercial bee operation is one with at least 50 hives. Micholson (2022, pers. comms.) indicated the following transmission line-related concerns for apiculture:

- The transmission line footprint can cut through land where hives are located and clear or reduce bee-foraging areas.
- Considering the mobile nature of apiaries and the potential for apiaries to be placed near the transmission line right-of-way during the operational phase of the project, there are concerns for bees due to vegetation management, particularly herbicide use.

- Manitoba Agriculture's Land Use and Ecosystem Resilience Branch expressed concerns regarding agricultural Crown lands (i.e., Crown lands under lease to producers for agricultural use) as the proposed transmission line route traverses three quarter sections of agricultural Crown lands under lease for cattle pasture (Erb 2023, pers. comms.).
  - The rent for leasing agricultural Crown land can be reduced proportionally if a portion of the leased land is lost to a transmission line development. However, if damages to infrastructure or seeded crops occurred due to transmission line construction or maintenance activities on leased agricultural Crown lands, such damages would be additional costs for the producer as they would not receive compensation from the province (Erb 2023, pers. comms.).
  - The clearing of a transmission line right-of-way through agricultural Crown land could increase public access to the leased parcels of land and this presents an increased potential for biosecurity risk to cattle for the agricultural producers leasing the land.

7.12.1.3 Potential effects, pathways, and measurable parameters

Table 7-67 summarizes the potential environmental effects of the project on commercial agriculture, the pathways by which they may affect commercial agriculture, and the measurable parameters for evaluating effects.

Table 7-67: Potential Effects, Effects Pathways, and Measurable Parameters for Commercial Agriculture

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Loss or degradation of agricultural land	Clearing of the right-of-way, creation of access routes, and set-up of marshalling/ fly yards may result in losses of agricultural production due to temporary agricultural land loss and	Extent of agricultural land loss (ha) – permanent and temporary Land capability class for agriculture

Table 7-67: Potential Effects, Effects Pathways, and Measurable Parameters for Commercial Agriculture

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
	degradation through soil disturbance and compaction. The presence of project structures and permanently disturbed footprints during operation will result in permanent loss of agricultural land. Traffic movement during project maintenance activities might cause soil degradation through compaction.	
Conflict with agricultural activities	Clearing of the right-of-way, creation of access routes, and set-up of marshalling/ fly yards, borrow sites and temporary camp sites might cause conflict with agricultural activities (e.g., disrupted ground field operations and manure application); increased potential for crop and livestock biosecurity risk, and removal of agricultural buildings/structures. The presence of the project can cause conflict with agricultural activities (e.g., disrupted ground field operations, baling, and manure application), increase the potential for electric and magnetic field (EMF) and stray voltage effects on livestock, and hinder the capacity for future operation expansion or other changes.	Interference with agricultural activities (e.g., relocation of livestock facilities, increased access distances)

7.12.1.4 Spatial boundaries

The following spatial boundaries are used to assess residual and cumulative environmental effects of the project on agriculture (Map 7-7):

- **Project development area (PDA):** encompasses the project footprint and is the anticipated area of physical disturbance associated with the construction and operation and maintenance of the project (i.e., transmission line right-of-way and station modification areas).
- **Local assessment area (LAA):** includes all components of the PDA and consists of a 1 km buffer from the right-of-way centreline for the transmission line and 1 km buffer around all station footprints. The LAA for each of the transmission line and station components covers an area that generally will encompass the basic field management unit most used within the project region – the quarter section, or an area of land 800 m × 800 m. The LAA represents the area where direct and indirect effects on commercial agriculture are likely to be most pronounced or identifiable and encompasses the locally affected commercial agricultural land uses or activities. Project effects that are experienced across the entire field management unit will generally be considered within the boundary of the LAA.
- **Regional assessment area (RAA):** includes the PDA and LAA and is defined by the boundaries of the municipalities that are traversed by the PDA. From north to south, the municipalities that make up the RAA are RM of Alexander, RM of Lac du Bonnet, LGD of Pinawa, and RM of Whitemouth. The area defined by the boundaries of the municipalities that are traversed by the project were chosen as the RAA because they represent the region that encompasses the communities within which changes in socio-economic parameters attributable to project effects on commercial agriculture might occur. The RAA is the area in which cumulative effects are assessed. It is anticipated that other projects or activities occurring within the same municipality as the project could act cumulatively with the project.

7.12.1.5 Temporal boundaries

The assessment addresses potential effects during project construction, operation and maintenance, and decommissioning phases.

Per the project schedule provided in the project description (see Chapter 2), the primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions.

- Operations and maintenance – for the life of the project, estimated to be a 75-year design life.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.12.1.6 Residual effects characterization

Table 7-68 presents definitions for the characterization of residual environmental effects on commercial agriculture. The criteria describe the potential residual effects that remain after mitigation measures have been implemented.

Table 7-68: Characterization of Residual Effects on Commercial Agriculture

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to commercial agriculture relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to commercial agriculture relative to baseline. **Neutral –** no net change in measurable parameters for the commercial agriculture relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**No Measurable Change –** no measurable change in the effect can be noted. **Low –** small but measurable change in the capacity for agriculture. Land loss, land degradation or conflict with activities has a measurable effect on production levels, however

Table 7-68: Characterization of Residual Effects on Commercial Agriculture		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		production can continue at or near pre-disturbance levels. **Moderate**—a change that is greater than low but will not result in an impairment of commercial agricultural capacity. Land loss, land degradation or conflict with activities has a measurable effect on production levels, however production can continue near pre-disturbance levels **High**—a change that can result in an impairment of commercial agricultural capacity. Land loss, land degradation or conflict with activities influences production such that production cannot continue at or near pre-disturbance levels
Geographic Extent	The geographic area in which a residual effect occurs	**PDA -** residual effects are restricted to the PDA **LAA -** residual effects extend into the LAA **RAA -** residual effects extend into the RAA
Timing[1]	Considers when the residual effect is expected to occur, where relevant to the VC.	**No sensitivity -** Effect does not occur during critical agricultural season or activities. **High sensitivity -** Effect occurs during critical agricultural season or activities.

Table 7-68: Characterization of Residual Effects on Commercial Agriculture

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to construction phase. **Medium-term –** the residual effect extends beyond the construction phase. **Long-term –** the residual effect extends beyond the life of the project.
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event –** residual effect occurs once **Multiple irregular event –** occurs at no set schedule **Multiple regular event –** occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

7.12.1.7 Significance definition

For this assessment, adverse residual effects on commercial agriculture are considered significant if the proposed use of the land for the project:

- results in a loss of commercial agricultural land or degradation of soil quality such that existing agricultural production cannot continue at current levels for extended periods of time (beyond the construction phase) or cannot be adequately compensated; or,

- results in interference with or disruption that restricts agricultural operations and activities such that existing agricultural operations and activities cannot continue at current levels for extended periods of time (beyond construction phase) or cannot be adequately compensated.

7.12.2 Summary of existing conditions for commercial agriculture

Beginning in the late 1870s, and soon after Treaties had been signed, the forestry industry greatly contributed to deforestation of the project region. Such deforestation increased access to the area and the cleared land became available for agricultural conversion by settlers especially after the First World War.

Though not a dominant land use in the RAA, agricultural land use remains a notable land use and contributes to the local and provincial economy. According to Statistics Canada (2021), there were 178 farms within the RAA in 2021, which represents approximately 1.2% of the reported farms in the province.

Information for this assessment was gathered through a detailed review of available and collected agricultural land use data. The existing conditions described in this section include:

- Land cover
- Agricultural capability
- Agricultural crop type distribution
- Livestock operations
- Risk to biosecurity

7.12.2.1 Land cover

Based on existing land cover data, 15% of the RAA is under agricultural land use (Map 7-8). As shown in Table 7-69, the proportion of agricultural land use is smaller for the LAA and PDA, at 3.1% and 1.8%, respectively.

Table 7-69: Land Cover Types within the Commercial Agriculture LAA and PDA

Land Cover Class	**RAA (ha)**	**%**	**LAA (ha)**	**%**	**PDA (ha)**	**%**
Agriculture[1]	54,665	15	335	3.1	5.7	1.8
Range and grassland	26,915	7.4	788	7.3	17	5.2
Forest[2]	175,485	48	5,342	49	161	50

Table 7-69: Land Cover Types within the Commercial Agriculture LAA and PDA

Land Cover Class	RAA (ha)	%	LAA (ha)	%	PDA (ha)	%
Forest cut blocks	6,247	1.7	48	0.4	3.6	1.1
Forest fire burnt areas	4	0.0	0.0	0.0	0.0	0.0
Cultural features	1,383	0.4	48	0.4	7.5	2.3
Wetland[3]	62,706	17	2,007	19	27	8.3
Sand and gravel	460	0.1	22	0.2	1.1	0.3
Treed rock	11,491	3.1	974	9.0	31	10
Water body	19,096	5.2	934	8.6	4.0	1.3
Roads, trails, and rail lines	6,524	1.8	322	3.0	63	20
Total	364,975	100	10,821	100	321	100

[1] Agriculture land cover class includes annual crop and forage fields.

[2] Forest land cover class includes coniferous, deciduous, mixedwood, and open deciduous forests.

[3] Wetland land cover class includes marsh and treed bog.

7.12.2.2 Agricultural capability

Agricultural land capability is a function of climatic, topographic and soil conditions for a given parcel of land. Assignment of land to agricultural capability classes provides insight into the ability of the soils to support cropping and the extent of limitations affecting the soils. The definitions of agricultural capability classes were given in Section 6.3.3 (Table 7-70).

Map 7-9 shows agricultural capability for the RAA, LAA, and PDA.

Organic soils which are not rated for agricultural capability are the dominant soil type for approximately 36% of the RAA (Table 7-70). The remainder of the RAA consists of soils belonging to agricultural capability Class 3 (21%), Class 2 (13%), Class 5 (7%), Class 4 (6%), and Class 6 (5%), as well as unclassified soils which cover 5% of the RAA (Table 7-70). The main limitations to agricultural capability in the RAA are excess water (subclass W, 17%), consolidated bedrock (subclass R, 8%), undesirable soil structure and/ or low permeability (subclass D, 8%), and moisture (subclass M, 7%).

Table 7-70: Agricultural Capability in the RAA

Agricultural Capability Class	RAA	
	Extent (ha)	Proportional Extent (%)
1	0	0
2	47,374	13
3	75,638	21
4	20,685	5.7
5	26,245	7.2
6	16,290	4.5
7	28,464	7.8
Organic	132,066	36
Unclassified[1]	18,213	5.0
Total[2]	364,975	100

[1] Includes developed lands (disturbed, urban, etc.) and open water, which are not assigned an agricultural capability class.

[2] Values might not sum to totals shown because of rounding.

Within the LAA, the most common agricultural capability classes are Class 3 (29%) and Class 7 (14%) (Table 7-71). Organic soils make up 25% of the LAA and are not rated for agricultural capability. Smaller portions of the LAA are covered by Class 5 (7%), Class 6 (5%), and Class 2 (4%) soils, or are unclassified (7%) or fall within Whiteshell Provincial Park (10%).

The main limitations to agricultural capability in the LAA are undesirable soil structure and/ or low permeability (subclass D, 22%), consolidated bedrock (subclass R, 17%), and excess water (subclass W, 9%).

Table 7-71: Agricultural Capability in the LAA

Agricultural Capability Class	LAA	
	Extent (ha)	Proportional Extent (%)
1	0.0	0.0
2	405	3.7
3	3,118	29
4	0.0	0.0
5	739	6.8
6	544	5.0
7	1,517	14
Organic	2,688	25
Unclassified[1]	764	7.1
Land within Whiteshell Provincial Park	1,047	10
Total[2]	10,821	100

[1] Includes developed lands (disturbed, urban, etc.) and open water, and are not assigned an agricultural capability class.

[2] Values might not sum to totals shown because of rounding.

Like the LAA, within the PDA, the most common agricultural capability classes are Class 3 (36%) and Class 7 (18%) (Table 7-72). Organic soils make up 18% of the LAA and are not rated for agricultural capability. Smaller portions of the LAA are covered by Class 5 (8%), Class 6 (6%), and Class 2 (4%) soils, or are unclassified (1.3%) or fall within Whiteshell Provincial Park (9%).

The main limitations to agricultural capability in the PDA are undesirable soil structure and/ or low permeability (subclass D, 24%), consolidated bedrock (subclass R, 19%), and excess water (subclass W, 10%).

Table 7-72: Agricultural Capability in the PDA

Agricultural Capability Class	PDA	
	Extent (ha)	Proportional Extent (%)
1	0.0	0.0
2	14	4.4
3	116	36
4	0.0	0.0
5	26	8.2
6	19	6.0
7	56	18
Organic	57	18
Unclassified[1]	4.1	1.3
Land within Whiteshell Provincial Park	28	8.6
Total[2]	321	100

[1] Includes developed lands (disturbed, urban, etc.) and open water, and are not assigned an agricultural capability class.

[2] Values might not sum to totals shown because of rounding.

7.12.2.3 Agricultural crop type distribution

Given the occurrence of the project within the Canadian Shield, the RAA, LAA, and PDA are predominantly under non-agricultural land use. According to the federal spatial distribution of crops data, in 2021, agricultural crops (including annual crops, natural hayland, and seeded hayland) covered approximately 22%, 12%, and 14% of the agricultural lands within the RAA, LAA, and PDA, respectively (Map 7-10).

Considering the land reported to be under agricultural cropping in 2021, within the RAA (see Table 7-73), cereal/oilseed cropland covered 38%, row cropland covered 28%, natural hayland covered 24%, and seeded hayland covered 9%.

Table 7-73: Crop Type Distribution within the RAA, LAA, and PDA

Crop Type	RAA		LAA		PDA	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Cereal/Oilseed[1]	30,534	38	182	14	3.2	7.0
Natural Hayland[2]	19,154	24	526	41	35	76
Row Crops[3]	22,143	28	357	28	2.8	6.1
Other Crops[4]	29	0.04	0.09	0.01	0.00	0.00
Seeded Hayland[5]	7,499	9.4	225	17	5.1	11
Total	79,360	100	1290	100	46	100

[1] Cereal/oilseeds – include cereals, canola, flaxseed, peas, fallow buckwheat, canary seed, millet

[2] Natural hayland – includes grasslands

[3] Row crop – includes corn, potatoes, soybeans, sunflower

[4] Other crop types – include beans, hemp, lentils, mustard, and vegetables, and are included in this category due to low reported acreages

[5] Seed hayland – includes forage crops and greenfeed

Of the land reported to be under agricultural cropping in 2021 within the LAA, natural hayland covered 41%, row cropland covered 28%, cereal/oilseed cropland covered 14%, and seeded hayland covered 17%.

Within the PDA, of the land reported to be under agricultural cropping in 2021, natural hayland covered 76%, seeded hayland covered 11%, cereal/oilseed crops covered 7%, and row crops covered 6%.

7.12.2.4 Livestock operations

As previously described in Section 6.3.3, the RAA contains several types of livestock operations.

Based on feedback from landowners and the Land Use and Ecosystem Resilience Branch of Manitoba Agriculture, as well as the key person interview with Manitoba Beef Producers (Callum and Cousins 2022, pers. comms.), there appear to be beef cattle operations agricultural Crown land used for pasture within the LAA. During windshield surveys of the transmission line route, there were no observations of livestock structures or buildings within the PDA.

Per the chicken egg farm information provided by Manitoba Egg Farmers, the two egg farms in the RM of Whitemouth are located outside the LAA, with the closest one approximately 4.5 km south of Whiteshell station.

According to information provided by the Dairy Farmers of Manitoba, there are seven dairy farms in the RM of Whitemouth all of which are outside the LAA, with the closest dairy farm located approximately 2.5 km south of Whiteshell station (Kyle 2023, pers. comms.).

There is one commercial apiary in each of the RMs of Alexander and Lac du Bonnet but the proximity of these apiaries to the proposed transmission line footprint is unknown (Micholson 2022, pers. comms.).

7.12.2.5 Risk to biosecurity

As mentioned in Section 6.3.3.3, the disease of primary concern for field crops within the RAA and LAA is clubroot, which affects canola (Froese 2022, pers. comm.) and is caused by a soil-borne pathogen. While the three RMs that are traversed by the project have fields that have been reported to have measurable concentrations of *Plasmodiophora brassicae* spores in soil (Table 7-74), the fields associated with these results are not adjacent to or crossed by the proposed transmission line (Froese 2022, pers. comms.). Movement of infested soil on machinery is the most important mechanism for the spread of clubroot (Strelkov et al. 2014).

Table 7-74: Clubroot Distribution in the RAA

Alexander	>80,000 or symptoms observed
Lac du Bonnet	1,000–10,000
Whitemouth	1,000–10,000

Table 7-74: Clubroot Distribution in the RAA	
Alexander	>80,000 or symptoms observed

Clubroot symptoms are typically observed in canola growing in soil with >80,000 spores per gram of soil.

The tabulated data are based on soil and canola plant tissue analysis from 2009 to 2022.

SOURCE: Manitoba Agriculture (2022) available online at https://www.gov.mb.ca/agriculture/crops/plant-diseases/clubroot-distribution-in-manitoba.html (accessed May 2, 2023).

For livestock biosecurity, increased access to livestock, particularly cattle, due to transmission line right-of-way establishment and the disturbance and movement of soils that may contain disease-causing pathogens are the main concerns. While the distribution and occurrence of livestock diseases that could be spread in the RAA due to compromised biosecurity is unknown, there is potential for diseases like anthrax, foot and mouth, bovine anaplasmosis, and bovine tuberculosis to occur in the RAA. The implementation of biosecurity measures will limit the spread and reduce the incidence and severity of such diseases.

7.12.3 Project interactions with commercial agriculture

Table 7-75 identifies, for each potential effect, the physical activities that might interact with commercial agriculture and result in the identified effect.

Project activities have the potential to result in temporary and permanent loss of commercial agricultural land during construction and operation and maintenance, respectively. Degradation of soil quality could occur during construction and operation and maintenance, which could lead to a reduction in land capability for agriculture. Project activities also have the potential to conflict with commercial agricultural activities during the construction and operation and maintenance phases of the project. Conflict with commercial agricultural activities could occur as a result of multiple pathways (e.g., effects on farm equipment operation and manure application, effects on livestock and animal health and compromised biosecurity for crops and livestock).

Temporary land loss is anticipated to occur during construction, after which most of the affected land will be returned to the previous agricultural land use. Permanent land loss will occur for the lifetime of the project under and immediately around tower structures. Standard mitigation measures will be followed to reduce soil degradation during construction. While conflict with agricultural activities will occur during both construction and operation and maintenance, route selection considerations such as design mitigation and landowner/producer engagement will help reduce the extent and severity of such conflicts. Manitoba Hydro will pay compensation for lost land and productivity as outlined in Section 7.12.1.

Table 7-75: Project Interactions with Commercial Agriculture

Project activity	Effects	
	Loss or Degradation of Agricultural Land	Conflict with Agricultural Activities
Transmission Line Construction		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Right-of-way clearing	✓	✓
Watercourse crossings	–	–
Marshalling / fly yards	✓	✓
Transmission tower construction	✓	✓
Implodes	–	–
Helicopter use	–	–
Clean-up and demobilization	✓	✓
Station Modification		
Mobilization and staff presence	–	–
Vehicle and equipment use	–	–
Marshalling / fly yard (Pointe du Bois station)	–	–
Realignment of access road (Pointe du Bois station)	–	–
Site preparation (Pointe du Bois station)	–	–
Station footprint expansion (Pointe du Bois station)	–	–

Table 7-75: Project Interactions with Commercial Agriculture

Project activity	Effects	
	Loss or Degradation of Agricultural Land	Conflict with Agricultural Activities
Installation of electrical equipment	–	–
Clean-up and demobilization	–	–
Transmission Line and Station Operation and Maintenance		
Transmission line and station presence	✓	✓
Vehicle and equipment use	✓	✓
Inspection and maintenance	✓	✓
Vegetation management	✓	✓
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓
Rehabilitation	✓	✓
Clean-up and demobilization	✓	✓

✓ = Potential interaction

– = No interaction

During transmission line operation and maintenance, inspection patrols are not anticipated to conflict with commercial agricultural activities because these routine and planned inspections are expected to occur outside the agricultural crop growing season. Vegetation management (tree control) is not anticipated to result in loss or degradation of land or conflict with agricultural activities as these activities will be scheduled to accommodate farming schedules. The presence of the transmission line structures and conductors will interact with the effects of loss of land and degradation and conflict with agricultural activities.

Interaction between the stations and commercial agriculture is anticipated only for Whiteshell station which is surrounded by agricultural land use. As mentioned in the project description (Chapter 2), Whiteshell station will be expanded within the boundaries of the existing station.

During station site preparation at Whiteshell station construction, conflict with agricultural activities is not anticipated because of the nature and small-scale of modifications and additional equipment required relative to the existing station and associated structures. Loss or degradation of agricultural land and conflict with agricultural activities are not anticipated at Whiteshell station because the new 115-kV bay will be constructed within an already developed portion of the existing station property.

During operation and maintenance of Whiteshell station, a change in interactions between station operation/presence and conflict with agricultural activities is not anticipated. The station already exists in this area of agricultural land use and is anticipated to have a similar interaction with commercial agriculture post-construction per the baseline condition. Vegetation management is also not anticipated to interact with agriculture during station operation and maintenance, as these activities will be inside station boundaries.

7.12.4 Assessment of residual environmental effects on commercial agriculture

While agriculture is not the dominant land use in the area traversed by the final preferred route, the project will interact with agricultural operations with the potential for effects to occur.

7.12.4.1 Effects pathways

Effects to agriculture could occur during both construction and operations and maintenance activities (Table 5-1, Chapter 5) and include the following:

- Loss and/or degradation of agricultural land due to the transmission line structures and activities during construction and operation
- Inconvenience, nuisance, and increased production costs associated with operating farming equipment, aerial spraying, tile drainage systems, irrigation equipment, and crop production around structures.
- The potential for increased biosecurity risk which can compromise existing crop and livestock operations
- Concerns related to potential impacts to livestock and bees due to transmission line-induced EMF and tingle voltage

7.12.4.2 Analytical assessment techniques

Temporary land loss is associated with the construction phase of the project (i.e., during the winters of 2024/25 and winter of 2025/26) while permanent land loss pertains to the operational phase of the project. The potential for conflict with agricultural activities applies to both project construction and operations.

Temporary land loss and degradation estimation

Estimates for areas of temporary land loss during the construction phase assume that the entire right-of-way will be unavailable to agricultural land use and activities during the construction period. As agricultural land use within the RAA begins near Lee River DSC and extends southwesterly, temporary loss of land for agriculture within the right-of-way is anticipated to affect the Lee River DSC to Whiteshell transmission line segment and occur during one growing season.

Permanent land loss estimation

Permanent land loss refers to the area that will be occupied by project structures or permanently disturbed footprints (e.g., station footprints) and that will be unavailable for continued agricultural land use through the operation and maintenance phase of the Project. Permanent land loss was estimated by determining the sum of the area under project structures and permanently disturbed footprints as given in the project description (Chapter 2).

For transmission line structures, the estimated number of towers that will be placed on commercial agricultural land was determined based on an average tower interval of 425 m and component length. A 2-m buffer was applied to anticipated structure footprints for the estimates for permanent land loss.

Potential for conflict with agricultural operations

Location data for livestock operations were provided by industry organizations representing dairy and egg producers but for confidentiality, these locations were not mapped. Manitoba Hydro conducted windshield surveys of the project area in May 2023, July 2022, June 2022, and May 2022 and identified some of the agricultural land use types through these surveys.

Issues and concerns for commercial agriculture that could result in conflict between the project and commercial agriculture were also identified through key person interviews and other engagement feedback for the project. Compared to the assessment of temporary and permanent loss of land from commercial agriculture, the assessment of conflict with agricultural activities was more qualitative.

7.12.4.3 Assessment of loss and or degradation of agricultural land

During project engagement, landowners, producer representative organizations, and provincial staff raised concerns on how the proposed PW75 transmission line could result in the loss and degradation of commercial agricultural land.

Construction

During construction of the transmission line, activities such as mobilization and staff presence, vehicle and equipment use, right-of-way clearing, establishment of marshalling/fly yards and tower construction can result in the loss and or degradation loss of agricultural land. The timing and the duration of the construction activities will determine the extent of potential effects to agricultural land.

It is assumed that temporary loss of commercial agricultural land will affect the entire agricultural portion of the PDA for the duration of construction. Of the whole PDA area of 321 ha, only 17 ha (approximately 5%) is under agricultural land use. As shown in Table 7-76, the area of PDA under agricultural land use predominantly falls under Class 3 agricultural capability (70%), and with an appreciable portion under Class 2 agricultural capability (29%).

Table 7-76: Agricultural land use area in the PDA

Agricultural Capability	**Area of Land**	**Percentage**
Class 2	4.805	29
Class 3	11.649	70
Class 7	0.133	1
Organic	0.100	1
Total[1]	16.687	100

NOTES:

[1] Values might not sum to totals shown because of rounding.

Potential effects from construction activities that could result in the degradation of agricultural land would be limited to the PDA and include soil compaction, rutting, admixing, and erosion. These effects can result in changes to land capability, soil productivity, decreased crop growth, and reduced crop yields (MAFRI 2008). The potential for soil compaction is greatest in areas of poorly drained fine textured soils or when soils are under high moisture conditions. Wheel use from heavy equipment on saturated soils increases the potential for compaction as well (Wolkowyski and Lowry, 2008). Soil that becomes exposed due construction activities can be susceptible to erosion by water and wind, leading to a change in soil thickness and crop productivity.

Operation and maintenance

The presence of transmission line structures will result in approximately 0.1 ha of agricultural land being lost because of the tower footprint. The area of agricultural land lost due to the presence of the towers comprises 0.03% of the entire transmission line right-of-way. Manitoba Hydro's compensation policy (i.e., the structure impact portion) takes into consideration the lost production underneath and directly adjacent to the towers situated on agricultural land for directly affected landowners. Although tower footprints will result in an area of land removed from production, due to the small size of the project and towers, the loss of land from production is anticipated to be low.

There is also the potential for soil disturbance / degradation to occur during operations and maintenance when vehicles and equipment is used for inspection patrols, specifically when soils are under high water conditions. Timing of the inspection patrols and limiting the use of vehicle and equipment to winter or frozen ground conditions can greatly reduce the impact to soils during operation and maintenance.

Mitigation for loss and or degradation of land

Mitigation for temporary loss of agricultural land includes the following:

- Manitoba Hydro will pay compensation pursuant to the Landowner Compensation Program for damage to infrastructure/crops from construction or maintenance activities. Where possible, construction schedules will take into consideration the timing of agricultural activities.
- Compensation will be provided to landowners and agricultural Crown land lessees, according to the Manitoba Hydro Land Compensation Program for:
    - damage to property, any relocation of incompatible agricultural buildings (e.g., grain bins and livestock overwintering shelter)
    - temporary loss of agricultural land

- Areas of temporary soil disturbance on agricultural lands will be rehabilitated in accordance with the Rehabilitation and Weed Management Plan. This plan will be developed before construction and would be part of the overall Environmental Protection Program, as described in Chapter 11.
- Manitoba Hydro will contact directly affected landowners to discuss how to reduce effects on their agriculture activities.

Mitigation for degradation of agricultural land includes the following:

- Effects of soil compaction and rutting will be mitigated by managing equipment traffic routes and activities for access route and bypass trail development, temporary sites' setup, clearing of the transmission ROW, installation of the transmission structures, and station site preparation. In accordance with the Access Management Plan, the Contractor will be restricted to established roads and trails and cleared construction areas
- The transmission line will be constructed in agricultural areas when soils are not saturated to limit compaction, rutting and admixing, particularly in areas of high compaction risk. If this is not possible, other mitigation or rehabilitation measures will be conducted to reverse effects
- If working on saturated soils during non-frozen ground conditions, equipment and techniques that distribute ground pressure (e.g., swamp mats, geofabric and padding and corduroy) will be used to avoid compaction and admixing
- Contractor-specific Erosion Protection and Sediment Control Plans will be prepared by the Contractor, accepted by Manitoba Hydro prior to construction and updated annually

Mitigation for permanent loss of agricultural land primarily involves reducing area of loss through design mitigation and compensation for land permanently removed from agriculture due to structure presence. Compensation will be provided to agricultural landowners according to Manitoba Hydro Land Compensation Program for land permanently removed from agriculture due to structure presence.

As part of design mitigation for the project:

- Manitoba Hydro chose self-supporting steel lattice towers for use in agricultural land to reduce the extent of permanent land loss since they have a smaller footprint than guyed towers, which were used in non-agricultural areas
- Manitoba Hydro has provided opportunities to discuss and identify areas of concern and potential tower spotting preferences with potentially affected landowners

7.12.4.4 Assessment of conflict with agricultural activities

During project engagement, landowners, producer representative organizations, and provincial staff raised concerns on how the proposed PW75 transmission line could cause conflict with commercial agricultural land activities during project construction and operation.

The project has the potential to result in conflict with agricultural activities during both construction and operation and maintenance. Conflict with agricultural activities could occur due to:

- damage to, or interference with, agricultural infrastructure (e.g., buildings, barns, grain bins, manure application and water-supply systems)
- interference with the use of field equipment
- increased potential for stray (or tingle) voltage and electric and magnetic field (EMF) effects on livestock
- effects on animal health following intake of remnants of construction materials
- increased management effort due to:
    - additional operational costs and inconveniences associated with increased management effort due to presence of project structures, including:
        - overlap of farm input application (e.g., seed, fertilizer, pesticides) in proximity to project structures resulting in inefficiencies and excess input usage
        - inefficiencies of field operations due to working around project structures resulting in excess fuel usage and equipment depreciation
    - A split farm management units (e.g., due to in-field placement of towers, diagonal crossings, or angled placement of tower)
    - increased biosecurity risk for crops and livestock
    - changes in access routes to farm properties and to areas of agricultural activities (e.g., rotational paddocks, watering facilities, wintering sites, cropping fields)
    - restricted field accessibility for manure spreading equipment
- removal of vegetation that provides pollen for bees

Most interactions between the project and commercial agriculture are similar between construction and operation and maintenance phases. However, the nature, degree and extent of interactions differ between the phases in some cases.

Construction

During construction, project activities could interfere with agricultural operations and activities through, for example, access and right-of-way establishment on fields that are used for pasturing cattle or crop production. Such interference might result in inconvenience, increased time and increased monetary costs to farming. The degree and extent of construction interactions will depend highly on timing of construction, with less interaction during the winter than during the spring, summer, and fall. Construction activities may be a concern in terms of biosecurity of crop and livestock operations, and may result in interference with, or damage to, infrastructure.

Interference with or damage to agricultural infrastructure

Right-of-way preparation, including clearing for the project, has the potential to affect agricultural buildings and structures (e.g., grain bins, fencing, storage sheds, barns, and livestock corrals). Interactions would be limited to the ROW, and buildings and structures within the PDA would have to be removed or relocated. There are no agricultural buildings within the PDA.

Construction activities might also interfere with livestock operations located within the LAA. The PDA traverses through and near lands that are used for cattle pasture, manure application, and hay production which typically involves the use of hay balers. A hay baler is a piece of farm equipment that is used to compress a cut and raked hay into compact bales that are easy to handle, transport, and store. Such livestock related activities and infrastructure can be disturbed or damaged by the establishment of a ROW or other construction activities (e.g., tower foundation installation). Some livestock operations may also use groundwater for livestock production. Construction activities might interfere with the infrastructure associated with these water withdrawals, for example, if above ground watering systems (e.g., pipes, watering station) are located within the PDA. If these situations occur, this minor infrastructure will likely have to be re-located.

The planned construction of the transmission line during frozen ground conditions along with the absence of intensive high-value crop production will limit the extent of conflict between commercial agricultural land and the project.

Increased biosecurity risk

During project engagement, landowners, producer representative organizations, and provincial staff raised concerns on how the proposed PW75 transmission line could cause increase biosecurity risk for commercial agricultural lands in the project area.

Increased biosecurity risk would be more pronounced during construction than operations.

Soil transport is an important mechanism for the spread of weeds and soil-borne diseases from one field or region to another. There is potential for soil to be transferred from field to field or from another region to the project site during the construction and operations and maintenance phase because of construction equipment, other vehicles and people moving between fields.

Soils in the project area are highly variable over a very small area – ranging from heavy clays to organic soils. Clubroot and other soil borne diseases tend to move more rapidly in organic and sandy soils with better water movement (Froese 2022b, pers. comms). Therefore, while there are no reports of positive clubroot results for fields crossed by or adjacent to the proposed transmission route, comprised biosecurity is of concern for the project area. The introduction of pests to previously non-affected agricultural lands can have lasting reductions in crop yields and increased input and management costs.

Livestock operations

According to Manitoba Beef Producers (Callum and Cousins, pers. Comm. 2022) right-of-way clearance might reduce natural shelter for livestock through removal of clumps of trees. Such reduction in natural shelter can increase the potential for predation of livestock by wildlife, and increased interaction between livestock and wildlife can present a pathway for disease transmission to livestock from wildlife resulting in compromised livestock biosecurity. However, such an effect would likely be short-lived since wildlife populations would likely decrease with reduced natural shelter. Further, generally there is already good access to areas of the livestock production, and it is not anticipated that the project will create much new access to livestock by wildlife.

Right-of-way establishment could also impact cattle movement during the grazing season and calving activities. Some landowners with agricultural land in the LAA have indicated that they grow hay for their own cattle operations and apply manure as a nutrient source for the hay. Other causes of conflict between the project and livestock operations that were raised by Manitoba Beef Producers (Callum and Cousins 2022, pers. comms.) are:

- Disrupted access, increased nuisance, and limited use of some large equipment.
- Disrupted pest control which could compromise biosecurity.

- Health and safety concerns due to stray voltage exposure and increased disease transmission, e.g., bovine tuberculosis, foot and mouth, and anthrax, anaplasmosis, from compromised biosecurity.
- Invasive weeds can reduce the quality of pasture and increase management costs for producers.
- Right-of-way establishment could result in more wild boars moving into livestock areas.

As indicated by Dairy Farmers of Manitoba (Wiens 2022, pers. comms.), on-going communication before and during construction will be helpful to keep producers aware of easement areas and timing so producers can plan their operations as best as they can.

Operation and maintenance

Effects associated with the operation and maintenance phase of the project are related primarily to project presence. They include nuisance, inconvenience and increased production costs associated with farming around structures (e.g., overlapping seed, fertilizer, and pesticide application), farm management unit splits, interference with livestock movement and access to pasture, biosecurity concerns for livestock and croplands, interference with infrastructure and specific operations, and restricted future expansion of agricultural operations.

Increased management effort

Farmers will face challenges related to nuisance, inconvenience and increased production costs associated with navigating around the tower structures (e.g., around towers in field, and in between the project ROW and other boundaries, including property boundaries) with farm equipment during various agricultural field operations.

Farming around towers presents several challenges to producers. Crop production is reduced within the immediate vicinity of the tower due to overlap around each structure (PAMI 2015); there are increased costs associated with the time it takes to farm around transmission towers, the application of seed, fertilizer, and chemicals in overlap areas around each structure and decreased weed control around the towers.

A study undertaken by PAMI (2015) estimated total lost crop production value by easement acre and total easement within a quarter section field based on different scenarios using transmission line configuration, crop, and equipment width variables. Based on a straight-line transmission line configuration paralleling a road (40 m from road edge), with self-supporting steel towers with base dimensions of 9 m × 9 m (with an applied 1 m safety buffer), a tower interval of 400 m, an easement width of 80 m, and equipment widths of 50 ft (seeder) and 100 ft (sprayer), the value of production loss for a wheat crop was estimated to be $16 per easement acre or $256 per quarter section easement.

Extra management effort is required to work around structures and there are risks inherent with operating farm machinery in proximity to the structures. The presence of structures must be considered when planning and executing field operations. Since the responsibility is on farmers and operators to avoid structures while operating wide equipment, working around structures requires more attention.

The growth of weeds around tower bases is a concern to agricultural producers. Because of the presence of towers, some areas may not be sprayed during typical field operations (i.e., immediately adjacent to and directly under tower footprint, areas between towers and other features that preclude a sprayer pass), and weeds may grow, allowing weed seeds to disperse into adjacent field areas and creating a nuisance for producers.

Farm management units, or field areas managed as a single management unit, may be split by the project PDA. An example of where this may occur is if the PDA is not located along the edge of the field or along the half mile line for quarter section field management units, or if it is located along a half mile line and it dissects a half section field management unit. These situations may result in multiple management units being needed for a field that was previously managed as a single unit and would likely increase management effort and production costs. However, it is unknown if the project will result in field management unit splits, and it is anticipated that these situations would only occur in rare circumstances.

The scheduling of transmission line construction for frozen ground conditions during each of 2024-2025 and 2025-2026 will substantially reduce the potential for project activities to interfere with the operation of farming equipment for crop operations during the growing season.

Increased biosecurity risk

During the operation and maintenance phase of the project, there will be potential for soil to be transferred from field to field when maintenance vehicles and people are moving between fields. Through these situations, pests could be introduced and spread in previously non-affected areas.

The introduction and spread of pests would largely be of concern during spring, summer, and fall, which are associated with the growing season and cropping activities. However, because routine transmission line maintenance in agricultural areas is typically completed during winter periods and under frozen soil conditions there is a low risk for biosecurity, and the potential for compromised biosecurity will be reduced.

For livestock operations, especially on pasture/grazing lands, there is potential for the introduction of disease during maintenance and repair activities. This potential for biosecurity risk would be greater where transmission line maintenance intersects areas of multiple operations with different livestock types. Pests and diseases have lasting adverse production value (reductions in yield and livestock health) and production cost (increased input and management costs) effects. The effect of compromised biosecurity would be greater for livestock operations with large numbers of animals contained in small common spaces (e.g., cattle feedlots).

Interference with farm infrastructure and operations

The presence of project structures has the potential to interfere with farm infrastructure and farm operations for the lifetime of the project.

The presence of project towers will affect the use of equipment during field operations (e.g., tillage, fertilizer application, seeding, ground application of crop protection and harvesting). Project structures will also create problems for turning field machinery and maintaining efficient fieldwork patterns. As part of design mitigation to reduce inconvenience and increased cost to producers, in agricultural areas, Manitoba Hydro will be using self-supporting towers which have a relatively smaller footprint, to limit the effect on agricultural structures and operations and (Chapter 2, Project description).

Given that some producers in the LAA indicated that they apply cattle manure to their fields for hay production, the presence of project towers may interfere with manure spreading. The presence of project structures could limit the area to which manure can be applied to, the direction of application, the maneuvering requirements and time and labour requirements.

Interference with other farm infrastructure such as corrals, rotational grazing and access to gates may cause inconvenience to livestock producers managing and moving livestock. However, these situations are anticipated to be rare and effects may be reduced through tower spotting following discussions with landowners during easement negotiations.

Concerns of for livestock due to EMF and stray (tingle) voltage

Electromagnetic field (EMF) can induce very low currents in anything capable of conducting electricity, including human beings and animals. However, these currents are too weak to be perceptible. Transmission line-induced electromagnetic field (EMF) can potentially have effects on livestock and bees but the scientific research on this is not conclusive. Some studies suggest potential adverse effects while others have not found conclusive evidence of notable harm caused by transmission line-induced EMFs on livestock or bees.

Some studies have shown that exposure of bees to EMF can disrupt bee navigation and foraging abilities, leading to difficulties in returning to the hive and potentially impacting the overall health of the colony (Shepherd et al., 2019; Shepherd et al., 2018). However, some of these studies' findings (e.g., Shepherd et. al 2019 and Shepherd et al 2018) were based on, laboratory-based sting extension response and intruder assay experiments, and simulated 400-kV transmission line conditions, respectively that may not may not be reflective of actual field conditions. For example, prior to their use in the Shepherd et al (2019) experiments, bees were exposed to levels of EMF that corresponded to 0 (control), 100 μT, and 1,000 μT for 17 hours before undergoing sting extension response trials. Also, since the project will consist of a 115-kV transmission line, which is much lower than the 400-kV capacity for which conditions were simulated by Shepherd et. al (2018), the extent of impacts on bees due to transmission line EMF for the project could be less. While EMF effects on livestock and bees were not raised as a concern by individual landowners, agricultural producers and agricultural producer representative organizations, EMF concerns for livestock and bees have been raised for previous transmission projects. Manitoba Hydro has engaged with the provincial apiarist in pursuit of understanding whether the reported adverse EMF effects on bee behaviour and honey production have been observed and or reported by beekeepers who place some their hives within transmission rights-of-way in Manitoba (Micholson 2023b, pers. comms).

Stray voltage is typically caused by electrical problems and takes the form of an undesirable difference in electrical potential between two objects. For example, if a cow touches a trough with her nose and the damp floor with her hind legs, and if the trough and the floor have different electrical potentials, a weak current will circulate in the cow's body. This current, when it is strong enough for the animal to perceive it, may cause some discomfort. Stray voltage concerns for livestock were raised by beef and dairy producers' representative organizations.

- Dairy Farmers of Manitoba indicated that transmission line towers can cause stray voltage concerns when they are placed too close to dairy facilities and that soliciting producer input for tower placement near dairy operations would reduce such concerns (Wiens 2022, pers. comms). Based on the locations' information for

their member operations, there are no dairy farms located in the LAA as the closest dairy farm is approximately 2.5 km south of Whiteshell station.
- Manitoba Beef Producers expressed transmission line-related stray voltage as a health and safety concern for cattle operations (Callum and Cousins 2022, pers. comm.). Based on engagement feedback, it appears that there are cattle operations within the LAA.

Mitigation for conflict with agricultural activities

Mitigation for interference with farm operations or damage to infrastructure includes the following:

- Transmission line routing considered effects on existing agricultural buildings (e.g., barns). In the alternative route evaluation model, proximity to buildings and structures was one of the criteria for route evaluation under the built environment perspective, which was concerned with limiting socio-economic effects.
- The transmission line has been routed to parallel field boundaries (e.g., edge of road rights of way, half-mile lines) and avoid/reduce diagonal crossings.
- Manitoba Hydro will pay compensation to landowners and agricultural Crown land lessees pursuant to the Landowner Compensation Program for damage to infrastructure/crops from construction or maintenance activities. Where possible, construction schedules will take into consideration the timing of agricultural activities.

Ancillary damage compensation could be provided for:

- damage to infrastructure, including that for hog manure application, irrigation and livestock watering.
- Prior to construction, if producers indicate the presence of manure application draglines, irrigation networks and watering infrastructure, they will be considered when tower siting, where possible, to reduce local effects. Manitoba Hydro understands that even though overall Project effects will affect a small proportion of the RAA, local effects can have a large effect on individual operations, particularly where there are multiple transmission lines in one field.

Mitigation for increased need for management effort includes the following:

- Manitoba Hydro applied design mitigation to reduce project effects on the increased need for management effort due to project presence. Transmission lines were aligned in straight lines and diagonal crossing of agricultural lands was avoided, wherever feasible, as recommended by Manitoba CEC (2013).

- Construction will be timed to avoid overlap with growing season. Where this is not feasible, Manitoba Hydro will pay compensation pursuant to the Landowner Compensation Program.
- Construction damage compensation is offered to landowners who experience damage to their property due to the construction, operations, and maintenance of the transmission line. It will be provided to compensate a landowner for damages such as the reapplication or rejuvenation of compacted topsoil where the remedial work requires farm machinery and the expertise of the landowner.
- Structure Impact Compensation is a one-time payment to landowners for each transmission tower placed on land classed as agricultural. Structure Impact Compensation will cover:
    - reduced productivity in an area of overlap around each tower structure
    - additional time required to maneuver farm machinery around each structure
    - double application of seed, fertilizer and weed control in the area of overlap around each tower structure
- Ancillary damage compensation is a one-time payment when Manitoba Hydro's use of the right-of-way directly or indirectly affects the use of the property. It will be provided for:
    - constraint effects such as restricted access to adjacent lands
    - traditional effects such as highest and best use of land

Mitigation for increase biosecurity risk includes the following:

- Manitoba Hydro understands the importance of upholding cropland biosecurity and sought to reduce the potential interaction between the project and croplands and livestock operations during route selection.
- Manitoba Hydro staff and contractors will follow and implement the Manitoba Hydro corporate policy on biosecurity and agricultural biosecurity SOP, respectively, during construction and operation and maintenance activities. Measures to be implemented in line with general considerations of the agricultural biosecurity SOP (Manitoba Hydro 2023) include:
    - completion of a risk assessment to identify the perceived risk to agricultural land from maintenance and construction activities using frequency of activities and consequence levels (field conditions such as wet, or frozen)
    - if existing farm level biosecurity measures exist, Manitoba Hydro staff and contractors will strive to meet the requirements of the agricultural operation when access is required

- regular maintenance activities (including patrols) on agricultural lands will typically be scheduled after crops have been harvested and conducted primarily after freeze-up
  - avoiding access through areas that may contain manure.

- Where construction or maintenance activities have the potential to interfere with field activities, discussions with the landowner or producers will be held to move livestock/equipment during those activities.
- Asking producers or landowners to avoid spreading manure or pasturing livestock in the transmission line ROW prior to construction.
- All equipment will arrive at the ROW or project site clean and free of soil or vegetative debris (including weed seeds).
- Where construction or maintenance activities have the potential to interfere with field activities discussions with the landowner or producers will be held to move livestock/equipment during those activities.
- Per the agricultural biosecurity SOP (Manitoba Hydro 2023b), in areas of high biosecurity risk, Manitoba Hydro staff or contractors will:
  - schedule activities to occur when ground conditions are more favourable, if possible
  - make sure that proper care and attention is paid to cleaning equipment and footwear prior to leaving the site, if activities cannot be rescheduled
  - fine clean equipment to remove remaining soil using pressure washing to rinse off remaining soil or manure. Such fine cleaning should be done at the field approach, preferably, but can be completed offsite. Vehicles must be cleaned before being taken to a different area. Use safety footwear that can be easily cleaned. Use a brush to remove visible soil or manure and disinfect footwear when leaving the field:
  - disinfectants such as 1% Virkon may be carried in a household spray bottle or a larger container if required
  - if washing footwear with disinfectant in the field, make sure wastewater is contained and appropriately disposed of offsite
  - fill out the Vehicle and Equipment Cleaning Record and submit with the Biosecurity Checklist.

Regarding concerns for impacts to livestock and bees due to EMF and stray voltage, Manitoba Hydro attempts to alleviate landowner and producer concerns by implementing the following mitigation to limit exposure of livestock to perceived EMF and stray (tingle) voltage:

- Through routing, Manitoba Hydro sought to reduce the interaction between the project and livestock operations.
- Manitoba Hydro will continue engaging with livestock producers and beekeepers regarding EMF and stray voltage concerns.
- Manitoba Hydro has engaged with the provincial apiarist in pursuit of understanding whether any of the reported adverse EMF effects on bee behaviour and honey production have been observed and or reported by beekeepers who place some their hives within transmission rights-of-way in Manitoba.

7.12.5 Summary of residual effects on commercial agriculture

7.12.5.1 Loss and or degradation of land

With the implementation of mitigation measures, including compensation, residual effects from the project due to temporary loss and degradation of land are anticipated to be adverse and confined to the PDA (i.e., site of construction or maintenance activities). Within the PDA, the temporary loss of agricultural land during construction would result in a small but measurable change in the capacity for agriculture (i.e., low magnitude). The change in land capability class for agriculture and extent of lands affected by compaction could result in a change that is greater than that for temporary land loss but one that will not affect the sustainability of the capacity for agriculture (i.e., moderate magnitude) within the PDA. Residual effects due to degradation of land will be highly sensitive to timing – construction during the growing season will result in more pronounced effects while construction under non-frozen conditions will largely reduce the potential for soil degradation. Residual effects from temporary land loss will be limited to the construction phase (short-term) while those for degradation of land due to compaction will extend beyond the construction phase (medium term) because if compaction effects occur, they could persist for a few years following remedial action. Temporary land loss will occur once during construction. In contrast, the frequency of events leading to degradation of soil is considered irregular because there could be multiple construction activities occurring at irregular intervals during construction and operation that could trigger a compaction effect. Because land removed from agricultural use within the ROW and temporary footprints during construction will be returned to agricultural use after construction, the residual effects due to temporary land loss and degradation of land are considered reversible.

With the implementation of mitigation measures (primarily through design mitigation and landowner compensation), the residual effects from the project due to permanent loss of land during operation and maintenance are anticipated to be adverse and confined to the PDA (i.e., site of tower strictures and station footprint). The residual effects of soil degradation are not anticipated during normal operation and maintenance. Within the PDA, the permanent loss of agricultural land will result in a small but measurable change in the capacity for agriculture (i.e., low magnitude). The land area affected by the presence of the project will be small compared to that currently used for agriculture in the PDA and LAA. However, while the overall effect of permanent land loss is small, permanent land loss is an important consideration at the individual farm level. Residual effects due to permanent land loss are a one-time event and permanent because the loss will persist for the lifetime of the project. Permanent loss of agricultural land is deemed reversible because the affected land can be returned to agricultural use following decommissioning.

7.12.5.2 Conflict with agricultural activities

Following the application of mitigation, while the potential for conflict with agricultural activities remain, the magnitude of these effects and the extent over which they are experienced will be reduced. Additionally, communications with landowners prior to construction may result in additional site-specific mitigation further reducing the potential conflict with agricultural activities. Compensation will be provided (see Section 7.12.1) to address the residual effects of potential conflict with agricultural activities and damages that may be caused during construction.

While the potential for conflict with agricultural activities will remain post-mitigation, the magnitude of these effects and the extent over which they are experienced will be reduced. Additionally, communications with landowners prior to land access for operation and maintenance may result in reduced potential for conflict with agricultural activities. Compensation will be provided to address the residual potential conflict during operation and maintenance. Residual effects due to conflicts with agricultural activities will be highly sensitive to timing for those conflicts that are associated with growing season activities (e.g., tillage, harvesting) but timing will be non-applicable for those activities that occur all year round (e.g., livestock production).

A summary of residual environmental effects that are likely to occur on commercial agriculture because of the project is provided in Table 7-77.

Table 7-77: Project residual effects on commercial agriculture

Residual Effects Characterization							
Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Loss and/or degradation of agricultural land							
Construction	A	L-M	PDA	HS	ST-MT	S-IR	R
Operations and Maintenance	A	L	PDA	HS	MT-LT	S-IR	R
Conflict with agricultural activities							
Construction	A	L-M	LAA	HS-N/A	ST-MT	IR	R
Operations and Maintenance	A	L	LAA	HS-N/A	MT-LT	R-C	R

KEY

See Table 7-68 for detailed definitions

Project Phase
C: Construction
O: Operation
D: Decommissioning

Direction:
P: Positive
A: Adverse
N: Neutral

Magnitude:
NMC: No Measurable Change
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area

Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity

Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

N/A: Not applicable

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous

Reversibility:
R: Reversible
I: Irreversible

7.12.6 Assessment of cumulative effects on commercial agriculture

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC, and

- the residual effects could act cumulatively with residual effects of other past, present, or reasonably foreseeable future physical activities

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

Table 7-78 displays the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 7-78: Potential cumulative effects on commercial agriculture

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects	
	Loss or degradation of agricultural land	Conflict with agricultural activities
Existing/Ongoing Projects and Activities		
Agriculture (crop and livestock production)	-	-
Domestic Resource Use (hunting, trapping, fishing)	-	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	-
Infrastructure (i.e., provincial trunk highways, provincial roads,	-	-
Generating Stations (Pointe du Bois, Slave Falls, Seven Sisters)	-	-
Transmission Lines		
P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines)	✓	✓
R1 and R2 (Pointe du Bois to Slave Falls) 115-kV transmission lines	-	-

Table 7-78: Potential cumulative effects on commercial agriculture

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects	
	Loss or degradation of agricultural land	Conflict with agricultural activities
S2 (Slave Falls to Stafford) 115-kV transmission line	✓	✓
SK1 (Seven Sisters to Star Lake) 115-kV transmission line	✓	✓
SG12 (Great Falls to Seven Sisters) 115-kV transmission line	✓	✓
SR3 (Seven Sisters to McArthur Falls) 115-kV transmission line	✓	✓
SW1, SW2, SW3 and SW4 (Seven Sisters to Whiteshell) 115-kV transmission lines	✓	✓
ST5 and ST6 (Seven Sisters to Transcona) 115-kV transmission lines	✓	✓
K21W and K22W (Whiteshell to Kenora) 230-kV transmission line	✓	✓
Nuclear Power (Whiteshell Laboratories)	-	-
Commercial Wild Rice Harvesting Operation at Rice Lake	-	-
Future Projects and Activities		
Slave Falls Generating Station (Slave Falls 7-Bay Sluiceway Life Extension Project)	-	-
Nuclear Power (Whiteshell Laboratories) - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	-	-

Table 7-78: Potential cumulative effects on commercial agriculture

Other Projects and Physical Activities with Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects	
	Loss or degradation of agricultural land	Conflict with agricultural activities

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

– = Interactions between the residual effects of other projects and those of the project residual effects are not expected.

The assessment of cumulative effects that are likely to result from the project in combination with other projects and physical activities follows in the sections below.

Existing projects and activities have been underway over the past several decades, from the 1870s until present day. These existing projects and activities include domestic resource use, commercial forestry, agricultural production, domestic resource use, recreational activities, road and highway infrastructure, and hydro electricity generating stations (i.e., Pointe du Bois [1911], Seven Sisters [1931] and Slave Falls [1948]). Several operational transmission lines that were built between 1920 and 1972, also traverse the area.

There are two reasonably foreseeable future projects at two existing developments within the RAA, namely the Slave Falls Sluiceway Extension Project and the StarCore Nuclear's Pinawa Demonstration Reactor. Neither of these two future projects will interact temporally or spatially with the project to result in cumulative effects on commercial agriculture.

7.12.6.1 Cumulative effect pathways for loss or degradation of commercial agricultural land

Past and present projects that were identified as having potential cumulative effects with the effects of this project on commercial agriculture are primarily power transmission lines (see Table 7-78). These developments have contributed to agricultural land loss throughout the RAA. Other existing linear developments that include aboveground infrastructure that preclude all or portions of the development footprints to be returned to agricultural production following construction, such highways, have also contributed to land losses from commercial agriculture in the RAA.

None of the two reasonably foreseeable future projects will interact with the project and result in cumulative loss or degradation of commercial agricultural land.

Mitigation for cumulative effects of loss or degradation of commercial agricultural land

The implementation of mitigation measures described in Section 7.12.4 will reduce the effects on agriculture from the project and the project's contribution to cumulative effects on agriculture.

Additional mitigation measures proposed to reduce the cumulative environmental effects on loss or degradation of agricultural land include the following:

- Manitoba Hydro will continue to evaluate design mitigation, including tower types, tower spacing, and tower placement to reduce agricultural land loss as much as feasible.
- Manitoba Hydro will continue to support studies to understand the effects of its projects on agricultural land use and use study outcomes to reduce effects of existing and future projects on conflict with agricultural activities.

Residual cumulative effects for loss or degradation of agricultural land

A portion of land capable of supporting commercial agriculture in the RAA has already been disturbed due to previously constructed and operational linear projects, primarily transmission lines. While agriculture is not the dominant land use in the RAA, these existing projects have not substantially reduced the land available for commercial agriculture.

With the addition of the proposed project's effects and those of other projects, cumulative effects on loss of agricultural land are anticipated to be low in magnitude. While the project will result in land loss that is considered permanent, it will be reversible upon the decommissioning of the project at some future date. The project's contribution to land loss will be small relative to losses from past projects and is not expected to measurably affect the capacity for commercial agriculture in the RAA. The combined cumulative environmental effect will be measurable but is not anticipated to result in an impairment to the capacity of agriculture in the RAA and agriculture is anticipated to continue at or near pre-disturbance levels.

7.12.6.2 Cumulative effect pathways for conflict with agricultural activities

Past and present projects in the RAA (Table 7-78) have the potential to interact cumulatively with the project if their plans included the development of facilities in areas under agriculture. These developments have contributed to conflict with agricultural activities throughout the RAA.

None of the two reasonably foreseeable future projects will interact with the project and result in cumulative conflict with agricultural activities.

Mitigation for cumulative effects of conflict with agricultural land

The implementation of mitigation measures described in Section 7.12.4 will reduce the effects on agriculture from the project and the project's contribution to cumulative effects on commercial agriculture.

Additional mitigation measures proposed to reduce the cumulative environmental effects on conflict with agricultural activities include the following:

- Manitoba Hydro will continue to evaluate design mitigation, including tower types, tower spacing, and tower placement to reduce conflict with agricultural activities.
- Manitoba Hydro will continue to support studies to understand the effects of its projects on commercial agricultural land use and use study outcomes to reduce effects of existing and future projects on conflict with agricultural activities.

With the addition of project effects and those of other projects, cumulative effects on conflict with agricultural activities will be moderate in magnitude and will not result in an impairment of the capacity of agriculture in the RAA and production is anticipated to continue at near pre-disturbance levels. It is anticipated that much of the project's contribution to this cumulative effect will be permanent, but reversible upon the decommissioning of the project at some future date. Agriculture is considered to have a moderate capacity to accommodate or recover from changes anticipated from the cumulative effects of past and current projects. While these projects will act cumulatively and increase the level of conflict with agricultural activities, agricultural production is anticipated to return and continue near pre-disturbance levels. The project's contribution to cumulative environmental effects is not expected to measurably affect the capacity for commercial agriculture within the RAA.

7.12.6.3 Summary of residual cumulative effects

A summary of residual cumulative effects that are likely to occur on commercial agriculture due to project activities is provided in Table 7-79.

Table 7-79: Residual cumulative effects on commercial agriculture

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect of loss or degradation of land							
Residual cumulative effect	A	L	RAA	NS	LT	IR	R
Contribution from the project to the residual cumulative effect	The project will result in temporary and permanent land losses for agricultural land uses throughout the life of the project. Permanent land losses will be limited in extent to a small portion of the PDA.						
Residual cumulative effect of conflict with agricultural activities							
Residual cumulative effect	A	M	RAA	NS	LT	R	R
Contribution from the project to the residual cumulative effect	The project will result in conflict with agricultural activities throughout the life of the project. These effects will be limited in extent to the PDA for some types of conflicts (e.g., ground operations for seeding, harvesting) and to the LAA for others (e.g., manure application, restricted movement of livestock).						

KEY

Direction:	Geographic Extent:	Frequency:
P: Positive	PDA: Project Development Area	S: Single event
A: Adverse	LAA: Local Assessment Area	

Table 7-79: Residual cumulative effects on commercial agriculture

Residual cumulative effect	Residual cumulative effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

N: Neutral	RAA: Regional Assessment Area	IR: Irregular event
Magnitude:	Timing	R: Regular event
N: Negligible	NS: No sensitivity	C: Continuous
L: Low	MS: Moderate sensitivity	Reversibility:
M: Moderate	HS: High sensitivity	R: Reversible
H: High	Duration:	I: Irreversible
	ST: Short-term	N/A: Not applicable
	MT: Medium-term	
	LT: Long-term	

7.12.7 Determination of significance

With mitigation and environmental protection measures, the residual effects on commercial agriculture are predicted to be not significant.

With mitigation and environmental protection measures, the cumulative effects on commercial agriculture are predicted to be not significant.

7.12.8 Prediction confidence

There is a moderate to high degree of confidence in the predicted effects of construction and operation and maintenance of the project on commercial agriculture. The prediction confidence is based on the information compiled during desktop-based data compilation, data analyses and understanding project activities, location, and schedule as well as information gathered from KPIs and other public engagement. Windshield surveys were conducted to provide additional information on the buildings inventory. There is a moderate to high degree of confidence in assessment predictions. While some of the available desktop data are limited in scale (e.g., reliability (e.g., AAFC crop inventory data are based on remote sensing and are not field validated), and completeness (e.g., agricultural operation type and location information was not provided by most industry association groups), the environmental effects mechanisms are well understood.

The mitigation measures identified in Section 7.12.4 are standard practice and have been implemented on previously completed transmission projects. Finally, the significance conclusion is based upon a well-founded understanding of the commercial agriculture context within the project RAA.

The prediction confidence with respect to cumulative effects is moderate given the lack of spatial context available for the assessment of cumulative effects.

7.12.9 Follow-up and monitoring

Environmental inspectors will conduct monitoring during transmission line construction and station modification or expansion. Inspectors will monitor activities for compliance with regulatory commitments and mitigation measures as outlined in the construction environmental protection plan (Chapter 11). Select construction activities conducted during certain periods (e.g., during wet soil conditions in soils that are at high risk to compaction) may be monitored by resource specialists (e.g., soil scientists, Professional Agrologists).

The objectives of the monitoring plan are to:

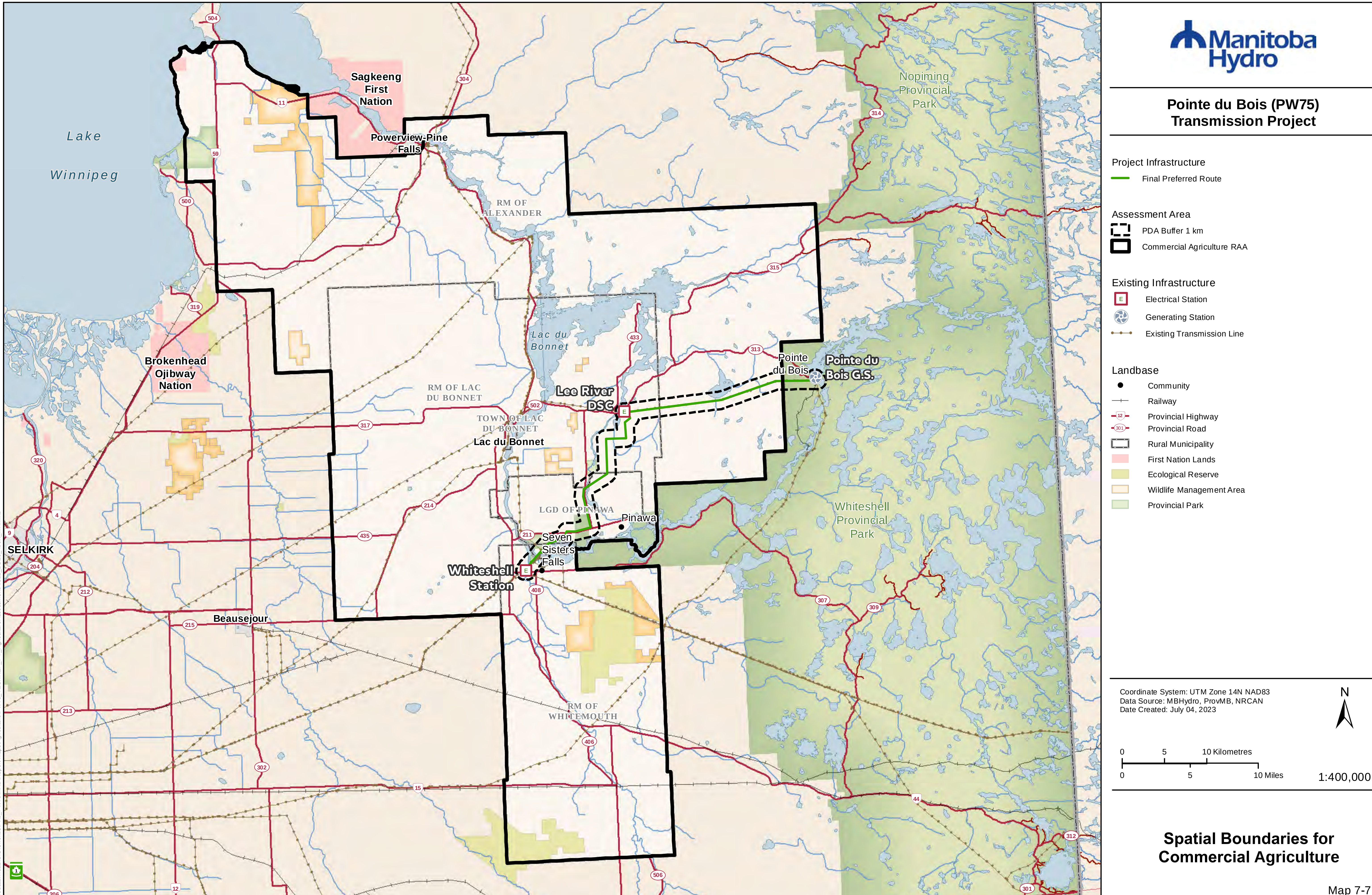
- Confirm the nature and magnitude of predicted environmental effects
- Evaluate the success of mitigation implemented
- Identify unexpected environmental effects of the Project, if they occur, and identify mitigation measures to address unexpected environmental effects, where required
- Confirm compliance with regulatory requirements, including approval terms and conditions
- Provide baseline information to evaluate long-term changes or trends

The monitoring plan evaluates land rehabilitation success against baseline and adjacent representative site conditions, recommends corrective actions, and allows for adaptive management where deficiencies are identified. This monitoring will occur as part of the post-construction monitoring and include monitoring the success of site-specific mitigation measures or other specific requirements that may be identified through the assessment process and reporting.

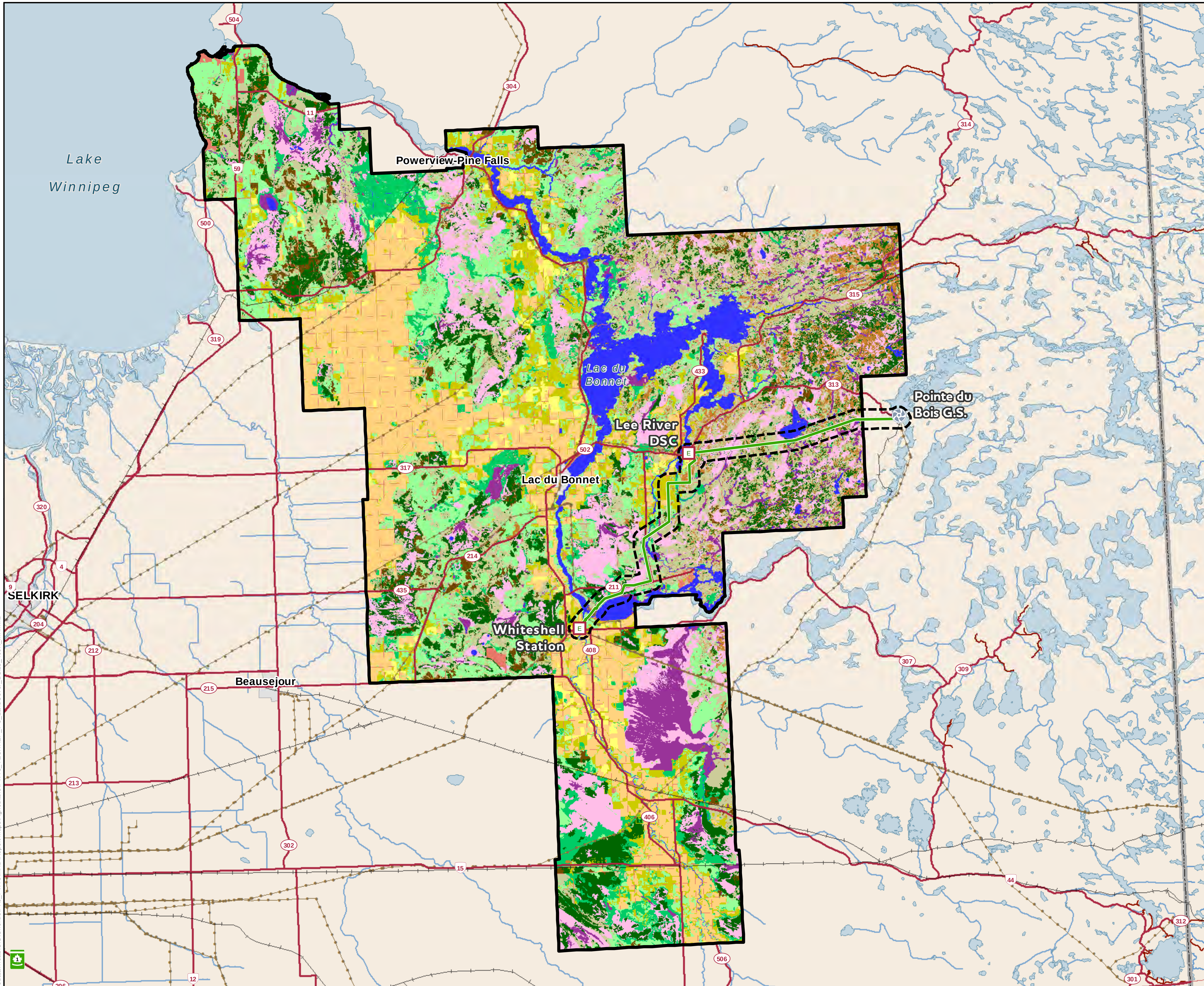
Specifically, rehabilitation success will be confirmed as follows:

- Post-construction inspection will confirm that agricultural fields are left in an acceptable condition and are free of visual evidence of compaction and rutting
- The Erosion Protection and Sediment Control Plan will describe evaluation mechanisms pertaining to soil erosion

Additional follow-up and monitoring may be warranted occasionally on a site-specific basis if issues related to crop performance or biosecurity (e.g., weed spread) arise within the ROW. Due to the site-specific nature of these issues, the follow-up and monitoring program needs to be developed following identification of the issue and tailored to the specific issue.



Manitoba Hydro
Pointe du Bois (PW75) Transmission Project
Project Infrastructure
Final Preferred Route
Assessment Area
PDA Buffer 1 km
Commercial Agriculture RAA
Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line
Landbase
Community
Railway
Provincial Highway
Provincial Road
Rural Municipality
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023
N
0 5 10 Kilometres
0 5 10 Miles
1:400,000
Spatial Boundaries for Commercial Agriculture
Map 7-7
Lake Winnipeg
Sagkeeng First Nation
Powerview-Pine Falls
RM OF ALEXANDER
Nopiming Provincial Park
Lac du Bonnet
Brokenhead Ojibway Nation
RM OF LAC DU BONNET
TOWN OF LAC DU BONNET
Lac du Bonnet
Lee River DSC
Pointe du Bois
Pointe du Bois G.S.
LGD OF PINAWA
Pinawa
Seven Sisters Falls
Whiteshell Station
Whiteshell Provincial Park
SELKIRK
Beausejour
RM OF WHITEMOUTH



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- PDA Buffer 1 km
- Commercial Agriculture RAA

Land Cover
- Agricultural Cropland
- Bare Rock, Gravel and Sand
- Coniferous Forest
- Cultural Features
- Deciduous Forest
- Forage Crops
- Forest Cutover
- Marsh and Fens
- Mixedwood Forest
- Open Decidious Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Railway
- Provincial Highway
- Provincial Road

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

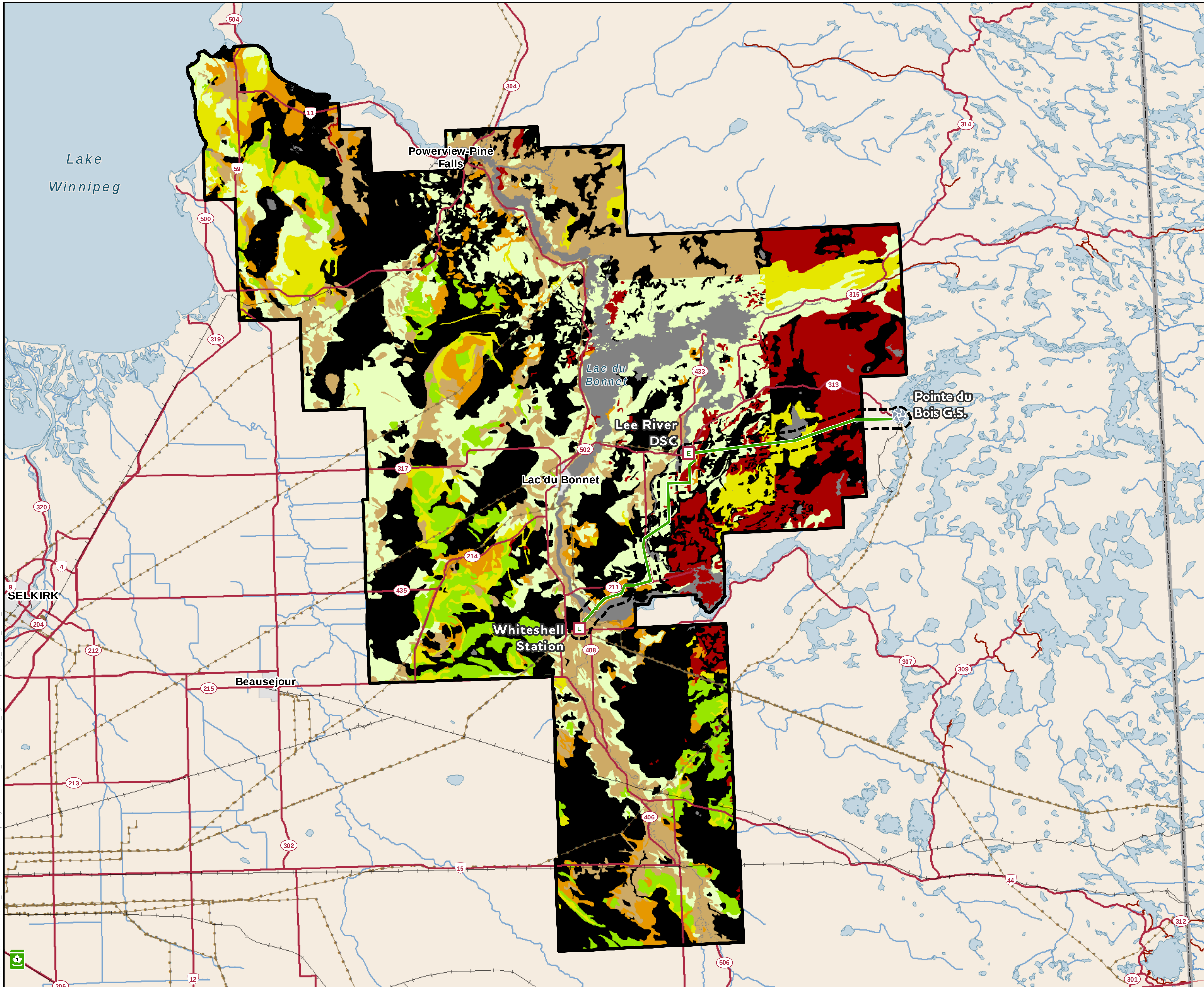
N

0 5 10 Kilometres
0 5 10 Miles

1:400,000

Land Cover in the Commercial Agriculture Assessment Areas

Map 7-8



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
- Final Preferred Route

Assessment Area
- PDA Buffer 1 km
- Commercial Agriculture RAA

Agriculture Capability
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Class 6
- Class 7
- Organic
- Unclassified;

Existing Infrastructure
- Electrical Station
- Generating Station
- Existing Transmission Line

Landbase
- Railway
- Provincial Highway
- Provincial Road

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

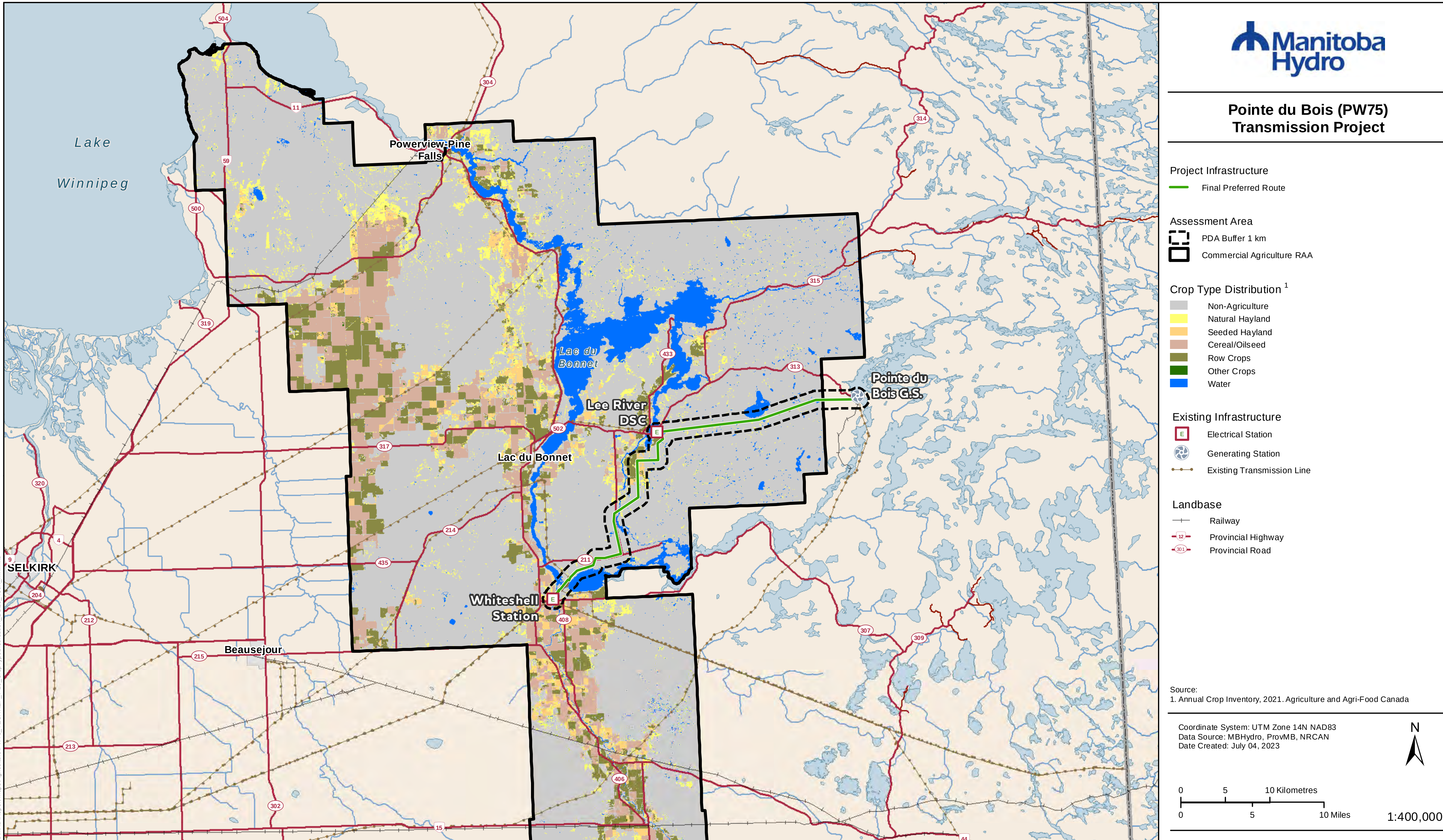
N

0 5 10 Kilometres
0 5 10 Miles

1:400,000

Agriculture Capability in the Commercial Agriculture Assessment Areas

Map 7-9



Crop Type Distribution in the Commercial Agriculture Assessment Areas

Map 7-10

7.13 Economic opportunities

Economic opportunities refer to unique business situations or community circumstances that enhance the economic state of individuals and or communities by providing a stimulus to the growth and or retention of commerce and industry.

Economic opportunities was selected as a valued component (VC) because of its importance to local and provincial residents, business owners, communities, and governments. The project also has potential to create and or enhance the economic opportunities in the project region. During project engagement, various audiences expressed interest in employment and business opportunities related to the project. Economic opportunities comprise the following topic areas:

- **Regional employment** –Project construction will generate employment opportunities for the local and regional labour force. Direct employment opportunities may include management and supervisory roles, inspection services, equipment operators, health and safety, trades, and semi-skilled and unskilled labour. Project spending during construction will also generate indirect and induced employment opportunities. Indirect employment is generated within industries supplying intermediate components such as raw materials, while induced employment is generated by household spending (e.g., consumer products, restaurants) from wages earned by direct and indirect workers.
- **Regional business** – Project spending will generate subcontracting opportunities and the demand for goods and services from local and regional businesses. Such opportunities could include the provision of accommodations, parts supply, and concrete foundations materials.
- **Regional economy** – estimates of government tax revenue and contributions to gross domestic product (GDP). Project spending and employment will contribute to the regional, provincial, and national economies. It will also contribute to federal, and provincial government revenue through taxation on income and on goods and services procured for the project.

This section assesses the effects of project activities during construction, operation and decommissioning on economic opportunities, drawing from the baseline conditions described in Section 6.3.5. An assessment of cumulative effects on economic opportunities is also presented.

7.13.1 Scope of the assessment

This assessment of the project effects on the economic opportunities has been influenced by Manitoba Hydro's previous experience with transmission line assessments, e.g., the Manitoba-Minnesota Transmission Project (MMTP) and the

Dorsey to Wash'ake Mayzoon Transmission Project. Like the noted previous projects, for the current project, Manitoba Hydro conducted multi-staged route selection and project engagement processes that considered various qualitative and quantitative factors to determine the final proposed route (see Chapter 3, Route selection).

Issues related to economic opportunities were identified during project engagement with various public, First Nation and Métis audiences. Most of the engagement feedback related to economic opportunities were on employment and contracting opportunities that could result from the project.

This section builds on the baseline conditions that were presented in Section 6.3.5 and assesses the effects of the project on economic opportunities from construction, operation, and maintenance, and decommissioning of the project.

7.13.1.1 Provincial regulatory framework

The project primarily involves the construction of 51 km of 115 kV transmission line, in a 60 m right-of-way, terminating at Whiteshell and Pointe du Bois Stations. The project also includes installation of equipment at Whiteshell Station to terminate the new line, expansion of the Pointe du Bois Station, construction of a tapping structure at the Lee River distribution supply centre, and salvage of P3/P4 66 kV transmission line from Pointe du Bois Station to the Lee River distribution supply centre.

As described in Section 2.5, a provincial licence for a Class II development is required for the transmission line under the *Environment Act* (Manitoba). Consideration of economic effects is required under the *Environment Act* per Manitoba Regulation 163/88.

7.13.1.2 Consideration of issues raised during engagement

In addition to engaging with regulators, Manitoba Hydro conducted a project engagement process (Section 4.0) for the project to engage with various audiences potentially affected by or interested in the project. The following key themes were identified with respect to economic opportunities:

- Opportunities for employment and contracting with the project, how positions/contracts will be advertised, and how job seekers and businesses can go about applying for work/contracts.
- Opportunities for Indigenous employment and contracting with the project.
- Interest in First Nations and Métis participation in environmental monitoring opportunities.
- Potential opportunities for wood harvesting along the right-of-way.
- Availability of training to increase local employment.

- Efforts that are being taken to increase participation of Indigenous persons and women on the project.

7.13.1.3 Spatial boundaries

The following spatial boundaries are used to assess residual and cumulative environmental effects of the project on economic opportunities and are shown on Map 7-11:

- **Project development area (PDA):** encompasses the proposed project footprint as described in Chapter 2 and is the anticipated area of physical disturbance associated with the construction, operation, and maintenance, and decommissioning of the project, including the Pointe du Bois and Whiteshell stations.
- **Local assessment area (LAA):** encompasses the communities for which economic opportunities could occur due to the project, i.e., communities that are most likely to provide labour, goods and services required for project construction, operation and maintenance, and decommissioning. The LAA includes the PDA and the boundaries of the municipalities traversed by the PDA, namely, the RM of Alexander, RM of Lac du Bonnet, LGD of Pinawa, RM of Whitemouth, and Unorganized Territory Division No. 1 (part of Whiteshell Provincial Park and Pointe du Bois Station area).
- **Regional Assessment Area (RAA):** the RAA is the same as the LAA and deemed to encompass a sufficiently broad area for assessing cumulative effects, including the incremental effects of the project.

7.13.1.4 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.13.1.5 Residual effects characterization

Criteria used to characterize residual effects on economic opportunities are provided in Table 7-80.

Table 7-80: Characterization of residual effects on economic opportunities

Characterization	Description	Quantitative measure or definition of qualitative categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters in a direction beneficial to economic opportunities relative to baseline. Adverse – a residual effect that moves measurable parameters in a direction detrimental to economic opportunities relative to baseline. Neutral – no net change in measurable parameters for the economic opportunities relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	No Measurable Change – no measurable change in the effect can be noted. Low – a measurable change on economic opportunities that is not substantial compared to other existing economic contributors. Moderate – measurable change in economic opportunities that is comparable to other economic contributors. High – measurable change in economic opportunities that is substantial compared to other existing economic contributors.
Geographic Extent	The geographic area in which a residual effect occurs	PDA – residual effects are restricted to the PDA. LAA – residual effects extend into the LAA.

Table 7-80: Characterization of residual effects on economic opportunities		
Characterization	Description	Quantitative measure or definition of qualitative categories
		RAA – residual effects extend into the RAA.
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	Not applicable – seasonal aspects are unlikely to affect economic opportunities. Applicable – seasonal aspects may affect economic opportunities.
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – residual effect restricted to no more than the duration of the construction phase (36 months). Medium-term – residual effect extends through the operation phase (75 years). Long-term – residual effect extends beyond the operation phase (>75 years).
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event. Multiple irregular event – occurs at no set schedule. Multiple regular event – occurs at regular intervals. Continuous – occurs continuously.
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation. Irreversible – the residual effect is unlikely to be reversed.

7.13.1.6 Significance definition

A significant adverse residual effect for economic opportunities is defined as follows:

- Effects are distinguishable from current economic conditions and trends for the region and cannot be managed or mitigated through adjustments to programs, policies, or plans, or through other mitigation measures.
- The residual effects assessment considers both positive and adverse effects after mitigation and other management measures are implemented. However, a significance determination is provided only for adverse effects.

7.13.2 Project interactions with economic opportunities

Table 7-81 identifies, for each potential effect, the physical activities that might interact with economic opportunities and result in the identified effect.

Table 7-81: Project interactions with economic opportunities

Project activity	Effects		
	Change in regional employment	Change in regional business	Change in regional economy
Transmission line construction			
Mobilization and staff presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Right-of-way clearing	✓	✓	✓
Watercourse crossings	✓	✓	✓
Marshalling / fly yards	✓	✓	✓
Transmission tower construction	✓	✓	✓
Implodes	✓	✓	✓
Helicopter use	✓	✓	✓
Clean-up and demobilization	✓	✓	✓

Table 7-81: Project interactions with economic opportunities

Project activity	Effects		
	Change in regional employment	Change in regional business	Change in regional economy
Station modification			
Mobilization and staff presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Marshalling / fly yard (Pointe du Bois station)	✓	✓	✓
Realignment of access road (Pointe du Bois station)	✓	✓	✓
Site preparation (Pointe du Bois station)	✓	✓	✓
Station footprint expansion (Pointe du Bois station)	✓	✓	✓
Installation of electrical equipment	✓	✓	✓
Clean-up and demobilization	✓	✓	✓
Transmission line and station operation and maintenance			
Transmission line and station presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Inspection and maintenance	✓	✓	✓
Vegetation management	✓	✓	✓
Decommissioning			
Mobilization and staff presence	✓	✓	✓

Table 7-81: Project interactions with economic opportunities

Project activity	Effects		
	Change in regional employment	Change in regional business	Change in regional economy
Vehicle and equipment use	✓	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	✓
Rehabilitation	✓	✓	✓
Clean-up and demobilization	✓	✓	✓

✓ = Potential interaction

– = No interaction

Because all project activities have a labour and expenditure component, it is anticipated that they will all interact with economic opportunities. Project construction, operation and maintenance, and decommissioning will create local and regional employment and procurement opportunities, while household spending by workers directly or indirectly associated with the project will induce additional economic effects. Government tax revenue generated during all project phases will be from income and consumption taxes.

7.13.3 Potential effects, pathways, and measurable parameters

Potential effects, effect pathways and measurable parameters and units of measurement used to characterize and assess effects on economic opportunities are provided in Table 7-82.

Table 7-82: Potential effects, effects pathways and measurable parameters for economic opportunities

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
Change in regional employment	Project demand for labour during construction, operation and maintenance, and decommissioning will create job opportunities.	Direct, indirect, and induced employment, labour force availability
Change in regional business	Construction, operation, and maintenance, and decommissioning of the project will necessitate the purchase of goods and services.	Procurement of goods and services ($)
Change in regional economy	Tax revenue generated through construction, operation and maintenance, and decommissioning. Value of production (goods and services) added to the economy generated by the project.	Estimated government revenue ($) Estimated GDP ($)

7.13.4 Assessment of residual environmental effects on economic opportunities

Overall environmental effects assessment methods are presented in Section 5.0. This section includes the specific techniques used to carry out the assessment for economic opportunities.

7.13.4.1 Analytical assessment techniques

Economic effects of construction, operation and maintenance, and decommissioning are qualified based on the project description and experience of Manitoba Hydro from operating and maintaining the existing P3/P4 transmission lines, Pointe du Bois and Whiteshell stations, and other regional infrastructure. Project labour demand and contributions to government revenue (taxes) and GDP are compared to existing conditions.

Where possible, economic impacts are described in terms of direct, indirect, and induced effects, where:

- Direct effects result from labour, materials, and services demand from Manitoba Hydro and its contractors during project construction (e.g., construction labour, project management).
- Indirect effects result from contractor expenditures on goods and services (e.g., employment with suppliers/manufacturers of materials used during construction).
- Induced effects result from spending by direct and indirect workers on consumer goods and services (e.g., restaurant servers, retail positions).

7.13.4.2 Change in regional employment

Project pathways

Project demand for labour has the potential to result in employment creation in the LAA/RAA through direct, indirect, and induced effects from project activity. Direct effects can be created through the employment of local workers who live in the LAA/RAA and from the procurement of goods and services from local and regional businesses, which would help increase local economic activity.

Differences in employment opportunities between various subgroups of the LAA/RAA population (i.e., men, women, Indigenous, non-Indigenous) could result in a disparate distribution of income-related effects. Indirect and induced effects can result from employees spending portions of their earned income in local businesses, who then in turn will further spend their revenue locally and increase overall economic activity within the LAA/RAA.

Mitigation

Facilitation of economic and employment opportunities includes the following aspects that apply to each of the three potential environmental effects for economic opportunities:

- Manitoba Hydro will contact local municipal authorities prior to project start-up regarding potential economic opportunities.
- Manitoba Hydro will contact First Nation and MMF representatives prior to project start-up regarding potential economic opportunities.
- Manitoba Hydro will work with the contractors through the contracting process to promote participation of Manitoba businesses in the project.

As part of Manitoba Hydro’s application for federal funding to go towards the project, a gender-based analysis plus (GBA+) assessment was completed (Manitoba Hydro

2021). Manitoba Hydro will implement the following additional measures that were outlined in the GBA+ assessment (Manitoba Hydro 2021), to help equalize the positive economic effects of the project.

- Successful contractors will be required to develop and implement an on-the-job training program for women, with first preference given to Indigenous women.
- Manitoba Hydro has identified an employment target for each of the three identified priority groups (apprentices, Indigenous peoples, and women); which will be incorporated into the applicable project contracts.
- Manitoba Hydro will include Indigenous content as a tender evaluation criterion for transmission construction contracts in order to incentivize the use of Indigenous labour, subcontractors, and suppliers.
- Manitoba Hydro offers pre-placement programs for Indigenous candidates who do not meet the minimum academic qualifications of our power line technician program or our power electrician training program.
- Manitoba Hydro will support Indigenous communities to hire construction monitors for transmission line construction. Manitoba Hydro will seek to support hiring practices that support gender-diverse representation.
- Manitoba Hydro will ask contractors to collect identity data of their workforce throughout construction. Reporting outcomes will be summarized and provided to those communities who express interest in the data (in a manner that protects anonymity and is compliant with The Freedom of Information and Protection of Privacy Act (FIPPA) and The Personal Health Information Action (PHIA)).
- Project reporting will include information on the percentage of hours worked by targeted groups which include apprentices, Indigenous peoples, and women.
- Manitoba Hydro will continue to track the success of its Indigenous and Women's preplacement programming.
- Manitoba Hydro has well-established mechanisms to collect and report information related to community economic benefits and will report on employment outcomes (percentage hours worked) for the three identified priority groups (apprentices, Indigenous peoples, and women) on an annual basis over the course of construction.

Residual effects

Project construction, operation and maintenance, and decommissioning will generate direct, indirect, and induced employment and income opportunities for the local and regional labour force.

Based on preliminary estimates, construction of the transmission line will require a direct onsite workforce that ranges in size from 45 persons during mobilization/demobilization to 112 persons at peak construction. A direct workforce ranging in size from 6 to 20 persons is estimated for modification activities at Whiteshell station while a direct workforce of 6 to 40 persons is estimated for modification activities at Point du Bois station.

Construction activities typically require skilled and unskilled labour for short-term employment. Construction employment will require education or trades certification, or applicable construction experience for some positions. Employment opportunities typically associated with construction include:

- Management and supervisory personnel (e.g., supervisor, foreperson)
- Transmission line inspection services
- Equipment operators (e.g., heavy equipment, bulldozers, cranes)
- Trades and apprentices (e.g., mechanics, technicians)
- Semi-skilled and unskilled labour (e.g., labourer, mechanic's helper)
- Health and safety (e.g., health and safety coordinator)

During operations and maintenance, Manitoba Hydro staff and contractors will be used as required. Typical employment opportunities will include staff positions, operators, electrical technicians, mechanical technicians, and maintenance utility workers. Contractor staff could include patrollers, and equipment operators. The average workforce requirement will be small, unless there is damage to towers and replacement is required.

Based on previous experience, Manitoba Hydro anticipates that the decommissioning workforce size will be less than that needed for construction. Typical employment opportunities associated with decommissioning include management and supervisory personnel, equipment operators, trades and apprenticeships, semi-skilled and unskilled labour, and health and safety.

As of 2021, 1,530 LAA/RAA workers were employed in occupations in trades, transport, and equipment operation, 310 workers in natural and applied sciences, and 205 workers in manufacturing and utilities: occupations most applicable to construction-related activities. As a result, a sufficient supply of skilled labour in the LAA/RAA is anticipated. Despite availability, it is likely that a percentage of the project's workforce will be comprised of non-local workers; in particular, specialized labour. Other factors, including contractor(s) use of preferred labour and the degree to which workers choose to seek employment with the project will also affect the final composition of project workforces.

It is likely that employment benefits related to the project will be highly skewed toward the existing skilled trades workforce with most construction positions comprised of skilled trades positions filled by people identifying as men.

To increase employment benefits among underrepresented subpopulations, Manitoba Hydro, as part of its community employment benefits reporting framework, will implement employment targets for Indigenous persons, women, and apprentices. Employment targets for these priority groups as outlined in the GBA+ assessment (Manitoba Hydro 2021), are presented in Table 7-83. Employment targets will be incorporated into tender and contract documents, and Manitoba Hydro will require regular reporting from contractors on their progress. Targets for women have been established in consideration of the very low representation of women in key designated trades involved in the project (based on Canadian labour market averages).

Table 7-83: Employment targets – priority groups

Priority group	Generation-components target (% hours worked)	Transmission-components target (% hours worked)
Apprentices	10%	10%
Indigenous persons	10%	10%
Women	4%	4%

While some aspects of construction will provide employment opportunities predominantly for workers in designated trades, other aspects will provide opportunities for individuals without formal trades training. From Manitoba Hydro's experience with other recent transmission construction projects, tower assembly positions often serve as a first point of entry for individuals seeking employment in the construction sector: the barriers for entry into this field are comparatively low (no formal training is typically required) and remuneration is competitive. Rates to be paid by contractors and sub-contractors on project work would be at the contractors' discretion, but it is anticipated that compensation would be comparable to other recent projects.

Contractors often draw heavily from Indigenous communities to fill tower assembly positions. On the three most recent Manitoba Hydro transmission construction projects, over 70% of such assembly positions were filled by Indigenous people. Based on Manitoba Hydro's experience, it is likely that a portion of these positions for the project will be filled by individuals that have recently experienced unemployment.

Income inequality is evident among genders (Canadian Women's Foundation 2018). Average annual employment income in the LAA/RAA for men in 2020 was $52,400 versus $33,060 for women. Given the intersectionality of income with education (more men than women in the LAA/RAA hold an apprenticeship or trades certificate or diploma) and employment status, employment income from the project is not expected to reduce income inequality between genders in the LAA/RAA.

In addition to direct employment there may also be opportunities for indirect and induced employment for LAA/RAA residents. Indirect employment will be generated within industries supplying raw materials and intermediate components to the project while induced employment (e.g., service sector) is created through household spending on the part of the direct and indirect workforce. Where businesses become established or expand in response to project contracting opportunities new indirect and induced employment could be created.

With the implementation of mitigation measures residual effects on regional employment are expected to be positive in direction and low in magnitude during all project phases. Residual effects extend throughout the LAA/RAA. Seasonal aspects are unlikely to affect regional employment. Effects are short-term in duration during construction and decommissioning and medium-term during operation and maintenance. Effects occur continuously and are reversable following the completion of each project phase.

7.13.4.3 Change in regional business

Project pathways

Project expenditures on equipment, goods and services during construction, operation and maintenance, and decommissioning will generate direct and indirect opportunities for local and regional businesses. Businesses successful in securing contracts for the project could realize increased business revenue, which could support capital investment and hiring, thereby increasing capabilities and capacity. Spending of wages by direct and indirect workers will contribute to positive effects on local businesses, primarily within the service sector, resulting in induced effects.

Mitigation

The mitigation and enhancement measures identified in Section 7.13.4.2 (Change in regional employment) also apply to the assessment of change in regional business and are not reproduced in this section.

Residual effects

Where project expenditures occur locally, positive effects on regional businesses are expected. During construction, contracts to clear the transmission line right-of-way and for tower assembly could result in short-term opportunities for local and regional businesses. Technically complex components and tower structures will be designed and manufactured outside the RAA. In addition to direct and indirect contracting, service sector businesses operating in communities near the project will experience induced economic benefits from the purchase of meals, fuel, and accommodations by workers. Incidental purchases of repairs and parts for construction vehicles and equipment, as well as the purchase of some materials required for construction will also result in economic benefits in nearby communities.

During operations, maintenance activities could include short-term contracts for maintaining the transmission line right-of-way. Decommissioning is expected to result in indirect and induced contracting opportunities for local and regional businesses and would also be expected to result in induced opportunities through consumer spending.

Economic opportunities associated with the project will include provisions for Indigenous content which will be included as a tender evaluation criterion. Specifics around the various contracts and Indigenous-related provisions and opportunities are currently under review; however, based on Manitoba Hydro's previous experience it is anticipated that this approach to Indigenous procurement will provide opportunities for Indigenous contractors to participate in the work as prime or sub-contractors.

With the implementation of mitigation measures, residual effects on regional business are expected to be positive in direction and low in magnitude during all project phases. Residual effects extend throughout the LAA/RAA. Seasonal aspects are unlikely to affect regional business. Effects are short-term for construction and decommissioning, and medium-term for operation and maintenance. Effects occur continuously and are reversable following the completion of each project phase.

7.13.4.4 Change in regional economy

Project pathways

Project expenditures during construction, operation and maintenance, and decommissioning will result in increased economic activity in the form of employment and procurement, as discussed in previous sections. The project's contribution to provincial and federal economies is measured through GDP (value added after the cost of intermediate goods and services). In addition to GDP contributions, the project and its workers will be subject to varying levels of taxation which will contribute to government revenues.

Mitigation

The mitigation and enhancement measures identified in Section 7.13.4.2 (Change in regional employment) also apply to the assessment of change in regional economy and are not reproduced in this section.

Residual effects

Quantitative estimates of GDP contributions are not available. However, considering the low magnitude characterizations associated with the project phases on employment and business, the project's contribution to the GDP of the local economy is low in magnitude. At the provincial and federal level, the project's GDP contribution is negligible in magnitude.

In terms of taxes, increases to regional government revenue would only be realized where additional property taxes are realized because of changes in the assessed value of lands traversed by the project. Given that much of the existing right-of-way will be used for the transmission line effects on regional government tax revenue is low in magnitude. Benefits to provincial and federal tax revenues would occur where the taxable income of workers increases, resulting in increased income tax revenue, and through PST and GST collected on goods and services used on the project. Project effects on provincial and federal tax revenues are negligible in magnitude.

With the implementation of mitigation measures, project effects on economic opportunities at the LAA/RAA level are positive in direction and low in magnitude during all project phases. Seasonal aspects are unlikely to affect the regional economy. Effects are short-term in duration during construction and decommissioning and medium-term during operation and maintenance. Effects occur continuously and are reversable following the completion of each project phase. Residual effects beyond the LAA/RAA at the provincial and federal level are positive in direction but negligible in magnitude – negligible effects are not characterized further.

7.13.5 Summary of residual effects

A summary of residual effects that are likely to occur on economic conditions, because of the Project, is provided in Table 7-84.

Table 7-84: Project residual effects on economic opportunities

Project phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in Regional Employment							
C	P	L	LAA/RAA	NA	ST	C	R
O	P	L	LAA/RAA	NA	MT	C	R
D	P	L	LAA/RAA	NA	ST	C	R
Change in Regional Business							
C	P	L	LAA/RAA	NA	ST	C	R
O	P	L	LAA/RAA	NA	MT	C	R
D	P	L	LAA/RAA	NA	ST	C	R
Change in Regional Economy							
C	P	L	LAA/RAA	NA	ST	C	R
O	P	L	LAA/RAA	NA	MT	C	R
D	P	L	LAA/RAA	NA	ST	C	R

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area

Frequency:
S: Single event

Table 7-84: Project residual effects on economic opportunities

Project phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility

Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
NMC: No Measurable Change
L: Low
M: Moderate
H: High

RAA: Regional Assessment Area
Timing
NA: Not Applicable
A: Applicable
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible
N/A: Not applicable

7.13.6 Assessment of cumulative effects on economic opportunities

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- The project has residual adverse effects on economic opportunities
- The residual effects could act cumulatively with residual effects of other past, present, or reasonably foreseeable future physical activities

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities. Because the project is not expected to have a residual adverse effect on regional employment, business or economy, further assessment of cumulative effects is not warranted.

7.13.7 Determination of significance

Through project design and planning, as well as the implementation of mitigation measures, no adverse residual effects are predicted for economic opportunities. As such, and in accordance with Section 7.13.1.5, a determination of significance is not required for economic conditions.

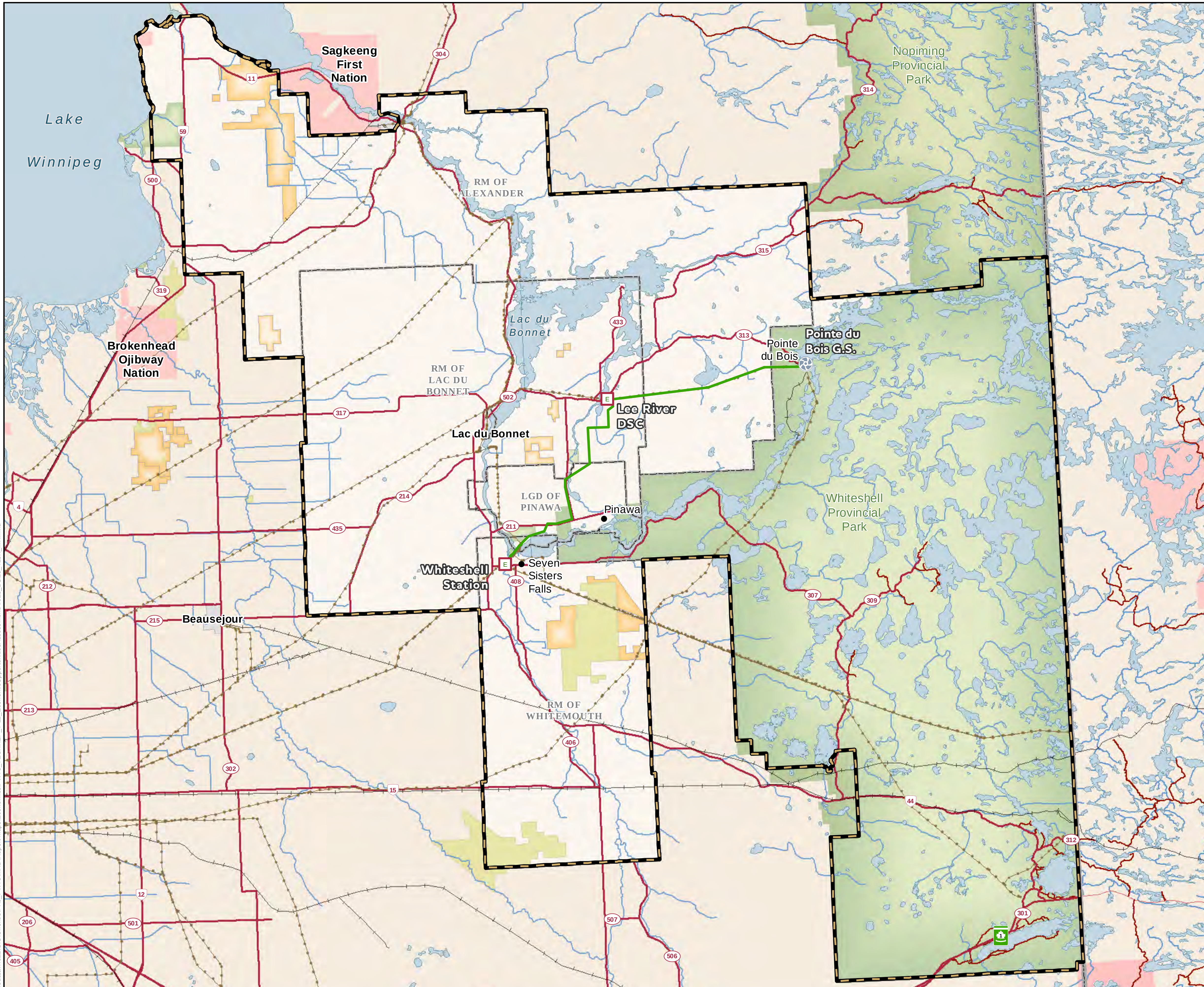
7.13.8 Prediction confidence

Prediction confidence is high based on professional judgement, quality of publicly available data, and the past effectiveness of proposed mitigation measures.

7.13.9 Follow-up and monitoring

Manitoba Hydro monitors employment and business effects associated with the development of new projects. The objective of monitoring is to track employment and business outcomes on labour income.

Monitoring employment and labour income for the project will occur for each year of construction and will include actual or estimated payments to government associated with the project (e.g., provincial sales tax, goods and services tax, payroll tax, corporate capital tax and fuel tax.



Manitoba Hydro

Pointe du Bois (PW75) Transmission Project

Project Infrastructure
Final Preferred Route

Assessment Area
Economic Opportunities and Well-being LAA
Economic Opportunities and Well-being RAA

Existing Infrastructure
Electrical Station
Generating Station
Existing Transmission Line

Landbase
Community
Railway
Provincial Highway
Provincial Road
Rural Municipality
First Nation Lands
Ecological Reserve
Wildlife Management Area
Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 04, 2023

N

0 5 10 Kilometres
0 5 10 Miles
1:425,000

Spatial Boundaries for Economic Opportunities and Well-being

Map 7-11

7.14 Well-being

Well-being was selected as a valued component (VC) because it was identified as an important issue during project engagement and by other effects assessments on similar projects in the region.

There is potential for the project to change the environmental and socioeconomic conditions that contribute to the well-being of the population in the assessment area. The well-being section is divided into two parts:

- Human health risk
- Well-being

Human health risk describes the potential changes in environmental conditions that influence the health risk of the population. The well-being section describes the effects that perception has on health and land use (e.g., perceived health effects from EMF and change in aesthetic conditions), effects on healthy populations and provides an overview on how other VCs contribute to well-being.

7.14.1 Human health

7.14.1.1 Scope of the assessment

Human health was selected as a valued component because it was identified as an important issue during project engagement and by other effects assessments on similar projects in the region.

Human health risk is a valued component (VC) because there is potential for the project to change the environmental conditions that influence the health risk of people. When evaluating human health risk, three components must interact for there to be a potential for health risk. These three components include:

- Presence of a human receptor (e.g., Indigenous, and non-Indigenous residents and wild food harvesters)
- Presence of a hazard (e.g., chemical of potential concern)
- Presence of an exposure pathway whereby humans may be exposed to the hazard

If any of these components are absent, there is no potential health risk. The assessment considered experience with previous health risk assessments and recommendations from regulators regarding potential human health risk associated with other similar projects.

Perceived health effects, including stress related to human health concerns and stress related to changes in tranquility, are discussed under well-being.

The scope of this assessment includes the evaluation of potential human health risk for people who live, work, or engage in cultural or recreational activities along the transmission line within the LAA.

The assessment method is based on Health Canada's risk assessment framework (Health Canada, 2021), which evaluates the potential effects of the project that may influence human health risk relative to the current scientific understanding of these effects. Specifically, this assessment evaluates the potential project influence on human health risk from:

- Change in potential human health risks associated with exposure to project-related releases of chemicals to the environment (air, soil, water) during the construction and operation phases of the project.
- Potential for noise-related effects (e.g., sleep disturbance) during the construction and operation phases of the project.
- Change in the quality of wild foods (e.g., meat, fish, berries, and vegetation) from vegetation management activities such as the application of herbicides.
- Change in potential human health risks associated with exposure to electromagnetic fields during the operation and maintenance phase of the project.

The project has the potential to affect human health through changes in water quality from the application of herbicides for vegetation management and weed control during operation and maintenance. Water comprises 10% of the surface of the RAA, with a network of lakes, rivers, and streams. Human health risks associated with water quality are typically estimated by comparing measured or calculated chemical concentrations in water to regulatory guidelines or standards for the protection of human health.

The herbicide product information supplied to Health Canada to aid them in making their decisions is proprietary; therefore, these data are not publicly available. Without these data, project-specific exposure estimates and health risks cannot be calculated. However, all herbicides approved for use by Health Canada, including the herbicides proposed for use in the project, have undergone human health risk assessments by Health Canada and are considered safe for use, provided that all guidelines for herbicide application are followed. The project is therefore not anticipated to adversely affect water resources.

Regulatory and policy setting

International regulation and policy

While neither Health Canada, nor Manitoba Health, Healthy Living and Seniors, maintain guidelines or standards for extremely low frequency electromagnetic frequency (ELF EMF), Health Canada recognizes the international exposure guidelines established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a group recognized by the World Health Organization (WHO) as the international independent advisory body for non-ionizing radiation protection. Government and international medical agencies, including Health Canada, the US National Institute of Health (NIH), and the National Institute of Environmental Health Sciences (NIEHS) have thoroughly reviewed the available scientific information about EMF, but have not recommended regulatory standards.

Federal regulation and policy

Assessment of the potential effects on human health considered the federal *Pest Control Products Act* (Health Canada 2006). Herbicide registration, premarket approval and regulations governing herbicide application follow the Act, which is reviewed by Health Canada to confirm that human health is adequately protected. Project-related use of herbicides relates to a potential change in wild foods quality, an effect that provides input to the assessment of human health risk. Herbicide registration and pre-market approval is controlled by the federal *Pest Control Products Act*, while the sale and use of herbicides, including applicator licensing, follows the *Pesticides and Fertilizers Control Act* (Province of Manitoba 2012).

Health Canada does not have noise guidelines or enforceable noise thresholds or standards and encourages consultation with provincial and municipal authorities to determine appropriate local standards or regulations for projects. Health Canada does, however, consider noise-induced endpoints as health effects. These include noise-induced hearing loss, sleep disturbance, interference with speech comprehension, complaints, and change in the percentage of the population at a specific receptor location who become highly annoyed. Health Canada advises different assessment approaches depending on the project phase, duration of noise-producing activities, and range of noise levels (Health Canada 2010c; Health Canada 2011).

Provincial regulation and policy

Manitoba's Guidelines for Sound Pollution specify outdoor environmental sound level objectives for residential, commercial, and industrial areas and include maximum acceptable noise levels for the protection of human health (Province of Manitoba 1992). These guidelines are applied in the assessment of human health to determine whether predicted levels of noise are above the acceptable thresholds and to determine whether additional mitigation measures may be needed to reduce or control noise levels.

Regulatory requirements are in place for assessing potential project-related change to air quality, effects of which provide input to the assessment of human health risk. Air quality is regulated by Manitoba Environment and Climate based on the Manitoba Ambient Air Quality Guidelines and Objectives. Manitoba has adopted the National Ambient Air Quality objectives for chemicals that are relevant to the project.

No municipal policies or bylaws related to acquiring permits are applicable in the assessment of environmental effects on human health risk.

Manitoba Hydro policy

Manitoba Hydro has adopted a sustainable development policy and 13 guiding principles that influence corporate decisions, actions, and day-to-day operations to achieve environmentally sound and sustainable economic development (Manitoba Hydro 1993). Stewardship of the economy and the environment is the first guiding principle of this policy. Under this principle, Manitoba Hydro commits to safeguarding human health.

Consideration of issues raised during engagement

Manitoba Hydro has an extensive engagement process (Chapter 4.0). The opportunity for input to project planning was available in multiple rounds of engagement.

Key issues associated with the human health risk VC that were identified during the engagement process include:

- Potential air quality effects due to construction vehicles and dust
- Noise (from construction and operation of the transmission lines)
- Potential effects to wildlife (wild foods) associated with herbicide use
- Potential health risks associated with EMF

These key issues were included as potential effects in the assessment of human health risk.

Spatial Boundaries:

The spatial boundaries for the environmental assessment of the project effects on human health are shown on Map 7-11 and consist of the following:

- Project Development Area (PDA): The PDA is the footprint of the proposed project as described in section 2.0, including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances.
- Local Assessment Area (LAA): includes the PDA and the boundaries of all rural municipalities (RMs) traversed by the PDA. Municipalities traversed consist of the Local Government District (LGD) of Pinawa, RM of Whitemouth, and Unorganized Territory Division No. 1 (including Whiteshell Provincial Park). The LAA also includes the Town of Lac du Bonnet. The LAA represents the area where project influences on human health risks are most probable.
- Regional Assessment Area (RAA): The RAA is the same as the LAA, which encompasses a sufficiently broad area for assessing cumulative effects, including the incremental effects of the Project. The RAA represents the region where potential changes in human health attributable to project effects might occur.

Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions.
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

Residual effects characterization

The residual environmental effects descriptions in Table 7-85 provide additional information to characterize the potential residual effects on human health risk.

Table 7-85: Characterization of Residual Effects on Human Health		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	Positive – a residual effect that moves measurable parameters or qualitative categories in a direction beneficial to human health relative to baseline. Adverse – a residual effect that moves measurable parameters or qualitative categories in a direction detrimental to human health relative to baseline. Neutral – no net change in measurable parameters or qualitative categories for the human health relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	Negligible – non-discernable change to human health risk or well-being (no increase in health risk or well-being). Low – a discernable change in human health risk (increase in health risk, but health risk is below regulatory risk benchmarks). Moderate – a measurable change in human health risk (increase in health risk above regulatory benchmarks). High-a measurable change in human health risk (increase in health risk above regulatory benchmarks).

Table 7-85: Characterization of Residual Effects on Human Health

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Geographic Extent	The geographic area in which a residual effect occurs	PDA – residual effects are restricted to the PDA. LAA – residual effects extend into the LAA. RAA – residual effects extend into the RAA.
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	No sensitivity - Effect does not occur during a sensitive life stage (e.g., infants, children, elderly) Moderate sensitivity - Effect may occur during a less sensitive period of a life stage (e.g., young adults). High sensitivity - Effect occurs during a sensitive life stage (e.g., infants, children, elderly).
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – the residual effect is restricted to construction phase. Medium-term – the residual effect extends more than the construction phase but less than project lifetime. Long-term – the residual effect extends beyond the life of the project.
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event Multiple irregular event – occurs at no set schedule.

Table 7-85: Characterization of Residual Effects on Human Health		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Multiple regular event – occurs at regular intervals. Continuous – occurs continuously.
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed

Significance Definition

Significance thresholds are benchmark values used to assess the potential change to human health risk. The significance thresholds are based on Health Canada's guidance for conducting human health risk assessments for chemicals, Manitoba Provincial guidance for noise, the federal *Pest Control Products Act* and ICNIRP or ICES reference levels for ELF EMF. A health risk is considered significant if there is a likely exceedance of an allowable level of exposure to a chemical (qualitative based assessment).

If the measurable parameter is below the significance threshold, there is no significant change to human health risk for that subcomponent. If the measurable parameter is above the significance threshold, mitigation measures would be implemented or improved upon to reduce the potential risk to below threshold levels.

Significance threshold for change to air quality: The project contributes to an increase in air quality parameter concentrations to levels that are above ambient air quality guidelines.

Significance threshold for change to noise levels: The significance threshold is reached when estimated audible noise exceeds the Manitoba provincial guidelines for residential and commercial areas for both daytime and nighttime conditions. Manitoba Environment and Climate does not enforce specific noise limits for regulation of ambient daytime and nighttime noise levels, but instead will review nuisance noise if five complaints have been reported by residents.

Significance threshold for change to wild food quality: Project increases chemical concentrations in harvested foods, such that the consumption of these foods would result in an exposure that exceeds the allowable daily intakes set by regulatory agencies.

Significance threshold for change to electric and magnetic fields: The significance threshold is reached when the estimated exposure of electric or magnetic field in human tissue exceeds the ICNIRP or ICES reference levels.

7.14.1.2 Project interactions with human health

This section describes interactions with human health risk during the construction, operation and maintenance, and decommissioning phases. For each interaction with human health risk (i.e., air quality, noise, wild food quality and EMF), an assessment of the potential effects is provided, including an evaluation of the significance of the effect.

Table 7-86 identifies, for each potential effect, the physical activities that might interact with the VC and result in the identified effect.

Table 7-86: Project interactions with human health

	Effects			
Project activity	Change in Air Quality	Change in Noise Levels	Change in Wild Food Quality	Change in EMF Levels
Transmission line construction				
Mobilization and staff presence	✓	✓	-	-
Vehicle and equipment use	✓	✓	-	-
Right-of-way clearing	✓	✓	-	-
Watercourse crossings	✓	✓	-	-
Marshalling / fly yards	✓	✓	-	-

Table 7-86: Project interactions with human health

Project activity	Effects			
	Change in Air Quality	Change in Noise Levels	Change in Wild Food Quality	Change in EMF Levels
Transmission line construction				
Transmission tower construction	✓	✓	-	-
Implodes	✓	✓	-	-
Helicopter use	✓	✓	-	-
Clean-up and demobilization	✓	✓	-	-
Station modification				
Mobilization and staff presence	✓	✓	-	-
Vehicle and equipment use	✓	✓	-	-
Marshalling / fly yard (Pointe du Bois station)	✓	✓	-	-
Realignment of access road (Pointe du Bois station)	✓	✓	-	-
Site preparation (Pointe du Bois station)	✓	✓	-	-
Station footprint expansion (Pointe du Bois station)	✓	✓	-	-
Installation of electrical equipment	✓	✓	-	-
Clean-up and demobilization	✓	✓	-	-

Table 7-86: Project interactions with human health

Project activity	Effects			
	Change in Air Quality	Change in Noise Levels	Change in Wild Food Quality	Change in EMF Levels
Transmission line construction				
Transmission line and station operation and maintenance				
Transmission line and station presence	-	✓	-	✓
Vehicle and equipment use	✓	✓	-	-
Inspection and maintenance	✓	✓	-	-
Vegetation management	✓	✓	✓	-
Decommissioning				
Mobilization and staff presence	✓	✓	-	-
Vehicle and equipment use	✓	✓	-	-
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	-	-
Rehabilitation	✓	✓	-	-
Clean-up and demobilization	✓	✓	-	-

✓ = Potential interaction

– = No interaction

7.14.1.3 Potential effects, pathways, and measurable parameters

The selection of potential environmental effects on change in human health risk are based on the project's potential health risks to people within the assessment area. The existence of an exposure pathway does not necessarily mean that there is a human health risk. If the probability of exposure is low, or the level of exposure is low, human health risk is unlikely. When both baseline and predicted data are available to assess project-related change to the biophysical environment (e.g., air, water, soil), measurable parameters are used to quantify this change. The predicted change in exposure is then compared to significance thresholds to determine whether a potential change in human health risk would be considered significant.

Table 7-87 presents the potential environmental effects and associated measurable parameters that are applicable to human health.

Table 7-87: Potential Effects, Effects Pathways and Measurable Parameters for Human Health

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
Change to air quality	Emissions of dust and vehicle and equipment exhaust during construction pose a potential increased risk to human health via inhalation of criteria air contaminants.	National Ambient Air Quality objectives for criteria air contaminants. Qualitative evaluation of whether exposure to the criteria air contaminants represent potential human health risks.
Change to noise levels	Construction noise and noise from vehicles and equipment during operation and maintenance pose a potential increased health risk for humans near the ROW and stations. Transmission line and station noise during operation poses a potential	The assessment of human health effects from noise uses predicted A-weighted noise levels measured in decibels (dBA). The Manitoba government has provincial guidelines for audible noise to prevent public annoyance and protect public health and welfare (Province of Manitoba 1992). A

Table 7-87: Potential Effects, Effects Pathways and Measurable Parameters for Human Health

Potential effect	Effect pathway	Measurable parameter(s) and units of measurement
	increased health risk for humans near the ROW.	qualitative assessment of risk will be conducted using these guidelines.
Change to wild food quality	The application of herbicides along the ROW during operation pose a human health risk via uptake from wild foods that are consumed.	Federal Pest Control Products Act (Health Canada 2006). Pesticides and Fertilizers Control Act (Province of Manitoba 2012).
Change to electric and magnetic fields	Humans are exposed to EMF near the ROW during operation.	Electric and magnetic field reference levels and basic restriction values (BRs) (Kv/m and mG). The International Commission on Non-Ionizing Radiation Protection and the International Committee for Electromagnetic Safety protection have reference levels for electric and magnetic fields intended to protect the health of the public. A qualitative assessment of risk will be conducted using these guidelines.

7.14.1.4 Assessment of residual environmental effects on human health

Analytical assessment techniques

This section describes the methods and sources of information used to characterize the existing air quality, wild food quality, noise level, and EMF conditions related to human health risk issues associated with the Project.

Baseline information for the assessment of human health risk was obtained through:

- a desktop review of general literature and project-specific technical reports

- review of input from project engagement

This assessment evaluates the potential health risk to people from exposure to chemicals of potential concern and non-chemical factors such as noise levels and EMF. The specific techniques used to assess the potential human health risk from exposure to change in air quality, wild food quality, noise, and EMF follow standard risk assessment methods accepted by federal and provincial governments (Health Canada 2010a, 2010b, 2010c, 2012a).

This assessment is based on a desktop study using the results and findings of other VC sections and TDRs, data from similar linear projects, research literature, and professional judgement of the project team. When professional judgement is applied, the assumptions and rationale for the assessment findings are provided. Provincial and federal health standards are also applied to assess human health risk, when applicable.

Air Quality

The assessment of human health risk from the inhalation of chemicals of potential concern is based on the change in exposure experienced by an individual that is predicted to occur between baseline (existing) and project conditions. Chemicals of potential concern for the project are associated with vehicle and machinery emissions, mainly during the construction phase. Human health risks associated with air quality under both existing and future project-related conditions are typically estimated by comparing measured or calculated chemical concentrations in air to regulatory benchmarks for the protection of human health. Concentrations of chemicals of potential concern were not measured or modeled for the project. The qualitative assessment of human health risks from chemicals of potential concern for the project is based on comparisons with similar Manitoba Hydro projects (e.g., Manitoba-Minnesota Transmission Project).

Noise

Manitoba's provincial guidelines for maximum desirable1-hour equivalent noise levels for residential and commercial areas are 45 dBA for nighttime and 55 dBA for daytime. These guidelines represent acceptable levels to prevent public annoyance and to protect public health and welfare with an adequate margin of safety and were used to assess predicted noise levels associated with project activities.

There are two general sources of noise associated with the project:

- noise generated by construction and maintenance activities (e.g., vehicles, machinery), and

- noise generated by transmission lines and stations.

The qualitative assessment of human health risks from noise is based on comparisons of noise burdens associated with similar Manitoba Hydro projects (e.g., Manitoba-Minnesota Transmission Project).

Health Canada does not have noise guidelines or enforceable noise thresholds or standards and recommends the use of standards or regulations specified for project-specific jurisdictions. Health Canada provides recommendations for the evaluation of projects where construction noise at a given receptor location lasts for more than one year, for operational noise, and where noise levels are in the range of 45-75 dB (Health Canada 2010c; Health Canada 2011). As the project is not anticipated to produce noise levels above baseline conditions over the long-term, and provincial noise regulations are available, Health Canada guidance was not used in this assessment. Manitoba's Provincial Guidelines for outdoor ambient daytime and nighttime noise levels were used to assess potential human health risk from audible noise associated with construction activities and vehicle and machinery use during operation.

Wild food quality

Wild foods (often referred as traditional foods) are defined as those that may be produced in an agricultural or backyard setting (not for commercial sale), or that are harvested through hunting, gathering, or fishing activities (Health Canada 2010b). Wild foods are particularly important to First Nation people and Red River Métis citizens for nutritional, medicinal, cultural, and spiritual purposes.

The application of herbicides for vegetation management and weed control during operation and maintenance may leave chemical residues on plants and soil, which have the potential to enter the food chain when consumed by wild animals or people.

Human health risks associated with country food quality are typically estimated by comparing measured or calculated chemical concentrations in country foods to regulatory guidelines or standards for the protection of human health, if available (i.e., calculating an exposure ratio). The product information supplied to Health Canada to aid them in making their decisions is proprietary; therefore, these data are not publicly available. Without these data, project-specific exposure estimates and exposure ratios cannot be calculated to assess human health risk. However, all pesticides approved for used by Health Canada, including the herbicides proposed for use in the project, have undergone human health risk assessments by Health Canada and are considered safe for use, provided that all guidelines for herbicide application are followed.

Electric and magnetic fields

Human exposure to EMF is determined by distance from the source (EMF decrease with distance from the source) and by the orientation of the EMF (e.g., height of the source from the ground).

Electric fields are a result of voltages applied to electrical conductors and equipment, expressed as volts per metre (V/m) or kilovolts per metre (kV/m), and are easily blocked by most objects (e.g., fences, vegetation, buildings).

Magnetic fields are produced by the flow of electric current, expressed as magnetic flux density in units of gauss (G) or milligauss (mG), and are not blocked by most materials (Exponent 2015a).

Anthropogenic sources of EMF, including the generation and transmission of electricity, are at extremely low frequencies (ELF), defined as having frequencies between 0 and 300 Hz (WHO 2005) and so exposure to EMF in the ELF range is considered in this assessment.

Health effects can be categorized as long-term or short-term effects. For this discussion, long-term effects, if any, would occur over a long period of time following exposure (e.g., cancers, neurological diseases, reproductive effects), and short-term effects would occur over a short period of time following exposure. Acute (short-term) exposure to extremely low-frequency electric fields can cause biological responses ranging from perception to annoyance through surface electric-charge effects. The only well-established effects on people exposed to short-term ELF magnetic fields are the stimulation of central and peripheral nervous tissues and a perception of faint flickering light in the periphery of the visual field (IARC 2002) at very high exposure levels. No causal relationship between long-term exposure to ELF EMF and health effects has been established (Health Canada 2012b).

As there are no confirmed long-term health effects from exposure to ELF EMF, no standards, or guidelines for protection of long-term health have been established (World Health Organization 2015). However, guidelines for short-term exposure to high levels of ELF EMF have been published. These guidelines are based on the avoidance of immediate short-term health effects, such as perception, annoyance, and the stimulation of nerves and muscles (ICNIRP 2010). It is important to note that the levels at which these short-term effects occur are not encountered in typical environments accessible to the public, including areas near electric transmission and distribution facilities (Exponent 2015a).

Health Canada (2012b) states:

> *"Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMFs at ELFs. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors*".

The qualitative assessment of potential ELF EMF effects on human health is based on comparisons of predicted project-related EMF levels at the edge of the ROW for similar Manitoba Hydro projects (e.g., Manitoba-Minnesota Transmission Project) to the reference levels available from the ICNIRP and International Committee for Electromagnetic Safety (ICES) for protection of the public (ICNIRP 2010; ICES 2002).

Change to air quality

Project pathways

The project has the potential to change air quality due to emissions from vehicles and machinery and dust generation, particularly during clearing and construction. The pathways, mitigation measures, and characterization of effects of change in air quality on human health risk are described below.

Air quality is determined by the levels of gases and particulate matter in the air. Gases include nitrogen dioxide, sulphur dioxide, and carbon monoxide, all of which can have health effects above certain concentrations. Particulate matter is classified according to particle size, with fine particulate matter defined as PM_{10} (less than 10 μm diameter) and $PM_{2.5}$ (less than 2.5 μm diameter). Smaller particles pose a greater health risk, as they can travel deeper into the respiratory system when inhaled.

Project clearing, construction, operation, and maintenance activities due to vehicle and equipment exhaust and dust emissions may cause a change in local air quality. Project-related change to air quality poses a potential human health risk if levels of gases and particulates exceed health-based air quality objectives. Change in air quality is of particular importance to sensitive individuals, including children, the elderly, and people with existing cardio-respiratory health problems such as asthma and chronic obstructive pulmonary disease.

Construction

Clearing activities along the ROW will involve cutting, piling, and chipping/mulching. During the construction phase, heavy equipment and vehicles will emit combustion products (e.g., NO_2, SO_2, CO and particulate matter). Particulate matter is generally the focus of human health concerns associated with diesel emissions from construction equipment. Fugitive dust (dust from disturbed soils becoming airborne) from the operation of heavy machinery, vehicles and vegetation removal will also be emitted.

However, air emissions during the construction phase are expected to be minor, resulting in temporary, short-term reductions in local air quality in areas close to construction sites, and are unlikely to result in exceedances of Manitoba's Ambient Air Quality Guidelines. Change in human health risks associated with air quality during the construction phase will be reversible because air emissions will stop once construction is complete.

Operation and maintenance

During the operation and maintenance phase, routine maintenance and inspection of transmission lines, emergency repairs, access to the stations and management of vegetation will require vehicles to travel along existing access roads. These activities will emit minimal amounts of particulate matter and fugitive dust. Overall, vehicles and heavy machinery, will generate fugitive dust, particulate matter, and combustion products, but the magnitude of change in health risk from potential project-related changes in air quality will be negligible.

Decommissioning

Decommissioning will have similar short-term effects to construction, from vehicle and equipment emissions and fugitive dust.

Mitigation for change in air quality

Mitigation measures to reduce project-related combustion and dust emissions during the construction, operation and maintenance phases include:

- mud, dust, and vehicle emissions will be managed in a manner that allows for safe and continuous public activities near construction sites.

Characterization of residual environmental effect for change to air quality

Construction

Project air emissions during the construction phase are expected to be minor, resulting in temporary, short-term reductions in local air quality in areas close to construction sites, but are unlikely to result in exceedances of Manitoba's Ambient Air Quality Guidelines.

Residual human health risk effects associated with change in air quality during the construction phase are adverse. Vehicles and heavy machinery will generate fugitive dust, particulate matter, and combustion products, but the magnitude of change in health risk from air quality is expected to be negligible. Change to human health risk associated with air quality will be largely confined to the PDA, including the transmission line, stations, and immediately adjacent areas. This change will be an irregular event, as construction activities are carried out at different locations along the transmission line and at the stations. Change in human health risk during the construction phase will be short-term and reversible because air emissions will stop once construction is complete.

Operation and maintenance

Residual human health risk effects associated with change in air quality during the operation and maintenance phase are adverse. However, particulate matter and dust generated during routine activities will be minor because of limited vehicle and equipment use during operations, and transient change in air quality will be limited to the PDA and immediately adjacent areas.

The magnitude of change in human health risk from air quality is negligible and the geographic extent is limited to the PDA.

Change in air quality is described as an irregular event and short-term because maintenance activities will be infrequent and temporary. The effects of the operation and maintenance activities on air quality are reversible, as vehicle emissions and dust will not be generated upon completion of the work, and these emissions will dissipate or settle quickly.

The area where change in air quality will occur is considered disturbed as the transmission line will be in predominantly agricultural and suburban areas, where use of vehicles and machinery already occurs.

Decommissioning

Project air emissions during the decommissioning phase are expected to similar to that of construction.

Change to noise

Pathways

There are two general sources of noise associated with the project, which can affect human receptors close to the ROW:

- noise generated by construction and maintenance activities, including during the decommissioning phase (e.g., equipment, vehicles)
- noise generated by transmission lines and stations during operation

Construction / decommissioning

During the construction and decommissioning phases, various activities will have the potential to increase noise levels and disturb people. Construction activities that would create noise include ROW clearing, access road construction and improvement, station pad grading, installation of tower footings, assembling and lifting towers into place, helicopter assistance during tower installation, and splicing of conductors. Construction activities will involve the use of heavy machinery such as bulldozers, excavators, or cranes. In rocky areas, where a conventional tower footing would be impractical, blasting could be required and would produce a short noise that could be audible for several kilometers.

Noise associated with construction will be intermittent and temporary. Except for noise associated with implosions and, potentially helicopters, the noise is expected to be contained within and immediately adjacent to the PDA. Occupied residences within the LAA will likely, on occasion, experience noise generated by construction activities along the transmission line; however, this noise will be minimal and relatively short-term in duration.

Operation and maintenance

The magnitude of the noise generated during operation and maintenance is expected to be far less than during the construction phase, as the main sources of noise during the operation and maintenance phase include activities for routine inspection (use of field vehicles and helicopters), maintenance of hardware, and vegetation management along the ROW.

To control vegetation growth along the line, the use of chainsaws, roller choppers and brush hogs may be required. Equipment and vehicle-related noise associated with maintenance activities will be intermittent and temporary and is expected to be contained mostly within the PDA.

Based on the predicted fair-weather audible noise at the edge of the ROW for other transmission lines such as the MMTP, the increase in noise is inaudible (Exponent 2015b). Therefore, noise from the project transmission lines would have a negligible effect on ambient noise levels, and total sound levels would remain below guidelines for residential and commercial areas. During foul weather, the levels of audible noise would be higher, but the wind and rain that typically occur would likely mask the noise from the transmission lines during these conditions (Exponent 2015b).

Mitigation for change to noise levels

Transmission line routing considered proximity to residences and residential development, including areas designated for future urban and rural landscape development, to the extent practicable. Potential nuisance effects on sensitive receptors were a consideration in route planning and selection.

Mitigation measures for noise emissions during the construction, operation and maintenance phases include:

- Conducting construction activities as per applicable noise bylaws
- Use of passive or active techniques to minimize noise such as construction of barriers or noise cancellation in areas of prolonged noise generation to the extent feasible, grouping implodes to minimize the total number of noise events

Characterization of residual environmental effect for change to noise levels

During the construction phase, residual effects for human health risk associated with noise levels are adverse. However, except for isolated activities such as splicing conductors, the magnitude of change in noise level will be low and similar to ambient noise levels. This change will largely be restricted to the LAA. Change in noise levels is described as multiple irregular events along the ROW because construction is carried out at different locations along the transmission line.

Noise associated with construction at the stations will be multiple regular events for the duration of the station construction phase (short term). Change in noise levels associated with construction activities are short-term, and the effects of change in noise levels are reversible, as noise emissions will stop after activity completion.

Residual effects for human health risk associated with noise levels during operation and maintenance are adverse. However, noise generated by vehicles and equipment during routine maintenance activities will be negligible and not expected to differ appreciably from noise levels associated the ambient environment in areas currently subject to such activities. In areas where human activities are limited, noise generated during routine maintenance may be noticeable but of short duration. Change in noise levels associated with maintenance activities are short-term, and the effects of change in noise levels are reversible, as noise emissions will stop after activity completion. The effects of Project operation on noise levels are reversible because noise emissions will cease at the end of the Project lifetime.

Change to wild food quality

Project pathways

The assessment of human health risk considers the potential effects of the Project on wild food quality.

Construction / decommissioning

As herbicides will not be used during the construction or decommissioning phases of the project, there is no pathway for change to wild food quality. Dust generated during construction activities is expected to be minimal, localized, and short-term in nature. While dust may have a temporary physical effect on vegetation close to the construction area (via smothering), dust is not a meaningful pathway for a change in wild food quality.

Operation and maintenance

Herbicides applied to vegetation along the transmission line as part of an integrated vegetation management plan may be taken up by other organisms from the soil or foliage and passed on through the food chain. If chemicals contained in herbicides are taken up by species of vegetation or wildlife harvested as wild foods, there is the potential for human exposure to these chemicals via ingestion of the vegetation or wildlife.

Health Canada's Pest Management Regulatory Agency (PMRA) is responsible for the regulation of pest control products in Canada (i.e., pesticides, including herbicides). If the PMRA deems there is reasonable certainty that no harm to human health, future generations, or the environment will result from exposure to, or use of, a pesticide, then a herbicide may be registered for use in Canada (Government of Canada 2015). PMRA determines when pesticides and herbicides can be used safely when label directions are followed and will be effective for their intended use (Government of Canada 2015).

Mitigation for wild food quality

Health Canada assesses all registered herbicides for health and safety considerations, dependent on their proposed use. Herbicide operators must be licensed under *The Pesticides and Fertilizer Control Act* (Manitoba). Manitoba Hydro will develop an integrated vegetation management plan for the control of woody and non-woody vegetation along the transmission line ROW and at other project sites. Manitoba Hydro is required to adhere to all laws and regulations regarding herbicide use, which will mitigate the potential for harm. Label restrictions will be adhered to during application.

Herbicides used by Manitoba Hydro on ROWs are formulated to target only woody vegetation and broad-leafed plants while leaving grasses largely unaffected.

In addition to the planned limited and infrequent use of herbicides, Manitoba Hydro has established additional herbicide use and application practices that will limit the potential for herbicides to enter the food chain and alter the quality of country foods.

Sensitive areas will not be treated with herbicides, such as those used for gathering berries and harvesting other types of plant and animal country foods identified through engagement including any sites outlined in knowledge studies.

In addition to the restrictions and mitigation measures outlined on the product labels, Manitoba Hydro's detailed vegetation management plan limits the use of herbicides. In areas where agricultural activities do not occur on the ROW, Manitoba Hydro's vegetation management goal is the establishment of a self-sustaining, low-growing plant community along the ROW. This would consist of a well-established plant community of bushes and shrubs that would out-compete tree seedlings for available light, nutrients and water and hinder the growth of trees that could threaten the security and operation of the transmission line.

The use of mechanical equipment or manual clearing for vegetation control is generally non-selective and removes the beneficial low-growing plants in addition to trees. Manitoba Hydro considers that selective herbicide application (compared with mechanical equipment or manual clearing) is a more effective means of controlling aspens and other fast-growing trees while encouraging the establishment of bushes and shrubs, (Manitoba CEC 2013). Over time, developing healthy communities of bushes and shrubs on the ROW, coupled with the selective use of herbicides, will decrease the number of tall, fast-growing trees within the ROW. This, in turn, will decrease the need for regular application of herbicide and could increase the time between required herbicide treatments to periods of 15 years or more (Manitoba CEC 2013).

Characterization of residual environmental effect for change to wild food quality

Herbicides are designed to target specific vegetation without damaging the environment or posing a risk to human health (US EPA 1995, 1998, 2005). Health Canada and the United States Environmental Protection Agency (US EPA) work together on herbicide registration decisions. They publish information about herbicides in registration eligibility documents, which explain how the respective agency determines the appropriate types of uses for herbicides, and the limits on uses of those herbicides.

As mentioned previously, the product information supplied to Health Canada and the US EPA to aid them in making their decisions is proprietary. As a result, neither Health Canada nor the US EPA can provide the numerical calculations used to determine the application rates recommended to protect human health. Without these data, project-specific exposure estimates and exposure ratios cannot be calculated to assess human health risk, and only a qualitative assessment of the human health risk associated with the application of herbicides to the ROW is possible.

Due to numerous outstanding variables such as total area requiring treatment, precise knowledge of sensitive sites, landowner concerns, and knowledge of the final clearing method for specific sites, the amount of herbicide required for subsequent vegetation management efforts cannot be determined at this time.

An objective of the vegetation management plan is to reduce herbicide use through the establishment of a compatible vegetation community within the ROW. However, given that Health Canada has already conducted quantitative human health risk assessments for pesticides approved for use in Canada (i.e., the products anticipated for use on the project), and has determined these herbicides are safe for use, a qualitative assessment is appropriate to assess human health risk for the project.

The residual effects associated with change to wild food quality during operation and maintenance are neutral assuming herbicides are applied according to Health Canada regulations; therefore, human health effects are not anticipated. The magnitude of the change in the quality of wild foods is expected to be negligible because Manitoba Hydro will follow herbicide label requirements for ROW application and will not use herbicides in clearly identified sensitive sites that contain plants of importance to wild food harvesters, or that include crops.

The geographic extent of potential change to wild food quality is the PDA, since Manitoba Hydro will spray herbicides on the ROW and around stations only, and herbicide label requirements for application will be followed. Herbicides are applied from a tank through a hose with a pressurized nozzle. Spray drift will be controlled by using appropriate nozzle pressure and by limiting application to low-wind conditions.

The frequency of the activities that could change wild food quality occur as multiple regular events. Herbicide application rates will be determined by qualified and licensed staff, condition-based assessments, labelling, and subject matter expert consultation in accordance with product label instructions.

Herbicides will be applied in accordance with the identified usage requirements as needed to control vegetation growth around some transmission line towers that are more difficult to clear with physical removal methods.

The duration of effect is long-term, as herbicides will be sprayed on the ROW for the lifetime of the project, to keep plants from growing underneath the power lines. However, effects are reversible, as potential change to human health risk will subside once herbicide treatment ceases. Herbicide application will not occur in agricultural areas.

Change to electric and magnetic fields

Project Pathways

Construction / decommissioning

Project-related electric and magnetic fields (EMF) are only associated with the operation and maintenance phase; therefore, the construction or decommissioning phases were not assessed.

Operation and maintenance

The voltage and current carried by the transmission line will generate EMF. The effect of EMF on human receptors depends on the EMF frequency. Extremely low-frequency EMF is in the frequency range of 1 Hertz (Hz) to 3 kilohertz (kHz) of the electromagnetic spectrum. The standard alternating current (AC) of power lines in Canada is 60Hz.

The EMF produced by the power line has the same 60Hz frequency, categorizing power lines' EMF as extremely low frequency. This extremely low frequency (ELF) EMF has the capacity to induce electric fields in the human body, but the levels are extremely small (World Health Organization 2015).

The ELF EMF fields are strongest directly at their source and diminish rapidly with distance from the transmission line. Electric fields are easily blocked by solid materials, including buildings and trees. Therefore, the levels of ELF electric fields to which the public may be exposed are very low, and generally are not a concern. For example, inside a home, the electric fields from high-voltage power lines are often weaker than the fields from household electrical appliances (Government of Canada 2022).

ELF magnetic fields are not as easily shielded. However, magnetic fields fall off rapidly with distance from the source. Health Canada has not independently established guidelines for ELF EMF, but rather follows the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (1998). The ICNIRP has issued guidelines for limiting exposure to extremely low-frequency EMF which help ensure that exposures to extremely low-frequency EMF do not create electric currents that are stronger than the ones made naturally in the body.

Change in potential human health risks associated with exposure to electromagnetic fields originating from the operation and maintenance of the transmission line is assessed qualitatively based on the context of effects assessed as negligible from higher voltage lines such as the Manitoba–Minnesota Transmission Project (MMTP), a 500 kilovolt (kV) AC transmission line in southeastern Manitoba. For the MMTP, the highest calculated electric field at the edge of the ROW was 0.8 kV/m. This level was well below recommended reference levels for public exposure (4.2 kV/m and 5.0 kV/m) (ICNIRP 2010; ICES 2002). The highest calculated electric field level on the MMTP ROW (more directly beneath the line) was 10 kV/m. This is an area where the public can be expected to spend a limited amount of time. ICES (2002) provide separate guidelines for electric-field levels on a ROW, recommending that they do not exceed 10 kV/m. Canadian Standards Association (CSA 2015) also refers to this 10 kV/m recommendation and further notes that it is based on comfort, stating that electric-field levels may exceed 10 kV/m for voltage classes 200 kV and greater.

ICNIRP does not discuss separate guidelines for within a ROW, but notes that in cases where reference levels are exceeded, further analyses and computations are needed to demonstrate compliance with the Basic Restriction (BR; Exponent 2015b). The peak electric field on the MMTP ROW was roughly three times lower than the BR. The highest calculated magnetic field levels for the MMTP ROW were 32 milligauss (mG) on the edge of the ROW and 225 mG on the ROW (Exponent 2015b). These values were well below the reference levels for public exposure of 2,000 mG (ICNIRP 2010) and 9,040 mG (ICES 2002).

For the MMTP human health risk assessment, it was concluded that residual human health risk effects associated with EMF are neutral as current scientific evidence indicates that ELF EMF from transmission lines is not harmful to human health, negligible in magnitude, and limited to the LAA. There were no residual human health risks associated with EMF at the levels associated with the MMTP project. Given that the voltage of the Point du Bois Transmission line is substantially less than the MMTP (i.e., 115 kV vs. 500kV), EMF generated during operation is also expected to be below the recommended reference levels for public exposure. Therefore, human health risks associated with project-related EMF are also expected to be negligible.

Mitigation for change to electric and magnetic fields

Additional mitigation measures are not required for this Project as EMF levels within and outside the ROW are anticipated to be below limits recommended by national and international agencies and standards.

Characterization of residual environmental effects for change to electric and magnetic fields

Residual effects during the operation and maintenance phase with respect to EMF are neutral, as current scientific evidence indicates that ELF EMF from transmission lines is not harmful to human health. EMF generated during operation will be below the levels set by international organizations and the change from existing maximum levels will be of negligible magnitude. Increased EMF levels above existing levels will be long-term, continuous, and reversible, as EMF will be produced for as long as the transmission line is in operation.

7.14.1.5 Summary of residual effects

A summary of the environmental effects assessment and predictions of residual environmental effects resulting from the interactions of the Project and human health risk is provided in Table 7-88.

Table 7-88: Project residual effects on well-being

Project phase	Residual Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change to air quality							
Construction	A	N	PDA	NS	ST	IR	R
Operation and Maintenance	A	N	PDA	NS	ST	IR	R
Change to noise levels							
Construction	A	N	LAA	NS	ST	IR	R
Operation and Maintenance	A	N	PDA	NS	P	C	R
Change to wild food quality							
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation and Maintenance	N	N	PDA	NS	P	IR	R
Change to electric and magnetic fields							
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation and Maintenance	N	N	LAA	NS	P	C	R

KEY

Project Phase	Geographic Extent:	Frequency:
C: Construction	PDA: Project Development Area	S: Single event
O: Operation	LAA: Local Assessment Area	IR: Irregular event

Table 7-88: Project residual effects on well-being

D: Decommissioning	RAA: Regional Assessment Area	R: Regular event
Direction:	Timing	C: Continuous
P: Positive	NS: No sensitivity	Reversibility:
A: Adverse	MS: Moderate sensitivity	R: Reversible
N: Neutral	HS: High sensitivity	I: Irreversible
Magnitude:	Duration:	
N: Negligible	ST: Short-term	N/A: Not applicable
L: Low	MT: Medium-term	
M: Moderate	LT: Long-term	
H: High		

7.14.1.6 Assessment of cumulative effects on human health

The Project residual effects described in Section 7.14.1.4 that are likely to interact cumulatively with residual environmental effects of other physical activities are identified in this section, and the resulting cumulative environmental effects are assessed. This is followed by an analysis of the project contribution to residual cumulative effects. The assessment of cumulative effects considers residual effects from the construction, operation and maintenance phases of the project.

See Table 7-89 for the project and physical activities inclusion list, which identifies other projects and physical activities that might act cumulatively with the Project. When residual environmental effects from the Project act cumulatively with those from other projects and physical activities, a cumulative effects assessment is conducted to determine their significance.

Table 7-89: Potential cumulative environmental effects on human health risk

Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	Change to air quality	Change to country food quality	Change to noise levels	Change to EMF
Existing/Ongoing Projects and Activities				
Agriculture (crop and livestock production)	✓	✓	✓	–
Domestic Resource Use (hunting, trapping, fishing)	✓	–	✓	–
Recreational Activities (Canoeing, Snowmobiling, Hiking)	–	–	✓	–
Infrastructure (existing rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities	✓	-	✓	-
Generating Stations (Pointe du Bois, Slave Falls, Seven Sisters)	-	-	-	-
Transmission Lines				
P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines	-	-	-	✓
R1 and R2 (Pointe du Bois to Slave Falls) 115-kV transmission lines		-	-	✓
S2 (Slave Falls to Stafford) 115-kV transmission line	-	-	-	✓
SK1 (Seven Sisters to Star Lake) 115-kV transmission line	-	-	-	✓

Table 7-89: Potential cumulative environmental effects on human health risk

Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	Change to air quality	Change to country food quality	Change to noise levels	Change to EMF
SG12 (Great Falls to Seven Sisters) 115-kV transmission line	-	-	-	✓
SR3 (Seven Sisters to McArthur Falls) 115-kV transmission line	-	-	-	✓
SW1, SW2, SW3 and SW4 (Seven Sisters to Whiteshell) 115-kV transmission lines	-	-	-	✓
ST5 and ST6 (Seven Sisters to Transcona) 115-kV transmission lines	-	-	-	✓
K21W and K22W (Whiteshell to Kenora) 230-kV transmission line	-	-	-	✓
Nuclear Power (Whiteshell Laboratories)	-	-	-	-
Future Projects and Activities				
Slave Falls Generating Station (Slave Falls 7-Bay Sluiceway Life Extension Project)	✓	-	✓	-
Transmission Projects (Decommissioning of P3/P4 66-kV transmission lines (Lee River distribution supply centre to Winnipeg)	✓	-	✓	✓
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	✓	-	✓	-

Table 7-89: Potential cumulative environmental effects on human health risk

Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	Change to air quality	Change to country food quality	Change to noise levels	Change to EMF

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

– = Interactions between the residual effects of other projects and those of the Project residual effects are not expected.

Environmental effects identified in Table 7-89 as unlikely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further. Potential residual effects associated with these projects or activities are not anticipated to overlap with the Project spatially or to occur at the same time.

Cumulative effects for change to air quality

Given that air emissions associated with the project will occur primarily during the construction phase, reasonably foreseeable projects and physical activities are only anticipated to interact cumulatively with the project to cause change to air quality if construction activities occur concurrently. These effects will be experienced primarily close to construction areas, and they will be short-term and continuous until the end of construction. Landowners and residents living near to both the project and the other projects and activities identified above may experience cumulative health risk from project-related change in air quality. However, with mitigation measures, effects will be negligible in magnitude, irregular, short-term, and reversible.

Implementation of the mitigation measures described in Section 7.14.1.4 will reduce the effects of the project on the change to air quality. Other proponents may adopt mitigation measures to mitigate their own project effects, or they may be required as permitting conditions. Manitoba Hydro will work with other proponents and government agencies where appropriate to address cumulative effects.

Cumulative effects for change to noise levels

Noise generated by future projects and activities in the LAA/RAA have the potential to interact cumulatively with the project and could increase the overall exposure to noise experienced by people living and working in the RAA.

Reasonably foreseeable projects and physical activities listed in Table 7-89 have the potential to interact cumulatively with the project to cause change to noise (for example, agriculture activities, existing linear developments and resource and recreational activities). However, effects will only be additive if noise-generating activities occur concurrently and close to one another.

Implementation of the mitigation measures described in Section 7.14.1.4 will reduce the effects of the project on change to noise levels. Other proponents may adopt mitigation measures to mitigate their own projects' effects, or they may be required as permitting conditions. Manitoba Hydro will work with other proponents and government agencies where appropriate to address cumulative effects.

The projects listed in Table 7-89 are likely to contribute to noise and related human health risk (stress or annoyance). These effects will be experienced primarily close to construction areas; they will be short-term and continuous until the end of construction. They will only be cumulative if noise-generating activities occur concurrently and close to each another.

Landowners and residents living near to both the Project and the other projects and activities identified above are most likely to experience cumulative health risk from project-related noise. In summary, potential cumulative effects due to noise will be negligible to low in magnitude, continuous, long-term, and reversible.

Cumulative effects for wild food quality

Project effects on wild food quality are limited to the use of herbicides for vegetation control during the operation and maintenance phase of the project. Herbicides will be applied according to Health Canada regulations protective of human health and will be limited to ground-based applications, which will limit the extent of herbicide release to the PDA.

Other transmission line projects that share parts of the Final Preferred Route may also use herbicides for vegetation management and weed control; however, their use of herbicides must also follow Health Canada regulations. Given that Health Canada has assessed the safety of herbicide application with respect to human health, project activities related to the application of herbicides do not have the potential to interact cumulatively with future projects and activities to alter the quality of country foods.

Therefore, there is no cumulative effects pathway for country food quality and an assessment of potential cumulative effects is not necessary.

Cumulative effects for change to electric and magnetic fields

Future projects and activities that generate EMF will increase the overall EMF exposure for people living and working near the project. However, additional mitigation measures are not required as EMF levels within and outside the project ROW are anticipated to be below limits recommended by national and international agencies and standards.

The projects listed in Table 7-89 are likely to contribute to EMF in the RAA. Landowners and residents living near to both the project and the other projects identified above may experience potential cumulative exposure from project-related EMF and common background sources. However, current scientific evidence indicates that ELF EMF from transmission lines and other sources do not pose a risk to human health (Exponent 2015a).

7.14.1.7 Determination of significance

With the application of mitigation measures, the residual environmental effects of the project on human health risk, associated with air quality, noise, wild food quality, and EMF, are predicted to be not significant.

Change in air quality resulting from construction and maintenance activities will be short-term in duration, limited to the ROW, and is not expected to produce emissions that differ greatly from current physical activities in developed areas along the ROW. The project is not expected to produce emissions that will result in an increase in air quality parameter concentrations that are above Manitoba's Ambient Air Quality Guidelines. As a result, residual environmental effects do not pose a human health risk.

Change in ambient noise levels during construction, operation and maintenance is not anticipated to exceed typical ambient noise levels, except for noise generated by construction activities (e.g., helicopter use and implosions), which are temporary and of relatively short duration. Therefore, project-related noise effects on human health risk are not anticipated.

Herbicide application will follow strict regulatory requirements, and herbicides will be applied as part of an integrated vegetation management plan which, at full implementation, aims to limit herbicide application to intervals of 15 years or more. The application of such herbicides in known areas of harvesting will be avoided and general application at approved rates is not expected to result in concentrations so that the consumption of wild foods would result in exposures that would exceed allowable daily intakes. Therefore, a measurable increase in human health risk associated with wild food quality is not anticipated.

Electric and magnetic fields originating from the transmission lines will be of low magnitude and are expected to meet the international exposure guidelines for EMF.

With the application of mitigation measures, the residual cumulative effects of the Project on human health risk, associated with air quality, noise, wild food quality, and EMF, are predicted to be not significant.

7.14.1.8 Prediction confidence

Prediction confidence is based on the information compiled during desktop-based data compilation and an understanding of project activities, location, and schedule. There is a high degree of confidence in the assessment predictions and the environmental effects mechanisms are well understood. There is also a high degree of prediction confidence based on Manitoba Hydro’s experience and demonstrated due diligence on transmission projects in agricultural and urban areas.

7.14.1.9 Follow-up and monitoring

There is no follow-up monitoring required specific to the assessment of potential human health risk. In terms of health concerns related to EMF, Manitoba Hydro will continue to follow studies and make information available to the public.

7.14.2 Well-being

7.14.2.1 Overview

The Canadian Index of Well-being (CIW) defines well-being as “the presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to good living standards, robust health, a sustainable environment, vital communities, an educated populace, balanced time use, high levels of democratic participation, and access to and participation in leisure and culture.” (Canadian Index of Well-Being n.d).

Through engagement, Manitoba Hydro heard from First Nations peoples and Red River Métis citizens that it is important to improve understanding and assess present-day environmental conditions, recognizing the effects of anthropogenic impacts to well-being over time in the geographic context of the Winnipeg River region. This section broadens the scope of environmental assessment to include a holistic perspective and provide insight into how change in environmental and socio-economic conditions affect well-being.

Well-being is influenced by social, economic, and environmental conditions (World Health Organization n.d.a). The social determinants of health (SDOH), defined as the interrelated social, political, and economic circumstances in which people are born, grow up, live and play (NCCDH 2022), contribute to the overall physical and mental health status and therefore, influences well-being. Examples of SDOH include (NCCDH 2022):

- Disability
- Early child development
- Education
- Employment and working conditions
- Food insecurity
- Gender
- Geography
- Globalization
- Health services
- Housing
- Immigration
- Income and income distribution
- Indigenous ancestry
- Race
- Social inclusion/exclusion
- Social safety net
- Unemployment and job security

The CIW identifies eight core domains which are themed ideas identified through engagement with Canadian citizens, that contribute to a positive impact on well-being. These domains are (Canadian Index of Wellbeing 2016):

- Community vitality
- Democratic engagement
- Education
- Environment
- Healthy populations
- Leisure and culture
- Living standards
- Time use

The way in which domains and SDOH interact are complex and do not operate as a list or in isolation (NCCDH 2022). These determinants can influence each other and the intersection of the SDOH and domains can shift and change overtime (NCCDH 2022).

Summary of holistic health perspectives

Manitoba Hydro understands, from engagement, that well-being is a holistic concept that encompasses physical, mental, emotional, and spiritual health, and is deeply connected to the health of the environment in which people live.

For many First Nations people and Red River Métis citizens who practice rights-based activities, well-being is closely tied to the health of the ecosystems that provide their resources and relies on the transmission of knowledge passed experientially through land-based management and stewardship practices.

Many of the SDOH and domains are assessed throughout the valued component (VC) sections and are described in section 6.0. Table 7-90 displays the SDOH related to each VC and how it is linked to well-being.

Table 7-90: Summary of VC sections and how the VC relates to the SDOH and well-being

VC	SDOH and CIW Domain	Connection to well-being
Section 7.2: Harvesting and important sites; Section 7.3: Heritage resources	Community vitality Environment Indigenous land and resource use Cultural vitality[4] Time use	These VC sections contribute to community vitality, access to land and resources for First Nations people and Métis citizens, and cultural vitality of First Nations people and Métis citizens. First Nations and Métis populations' connections to the land contribute to mental and physical health and are vital for cultural continuity. Environmental stewardship, defined as the actions taken to care for, or responsible use of, the

[4] Cultural vitality can also be considered a component of community health and well-being, as described in Section 6.1 History of the cultural landscape

Table 7-90: Summary of VC sections and how the VC relates to the SDOH and well-being

VC	SDOH and CIW Domain	Connection to well-being
		environment in pursuit of environmental and/or social outcomes (Bennet et al 2018) is a determinant of Indigenous peoples' health (Loppie and Wein 2022).
Ecological/Biophysical VC's (Birds and bird habitat, Fish and fish habitat, Wetlands, Amphibians and reptiles, Vegetation, Terrestrial wildlife and wildlife habitat)	Environmental	Environmental conditions are linked to our physical and mental health, community vitality and economy (CIW 2016) which are all dimensions used to determine well-being. Environmental health and human health are inextricably linked through the ability to interact with the environment and the consumption of resources (Beausoleil et al. 2021) (Also see Section 7.2 Harvesting and important sites, and Section 7.3 Heritage Resources)
Socio-economic VC's		
Section 7.10: Infrastructure and services	Health services Housing Early childhood development Living standards Education Community Vitality	Infrastructure and services describe where residents live, work, and play and the services that are depended on for survival and health. For instance, living in safe, affordable housing is a necessity for a healthy life and economic resources is one of the main reasons Canadians experience housing problems (Raphael et. Al 2020). Having

Table 7-90: Summary of VC sections and how the VC relates to the SDOH and well-being

VC	SDOH and CIW Domain	Connection to well-being
		access to timely health and emergency services also contribute to our health status.
Section 7.11: Land and resource use	Leisure and culture Time use Environment	Land use relates to the CIW domains of leisure and culture and time use, which provides opportunity to enhance quality of life (CIW 2016).
Section 7.12: Commercial agriculture	Time use Income and employment Living standards	Commercial agriculture is a type of land use and it relates to the CIW domains of leisure and culture and time use, which provide opportunity to enhance quality of life (CIW 2016). Commercial agriculture is also a livelihood and generates income that can enhance quality of life.
Section 7.13: Economic opportunities	Income and income distribution Employment and working conditions. Unemployment and job security Education Living standards	Income and employment conditions are closely related. Income is arguably one of the most important determinants of health as it shapes overall living conditions and can influence health-related behaviours such as nutrition, exercise, and risky behaviours (Raphael et al 2020). People with higher education tend to be healthier than those with lower educational attainment (Raphael et al 2020).

Table 7-90: Summary of VC sections and how the VC relates to the SDOH and well-being

VC	SDOH and CIW Domain	Connection to well-being
Section 7.14.1: Human health	Healthy populations Environment	This section informs the conditions that directly contribute to disease and injury, which contribute to defining health status. Robust health is identified as a component of well-being.

Overall, well-being has the potential to be both positively and adversely affected because of the project, and the degree to which well-being may be affected will depend on factors such as proximity to the ROW, how residents in the ROW use the land, and the extent to which employment opportunities extend into the RAA.

There are many factors that influence well-being, some of which are subjective, and diverse populations may not experience all effects the same way.

Due to historical events and the deeply rooted connections that First Nations people and Red River Métis citizens have with the land, their well-being may be affected in different ways than the well-being of non-Indigenous people.

Therefore, effects of the project on well-being will differ among individual circumstances. Manitoba Hydro will continue to engage and monitor factors related to well-being.

Gender-based analysis plus (GBA+) summary

As indicated throughout the assessment, diverse populations may have differentiating positive and adverse experiences based on the historical and social constructs that influence well-being.

In the GBA+ report conducted by Manitoba Hydro (2021), diverse population groups were identified as potentially being adversely or positively affected by transmission line work.

In this analysis, the population groups that had the potential to be most adversely affected were gender and sexually diverse populations and populations with Indigenous identity. Low adverse effects were identified for persons with disabilities, region of residence, visible minority status, immigration status, education, and language status.

Adverse effects have been identified for Indigenous peoples and the changes to aesthetic conditions through project activities such as clearing and the presence of transmission lines, which may disturb areas that are culturally or spiritually important to Indigenous peoples. This includes a change to the landscape and sense of place, which is important to cultural identity and continuity (Manitoba Hydro 2021).

Potential benefits were identified from project-related employment opportunities. For instance, those with an educational attainment with trades, apprenticeship training or post-secondary education are expected to experience a high level of benefit related to employment opportunities.

People who don't have additional training may still realize some employment benefit, however there are fewer positions available for unskilled labour (Manitoba Hydro 2021). Manitoba Hydro has identified in responses to engagement that efforts will be made to employ First Nations peoples and Métis citizens, women, and apprentices.

7.14.2.2 Scope of the assessment

This section will assess effects that contribute to well-being, including mental health associated with perceived health effects and other project-related concerns, substance abuse and communicable diseases due to the presence of a temporary workforce, aesthetic conditions as well as access and connection to land and resources. Specifically, this section will assess:

- Change in perceived health and stress associated with EMF and property values.
- Change in aesthetics, tranquility, and connection to the land.
- Change in healthy populations associated with the presence of the temporary workforce in the region.

This assessment has been informed by the learnings from project engagement.

It is acknowledged and recognized that the geographical context of the Winnipeg River region, and anthropogenic impacts to this region over time influence present-day environmental conditions and well-being. This section intends to broaden the scope of environmental assessment to include a holistic perspective of well-being.

Regulatory and policy setting

Provincial regulatory framework

The environmental assessment is conducted in accordance with Manitoba Hydro's corporate and environmental policies and Manitoba's environmental assessment legislation.

Consideration of issues raised during engagement

Manitoba Hydro has conducted project engagement to provide input to project planning and identify concerns.

Key issues associated with well-being identified during engagement included concerns regarding:

- Potential effects to the environment (e.g., clear cutting, water levels, wood harvesting)
- Potential effects to human health (e.g., through pesticides and noise)
- Public accessibility, disruption of privacy and effects to private property (e.g., devaluation of property, effects to livestock)
- Revenue sharing/benefits with private landowners
- Aesthetic conditions (e.g., noise, peacefulness, and serenity)
- Effects to lifestyle (e.g., more sedentary, change in diet)
- Equal/fair employment opportunities for women and Indigenous peoples

Manitoba Hydro recognizes that many comments received through engagement activities can be relevant to multiple VC sections, including well-being. Many engagement comments and concerns also have the potential to influence well-being to some capacity.

Concerns surrounding potential effects to the environment have been described in the biophysical VC sections (e.g., vegetation or wetlands) and are discussed in this section in relation to how changes to the environment affect well-being.

Concerns around potential effects to human health are discussed below.

Public accessibility and disruption of privacy and effects to private property are discussed in Section 7.11 (land and resource use). Concerns regarding devaluation of property are also discussed in this section as it relates to overall perception and health outcomes.

Aesthetic conditions are assessed in this section.

Effects to lifestyle have been assessed in Section 7.11 (land and resource use) in terms of recreational use and hunting and trapping and in this section with respect to using the land to harvest food.

Economic opportunities such as revenue sharing, benefits with private landowners and employment opportunities were mentioned during engagement activities. Section 7.12.2 (economic opportunities) discusses some of these concerns and Manitoba Hydro has easement agreements with private landowners. This section discusses how employment and economy affect overall well-being.

Spatial boundaries

The spatial boundaries for well-being are composed of:

- **Project development area (PDA):** The PDA is the footprint of the proposed project as described in section 2.0, including the transmission line right-of-way and any additional areas such as marshalling yards and access road allowances.
- **Local assessment area (LAA**): includes the PDA and the boundaries of all rural municipalities (RMs) traversed by the PDA. Municipalities within the LAA consist of the Local Government District (LGD) of Pinawa (in whole) and portions of the Rural Municipality (RM) of Alexander, RM of Lac du Bonnet, RM of Whitemouth, and Unorganized Territory Division No. 1 (including Whiteshell Provincial Park). The LAA also includes the Town of Lac du Bonnet. This assessment area is sufficiently broad to encompass the potential effects of a temporary workforce interacting with local communities.
- **Regional assessment area (RAA):** The RAA is the same as the LAA, which encompasses a sufficiently broad area for assessing cumulative effects, including the incremental effects of the Project.

Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years; Fall 2024 to Summer 2026. Station work to occur year-round, transmission line construction to occur under frozen conditions
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

Residual effects characterization

The characterization of residual effects on well-being in Table 7-91 provide a description of the characterization criteria for well-being.

Table 7-91: Characterization of Residual Effects on Well-being

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters or qualitative categories in a direction beneficial to well-being relative to baseline. **Adverse –** a residual effect that moves measurable parameters or qualitative categories in a direction detrimental to well-being relative to baseline. **Neutral –** no net change in measurable parameters or qualitative categories for the well-being relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**Negligible –** non-discernable change to human health risk or well-being (no increase in health risk or well-being). **Low –** a change in health (mental, physical, emotional, or spiritual) outcomes because of the project that exceeds baseline conditions but is not severe enough to affect daily activities. **Moderate –** a change in health outcomes (mental, physical, spiritual, or emotional) because of the project that exceeds baseline conditions and moderately affect individuals' daily life and activities. **High-** a change in health (mental, physical, emotional, or spiritual) outcomes, that has a severe affect on an individual's daily life or activities or could result in hospitalization or death.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA. **LAA –** residual effects extend into the LAA. **RAA –** residual effects extend into the RAA.

Table 7-91: Characterization of Residual Effects on Well-being

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	**No sensitivity -** Effect does not occur during a sensitive life stage (e.g., infants, children, elderly) **Moderate sensitivity -** Effect may occur during a less sensitive period of a life stage (e.g., young adults). **High sensitivity -** Effect occurs during a sensitive life stage (e.g., infants, children, elderly).
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to construction phase. **Medium-term –** the residual effect extends more than the construction phase but less than project lifetime. **Long-term –** the residual effect extends beyond the life of the project.
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously.
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

Significance definition

Effects on well-being will be determined significant if the project has the potential to adversely change mental and physical health conditions that exceeds baseline conditions and cannot be mitigated or reduced with current or anticipated programs, policies, or mitigation measures.

7.14.2.3 Project interactions with well-being

This section describes project interactions with well-being during the construction, operation and maintenance and decommissioning phases. For each project interaction with well-being, an assessment of the potential effects is provided, including an evaluation of the significance of the effect.

Table 7-92 identifies, for each potential effect, the physical activities that might interact with the VC and result in the identified effect.

Table 7-92: Project Interactions with Well-being

Project activity	Effects		
	Change in perceived health and stress	Change in aesthetic conditions, tranquility, and connection to the land	Change in healthy populations
Transmission Line Construction			
Mobilization and staff presence	-	✓	✓
Vehicle and equipment use	-	✓	-
Right-of-way clearing	-	✓	-
Watercourse crossings	-	✓	-
Marshalling / fly yards	-	✓	-
Transmission tower construction	-	✓	-
Implodes	-	✓	-
Helicopter use	-	✓	-
Clean-up and demobilization	-	✓	-
Station Modification			

Table 7-92: Project Interactions with Well-being

Project activity	Effects		
	Change in perceived health and stress	Change in aesthetic conditions, tranquility, and connection to the land	Change in healthy populations
Mobilization and staff presence	-	✓	✓
Vehicle and equipment use	-	✓	-
Marshalling / fly yard (Pointe du Bois station)	-	✓	-
Realignment of access road (Pointe du Bois station)	-	✓	-
Site preparation (Pointe du Bois station)	-	✓	-
Station footprint expansion (Pointe du Bois station)	-	✓	-
Installation of electrical equipment	-	✓	-
Clean-up and demobilization		✓	-
Transmission Line and Station Operation and Maintenance			
Transmission line and station presence	✓	✓	-
Vehicle and equipment use	-	✓	-
Inspection and maintenance	-	✓	-
Vegetation management	-	✓	
Decommissioning			
Mobilization and staff presence	-	✓	✓
Vehicle and equipment use	-	✓	-
Removal of equipment	-	✓	-
Rehabilitation	-	✓	-

Table 7-92: Project Interactions with Well-being

Project activity	Effects		
	Change in perceived health and stress	Change in aesthetic conditions, tranquility, and connection to the land	Change in healthy populations
Clean-up and demobilization	-	✓	-

✓= Potential interaction

– = No interaction

7.14.2.4 Potential effects, pathways, and measurable parameters

Table 7-93 describes the potential effects, effect pathways and measurable parameters used in the assessment of effects on well-being.

Table 7-93: Potential effects, effects pathways and indicators of well-being

Potential effect	Effect pathway	Indicators
Change in perceived health and stress	Presence of transmission lines may cause stress due to the perceived health-related effects of EMF. Presence of transmission lines may cause stress related to concerns on property devaluation.	Perceived health-related stress (qualitative) Property value stress (qualitative)
Change in aesthetics, tranquility, and connection to the land	Project-related activities and the presence of a transmission line may decrease accessibility to the land and resource use and contribute to avoidance due to aesthetic conditions and/or perceived and measurable environmental impacts	Aesthetic conditions (e.g., noise, visual quality) (qualitative) Connection to the land/enjoyment of land activities (qualitative)

Table 7-93: Potential effects, effects pathways and indicators of well-being

Potential effect	Effect pathway	Indicators
		Access to resources/food security for Indigenous populations (qualitative)
Change in healthy populations	Out-of-region workers may interact with communities and disrupt the social and cultural setting	Size of transient workforce relative to community population Communicable disease transmission (e.g., STI's) (qualitative) Substance-use (qualitative) Crime (qualitative)

7.14.2.5 Assessment of residual effects on well-being

Analytical assessment techniques

The assessment of effects on well-being are based on secondary research, with baseline information developed from similar environmental assessments and applications; information gathered through project engagement; an understanding of project interactions and mitigation; and professional judgement.

The overview of well-being (Section 7.14.1) aims to provide a holistic approach on well-being and references Canadian based research on well-being and the social determinants of health. Through the guidance of resources produced by reputable organizations such as the National Collaborating Centre for Determinants of Health (NCCDH), Canadian Index of Wellbeing housed within the University of Waterloo and the National Collaborating Centre for Indigenous Health (NCCIH), this assessment conceptualizes how applicable effects on other VC's interact to influence well-being.

Change in perceived health and stress

Project pathways

The construction and operation of the transmission line may have effects on stress and mental health conditions due to a change in risk perceptions such as perceived health risks from EMF exposure and stress from perceived changes to property values due to the presence of transmission lines.

Risk perceptions are an important contributor to health-related behaviours (Paek H & Hove, T 2017). The World Health Organization states that "mental health is a state of well-being in which an individual realizes their own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to their community" (World Health Organization n.d.b).

Long-term stress can increase the risk of adverse mental health effects such as increased anxiety, depression, substance abuse problems, sleep problems, pain and complaints, increased headaches, gastrointestinal problems, weakened immune system, raised blood pressure, contribute to difficulty conceiving, cardiovascular disease, and stroke (CAMH n.d).

Hess et al (2021), discovered that health and safety such as perceived health risk from EMF, noise and construction effects were frequently mentioned concerns to proposed powerlines in North America. This observation has been supported through comments recorded through engagement efforts conducted by Manitoba Hydro. For instance, one participant asked about hazards of 115 kV lines and what information is available to share.

During an engagement circle, participants noted the relationship between effects to human health and effects to mental health caused by the project. Additionally, several general concerns were raised with respect to the effects on the environment and how that will affect future generations.

EMF generated during operation is expected to be below the recommended reference levels for public exposure and as a result, human health risks associated with EMF are expected to be negligible. However, risk perception refers to people's subjective judgements about the likelihood of negative occurrences such as injury, illness, disease, and death (Paek H & Hove, T 2017).

There is a common perceived risk that living near powerlines increases cancer risk due to the production of strong electromagnetic fields (EMF) (City of Hope 2023) which was first raised in 1979 due to a study which associated increased risk of childhood leukemia with residential proximity to power lines (Zeman n.d.). There has been no consistent evidence linking cancer to EMF exposure from powerlines including childhood leukemia and brain tumors (National Cancer Institute 2022).

Several studies have linked how power transmission lines have increased levels of stress and annoyance in relation to perceived changes in property values, noise, and aesthetic concerns (MMTP 2015). Hess et al (2021) also identified that effects on property value had the greatest frequency of concern for proposed electricity power lines in North America (Hess 2021), which has also been identified as a repeated concern through public engagement sessions and surveys collected by Manitoba Hydro.

With respect to stress and anxiety related to devalued property, a literature review was conducted for the Manitoba-Minnesota Transmission Line Project on the effects of transmission line development on private property value. The results of this review were inconclusive, with some studies showing that there were negative private property value impacts due to transmission line proximity and other studies finding that transmission lines have little to no effect on property values (MMTP 2015). The literature also provided mixed conclusions about whether the effect on property value diminishes over time (MMTP 2015).

Mitigation

Manitoba Hydro will implement the following measures to reduce effects on health and stress:

- Manitoba Hydro will enter into easement agreements and provide information to private landowners whose land is crossed by the transmission line.
- The transmission line has been routed to consider populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks, and communities.
- Continuing to address concerns related to EMF and providing factual, science-based information to concerned individuals and organizations.

Residual effects

Perceived health effects from EMF due to the presence of a transmission line and stress-related effects such as devalued property may contribute to adverse mental outcomes such as stress and anxiety. Manitoba Hydro will continue to address concerns related to EMF by providing evidence-based information to concerned individuals and organizations which has the potential to decrease associated risk perceptions. However, perceived risks are subjective and there is the potential that the perceived risks over EMF may linger.

Section 7.11.3.2 assesses the effects of the project on property values. It was concluded that the project will have low potential to affect property values due to the small number of residences and private land parcels potentially affected.

The transmission line has been routed to consider populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks, and communities. This routing will limit potential effects on private landowners.

Manitoba Hydro will enter into easement agreements with private landowners which is anticipated to reduce concerns related to project uncertainty and compensate them for change in use and enjoyment of their land. Private landowners who are closer to the transmission lines may experience greater project-related stress with concerns over their property values (Mueller 2019). Additional mitigation measures related to property value are described in Section 7.11.5.2.

Despite the measures in place to reduce effects on perceived health risks and stress, there remains a possibility that adverse mental health outcomes may still occur. The magnitude has been assessed as ranging from negligible to moderate because perceived health and stress is subjective and may vary between individuals depending on factors such as proximity to the transmission line.

Effects may extend from the PDA to the RAA however, those living closer to the transmission lines may experience a greater magnitude of perceived risk (Mueller 2019). There are 176 occupied houses within a 1 km buffer of the PDA, and the effects on these residents may be greater compared to those residents who live on the outer boundaries of the LAA. The duration may range from short-term to medium-term depending on individual circumstances and due to the continual presence of a transmission line.

Risk perception may change with time for some individuals and may linger beyond the lifespan of the project for others. The frequency of perceived stress occurs on multiple irregular events and may range from reversible to irreversible, depending on individuals' ability to cope with stress.

Change in aesthetics, tranquility, and connection to the land

Project pathways

Human relationships with the land are both directly and indirectly connected to health and well-being, and access to a functioning ecosystem available for land use and cultural activities is a determinant for human health and well-being.

Connections to the land and environmental stewardship are also determinants of First Nations peoples and Métis citizens' health. For instance, The First Nation Health Authority states that "land and health are closely intertwined because land is the ultimate nurturer of people. It provides not only physical but emotional and spiritual sustenance, because it inspires and provides beauty; it nurtures our souls." (COBC n.d.). Access to the land, and land use activities can enable knowledge transmission, including the transmission of skills and ecological knowledge (PDAC 2022) (See Section 6.1.2).

Project-related activities and the presence of a transmission line may result in direct and indirect changes related to land use and cultural activities. Direct effects may include changes in accessibility (e.g., loss of land, fragmentation, change in wildlife and plant abundance) and indirect effects may include changes in perception of the land (e.g., observed changes to wildlife, air, land, and water) which may result in avoidance and/or hinder the enjoyment of space, tranquility, aesthetics, and create barriers to harvesting, and important sites for First Nations peoples and Red River Métis citizens land and resource use.

Aesthetic conditions include noise and visual disturbance. Visual quality may depend on:

- The physical relationship of the viewer and the transmission line (distance and line of sight).
- The activity of the viewer (e.g., living in the area, driving through, sightseeing).
- The contrast between the transmission line and the surrounding environment.

Changes to aesthetic conditions may affect First Nations peoples and Red River Métis citizens 'sense of place', defined as peaceful enjoyment of lands and waters without sensory disturbances, stress, or harassment, and their emotional and spiritual attachment to culturally important places. To experience a 'sense of place' it is critical to have the ability to enjoy the surroundings without sensory disturbances, stress, or harassment (Cedar 2022).

Changes observed in the air, water, or land can alter behavior of First Nations peoples and Red River Métis citizens because of concerns over the access and safety of resources from these environments which could lead to avoidance and has the potential to affect cultural continuity and knowledge transfer (Beausoleil 2021).

Access to resources is a vital component of First Nations peoples and Red River Métis citizens culture, language, and community well-being (Bell-Sheeter 2004). Morrison (2011) explains that Indigenous peoples have a sacred responsibility to a relationship with the land, as stewards, to maintain the landscape for future generations. However, the history of land rights and the imposition of Treaty and reserves after colonization have prevented many First Nations peoples and Red River Métis citizens from carrying out land management practices necessary for obtaining sustainable and reliable sustenance.

Through public engagement sessions and surveys conducted by Manitoba Hydro, Peguis First Nation reported that the Pointe du Bois area is highly spiritual and is heavily used for ceremonial purposes. Engagement also revealed concerns about transmission lines creating accessibility to the public, which can result in people disrespecting the environment by littering and participating in illegal hunting, trespassing and overall change in privacy. A survey participant also noted that there are concerns with respect to change in "peacefulness and serenity".

Mitigation

Manitoba Hydro will use the following mitigation to address noise:

- Construction activities will follow local noise by-laws.
- A communication protocol will be developed to notify relevant parties of conductor splicing (i.e., implodes). Relevant parties may include Manitoba Environment and Climate, RCMP, municipalities, landowners, and resource users.
- Use of passive or active techniques to minimize noise to the extent feasible.

Manitoba Hydro has or will use the following mitigation measures to enhance visual screening and reduce visual contrast of the project:

- The transmission line has been routed to consider populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks, and communities.
- Except for reflective bird diverters at areas of high bird-wire collision potential, non-reflective galvanized tower materials are used which reduce the visual contrast with background.
- Where practical, towers will be sited to limit their visibility from viewpoints of concern identified through project engagement.
- Efforts will be made during the design process to spot transmission towers to reduce visual interference in areas identified during project engagement.

Manitoba Hydro will implement a Cultural Heritage Resources Protection Plan (Section 11.7.4.4) and use protective barriers around found heritage resource sites which will maintain the visual quality of important sites. More measures can be found in Section 7.3.3.

Residual effects

Land use is a determinant of health and contributes to overall well-being. Change in land use can directly and indirectly affect diverse population groups (e.g., gender, ethnicity, Indigeneity) experiences in how they access or perceive the land.

With respect to direct effects such as accessibility, Manitoba Hydro has routed the transmission line considering populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks and communities and feedback through engagement. Section 7.11 (land and resource use) discusses further the effects on accessibility and has primarily assessed a change in designated lands and recreation, and effects on hunting and trapping as low magnitude.

Changes in aesthetics (e.g., noise and visual quality) may change the perception of land which can potentially lead to avoidance. Residual effects on noise and visual quality are discussed below:

Noise

As assessed in Section 7.14.1 (Human Health), except for isolated activities, the magnitude of noise during construction has been assessed as low and noise generated by vehicles and equipment during operation and maintenance phases are negligible.

Visual Quality

The route selection process (Chapter 3.0) considered and limited the proximity of the project to visual quality receptors such as cottages, communities, designated protected areas and recreation areas. However, there will be 176 occupied residences, two recreation buildings, two campgrounds and recreational trails (e.g., biking, hiking, canoe, snowmobile trails) within 1 km of the project and residents and land users could experience changes in visual quality due to the presence of project infrastructure.

Photos and drawings of transmission lines are further described in Chapter 2.0.

While mitigation measures implemented by Manitoba Hydro are anticipated to reduce adverse effects on land use and aesthetic conditions, the enjoyment of land, recreation and cultural activities may still be adversely affected by the presence of the transmission lines and ROW on the landscape. This is because, the change in aesthetics may cause some people to avoid participating in recreational or cultural activities in the LAA.

Wild food accessibility and quality may also be affected. There may be limitations and barriers to accessing resources, because of direct (physical loss of access) and indirect (perceived changes) impacts to the environment, which can also create reliance on processed store-bought food within Indigenous communities (Morrison 2011). Change to wild food quality has been assessed as a non measurable change (Section 7.14.1).

The magnitude of effects on aesthetics, tranquility and connection to land is anticipated to be moderate because there is the potential to change the way the land is viewed and therefore, enjoyed, which could potentially lead to avoidance of the project area. The geographical extent of effects may range from the PDA to the RAA as it would depend on where people who use the land reside, and how often they use the proposed ROW route for their activities.

Those who live closer to the PDA may experience continual effects to the change on aesthetic conditions. Those who use it for recreational or cultural purposes may experience the adverse effects on multiple occasions. The duration is anticipated to be medium-term because of the continual visual presence of the transmission line. There is a possibility of greater avoidance and accessibility issues during construction and earlier years of operation phases and this effect may linger with the presence of transmission lines. This effect has the potential to be irreversible due to the long project life of the transmission lines.

Change to healthy populations

Project pathways

Lifestyle, behaviour, and community safety are among many of the factors that contribute to a healthy population (Canadian Index Well-being 2016). Tariq and Gupta (2022) define high-risk behaviours as "acts that increase the risk of disease or injury, which can subsequently lead to disability, death, or social problems." Alcohol and substance use, violence, and risky sexual behaviours are some of the most common high-risk behaviours (Tariq and Gupta 2022).

Out of region workers may affect community stability and security through adverse interactions that could affect the safety and health behaviours of some community members. Possible adverse interactions may include risky behaviours undertaken by the out-of-region workers and contribute to the transmission of communicable diseases because the workforce may take measures to seek social interaction (which could lead to sexual encounters) within the communities and potentially change the social networks which can contribute to the spread of clusters and outbreaks (Oster et al. 2021).

It is possible that out-of-region workers could undertake in other risky behaviours such as substance misuse or heavy alcohol consumption which has the potential to affect the safety of the residents within communities. There are relationships between increased substance abuse, including alcohol, and the presence of a predominantly male transient workforce (PDAC 2022). There are also relationships between those who have higher earnings and higher alcohol consumption (Government of Canada

2022). Consequences of risky drinking to the community may include traffic accidents and violence (World Health Organization n.d.c).

In the socio-economic monitoring plan for the Keeyask Generation Project (2018), it was indicated that the Keeyask Project has contributed to an increase in the presence and use of drugs and alcohol in the region and concerns were also raised about potential sexual exploitation at the Keeyask site and within the community (Manitoba Hydro 2018).

Mitigation

Manitoba Hydro will implement the following mitigation measures to reduce the risk of increasing the spread of transmissible diseases between the temporary project workforce and the local community and protect the safety of the community by:

- Hiring local or regional workers, whenever possible.
- Work with the relevant regional health authorities to ensure adequate and appropriate strategies are put in place to reduce or eliminate the spread of infection at worksites, including the transport of severely contagious workers, and ensure sanitation standards meet public health guidelines.
- Manitoba Hydro workers will adhere to Manitoba Hydro's Code of Conduct.
- The *Discrimination and Harassment Free Workplace* Policy will be enacted and enforced for Manitoba Hydro workers.
- The *Violence in the Workplace Policy* will be enacted and enforced for Manitoba Hydro workers.
- The *Drug and Alcohol* Policy will be enacted and enforced for Manitoba Hydro workers.

Residual effects

Healthy populations and risk behaviors are directly linked to overall physical and mental health outcomes and well-being. The project is anticipated to have a transmission line construction workforce ranging from 45 to 112 personnel per month during peak construction periods, between December 2024 to April 2027. Manitoba Hydro anticipates that there is a sufficient supply of skilled labour in the LAA/RAA to address project requirements.

Provided that the out-of-region workforce is relatively small, it is not anticipated that the social fabric of the communities will be disrupted however, there remains a possibility that the workforce may interact with community members in social settings which has a potential for communicable disease transmission and consequences related to the potential of risky behaviours conducted by the workforce.

While it is difficult to predict the level of interaction that the workforce may have with the communities, with the measures in place and in consideration that the workforce is relatively small and there is a shorter and seasonal duration of the project, the magnitude is anticipated to low. However, there remains a possibility that potential instances of high magnitude events (e.g., a circumstance that could result in hospitalization or death) could occur.

Depending on the where most of the workforce resides, the effects may extend into the RAA and will last for the duration of the construction phase of project (short-term).

The frequency of effects are multiple irregular events and depending on the individual circumstance's effects may be reversible (e.g., alcohol-related traffic incidents may decrease once the workforce leaves) and irreversible (e.g., long lasting effects from STI's or the spread of communicable disease among the community).

Diverse population groups such as women, First Nations peoples and Métis citizens, and 2SLGBTQQIA+ (two-spirited, lesbian, gay, bisexual, transgender, queer, questioning, intersex, asexual plus) populations experience inequitable instances of sexual violence and effects of substance misuse from transient workforces that are predominately males (National Inquiry into Missing and Murdered Indigenous Women and Girls 2019).

7.14.2.6 Summary of Residual Effects

A summary of the environmental effects assessment and predictions of residual environmental effects resulting from the interactions of the Project and human health risk is provided in Table 7-94.

Table 7-94: Project Residual Effects on Well-being

Project phase	Residual effects characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in perceived health and stress							
C/O/D	A	N /L/M	RAA	N/A	ST/MT	IR	R/I
Change in aesthetics, tranquility, and connection to the land							
C/O/D	A	M	PDA/LAA	N/A	MT	IR	R/I
Change in healthy populations							
C/OD	A	L/M/H	RAA	N/A	ST	IR	R/I

KEY

Project Phase
C: Construction
O: Operation
D: Decommissioning
Direction:
P: Positive
A: Adverse
N: Neutral
Magnitude:
N: Negligible
L: Low
M: Moderate
H: High

Geographic Extent:
PDA: Project Development Area
LAA: Local Assessment Area
RAA: Regional Assessment Area
Timing
NS: No sensitivity
MS: Moderate sensitivity
HS: High sensitivity
Duration:
ST: Short-term
MT: Medium-term
LT: Long-term

N/A: Not applicable

Frequency:
S: Single event
IR: Irregular event
R: Regular event
C: Continuous
Reversibility:
R: Reversible
I: Irreversible

7.14.2.7 Assessment of cumulative effects on well-being

The project residual effects on well-being are anticipated to act cumulatively with past, current, and foreseeable projects and therefore a cumulative effects assessment will be conducted. Table 7-95 displays the project and physical activities inclusion list which identifies other projects and physical activities that may act cumulatively with the project.

Table 7-95: Potential cumulative environmental effects on well-being			
Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Change to perceived health and stress	Change to aesthetics, tranquility, and connection to the land	Change to healthy populations
Existing/Ongoing Projects and Activities			
Agriculture (crop and livestock production)	✓	✓	-
Domestic Resource Use (hunting, trapping, fishing)	✓	✓	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	✓	✓	-
Infrastructure (existing rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities	✓	✓	-
Generating Stations (Pointe du Bois, Slave Falls, Seven Sisters)	✓	✓	-
Transmission Lines			
P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines	✓	✓	-

Table 7-95: Potential cumulative environmental effects on well-being			
Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Change to perceived health and stress	Change to aesthetics, tranquility, and connection to the land	Change to healthy populations
R1 and R2 (Pointe du Bois to Slave Falls) 115-kV transmission lines	✓	✓	-
S2 (Slave Falls to Stafford) 115-kV transmission line	✓	✓	-
SK1 (Seven Sisters to Star Lake) 115-kV transmission line	✓	✓	-
SG12 (Great Falls to Seven Sisters) 115-kV transmission line	✓	✓	-
SR3 (Seven Sisters to McArthur Falls) 115-kV transmission line	✓	✓	-
SW1, SW2, SW3 and SW4 (Seven Sisters to Whiteshell) 115-kV transmission lines	✓	✓	-
ST5 and ST6 (Seven Sisters to Transcona) 115-kV transmission lines	✓	✓	-
K21W and K22W (Whiteshell to Kenora) 230-kV transmission line	✓	✓	-
Nuclear Power (Whiteshell Laboratories)	✓	✓	-
Future Projects and Activities			

Table 7-95: Potential cumulative environmental effects on well-being			
Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Change to perceived health and stress	Change to aesthetics, tranquility, and connection to the land	Change to healthy populations
Slave Falls Generating Station (Slave Falls 7-Bay Sluiceway Life Extension Project)	✓	✓	✓
Transmission Projects (Decommissioning of P3/P4 66-kV transmission lines (Lee River distribution supply centre to Winnipeg)	✓	✓	✓
Nuclear Power (Whiteshell Laboratories - Small Modular Nuclear Reactor (Pinawa Demonstration Reactor)	✓	✓	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

– = Interactions between the residual effects of other projects and those of the Project residual effects are not expected.

Effects on well-being identified in Table 7-95 are unlikely to interact cumulatively with residual effects of other projects and physical activities (no check mark) are not discussed further. Potential residual effects associated with these projects or activities are not anticipated to overlap with the project spatially or to occur at the same time.

Cumulative effects for change to perceived health and stress

Project-related effects on perceived health and stress are anticipated to act cumulatively with current and foreseeable projects.

Pathways

Changes to perceived health and stress has the potential to act cumulatively with past, current, and foreseeable projects within the region indicated on Table 7-95. The development of past projects has potentially contributed to the existing health conditions of the population in the RAA.

The addition of current and foreseeable projects such as the nine stretches of transmission lines identified in Table 7-95 that overlap spatially and temporally has the potential to contribute to perceived health-effects from EMF and stress related to change in property values. The same pathways remain as discussed section 7.14.2.4.

Mitigation

Implementation of the mitigation measures described in Section 7.14.2.5 will likely reduce the Project's effects on perceived health effects and stress. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effects

A summary of the characterization of the cumulative effects on change in perceived health and stress, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7-9595.

In consideration of the current and foreseeable projects or existing transmission lines in the RAA, more industrial development, and presence of transmission lines in the RAA, may contribute to an increase in people experiencing perceived health and stress, which could contribute to an increase in health conditions in the RAA.

Effects from EMF have been described in Section 7.14.1 and effects on property values have been discussed in Section 7.11. There are nine current transmission lines in the RAA that have been ongoing since the earliest development in 1920 (P3 and P4 (Pointe du Bois to Rover) 66-kV transmission lines) and the latest transmission line was developed in 1989 (SK1 (Seven Sisters to Star Lake) 115-kV transmission line).

The cumulative magnitude of perceived health and stress will range from a non-measurable change to potentially moderate because perception is related to proximity to the projects/existing transmission lines and individuals may have different perceptions depending on where they reside in relation to the project. Perceived health effects are subjective and may differ among individuals.

The geographical extent will extend into the RAA and the duration is anticipated to range from short-term to long-term as there will be temporal overlap among projects and existing transmission lines. Perceptions may change overtime (e.g., greater risk perception at the beginning of projects and diminishing effects over time), however with the cumulation of projects, the perception may exacerbate and not diminish. The frequency will likely be on multiple irregular events or occur continually depending on the proximity and the individual. Cumulative impacts have the potential to be reversible or irreversible depending on the nature of individual circumstances and coping strategies.

The project's contribution to cumulative socio-economic effects is not anticipated to result in a change that widely disrupts continued change in perceived health and stress within the RAA.

Cumulative effects for change to aesthetics, tranquility and connection to the land

Project-related effects on aesthetics, tranquility and connections to the land are anticipated to act cumulatively with past, current, and foreseeable projects indicated in Table 7-9595.

Pathways

The addition of current and foreseeable projects such as the existing transmission lines, and the potential future Pinawa Demonstration Reactor Project that is anticipated to begin in 2026 which will overlap spatially and partially temporally, will likely change aesthetic conditions, tranquility, and connection to the land in the RAA and may lead to changes in accessibility and avoidance in those areas, which is the same pathways described in 7.14.2.4.

For First Nations peoples and Métis citizens, cumulative effects described in Section 6.1.4, have acted to limit access to, and availability of, resources and important cultural and spiritual sites. This includes barriers to inherent treaty and asserted rights to pursue First Nations peoples and Red River Métis citizens land, resource, and cultural use practices, such as the right to harvest, hunt, trap, and fish in the project area in a manner that may have been enjoyed in the past. As such, the cumulation of current and future projects may result in more geographical locations which populations choose to avoid due to change in aesthetic or environmental conditions. This may further affect First Nations peoples and Red River Métis citizens rights to access the land which has the potential to affect cultural continuity, and cultural practices. Food security and harvesting practices may also be affected due to avoidance of project development areas which has the potential to adversely change the diet of First Nations peoples and Red River Métis citizens populations.

Mitigation

Implementation of the mitigation measures described in Section 7.14.2.5 will reduce the project's effects on aesthetic conditions, tranquility, and connection to the land. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effects

A summary of the characterization of the cumulative effects on change in aesthetic conditions, tranquility, and connection to the land, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7-9595.

There are few foreseeable projects that may influence aesthetics, tranquility, and connection to the land. Therefore, the magnitude has been assessed moderate because, with the presence of current transmission lines and facilities and more industrial development in the RAA, there will be potentially more locations that populations may avoid due to change in aesthetic conditions, which could include places used for cultural or spiritual practices. In turn, avoidance could adversely affect knowledge transfer and cultural continuity.

The geographical extent will extend into the RAA and the duration is anticipated to be medium-term to long-term as there will be temporal overlap among projects (e.g., existing transmission lines and Whiteshell Laboratories).

The frequency will range from continual exposure, for those who are in closer proximity to the projects, to potential multiple irregular events for people who use the land recreationally or culturally. Cumulative impacts have the potential to be irreversible as the land will not go back to the original state.

The project's contribution to cumulative socio-economic effects is not anticipated to result in a change that widely disrupts continued change in aesthetics, tranquility, and connection to the land within the RAA.

Cumulative effects for healthy populations

Project-related effects on healthy populations are anticipated to act cumulatively with current and foreseeable projects.

Pathways

Changes to healthy populations have the potential to act cumulatively with past, current, and foreseeable projects within the region indicated on Table 7-9595. The development of past projects may have contributed to the existing health conditions of the population in the RAA.

The addition of current and foreseeable projects such as the potential Pinawa Demonstration Reactor and project work with Salve Falls Generating Station and the decommissioning of P3/P4 66-kV transmission lines (Lee River distribution supply centre to Winnipeg) that overlap spatially and partially temporally has the potential to contribute to the number of temporary workers in the RAA. The same pathways remain as discussed section 7.14.2.4 in which a temporary workforce has the potential to change the social fabric of the community by interacting with community member.

Mitigation

Implementation of the mitigation measures described in Section 7.14.2.5 will reduce the project's effects on healthy populations. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effects

A summary of the characterization of the cumulative effects on change in healthy populations, including the cumulative environmental effects with the project and the project contribution to cumulative effects, is presented in Table 7.13-10.

There is anticipated to be a temporal overlap between foreseeable projects (e.g., Pinawa Demonstration Reactor Project is anticipated to begin in 2026 which would overlap with Manitoba Hydro project activities), therefore the accumulation of temporary workers could change the social fabric of the communities within the RAA given that their populations are relatively small. While there is no established workforce "threshold" to determine how many people it takes to adversely change communicable diseases or substance use, there will be approximately an addition of 256 full-time continuing jobs and 450 spinoff jobs for the Pinawa Demonstrator Reactor Project (Starcore Nuclear n.d.) which would increase the workers in the RAA Therefore, the cumulative magnitude has been assessed as moderate because the additional workforce has the potential to result in measurable or observable changes in health outcomes and/or may affect resident's daily activities.

The geographical extent will extend into the RAA and the duration is anticipated to be short-term to medium-term as there will be temporal overlap among projects.

It is anticipated that majority of project workforces will be present during the construction phases of projects. The frequency will likely be on multiple irregular events. Cumulative impacts have the potential to be reversible (once the workforce leaves) or irreversible depending on the nature of individual circumstances.

The project's contribution to cumulative socio-economic effects is not anticipated to result in a change that widely disrupts continued change in healthy populations within the RAA.

7.14.2.8 Summary of residual cumulative effects

Table 7-96 provides a summary of the characterization of cumulative effects and the projects' contribution to the residual cumulative effect.

Table 7-96: Summary of Residual Cumulative Effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in perceived health and stress							
Residual cumulative effect	A	NMC/L/M	RAA	N/A	ST-LT	IR	R/I
Contribution from the Project to the Residual Cumulative Effect	The project's contribution to cumulative socio-economic effects is not anticipated to result in a change that widely disrupts continued change in perceived health and stress within the RAA.						
Change in aesthetic conditions, tranquility and connection to the land							
Residual cumulative effect	A	M	RAA	N/A	MT-LT	C	I
Contribution from the Project to the Residual Cumulative Effect	The project's contribution to cumulative socio-economic effects is not anticipated to result in a change that widely disrupts continued change in aesthetics, tranquility and connection to the land within the RAA.						
Change in healthy populations							

Table 7-96: Summary of Residual Cumulative Effects

Residual Cumulative Effect	Residual Cumulative Effects Characterization						
	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Residual cumulative effect	A	M	RAA	N/A	ST-MT	IR	R/I
Contribution from the Project to the Residual Cumulative Effect	The Project's contribution to cumulative socio-economic effects is not anticipated to result in a change that widely disrupts continued change in healthy populations within the RAA.						

KEY

Direction:	Geographic Extent:	Frequency:
P: Positive	PDA: Project Development Area	S: Single event
A: Adverse	LAA: Local Assessment Area	IR: Irregular event
N: Neutral	RAA: Regional Assessment Area	R: Regular event
Magnitude:	Timing	C: Continuous
NMC: No Measurable Change	NS: No sensitivity	Reversibility:
L: Low	MS: Moderate sensitivity	R: Reversible
M: Moderate	HS: High sensitivity	I: Irreversible
H: High	Duration:	N/A: Not applicable
	ST: Short-term	
	MT: Medium-term	
	LT: Long-term	

7.14.2.9 Determination of significance

With the application of mitigation measures, the residual effects of the project on well-being associated perceived health and stress, aesthetics, tranquility and connection to the land and healthy populations is predicted to be not significant.

Given that the magnitude of perceived health and stress has ranged from a negligible change to potentially moderate which is subjective and depends on proximity to the project, this is not anticipated to have such a large effect on stress that it changes measurable mental or physical health outcomes which exceeds baseline conditions in the LAA/RAA.

While aesthetic conditions will change from original state, how this is perceived is also subjective and will affect people who use the land in different ways, some of which could lead to avoidance. The magnitude has been assessed as low to moderate, however, it is not anticipated that baseline conditions of measurable physical and mental health of the population in the LAA/RAA will change because of the project.

The workforce is anticipated to be relatively small, and there is potential to hire locally which will reduce the likelihood of community interactions with the temporary workforce. While the magnitude has been assessed as low overall, there remains a possibility that high magnitude effects could occur for some individuals. It is not anticipated that the project will result in the change of mental and physical health beyond baseline conditions in the LAA/RAA.

7.14.2.10 Prediction confidence

Prediction confidence is based on the information compiled during desktop-based data compilation and an understanding of project activities, location, and schedule.

There is a moderate degree of confidence in the assessment predictions and the well-being effects are well-understood. Well-being is influenced by many determinants and the degree to which each determinant may be weighted for an individual's overall well-being is not understood. Residents in the RAA may experience effects differently depending on factors such as proximity to the project and the location and type of land activities they enjoy which contributes to a moderate degree of confidence.

7.14.2.11 Follow-up and monitoring

Manitoba Hydro has not identified any follow-up plans that pertain to well-being.

8.0 Effects of the environment on the project

Effects of the environment on the project refer to the forces of nature that could affect the project physically or hamper the ability to carry out the project's activities in their normal, planned manner. Typically, potential effects of the environment on any project are a function of project or infrastructure design and the risks of natural hazards and influences of nature. These effects may result from physical conditions, landforms and general site characteristics that may act on the project such that project components, schedule and/or costs could be substantively and adversely changed.

While environmental forces (e.g., severe weather, climate change) have the potential to adversely affect a project, good engineering design considers and accounts for such effects and the associated loadings or stresses on the project that may be caused by these environmental forces. The methods used for mitigating potential effects of the environment on the project are inherent in the planning, engineering design, construction, and planned operation of a well-designed project expected to be in service for several decades or longer.

The potential effects of the environment on the project are focused on the following effects:

- Delays in construction and/or operation and maintenance
- Damage to infrastructure
- Reduced visibility impacting public health and safety

8.1 Effects analysis

The assessment of the effects of the environment on the project considers potential changes to the project that may be caused by the environment. There are no environmental factors expected to interact substantially with the construction of the project. While some weather-related delays are possible, they are not likely to adversely affect the project's construction, schedule, or cost.

During operation and maintenance, the PW75 transmission line or the station components with which it will be associated may be subject to severe weather events. While Manitoba Hydro designs its infrastructure to withstand extreme weather, it is not possible to design for all eventualities.

Severe weather that has adversely affected the Manitoba Hydro system in the past includes tornados, ice storms and floods. There is potential for any of these to occur in the regional area of the project. Mitigation measures include, applying engineering practices and scheduling of activities to account for possible weather disruptions.

Over the next 100 years, Manitoba will likely experience warmer temperatures, a greater frequency of storm events, increasing storm intensity and an increase in annual precipitation. Potential effects of climate change on operation and maintenance of the project would relate to increases in the frequency of severe weather events, changes in temperature and changes in precipitation. It is expected that increases in extreme weather events would affect operation and maintenance of the project by increasing unexpected maintenance due to storm damage. Changes in temperature could affect the freeze/thaw cycle, which will result in decreased foundation stability and potentially increased maintenance.

Mitigation measures include applying engineering practices and scheduling of activities to account for possible weather disruptions. Based on the above, the residual effects of the environment on the Project during all phases of the project were deemed minor, with a moderate level of confidence because of the uncertainty in the potential changes to local, regional, and global climate that could occur over the life of the project.

8.2 Assessment conclusions

The most likely effect of the environment on the project is a short-term disruption in service and the economic costs of repair. The project will be designed to meet applicable CSA standards. Design will be subject to two general design standards and the structural design loads will be based on a 150-year return period. Despite these measures, it is likely that extreme weather events could still result in outages and the requirement for repair of transmission lines, conductors, or towers. While this can result in socio-economic effects and potential public safety hazards, potential effects on the biophysical environment would be limited and associated mainly with an increased risk of an accidental release of hydrocarbons in the event of a flood or fire.

The project is being designed and will be constructed and operated with regard for health, safety, and environmental protection to minimize potential environmental effects that could result during the normal course of construction, operation, and maintenance as well as those that could result from forces of nature and affect the project physically or hamper the ability for project activities to proceed normally as planned.

The careful planning and design of the project will minimize the potential for damage from extreme weather events. The effects of an individual event could have significant effects on a localized extent. However, the potential for these events to occur, given the measures that will be undertaken to prevent their occurrence, is low.

In the very unlikely and improbable event that damage to the PW75 transmission line were to occur, it would be of a short duration, low frequency, or limited geographic extent such that major residual adverse environmental effects will not likely occur.

Overall, given the nature of the project, proposed mitigation, the potential residual environmental effects due to extreme weather events on the valued components during all phases of the project, are assessed as not significant.

9.0 Greenhouse gases and climate change

The Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Environment, Climate and Parks 2022) requires the discussion of climate change implications including a greenhouse gas inventory that should be calculated according to guidelines developed by Environment Canada (2021) and the United Nations (IPCC 2019). The following sections outline past, present, and future climate conditions and a summary of the greenhouse gas assessment. Further details on greenhouse gases and climate can be found in Appendix I and Appendix J respectively.

9.1 Climate

Climate plays an important role in multiple aspects of the project. For example, design loads are influenced by ice accumulation and wind, construction planning may use seasonal temperature patterns to favour frozen ground conditions, and conductor clearances are influenced by ambient temperature and wind conditions.

Furthermore, the impact of extreme climate events can result in substantial outages and financial consequences.

At a high level, this section characterizes historic climate conditions and presents projections of how climate in the area may change in the future. The information provided will become foundational for subsequent assessments of climate change impacts and resilience for transmission projects in the RAA.

9.2 Historic climate

The region has a continental climate characterized by short, warm summers and long, cold winters (Smith et al. 1998). The western portion of the regional study area lies within the Subhumid Low Boreal Ecoclimatic Region while the remainder lies within the Subhumid Transitional Low Boreal Ecoclimatic Region.

Climate parameters vary somewhat across the region with mean annual temperatures and total annual precipitation generally increasing from 1.9°C and 540 mm in the west, and 2.3°C and 650 mm in the east (Smith et al. 1998).

Table 9-1 provides mean temperature and precipitation parameters from 1981-2010 climate normals using data from the Pinawa weather station (Environment Canada 2013a).

Mean annual temperature at Pinawa was 2.8°C over the 30-year period. Daily temperature ranged from 19.3°C in July to -16.6°C in January. The growing season in terms of total degree days above 5° C averaged 1,744 days. Mean total annual precipitation was about 580 mm, with approximately 460 mm falling as rain. Precipitation was highest during the growing season. Moisture deficits were higher in the eastern portion of the region, but the number of growing degree-days and growing season days were consistent throughout the Regional Study Area at 1,600 and 180, respectively (Smith et al. 1998).

Table 9-1: Climate Normals (1981-2010) from Pinawa Weather Station

Climate Parameter	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Mean daily temperature deg C	-16.6	-13.2	-5.7	3.9	11.2	16.4	19.3	18.2	12.3	5.1	-4.5	-13.1	2.8
Mean daily max temperature deg C	-11.1	-7.3	0.2	10.3	17.7	22.5	25.2	24.3	18.0	9.7	-0.7	-8.5	8.4
Mean daily min temperature deg C	-22.1	-19.0	-11.6	-2.5	4.6	10.3	13.2	12.0	6.7	0.4	-8.3	-17.6	-2.8
Mean days to last frost in spring	-	-	-	-	-	-	-	-	-	-	-	-	147
Mean days to first frost in fall	-	-	-	-	-	-	-	-	-	-	-	-	262
Mean length frost-free period in days	-	-	-	-	-	-	-	-	-	-	-	-	113
Days with daily max temperature GT 0 deg C	2.6	5.4	16.6	27.4	30.9	30.0	31.0	31.0	30.0	29.2	13.6	3.9	252
Total degree-days Above 0 deg C	0.6	2.8	27.1	148.1	346.7	492.8	596.7	563.9	373.4	172.5	24.8	1.0	2,750
Total degree-days Above 5 deg C	0.0	0.0	2.3	56.2	200.2	342.8	441.7	408.9	225.5	62.5	3.9	0.0	1,744
Total precipitation mm	22	17	26	29	67	99	89	65	62	48	30	26	578
Total rainfall mm	0	2	11	20	65	99	89	65	61	40	10	2	464
Total snowfall cm	21.4	14.6	14.9	9.4	2.1	0.0	0.0	0.0	0.5	7.9	19.2	24.0	114
Mean month end snow depth cm	26.0	25.6	5.6	1.6	0.0	0.0	0.0	0.0	0.0	0.7	11.6	18.8	7.5

9.3 Future climate

A brief description of the event, impact, and projected future change is included below. This section combines existing sources of information (e.g., internal to Manitoba Hydro), new data analyses, and review of scientific literature which is cited for further reference.

9.3.1 Extreme heat

The number of hours or days where maximum temperature exceeds a threshold can affect multiple project components. Transmission system operations can be affected by air temperatures exceeding 40°C due to reduced capability of the lines.

Temperatures exceeding other thresholds (e.g., 30°C) can also impact the ability of staff to conduct outdoor field work and may affect cooling requirements for powerhouse equipment.

Extreme heat is not expected to affect construction activities as schedules are of adequate duration to safeguard against days during which productivity may be impacted by warmer air temperatures. A large portion of construction is during winter months.

In general, there is good agreement among simulations that extreme heat events will increase, but the magnitude varies based on representative concentration pathway and time period.

Under a scenario where global mean temperature increases by 2.1°C beyond preindustrial levels, Li et al. (2018) projects 10 to 20 additional hot days in southern Manitoba. Although there is high probability that days with temperature more than 30°C will increase, there is less evidence that days with temperature more than 40°C will increase substantially in the 2050s (ClimateData.ca, 2021) and a medium probability is assigned.

9.3.2 Winter temperature

Warmer winters can reduce the duration in which transmission line work can be undertaken and may result in access challenges during operation and maintenance.

Conversely, less extreme cold weather may facilitate some construction and operational/maintenance activities. In general, there is good agreement among simulations that winter temperature will increase, but the magnitude varies based on RCP and future time horizon. There is also scientific consensus that winter mean temperatures will increase more than other seasons due to factors including reduced snow cover and the associated loss of albedo, allowing for greater absorption of heat by land masses.

For construction and refurbishment related impacts, the 2020s time period (2010-2039) is of interest because work is planned in the nearer term. Manitoba Hydro (2015a) projects mean winter temperature to increase by +1.9°C in the 2020s and the average value of minimum temperatures in winter to increase by +2.1°C relative to the 1981-2010 baseline. However, since construction planning takes more recent (up to current) weather information into consideration, a portion of projected changes are inherently considered, and remaining signals are masked by noise due to natural climate variability. As such, changes to winter temperature that could impact construction activities are assigned a low probability since they are not likely to deviate strongly from the range of observed conditions already considered in construction planning.

The 2050s time period (2040-2069) is of greater importance for impacts related to access for operations and maintenance. For this time period, mean winter temperature is projected to increase by 3.8°C and the average value of minimum temperatures in winter to increase by 4.2°C relative to the 1981-2010 baseline (Manitoba Hydro, 2015a). Projections also suggest a reduction in heating degree days (Zhang et al., 2019; Manitoba Hydro 2015c), freezing degree days (Zhang et al., 2019), and a limited ensemble of RCM simulations in Manitoba Hydro (2015a) suggest reduced number of frost days, icing days, and cold spell duration.

Under a scenario where global mean temperature has increased by +2.1°C beyond preindustrial levels, Li et al. (2018; Supplementary Material) projects 10 to 20 additional frost-free days in southern Manitoba. All simulations available from ClimateAtlas.ca (2020) agree that there will be fewer winter days with an ensemble median projection of 23 fewer days per year with minimum temperature below -15°C.

9.3.3 General air temperature increase

It is virtually certain that Canada's air temperature has increased and will continue to increase in the future (Zhang et al., 2019) with greater change projected for winter relative to other seasons (Manitoba Hydro, 2020).

Statistically significant mean temperature trends for all of Manitoba were found over the 1948-2014 period and mean annual temperature is projected to increase by about 2.5°C to 2.9°C in the Project area (Manitoba Hydro, 2020; Manitoba Hydro, 2015a; Manitoba Hydro, 2015c). The magnitude of change varies depending on the climate model ensemble, RCP, and downscaling technique.

9.3.4 Wind speed

Cheng et al. (2014) projected changes in the frequency of wind gusts across Canada. Results show potential for more frequent wind gusts in southern Manitoba by the end of the 21st century with considerable uncertainty for higher velocity gusts.

Results also show variability depending on the season, gust speed, location, GCM, and GHG emission scenario which underscore some of the uncertainty in such projections.

Jeong and Sushama (2018) assessed how future (2071-2100) wind speed and design wind loads (50-year event) are projected to change across Canada. Results for southern Manitoba show variability depending on the driving GCM and GHG emission scenario with some showing increases and others show decreases.

Using a different climate model, Jeong and Sushama (2019) found similar disagreement among projections regarding changes to 50-year wind events in the 2071-2100 period. Minimal change is projected to annual maximum wind's direction.

In Jeong and Sushama (2019), seasonal results for a region that aggregates Manitoba and Saskatchewan suggest that summer mean wind speed will decrease while winter and spring mean wind speed will increase in the future. This finding is broadly consistent with provincial-scale findings from an ensemble of 40 GCM simulations in Manitoba Hydro (2020) where summer and winter exhibited more pronounced changes with arguably better agreement compared to other seasons.

9.3.5 Wildfire

Manitoba Hydro (2015a) summarized scientific literature related to forest fires which typically focus on boreal forest regions and may not be applicable to the entire Project area. Excerpts from Manitoba Hydro (2015a) are included below for quick reference:

- Although there is a lack of agreement about future forest fire regimes, historic analyses show that areas burned in the North American boreal forest have been increasing in the past 50 years, but still falls within long-term historic variability (Bergeron et al. 2010).
- Fires spread rapidly when fuel is dry and weather is warm, dry, and windy (Girardin and Mudelsee, 2008). The past 150 years have seen a lengthening of the fire cycle in parts of Manitoba which raises the risk of a large fire (Tardif 2004; Flannigan et al. 2005a).
- Fire activity is influenced by weather, fuel, ignition agents, and human activity (Flannigan et al. 2005b). Weather is a key factor because it drives fuel moisture,

soil moisture, lightning ignitions, and wind (Flannigan et al., 2005b). Area burned is linked to temperature (de Groot et al. 2013; Flannigan et al. 2005a), which is expected to rise into the future

- Future severity and area burned are projected to increase (de Groot et al. 2013). Severity of fire weather is expected to increase across large portions of Canada, with an earlier start and lengthening of the fire season (de Groot et al. 2013). In southern Manitoba, a tripled atmospheric carbon dioxide concentration scenario projected 1.5 to 2 times greater burned area (Flannigan et al. 2005b). Lightning induced wildfires are expected to increase (Flannigan et al., 2005a; Flannigan et al. 2005b). For a moderate GHG emission scenario, wildfire occurrences fall within the range of the past 240 years (Girardin and Mudelsee 2008).

9.4 Greenhouse gases

The Pointe du Bois Renewable Energy Project (PREP), including the transmission line and generating station upgrades, underwent a Greenhouse Gas (GHG) Mitigation Assessment ("*GHG Assessment*") as part of a federal government funding application process. This detailed assessment can be found in Appendix I. The GHG assessment concluded that the construction of PREP will result in the reduction of GHG emissions in Manitoba, Canada, and globally.

Key take-aways from this GHG assessment are as follows:

- PREP will result in a cumulative net reduction in emissions within Canada of approximately 0.5 Mt through 2055
- PREP could potentially have a greater impact on Canadian emissions if additional transmission was built between MB and adjacent provinces
- PREP will contribute in a small way to Canada's Paris Agreement commitment
- PREP cost-effectively contributes to both emission reductions and an increase in Canada's renewable energy portfolio
- PREP will result in an overall reduction in global emissions upwards of 9 Mt through 2055. For comparison, MB's total annual emissions in 2018 were 22 Mt. Therefore, in the MB context, 9 Mt is a relatively large amount

10.0 Accidents and malfunctions

In the context of environmental assessment, an accident is an unexpected and unintended interaction of a project component or activity with environmental, health-related, social, or economic conditions, and a malfunction is a failure of a piece of equipment, a device, or a system to operate as intended (Impact Assessment Agency 2021).

Accidents and malfunctions could occur because of abnormal operating conditions, wear and tear, human error, equipment failure, or other possible causes. Many accidents or malfunctions are preventable and can be readily addressed or prevented by good planning, design, equipment selection, hazards' analysis and corrective action, emergency response planning, and mitigation.

In this section, potential accidents and malfunctions associated with the project that could result in appreciable adverse environmental effects are described, discussed, and assessed. The focus is on credible accidents that have a reasonable probability of occurrence, and where the resulting residual environmental effects could be major without careful management.

It is noted that accidents and malfunctions are evaluated individually, in isolation of each other, as the probability of a series of accidental events occurring in combination with each other is deemed unlikely. These possible events, on their own, generally have a very low probability of occurrence and thus their environmental effects are of low likelihood. They have an even lower probability or likelihood of occurring together – thus their combination is not considered credible, nor of any measurable likelihood of occurrence.

Accident and malfunction event scenarios have been conservatively selected to represent higher consequence events that would also address the consequences of less likely or lower consequence scenarios.

The following accidents, malfunctions, and unplanned events are assessed in this section and were selected based on experience and professional judgment:

- Worker accident
- Fire
- Power outages
- Tower or structure collapse (e.g., due to adverse weather, sabotage, or force majeure)
- Spill of hazardous materials
- Collisions

- Encounter of a heritage site or object

Table 10-1 presents the potential interactions between the areas of assessment and potential accidents or malfunctions. Project and cumulative effects of the accident or malfunction event on each valued component with a potential interaction are described, and the significance of the effect is determined using the same thresholds as those for the project environmental effects. Any event that results in human mortality is considered significant. The potential for, and consequence of, accidents and malfunctions were assessed considering historical risk information from Manitoba Hydro’s experience and other similar projects.

Table 10-1: Potential interactions between accidents and malfunctions and areas of assessment

Potential Accidents and Malfunctions	Areas of Assessment												
	Birds and bird Habitat	Fish and Fish Habitat	Wetlands	Amphibians and Reptiles	Vegetation	Terrestrial Wildlife and Wildlife Habitat	Harvesting and Important Sites	Heritage Resources	Land and Resource Use	Commercial Agriculture	Infrastructure and Services	Economic Opportunities	Well-being (Human Health)
Worker accident	-	-	-	-	-	-	-	-	-	-	-	-	✓
Fire	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	✓
Power outage	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Tower or structure collapse	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	✓
Hazardous materials spill	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-	-	✓
Vehicle accident	-	-	-	-	-	✓	-	-	-	-	-	-	✓
Encounter of a heritage site or object	-	-	-	-	-	-	-	-	-	-	-	-	✓

✓ = Potential interactions that might cause an effect.
- = Interactions not expected.

10.1 Effects assessment for accidents and malfunctions

10.1.1 Worker accident

A worker accident has the potential to interact with human health and safety as it may result in harm, injury, or death to workers. All workers will be properly trained in practices to prevent workplace accidents including Workplace Hazardous Materials Information System (WHMIS), first aid, and other applicable training programs. These procedures are designed to prevent serious injury to staff and the public as well as to minimize the occurrence of unplanned events and minimize any potential damage to the environment.

Interactions between a worker accident and communities will be mitigated by compliance with health and safety legislation, safety by design, and implementation of environmental management measures aimed at protecting human health. Safety risks to workers will be reduced by complying with the requirements of various governing standards including the federal Canada Labor Code, the federal *Transportation of Dangerous Goods Act*, the Manitoba Workplace Health and Safety Act and all associated regulations. Adherence to public safety codes and regulations will help the project to be carried out in a safe manner to protect workers and the public.

With the application of, and compliance with, the above-mentioned acts, regulations, and standards, including the application of safety and security measures that are known to effectively mitigate the potential environmental effects, the potential environmental effects of a worker accident on communities during construction and operation and maintenance of the project are considered not significant.

10.1.2 Fire

Potential effects caused by a fire include:

- Carbon dioxide emissions (contribute to GHG emissions and climate change)
- Safety risks to workers and the public (well-being)
- Loss or damage to property or resources (well-being)
- Direct crop loss (commercial agriculture)
- Soil and shallow groundwater contamination with sediment-laden water used in extinguishing the fire (groundwater [well-being], wildlife, commercial agriculture)
- Damage to infrastructure or heritage sites or objects (heritage sites / objects)

A fire may arise from heavy equipment or from natural causes such as a lightning strike.

Manitoba Hydro will ensure that personnel are trained in the use of fire-extinguishing equipment. In the unlikely event of a fire, local emergency response will be able to reduce the severity and extent of damage.

A large fire could create particulate matter levels greater than the ambient air quality standard over distances of several kilometers or damage vegetation or infrastructure in the area, but such situations would be of short duration, infrequent, and are not expected to occur because of planned mitigation and prevention measures. The potential residual environmental effects of a fire are therefore considered not significant.

10.1.3 Power outage

Several factors can cause power outages. These include equipment failure, wildlife or equipment contact with live wires, environmental events such as fires, tornado-like winds, and ice storms, automatic safety equipment deactivating the line, and staff temporarily taking a transmission line out of service either intentionally or accidently.

A power outage can affect infrastructure and services, economic opportunities, commercial agriculture, and well-being valued components. Effects on infrastructure and services consist of changes to community road traffic and transportation utility due to failure of traffic lights and interference with communication and radio signals with the loss of power to signal sources. Effects on economic opportunities would result if the power outage resulted in a loss of productivity for businesses. Effects on commercial agriculture would occur if power was lost by agriculture operations such as hog or dairy operations. Effects to well-being involve changes in levels of stress and annoyance and change in capacity of health care services. The lack of power could affect the operation of health care facilities.

With the application of, and compliance with, the various acts, regulations, and standards, including the application of safety and security measures that are known to effectively mitigate the potential environmental effects, the potential environmental effects of a power outage on communities during construction and operation and maintenance of the project are considered not significant.

10.1.4 Tower or structure collapse

While considered unlikely given the applied design standards, it is possible for a transmission tower or station structure to collapse during construction and operation due to extreme weather, mechanical failure, or intentional or unintentional human interaction.

Tower collapse has the potential to:

- Cause injury or death (well-being)
- Cause fires (effects and mitigation discussed above)
- Damage other infrastructure, heritage or cultural sites, agricultural crops, either directly due to tower collapse or indirectly because of emergency repair activities (commercial agriculture, well-being, land and resource use, and harvesting and important sites)
- Impede access or movement (harvesting and important sites, land and resource use, and terrestrial wildlife and habitat)

The risk of tower failure will be reduced through the application of sound engineering practice in the design of the towers and transmission lines for extreme loadings, the use of qualified construction contractors, and regular maintenance.

Engineering design will adhere to industry standards and reflect Manitoba Hydro's experience with similar projects. Design will follow the Canadian Standards Association (CSA) C22.3 No. 1-10 "Overhead Systems" standard. The reliability-based design method will be used for designing the structural components following the CAN/CSA-C22.3 No. 60826-10 "Design Criteria of Overhead Transmission Lines" standard.

In addition, consequences are managed through mitigation. Line maintenance crews will address damage to personal property, vegetation, or soils. Soil contamination issues will be addressed as part of spill response planning.

The effects of a tower collapse would be localized and short term. The viability of wildlife populations or the capacity of critical habitat for wildlife species of conservation concern would not be jeopardized. Disruption of infrastructure or commercial agriculture is short term and minimal. Given the localized extent of the effects on wildlife habitat, effects on land use activities are not expected to extend beyond the actual collapsed structures. The likelihood of injury to or death of humans or wildlife is low given the limited area affected by a tower collapse and the rarity of such an occurrence. As a result, while the magnitude of the effect of tower collapse on the affected valued component could be moderate to high, given the low likelihood and array of mitigation measures the effect is assessed as being not significant.

10.1.5 Hazardous materials spill

Hazardous materials could be released into the air, soils, surface water or groundwater because of an accidental spill during construction or operation and maintenance activities.

In general, hazardous materials spills have the potential to:

- Contaminate surface and groundwater (well-being, harvesting and important sites, land and resource use, birds and bird habitat, fish and fish habitat, amphibians and reptiles, and terrestrial wildlife and habitat)
- Contaminate soil (commercial agriculture, harvesting and important sites, land and resource use, vegetation, wetlands, terrestrial wildlife and habitat, and well-being)
- Increase harmful emissions (GHG effect, climate change)

Spills are usually highly localized and easily cleaned up by on-site crews using standard equipment. The oil containment infrastructure for the station will limit potential effects during operation.

Implementation of a detailed spill response plan and a well-designed construction environmental protection plan (Appendix H) will result in minimal potential effects through accidental releases. The contractor will be required to provide environmental training, as well as training in spill prevention and response, to construction personnel. Prior to the commencement of construction activities, Manitoba Hydro will ensure that spill response equipment is readily available. All spills will be contained, cleaned, and reported to applicable authorities as follows:

- Contaminated material or potentially hazardous material will be contained
- Proper safety precautions (e.g., protective clothing and footwear) will be implemented
- The contractor will follow their spill response plan and ensure that the province's spill-reporting line is notified for reportable spills
- Contaminated wastes, such as used cleaning cloths, absorbents, and pads, will be stored in proper waste containers
- Waste material will be disposed of at approved disposal facilities

Construction equipment will be cleaned and maintained in good working condition, with visual inspections of equipment performed on a regular basis. Petroleum products such as gasoline, diesel fuel, and oil will be properly labeled in accordance with the appropriate legislation and regulations. Refueling, oiling, and maintenance of equipment, as well as storage of hazardous materials, will be conducted in a designated and contained area(s). Servicing of equipment (e.g., oil changes and hydraulic repairs) will be completed off-site when possible. Vehicles will be equipped with spill containment and cleanup materials.

Personnel handling fuels and hazardous wastes will have Workplace Hazardous Materials Information System training and be qualified to handle these materials in accordance with the manufacturer's instructions and applicable regulations. Hazardous waste and storage area(s) will be clearly marked and secured. Industrial waste will be reused or recycled on a priority basis. Where reuse or recycling opportunities are not available, industrial waste will be collected and disposed of at an approved facility. Garbage receptacles for solid non- hazardous wastes will be available. These wastes will be collected on a regular basis or as they are generated and will be disposed of at approved locations. With these mitigation measures and emergency response procedures implemented, and because of the low likelihood of such events, the potential residual environmental effects of a hazardous material spill on groundwater resources, aquatic environment, and terrestrial environment during construction and operation and maintenance of the project are considered not significant.

10.1.6 Vehicle accident

A vehicle accident arising from project-related activities could cause injury or death to workers or the public (well-being) and wildlife (wildlife and wildlife habitat). The potential for a fire or hazardous material spill, which could be associated with a vehicle accident or other means has been addressed above.

The potential for a vehicle accident would exist during construction, operation and maintenance, as well decommissioning phases of the project. Worker traffic and truck traffic to and from the site, and the operation of heavy equipment on-site during construction have the potential to result in a vehicle accident during construction. Project-related vehicles will observe all traffic rules and provincial and federal highway regulations. Trucking activity will observe speed limits and weight restrictions. Because the project will comply with all applicable traffic rules and regulations, the nominal increase in traffic volumes because of the project along with safety precautions, the potential residual environmental effects of a vehicle accident are considered not significant.

10.1.7 Encounter of a heritage site or object

Cultural or heritage sites or objects may be encountered during activities involving ground disturbance such as construction related excavation. It is unlikely that heritage sites or objects will be encountered during operation.

The encounter of a heritage site or object has the potential to affect harvesting and important sites and heritage resources. Heritage potential is determined during the environmental assessment. If areas of high potential are found, a preconstruction archaeological survey may be conducted.

Mitigation for the protection of heritage sites or objects is outlined in the CHRPP (Appendix K). The CHRPP will provide clear instructions on how to proceed should Manitoba Hydro, its contractors and/or consultants, discover or disturb a cultural or heritage sites or objects and will determine the ongoing protection measures for the resources through processes outlined in this document.

If a heritage site or object is discovered, project work will cease around the discovery and the project archaeologist will be contacted. Work in the area will continue only if approval is received from the archaeologist or the Historic Resources Branch.

With the low probability of encountering heritage sites or objects during the project related activities, and in consideration of the nature of the project and planned mitigation, the potential residual effects are considered not significant.

10.2 Assessment conclusion

The project is being designed and will be constructed and operated with regard for health, safety, and environmental protection, to minimize potential environmental effects that could result during the normal course of construction, operation, and maintenance as well as those that could result from accidents and malfunctions.

The careful planning of the project and the implementation of proven and effective mitigation will minimize the potential for accidents and malfunctions. The effects of an individual accident or unplanned event could have notable effects at a localized scale. However, the potential for these events to occur, given the measures that will be undertaken to prevent their occurrence, is low. In the very unlikely and improbable event that an accident or malfunction were to occur, it would be of a short duration, low frequency, or limited geographic extent such that major residual adverse environmental effects will not likely occur.

Overall, given the nature of the project, the credible accidents and malfunctions considered, and proposed mitigation, the potential residual environmental effects of project-related accidents and malfunctions on the valued components considered in this report, are assessed as not significant.

11.0 Environmental protection program

11.1 Introduction

Manitoba Hydro will implement the mitigation measures, monitoring and other follow-up actions identified during the assessment through an Environmental Protection Program (EPP). The EPP provides the framework for implementing, managing, monitoring, and evaluating environmental protection measures consistent with regulatory requirements, corporate commitments, beneficial practices, and public expectations. Environmental protection, management and monitoring plans will be prepared and implemented under the EPP to address environmental protection requirements in a responsible manner.

The purpose of this chapter is to outline how Manitoba Hydro will implement, manage, and report on environmental protection measures, monitoring and other follow-up actions as well as regulatory requirements and other commitments identified in this environmental assessment report.

Manitoba Hydro developed the EPP in accordance with its environmental policy.

Manitoba Hydro's Corporate Environmental Management Policy states the corporation is committed to protecting the environment by:

- Ensuring that work performed by its employees and contractors meets environmental, regulatory, contractual, and voluntary commitments
- Recognizing the needs and views of its interested parties and ensuring that relevant information is communicated
- Continuously assessing its environmental risks to ensure they are managed effectively
- Reviewing its environmental objectives regularly, seeking opportunities to improve its environmental performance
- Considering the life cycle impacts of its products and services
- Ensuring that its employees and contractors receive relevant environmental training, and
- Fostering an environment of continual improvement

11.2 Environmental management

Manitoba Hydro is seeking self-verification under the International Organization for Standardization (ISO) 14001 Environmental Management System Standard.

An environmental management system is a framework for developing and applying an organization's environmental policy and includes articulation of organizational structure, responsibilities, practices, processes, and resources at all levels of the corporation. The environmental management system includes commitments to comply with legislation, licenses, permits and guidelines, conduct inspections and monitoring, and review the results for adherence to requirements. The ISO standard ensures quality, performance, and continual improvement in the delivery of Manitoba Hydro's environmental protection program.

11.3 Adaptive management

Adaptive management is a planned systematic process employed with the goal of continually improving environmental management practices by learning from their outcomes. The environmental protection program for the project has established the principles of adaptive management allowing for flexibility in the mitigation of adverse environmental effects that may result from the project. Manitoba Hydro will use the information gathered during follow up and monitoring activities to verify the accuracy of the environmental assessment effects predictions and the effectiveness of implemented mitigation measures.

Manitoba Hydro designed the EPP to be adaptive and responsive throughout the project lifecycle by evaluating program documents, processes, procedures, and mitigation measures through inspection, monitoring and communication programs and conducting reviews to facilitate updates to the program.

Within the EPP, adaptive management will take place in two primary areas:

- At the management level, involving changes with the program structure itself.
- At the implementation level, involving individual mitigation measures as management and implementation teams evaluate the onsite effectiveness of mitigation strategies or the program.

11.4 Experience from previous projects

Manitoba Hydro has extensive experience in the development of environmental protection, monitoring and follow-up plans for all sizes of projects in many different environments, from small electrical stations to transmission lines that span over half of Manitoba.

The development of the EPP has allowed the standardization and consistent approach to environmental protection, monitoring and follow-up. The EPP improves through the experiences from past and current projects (e.g., monitoring and inspection results, documentation format changes).

11.5 First Nation and Métis feedback

Feedback shared by First Nations and the MMF during project engagement helped inform the environmental assessment report and EPP. The knowledge that was shared by First Nations people and Red River Métis citizens assisted Manitoba Hydro with:

- Developing a greater understanding of the PDA
- Identifying key concerns in the PDA
- Identifying potential project effects
- Planning and designing the project and environmental assessment process
- Developing potential mitigation measures

There will be opportunities for additional sensitive sites to be identified in the EPP should any be discovered during construction or operation of the project.

Manitoba Hydro recognizes the unique relationship that First Nations people and Red River Métis citizens have with their traditional lands and appreciates the sharing of information about First Nation and Métis histories, cultures, and perspectives on the project.

11.6 Environmental protection program framework

Manitoba Hydro's Environmental Protection Program (EPP) provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and beneficial practices, and input during the public engagement process and First Nation and Métis engagement process. The EPP:

- Describes how Manitoba Hydro is organized.
- Functions to deliver timely, effective, comprehensive solutions and mitigation measures to address potential environmental effects.
- Defines roles and responsibilities for Manitoba Hydro employees and contractors.
- Outlines management, communication, and reporting structures.

The EPP includes what, where, and how aspects of protecting the environment during the pre-construction, construction, operation and decommissioning of the project. Figure 11-1 illustrates the components of the EPP. The following sections describe each component in further detail.

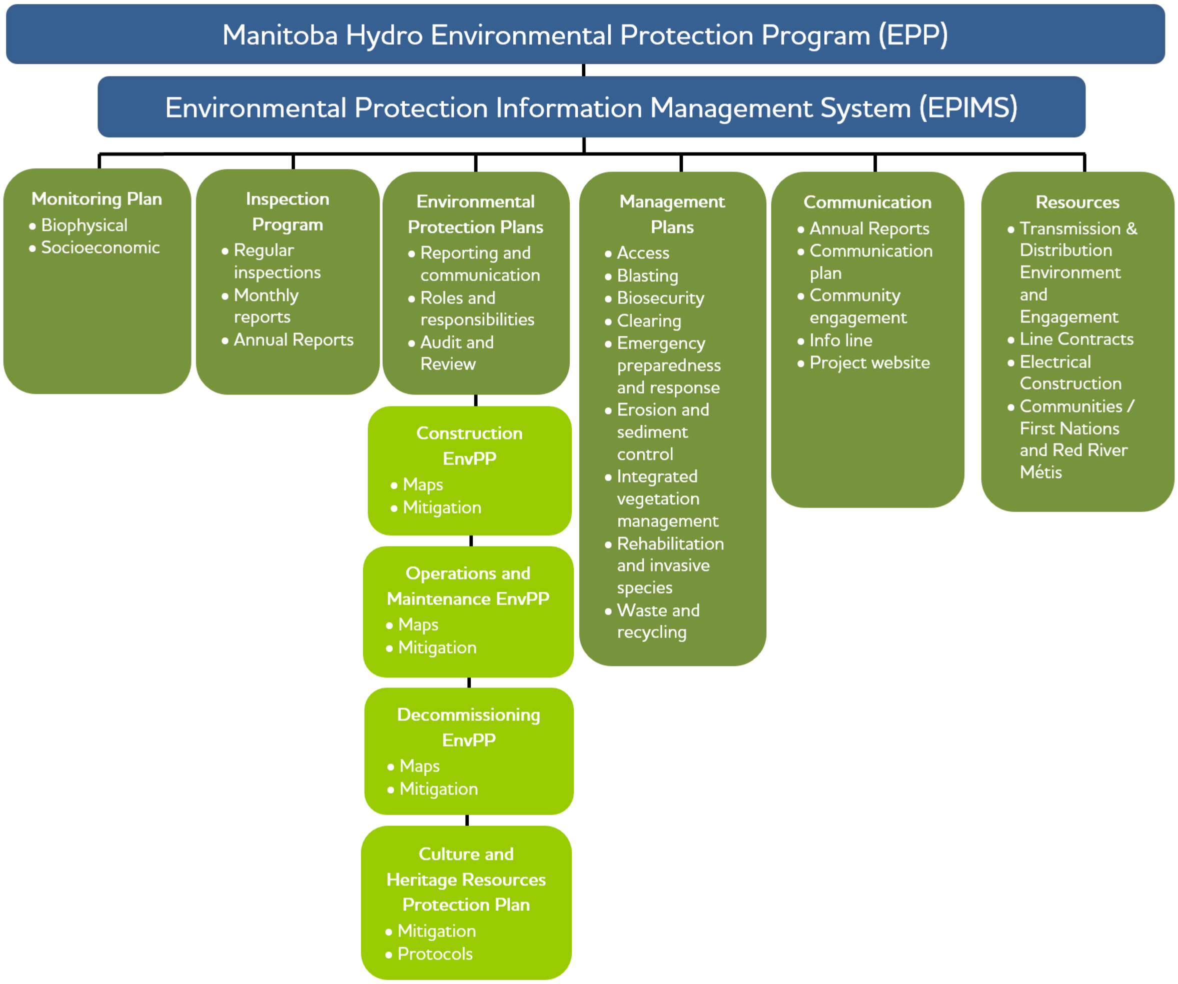


Figure 11-1: Environmental protection program components

11.7 Organization

The organizational structure of the EPP (Figure 11-2) includes senior Manitoba Hydro management, project management and implementation teams that work together to provide timely and effective implementation of environmental protection measures identified in environmental protection plans. Manitoba Hydro senior management is responsible for the overall EPP, including resourcing, management, and performance, and is accountable for regulatory compliance, policy adherence and interested party satisfaction.

The environmental protection management team is composed of senior Manitoba Hydro staff and is responsible for the management of environmental protection plans, including compliance with regulatory and other requirements, quality assurance and control, consultation with regulators, and related public and First

Nation and Métis engagement activities. Environmental consultants and advisors support the management team.

The environmental protection implementation team is composed of Manitoba Hydro operational field and office staff and is responsible for the day-to-day implementation of environmental protection plans, including monitoring, inspecting, and reporting. The implementation team works closely with other Manitoba Hydro staff as required.

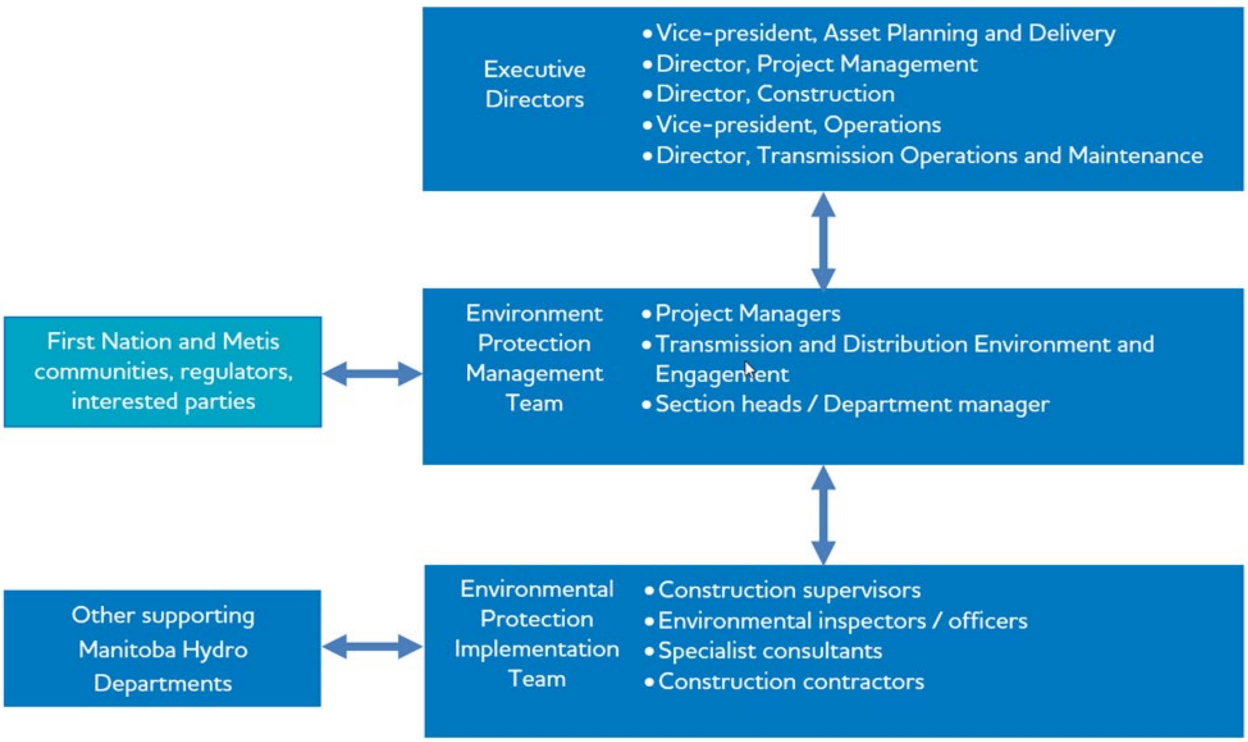


Figure 11-2: Environmental protection program organizational structure

11.7.1 Resources

Manitoba Hydro commits resources early in the planning cycle to provide effective environmental assessment, mitigation, and monitoring. Teams of engineers and environmental professionals develop preventative or avoidance mitigation measures that include design and routing alternatives. In addition, there are resource allocations for the delivery and implementation of environmental protection measures to meet corporate policy and government regulatory requirements.

Manitoba Hydro is committed to staffing the environmental protection program with environmental inspectors and providing required support, including training, financial resources, and equipment.

11.7.2 Roles and responsibilities

Figure 11-3 illustrates the typical organizational lines of reporting and communications. The roles and responsibilities for delivery of the project and implementation of environmental protection measures are as follows:

- The project engineer has overall responsibility for the implementation of the environmental protection plans and reports to a section head or department manager.
- The Transmission & Distribution Environment and Engagement Department oversees the development of environmental protection documents and associated inspection and monitoring programs, including ongoing public and First Nation and Métis engagement activities.
- The construction contractor is responsible for ensuring work adheres to the environmental protection plans and reports to the construction supervisor.
- Environmental inspectors and officers have the primary responsibility to confirm that environmental protection measures and specifications are implemented per the environmental protection plans as well as provide information and advice to the construction supervisor.
- Manitoba Hydro field safety, health and emergency response officers are responsible for the development and execution of the safety program and occupational health and safety practices at the various construction sites.

Other Manitoba Hydro employees, including engineers and technicians, provide information and advice to the construction supervisor.

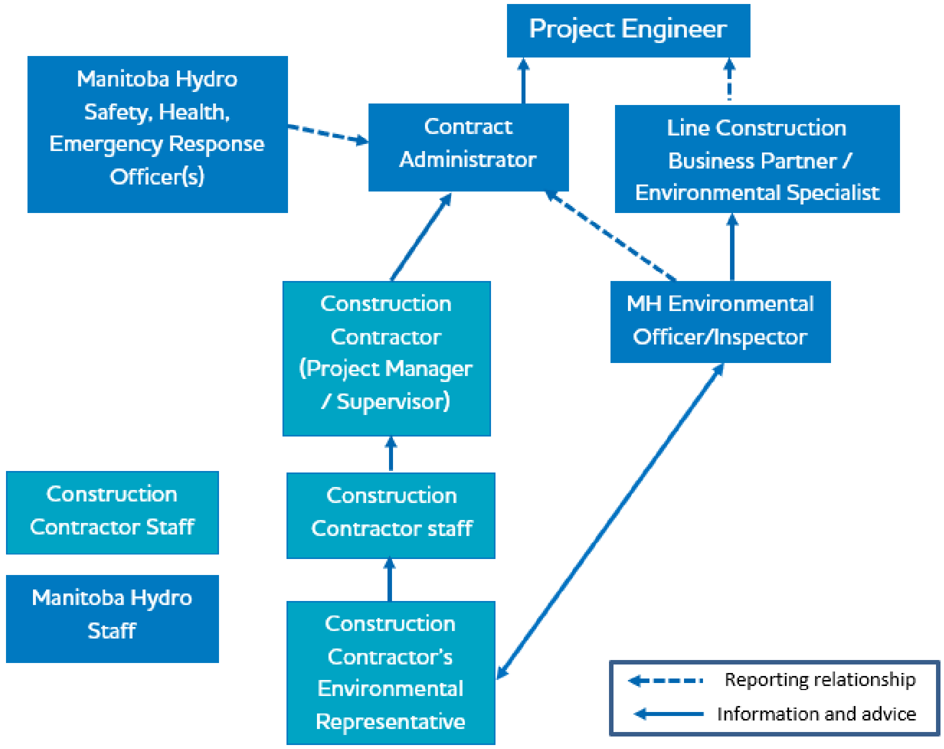


Figure 11-3: Typical organizational lines or reporting and communications

11.7.3 Communication and reporting

Manitoba Hydro personnel will maintain ongoing communications with Manitoba Environment and Climate, other provincial and federal departments, First Nations, the MMF, the GCT#3, NACs, and organizations regarding implementation of the environmental protection plan. The contract administrator and environmental officers/inspectors will maintain ongoing communications with the contractor and contract staff through daily tailboard meetings and weekly or otherwise scheduled construction meetings at the worksite. Inspection reports as well as incident, monitoring and other reports will be prepared and available for the regulators, contractors, and Manitoba Hydro staff.

Manitoba Hydro will provide First Nations, the MMF, the GCT#3, NACs, and organizations, landowners, interested parties and the public with ongoing opportunities to review and comment on the project. Manitoba Hydro developed a dedicated project webpage to facilitate communication with First Nations, the MMF, the GCT#3, NACs, and organizations, landowners, interested parties and the public. The environmental protection management team will record and review formal enquiries or complaints for response or action.

11.7.4 Environmental protection plans

Environmental protection plans document environmental protection measures to provide for compliance with regulatory and other requirements, and to achieve environmental protection goals consistent with corporate environmental policies. Manitoba Hydro designed the environmental protection plans as user-friendly reference documents that provide project managers, construction supervisors and contractors with detailed lists of environmental protection measures and other requirements implemented in the design, construction, and operation phases of a project.

Manitoba Hydro organized the environmental protection measures by construction component and activity, and environmental component and issue to assist project personnel in implementing measures for work sites and activities.

Manitoba Hydro will develop the environmental protection plans described in the following sections.

11.7.4.1 Construction

The construction environmental protection plan (Appendix H) will be prepared prior to construction. It is a key element in implementing effective environmental protection and limiting the potential adverse environmental effects identified in the environmental assessment report. It also outlines actions to identify unforeseen environmental effects and implement adaptive management strategies to address them. An important component of an environmental protection plan is review and updating. This allows environmental protection measures to remain current, continually improving environmental performance.

A CEnvPP is composed of general and specific environmental protection measures that cover all aspects of the work and the environment. General environmental protection measures for the project include mitigation measures and follow-up actions identified in the environmental assessment report, including design mitigation, provincial and federal regulatory requirements, beneficial practice guidelines, Manitoba Hydro environmental policies and commitments, and input during public and First Nation and Métis engagement.

The CEnvPP lists the general environmental protection measures for major components and activities associated with the project. Environmental protection measures are provided for environmentally sensitive sites (ESS) identified during public and First Nation and Métis engagement and assessment activities. Environmentally sensitive sites are locations, features, areas, activities, or facilities along or immediately adjacent to the transmission line corridor or other project components that are ecologically, socially, economically, or culturally important and sensitive to disturbance by the project and, as a result, require site-specific mitigation measures.

The CEnvPP will contain orthophoto map sheets that provide Manitoba Hydro project managers, construction supervisors, employees, contractors, and contract employees with detailed site-specific environmental protection information that can be implemented, managed, evaluated, and reported on in the field.

11.7.4.2 Operation and maintenance

Standard mitigation measures will apply during operations. A specific operation and maintenance environmental protection plan is not planned at this time.

11.7.4.3 Decommissioning

A decommissioning environmental protection plan will be prepared at the end of the project's operational life and will contain decommissioning methods, waste and recycling management, and mitigation measures to address environmental effects and legislation that is in effect at that time.

11.7.4.4 Cultural and heritage sites / objects

The fact that cultural and heritage sites / objects have intrinsic value to Manitobans is understood by Manitoba Hydro and addressed through a separate protection plan. The culture and heritage resource protection plan (Appendix K) outlines protection measures in the event of the discovery of previously unrecorded cultural and heritage sites / objects during construction and describes the ongoing monitoring of known cultural and heritage sites / objects for disturbance.

Through First Nation and Métis engagement and previous projects, Manitoba Hydro understands and acknowledges the importance of cultural and heritage sites / objects to Indigenous communities. Manitoba Hydro has developed mechanisms such as notification of discovery and involvement in site investigations, which are further explained in the culture and heritage resource protection plan.

Results from the heritage resources monitoring program will be addressed in conjunction with First Nation and Métis engagement on an as required basis during construction, as well as through a heritage resources impact assessment to the Manitoba Historic Resources Branch per the terms of the Heritage Resources Act (1986) and heritage permit(s) issued to Manitoba Hydro.

11.7.5 Management plans

Management involves the organization of activities and resources to resolve or respond to environmental problems, issues, or concerns. Management plans provide reasoned courses of action to achieve pre-defined goals or objectives. Management plans will be prepared to address important management issues, regulatory requirements and corporate commitments identified in the environmental assessment report. The management plans will describe the management actions, roles and responsibilities, evaluation mechanisms, updating requirements and reporting schedules. The following management plans will be prepared prior to the start of construction of the project:

- Access
- Biosecurity
- Blasting
- Erosion protection and sediment control
- Emergency preparedness and response
- Rehabilitation and invasive species
- Waste and recycling
- Clearing management

Environmental inspectors / officers will conduct regular inspections during construction to ensure adherence to the plans. The following sections describe each plan.

11.7.5.1 Access management plan

Manitoba Hydro has prepared an access management plan to minimize the need to construct new access roads and trails.

The access management plan outlines:

- The use of existing roads and trails to the extent possible during construction
- Management objectives and principles
- Security requirements, including
    - Terms and conditions for access
    - Restrictions on firearms
    - Hunting and fishing
    - Other resource use activities
- Environmental protection measures including
    - Timing windows
    - Vehicle cleaning and servicing

- Load restrictions
  - Warning signage
  - Speed limits
  - Sensitive area avoidance
  - Stream crossings
  - Other environmental issues
- Access management issues and mitigation strategies
- Safety of construction workers and the public
- Respect for First Nation and Red River Métis rights and resource users
- Protection of natural, cultural and heritage sites / objects

11.7.5.2 Biosecurity

Manitoba Hydro has prepared a biosecurity management plan for the project to provide guidance to Manitoba Hydro staff and contractors to prevent the introduction and spread of weeds and other pests, including invasive species, in agricultural land and livestock operations through project pre-construction and construction activities.

11.7.5.3 Blasting

Prior to the use of explosives, the contractor will prepare blasting plans to manage the storage and use of explosives at construction sites in accordance with environmental protection measures, provincial and federal legislation and guidelines, and corporate policies for explosives.

11.7.5.4 Emergency preparedness and response

Prior to the start of construction, each contractor will prepare an emergency preparedness and response plan to prepare for and respond to emergencies at construction sites in accordance with provincial legislation and guidelines, and corporate policies and procedures for the protection of human health and the environment. The plan will include the following:

- Spills or releases of hazardous substances, including petroleum products
- Accidents involving hazardous substances
- Medical emergencies
- Explosions and fire

11.7.5.5 Erosion protection and sediment control

Manitoba Hydro has developed an erosion protection and sediment control framework to guide each contractor in preparing an erosion protection and sediment control plan to limit adverse environmental effects of sediment releases on the aquatic environment in accordance with provincial and federal legislation and guidelines, and corporate environment policies and guidelines.

The plan prescribes environmental protection measures including:

- Frozen ground conditions
- Establishment of buffer zones
- Avoidance of sensitive areas
- Use of bioengineering techniques

11.7.5.6 Rehabilitation and invasive species

Manitoba Hydro has prepared a rehabilitation and invasive species management plan in accordance with environmental protection measures and provincial guidelines for rehabilitation.

The plan prescribes measures for:

- Washing equipment and vehicles prior to entering construction sites
- Controlling vegetation at construction sites
- Restoring and re-vegetating disturbed sites

11.7.5.7 Waste and recycling

Manitoba Hydro or the contractor will develop a waste and recycling management plan to manage waste at construction locations in accordance with provincial legislation and guidelines, and corporate policies and procedures for the protection of human health and the environment.

The plan will include measures for:

- Waste reduction
- Recycling and reusing initiatives
- Storage of kitchen wastes
- Recycling and disposal of construction wastes
- Disposal of wastes at licenced facilities

11.7.5.8 Clearing management

A clearing management plan will be developed prior to clearing that provides guidance and instruction to contractors to manage vegetation removal within the right-of-way required to construct the project.

The plan will provide clearing prescriptions, additional guidance and required actions specific to the project and is augmented by the mapbook, which will contain detailed locations where clearing prescriptions are implemented. The map book will be created prior to construction.

11.8 Follow-up and monitoring

Follow-up and monitoring are conducted to verify the accuracy of the environmental assessment of a project, assess the effectiveness of measures taken to mitigate adverse effects and determine compliance with regulatory requirements. Manitoba Hydro implements the follow-up and monitoring activity using two programs called inspection and monitoring, which are discussed further in the sections below.

11.8.1 First Nation and Métis engagement

Manitoba Hydro will meet with First Nations, the MMF and northern affairs communities who express interest to review and discuss how the information shared will inform the EPP and monitoring interests for the project.

11.8.2 Inspection program

Inspection is the organized examination or evaluation involving observations, measurements and sometimes tests for a construction project or activity. The results of an inspection are compared to specified requirements, drawings, and standards for determining whether the item or activity is in conformance with these requirements. Environmental inspection is an essential and key function in environmental protection and implementation of mitigation measures.

Manitoba Hydro has established a comprehensive integrated environmental inspection program to comply with regulatory approvals and meet corporate environmental objectives. The program includes environmental inspectors onsite during construction activities. Manitoba Hydro’s approach to environmental inspection includes:

- Compliance with regulatory approvals
- Adherence to environmental protection plans
- Onsite environmental inspectors
- Training and education
- Regular monitoring and inspection during construction
- Interaction with contractors (e.g., pre-construction meeting, daily discussion)
- Regular review of inspection and monitoring information
- Quick response to incidents or changing conditions

- Monthly summary reports
- Regular reporting to regulators
- Notification of regulators of emergency or contingency situations

Environmental inspectors / officers will:

- Visit active work sites to inspect for compliance with licence, permit or other approval terms and conditions, and adherence to environmental protection plan general and specific mitigation measures
- Report all instances of non-compliance to the construction supervisor, contractor, and applicable regulatory authority
- Report incidents such as accidents, malfunctions, spills, fires, explosions, and environmental damage to the construction supervisor and applicable regulatory authority
- Record all inspection activities in a daily journal and complete daily inspection forms
- Provide daily and monthly inspection reports electronically to the environmental protection information management system for review and viewing by applicable Project staff

Incidents will be dealt with immediately and followed up in subsequent daily inspection reports.

11.8.3 Monitoring program

Due to understood effects to natural habitat traversed by the project, and confidence in predictions based on monitoring results learned from recently completed projects in southern Manitoba, an environmental monitoring plan has not been prepared for this project. However, should environmental inspection identify unexpected environmental effects or damage to habitat, a Monitoring plan will be developed to outline monitoring steps to describe additional mitigation and follow-up.

11.8.4 Environmental protection information management system

An environmental protection information management system (EPIMS) is the internal central repository of environmental protection information, including:

- Environmental protection documents
- Reference information such as regulations and guidelines
- Inspection reports
- Monitoring field data and reports

The environmental inspection program will employ modern electronic recording, reporting and communication systems using field computers, geographic positioning systems and digital cameras. Field computers will have project and other reference information needed for effective implementation of environmental protection measures, including regulations, guidelines, licences, permits, engineering drawings, specifications, maps, reports, and data.

EPIMS is a tool that helps Manitoba Hydro monitor and report on environmental protection implementation, regulatory compliance, and incident reporting. EPIMS will be the mechanism to provide reporting and tracking of environmental protection performance.

11.9 Pre-construction activities

Manitoba Hydro will undertake several activities prior to commencing construction of the project to set the direction for environmental protection and compliance with legislated requirements. Manitoba Hydro will endeavour to meet with interested Indigenous communities and organizations during the finalization of the construction environmental protection plan to discuss and work to address and mitigate concerns, to the extent possible, with cultural and environmentally sensitive sites.

Manitoba Hydro will obtain licenses, permits, authorizations and other approvals, including property agreements, right-of-way easements and releases, prior to commencement of construction of each project component. Additional terms and conditions of these approvals will be incorporated into the construction environmental protection plan. Additional approval requirements to be obtained by the contractors will be identified and communicated to the successful bidders.

The Transmission & Distribution Environment and Engagement Department will typically participate in the tender / direct negotiated contract development process to make sure environmental requirements are included as contract specifications. Bidders are required to list and defend their environmental record and must have an environmental policy, including a commitment to environmental protection.

Meetings will be held with the contractors to review the environmental protection requirements, establish roles and responsibilities, management, monitoring and other plans, inspection and reporting requirements, and other submittals. Prior to the start of construction, contractor employees will be trained and/or oriented on environmental protection requirements.

11.10 Work stoppage

The duty to stop work rests with everyone encountering situations where the environment, including biophysical, socio-economic and heritage sites / objects, are threatened by an activity or occurrence that has not been previously identified, assessed, and mitigated. Work stoppage is also to occur in the event of an environmental accident, extreme weather event or exposed human remains. Individuals discovering such situations are to inform their supervisor who will report the matter to the contract administrator or environmental inspector / officer immediately. The contractor is also required to stop work voluntarily where construction activities are adversely affecting the environment or where mitigation measures are not effective in controlling environmental effects. Remedial action plans or other environmental protection measures will be developed and implemented immediately after discussion and prior to resumption of work if previously halted. Work is not to resume until the situation has been assessed and responded to and Manitoba Hydro approves the resumption of work. Stop work orders will be documented, reported to regulatory authorities (if applicable) and reviewed at construction meetings.

11.11 Review and updating

11.11.1 Incident reviews

CEnvPP will be subject to review in the event of an incident, including environmental accidents, fires and explosions, reportable releases of hazardous substances and non-compliance situations.

11.11.2 Auditing

Auditing is a systematic approach to defining environmental risk and/or determining the conformance of an operation with respect to prescribed criteria. An environmental audit typically involves a methodical examination of evidence that may include interviews, site visits, sampling, testing, analysis, and verification of practices and procedures. Environmental protection plans for the project will be subject to internal and external audits. The audit results will help to evaluate the effectiveness of environmental protection measures, to learn from inspection and monitoring programs, and to improve project planning and environmental assessment performance.

11.11.3 List of revisions

A list of revisions will be maintained at the beginning of each environmental protection plan that identifies the nature of the revision, section revised and dates.

12.0 Summary

This environmental assessment examined the potential effects of the Pointe du Bois to Whiteshell (PW75) Transmission Project on the biophysical and socioeconomic environments, attempting to consider the interconnectedness of these elements.

Feedback and perspectives shared by First Nations people and Métis citizens informed the assessment of project effects on the environmental and socioeconomic elements discussed throughout this report and directly influenced the selection of valued components. Manitoba Hydro understands that effects on all aspects of the environment have the potential to be experienced by First Nations people and Métis citizens and that the severity of the residual effects by experienced uniquely by different nations and individuals.

The primary mechanism to mitigate potential effects involved a routing process that balanced the overall effects between all the components. Mitigation was developed to address effects that would not be avoided by routing.

Residual effects to the environment consist mainly of changes to vegetation and wetlands and the associated effects to wildlife (e.g., fish, mammals, and birds), through changes to habitat. The combination of these effects will alter the landscape and thus potentially change the use of land, which can affect overall well-being.

There will be changes to the use of the land for agriculture and human development. These changes along with changes to the aesthetics of the area (e.g., increase in noise or the presence of towers on the landscape) can also have indirect effects on well-being.

There are vegetation and wildlife species of concern in the area, however, no species of conservation concern should be adversely affected.

The project is expected to result in positive economic benefits to the region, through the presence of the workforce and the potential for employment. There will be a slight increase in traffic associated with the workforce, but the volume will be low and outside of traditionally heavy traffic periods.

Known heritage sites were mostly avoided during the routing process, with measures developed to manage previously un-discovered cultural or heritage sites / objects that could be encountered during project activities.

The environmental assessment includes an evaluation of potential cumulative effects and effects of the environment on the project, as well as an analysis of potential accidents, malfunctions, and unplanned events. It also includes a description of the environmental protection program developed for the project, including the various roles, communication protocols, and commitments to monitor project activities and manage potential effects.

Based on the routing process, and the measures developed to mitigate and manage any potential adverse effects, the conclusion of environmental assessment was that the residual effects were predicted to be not significant.

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13.1 Personal Communications

Erb, Michelle. 2023. Agricultural Planning Specialist. MS Teams call and follow-up emails regarding potential impacts of the Pointe du Bois to Whiteshell Transmission Project to agricultural land use in the project area, with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, March 15, 2023.

Froese, Dane. 2022a. Oilseed Specialist. Manitoba Agriculture. Telephone call regarding clubroot and Verticillium stripe risk in project area for the Dorsey to Wash'ake Mayzoon (D83W) Transmission Project and follow-up email correspondence with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, October 26, 2022.

Froese, Dane. 2022b. Oilseed Specialist. Manitoba Agriculture. MS Teams discussion regarding potential project impacts to oilseed crops in the Pointe du Bois to Whiteshell Transmission Project area and follow-up email correspondence with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, December 13, 2022.

Kingdon, Katrien. 2023. PhD Candidate. Wildlife Evolutionary Lab, Biology Department, Memorial University of Newfoundland

Kyle, Lynda. 2023. Industry Services Director, Dairy Farmers of Manitoba. Email communication regarding dairy farm locations within the regional area of the Pointe du Bois to Whiteshell Transmission Project with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, May 18, 2023.

Libau Landfill employee. June 2023. pers. comms.

Micholson, Derek. 2022. Crop Production Extension – Apiarist, Manitoba Agriculture. MS Teams meeting and follow-up correspondence via email regarding feedback for the proposed Pointe du Bois to Whiteshell Transmission Project with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, December 7, 2022.

RM of Lac du Bonnet employee. May 2023, pers. comms.

Rybuck, Cory. 2022. General Manager, Manitoba Egg Farmers, Winnipeg, Manitoba. MS Teams meeting regarding feedback for the proposed Pointe du Bois to Whiteshell Transmission Project with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, December 5, 2022.

Steppler, Ian. 2022. Chairperson, Manitoba Beekeepers Association, Winnipeg, Manitoba. Email correspondence regarding feedback for the proposed Pointe du Bois to Whiteshell Transmission Project with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, December 5, 2022.

Thorlacius, Arne. 2022. Industry Service Coordinator, Manitoba Pork, Winnipeg, Manitoba. Feedback for the proposed Pointe du Bois to Whiteshell Transmission Project via email with Wara Chiyoka, Environmental Assessment Officer, Manitoba Hydro, Winnipeg, MB, December 2, 2022.

Viveiros, A. 2023. Forestry and Peatlands Branch, Natural Resources and Northern Development. Correspondence regarding resource inventory and volume estimation with Lee Ann Malley, Senior Environmental Planner, Stantec, April 4, 2023.

Whiklo, Todd. 2023. Manitoba Regional Wildlife Manager, Integrated Resource Management Team, Member, Eastern Region. Manitoba Natural Resources and Northern Development.

Williams, Lorne. 2023. Owner, wild rice operation at Rice Lake, RM of Alexander. Telephone discussion regarding wild rice and other resource harvesting at Rice Lake with Duane Hatley, Construction Community Liaison, Manitoba Hydro, Winnipeg, MB, May 29, 2023.