7.0 EFFECTS ASSESSMENT AND MITIGATION

7.1 OVERVIEW

The following chapter describes the findings of the effects assessment and mitigation measures for implementation during construction and operation of the Project. Both positive and adverse environmental effects are described along with mitigation measures for adverse effects. Selection of appropriate mitigation measures for implementation will be decided, in part, based on the detailed engineering design for the Project. Apart from the effects of the Project on the environment, this chapter describes the effects of the environment on the Project (Section 7.4), and accidents and malfunctions (Section 7.5). It also describes the Cumulative Effects Assessment (CEA) [Section 7.6], and the Project Sustainability Assessment (Section 7.7).

As outlined in Chapter 3, Assessment Approach, the following criteria were used to evaluate and compare the significance of effects of the Project:

- Nature;
- Direction;
- Magnitude;
- Geographic extent;
- Duration;
- Frequency; and
- Reversibility.

The assessment also considered Public Engagement Program (PEP) input for the Project (Chapter 6). Mitigation measures to manage or avoid adverse effects are described according to the phase of the Project – construction and operations, and by Project component (PW75 115 kV transmission line, Pointe du Bois Station and Whiteshell Station upgrades). Site-specific mitigation measures will be included in the Construction and Operations EnvPPs for the Project.

General mitigation measures that apply to all construction and operation activities are provided in Chapter 8, Environmental Protection Follow-Up and Monitoring.

7.2 PW75 115 KV TRANSMISSION LINE

Based on the site selection process (Chapter 4), the best balanced route for the PW75 115 kV transmission line was selected. The FPR was selected to minimize disruption to people and the environment within the context of technical (engineering) and cost considerations. The site selection process sought to avoid adverse impacts and enhance positive benefits wherever possible and practical. Biophysical and socio-economic studies were conducted to more precisely determine the specific impacts of the Project on people and the environment. These

studies included field assessment of the route from various disciplinary perspectives (e.g., aquatics, rare and endangered plants and habitats, wildlife, land use and heritage resources). Together with input received from the PEP, appropriate mitigation measures were identified and outlined in this chapter.

The FPR for the transmission line is 46.5 km in length (Map 7-1). From Pointe du Bois Station, which is located in the Whiteshell Provincial Park, the FPR uses an existing Manitoba Hydro ROW for 21.5 km. The existing 66 kV sub-transmission lines (P lines) which occupy the ROW are being decommissioned. The existing ROW needs to be widened by 15 m on either side to accommodate the PW75 line (Chapter 2). From the existing ROW, the FPR moves in a southwesterly direction to the east of the Lee River and continues in this direction towards the Whiteshell Station. North of the Whiteshell Station, PW75 also uses an existing Manitoba Hydro ROW to the north and south of the Whitemouth River. Through this area, the existing ROW needs to be widened. Manitoba Hydro has obtained the additional ROW north of the river for PW75. Immediately south of the river, a portion of one private property will need to be acquired through easement for the additional ROW to terminate PW75 at the Whiteshell Station. This is the only private property that required an easement for the project.

7.2.1 Physical Environment

This section describes and assesses Project effects on the physical environment based on the FPR for PW75, including predicted potential Project effects, mitigation measures designed to minimize effects to the extent practicable, and the expected residual effects with mitigation measures in place. Follow-up and monitoring are outlined for situations where a prediction has substantial uncertainty or a difference between predicted and actual residual effects could substantially alter the effects assessment.

7.2.1.1 Physiography

Potential Project effects on physiography are associated with aggregate removal and changes to soil quantity and quality. Potential effects on soil quantity and quality (e.g., compaction, rutting, erosion) are addressed by the ecosystem diversity VEC (see Section 7.2.4.2).

Aggregate material will be required for tower foundation construction. This material will generally be obtained from within the ROW and existing licensed borrow areas. In the event that additional borrow area locations are developed, it is expected that these areas will be very small in size and situated close to existing access. It is unlikely that additional aggregate material will be required during the operation phase.

Borrow area development will generally entail stripping topsoil to expose granular material. The granular material will be excavated and then transported to the tower locations. Excavations may result in sediment runoff into adjacent waterbodies or riparian wetlands or create unstable slopes. The pits left by borrow material extraction alter the terrain.

Project operation is not expected to create additional effects on physiography.

Mitigation Measures

To minimize the effects of borrow material extraction activities:

- Borrow material extraction activities that occur off established roads, trails and borrow areas will be conducted when the ground is solidly frozen to minimize a wide range of potential adverse effects such as unnecessary disturbance of vegetation and soils, soil rutting, soil compaction and damage to the roots of trees growing adjacent to the ROW;
- Borrow pits will be located at least 100 m from a waterbody or a riparian wetland to minimize the potential for adverse effects from runoff or accidental spills;
- Borrow pits will be located at least 100 m from a steeply sloped mineral bank to avoid destabilizing the bank;
- Stripped topsoil will be stockpiled for use in borrow pit rehabilitation; and
- Prior to completion of the construction phase, borrow pit banks will be graded to a maximum slope of 4:1, and stockpiled topsoil will be spread to promote vegetation and soil recovery and limit invasive plant colonization.

Mitigation measures outlined for the protection of fish habitat, for ecosystem diversity and heritage resources will also contribute to reducing the effects of borrow material extraction activities.

Residual Effects

The mitigation measures outlined above, in combination with those implemented to minimize Project effects on ecosystem diversity (see Section 7.2.3.1.2), are expected to eliminate significant adverse effects on physiography. The total area required for borrow material extraction is expected to be very small, and utilized areas will be treated to facilitate soil and vegetation regeneration. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on physiography are expected to be adverse, irreversible, local in geographic extent, continuous in frequency, long-term in duration and small in magnitude and therefore not significant.

7.2.1.2 Hydrogeology

Potential Project effects on hydrogeology relate to changes in groundwater quantity and quality. Groundwater quantity and quality may be affected by tower foundation drilling, borrow material extraction, herbicide use for vegetation maintenance and accidental discharges of fuels, lubricants and other hazardous materials.

Groundwater resources are limited within and near the Project Footprint. The Project is not expected to affect any existing water wells assuming the mitigation and EnvPP measures are fully implemented.

Tower foundation construction is not expected to affect groundwater quantity and quality since the drilling extends to a maximum depth of 3 m, which is usually above the groundwater aquifer. Exceptions may occur in areas with artesian wells or springs. Borrow material will generally be obtained from within the ROW and existing licensed borrow areas. In the event that additional borrow area locations are developed, it is expected that these areas will be very small in size and situated close to existing access.

Mitigation Measures

- In situations where herbicides are used, appropriate permits will be obtained.
- Herbicides will not be used within 15 m of a waterbody or riparian wetland.
- The risk that accidental discharges of fuels, lubricants and other hazardous materials may contaminate groundwater and surface water will be minimized with contractor education, and regular inspections of machinery and equipment.

Residual Effects

The mitigation measures outlined above, in combination with those implemented to minimize Project effects on physiography, are expected to eliminate significant adverse effects on groundwater quantity and quality. Manitoba Hydro's standard environmental protection measures are expected to minimize the risk that accidental discharges will have significant adverse effects on groundwater quantity and quality. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on hydrogeology are expected to be adverse, reversible, local in geographic extent, infrequent in frequency, short-term in duration and small in magnitude, and therefore not significant.

7.2.1.3 Residual Effects Summary

Table 7-1 summarizes residual Project effects on the physical environment.

Table 7-1: Physical Environment Residual Effects Summary

VEC	Phase	Residual Effect	Assessment Characteristics
Physiography	Construction	Reduction in available amount of aggregate material. Terrain alteration.	Direction – Negative Magnitude – Small Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
	Operation	None.	Direction – Negative Magnitude – Small Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
Hydrogeology	Construction	Risk that borrow material extraction or tower foundation construction will contact an artesian aquifer. Risk that accidental discharges of hazardous materials will affect groundwater quality.	Direction – Negative Magnitude – Small Geographic Extent – Local Duration – Short Term Frequency –Infrequent Reversibility – Reversible **Overall – Not Significant**
	Operation	Risk that herbicides used to maintain vegetation will affect groundwater quality. Risk that accidental discharges of hazardous materials will affect groundwater quality.	Direction – Negative Magnitude – Small Geographic Extent – Local Duration – Short Term Frequency – Infrequent Reversibility – Reversible **Overall – Not Significant**

7.2.1.4 Follow-up and Monitoring

No follow-up or monitoring is required due to the limited potential for effects and small magnitude. Any accidental discharge will follow Manitoba Hydro procedures outlined in the spill response plan including clean up and testing of potentially contaminated sites.

7.2.2 Aquatic Environment

Potential effects were assessed on Fish Habitat as defined under the Federal *Fisheries Act*. A total of 19 water crossings exist along the FPR.

7.2.2.1 Fish Habitat

Loss of Riparian Vegetation at Water Crossings

Construction

Riparian vegetation can play an important ecological role in protecting fish habitat. Overhanging tree and shrub canopy can provide shade, and therefore, at least partially regulate water temperature, as well as be a source of litter fall and terrestrial insects (a food source for some fish species). The removal of overhanging canopy can increase light and temperature, leading to increased aquatic plant growth in a watercourse. The removal of large trees that overhang a watercourse can limit the long term input of large woody debris (LWD) into a watercourse. This LWD provides for additional complexity to the fish habitat (e.g., altering water flow, providing rest areas or areas for foraging and ambush by predatory fish species) and also act as a source of carbon (energy) in the aquatic environment and a substrate upon which other aquatic organisms colonize (0e.g., bacteria, algae, invertebrates).

Of the six water crossing sites assessed in the field studies (Map 7-2), only one crossing site (crossing #17, on an ephemeral creek) had overhanging shrub and tree canopy. This creek would not represent important fish habitat as the channel is dry part of the year. Due to the fact that the removal of riparian vegetation along the existing P1 to P4 ROW will be minimal (the existing ROW will be widened by 30 m) and that these riparian areas are dominated by marsh, willow/alder or treed muskeg, and that the removal of forested riparian vegetation at watercourse crossings in areas where the new ROW will be required represents a very small portion of the total shoreline length for the watercourses, effects of ROW clearing on fish habitat will be negligible.

Bank Erosion and Sedimentation

Construction

The combination of vegetation removal and improper construction practices in riparian areas can result in soil compaction, rutting, decreased bank stability, bank slumping and exposure of bare soil. This could lead to soil erosion and subsequent sedimentation into receiving waters. Compaction, particularly in riparian areas that are saturated (e.g., very wet areas along shorelines such as floodplains) can result in decreased infiltration, increased channelized flow and greater surface erosion. Eroded soils also carry with it, dissolved and particulate nutrients such as phosphorus and nitrogen. Thus, soil erosion can also change water quality from a nutrient perspective.

Sedimentation of eroded soils in waterbodies can result in an increase in total suspended solids (TSS) and turbidity. An associated reduction in water clarity can limit photosynthesis by aquatic plants. Since aquatic plants form the base of the aquatic food web, changes in the species composition and productivity can have implications to higher trophic levels, such as invertebrates and fish. Sedimentation in waterbodies can also smother bottom substrates,

resulting in an alteration or loss of habitat for benthic macroinvertebrates and can affect spawning habitat of fish. Fish spawning habitat can become more limited in supply, and quality of spawning habitat may decline.

Of the 19 water crossings along the FPR, 15 contain no or marginal fish habitat. The four watercourses considered to have important fish habitat are as follows:

- Boggy Creek (although observations during the field studies indicated that the water depth was usually less than 1 m, indicating that the creek may freeze to the bottom in the winter);
- Pinawa Channel;
- Winnipeg River; and
- Whitemouth River.

The riparian area surrounding Boggy Creek is a wide (187 m and 70 m on the north and south bank respectively) and wet floodplain, comprised of semi-floating vegetation (sedge/grass and shrub) communities. This area will require special attention with respect to construction activities to ensure no compaction and erosion effects occur.

Potential effects of ROW construction activities in riparian areas along the Pinawa Channel are expected to be negligible due to high bank stability and a gentle slope (2^{o}). Shorelines of the Winnipeg River at the crossing location are either dominated by bare rock (northeast shoreline) or sedge/grass vegetation communities (southwest shore), and hence construction effects are expected to be negligible.

Although the river banks along the Whitemouth River at the crossing location have high bank stability, they are also slightly steeper (slope of 20° for the northeast bank and 10° for the southwest bank). Soils are clay-dominated. In addition, there is a 1 m high bank along the southwest shoreline, located approximately 2 m from the water's edge. The riparian area along the Whitemouth River will require special attention during construction activities.

Alteration of Habitat from Structure Foundations and Installations

Construction

Foundations and installations that support transmission line towers could affect fish habitat if they are located within the normal high water mark. The installation of such structures would not only necessitate the removal of vegetation, but also grubbing of the site. This could result in erosion and sedimentation to adjacent watercourses.

Contamination from Structure Foundations and Installations

Construction

There are several types of foundations and anchors for towers, including rock sets, cast-in-place concrete piles and pre-cast concrete screw piles. The use of cast-in-place piles can result in the release of concrete wash water into watercourses, and constituents containing lime (e.g., Portland cement, mortar, grout) have a high pH, are caustic and toxic to aquatic life. Runoff of such constituents and wash water could alter pH in receiving watercourses, as many aquatic ecosystems in the region have low alkalinity and therefore little capacity to buffer high pH water inputs (Kotak et al., 2005). Wash water can also contain sediments, and therefore increase suspended solids and turbidity.

Mitigation Measures

Operational Statements have been developed by DFO for all aspects of the construction and operation of transmission lines in riparian areas and for stream crossings. When the Operational Statements are followed, DFO considers the risk to aquatic habitat to be minimal and no authorization is required under the Fisheries Act. The Operational Statement for Overhead Line Construction (DFO, 2007a) stipulates the requirements for vegetation clearing activities in riparian areas, as well as the use of equipment and placement of structures in riparian areas. Manitoba Hydro will follow the DFO Operational Statement during construction of the line. Requirements include the following:

- Construction activities to occur preferably under frozen ground conditions;
- Design and construct ROW approaches so that they are perpendicular to the shorelines wherever possible (this will reduce the need for vegetation clearing);
- Avoid building structures on meander bends, braided streams, alluvial fans, active flood plains or other areas that are unstable;
- Place temporary or permanent structures above the high water mark;
- Minimize the removal of riparian vegetation;
- Operate machinery on land in a way that minimizes disturbance to the banks of watercourses;
- Stabilize any waste materials (e.g., logging slash); and
- Re-vegetate disturbed areas.

The riparian area of Boggy Creek at the crossing of PW75 consists primarily of a semi-floating shrub (willow, alder) vegetation community. Very few individual trees were noted. Hand-felling of trees and no clearing of shrub vegetation will be done. The very saturated conditions of the

soils (and the floating nature of the soil and vegetation closer to the creek) warrants the minimization of heavy equipment in this wide (>250 m) floodplain zone.

Crossing #17 (Map 7-2) will require hand felling of trees to avoid risk of erosion or bank slumping. Although this is an ephemeral creek, does not contain important fish habitat and did not contain water at the time of the field studies, the steep, high slopes require special attention. When water is present, this creek flows into the Winnipeg River, downstream of the Seven Sisters Generating Station. Winter clearing and hand-felling of trees will prevent any soil disturbance on the steep slopes.

The crossing at the Whitemouth River (Crossing #19) is a sensitive site. Restriction of construction activities to frozen ground conditions, along with minimizing the use of equipment immediately next to the shoreline (e.g., a machine free zone – see below), will ensure proper mitigation for potential soil compaction and erosion effects.

In addition to the above, Manitoba Hydro will use the following mitigation measures which will be identified in the Construction EnvPP for the Project:

- Restricting the removal of vegetation in riparian areas to tree species and, as much as possible, shrub and understory plants will be maintained;
- The use of hand-felling or the use of mechanical clearing (e.g., feller buncher) with a 7 m machine-free zone in riparian areas (except in instances where machinery may need to cross frozen water bodies to access the opposite bank);
- All riparian areas to be cleared and sensitive areas will be marked (e.g., flagged) prior to operations;
- Removal of trees and shrubs in riparian areas to not disturb soils and root systems;
- Wherever possible, placement of all structure foundations and installations above the high water mark; and
- Place and secure all debris (e.g., slash) above the high water mark.

Watercourse Crossings Temporary Access Trails

Construction

Construction of water crossings along access trails can cause soil erosion and sedimentation, particularly if construction activities involve modification of the banks and/or modification of the stream channel. Poor construction practices for the installation of culverts in particular, can lead to elevation in total suspended solids and turbidity. In addition, the installation of undersized sized culverts can cause washouts (e.g., if the culvert is too small to accommodate discharge during peak flow periods and the watercourse cuts a new channel around the culvert), can increase water velocity and restrict or prevent fish passage (Fisheries and Oceans Canada and

Manitoba Natural Resources, 1996). No culverts will be used at the ROW crossing of watercourses, or in watercourses with important fish habitat.

Mitigation Measures

As construction of the transmission line will only occur in winter, the environmental effects of crossing installations will be minimized. Fish spawning periods will also be avoided.

DFO has developed a number of operational statements for access water crossings. These include operational statements for temporary stream crossings (fords and bridges – DFO, 2007b, dry open-cut stream crossings - DFO, 2007c, and ice bridges and snow fills – DFO, 2007d). Mitigation measures outlined in the operational statements include:

- Temporary water crossings should only be constructed where existing ones do not exist or are not practical for the intended use. Existing roads, trails and their associated crossing structures should be used as much as possible;
- Temporary crossings should include ice bridges, snow fills, bridges and one-time fords;
- Wherever possible, crossings will be constructed on a straight portion of the watercourse, and perpendicular to the channel;
- Clean materials (including snow) are to be used in the construction of temporary watercourse crossings. Materials will be removed before project completion or snow melt (whichever comes first);
- If water is to be used to build up ice bridges, intakes on water pumps must be screened to prevent blockage and fish mortality;
- Where warranted, banks will be protected from erosion by use of pads, swamp mats or other means. Sediment erosion and control methods will be inspected to ensure their effectiveness;
- Re-vegetate the banks if necessary;
- Crossing structures are not to impede water flow; and
- Re-fueling and storage of fuel only to occur more than 100m from the high water mark.

Following the requirements outlined in the statements noted above ensures compliance with Section 35(1) the Fisheries Act. This section of the Act prohibits the Harmful Alteration, Disruption or Destruction (HADD) of fish habitat. As much as possible, and in particular for larger creeks and rivers that will be crossed by the transmission line, ice bridges and snow fills will be used. These types of crossings have the least effect on fish habitat. Fording in open water periods will not be required, as all construction activities will take place in winter.

Operations

Mitigation Measures

To reduce potential environmental effects in riparian areas during operations, the following mitigation measures are recommended and will be included in the Operations EnvPP for the Project:

- Routine ground-based inspections should be undertaken in the winter, under frozen ground conditions; and
- The use of snowmobiles or tracked vehicles will eliminate the potential for ground disturbance. Re-fueling during inspections is usually not required but, if required will be done at a distance of more than 100 m from the high water mark of watercourses.

In terms of vegetation management, Manitoba Hydro will follow the DFO Operational Statement for Maintenance of Riparian Vegetation in Existing Right-of-Way (DFO, 2007e). Mitigation measures include:

- Vegetation in riparian areas will be maintained in such a way as to leave root systems intact, which will minimize soil erosion;
- Riparian vegetation maintenance within 30 m of the high water mark will affect no more than one-third of the woody vegetation (tree, shrubs) within the ROW;
- Where practical, hand clearing of vegetation will be used near banks with low stability, where risk of bank erosion or slumping is likely, or in non-frozen conditions;
- Methods of vegetation management will minimize bank disturbance. Appropriate protection measures will be used when erosion or rutting is likely to occur;
- All slash will be placed above the high water mark and stabilized;
- If herbicides are used, preparation, application and cleanup will follow best management practices. Application of herbicide can only be conducted by a certified applicator;
- Disturbed areas in riparian zones will be stabilized by seeding, planting, use of mulch or through other means to prevent erosion and sedimentation to watercourses;
- Erosion control measures will be routinely inspected to ensure their effectiveness;
- Re-fueling and maintenance of machinery will occur more than 100 m from the high water mark of watercourses;
- All machinery will arrive on site in a clean condition and free of leaks; and
- Emergency spill kits will be kept on site at all times.

Residual Effects

The mitigation measures outlined above will minimize adverse effects on the aquatic environment. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on the aquatic environment are expected to be local in geographic extent, small in magnitude, and short to medium -term in duration, and therefore not significant.

7.2.2.2 Residual Effects Summary

Table 7-2 provides a summary of the residual effects and assessment characteristics of PW75 on the aquatic environment.

Table 7-2: Residual Effects of PW75 on the Aquatic Environment

VEC	Phase	Residual Effect	Assessment Characteristics
Fish Habitat (water quality and physical habitat)	Construction	Increased erosion and total suspended solids (TSS) due to transmission line ROW clearing	Direction - Negative Magnitude - Small Geographic Extent – Local Study Area Duration – Short Term **Overall – Not Significant**
	Construction	Increased bank erosion and downstream TSS due to water crossing construction at ROW locations (snow fills, ice bridges)	Direction - Negative Magnitude - Small Geographic Extent – Local Study Area Duration – Short Term **Overall – Not Significant**
	Construction	Increased bank erosion and downstream TSS due to water crossing construction at access trails/roads (including culverts, clear span bridges)	Direction - Negative Magnitude - Small Geographic Extent – Local Study Area Duration – Short Term **Overall – Not Significant**
	Construction, Operations and Maintenance	Release of deleterious substances to watercourses due to spills and leaks	Direction - Negative Magnitude - Small Geographic Extent – Local Study Area Duration – Short to Medium Term **Overall – Not Significant**

Table 7-2: Residual Effects of PW75 on the Aquatic Environment

VEC	Phase	Residual Effect	Assessment Characteristics
	Operations and Maintenance	Loss of riparian vegetation, increased erosion, increased TSS due to ROW vegetation management	Direction - Negative Magnitude - Small Geographic Extent – Local Study Area Duration – Medium Term **Overall – Not Significant**

7.2.2.3 Follow up and Monitoring

Standard construction monitoring procedures outlined in the Construction EnvPP created for the project will be followed. No additional fish habitat specific follow up and monitoring is required.

7.2.3 Terrestrial Environment

7.2.3.1 Terrestrial Ecosystems, Habitat and Plants

This section describes and assesses Project effects on terrestrial ecosystems, habitat and plants based on the final location of the Project Footprint. Potential effects before considering mitigation measures are evaluated, and the results of these evaluations are used to identify practicable mitigation measures to minimize Project effects. Monitoring is outlined for situations where a prediction has substantial uncertainty or a difference between predicted and actual residual effects could substantially alter the effects assessment. The terrestrial ecosystems, habitat and plants assessments focus on intactness, ecosystem diversity and priority plants, which were the VECs selected to represent terrestrial ecosystems as a whole and the terrestrial habitat and plant components of those ecosystems (see Chapter 3).

Methods

Potential effects and mitigation measures were generally identified based on a combination of scientific knowledge of causal relationships (e.g., how vegetation and soils are affected by elevated soil temperatures due to vegetation clearing), results from Project studies, other studies from the area that provide highly relevant information, such as Ehnes (1998; 2000a; 2000b), ECOSTEM (2003), and Manitoba Conservation (2002), Federal or Provincial policies and guidelines, and information from other existing transmission projects that provided relevant examples of how the Project could affect ecosystem components and relationships between these components.

Predictions of potential Project effects on terrestrial habitat and ecosystems were based on a detailed terrestrial habitat map for the existing environment, partially because habitat types and habitat mapping are often used as proxies for ecosystem types and ecosystem mapping. A

large scale terrestrial habitat dataset was created for the Regional Study Area by combining Forest Land Inventories overlapping the Project Study Area into a consolidated dataset and adding a set of consistent derived ecosite and habitat fields. The derived fields provided a hierarchical ecological land classification for the Regional Study Area.

Field data were collected along the preliminary preferred route, and the existing ROW of the P lines to identify sensitive habitat sites, to support habitat classifications, to help identify potential rare plant survey locations and to identify rare plant locations. Fieldwork conducted during July and August 2013 included aerial surveys by helicopter, acquiring oblique low-level photography during aerial surveys, and conducting ground-based rare plant surveys along transects located in the habitats with the highest potential to support the rare plant species that could occur in the Project Study Area. Benchmarks for evaluating the magnitude of potential Project effects on the VECs were derived from a variety of literature sources. For intactness, the primary sources included Salmo et al. (2003), Dillon and Salmo (2005) and Dzus et al. (2010). For terrestrial habitat, Swift and Hannon (2010) was the primary source. Terrestrial plants primarily utilized Swift and Hannon (2010) and Wagner (1991).

7.2.3.1.1 Intactness

Potential Project effects on intactness include increased linear feature density, lower total core area and fewer large core areas. Newly constructed roads, transmission lines, trails and cutlines add to linear feature density. Core area is reduced by Project features that either remove existing core area or are constructed near an existing core area.

Linear Disturbance

Construction

While the PW75 FPR is approximately 46.5 km long, approximately 22.7 km of this length is on existing ROWs. Consequently, the line would only increase total linear feature length by approximately 24 km. Total linear feature density would remain at 1.92 km/km^2 for the Project Study Area, 3.10 km/km^2 for the western portion and 1.08 km/km^2 for the eastern portion (see Section 5.1 for areas included in the western or eastern portions of the Project Study Area). Transmission line density would increase by approximately 0.03 km/km^2 to 0.57 km/km^2 for the entire Project Study Area. Increases would be similar for the western and eastern portions of the Project Study Area.

At 0.53 km/km^2, total linear feature density without cutlines and trails would be within the moderate magnitude of effects range for the eastern portion of the Project Study Area. As expected for a developed area, the corresponding 2.27 km/km^2 density for the western portion would be within the high magnitude range.

Core Areas

Construction

Because avoidance of large core areas was a key consideration in routing, Project construction would reduce total core area in core areas larger than 200 ha by approximately 690 ha. Since the Project-related reduction in core area would be relatively small, the percentage of the Project Study Area in core areas would only decline by approximately 1% regardless of whether 200 ha or 1,000 ha was used as the minimum core area size . The resulting percentages of core area remaining of 77% for the 200 ha minimum and 72% for the 1,000 ha minimum are both within the small magnitude range of effects (i.e., between 66% and 100% of land area).

Project construction would affect three core areas in the Project Study Area, all of which are larger than 1,000 ha. The largest core area in the Project Study Area would become 564 ha smaller and be fragmented into two core areas, with the larger fragment being 24,910 ha in size. The second largest affected core area would be fragmented in two and reduced in size from 3,519 ha to 3,170 ha while the final affected core area would be reduced in size from 294 ha to 285 ha.

Mitigation Measures

The most important Project effects on intactness were avoided and minimized by routing the line along an existing transmission line ROW for 55% of the route and locating the remainder of the route outside of or towards the periphery of existing core areas larger than 1,000 ha.

The mitigation measures implemented for the ecosystem diversity VEC (Section 7.2.3.1.2) will benefit intactness by reducing the extent to which the ROW functions as an ecological filter and a movement corridor. No additional mitigation is proposed.

Residual Effects

Residual Project effects on intactness during construction are expected to include a small increase to linear feature density and a small reduction to total core area percentage. Total linear feature density for the entire Project Study Area was expected to remain at the low end of the moderate magnitude effects range (between 0.40 km/km2 and 0.60 km/km2) for the eastern portion of the Project Study Area. The predicted total core area percentage during construction would be reduced from 78% to 77%, which is considerably above the 65% value for the transition from small to moderate magnitude effects.

Operations

Project operation would not change any of the linear feature density or core area measures. Project effects on intactness during operation are expected to decline slightly because reduced construction activity will reduce the barrier and filter effect of the ROW, and habitat recovery may reduce the extent to which the ROW functions as a movement corridor.

Mitigation Measures

No further mitigation beyond that already included for the ecosystem diversity VEC (Section 7.2.3.1.2) is proposed.

Residual Effects

Residual Project effects on intactness during operation are expected to remain at the low end of the moderate magnitude effects range for linear feature density and within the small magnitude range for core area percentage.

Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on intactness are expected to be adverse, irreversible, local in geographic extent, continuous in frequency, long-term in duration and moderate in magnitude, and therefore not significant.

7.2.3.1.2 Ecosystem Diversity

Potential Project effects on ecosystem diversity include reducing the number of native ecosystem types, altering the distribution of area amongst the native ecosystem types and/or reducing the total area of a priority ecosystem type or important habitat complex. Physical impacts, access related effects and permanent habitat alterations are the general sources for potential Project effects. Project clearing, disturbance and other physical impacts remove or alter habitat within the Project Footprint, and these direct effects indirectly alter vegetation, soils and other environmental attributes within the Project Footprint and in surrounding areas.

Better access brings more equipment, material and/or people into an area, which could lead to increased resource harvesting, invasive plant spread and human-caused fires, among other things. In extreme cases, a Project-caused severe accidental fire could alter ecosystem diversity, either by extirpating an ecosystem type or substantially reducing its abundance (by degrading site conditions and/or decimating the propagule bank). Invasive plants have the potential to crowd out native plant species and, in extreme cases, alter ecosystem diversity through changes to broad habitat composition.

Similar to what was described for the intactness VEC (Section 7.2.3.1.1), the permanent maintenance of the ROW as low vegetation creates an ecological corridor that can facilitate atypical movement (e.g., migration of invasive species) or hinder natural ecological flows (e.g., plant seed dispersal), which can then affect the natural distribution and abundance of ecosystem types.

Total Terrestrial Habitat

Construction

The Project Footprint during construction, which encompasses 275 ha of land area, would directly remove or alter 188 ha of native terrestrial habitat assuming that the ROW is cleared to the full 60 m width along the entire route. Herbicides will not be used to clear ROW vegetation (Manitoba Hydro 2007).

The Project could increase cumulative total terrestrial habitat loss from 16.0% to 16.2% in the Project Study Area while cumulative total terrestrial habitat loss in the Regional Study Area would remain at 11.4%. It is noted that this total does not include losses due to reservoir flooding along the Winnipeg River, the addition of which would increase these percentages somewhat.

Indirect habitat effects are generally expected to extend less than 25 m into the surrounding areas but could extend up to 50 m in some locations. While it is expected that access to the ROW during construction would be along existing roads and trails and that borrow material for structures will be obtained from existing borrow areas or within the ROW, there may be locations where this will not be practicable (e.g., by-pass trails in bedrock terrain).

Taking a precautionary approach, it was assumed that all terrestrial habitat within 50 m of the Project Footprint will be affected (i.e., the Habitat Zone of Influence). This overestimate of total area affected provides some allowance for situations where Project activities may occur more than 25 m from the ROW. On this basis, the total amount of native habitat directly and indirectly affected by the Project could increase from 188 ha to 607 ha, which is approximately 0.95% of the total remaining native terrestrial habitat and approximately 0.80% of the land area in the Project Study Area. The corresponding Regional Study Area percentages are 0.05% for both indicators.

Habitat Composition

Construction

Approximately 125 ha (17%) of the 732 ha land area in the Project Footprint and Habitat Zone of Influence overlaps with previously developed areas. Most of the developed area in the Project Footprint (81%) is the portion of the existing transmission line that overlaps with the new proposed route. Settlements and transportation make up the larger portions of the developed land in the habitat zone of influence. Broadleaf treed on mineral, primarily aspen treed and mixedwoods on mineral, make up approximately 28% of the habitat directly and indirectly affected by the project. Jack pine treed on outcrop and black spruce treed on wet peatland each comprise an additional 10% of the potentially affected terrestrial habitat. Overall, the composition of the Project Footprint and Habitat Zone of Influence are very similar to each other with respect to land cover and coarse habitat type. Treed habitat types make up most of the

potentially affected habitat area, approximately 87%. Most of the remaining area is comprised of tall shrub peatlands and shore zone habitat, most of which is beaver flood and riparian peatland.

Project construction will not change the total number of native broad habitat types in the Regional or Project Study Areas, or substantially change the relative proportions of any of the types. In the Regional Study Area, the maximum percentage change of any broad habitat type is predicted to be less than 0.01%. The habitat type with the highest predicted change in proportion for the Project Study Area is trembling aspen mixedwood on mineral, where the relative area proportion would decrease by less than 0.1%.

Priority Habitat Types

Construction

Five of the seven regionally rare or uncommon tree species occur in habitat patches that would be directly or indirectly affected by project construction. Ash, which was classified as uncommon, was the most abundant of these tree species in the affected areas, followed by the other uncommon species (cedar). Red and white pine were the only two priority tree species that did not occur in potentially affected areas. Just over 65 ha, or 1%, of the habitat supporting rare and uncommon tree species in the Project Study Area is predicted to be directly and indirectly affected by the Project.

Up to 57 ha of regionally rare and uncommon habitat could be directly and indirectly affected by the Project, accounting for 0.1% and 0.9% of these priority habitat types in the Regional and Project Study Area, respectively. This total area includes seven of the 15 regionally rare or uncommon habitat types, with potential effects ranging from zero to 3.5% of the remaining area in the Project Study Area, depending on the individual habitat type. In descending order, the habitat types with the highest potential percentage effects are balsam fir mixedwood on mineral, balsam fir dominant on non-mineral and balsam poplar dominant on all ecosites.

The project is predicted to directly and indirectly affect 9 ha, or less than 1%, of riparian habitat within the Project Study area, and have no effects on patterned peatland complexes. Trembling aspen mixedwood on mineral is the only habitat type in the riparian zone with greater than one hectare potentially affected by the project.

Mitigation Measures

The following mitigation measures will be implemented during construction to minimize effects on ecosystem diversity.

- Clearing will be minimized to the extent possible immediately west of the western shoreline of the Whitemouth River to minimize effects on regionally rare tree species and their habitats.
- Clearing will be minimized to the extent possible between the Whitemouth and Winnipeg Rivers to minimize effects on regionally rare tree species and their habitats.

- Construction will occur when the ground is frozen to the extent practicable so as to minimize a wide range of potential adverse effects such as unnecessary disturbance of vegetation and soils, soil rutting, soil compaction and damage to the roots of growing trees adjacent to the ROW.
- Construction activities on wetlands will occur when the ground is frozen.
- Vegetation buffers will be retained around waterbodies, waterways and riparian wetlands to the extent practicable to minimize soil erosion and effects on riparian zone habitat.
- Grubbing within the right-of-way will be minimized to reduce soil disturbance, soil erosion and tree root damage.
- Dust suppression, if required, will be achieved with water or approved suppression agents.
- The EnvPPs (spill response plan) will include appropriate best practice measures to minimize the risk of accidental spills, and to quickly address these events should they occur.
- To minimize the risk of introducing and spreading invasive plants:
    - Grubbing within the right-of-way will be minimized;
    - Borrow material for tower foundations will be obtained from existing site to the extent possible
    - Equipment and machinery will be washed prior to transport to the Project area;
    - Personnel working on the Project will be educated about the importance of cleaning their vehicles, equipment and footwear before travelling to the area; and
    - Personnel working on the Project will be educated about the importance of avoiding highly invasive plants when operating equipment.
- To minimize the risk of accidental fires, removal of soil organic material and damage to vegetation adjacent to the ROW, brush piles that are burned during construction will be:
    - Burned during the winter months;
    - Located far enough away from the ROW edge to avoid damaging uncleared vegetation, and, to the extent feasible, on mineral or bedrock sites; and
    - Inspected prior to the spring to ensure the fire is completely out.
- Areas not required for Project operation will be rehabilitated to a native habitat type appropriate for the site conditions to the extent this will not interfere with transmission line conductors (e.g., trees will not be rehabilitated under conductors).
- Existing borrow areas and marshalling yards will be used to the extent practicable.
- Where borrow areas or marshalling yards are developed within the ROW, mineral and organic topsoil will be stripped and stockpiled. Prior to construction completion, stockpiled mineral and organic material will be spread over stripped areas to encourage re-growth of native vegetation and minimize invasive plant establishment.
- Existing roads and trails will be used to the extent practicable.

- Access trails created for Project construction that are not required for operation will be decommissioned to minimize access-related effects.

Residual Effects

Residual Project effects on ecosystem diversity are low for all of the indicator measures due to the favorable outcome of the site selection process, which resulted in a relatively small total area of native habitat being included within the Project Footprint. Project construction was not expected to affect 12 priority habitat types. Project construction was expected to affect between 0.1% and 3.3% of the estimated area for the eight remaining priority habitat types.

Operations

Project effects on ecosystem diversity are expected to decline during operation because Project-related access and disturbance will be considerably reduced, disturbed vegetation and soils will recover to some degree and other access-related effects may decline. Portions of the ROW that are not potential forest vegetation are expected to recover to native habitat types.

Vegetation and infrastructure maintenance during operation will create some ongoing disturbance to vegetation and soils but this is expected to be a relatively low magnitude effect since these activities are infrequent and often carried out primarily in winter.

Herbicides may be used in some situations. Effects on ecosystem diversity are expected to be minor because:

- The effects are not expected to be large enough to change a native habitat type or
- The habitat types are already being maintained as a non-native type.

Potential effects on priority plants are discussed in Section 7.2.3.1.3.

Mitigation Measures

The following mitigation measures will be implemented during operations to minimize effects on ecosystem diversity.

- Disturbance of areas adjacent to the ROW will be avoided to the extent practicable.
- Vegetation buffers will be retained around waterbodies, waterways and riparian wetlands to the extent practicable to minimize soil erosion and effects on riparian zone habitat.
- Maintenance activities on wetlands will occur when the ground is frozen.
- The EnvPPs will include appropriate best practice measures to minimize the risk of accidental spills, and to quickly address these events should they occur.
- To minimize the risk of introducing and spreading invasive plants:
    - Equipment and machinery will be washed prior to transport to the Project area;

- Personnel working on the Project will be educated about the importance of cleaning their vehicles, equipment and footwear before travelling to the area; and
- Personnel working on the Project will be educated about the importance of avoiding highly invasive plants when operating equipment.

- To minimize the risk of accidental fires, removal of soil organic material and damage to vegetation adjacent to the ROW, brush piles that are burned during ROW maintenance will be:

  - Burned during the winter months;
  - Located far enough away from the ROW edge to avoid damaging uncleared vegetation and, to the extent feasible, on mineral or bedrock sites; and
  - Inspected prior to the spring to ensure the fire is completely out.

Residual Effects

Overall, Project effects on ecosystem diversity area expected to decline during operation. Even assuming the decline will be small, residual Project effects on ecosystem diversity are expected to remain low for all of the indicator measures. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on ecosystem diversity are expected to be adverse, irreversible, local in geographic extent, continuous in frequency, long-term in duration and moderate in magnitude, and therefore not significant.

7.2.3.1.3 Priority Plants

Direct Project effects on terrestrial plants will include loss and disturbance of plants and plant populations as well as loss, alteration and disturbance of their habitats in the Project Footprint and in the locations of Project activities that occur outside of the Project Footprint, if any. These direct effects will lead to indirect effects on terrestrial plants, both within the Project Footprint and in some adjacent areas surrounding the physical footprint, through pathways such as increased light and soil temperature within the ROW and adjacent to it.

Improved access is another potentially important pathway for indirect Project effects on terrestrial plants since this will bring more equipment, material and/or people into an area, which could lead to increased resource harvesting, invasive plant spread and/or human-caused fires, among other things.

Construction

In general, Project effects on plants were expected to decline with distance from the ROW. The spatial extent of the Project zone of indirect effects on terrestrial plants (i.e., the terrestrial plants zone of influence) was expected to generally extend less than 25 m adjacent to the ROW. As was the case for ecosystem diversity, it was cautiously assumed that all plants and their habitat within 50 m of the ROW would be affected by the Project.

The Project is not expected to substantially increase plant harvesting during construction for several reasons. Over half of the ROW will overlap an existing transmission line ROW. Most of the remainder of the route is near existing human features that already provide access. Where this is not the case, waterways and wet peatlands often limit how far human travel can proceed along the ROW during the growing season. While ROW locations near existing human features may eventually become new berry picking areas because maintaining a more open vegetation canopy will benefit some species in particular types of site conditions, this is not expected to occur during the short construction phase.

Past and current projects and activities, as well as natural dispersal processes, have introduced and will continue to introduce and spread invasive plants into the Project Study Area. The Project is not expected to substantially increase the rate at which invasive plants are introduced and/or spread in the Habitat Local Study Area. Project mitigation (see below) and EnvPPs will include measures that minimize the risk that invasive plants will be spread by Project activities. Additionally, weed control on the ROW is required for regulatory (i.e., *The Noxious Weed Act*), operational and safety reasons.

The remainder of this section addresses potential Project effects on priority plant species.

Listed Plant Species

Based on known locations and habitat associations, flooded jellyskin lichen and Riddell's Goldenrod were the only species listed as endangered, threatened or of special concern that had a limited potential to occur in the Habitat Local Study Area. Gattinger's agalinis has not been recorded in Manitoba. Recorded hackberry locations are confined to southwestern and south central Manitoba. Western silvery aster is a prairie species which has many known locations situated between the Regional Study Area and Winnipeg.

Project effects on flooded jellyskin lichen are not anticipated. While the Habitat Local Study Area is within the known range of the species and contains potential habitat, to date the species has not been recorded in southern or eastern Manitoba.

Project effects on Riddell's goldenrod are not anticipated. Riddell's goldenrod is known from an area south of Winnipeg, as it prefers prairie habitat, as well as ditches. While the Habitat Local Study Area is within the known range of the species, it has not been recorded in the Project Study Area.

Provincially Very Rare to Uncommon Plant Species

Project effects on provincially very rare plant species were not expected since none were found during field studies in the Habitat Local Study Area. To the extent that these species were associated with regionally rare habitat types, Project effects on their anticipated habitats were expected to be nil or low, depending on the species.

Wooly sweet cicely, the only provincially rare species found in the Habitat Local Study Area during field studies, was observed at one location in the Project Footprint, one additional

location in the Habitat Local Study Area and one additional location just outside the Habitat Local Study Area.

The provincially uncommon black ash was observed at five locations in the Project Footprint and three additional locations in the Habitat Local Study Area, including a black ash and American elm swamp.

Chapter 5 (Section 5.1.1.1) identified an additional 75 very rare to rare species and an additional 61 uncommon species that were not found but could potentially occur in the Habitat Local Study Area. While none of these species were found in the Habitat Local Study Area, 16 very rare to rare and 11 uncommon species have been recorded elsewhere within the Regional Study area, mainly within the Pointe du Bois and Slave Falls Study Areas.

Mitigation Measures

Pre-clearing rare plant surveys will be conducted for the species of high conservation concern because it is possible that they were present but were not found in the proposed ROW. Pre-clearing mitigation will include:

- Pre-clearing rare plant surveys will be conducted in portions of the final ROW areas that were not previously surveyed and have the highest potential to include species of high conservation concern;
- If locations for flooded jellyskin lichen, Gattinger's agalinis or hackberry are discovered, site-specific mitigation will be implemented to avoid disruption or destruction of the above species;
- In the unlikely event that locations for other provincially very rare plants (i.e., plants ranked S-1 by the MBCDC) are discovered during pre-clearing rare plant surveys, site specific mitigation measures will be implemented to avoid disruption or destruction;
- In the event that locations for provincially rare plants (i.e., plants ranked S-2 by the MBCDC) are discovered during pre-clearing rare plant surveys, site specific mitigation measures will be implemented to avoid disruption or destruction. not disrupt or destroy these species; and
- All provincially very rare plants within the ROW, and a 50 m buffer around them, will be clearly marked.

Additional mitigation measures for priority plants will include all of the construction phase measures outlined for ecosystem diversity (see Section 7.2.3.1.2).

Residual Effects

Based on the mitigation describe above, substantial residual Project effects on priority plants during construction are not expected. None of the listed species at risk are expected to occur in the Project Footprint. None of the remaining provincially very rare species are known to occur in the Project Footprint. To provide for the situation that these species are present but were not found during field surveys, pre-clearing surveys will be conducted and, in the unlikely event that any listed or provincially very rare plant locations are discovered, mitigation measures will be

implemented to avoid effects on listed species and avoid or minimize effects on the remaining provincially very rare species. For the remaining species, the Project is expected to affect low percentages of their known locations and/or available habitat. The risks that there would be adverse Project effects on priority plants due to Project-related spreading of invasive plants, increased harvesting and fire regime changes should be low assuming that the mitigation and EnvPP measures are effective.

Operations

As described for ecosystem diversity (Section 7.2.3.1.2), the decline in terrestrial habitat area affected during operation when compared to construction is expected to be relatively small. Consequently, Project effects on priority plants during operations are expected to remain similar to those described for Project construction. The potential for maintenance activities to affect priority plant locations or further spread invasive plants is expected to be lower than during the construction phase because the physical activities are less disruptive to vegetation and soils and they will be carried out primarily when the ground is frozen along much of the route.

Herbicides may be used to limit vegetation height in the ROW. Since these herbicides are formulated to target broad-leafed plants, they may affect species of conservation concern. Mechanical vegetation maintenance in the ROW may also affect species of conservation concern, particularly if the soil and/or understorey is disturbed.

Similar to the construction phase, the Project is not expected to substantially increase plant harvesting during operation for several reasons. Over half of the ROW will overlap an existing transmission line ROW. Most of the remainder of the route is near existing human features that provide access. Where this is not the case, waterways and wet peatlands often limit how far a person can travel along the ROW during the growing season. ROW locations near existing human features may eventually become new berry picking areas because maintaining a more open vegetation canopy will benefit some species in particular types of site conditions.

Mitigation Measures

Mitigation measures for priority plants during Project operation will include:

- All of the operation phase measures outlined for ecosystem diversity (see Section 7.2.3.1.2).
- The locations of any listed or provincially very rare or provincially rare species in the ROW, and a 50 m buffer around them, will be clearly marked. Herbicides will not be applied within 100 m of these locations, and vegetation maintenance within the 50 m buffer will be limited to clearing danger trees.

Residual Effects

Compared with construction effects, residual Project effects on priority plants during operation are expected to remain similar or decline. None of the listed species at risk are expected to occur in the Project Footprint. None of the remaining provincially very rare species are known to occur in the Project Footprint. To provide for the situation that these species are present but were not found during field surveys, any locations found during field surveys that were not

avoided will be permanently marked to minimize the risk of disturbance during operation. For the remaining species, the Project was expected to affect low percentages of their known locations and/or available habitat. The risks that there would be adverse Project effects on priority plants due to Project-related spreading of invasive plants, increased harvesting and fire regime changes should be low assuming that the mitigation and EnvPP measures are effective. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on priority plants are expected to be adverse, irreversible, local in geographic extent, continuous in frequency, long-term in duration and moderate in magnitude, and therefore not significant.

7.2.3.2 Summary of Residual Effects

Table 7-3 summarizes residual effects on terrestrial ecosystems, habitat and plants.

Table 7-3: Residual Effects on the Terrestrial Ecosystems, Habitat and Plants

VEC	Phase	Residual effect	Assessment characteristics
Intactness	Construction	Small increase to linear feature density. Small reduction to percentage of Project Study Area in core areas larger than 200 ha.	Direction – Negative Magnitude – Moderate Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
	Operation	No change to linear feature density. No change to percentage of Project Study Area in core areas larger than 200 ha.	Direction – Negative Magnitude – Moderate Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
Ecosystem Diversity	Construction	Remove and alter terrestrial habitat. Remove and alter priority habitats.	Direction – Negative Magnitude – Moderate Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
	Operation	Slight reduction in total amount of affected terrestrial habitat. Slight reductions in effects on some priority habitats.	Direction – Negative Magnitude – Moderate Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
Priority Plants	Construction	Remove or disturb priority	Direction – Negative

Table 7-3: Residual Effects on the Terrestrial Ecosystems, Habitat and Plants

VEC	Phase	Residual effect	Assessment characteristics
		plants. Remove or alter priority plant habitat.	Magnitude – Moderate Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**
	Operation	Nil to slight reductions in effects on some priority plants. Nil to slight reductions in effects on some priority plant habitats. Nil to slight increase in priority plant harvesting.	Direction – Negative Magnitude – Moderate Geographic Extent – Local Duration – Long Term Frequency –Continuous Reversibility – Irreversible **Overall – Not Significant**

7.2.3.3 Follow-up and Monitoring

Follow-up and monitoring during construction will include the following:

- The ROW will be inspected annually to:
    - Confirm that the mitigation measures were implemented appropriately;
    - Identify sites that require rehabilitation due to vegetation and/or soil removal;
    - Identify disturbed riparian areas requiring some form of rehabilitation; and
    - Identify patches of highly invasive plants that require control or eradication. Control or eradication measures appropriate for the species and conditions will be implemented.

Follow-up and monitoring during operations will include:

- The ROW will be inspected to:
    - Identify sites that are not achieving their rehabilitation targets. Annual inspections of rehabilitated areas will be conducted until it is confirmed that all locations have achieved their rehabilitation targets. For sites not achieving their targets, the follow up action will be to either modify the rehabilitation prescription or the rehabilitation target. The latter response will be appropriate for situations where conditions have developed that limit the likelihood that the original habitat target can be achieved.

7.2.3.4 Wildlife

Methods

Project activities from construction, operation, and maintenance of the Project have the potential to affect wildlife and habitat in the area. Such activities include:

- Station site disturbances from people and machinery;
- Transmission line ROW clearing activities (e.g., removal of trees);
- Development of marshalling yards, borrow areas and access trails;
- Construction and installation of tower structures, guyed wires, conductors and ground wires;
- Increased vehicle traffic to and from the Project sites during construction and operations;
- Use of chemicals and herbicides during construction and operations, and
- Accidents.

Potential effects from these activities on wildlife and habitat include:

- Habitat loss, alteration, and fragmentation;
- Disruption of movements;
- Reduced recruitment (e.g., from increased brood parasitism); and
- Mortality from increased hunting, predation, disease transference and accidents associated with linear feature access, nest destruction, and bird-wire collisions.

A variety of methods were used to examine the potential effects from construction, operation, and maintenance of PW75. Wildlife studies reviewed existing Manitoba Hydro environmental assessments, peer-reviewed literature, government and Manitoba Hydro reports, discussions with government and non-government organizations, and field surveys. Data from studies completed by MCWS, the Manitoba Model Forest and the Manitoba Breeding Bird Atlas were also reviewed and incorporated. Information from these sources were used to develop wildlife surveys, identify important wildlife species and habitat in the Project Study Area, assess the potential effects from this Project, and develop species-specific mitigation measures to reduce anticipated effects as required.

Data collection for wildlife species and habitats focused on species of regulatory concern, conservation concern, that were important to people, and on potentially sensitive habitat types found in the Project Study Area. Considerations were made for field sampling to fill gaps in knowledge for the effects assessment. Wildlife use of existing habitats and specific habitat features were measured using techniques conforming to accepted professional standards and practices. Details of methods are provided in Appendix C1.

In 2013, point-counts were used to identify breeding birds in various habitat types, with emphasis on habitats of provincially or federally listed wildlife species (Ralph et al. 1993, Hobson et al. 2002, and Rempel et al. 2005) to maximize detection probability. Remote automated recorders were also used to identify nocturnal wetland birds (i.e. yellow rail) that are not typically observed during point counts (Bookhout 1995). Amphibian surveys generally followed the methods of Konze and McLaren (1997) and were conducted at night at various types of waterbodies, water courses, and some forested habitats to identify important amphibian habitat and to detect listed amphibian species. Aerial surveys, conducted from a helicopter, were used to identify ungulates and sensitive sites, although most of the population data were derived from government sources. Maps of field sample locations for birds, amphibians and mammals are located in Appendix Maps C4-1 to C4-4. Where feasible, these data were used to describe the relative abundance and distribution of species in the Project Study Area. Maps of wildlife observations, waterfowl and waterbird observations, nests, listed bird species, listed amphibian and reptiles, and moose, marten, and bird VECs are located in Appendix Maps C4-5 to C4-12. Evaluation of environmental effects focused on VECs with an identified ecological or societal importance (see Chapter 3).

Habitat models were developed for each VEC and for Species of Conservation Concern that were listed by SARA, (MBESA), and/or COSEWIC. Literature and professional judgement was used to identify variables used in each of the species-specific habitat models (Appendix C2). Habitat models were constructed using a GIS platform, and the amount of habitat for each species affected by the proposed transmission line was calculated. These data, in conjunction with information from literature and other data from field studies were used in the effects assessment, and to recommend mitigation measures.

The following sections present the VECs used to assess the potential effects of PW75 on wildlife and habitat. Wildlife VECs include moose, American marten, bald eagle, ruffed grouse, and Canada warbler. Additional details are provided for an effects assessment of Species of Conservation Concern (Section 7.2.3.4.6), and for other wildlife or habitats (Section 7.2.3.4.7) that could be affected by the Project.

The Project Study Area for moose, American Marten, bald eagle, ruffed grouse and Canada warbler is shown on Map 5-1.

7.2.3.4.1 Moose

Construction

Potential Project effects on moose during construction include habitat loss, habitat alteration, and sensory disturbance. Habitat modeling indicates that 185.72 ha of the 278 ha present in the project footprint is potential moose habitat with the project footprint consisting of 18.80% and 48.01% primary and secondary moose habitat, respectively (Appendix C Table C3-8). When available habitat in the Project Footprint is compared to the Regional Study Area, only 0.02% of the total moose habitat would be affected by the transmission line ROW. About 0.3% of primary moose habitat will be affected in the Project Study Area (Map 7-3). Of this total, a small amount

of forest cover will be converted to shrublands and grasslands. Browse and other forage plants are likely to grow in the ROW; conversely some thermal and other cover will be lost. The alteration of habitat in and near the transmission line ROW is small and is only likely to affect few individual moose.

Sensory disturbances during construction along the ROW, marshalling yards, borrow areas, and stations from traffic, machinery, etc. could result in effective habitat loss, displacing moose from habitat near the ROW, and potentially result in the disruption of movements of moose (Stankovich 2008; Wasser et al. 2011). Currently, the winter moose population appears to be distributed in the eastern half of the Project Study Area in unfragmented core habitat (Appendix C Map C4-5). The habitat effects are likely to extend into the Intactness Local Study Area, which is comprised of 26.24% and 57.25% of primary and secondary moose habitat, respectively (Appendix C Table C3-8). Loss of total effective primary and secondary moose habitat in the Intactness Local Study Area compared to the Region is still small (0.72%) for disturbances extending out one km from the ROW, but could be higher if disturbances extend further than this distance. However, moose do not easily abandon suitable areas and often return when disturbances end (Silverberg et al. 2003; Harris et al. 2013). Some ungulate species tend to habituate to transmission lines, including moose. Because moose are likely to return when the disturbance ends given food and cover availability, the effects of sensory disturbance and temporary disruption of movements on individual moose in the Local Study Area as compared to the Regional Study Area are expected to be small and short-term.

Construction access trails to the transmission line ROW can contribute to habitat fragmentation effects (see operation). Management is required to minimize potential access-related effects. Marshalling yards and borrow areas may slightly increase the amount of moose habitat lost. The effects of habitat alteration will be minimized by using borrow materials from existing sources.

One mineral lick was found during field studies, and others may be present. Due to the importance of mineral licks to moose for nutrition and antler growth (Tankersley and Gasaway 1983), mitigation will require set-back distances to minimize Project effects.

The risk of accidents and malfunctions, including fires and spills may increase during the construction period and cause short-term to long-term habitat alteration at site-specific areas, depending on the severity. Construction (and operation) fire prevention methods are described in the EnvPP. Due to the low probability of occurrence and the regulation requirements for storing, handling, and transporting fuel, oil, and other hazardous materials under the Dangerous Goods and Transportation Act and as described in the EnvPP, the effects on the moose population are expected to be negligible.

The licensed moose hunting season was closed in 2010 and some areas were closed to all hunting in early 2012 in GHA 26 (Government of Manitoba 2012). The moose population is currently low in GHA 26. With cooperative moose management in the region, signs of recovery occurred between 2010-2013, increasing from 823 individuals ($\pm$18%) to 1,307 individuals ($\pm$17.2%; MCWS 2013 unpublished data). Because additional Project-related moose mortality from hunting is not anticipated during construction, hunting is not anticipated to affect the moose population in the Project or Regional Study Areas at this time.

Other Project effects on moose could include increased mortality due to collisions with vehicles and to hunting. No moose collisions have occurred in the last 20 years on PR 313, PR 211, and PR5 520 (McMahon 2013). Limited increases in local traffic to and from the construction sites and low vehicle speeds on the ROW are expected to result in very few moose injuries or mortalities.

Mitigation Measures

The following mitigation measures will be implemented during construction to minimize effects on moose:

- Clearing will occur during late fall and winter to the extent possible to avoid parturition times for moose;
- Construction activities will not be carried out within established buffer zones and setback distances for wildlife species, including a 120 m buffer around mineral licks, during timing windows;
- Marshalling yards will be constructed on previously disturbed areas if possible, new borrow areas will be minimized by using borrow from existing sources;
- Existing access roads, trails, or cut lines will be used to the extent possible and access roads and trails will be kept as short and narrow as possible;
- Public use of access roads and trails during construction will be controlled through the Access Management Plans;
- Hunting and harvesting of wildlife by project staff will not be permitted while working on the project sites; and
- Vehicles will not exceed posted speed limits and wildlife warning signs will be installed in high density areas.

Residual Effects

Residual effects of construction on moose following mitigation measures may include a temporary decrease of abundance within the Project Study Area during construction as a result of sensory disturbance and a small loss of effective habitat in fall and winter where individual home ranges overlap with construction activities. The decrease in abundance is anticipated to be short-term and reversible as moose are expected to return to areas that were previously disturbed during construction. Some loss and alteration of moose habitat will occur as a result of ROW clearing. Due to the relatively small amount of habitat lost and altered in the Regional Study Area (0.02%), and the potential that altered habitat in the ROW will provide moose habitat, the effects of construction are anticipated to be small and reversible. Mortality from hunting is not anticipated to increase during construction as the licensed hunting is currently closed in the area, and domestic harvest is unlikely to occur in an active construction area. Mortality from vehicle collisions is also not anticipated to increase despite an increase in traffic volumes as the moose population in the area is currently low and collisions are highly unlikely.

Overall, the residual effects of construction after mitigation measured are applied for moose are not expected to be significant.

Operations

Potential Project effects on moose during operation include habitat alteration, habitat fragmentation, and sensory disturbance. Although no direct loss of moose habitat is anticipated during operation, additional moose habitat indirectly affected at the edge of the ROW could extend into the Habitat Zone of Influence over time (see Section 7.2.3.1), and compared to the Region, it could reach 0.05% of the total moose habitat affected. Vegetation on the ROW is expected to regenerate over time, which will likely provide forage for moose (KBM Forestry Consultants Inc. 2006; Peek 2007). Periodic maintenance will be required to prevent vegetation from reaching heights that may interfere with the function of the transmission line, impede access for maintenance workers, or create a fire hazard (Manitoba Hydro 2007). Vegetation management will likely disturb individual moose and moose habitat periodically. Low vegetation and regenerating shrub communities will likely be used as forage and potentially attract moose onto the ROW, while thermal and other cover expected for moose on the transmission line ROW will be reduced for the life of the project. Overall, periodic maintenance is expected to affect few moose and habitat effects are anticipated to be small.

Annual inspections of the transmission line could disturb moose. However, such events will be brief and infrequent. Maintenance activities follow well-established guidelines and the effects of sensory disturbance on moose are expected to be negligible. Intermittent sensory disturbance due to off-road vehicle and snowmobile use on the ROW is likely to occur, as portions of the existing P1-P4 line are used currently by trappers, snowmobilers and recreationists, and is likely to continue into the future. Moose movements in the area could be disrupted due to habitat fragmentation. Moose are resilient to development features on the landscape (Laurian et al. 2008) and often use edge habitat (Dussault et al. 2006). Although some minor and infrequent long-term effects can occur, loss of habitat effectiveness and disruption of moose movements for few individual moose near the ROW is likely to be small during operation.

Potential effects of fragmentation, including reduction of core areas and increased linear features were largely avoided by routing during Site Selection (see Section 5.4.3). The ROW could contribute to habitat fragmentation in the Project Study Area, including new access trails to the ROW. Linear feature density is not expected to change from 1.92 km/km^2 within the Project Study Area and transmission line density is only expected to increase from 0.54 to 0.57 km/km^2 within the Project Study Area (Section 7.2.3.1). As a large portion of the route follows an existing ROW, the majority of the large, core areas in the eastern portion of the Project Study Area will remain intact and the direct effects of habitat fragmentation on moose are expected to be small. Habitat fragmentation could also indirectly affect moose by attracting white-tailed deer to the ROW (Manitoba Model Forest 2011a). Deer can transmit disease to moose, such as brainworm and liver fluke parasites. The brainworm parasite, which is known to occur in the area, is harmless to deer but fatal to moose (Schimtz and Nudds 1994; Manitoba Model Forest 2011a). Liver flukes can also contribute to mortality if moose are in a weakened state (Lankester and Samuel 2007; Manitoba Model Forest 2011a). The creation of favourable deer habitat and

increased white-tailed deer movements in the Project Study Area could result in a greater rate of infection for moose. However, deer are commonly found throughout the Project Study Area and the spread of brainworm or liver flukes is not anticipated to increase.

Moose mortality could increase during operation due to hunting and predation. Increased sight-lines for hunters and predators and more efficient movement for predators such as gray wolves could contribute to moose mortality (James and Stuart-Smith 2000). Gray wolves often use linear features on the landscape as a travel corridor, which increases their ability to search for prey and reduces the amount of effort required to find prey (Kunkel and Pletscher 2003). Because the transmission line route in part follows existing linear features and has largely avoided intact core areas within the Project Study Area, increased predation by gray wolf along this linear feature is expected to be small. Although few individual moose would be affected, minimizing line-of-sight is considered important to mitigate potential future harvest effects as the moose population recovers.

The moose population is currently low in GHA 26, and although not anticipated, substantial Project-related moose mortality could negatively affect the recovery rate of moose in the Project Study Area. Moose numbers in GHA 26 are expected to increase with the closure of the licensed hunting season in the Project study area and surrounding region and on-going management efforts (e.g., wolf and deer management) (MCWS 2013). When moose hunting resumes, improved access to moose habitat provided by the new transmission line could result in increased moose harvest from subsistence, licensed and illegal hunting. Because the transmission line route in part follows existing linear features and has largely avoided intact core areas within the Project Study Area. Increased access to a few individual moose and potential future moose harvest is expected to be small and limited to about 21 km of new access, created on the cleared ROW. This access is usually limited to within one kilometre of existing roads and trails. Where present, rough topography such as bedrock outcrop, or large wetlands are also anticipated to reduce potential access effects. Access trails initially managed during construction will require operational follow-up.

Mitigation Measures

The following mitigation measures will be implemented during operations to minimize effects on moose:

- Rehabilitated access roads and trails will be inspected to assess the success of re-vegetation and to determine if additional rehabilitation is required;
- At points where the transmission line ROW crosses major roads or trails, existing vegetation will be managed within safe operating limits to screen the line of sight along the transmission line ROW; and
- Where possible conduct investigative maintenance surveys by air rather than on-ground.

Residual Effects

Residual operation effects on moose will include a relatively small amount of habitat alteration as vegetation along the ROW becomes re-established in areas where it was disturbed and

maintenance of the ROW temporarily alters vegetation. The amount of habitat that is expected to be altered following mitigation is small, infrequent, limited to the newly created ROW, and will provide moose with some forage habitat. As a result, the effects on moose are anticipated to be small. Spatially, the disturbance caused by ROW maintenance will be temporary, infrequent, and only affect a few individuals within close proximity to the ROW, resulting in small effects on moose and potential moose habitat.

A decrease of moose abundance within the Project Study Area may occur as a result of increased linear feature density and reduction of core areas. Increased linear feature density may result in increase access by predators and hunters, which may increase moose mortality. The transmission of parasites to moose by white-tailed deer, including brainworm and liver flukes, may also increase as more white-tailed deer may travel into the area. However with sustainable harvest, predator control and enhanced white-tailed deer harvest as managed by Manitoba Conservation and Water Stewardship, and with few individual moose expected to affected by these factors locally, no substantial changes to the population are anticipated. With past and present projects, increased linear feature density and a reduction in core area size may have small, negative effect on the moose population; however, as intactness and linear feature benchmarks are low overall (Section 7.2.3.1), and above the 65% value for the transition from small to moderate magnitude effects, the moose population is most likely to remain viable. Overall, residual effects on moose in the Regional Study Area are expected to be not significant.

7.2.3.4.2 American Marten

Construction

Potential Project effects on American marten during construction include habitat loss, alteration, and sensory disturbance. Habitat modeling indicates that 105.81 ha of the 278 ha present in the project footprint is potential American marten habitat with the project footprint consisting of 11.51% and 26.55% primary and secondary American marten habitat, respectively (Appendix C Table C3-8). When available habitat in the Project Footprint is compared to the Regional Study Area, only 0.02% of the total American marten habitat would be affected by the transmission line ROW. About 0.2% of primary American Marten habitat will be affected in the Project Study Area (Map 7-4). Due to the relatively small amount of habitat lost or altered, and where few individual marten are likely to be affected near the ROW, and the effects on American marten are expected to be small.

Sensory disturbance due to clearing and construction activities may cause American martens to avoid the construction zone, reducing the amount of effective habitat in the Project Study Area. Sensory disturbance may also alter movements of individuals with home ranges spatially and temporally overlapping the project (Robitaille and Aubry 2000). American martens appear to tolerate intermittent sensory disturbance due to motorized vehicles (Zielinski et al. 2008). However, American marten may temporarily avoid the construction area as clearing and construction progress along the ROW due to construction noise and the presence of workers and machinery in these areas. These individuals will likely find suitable habitat elsewhere in their home ranges, and are expected to return to the area after sensory disturbances end. The

habitat effects are likely to extend into the Intactness Local Study Area, which is comprised of 19.76% and 21.35% of primary and secondary American marten habitat, respectively (Appendix C Table C3-8). Loss of total effective marten habitat in the Intactness Local Study Area compared to the Region is still small (0.71%) for disturbances extending out one km from the ROW, but could be higher if disturbances extend further.

Construction access trails to the transmission line ROW can contribute to habitat fragmentation effects (see operation). Management is required to minimize potential access-related effects. Marshalling yards and borrow areas may increase the amount of American marten habitat lost and altered and it is recommended that marshalling yards occur on previously developed areas. The effects of habitat alteration will be minimized by using borrow materials from existing sources.

As described in Section 7.2.4.2, with mitigation, the risk of accidents and malfunctions, and the potential effects on American marten are expected to be negligible.

Other potential Project effects on American marten include increased mortality due to trapping. As portions of the ROW could create new access in the Project Study Area, trapping activity could increase in the area. Because trapping is unlikely to occur in an active construction area, and trapping success will likely be limited if American marten avoid the immediate area during construction, no effect on mortality is anticipated during construction.

Mitigation Measures

The following mitigation measures will be implemented during construction to minimize effects on American marten:

- Existing access roads, trails, or cut lines will be used to the extent possible and access roads and trails will be kept as short and narrow as possible;
- Trees containing areas where active animal dens or burrows are encountered will be left undisturbed until unoccupied; and
- Manitoba Conservation and Water Stewardship will be notified if animal traps are encountered and must be removed for Project activities.

Residual Effects

Residual effects of construction on American marten may include a temporary decrease of abundance within the Project Study Area as a result of sensory disturbance and a small loss of effective habitat where individual home ranges overlap with construction activities. The decrease in abundance is anticipated to be short-term and reversible as American marten are expected to return to areas that were previously disturbed during construction. Some loss and alteration of American marten habitat will occur as a result of ROW clearing. Due to the relatively small amount of habitat lost and altered in the Regional Study Area (0.02%), the effects of Project construction are anticipated to be small and reversible. Mortality from trapping is not anticipated to increase during construction as trapping is unlikely to occur in an active

construction zone. Overall, the effects on American marten after construction mitigation measures are applied are anticipated to be not significant.

Operations

Potential Project effects on American marten during operation include habitat alteration, habitat fragmentation, and sensory disturbance. Although no direct loss of marten habitat is anticipated during operation, additional marten habitat indirectly affected at the edge of the ROW could extend into the Habitat Zone of Influence over the ROW is expected to regenerate over time and be maintained in a relatively stable state.

Potential effects of fragmentation, including reduction of core areas and increased linear features were largely avoided by routing during Site Selection (see Chapter 4). The ROW could contribute to habitat fragmentation in the Project Study Area, including new access trails to the ROW. Total intactness and linear feature density is not expected to change substantially (see Section 7.2.3.1). Although marten do not make extensive use of openings and may be reluctant to cross large openings, they may occupy openings narrower than 100 m in summer and winter (Clark et al. 1987). Due to vegetation regrowth on the ROW, the limited ROW width of 60 m, and the expected continued use of large intact core areas in the Project Study Area, the effect of habitat alteration and potential fragmentation effects are expected to be small on the marten population. A few local individual marten could be affected by the Project.

Annual inspections of the transmission line and periodic vegetation management may temporarily disturb American marten on the ROW. However, such events will be brief and infrequent. Maintenance activities follow well-established guidelines and the effects of sensory disturbance on American marten are expected to be small. Intermittent sensory disturbance due to off-road vehicle and snowmobile use on the ROW is also possible. American martens appear to tolerate intermittent sensory disturbance due to motorized vehicles (Zielinski et al. 2008), although some local individuals may avoid the transmission line.

American marten mortality could increase during operation due to trapping. As portions of the ROW could create new access in the Project Study Area, trapping activity could increase in the area. If trapping effort surpasses a sustainable level, a corresponding decrease in the American marten population could be expected. American marten harvest will not likely exceed sustainable levels as a result of increased access as trappers manage the production of fur on their lines, and Manitoba Conservation and Water Stewardship manage and monitor the provincial trapping of fur on a sustainable basis.

Mitigation Measures

The following mitigation measures will be implemented during operation to minimize effects on American marten:

- Rehabilitated access roads and trails will be inspected to assess the success of re-vegetation and to determine if additional rehabilitation is required; and
- Where possible, conduct investigative maintenance surveys by air rather than on-ground.

Residual Effects

Residual operation effects on American marten will include a relatively small amount of habitat alteration as vegetation along the ROW becomes re-established in areas where it was disturbed and maintenance of the ROW temporarily alters vegetation. The amount of habitat that is expected to be altered following mitigation is small, infrequent, and limited mainly to the newly created ROW. As a result, the effects on American marten habitat are anticipated to be small. Spatially, the disturbance caused by ROW maintenance will be temporary, infrequent, and only affect a few individuals in close proximity to the ROW, resulting in small effects on American marten and potential marten habitat.

A decrease of American marten abundance within the Project Study Area may occur as a result of increased linear feature density and reduction of core areas. Increased linear feature density may result in better access for trappers, increasing mortality; however, with sustainable trapping management practices by individual trapline holders, and as managed by Manitoba Conservation and Water Stewardship, no substantial changes in the population are anticipated. Increased linear feature density may also alter movements of some American marten in their home ranges, but this is expected to affect relatively few individuals due to the small amount of local core area being affected and the relatively narrow width of the ROW that marten are still anticipated to cross. With past and present projects, increased linear feature density and a reduction in core area size may have small, negative effect on the American marten population; however, as intactness and linear feature benchmarks are low overall (Section 7.2.3.1), and above the 65% value for the transition from small to moderate magnitude effects, the marten population is most likely to remain viable.

Overall, residual effects on American marten in the Regional Study Area are expected to be not significant. There is some uncertainty in this assertion as historic terrestrial physical habitat loss for American marten has not been calculated, but it is understood that the cumulative total terrestrial habitat loss totals 16% of the Project Study Area (Section 7.2.3.1), The residual effects on American marten are still expected to be not significant because even with the Project, past and current habitat loss, alteration and fragmentation will remain low. The American marten is a common and a widespread species with a cyclic but stable to increasing population, and because it is regulated and managed on a regional and Provincial basis, and where there are Provincial parks and wilderness areas set aside in part, for the preservation of wildlife found in the Project area, it is highly likely to remain sustainable.

7.2.3.4.3 Bald Eagle

Construction

Potential Project effects on bald eagle during construction include habitat loss, habitat alteration, and sensory disturbance. Habitat modeling indicates that 20.32 ha or 7.31% of the 278 ha of the project footprint is potential bald eagle habitat (Appendix C Table C3-8). Compared to the Regional study area, 0.01% of the total bald eagle nesting habitat would be affected by the

transmission line ROW. About 0.2% of the Bald Eagle habitat will be affected in the Project Study Area (Map 7-5).

Bald eagle nests could be damaged or removed during clearing and mitigation is required to avoid this. While some loss of potential perching and nesting trees is anticipated, transmission towers can provide alternate perching and nesting opportunities for bald eagles (Guinn 2004; Gross and Brauning 2011). With mitigation, the overall effect on bald eagles will likely be small.

Sensory disturbance and disruption of movements can affect bald eagles during construction. The habitat effects are likely to extend into the Intactness Local Study Area, which is potentially comprised of 11.38% bald eagle habitat (Appendix C Table C3-8). Loss of total effective bald eagle habitat in the Intactness Local Study Area compared to the Region is still small (0.71%) for disturbances extending out one km from the ROW, but could be higher if disturbances extend further. Bald eagles arrive early in Manitoba (as early as mid-March to late April) and were mainly found near large rivers and lakes in the Project Study Area (Appendix C Map C4-8). Bald eagles are relatively sensitive to sensory disturbance (Buehler 2000) and effective habitat could be reduced in the Project Study Area if clearing and construction occur into early spring. If construction occurs in summer, sensory disturbance could affect breeding and nesting activities and disrupt daily movements. As bald eagles are primarily migratory, few to no individuals are expected to be in the Project Study Area in winter. No effects on seasonal movements are anticipated, as bald eagles migrate long distances with relatively few stopovers (Laing et al. 2005), and they generally fly an estimated minimum of 1 km above the ground (Harmata 1984).

As described in Section 7.2.4.2, with mitigation, the risk of accidents and malfunctions, and the potential effects on bald eagle are expected to be small.

Bald eagles are occasionally killed by collisions with vehicles when scavenging road-killed carcasses (Stinson et al. 2007). Collisions with vehicles are infrequent relative to other sources of mortality (Harmata et al. 1999). Limited increases in local traffic to and from the construction sites and low vehicle speeds on the ROW are expected to result in very few bald eagle injuries or mortalities. With mitigation the effects on the bald eagle population will likely be small.

Mitigation Measures

The following mitigation measures will be implemented during construction to minimize effects on bald eagle:

- Clearing will occur during late fall and winter to the extent possible to avoid the spring/summer nesting season for birds;
- Clearing will not be permitted within established setbacks for bird nesting and brood rearing during established timing windows, including a 200 m buffer around large stick nests from April 1 to August 31; and
- Trees containing large stick nests will be left undisturbed until unoccupied. Artificial structures for nesting may be provided if unoccupied nests must be removed.

Residual Effects

No residual effects of construction are anticipated for bald eagle primarily because this species is migratory and is likely to be absent during fall and winter construction activities, and because potential perching and nesting trees are unlikely to be affected by the Project.

Operations

Project effects on bald eagle could include habitat alteration, sensory disturbance and disruption of movements. Although no direct loss of bald eagle habitat is anticipated during operation, additional eagle habitat indirectly affected at the edge of the ROW could extend into the Habitat Zone of Influence over time (see Section 7.2.3.1); compared to the Region, 0.04% of the total bald eagle habitat may be affected. However, the transmission towers will likely provide alternate perching and nesting habitat (Guinn 2004; Gross and Brauning 2011). If nests interrupt power transmission (Steenhoff et al. 1993) necessitating their removal (Manitoba Hydro 2010), mitigation will be required. Where alternate nesting habitat is available, these effects are considered small.

Annual inspections of the transmission line could disturb bald eagles, particularly during the spring nesting season. However, such events will be brief and infrequent. Maintenance activities follow well-established guidelines and the effects of sensory disturbance on bald eagle are expected to be small. Intermittent sensory disturbance due to off-road vehicle use on the ROW is also possible. The transmission line is not expected to affect daily movements and could enhance them slightly by providing more perches. No effects on seasonal movements are anticipated.

Potential Project effects on bald eagle also include increased mortality. Bald eagles can be susceptible to electrocution (Harness and Wilson 2001; Millsap et al. 2004) and the risk of death or injury could increase if they perch or nest on transmission towers. A minimum of 1.5 m, 1.2 m vertical, and 1.5 m diagonal spacing between electrically conductive points on the transmission line is required to prevent most bird of prey electrocutions (APLIC 2006). The wide spacing of the lines between the conductors, and the configuration of the PW75 transmission line makes electrocutions highly unlikely.

Collisions with wires are another source of mortality associated with transmission lines (Mojica et al. 2009). The presence of ground wires at the tops of the transmission line structures may further increase the risk of bald eagle strikes due to their relatively thin diameter. As collisions with wires are more likely over or near large bodies of open water, the risk of collision would likely be greatest near Rice Lake, Pinawa Channel, the Winnipeg River and Whitemouth River crossings. Healthy bird populations are not at risk with occasional accidents. With mitigation, effects of increased mortality on the bald eagle population are expected to be small.

Mitigation Measures

The following mitigation measures will be implemented during operation to minimize effects on bald eagle:

- Bird diverters or aerial markers may be installed in high bird traffic areas such as at the Rice Lake, Pinawa Channel, Whitemouth River and Winnipeg River crossings;
- Artificial structures for nesting may be provided if nests must be removed for safety reasons; and
- Maintenance should be carried out during the fall or winter where feasible to avoid the disturbance and potential destruction of nests and/or young, to the extent feasible.

Residual Effects

Residual operation effects on bald eagle will result in a small amount of habitat alteration as vegetation along the ROW becomes re-established in areas where it was disturbed and maintenance of the ROW temporarily alters vegetation. If danger trees pose a risk to the transmission line they will need to be removed, reducing the amount natural perching and nesting habitat available to bald eagles. Alternatively, the construction of transmission towers may provide bald eagles with alternate perching and nesting habitat. Tall structures are anticipated to provide a small net benefit to bald eagles. The amount of habitat that is expected to be altered following mitigation is small and limited to the newly created ROW and is not anticipated to have a significant effect on the regional bald eagle population.

Overall, residual effects on bald eagle in the Regional Study Area are expected to be not significant. There is some uncertainty in this assertion as historic terrestrial physical habitat loss, including historic flooding of the Winnipeg River by the Seven Sisters and the Pointe du Bois Generating Stations, and the former decommissioned Pinawa Station that also likely affected riparian habitat for bald eagle, have not been calculated. It is understood that the cumulative total terrestrial habitat loss totals 16% of the Project Study Area (Section 7.2.3.1), Although past and present generating stations can affect habitat, they often produce opportunities from turbine-related fish mortalities, which can benefit bald eagle that often scavenge for food. The residual effects on bald eagle are still expected to be not significant because even with the Project, past and current habitat alteration is relatively low. Prey items including fish populations are plentiful, and fish habitat will not be affected by the Project (Section 7.2.2). In addition, bald eagle habitat that includes perches and nest sites appear to be abundant given the relatively high density of bald eagles observed in the regional study area, The bald eagle is a common and a widespread species with a stable population, and because it is regulated and managed on a regional and Provincial basis, where there are Provincial parks and wilderness areas set aside in part, for the preservation of wildlife found in the Project area, and because this species is protected from harvest, it is highly likely to remain sustainable. With mitigation measures in place, the chances of bald eagle collisions with wires are very low, and because the population appears to be healthy, a significant effect on the bald eagle population is not anticipated.

7.2.3.4.4 Ruffed Grouse

Construction

Potential Project effects on ruffed grouse during construction include habitat loss, habitat alteration, and sensory disturbance. Habitat modeling indicates that 106.52 ha of the 278 ha present in the project footprint is potential ruffed grouse habitat with the project footprint consisting of 24.20% and 14.12% primary and secondary ruffed grouse habitat, respectively (Appendix C Table C3-8). When available habitat in the Project Footprint is compared to the Project Study Area, only 0.38% of the total ruffed grouse habitat would be affected by the transmission line ROW, and 0.45% of primary ruffed grouse habitat will be affected in the Project Study Area (Map 7-6). Ruffed grouse are expected to find forested habitat near the ROW in the Project Study Area and the effects of habitat loss are expected to be small.

If clearing and construction occur in spring and early summer, sensory disturbance could affect breeding and nesting activities, disrupt daily movements, or damage or destroy nests. The habitat effects are likely to extend into the Intactness Local Study Area, which is comprised of 23.3% and 15.44% of primary and secondary ruffed grouse habitat, respectively (Appendix C Table C3-8). Loss of total effective primary and secondary ruffed grouse habitat in the Intactness Local Study Area compared to the Project Study Area is moderate (2.81%) for disturbances extending out one km from the ROW, but could be higher if disturbances extend further. The effects will not occur if the nesting season is avoided. Additionally, because ruffed grouse inhabit the Project Study Area year-round, some habitat avoidance and disruption of daily movements are anticipated for winter. These effects will be temporary and limited to the local population, and are expected to be small.

Construction access trails to the transmission line ROW can contribute to habitat fragmentation effects (see operation). Management is required to minimize potential access-related effects. Marshalling yards and borrow areas may increase the amount of ruffed grouse habitat altered and it is recommended that marshalling yards occur on previously developed areas. However, small borrow areas that expose surface gravel can be attractive to individual ruffed grouse by providing a source of grit necessary for physical digestion in the gizzard. The effects of habitat alteration will be minimized by using borrow materials from existing sources.

As described in Section 7.2.4.2 with mitigation, the risk of accidents and malfunctions, and the potential effects on ruffed grouse are expected to be small.

Project effects on ruffed grouse could include increased mortality. As the ROW is cleared, opportunities for harvest of ruffed grouse could increase. Legal harvest is unlikely to occur or will be minimal if clearing occurs during winter as the hunting season for these species ends in mid-December (Manitoba Conservation and Water Stewardship 2013). Because domestic or illegal harvest is unlikely to occur in an active construction area, and chances of harvest success are further reduced if ruffed grouse avoid the area during construction, no effects are anticipated.

Ruffed grouse are vulnerable to collisions with vehicles (Rusch et al. 2000). Limited increases in local traffic to and from the construction sites are expected to result in very few ruffed grouse injuries or mortalities. Individuals foraging on the cleared ROW could be susceptible to collisions with construction machinery, but vehicle speeds are expected to be slow and controlled, reducing the risk of collisions. As the harvest is not expected to increase during construction and collisions with vehicles are unlikely, increased mortality is expected to have a small effect on the ruffed grouse population.

Mitigation Measures

The following mitigation measures will be implemented during construction to minimize effects on ruffed grouse:

- Clearing will occur during late fall and winter to the extent possible to avoid the spring/summer nesting season for birds;
- Clearing will not be permitted within established setbacks for bird nesting and brood rearing during established timing windows;
- Marshalling yards will be constructed on previously developed areas if possible;
- New borrow areas will be minimized by using borrow from existing sources; and
- Hunting and harvesting of wildlife by project staff will not be permitted while working on the project sites.

Residual Effects

Residual effects of construction on ruffed grouse may include a temporary decrease of abundance within the Project Study Area as a result of sensory disturbance and a small loss of effective habitat in fall and winter where individual home ranges overlap with construction activities. The decrease in abundance is anticipated to be short-term and reversible as ruffed grouse are expected to return to areas that were previously disturbed during construction. Some loss and alteration of ruffed grouse habitat will occur as a result of ROW clearing. Due to the relatively small amount of habitat lost and altered in the Project Study Area (0.38%), and the potential that altered habitat in the ROW will create ruffed grouse habitat, the effects of Project construction are anticipated to be small and reversible. Mortality from hunting is not anticipated to increase during construction as hunting is unlikely to occur in an active construction zone. Mortality from vehicle collisions is also not anticipated as the chances of collisions are low. Overall, the residual effects of construction after mitigation measures are applied for ruffed grouse are not significant.

Operations

Potential Project effects on ruffed grouse during operation include habitat alteration and sensory disturbance. Although no direct loss of ruffed grouse habitat is anticipated during operation, additional ruffed grouse habitat indirectly affected at the edge of the ROW could extend into the Habitat Zone of Influence over time (see Section 7.2.3.1); compared to the Project Study, 1.21%

of the total ruffed grouse habitat may be affected. Periodic vegetation management may temporarily disturb ruffed grouse on the ROW and alter habitat. Vegetation management is expected to be infrequent, and vegetation will regenerate. Young, regenerating vegetation may increase use of the ROW by ruffed grouse as they often feed along openings in the forest (Sharp 1963). As a large portion of the preferred route follows existing rights-of-way, and some habitat for ruffed grouse may be created, the effects of habitat alteration on ruffed grouse are expected to be small.

Annual inspections of the transmission line could disturb ruffed grouse, particularly during the spring nesting season; however, such events will be brief and infrequent. Maintenance activities follow well-established guidelines and the effects of sensory disturbance on ruffed grouse are expected to be small. Intermittent sensory disturbance due to off-road vehicle and snowmobile use on the ROW is also possible. Daily movements could be affected, as ruffed grouse use edge habitats and may frequent the ROW. No effects on seasonal movements are anticipated, as ruffed grouse are not migratory. As sensory disturbance and disruption of movements will affect a limited number of individuals in the immediate area of the transmission line, effects on the ruffed grouse population are expected to be small.

Potential effects of fragmentation, including reduction of core areas and increased linear features were largely avoided by routing during Site Selection (see Chapter 4). The ROW could contribute to habitat fragmentation in the Project Study Area, including new access trails to the ROW. Total intactness and linear feature density is not expected to change substantially (see Section 7.2.3.1). Ruffed grouse are attracted to edge habitat (Sharp 1963), making them more vulnerable to predation and hunting mortality. Ruffed grouse mortality could increase during operation as a result of improved access to hunters and increased hunting efficacy by predators. As a large portion of the transmission follows an existing ROW access to hunters and predators is minimized and any increased mortality as a result of increased access will likely be small relative to the ruffed grouse population in the Project Study Area.

Mortality may also be increased through collisions transmission line structures. The presence of ground wires and guy wires may further increase the risk of ruffed grouse strikes. The risk of collisions is small and occasional wire strikes are not expected to have an effect on a healthy population.

Mitigation Measures

The following mitigation measures will be implemented during operation to minimize effects on ruffed grouse:

- Maintenance should be carried out during the fall or winter where feasible to avoid the disturbance and potential destruction of nests and/or young.

Residual Effects

Residual operation effects on ruffed grouse will include a relatively small amount of habitat alteration as vegetation along the ROW becomes re-established in areas where it was disturbed

and maintenance of the ROW temporarily alters vegetation. The amount of habitat that is expected to be altered following mitigation is small, and mainly limited to the newly created ROW. The new ROW may provide ruffed grouse with some suitable edge habitat. As a result, the effects on ruffed grouse are anticipated to be small and reversible. Spatially, the disturbance caused by ROW maintenance or vehicles travelling on the ROW will be temporary, infrequent, and only affect a few individuals within close proximity to the ROW, resulting in small effects on ruffed grouse and potential grouse habitat.

A decrease of ruffed grouse abundance within the Project Study Area may occur as a result of increased linear feature density and reduction of core areas. Increased linear feature density may result in increase access by predators and hunters, which may increase ruffed grouse mortality; however with sustainable harvest as managed by Manitoba Conservation and Water Stewardship, and with few individual grouse expected to affected by increased predation, no substantial changes in the population are anticipated. With past and present projects, increased linear feature density and a reduction in core area size may have small, negative effect on the ruffed grouse population; however, as intactness and linear feature benchmarks are low overall (Section 7.2.3.4.1), and above the 65% value for the transition from small to moderate magnitude effects, the grouse population is most likely to remain viable.

Overall, residual effects on ruffed grouse in the Regional Study Area are not expected to be significant. There is some uncertainty in this assertion as historic terrestrial physical habitat loss for ruffed grouse has not been calculated, but it is understood that the cumulative total terrestrial habitat loss totals 16% of the Project Study Area (Section 7.2.3.1), The residual effects on ruffed grouse are still expected to be not significant because even with the Project, past and current habitat loss, alteration and fragmentation will remain low, The ruffed grouse is a common and a widespread species with a cyclic but stable population, and because it is regulated and managed on a regional and Provincial basis, and because it is regulated and managed on a regional and Provincial basis, and where there are Provincial parks and wilderness areas set aside in part, for the preservation of wildlife found in the Project area. It is highly likely to remain sustainable.

7.2.3.4.5 Canada Warbler

Construction

Potential Project effects on Canada warbler during construction include habitat loss and habitat alteration, which is a threat to Canada warbler populations (COSEWIC 2008c). Spring and summer clearing could result in direct nest and brood destruction, and have a substantial effect on the Canada warbler population. Habitat modeling indicates that 90.02 ha, or 32.38%, of the 278 ha Project Footprint consists of potential Canada warbler habitat (Appendix C Table C3-8). Based on these projections, 0.44% of the total Canada warbler habitat in the Project Study Area would be affected by the transmission line ROW (Map 7-7). Small habitat alterations may affect a few individual's territories but are not expected to have an effect on the regional Canada warbler population or on breeding and nesting habitat availability. As a small loss of habitat is expected, effects on the Canada warbler population will likely be small.

Project effects could also include sensory disturbance and disruption of movements. Currently, most of the Canada warbler population detected during field studies was limited mainly to the northern half of the Project Study Area (Appendix C Map C4-8). If clearing and construction occur in spring and early summer, sensory disturbance could affect breeding and nesting activities and temporarily reduce the amount of effective habitat in the Project Study Area, possibly resulting in reduced reproductive success or nest loss. The habitat effects are likely to extend into the Intactness Local Study Area, which is comprised of 30.55% Canada warbler habitat (Appendix C Table C3-8). Loss of total effective Canada warbler habitat in the Intactness Local Study Area compared to the Project Study Area is 14.80% for disturbances extending out one km from the ROW. No effects are anticipated for winter, as this species is migratory and will be absent. With mitigation, including the avoidance of clearing and construction during the breeding and nesting season, no Project effects are anticipated during construction.

Construction access trails to the transmission line ROW can contribute to habitat fragmentation effects (see operation). Management is required to minimize potential access-related effects. Marshalling yards and borrow areas may increase the amount of Canada warbler habitat lost and altered and it is recommended that marshalling yards occur on previously developed areas. The effects of habitat alteration will be minimized by using borrow materials from existing sources.

As described in Section 7.2.4.2, with mitigation, the risk of accidents and malfunctions, and the potential effects on Canada warbler are expected to be small.

Few direct sources of Canada warbler mortality are anticipated during construction. If clearing and construction occur in spring, nests could be damaged or destroyed. Collisions with vehicles are not reported as a source of mortality in the literature, but there is small risk for such accidents to occur. Limited increases in local traffic to and from the construction sites and low vehicle speeds on the ROW are expected to result in very few Canada warbler injuries or mortalities. With mitigation, no effects are anticipated.

Mitigation Measures

The following mitigation measures will be implemented during construction to minimize effects on Canada warbler:

- Clearing will occur during late fall and winter to the extent possible to avoid the spring/summer nesting season for birds;
- Existing access roads, trails, or cut lines will be used to the extent possible and access roads and trails will be kept as short and narrow as possible; and
- Clearing will not be permitted within established setbacks for bird nesting and brood rearing areas during established timing windows.

Residual Effects

No residual effects of construction are anticipated for Canada warbler primarily because this species is migratory and will be absent during fall and winter construction activities, and because the vegetation that provides potential future habitat is unlikely to be affected substantially by the Project.

Operations

Potential Project effects on Canada warbler during operation include habitat alteration, habitat fragmentation, and sensory disturbance. Although no direct loss of Canada warbler habitat is anticipated during operation, additional Canada warbler habitat indirectly affected at the edge of the ROW could extend into the Habitat Zone of Influence over time (see Section 7.2.3.1); compared to the Project Study Area, .1.36% of the total Canada warbler habitat may be affected. The Canada warbler is relatively resilient to some levels of human-caused disturbance (Cooper et al. 1997). But could be vulnerable to brown-headed cowbird brood parasitism, which is much greater in habitat edges associated with fragmentation than in interior forests (Chace et al. 2005; Tewksbury et al. 2006). New transmission lines could increase predation on species such as Canada warbler which use transmission line towers as perch sites to aid in locating prey. Nests located near edges are also more susceptible to small mammal predation (e.g., red squirrel). Because intactness and linear feature density is not expected to change substantially (see Section 5.4.3) as a result of the Project, the incremental effects of habitat alteration and fragmentation are expected to be small.

Annual inspections of the transmission line could disturb Canada warblers in the vicinity of the ROW, particularly during the spring nesting season. Such events will be brief and infrequent. Maintenance activities follow well-established guidelines and the effects of sensory disturbance on Canada warbler are expected to be small. No effects are anticipated for winter, as this species is migratory and will be absent from the Project Study Area. Intermittent sensory disturbance due to off-road vehicle use on the ROW is also possible. Although excessive noise can affect breeding bird communications (Brumm 2004; Habib et al. 2007; Goodwin et al. 2011), no additional effect is anticipated due to the intermittent and site-specific nature of maintenance-related noise occurring in the Habitat Zone of Influence.

Few sources of Project-related Canada warbler mortality are anticipated during operation. Collisions with transmission lines are not listed as a threat to Canada Warbler populations (COSEWIC 2008c). Vegetation management conducted in spring could result in damage or destruction of nests, reducing the population's nesting success. Although the loss of individual birds or eggs could have a negative effect on the population, these effects are expected to be small with appropriate mitigation measures in place.

Mitigation Measures

The following mitigation measures will be implemented during operation to minimize effects on Canada warbler:

- Maintenance should be carried out during the fall or winter where feasible to avoid the disturbance and potential destruction of nests and/or young.

Residual Effects

Residual operation effects on Canada warbler will include a relatively small amount of habitat alteration as vegetation along the ROW becomes re-established in areas where it was disturbed and maintenance of the ROW temporarily alters vegetation periodically over time. Newly created habitat edges and a marginal increase in habitat fragmentation may result in increased brood parasitism by brown-headed cowbirds and increased predation of a few individual Canada warbler; however, these effects are unlikely to be measureable at the population level. Brown-headed cowbird populations are unlikely to be present where forested core areas remain intact. The potential increased predation rate of any nests, young or adults along the new edge is not likely to be measureable given the large range of natural variation expected for passerine species such as these, which includes the Canada warbler.

The amount of habitat that is expected to be altered and fragmented following mitigation is small and the amount of new edge created and limited to portion of the ROW that does not follow the existing ROW. As a result, the effects on Canada warbler are anticipated to be small and reversible. The disturbance caused by ROW maintenance or vehicles travelling on the ROW will be temporary, infrequent, and only affect a few individuals within close proximity to the ROW, resulting in small effects. Overall, no significant effects on Canada warbler are anticipated. With past and present projects, increased linear feature density and a reduction in core area size may have small, negative effect on the Canada warbler population. As intactness and linear feature benchmarks are low overall (Section 7.2.3.1), and above the 65% value for the transition from small to moderate magnitude effects, the Canada warbler population in this area is likely to remain viable in this area, and may act as a source population for other Canada warbler populations in decline.

Overall, past and present project effects are thought to be moderate magnitude, but the residual effects on Canada warbler in the Regional Study Area are expected to be not significant. There is some uncertainty in this assertion as historic terrestrial physical habitat loss, including historic flooding of the Winnipeg River by the Seven Sisters and the Pointe du Bois Generating Stations, and the former decommissioned Pinawa Station that also likely affected riparian habitat for Canada warbler, have not been calculated. It is understood that the cumulative total terrestrial habitat loss totals 16% of the Project Study Area (Section 7.2.3.1). The residual effects on Canada warbler are still expected to be not significant because even with the Project, past and current habitat alteration is relatively low. The Canada warbler is an uncommon and a widespread species, but has a declining population. Currently, the Canada warbler population is listed as Threatened. Although it is regulated and managed on a regional, Provincial, Federal and internationally, unless substantive steps are taken to reverse its decline, the global population will continue to be threatened. In the Project area where there are Provincial parks and wilderness areas set aside in part, for the preservation of wildlife found in the Project area, and because this species is protected from harvest, the regional population is likely to remain sustainable.

7.2.3.4.6 Species of Conservation Concern

Species of conservation concern are listed by the COSEWIC, the federal SARA, and/or the provincial MESA. Those most likely to be found in the Project Study Area that could be affected by the Project include:

- mottled duskywing;
- monarch butterfly;
- northern leopard frog;
- common snapping turtle;
- trumpeter swan;
- yellow rail;
- least bittern;
- horned grebe;
- short-eared owl;
- common nighthawk;
- eastern whip-poor-will;
- olive-sided flycatcher;
- golden-winged warbler;
- rusty blackbird;
- bank swallow;
- eastern wood-pewee;
- little brown myotis; and
- northern myotis.

Amphibians and Reptiles of Conservation Concern

Construction

Amphibians and reptiles are commonly found in the Project Study Area. A relatively large amount of suitable habitat is present in the Project and Regional Study Areas due to the abundance of waterbodies, watercourses, wetlands and forested habitats. Northern leopard frog was detected frequently. Although it is thought to be widely distributed, it appeared to be found most often found in close proximity to large rivers (Appendix C Map C4-12).

Potential Project effects on northern leopard frog and common snapping turtle during construction include habitat loss and alteration, which are threats to these populations (COSEWIC 2009d; COSEWIC 2008b). Habitat modeling indicated that 2.15% and 1.70% of the habitat in the transmission line footprint is suitable as northern leopard frog primary and secondary habitat, respectively (Appendix C Table C3-8). Due to the relatively small amount of northern leopard frog habitat affected, in combination with mitigation measures, effects on these species are expected to be small.

A habitat model was not constructed for common snapping turtles as the Project is likely to have no effect on common snapping turtle habitat (i.e. large waterbodies) and the spatial overlap with potential nesting habitat along sand or gravel shorelines (COSEWIC 2008b) is avoided with tower placement requirements near large waterbodies and the use of riparian buffers. Construction noise may result in sensory disturbance of leopard frogs. Construction noise may

also reduce the reproductive ability of leopard frogs by interfering with mating calls in the spring (Legagne 2008; Bee and Swanson 2007). Due to the intermittent nature of the noise, the effects on leopard frogs are expected to be small.

Mortality of amphibians and reptiles could increase in the Project Study Area during construction due to increased vehicle traffic on PR 313, PR 211, and PR 520. Northern leopard frogs are particularly susceptible to road mortality during migration and dispersal (Linck 2000). Common snapping turtles are also potentially vulnerable to vehicle collisions. Limited increases in local traffic to and from the construction sites and low vehicle speeds on the ROW are expected to result in very few turtle injuries or mortalities. Late fall and winter construction are anticipated to minimize these potential effects on amphibians and reptiles.

As described in Section 7.2.2.2, with mitigation, the risk of accidents and malfunctions, and the potential effects on amphibians and reptiles of conservation concern are expected to be small.

Mitigation Measures

Operational Statements have been developed by DFO for all aspects of the construction and operation of transmission lines in riparian areas and for stream crossings. As described in Section 7.2.2, Manitoba Hydro will follow the DFO Operational Statements during construction of the line. Other mitigation measures that will protect amphibian and reptile habitat are described in Section 7.2.8. These mitigation methods used for the protection of riparian habitat will also protect northern leopard frog and common snapping turtle habitat.

Mitigation measures for amphibians and reptiles during construction include the following:

- Clearing will occur during late fall and winter to the extent possible; and
- Attempt to maintain wetland form and function during construction and operation.

Operations

No loss of northern leopard frog or common snapping turtle habitat is anticipated during operation. Potential Project effects include increased mortality, as transmission towers near waterbodies could provide perching and hunting opportunities for birds. Use of the transmission line ROW for hunting by predators such as raccoon and red fox could result in an incrementally small increase in northern leopard frog mortality or result in the predation of common snapping turtle eggs or young in the Project Study Area. As a large portion of the transmission line follows an existing ROW, where the project is predicted to directly and indirectly affect 9 ha, or less than 1%, of riparian habitat within the Project Study area, and potential fragmentation effects were minimized during routing, the effects on northern leopard frog and common snapping turtle are anticipated to be small.

The use of herbicides for vegetation maintenance along the ROW and at station sites may negatively affect leopard frogs if improperly applied. Herbicides entering ponds or wetlands can have an effect on tadpole development and survival (Berril et al. 1994; Howe et al. 2004) and

sexual development (Hayes et al. 2002). These effects could lead to low productivity of leopard frogs and declines in local populations. The effects on leopard frogs are anticipated to be small with appropriate herbicide application procedures as will be outlined in the Pesticide Application Requirements For Manitoba Hydro Employees And Contractors (Manitoba Hydro 2008).

Mitigation Measures

Operational Statements have been developed by DFO for all aspects of the construction and operation of transmission lines in riparian areas and for stream crossings. As described in Section 7.2.2, Manitoba Hydro will follow the DFO Operational Statement during construction of the line. Other mitigation measures that will protect amphibian and reptile habitat are described in Section 7.2.8. These mitigation methods used for the protection of riparian habitat will also protect northern leopard frog and common snapping turtle habitat.

Mitigation measures for amphibians and reptiles during operations include the following:

- Maintenance during late fall and winter to the extent feasible to avoid the breeding season.

Birds of Conservation Concern

Construction

Potential Project effects on bird species of conservation concern (trumpeter swan, yellow rail, least bittern, horned grebe, short- eared owl, common nighthawk, eastern whip-poor-will, olive-sided flycatcher, golden-winged warbler, rusty blackbird, bank swallow, barn swallow, eastern wood-pewee) include habitat loss, habitat alteration, and sensory disturbance. The distribution of species detected during field studies, including Canada warbler (see Section 7.2.3.4.5), common nighthawk, eastern whip-poor-will, golden-winged warbler, olive-sided flycatcher, trumpeter swan and yellow rail, is found in Appendix C Map C4-11. Due to the transmission line following a large portion of existing ROW and the relatively small amount of habitat lost and altered, construction is expected to have a small effect on populations and breeding and nesting habitat availability.

Habitat models were not constructed for the bank swallow species as no suitable habitat (i.e. steep mud cliffs, gravel pits) could be identified in the Local Study Area where the Final Preferred Route is located. Accordingly, construction and operation effects on the bank swallow are not expected.

A small amount of habitat for the golden-winged warbler and olive-sided flycatcher, and other edge tolerant species may be created by the ROW. Habitat modeling indicated that 26.15% and 70.28% of the habitat in the Project Footprint is suitable for the olive-sided flycatcher and golden-winged warbler, respectively. When compared to the Project Study Area, 0.33% and 0.43% of olive-sided flycatcher and golden-winged warbler habitat is anticipated to be affected (Appendix C Table C3-8). Where the transmission line crosses sparsely treed or open habitat including low vegetation, emergent marshes, beaver floods, and agricultural areas, only a small amount of habitat at the tower footprints would likely be lost or altered, and therefore, a small

effect on the local habitat or population is anticipated. However, for some species, anthropogenic disturbances such as forest clearing can mimic more suitable natural habitat, attracting nesting birds and reducing nest success (Robertson and Hutto 2007). Anthropogenic activities that create edge areas have been identified as potential "ecological traps" where predation by squirrels and corvids causes increased mortality (Altman and Sallabanks 2000; COSEWIC 2007d).

A small amount of habitat for the short-eared owl and common nighthawk may be created by the clearing of the ROW. The creation of open areas grassland, low vegetation, and young regeneration may create foraging and nesting habitat for these species (Holt and Leasure 1993; Pulin et al. 1996). Due to the relatively small amount of habitat affected by the Project (Appendix C Table C3-8) the effect on these species is expected to be small and positive because of open habitat created by the ROW. The loss of habitat for these species is primarily expected based on the placement of transmission line towers. Unaltered habitat beneath transmission lines, where no clearing is required and no permanent structure has been constructed, is likely to maintain much of its viability as potential habitat for bird species that used these areas previously. As a result, the values in Appendix C Table C3-8 for short-eared owl and common nighthawk likely overestimate the amount of habitat that will be lost or altered as values were calculated for the Project Footprint as a whole.

Effects of construction on the bank swallow are not expected as no known suitable habitat is known to exist in the Project footprint.

A small amount of forest habitat for the eastern wood-pewee and eastern whip-poor-will may be lost or altered by the Project. Within the Project Footprint, 39.52% of the habitat is suitable for both the eastern wood-pewee and eastern whip-poor-will. When suitable habitat in the Project Footprint is compared to the Project Study Area, 0.36% of the habitat in this study area may be affected (Appendix C Table C3-8). As a large portion of the transmission line follows existing ROW, the effects of habitat fragmentation on eastern wood-pewee and eastern whip-poor-will are expected to be small. Intactness and linear feature density is not expected to change substantially (see Section 5.4.3) as a result of the Project. As a result, the incremental effects of habitat alteration and fragmentation are expected to be small for the Project.

Project effects on birds of conservation concern could also include sensory disturbance and disruption of movements. If clearing and construction occur in spring and early summer, sensory disturbance could affect breeding and nesting activities and temporarily reduce the amount of effective habitat in the Project Study Area, possibly resulting in reduced reproductive success. Limited effects are anticipated for winter, as these species are migratory and absent in winter. Effects of sensory disturbance will be temporary and limited to the local populations. Seasonal and daily movements could be affected as individuals will likely avoid the construction zone. Effects of altered movements will be local and limited to the construction period, and are expected to be small.

Few direct sources of mortality for birds of conservation concern are anticipated during construction. If clearing and construction occur in spring or summer, nests are likely to be

damaged or destroyed and brood-rearing activities may be disturbed. Any clearing that occurs during this time should only be pursued following established mitigation protocols.

Collisions with vehicles are a source of mortality for least bittern (COSEWIC 2009b), short-eared owl (COSEWIC 2008a), and common nighthawk (COSEWIC 2007c). Limited increases in local traffic to and from the construction sites and low vehicle speeds on the ROW are expected to result in very few injuries or mortalities to species of conservation concern. Since all sources of mortality are important to species at risk as they can affect local and regional populations, mitigation measures are required to minimize these potential effects. With mitigation, including the avoidance of the breeding and nesting season during winter construction, no Project effects are anticipated during construction.

As described in Section 7.2.4.2, with mitigation, the risk of accidents and malfunctions, and the potential effects on bird species of conservation concern are expected to be small.

Mitigation Measures

Mitigation measures for bird species of conservation concern during construction include the following:

- Clearing will occur during late fall and winter to the extent possible to avoid the spring/summer nesting season for birds; and
- Clearing will not be permitted within established setbacks for bird nesting and brood rearing during established timing windows; and
- Attempt to maintain wetland form and function during construction and operation.

Operations

Potential Project effects on bird species of conservation concern include habitat alteration and fragmentation. No habitat loss is anticipated during operation. Vegetation management will periodically alter habitat on the ROW. Intactness and linear feature density is not expected to change substantially (see Section 5.4.3) as a result of the Project. As a result, the incremental effects of habitat alteration and fragmentation are expected to be small for the Project.

Species such as the golden-winged warbler and olive-sided flycatcher that nest and forage along edges may be affected by vegetation management along the ROW. Removal of standing dead, or danger trees may reduce the suitability of habitat along the ROW for the olive-sided flycatcher, but the maintenance of edges may improve habitat overall which this species requires in order to maintain its life requisites. Golden-winged warblers are often found in areas of human disturbance such as clearcuts or abandoned farmland (Hunter et al. 2001), and rely on disturbance for habitat (Askins 1994). As a result, golden-winged warblers will likely benefit from the openings created by clearing, and from ROW maintenance over the long-term. Other listed species including common nighthawk and eastern whip-poor-are also likely to benefit from the creation of these openings.

Common nighthawks and short-eared owls may also be affected by vegetation maintenance along the ROW. If maintenance occurs during the nesting season, there is a possibility that the nests of these species may be destroyed. The creation of openings along the ROW as a result of vegetation maintenance will likely provide foraging and nesting habitat for these species. With mitigation, these effects should be positive but likely small.

Project effects could also include sensory disturbance and disruption of movements. Annual inspections of the transmission line could disturb individuals in the vicinity of the ROW. Such events will be brief and infrequent. Maintenance activities follow well-established guidelines and the effects of sensory disturbance are expected to be small. Intermittent sensory disturbance due to off-road vehicle use on the ROW is also possible. Although excessive noise can affect breeding bird communications (Brumm 2004; Habib et al. 2007; Goodwin et al. 2011), no additional effect is anticipated because of the intermittent nature of the noise. No effects are anticipated for winter, as these species are migratory and will be absent from the Project Study Area.

Few sources of mortality on bird species of conservation concern are anticipated during operation. Collisions with towers, power lines, ground wires, and guy wires are possible. Species such as the yellow rail (Goldade et al. 2002; COSEWIC 2009a), least bittern (COSEWIC 2009b), and short-eared owl (COSEWIC 2008a), which are not agile flyers, may be more susceptible to wire collisions than other species. Of these species however, short-eared owls are known to perch on transmission line towers. The risk of collision for these species may be higher near Rice Lake, where the transmission line nears the large wetland, where these species may or are known to occur. Although the loss of individual birds could have a negative effect on local populations, the effect is considered small.

Mitigation Measures

Mitigation measures for bird species of conservation concern during operations include the following:

- Maintenance should be carried out during the fall or winter where feasible to avoid the disturbance and potential destruction of nests and/or young; and
- Bird diverters will be installed in high bird traffic areas for bird species of conservation concern at Rice Lake.

Mammals of Conservation Concern

Construction

Mammal species of conservation concern (little brown myotis, northern myotis) use a wide variety of habitat types for foraging and roosting (Fenton and Barclay 1980; Caceres and Barclay 2000; Wund 2006). Due to the large variety of habitat types used and the absence of hibernacula in the Project Study Area, habitat models were not created for the little brown myotis or northern myotis.

Potential Project effects on the little brown myotis and northern myotis include habitat loss, habitat alteration, and sensory disturbance. Habitat alterations and losses, particularly to wetland habitat may have a small negative effect on these species, while clearing for the new ROW may also provide these species with an increase in foraging habitat, which may have a small, positive effect on individuals (Grindal and Brigham 1998). A small loss of potential roosting sites or maternity roosts may occur due to ROW clearing. Due to the transmission line following a large portion of an existing ROW, the relatively small amount of habitat altered, and the potential for alternate roosting trees in the Project Study Area, the effects on bat habitat will likely be small.

The little brown myotis and northern myotis feed almost exclusively on insects (Fenton and Barclay 1980; Caceres and Barclay 2000). If insects such as moths are attracted to lights, it is possible that the future lighting conditions at either station will create suitable foraging habitat for bats.

As described in Section 7.2.4.2, with mitigation, the risk of accidents and malfunctions, and the potential effects on mammal species of conservation concern are expected to be small.

No known bat hibernacula are present in the Project Study Area and as a result, sensory disturbances near these features are not anticipated. Although most bats are anticipated to migrate out of the Project Study Area during construction, spatial and temporal overlap is possible for roosting sites or maternity roosts near the ROW during clearing. Due to the wide variety of roosting sites used by both the little brown myotis and northern myotis (Fenton and Barclay 1980; Caceres and Barclay 2000), if disturbance of roosts occurs as a result of construction, bats will likely locate and use new roosts as they are likely to be relatively abundant in the Project Study Area (Lewis 1995).

Mitigation Measures

Mitigation measures for mammal species of conservation concern include the following:

- Clearing will occur during winter to the extent feasible to avoid the spring/summer/fall reproductive season;
- Existing access roads, trails, or cut lines will be used to the extent possible and access roads and trails will be kept as short and narrow as possible;
- Maintain a 200 m buffer around bat hibernacula year-round to protect from disturbance (Manitoba Conservation 2010); and
- Attempt to maintain wetland form and function during construction and operations.

Operations

No additional habitat loss is anticipated during operation. The ROW could contribute to habitat fragmentation in the Project Study Area. Intactness and linear feature density is not expected to change substantially (see Section 5.4.3) as a result of the Project. As a result, the incremental effects of habitat alteration and fragmentation are expected to be negligible to small for the

Project. Because bats also prefer openings in the forest for feeding, these types of effects for listed bat species are not expected.

Due to the wide variety of roosting sites used by both the little brown myotis and northern myotis (Fenton and Barclay 1980; Caceres and Barclay 2000), if disturbance of roosts occurs as a result of maintenance activities , bats will likely locate and use new roosts as they will be relatively abundant in the Project Study Area (Lewis 1995).

Mitigation Measures

Mitigation measures for mammal species of conservation concern during operations include the following:

- Maintain a 200 m buffer around bat hibernacula year-round to protect from disturbance (Manitoba Conservation 2010).

7.2.3.4.7 Other Wildlife

Insects

Potential effects on insects will mainly be due to habitat loss and alteration. The removal of existing vegetation along the ROW during construction and vegetation management during operation will change the plant community and microsite characteristics, potentially resulting in a small reduction in the abundance and diversity of insects. Due to the large variety of insects in the Project Study Area, the large variety of available habitats used by these species, the large populations expected (with the exception of rare and listed species), and the relatively small amount of habitat affected by the Project, effects on insect populations are expected to be small.

Amphibians and Reptiles

During construction, some amphibian and reptile habitat will be altered due to clearing for the new transmission line. In summer, mortality could result from increased traffic in areas where frogs, snakes, and turtles cross roads.

Although there is a small potential for red-sided garter snake hibernacula to occur, Project effects are not anticipated because hibernacula are unlikely to occur in the Project footprint. Mitigation would be required if red-sided garter snake hibernacula are found. No additional habitat loss is expected during operation.

No amphibian and reptile habitat loss or alteration is expected to occur at either the Whiteshell or Pointe du Bois stations.

The use of herbicides for vegetation maintenance along the ROW and at station sites may negatively affect some frog species, including northern leopard frog if improperly applied.

Herbicides entering ponds or wetlands can have an effect on tadpole development and survival (Berril et al. 1994; Howe et al. 2004) and sexual development (Hayes et al. 2002). These effects could lead to low productivity of frogs and declines in local populations. The effects on frogs are anticipated to be small with appropriate herbicide application procedures outlined in the Pesticide Application Requirements For Manitoba Hydro Employees And Contractors (Manitoba Hydro 2008).

Mitigation Measures

Mitigation measures for amphibians and reptiles during construction and operations include the following:

- Construction activities will not be carried out within established buffer zones and setback distances for wildlife species, including a 200 m year-round buffer around garter snake hibernacula; and
- Maintenance during late fall and winter to the extent feasible to avoid the breeding season.

Birds

During construction, some bird habitat will be altered due to clearing for the new transmission line. Because clearing and construction on the transmission line will occur in winter, nesting birds will not be affected. No effects on migratory species are anticipated in winter, as they will not be in the Project Study Area. Birds are expected to find suitable habitat throughout the Project Study Area when they return.

Some disruption of year-round resident species, such as the great gray owl (*Strix nebulosa*), may occur during winter clearing activities. Important great gray owl habitat at Whitemouth Falls Provincial Park was avoided during site selection. Suitable nesting sites may limit great gray owl populations and the loss of nesting sites may have negative effects on populations as great gray owls do not build their own nests and rely on abandoned nests of other species (Bull and Duncan 1993; Duncan 1997). For some species, forest fragmentation can have an adverse effect on their abundance and distribution. Some raptor species may benefit from the creation of edge associated with clearing along the ROW. 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).

Annual inspections of the transmission line could periodically disturb birds in the vicinity of the ROW, particularly during the spring nesting season. Intermittent sensory disturbance due to off-road vehicle and snowmobile and snowmobile use on the ROW is possible; however, no effects of sensory disturbance are anticipated for migratory species in winter. Disruption of bird movements is generally not expected, as some species are associated with open habitats and some are long-distance migrants who would be expected to encounter a range of conditions along their migration routes. However, some forest interior bird species may not use habitat or

incorporate territories that are fragmented by the 60 m ROW (Schimiegelow et al. 1997). Some mortality due to bird-wire collisions is anticipated, particularly for larger species such as waterfowl, colonial or semi-colonial waterbirds and upland game birds, such as sharp-tailed grouse. The presence of ground wires and guy wires may increase the risk of collisions. Field observations of these types of species such as American bittern, American white-pelican, black tern, Canada goose, common loon, Franklin's gull, great blue heron, mallard, pied-billed grebe, sandhill crane, sora and Virginia rail are shown in Appendix C Map C4-9. While individual birds may collide with wires, otherwise healthy populations are not expected to be affected by such incidents should they occur.

Mitigation Measures

Mitigation measures for birds during construction and operations include the following:

- Trees containing large stick nests will be left undisturbed until unoccupied. Artificial structures for nesting may be provided if unoccupied nests must be removed; and
- Maintenance should be carried out during the fall or winter where feasible to avoid the disturbance and potential destruction of nests and/or young.

Mammals

During construction, some forested mammal habitat will be altered due to clearing for the transmission line. As described for mammal VECs, other mammal species are expected to find suitable habitat elsewhere in the Project Study Area. Sensory disturbance from construction activity could result in a temporary loss of effective habitat and disruption of movement, as individuals will likely avoid the construction zone. Some small mammal mortality could occur during clearing of the ROW.

If black bear dens occur in the construction zone, they may be disturbed during winter clearing and construction. As other mammal species' populations are generally common, widespread and secure, with mitigation, these effects will likely be small. No additional habitat loss is expected during operation, but some habitat fragmentation is anticipated. As vegetation regenerates on the ROW, new habitats will be created and used by species including small mammals, furbearers, ungulates and large carnivores. A slightly altered mammal community will likely develop on the ROW and near its edges due to the change in forest cover at those locations where it is removed.

Limited new access to the area will likely be created by the ROW and access trails, but trapping pressure is not expected to increase substantially due to the routing of the proposed transmission line. The ROW and access trails could facilitate movement and increase hunting efficiency for gray wolves and humans. White-tailed deer are expected to browse on regenerating vegetation on the ROW, but may experience increased predation by predators moving along the linear corridor. Management of deer and gray wolf populations in the region are being conducted to help re-establish the moose population. These management actions are

anticipated to depress local deer and wolf populations. Overall, the effects on gray wolves and white-tailed deer in the Project Study Area are expected to be small as linear feature density within the Project Study Area remains relatively low and core areas will remain relatively intact.

Mitigation Measures

Mitigation measures for other mammals during construction and operations include the following:

- Construction activities will not be carried out within established buffer zones and setback distances for wildlife species, including a 50 m buffer around occupied black bear dens;
- Wildlife will not be fed, befriended, or harassed at construction areas;
- If required, temporary construction camps will be kept clean, food will be kept in sealed storage areas, and kitchen wastes will be stored in bear-proof containers in northern and rural areas;
- Problem wildlife will be reported immediately to Manitoba Conservation and Water Stewardship; and
- Rehabilitated access roads and trails will be inspected to assess the success of re-vegetation and to determine if additional rehabilitation is required.

Sensitive Sites for Wildlife

Rice Lake

This small, shallow lake and the surrounding riparian area provides habitat to a wide-variety of wildlife species within the Project Study Area. It provides breeding habitat for numerous species of waterfowl, including two species of special concern: the yellow rail, which was detected during field studies, and the trumpeter swan, which was also observed with young during a 2013 field survey, and identified in the Manitoba Breeding Bird Atlas data as breeding in this vicinity. The relatively close proximity of the transmission line to this lake may increase the risk of bird-wire collisions and result in the mortality or altered movement of waterfowl in the area. Rice Lake likely also provides important habitat for all wildlife that use wetland or shallow lake habitat for reproduction and/or staging.

Mitigation Measures

Mitigation measures for the Rice Lake area during construction and operations include the following:

- Installing bird deflectors on ground wires to reduce the risk of bird-wire collisions;

- Project activities will avoid wetland areas to the extent possible. If avoidance is not practical, the extent of disturbance will be minimized. Disturbance of wetlands will only be carried out under frozen ground conditions;
- Natural vegetated buffer areas around wetlands and riparian zones will be maintained to the extent possible;
- Maintenance should be carried out during the fall or winter where feasible to avoid the disturbance and potential destruction of nests and/or young; and
- Clearing will not be permitted within established setbacks for bird nesting and brood rearing areas during established timing windows.

Pinawa Channel

This river environment provides movement corridor habitat for numerous species of waterfowl, waterbirds, and to bald eagles. The crossing of the transmission line over this river may increase the risk of bird-wire collisions and result in the mortality or altered movement of bird species in the area.

Mitigation Measures

Mitigation measures during operation include the following:

- Installing bird deflectors on ground wires across the Pinawa Channel to reduce the risk of bird-wire collisions.

Winnipeg River and Whitemouth River

These river environments provide movement corridor habitat for numerous species of waterfowl, waterbirds, terns and gulls, and to bald eagles. The crossing of the transmission line over these rivers will likely increase the risk of bird-wire collisions and result in the mortality or altered movement of bird species in the area.

Mitigation Measures

Mitigation measures during operation include the following:

- Installing bird deflectors on ground wires across the Winnipeg and Whitemouth Rivers to reduce the risk of bird-wire collisions.

Mineral Lick

One mineral lick was found during field studies, and others may be present. Due to the importance of mineral licks to moose and other ungulates for nutrition and antler growth, mitigation will require set-back distances to minimize Project effects.

Mitigation Measures

To protect this site and potentially others that may be found, mitigation measures during construction and operation include the following:

- Establishing a non-frozen ground and/or winter vegetated buffer distance where shrub and herbaceous vegetation are retained of 120 m.

Access

A total of 21 existing roads, trails and cutlines intersect with PW75 FPR between Seven Sisters and the P1-P4 intersection. Improved access to local wildlife populations could potentially increase at 15 of these locations (Table 7-4). Improved line of site is associated with three roads.

Table 7-4: Improved Access Intersections and Estimated Risk Ranking Relative to Potential Harvest of Local Wildlife Populations

Name	Location (UTM)	Rationale	Risk Ranking
Trail	15U 295701 5568826	PW75 FPR intersects with cutline	Low
Trail	15U 291516 5564713	PW75 FPR intersects with trail	Low
Trail	15U 291315 5564618	PW75 FPR intersects with trail	Low
Trail	15U 288745 5561272	PW75 FPR intersects with trail	Low
Trail	15U 288502 5560785	PW75 FPR intersects with trail	Low
Trail	15U 288014 5559806	PW75 FPR intersects with trail	Low
Highway 211	15U 287608 5559003	PW75 FPR intersects with highway. Improved line of site.	Moderate
Highway 520	15U 290231 5564050	PW75 FPR intersects with highway. Improved line of site.	Moderate
Cemetery Trail	15U 289343 5562497	PW75 FPR intersects with highway. Improved line of site.	Moderate
King's Trail	15U 292643 5565326	PW75 FPR intersects with trail	Moderate
Trail	15U 296399 5569535	PW75 FPR intersects with trail	Low
Trail	15U 287155 5558302	PW75 FPR intersects with trail	Low
Pinawa Trail (Trans Canada Trail)	15U 290422 5564156	PW75 FPR intersects with trail	Low
Trail	15U 294171 5566129	PW75 FPR intersects with trail	Low
Trail	15U 288296 5560378	PW75 FPR intersects with trail	Low

Mitigation

To minimize access and improved harvest of wildlife which can affect local populations, mitigation measures during construction and operation include the following:

- Existing access roads, trails, or cut lines will be used to the extent possible and access roads and trails will be kept as short and narrow as possible;
- Access trails created for Project construction that are not required for operation will be decommissioned to minimize access-related effects;
- Disturbance of areas adjacent to the ROW will be avoided to the extent practicable;
- Rehabilitated access roads and trails will be inspected to assess the success of re-vegetation and to determine if additional rehabilitation is required; and
- At those points where the transmission line ROW crosses roads or trails, vegetation will be managed within safe operating limits to screen the line of sight along the transmission line ROW.

Goose Ponds

This breeding environment provided movement corridor habitat for numerous species of waterfowl. The crossing of the transmission line near this site may increase the risk of bird-wire collisions and result in the mortality or altered movement of bird species in the area.

Mitigation

Mitigation measures during operations include the following:

- Installing bird deflectors on ground wires near ponds to reduce the risk of bird-wire collisions.

7.2.3.5 Summary of Residual Effects

Table 7-5 provides a summary of the expected residual effects and the assessment characteristics of PW75 on wildlife VECs. Residual effects include habitat loss and alternation, sensory disturbance and disruption of movement and increased mortality for moose, American marten, ruffed grouse, and Canada warbler. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), for most species, the residual effects on wildlife are considered to be small in magnitude, local in geographic extent, and short to long-term in duration. The residual effects of the Project are considered to be not significant for wildlife VECs.

Table 7-5: Residual Effects of PW75 on Wildlife

VEC	Phase	Residual effect	Assessment characteristics
Moose	Construction	Decreased local abundance due to avoidance of construction zones	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short Term Frequency – Regular/continuous Reversibility – Reversible **Overall – Not Significant**
	Operation	Slight alteration in terrestrial habitat. Small increase to linear feature density and decrease in core areas resulting in decreased local abundance due to increased mortality from hunting, predation, and transmission of diseases.	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – medium-term Frequency – Sporadic/periodic Reversibility – Reversible **Overall – Not Significant**
American Marten	Construction	Decreased local abundance due to avoidance of construction zones	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short Term Frequency – Regular/continuous Reversibility – Reversible **Overall – Not Significant**
	Operation	Slight alteration of terrestrial habitat. Small increase to linear feature density and decrease in core areas resulting in reduced movements of individuals in home ranges. Slight reduction in local abundance due to increased mortality from trapping.	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – medium-term Frequency – Sporadic/periodic Reversibility – Reversible **Overall – Not Significant**
Bald Eagle	Construction	No effect with winter clearing and fall or winter construction.	N/A
	Operation	Slight alteration in terrestrial habitat. Slight increase in local abundance due to increased perching and nesting opportunities. Slight reduction in local abundance due to increased mortality from	Direction – Positive to Negative Magnitude – Nil to Small Geographic Extent – Local Study Area Duration – Medium Term Frequency – Sporadic/periodic Reversibility – Reversible

Table 7-5: Residual Effects of PW75 on Wildlife

VEC	Phase	Residual effect	Assessment characteristics
		wire collisions	**Overall – Not Significant**
Ruffed Grouse	Construction	Decreased local abundance due to avoidance of construction zones	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short Term Frequency – Regular/continuous Reversibility – Reversible **Overall – Not Significant**
	Operation	Slight alteration of terrestrial habitat. Small increase to linear feature density and decrease in core areas resulting in decreased local abundance due to increased mortality from hunting, predation and collisions.	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – medium-term Frequency – Sporadic/periodic Reversibility – Reversible **Overall – Not Significant**
Canada Warbler	Construction	No effect with winter clearing and fall or winter construction.	N/A
	Operation	Slight alteration of terrestrial habitat. Small increase to linear feature density and decrease in core areas resulting in decreased local abundance due to slightly reduced recruitment from brood parasitism and increased mortality from predators.	Direction – Negative Magnitude – Moderate Geographic Extent – Local Study Area Duration – Long-term Frequency – Sporadic/periodic Reversibility – Reversible **Overall – Not Significant**

7.2.3.6 Follow-up and Monitoring

Standard inspection and effects monitoring are recommended for amphibians and reptiles to ensure that wetland mitigation measures are followed, including the retention of riparian buffers and maintenance of wetland form and function.

A pre-construction survey will be conducted to identify large stick nests for birds of prey and colonial waterbirds. Standard inspection and effects monitoring will be completed if nests are found on or within 200 m of the ROW. Follow-up monitoring will be conducted to ensure that mitigation measures are adhered to, such as the retention of buffers, the use of bird diverters, and the application of timing restrictions.

Recommended follow-up during the initial years of operation includes monitoring of species at risk populations with an assessment of bird-wire collisions. Monitoring for bird wire strikes during

the operation of the transmission line will occur to help verify the predicted effects of mortality for all bird VECs during Project operations and allow for the identification of any unknown areas with high potential for bird wire collision. In particular, yellow rail and least bittern follow-up will be conducted to verify the presence or absence of populations in suitable habitats along the ROW. Because these listed waterbird species are more susceptible to mortality associated with wire collisions, follow-up will include the installation of bird diverters if birds are found in ROW habitats not identified previously. Monitoring the effectiveness of bird diverters will then be conducted at these sensitive sites.

7.2.4 Socio-Economic Environment

The assessment of socio-economic effects cover a range of potential effects including those related to land use, economy, services, resource use, and personal, family and community life. Through the site selection process (see Chapter 4), highly sensitive land uses such as communities, residences, cottage developments, recreational sites, and associated effects were avoided.

Effects of the proposed Project on the socio-economic environment will vary with the stage of development of the Project. Based on existing information and the PEP, the Project is not expected to create significant effects on the socio-economic environment. During the preconstruction phase, activities such as acquisition of easements for the new ROW, route surveys, and engineering design are anticipated to have negligible effects on the socio-economic environment. Effects related to the construction and operations of the proposed PW75 line are outlined below. The rationale for the VECs is outlined in Chapter 3.

7.2.4.1 Land Use

The VECs selected to assess the effects of the Project on Land Use are as follows:

- Property and Residential Development;
- First Nation Lands (Reserve, TLE, fee simple lands, private purchase [TLE or FN]);
- Protected Areas Initiative Lands (Ecological Reserves, Provincial Park, ASIs, WMAs, Provincial Forest Reserves); and
- Infrastructure (aerodromes, communications facilities, railway lines, pipelines, roads, drains, culverts).

Property and Residential Development

Construction and operations can potentially affect property and residential development. Issues and concerns typically relate to the proximity of the Project to residences, shelterbelts, damage to property, decreases in property values, and the physical presence of the line. Nuisance effects and aesthetics are addressed in Personal, Family and Community Life (Section 7.2.4.2).

Construction

The Pointe du Bois Station is located in the townsite of Pointe du Bois. The townsite and the residences in the townsite are owned by Manitoba Hydro. Manitoba Hydro is in the process of decommissioning the townsite including the residences. From the Pointe du Bois Station through the townsite, PW75 will use the existing P1 to P4 Manitoba Hydro ROW although it needs to be widened by 15 m on each side to accommodate the new line.

To the north of Whiteshell Station, immediately south of the Whitemouth River, there is a residence adjacent to an existing transmission ROW which contains 3-115 kV double circuit transmission lines (Seven Sisters to Whiteshell SW2/SW3 lines; Seven Sisters to Transcona ST5/ST6 lines; Seven Sisters to Whiteshell SW1/SW4 lines). Through this area, PW75 will be located on the opposite side of the ROW to the residence, and an existing shelterbelt blocks the view of the ROW from the residence. North of the residence and the Whitemouth River, PW75 crosses to the west side of the ROW.

The FPR crosses along existing Manitoba Hydro ROWs or Provincial Crown Lands for the majority of its length. Between the Whiteshell Station and the Whitemouth River, additional ROW will need to be acquired for PW75. A portion of one private property, to the northeast of the station, will need to be acquired through easement to accommodate the new line. The length of ROW required is approximately 307 m. Thirty m of additional ROW will need to be acquired from the landowner. Through this area, PW75 will share a ROW with three double circuit 115 kV transmission lines. No other private properties will be directly affected by the line.

A compensation policy is in place for the property owner that will be directly affected by the PW75 line. As part of this policy, compensation will be provided to the property owner for the additional ROW. A one-time payment will also made to offset the nuisance effects of structures. In addition, in the event of any damage to property as a result of construction of the line, the damage will be rectified or compensation paid to the property owner. The routing process (Chapter 4) avoided the majority of private property.

Mitigation Measures

- The property owner of the one private property that needs to be acquired will be provided with compensation as per Manitoba Hydro's Property Compensation Policy.
- Construction will take place during the winter months which will minimize the potential to damage soil (e.g., through compaction). If physical damages occur as a result of construction, the Compensation Policy will ensure that damage is rectified or compensation paid to the landowner.

Operations

Potential effects during operation include damage to private property and decreases in property values. Manitoba Hydro monitors property values in the vicinity of its projects. It is Manitoba Hydro's position that the presence of transmission lines does not significantly affect residential property values.

Mitigation Measures

- If operations activities result in physical damage to private property, the damage will be rectified or compensation paid to the property owner.

First Nation Lands

Construction and operations have the potential to affect First Nation lands or the ability of a First Nation to obtain new Reserve Lands.

Construction and Operations

There are no interactions with designated or registered First Nation lands along the FPR. This includes First Nation Reserves, Crown or private purchase lands acquired through Treaty Land Entitlement (TLE) or Crown lands under Fee Simple lease or any other encumbrance registered with the Provincial Crown Land Registry. No effects are anticipated from construction of the transmission line. The physical presence of the line is expected to have only a minimal impact on future development potential.

Mitigation Measures

No mitigation measures are required.

Protected Areas Initiative Lands

Construction

Construction of PW75 could potentially affect Protected Areas Initiative Lands through intrusion into these lands, loss of lands to be protected in the future, or loss of integrity and enduring features. The FPR for the PW75 line crosses through the Whiteshell Provincial Park along the ROW for the P1 to P4 66 kV sub-transmission lines which are being decommissioned. The existing ROW needs to be widened by 15 m on either side. Through this area, the parks Land Use Classification (LUC) is “Resource Use”.

There are five other protected areas that are within 1.6 km of the FPR but are not crossed by the route. These are as follows:

- Pinawa Dam Provincial Park southeast boundary area east of PR 520;
- Whiteshell Provincial Park west boundary area north of PR 211 and west of PR 520;
- Pinawa Provincial Park east of Winnipeg River and south of PR 211;
- Whitemouth Falls Provincial Park north parcel along southeast boundary; and
- Whitemouth Falls Provincial Park south parcel east of Seven Sisters GS.

North of the Whitemouth River, the FPR is adjacent to the southeast boundary of the Whitemouth Falls Provincial Park. Through this area, the park’s LUC is “Recreational Development”. PW75 will be located on existing ROW in this area but the ROW needs to be

widened by 30 m along the park's boundary. Manitoba Hydro has obtained permission from MCWS and Natural Areas Branch to widen the ROW in this area to accommodate the new line.

Mitigation Measures

- Parks and protected areas were used as a criteria in the routing process. Routing through these areas was minimized.
- With the exception of the ROW for PW75 through the Whiteshell Provincial Park and the southeast boundary of the Whitemouth Falls Provincial Park, construction activities will not occur in the designated protected areas.
- Along the existing ROW in the Whiteshell Provincial Park and the Whitemouth Falls Provincial Park, construction activities will be confined to the existing ROW to the extent possible.
- Construction activities will occur in the winter under frozen ground conditions to minimize potential effects.
- Removal and disposal of timber will be in accordance with Work Permits.

Operations

Minor effect on future development potential due presence of the transmission line.

Mitigation Measures

- Parks and protected areas were used as a criteria in the routing process. Routing through these areas was minimized.
- With the exception of the ROW in the Whiteshell Provincial Park and Whitemouth Falls Provincial Park, operations activities will not occur in designated protected areas.
- Along the ROW in the Whiteshell Provincial Park and the Whitemouth Falls Provincial Park, operations will be confined to the ROW to the extent possible.

Infrastructure

Concerns relating to infrastructure is dependent on the type of infrastructure the Project will cross (e.g., roads, railways) and typically relate to disruption, damage and interference. Construction and, to a less extent operations, can cause disruption or damage to infrastructure. Traffic related concerns are addressed in Section 7.2.4.3.

Construction

The FPR for PW75 crosses PR 520 and PR 211. The FPR does not cross any railway lines or pipelines, and is not located in proximity to any airports. There are communications towers

located in the vicinity of the FPR at Pointe du Bois and Seven Sisters. The FPR also crossed Brookfield Road, to the east of the Whiteshell Station, as well as Two Rivers Drive which runs from the community of Seven Sisters to the Winnipeg River. The FPR also crosses a road to the north of Natalie Lake, as well as an access road to a garbage dump to the west of the FPR, to the north of the Winnipeg River. Roads in the Pointe du Bois townsite are also crossed by the FPR although, as noted above, through this area, the FPR is located on existing Manitoba Hydro ROW, and the townsite is being decommissioned. Overall, no adverse effects are anticipated on infrastructure and facilities as a result of the transmission line and station. If issues arise with respect to impacts on infrastructure and facilities from the project, they are subject to application and adherence to established design protocols and procedures and will be mitigated to address any associated potential effects. For example, necessary clearances over transmission lines, roadways, waterways, and rail will meet or exceed the minimum values outlined in the CSA c22.3 No. 1-10 - "Overhead Systems" standard.

Mitigation Measures

Reviews of potential effects and appropriate mitigation measures are subject to standard Manitoba Hydro protocols for contact and engagement with responsible authorities and companies (e.g., MIT, RMs). Applicable design specifications associated with infrastructure crossings will be respected and appropriate mitigation measures applied as required. Measures to mitigate the effects of the Project during construction include:

- Agencies responsible for infrastructure crossed by the transmission line will be consulted regarding the construction schedule. Confirmation of any permits/approvals or design measures for construction will be made during the detailed design phase;
- The Construction EnvPP will identify crossings of infrastructure and mitigation measures;
- Movements of equipment and materials will be subject to regulations regarding load restrictions and transport of dangerous goods; and
- Winter construction will minimize potential damage to roads.

Operations

Manitoba Hydro conducts inspections of transmission lines annually once they are operational. The annual patrol is conducted either by ground or by air. Non-scheduled patrols, by ground or by air, may be conducted should unexpected repairs to the line be required. Agencies responsible for infrastructure crossed by the transmission line (e.g., MIT) will be notified with respect to operations and maintenance schedules for the transmission line to minimize disruption to operations; and the locations of infrastructure crossed by the line will be identified in a Project specific operations and maintenance Environmental Protection Plan. Effects on infrastructure during operations are expected to be minor.

Mitigation Measures

- Agencies responsible for infrastructure crossed by the line (e.g., MIT, RMs) will be notified regarding operations schedules to minimize disruption to operations; and
- The location of infrastructure crossed by PW75 will be identified in the Project Operations EnvPP.

Residual Effects

The mitigation measures outlined above will minimize adverse effects on land use. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on land use are expected to be adverse, small in magnitude, Project Footprint to local in geographic extent, and short to medium terms in duration, and therefore not significant.

7.2.4.1.1 Residual Effects Summary

Table 7-6 provides a summary of the residual effects and assessment characteristics of PW75 on land use.

Table 7-6: Residual Effects of PW75 on VECs for Land Use

VEC	Phase	Residual socio-economic effect	Assessment characteristics
Property and Residential Development	Construction	Acquisition of 1 private property easement; landowner will be compensated.	Direction – Negative Magnitude – Small Geographic Extent – Project Site/Footprint Duration – Short Term **Overall – Not Significant**
	Operations	Physical Presence of the Transmission Line	Direction – Negative Magnitude – Small Geographic Extent – Project Site/Footprint Duration – Medium Term **Overall – Not Significant**
First Nation Lands	Construction and Operations	Physical Presence of the Transmission Line and development potential	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short to Medium Term **Overall – Not Significant**
Protected Areas Initiative Lands	Construction & Operations	Physical Presence of the Transmission Line and development potential	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short to Medium Term **Overall – Not Significant**
Infrastructure	Construction & Operations	Physical Presence of the Transmission Line	Direction – Negative Magnitude – Small Geographic Extent – Study Area Duration - Short to Medium term **Overall – Not Significant**

7.2.4.1.2 Follow-up and Monitoring

Agencies (MIT, RMs) responsible for infrastructure crossed by PW75 will be informed regarding construction schedule.

7.2.4.2 Economy

The VEC selected to assess the effects of the Project on Economy is Economic Opportunities (Business and Job Opportunities). Construction and, to a much lesser extent operations, can provide modest economic benefits to communities in the vicinity of the Project.

Construction

Construction of PW75 will result in modest benefits to communities in the study area through employment and business opportunities. Economic benefits could result directly from contracting and indirectly through the provision of goods and services to the construction workforce. Benefits will be short-term in duration as construction of the line is expected to occur on a seasonal basis (in the winter months) over a period of 1½ years. During construction mobilization and demobilization, the estimated workforce is approximately 13 workers per month with a peak of 112 during actual construction. A small number of short-term and temporary employment opportunities are expected during clearing of the ROW. Construction of the transmission line will require personnel with varying skill levels.

Construction of the line will be subject to a collective agreement that will allow Manitoba Hydro to include hiring preferences in tender specifications. Through the contracting process, Manitoba Hydro expects the contractor to actively promote the participation of Manitoba businesses, and Aboriginal businesses for the Project. In addition, when the contractor is selecting persons (other than supervisory personnel) to be employed on the Project, preference will be given to Aboriginal and local residents who meet the contractor's requirements in training, experience and other qualifications for the work to be performed.

Regarding business opportunities, First Nation and Aboriginal communities with construction expertise in the vicinity of the Project could secure contracting opportunities through a public tendering process made available under the terms of Manitoba Hydro's Northern Purchasing Policy, which includes measures to increase the participation of local businesses and workers. Possible contract or employment opportunities where the Northern Purchasing Policy could be applied include clearing and/or construction work on the Project.

Indirect business effects can also be expected by communities in the vicinity of the Project through the purchase of meals, fuel, and accommodations by contractors. Incidental purchases of repairs and parts for construction vehicles and equipment, as well as the purchase of some materials required for construction (e.g., granular fill) could also produce small economic benefits in nearby communities.

Mitigation Measures

No mitigation measures are required.

Operations

Once operational, PW75 will be patrolled on an annual basis by Manitoba Hydro. During operations, workforce requirements for a transmission line such as PW75 generally involve Manitoba Hydro operations and maintenance personnel, and contractor staff as required. Maintenance activities could involve short-term contracts for brush clearing to maintain the ROW. Indirect business effects include incidental purchases of meals and fuel which would produce a small economic benefit to nearby communities.

Mitigation Measures

No mitigation measures are required.

Residual Effects

Construction and, to a much lesser extent, operations of PW75 are expected to have modest economic benefits for communities in the Project Study Area. No mitigation measures are required.

7.2.4.1.1 Residual Effects Summary

Table 7-7 provides a summary of the expected residual effects and the assessment characteristics of PW75 on the economy. Effects are expected to be positive.

Table 7-7: Residual Effects of PW75 on VECs for Economy

VEC	Phase	Residual socio-economic effect	Assessment characteristics
Economic Opportunities	Construction	Contractor, Employees and Local Businesses benefit	Direction – Positive Magnitude – Small Geographic Extent – Regional Duration – Short Term **Overall - Not Significant**
	Operations	Local Businesses may benefit	Direction – Positive Magnitude Small Geographic Extent - Project Study Area Duration – Medium Term **Overall - Not Significant**

7.2.4.2.2 Follow-up and Monitoring

No follow-up or monitoring is required.

7.2.4.3 Services

The VEC selected to assess the effects of the Project on Services is Community Services (Emergency, Health, and Travel & Transportation). Concerns related to the development of a transmission project on Services typically relate the increased demands for community-based services such as health and emergency, as well as increased traffic on area roads.

Community Services (Emergency, Health)

Construction

There is a potential that construction activities could result in increased pressure on local community, health and emergency response services. During mobilization and demobilization, a workforce of approximately 15 is anticipated. The workforce will maximize at approximately 112 during peak construction periods. Construction of PW75 is expected to occur for 1 ½ years and during the winter months under frozen ground conditions.

Construction workers are planned to be housed in accommodations available in local communities. If securing accommodations is problematic, contractors may develop temporary work camps. Having a construction workforce reside in the local study are could potentially have some negative effects (i.e., limiting accommodation availability in the area for residences) and positive effects. Positive effects are discussed under "Economy". Potential negative effects are expected to be small given that the relative small workforce and the duration of construction. Winter construction will also minimize possible stresses on community services that occur in terms of recreational opportunities in the summer months.

Currently, the Pointe du Bois Spillway Replacement Project is under construction and workforce members are being housed in accommodations available in local communities. By the time construction starts for the Project, the Spillway Replacement Project is expected to be in operation. The current schedule is for the Spillway Replacement Project to be in-service in 2015. Hence, accommodation of the workforce in not expected to be a concern. There are two RCMP detachments in the study area – in Pinawa and Lac du Bonnet. No effect is anticipated in terms of worker interactions with the local communities. However, should any concerns arise, Manitoba Hydro will address them directly. Pinawa also has a 17 bed acute care hospital with 24 hour emergency room and diagnostic services. Both Pinawa and Lac du Bonnet have ambulance services.

Mitigation Measures

- Local RCMP detachments and the hospitals will be notified with respect to construction schedules and when the presence of workforces will be present.

- Manitoba Hydro will address any workforce issues if they arise.

Operations

Manitoba Hydro conducts inspections of transmission lines annually once they are operational. The annual patrol is conducted either by ground or by air. Non-scheduled patrols, by ground or by air, may be conducted should unexpected repairs to the line be required. The patrols require a small workforce for a very short period of them and therefore No measureable effects are anticipated on community services.

Mitigation Measures

No mitigation measures are required.

Travel and Transportation

Construction

During construction, it is anticipated that project traffic including transportation of equipment, materials and workers will utilize existing highways to access the ROW. This will include PR 313, PR 520 and PR 211. Other local roads such as Brookfield Road to the east of the Whiteshell Station will also be used for project traffic. There will be a minor increase in traffic volumes on roadways in the project study area.

Mitigation Measures

- Manitoba Hydro will work with the appropriate agencies (e.g., MIT) to minimize traffic-related effects, and will comply with relevant regulations and by-laws. This will include notifying appropriate agencies about the schedule for equipment and material deliveries.
- All related movements will be subject to regulations governing load restrictions and transportation of dangerous goods.

Operations

During operations, only a small number of vehicles will be required and activities will take place annually. No measurable effects are anticipated.

Mitigation Measures

No mitigation measures are required.

Residual Effects

The mitigation measures outlined above will minimize adverse effects on services in the Project Study Area. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on services during construction are expected to be adverse, small in magnitude, Project Study Area to regional in geographic extent, and short term in duration, and therefore not significant. Negligible effects

are anticipated during operations given the nature and extent of the activities, and the small workforce required.

7.2.4.3.1 Residual Effects Summary

Table 7-8 provides a summary of the expected residual effects and the assessment characteristics of PW75 on services.

Table 7-8: Residual Effects of PW75 on VECs for Services

VEC	Phase	Residual socio-economic effect	Assessment characteristics
Community Services	Construction	Increased Stress on Community Services	Direction – Negative Magnitude – Small Geographic Extent – Project Study Area Duration – Short Term **Overall – Not Significant**
	Operations	Increased Stress on Community Services	Negligible effects are anticipated
Travel & Transportation	Construction	Increased Stress on Transportation Services	Direction – Negative Magnitude Small Geographic Extent - Regional Duration – Short Term **Overall – Not Significant**
	Operations	Increased Stress on Transportation Services	Negligible effects are anticipated

7.2.4.3.2 Follow-up and Monitoring

No follow-up or monitoring is required.

7.2.4.4 Personal, Family and Community Life

The VEC selected to assess the effects of the Project on Personal, Family and Community Life are Human Health (public safety, smoke, noise, vibration, dust, EMF, herbicides), and Aesthetics. Concerns and issues typically include the following:

- Human Health – noise, dust vibration, etc. and effects of Electric and Magnetic Fields (EMFs) on health. Issues related to public safety include adverse effects due to herbicide use and access to the construction site.
- Aesthetics – impairment of aesthetics.

Human Health

Construction

Human health issues that may arise during construction include public safety, noise, smoke, vibration and dust, and consequences of accidental spills of hazardous materials such as fuel. Accidents and malfunctions are discussed in Section 7.5. No herbicides will be used during clearing of the ROW. Hence, there will be no effect.

Public safety is of paramount importance to Manitoba Hydro at all times. During construction, access to the ROW will be limited to those who need to be there and will be closely monitored. Standard Manitoba Hydro and workplace health and safety protocols will be followed at the construction site. Anyone accessing the construction site will undergo an orientation.

Construction activities will create noise, and cause vibration and dust, and hence result in disturbances to people in the vicinity of the ROW. ROW clearing, foundation installation, structure erection, works at marshalling yards and the use of implosive sleeves for splicing conductors are some of the activities that can result in these effects. As noted in Section 7.2.4.1, Land Use, with the exception of one residence to the west of the existing ROW north of the Whiteshell Station, the FPR for PW75 avoids areas of residential development. The FPR does cross through the Whiteshell Provincial Park and is adjacent to the Whitemouth Falls Provincial Park, north of the Whiteshell Station. Winter construction should minimize concerns regarding dust, as well as noise concerns for park users. Noise generated during construction activities will typically fall within acceptable provincial noise level guidelines. Noise and other nuisance disturbances will occur in the vicinity of construction, and will be intermittent and short-term in duration.

Mitigation Measures

- Access to the active construction area will be limited to those who need to be there and will be closely monitored. Standard Manitoba Hydro, and workplace health and safety protocols will be followed at the construction site. Anyone accessing the construction site will undergo an orientation.
- Winter construction to minimize dust, smoke and noise concerns particularly in the Whiteshell Provincial Park and on the existing ROW adjacent to the Whitemouth Falls Provincial Park.
- Provide notification/signage regarding the use of implosives to nearby communities (Pointe du Bois, Pinawa, and Seven Sisters), the owner of the residence to north of the Whiteshell Station, and in the Whiteshell and Whitemouth Falls Provincial Parks.
- Restrict the use of implosives to normal working hours.

Operations

Human health concerns during operations of a transmission line primarily relate to EMFs, and noise from the line. Other concerns can include the use of herbicides to maintain the ROW, as well as public safety.

Electric and Magnetic Effects (EMFs)

EMFs are invisible lines of force surrounding any wire carrying electricity, and are produced by all electric tools and appliances, household wiring, and power lines. A transmission line produces an electric field, a magnetic field and corona. Corona and an electric field can cause electrical effects, the most common of which are radio interference, television interference, audible noise, and induction on nearby metallic objects.

Many studies on EMFs have been completed worldwide. The general consensus of the worldwide scientific community is that a public health risk from exposure to these fields has not been established. Position statements adopted by Federal and Provincial health agencies express the same view. A health and EMF expert's consensus statement on human health effects of EMFs (Manitoba Clean Environment Commission, March 2001) suggests that "the weight of scientific evidence does not support the conclusion that extremely low frequency EMFs such as those produced by power lines are a cause of adverse effects on human health". The consensus statement also notes "research to date has not confirmed any biophysical mechanisms that would link properties of power and frequency fields to the initiation or promotion of cancer or any other adverse effect on human health." International studies including the World Health Organization (2007) have concluded that there is insufficient scientific evidence to show exposure to EMFs from transmission lines can cause adverse health effects such as cancer. Health Canada (2008) states that there is no conclusive evidence of any harm caused by exposures at levels normally found in Canadian living environments.

While Manitoba Hydro is sensitive to public concerns regarding potential health effects from electric and magnetic fields, there is at present no scientific evidence to justify modification of existing practices respecting facilities for the generation, transmission and distribution of electricity. Manitoba Hydro continues to undertake the following actions regarding the issue:

- Monitoring of worldwide research programs on EMFs;
- Participation in and support of on-going health and safety research on the local, national and international levels; and
- Maintenance of active communications and provision of technical information to interested parties, including the public and agencies responsible for public and occupational health and the environment.

Mitigation Measures

No mitigation measures are required.

Audible Noise and Radio Frequency Interference

Operation of a transmission line involves the production of corona discharges which can result in audible noise (AN) and low frequency electrical interference through radio noise (RN). The level will vary with time, subject to the operating mode and loading conditions, as well as the final line design, conductor conditions and weather. With respect to AN, provincial guidelines in Manitoba specify maximum 1-hour equivalent noise levels for residential and commercial areas of 55 dBA and 45 dBA, for daytime and night-time periods respectively. The audible noise level from a transmission line decreases by about 3 to 4 dBA for each doubling of distance from the line. PW75 will comply with the provincial guidelines in terms of AN.

During operations, electrical interference from a transmission line on radio and television equipment is not normally a problem. The most common cause of such interference is loose electrical hardware. Individual sources of such interference can be eliminated by proper construction and maintenance methods (i.e., tightening of hardware components). Manitoba Hydro will meet the requirements of *The Radio Communications Act* (R.S., 1985, c. R-2 [as amended to 2007-07-09] and the Radio Communication Regulations (SOR/96-484, Registration 05 November 1996 [as amended to 2011-02-17]). Manitoba Hydro also meets the requirements of the Industry Canada's Interference-Causing Equipment Standard - ICES-004 Issue 3, December, 2001 - Alternating Current High Voltage Power Systems. Manitoba Hydro will attempt to resolve any radio or television interference problems traceable to the new line. No effects are anticipated. In the event that electrical interference issues are encountered in the vicinity of the transmission line, Manitoba Hydro will identify the interference source, assess and test the signal reception equipment, and will rectify any issues caused by the line through repair of the line.

Mitigation Measures

No mitigation measures are required.

Herbicide Use

Vegetation management is required to ensure that re-growth in the ROW does not interfere with the operation of the transmission line. Vegetation management involves a variety of methods including hand cutting (e.g., utilizing chainsaws, brush saws, axes, or brush hooks), mechanical shear blading (using "V" or "KG" blades), brush mowing with rotary and drum cutters (typically rubber-tired equipment), and herbicide treatment. An integrated vegetation management and weed control approach is used within the ROW to control and reduce potential tree and weed problems. Herbicide treatments are formulated to target only broad-leafed plants (trees and weeds) leaving grasses unaffected.

Permits for herbicides use are obtained on an annual basis. The process involves public notification as part of the formal permit application to Manitoba Conservation Pesticide Approvals Branch. All herbicide applications are completed and supervised by licensed applicators and in accordance with conditions specified in a Pesticide Use Permit. Herbicide application rates are established by Manitoba Hydro's Chief Forester in accordance with product

label instructions. Only herbicides which have been approved in the Pesticide Use Permit are used. Manitoba Hydro maintains a typical list of herbicide foliage treatments and has developed application guidelines that it adheres to for its activities.

Manitoba Hydro's vegetation management procedures are well established with respect to herbicide application requirements and obtaining the Pesticide Use Permits. On provincial Crown lands, a work permit issued under The *Forest Act* (Manitoba) is required and owners adjacent to the ROW are typically notified in advance. Manitoba Hydro's Chief Forester coordinates the necessary approvals and is responsible for obtaining the necessary Pesticide Use Permits and submitting Post Seasonal Control Reports as per Manitoba Regulation 94-88R under *The Environment Act*. No effects to personal well-being from spraying herbicides are anticipated.

Mitigation Measures

- If herbicides are required to control vegetation growth, all applicable permits and provincial regulations will be followed.
- On private lands, prior to any vegetation management work, landowners and appropriate authorities will be contacted to obtain permission.

Public Safety

As with construction, public safety is of paramount importance to Manitoba Hydro during operations of its transmission lines. Access to the active construction site will be limited during construction to project personnel for reasons of safety. Issues surrounding safety of the transmission line traversing various trails are addressed under recreation and tourism.

Mitigation Measures

- Manitoba Hydro will mark all support wires with safety markers and include public safety along transmission line ROWs in their educational materials and programs.
- An Access Management Plan for the Project will be prepared.

Aesthetics

The presence of a transmission line can influence the visual landscape particularly in sensitive settings. Aesthetics do, to a certain extent, differ according to a person's values and perspectives. An individual's response to visual changes in the landscape and the magnitude of the concern related to a particular viewscape is a function of the types of views involved, the distance, perspective and duration of view. Aesthetics will 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); and

- The contrast between the transmission line and the surrounding environment.

The site selection process (see Chapter 4) for PW75 sought to avoid site-specific issues of concerns such as residences, cottages, communities, designated protected areas, and recreational sites. In addition, PW75 uses the existing P1 to P4 ROW for approximately 21.5 km of its length (which is 46.5 km). PW75 will replace the two double circuit P1 to P4 lines along this ROW. North of the Whiteshell Station, the FPR is located on or adjacent to an existing Manitoba Hydro ROW for approximately 1.2 km. The ROW north of the Whiteshell Station contains three double circuit 115 kV transmission lines. This will tend to minimize the effects associated with the new transmission line. There is one residence located to the west of the ROW. However, PW75 is located on the opposite side of the ROW through this area, and the residence faces away from the ROW and is shielded from it by a shelterbelt. PW75 does cross the TransCanada Trail west of PR 520 and also parallels the trail for a short distance north of Natalie Lake (See Section 7.2.4.5, Resource Use). Visual landscape concerns were identified through the PEP. The FPR is primarily located within forested Crown Land and is removed from residences in the area of concern identified in the PEP and hence, effects are anticipated to be small.

Mitigation Measures

Subject to detailed engineering analysis, tower location ("tower spotting") has been identified as a potential mitigation measure to reduce adverse effects in proximity or crossed by the ROW. Where feasible, tower placement will be selected to minimize impacts.

Residual Effects

The mitigation measures outlined above will minimize adverse effects on personal, family and community life. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on services during construction are expected to be adverse, small in magnitude, local study area in geographic extent, and short to medium term in duration, and therefore not significant.

7.2.4.4.1 Residual Effects Summary

Table 7-9 provides a summary of the expected residual effects and assessment characteristics of PW75 on personal, family and community life.

Table 7-9: Residual Effects of PW75 on VECs for Personal, Family and Community Life

VEC	Phase	Residual socio-economic effect	Assessment characteristics
Human Health	Construction	Construction site risks; noise, smoke, dust, vibration & other disturbance effects	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short Term **Overall – Not Significant**
	Operations	Noise, smoke, dust, vibration & other disturbance effects, guy wires on structures	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Medium Term **Overall – Not Significant**
Aesthetics	Operations	Physical Presence of the Transmission Line – Reduced Aesthetics	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Medium Term **Overall – Not Significant**

7.2.4.4.2 Follow-up and Monitoring

- When burning of cleared debris is used in proximity to developed areas. monitor weather conditions, including inversion and wind conditions, to reduce potential smoke effects on local communities.

7.2.4.5 Resource Use

The VEC selected to assess the effects of the Project on Resource Use are as follows:

- Mining and Aggregates;
- Trapping;
- Recreation and Tourism (lodges, outfitting, hunting, recreation sites);
- Domestic Resource Use;
- Productive Forestland; and
- High Value Forest Sites.

Concerns and issues related to the development of a transmission project on Resource Use typically relate to disruption activities. This can occur as a result of noise and other nuisance effects (e.g., vibration, dust).

Mining and Aggregates

In the case of mining and aggregates, concerns relate to proximity of a transmission line to these facilities and potential interference with their operations, both during construction and operations.

Construction

There are no active mining operations in the Project Study Area. No effects are anticipated. A quarry lease is located west of Pointe du Bois to the north of the existing P1 to P4 ROW. There is also a quarry lease located north of the Winnipeg River. There is one mineral lease located southeast of the Lee River which is in the Local Study Area and crossed by the FPR.

Mitigation Measures

- Mineral claim and lease holders crossed by the FPR will be provided with information regarding the construction schedule to minimize any potential interference with activities.
- Locations of mineral and quarry claims/leases will be identified in the Construction EnvPP.

Operations

During operations, concerns relate to proximity of a transmission line to these facilities and potential interference with their operations as well as future development potential.

Mitigation Measures

- Mineral claim and lease holders crossed by the FPR will be provided with information regarding the operations and maintenance schedules to minimize any potential interference with activities.
- Locations of mineral and quarry claims/leases will be identified in the Operations EnvPP.

Trapping

Construction

The FPR for PW75 crosses through 3 registered traplines (Lac du Bonnet RTL 21 and Whiteshell RTL 23 & 24). All three trapline holders were interviewed as part of the route selection process and areas of interest identified and considered in the route selection process. Trappers appreciated Manitoba Hydro considering their input at the route development stage. Trapline 24 is in the Whiteshell Provincial Park and includes the Pointe du Bois townsite area, as well as areas to the north and south, which are removed from the FPR. Trapline 21 is in the RM of Alexander immediately west of the Pointe du Bois Station. Through this area, the FPR is

located along the existing P1 to P4 ROW although the ROW needs to be widened through this area. Areas to the west of southwest in Alexander and the LGD of Pinawa are in an Open Trapping Area Zone. Trapline 23 is in the western portion of the Whiteshell Provincial Park and extends northward into the LGD of Pinawa and the RM of Lac du Bonnet, adjacent to the Seven Sisters Falls Generating Station.

During construction, activities may temporarily displace wildlife from areas in proximity to the ROW due to sensory disturbances. A pilot project undertaken by Manitoba Hydro in 2012 for the Wuskwatim Transmission Line Project supported the assertion in which furbearers avoided areas with consistent amounts of noise and disturbance during construction; however, furbearers returned to the area once the disturbance ceased. It is possible that trappers could see a decrease in furbearer capture rates during construction in the area. Manitoba Hydro has a Trapper's Notification/Compensation Policy in place for registered trapline holders whose lines are affected by the construction of 115 kV transmission facilities or greater. Prior to construction, a compensation amount will be determined with eligible holders of registered traplines for the disturbance during the period of construction. Compensation would also be paid for any damage to equipment, buildings and trails used for trapping during construction activities. During an overflight of the FPR through this area, the presence of a cabin that was identified and was confirmed as a trapper's cabin during the PEP. Increased access should not be a concern for RTL 21 & 24 as the ROW for PW75 exists through these traplines; however, RTL 23 will see a cumulative effect from the addition of PW 75 to the existing Snowman snowmobile trails and Trans Canada Trail that traverse this portion of the RTL.

Mitigation Measures

- Prior to construction activities, registered trapline holders will be notified as to the schedule for construction activities;
- Trapline holders will be requested to remove trapping equipment as required;
- Access will be managed through development of an Access Management Plan; and
- Ongoing discussions with directly affected registered trapline holders to establish mutually acceptable measures to deal with any issues.

Operations

After construction, some trappers may benefit from improved access to their trapping areas. Conversely, there may also be concerns regarding managing access to these areas. The cleared ROW will largely be accessible during the winter months (i.e., frozen period) due to the nature of the terrain in some areas Increased access is not anticipated to provide much benefit to trappers, who already have access to local traplines from the Provincial Road. However, trap placement on the Project ROW may increase depending on targeted species. The main species trapped in the Project Study Area is Marten, which is a forest dwelling species. Although the right-of-way may result in increased trap placement on the ROW, marten are often trapped near forest edges, and in these cases, the right-of-way and access may prove to be beneficial. An

access management plan will be prepared and implemented for the operations phase of the project to address issues of increased access potential. Anticipated effects are expected to be minimal.

The presence of the transmission line and station, and the removal of habitat has the potential to affect furbearer movements, but these species generally return to areas previously inhabited once the disturbance has ended. Removal of habitat is expected to be limited and not affect the overall abundance of commercial furbearing species. Annual inspections could have an occasional effect on a few individual wildlife species, temporarily decreasing furbearer abundance in the area. Low level disturbances are not likely to be measureable. Examples of measures to minimize the effects of project-related impacts will include the following:

- Access will be managed through development of an Access Management Plan; and
- Ongoing discussions with directly affected registered trapline holders to establish mutually acceptable measures to deal with any issues.

Recreation and Tourism

Construction

Construction of PW75 has the potential to cause disturbance to recreation and tourism. The FPR for PW75 is removed from cottage and recreational areas along the Lee and Winnipeg Rivers, and Lac du Bonnet. In the vicinity of the Whitemouth Falls Provincial Park, much of the ROW is existing although additional ROW is required along the park boundary north of the Whitemouth River. Part of the line will cross through the Whiteshell Provincial Park. However, through the park, PW75 will be located on an existing ROW although the ROW does need to be widened. The existing ROW in the Whiteshell Provincial Park is removed from lakes and rivers which are often used for recreational activities. In addition, there are no cottages in the immediate vicinity of the ROW in the park. Winter construction and the short term duration of construction activities through the parks should minimize potential effects.

Along the existing ROW west of the Whiteshell Provincial Park, to the west of Rice Lake, PW75 crosses a snowmobile trail. In addition, PW75 also crosses a snowmobile trail to the east of the Pinawa Dam Provincial Park, as well as two snowmobile trails to the west of PR 520. The FPR for the line also runs parallel to a short section of a snowmobile trails to the north of Natalie Lake, and crosses a trail to the north of the Whiteshell Station. Representatives from the relevant snowmobile chapters were contacted any issues/concerns and locations of snowmobile warming huts were addressed through the routing process. No major concerns were identified by the snowmobile clubs.

PW75 crosses the TransCanada Trail (Pinawa Trail section) to the south of the Pinawa Dam Provincial Park. However, the crossing of the trail is removed (approximately 300 m) from a bridge over a beaver dam that is scheduled for repairs/replacement and the Pinawa Suspension Bridge (approximately 4.7 km) along the trail. PW75 also parallels a short section of the

TransCanada Trail north of Natalie Lake. South of the Pinawa Dam Provincial Park, the FPR also crosses the Pinawa Channel Canoe Route.

Through the PEP, the existing P1 to P4 ROW was identified as being used as a trail. Other trails were identified as crossing the existing ROW along the boundary of the Whiteshell Provincial Park, as well as west of the park. PW75 is also routed to the east of a certified shooting range north of PR 211. Through the development of site selection criteria and the PEP, the Trans Canada Trail and the shooting range were identified as sensitive sites (Chapter 6, Section 6.4). Mitigation measures were identified for each site for possible inclusion in Project EnvPPs. These are also outlined below.

The Pinawa Channel, Winnipeg River and Whitemouth River (and to a much lesser extent, Boggy Creek) are the only watercourses with important fish populations from a sport fishing perspective. Access to the Winnipeg River and Whitemouth River already exists in several areas. The new ROW crossing of the Pinawa Channel will be more than 300 m from the nearest road (PR 520) and easier access points to the Pinawa Channel exist elsewhere (e.g., at the Pinawa Dam Provincial Park). The only new access that will be created will be to the Pinawa Channel through the new ROW. ROWs already exist at the crossing locations of the Winnipeg River and Whitemouth River.

Interviews were also carried out with some of the potentially affected lodge and outfitters in the area as part of the routing process. Important areas such as general locations of bait sites and other features on the landscape were considered during the routing process. No major concerns were identified by the lodge and outfitters interviewed for the Project.

Mitigation Measures

- Applicable legislation, regulations and guidelines will be adhered to. If site-specific issues of concern arise, during the detailed design phase, mitigation may be possible by maintaining a buffer of trees between a site/trails and the ROW.
- Lodge owners and recreational resource user groups will be notified in advance of the schedule for construction;
- Information signs and the placement of warning markers will be used to identify the ROW where it intersects a recreational trail;
- Care will be taken to protect the natural landscape surround work activities sites; construction activities will be conducted to prevent any unnecessary damage outside of the ROW and other construction sites (e.g., borrow pits); and
- Access will be managed through development of an Access Management Plan.

In terms of the Trans Canada Trail, the following mitigation measures are also identified:

- Site towers as far away as possible from where PW75 intersects the trail;

- Use low disturbance clearing adjacent to the developed trail to minimize potential damage;
- Restrict equipment travel across the developed trail to one location only to the extent possible;
- Remove cleared material from the developed trail surface;
- Repair any damage to the trail or provide a stockpile of trail surfacing material for use by the trail maintenance group; and
- Where debris is disposed of by burning, pile 50 m from the developed trail where feasible.

In terms of the Snoman snowmobile trails, the following mitigation measures are also identified:

- Site towers as far away as possible from the trail intersect for aesthetic purposes.
- Notify snowmobile clubs about the construction schedule.
- Limit all equipment to ROW only, unless approved in writing by the Construction Supervisor/Site Manager.
- Remove clearing material from developed trail surface.
- Repair any damage to developed trail.
- Where debris disposal is by burning, pile 50 m, if feasible, from developed trail and 30 m from edge of ROW.
- Burn during frozen conditions only
- Ensure fires are extinguished prior to spring breakup.

In addition, the following mitigation measures are identified for the Trans Canada Trail:

- Limit all equipment to the ROW only;
- Where debris is disposed of by burning, pile 30 m from the edge of the ROW;
- Burn during frozen ground conditions only; and
- Ensure fires are extinguished prior to spring break-up.

Construction of the line in the winter and the short term duration of construction should minimize potential effects. Construction related effects on recreation and tourism are expected to be negative, small in magnitude, Local Study Area in geographic extent, short term in duration, and therefore not significant.

Operations

Operations have less potential for disturbance to recreation and tourism than construction. The major effect on recreation and tourism during operations is the physical presence of the line. PW75 will be a net addition to the landscape along the section where new ROW is required.

Adherence to the Operations EnvPP will tend to protect the same environmental qualities that are valued for outdoor recreation.

Mitigation Measures

- Work permits from MCWS will be obtained for Project activities occurring on provincial Crown Lands;
- Prior to operations and maintenance activities, the snowmobile associations will be notified as to the proposed schedule;
- Information signs and the placement of warning markers will be used to identify the ROW where it intersects a recreational trail;
- Care will be taken to protect the natural landscape surrounding work areas; and
- Access will be managed through development of an Access Management Plan.

Given these mitigation measures, effects are expected to be negative, small in magnitude, Local Study Area in geographic extent, medium term in duration, and therefore not significant.

Domestic Resource Use

Traditional land use activities have persisted over time, and development has affected traditional ways of life. Traditional activities, whether practised or not, are part of the collective memory and important to communities(Elias et al 1997).

Chapter 5 identifies historic use of the area. Domestic resource use in the Project Study Area includes hunting, fishing, and plant gathering. Ongoing meetings will identify important locations for hunting, fishing, and plant gathering. These will be included in the Environmental Protection Plan.

During construction, sensory disturbance (e.g., construction noise) and nuisance effects (e.g., traffic and construction activities) are anticipated to result in some bird and mammal species avoiding the area. Hunting and trapping are occasionally used to supplement diet. As a result, some individuals may experience a small reduction in harvesting success temporarily. Effects on harvesting success rates are expected to be minimal, due to the fact that construction of the line will primarily take place during the winter months. Changes are expected to be short-term and minor.

Alternative areas may be used to harvest wildlife during the construction period, and shift hunting activities to other geographic areas in Project Study Area and elsewhere. Individuals may have to travel further to find animals during the construction period. Added harvest pressure on other local wildlife populations and unfamiliarity with new hunting areas can marginally reduce harvest success rates if alternative hunting areas are over-utilized. Any changes are expected to be short-term and minor within and outside the Project Study Area.

Plant gathering areas may be temporarily disturbed by construction activities. Re-growth along the transmission line may provide new areas to harvest berries, while in some cases, other plant species (e.g., medicinal plants) may be reduced.

The Project may also result in increased access to berry picking and other important plant locations. Access will be managed through the development of an Access Management Plan.

Manitoba Hydro shared project information with Brokenhead Ojibway Nation and Hollow Water First Nation regarding the projects. No concerns were identified. Manitoba Hydro is continuing to work with Sagkeeng First Nation, Black River First Nation and the MMF.

Mitigation Measures

To mitigate effects to traditional land use, applicable legislation, regulations and guidelines will be adhered to, and Project-specific mitigation measures will be outlined in the Construction Environmental Protection Plan. Examples of measures to mitigate or minimize the effects of Project-related impacts include the following:

- Care will be taken to protect the natural landscape surrounding work activity sites;
- Construction activities will be conducted to prevent any unnecessary damage outside the required rights-of-way and other disturbed/developed areas; and
- Access will be managed through development of an Access Management Plan.

Manitoba Hydro is continuing to work with Sagkeeng First Nation, Black River First Nation and the MMF. Any new potential effects and mitigation measures will be included in the Environmental Protection Plans.

Operations

Operations and maintenance has less potential for disturbance to domestic resource use in the Project Study Area. The presence of the transmission line and station, and the removal of habitat have the potential to affect wildlife movement, but wildlife generally returns to areas previously inhabited once the disturbance has ended. Removal of habitat is expected to be limited and not affect the overall abundance of bird and mammal species used for domestic resource purposes.

Annual inspections could have an occasional effect on a few individual wildlife species, temporarily decreasing bird and mammal abundance in the area. Low level disturbances are not likely to be measureable. Increased access to the area could result in increased pressure on species harvested for traditional use purposes in the Project Study Area. Because the transmission line minimizes access to remote areas, access to remote wildlife populations (e.g., moose) should not occur.

Although hunting may improve locally, regional hunting of wildlife species is not expected to change. In the long-term, the potential for increased wildlife mortality due to increased hunting pressure from new access may result in a minor decrease in local wildlife populations over the

long-term. For important species such as moose, which are in decline in GHA26, on-going management initiatives including the Cooperative Committee for Moose Management will work towards a sustainable moose population is maintained.

Plant harvesting during operations and maintenance has the potential to increase due to plant growth on the ROW and improved access in the area. To mitigate increased access resulting in pressure on traditional use plants and medicines, an Access Management Plan will be developed.

Spraying during operations and maintenance also has the potential to affect plant harvesting. Adherence to measures outlined in the Environmental Protection Plan will mitigate effects on traditional use resources.

Examples of measures to mitigate or minimize the effects of Project-related impacts include the following:

- Care will be taken to protect the natural landscape surrounding work activities; and
- Access will be managed through development of an Access Management Plan.

Productive Forestland

With respect to Productive Forestland and High Value Forest Sites, concerns relate to damage to trees and forest adjacent to the ROW, invasive species, forest resource utilization, and displacement of shelterbelts and other high valued forest sites.

Construction and Operations

The measurable parameters defined for the effects assessment for this VEC include productive forestland, annual allowable cut (AAC) levels, and volume of standing timber.

The effect on the productive forestlands are minimal and amount to 0.02% of either the total productive forestland or the commercial forest area. Table 7-10 provides the effect of the Project Site/Footprint on Crown and private land ownership classes of productive forestland and on the commercial forest area. Manitoba Hydro owns the majority of the private land within the Project Site/Footprint except for one area identified under High Value Forest Sites below.

MCWS, Forestry Branch no longer has responsibility within Whiteshell Provincial Park (Liu pers. comm., 2013). Therefore, the effect of the Project on the AAC is only assessed for FMU 24, as summarized in Table 7-11. The effect of the PW75 on the AAC for FMU 24 is very small and totals approximately 0.06%. The Project effect would reduce the AAC for FMU 24 by approximately 173 m^3 of softwood and hardwood species per year.

Table 7-10: Effects on FMU 24 & 30 Productive Forest Area

Management Unit	Pre-Project Productive Forestland (ha)	Crown and Private Lands		Commercial Forest Area	
		Productive Forestland Withdrawal[3] (ha)	Productive Forestland Withdrawal (%)	Productive Forestland Withdrawal[3] (ha)	Productive Forestland Withdrawal (%)
24	585,075[1]	136	0.02	130	0.02
30	172,164[2]	19	0.01	17	0.01
Total	757,239	155	0.02	147	0.02

[1]Source: Manitoba Conservation, 2010

[2]Source: Doig pers. comm., 2013.

[3]Appendix F: Forestry.

Table 7-11: Effect on FMU 24 Annual Allowable Cut Levels

Species Cover Type	Total Harvest Scenario AAC[1] (m^3/yr)	Project Effect[2] (m^3/yr)	Project Effect (%)
Softwood	174,112	83	0.05
Hardwood	106,093	90	0.08
Total	**280,205**	**173**	**0.06**

[1]Source: Manitoba Conservation, 2010.

[2]Appendix F: Forestry.

Due to the very small size of the commercial forest area withdrawal, MCWS will probably not recalculate the AAC until the next inventory is undertaken or the current inventory needs to be updated. Inventory updates would be required for major land withdrawals or large area depletions resulting from forest fire, blow-down or insect and disease losses.

As Forestry Branch no longer has responsibility within the Whiteshell Provincial Park, the effect of PW75 on standing timber is only assessed for FMU 24. Project effects on standing timber are minimal and account for 0.02% of the total growing stock for FMU 24 (Table 7-12).

Table 7-12: Effect on FMU 24 Crown Land Standing Timber

Pre-Project Standing Timber Total Growing Stock[1] (m^3)			Project Effect on Standing Timber Total Volume[2] (m^3)			Project Effect (%)		
Soft	Hard	Total	Soft	Hard	Total	Soft	Hard	Total
18,500,000	15,200,000	33,700,000	3,483	3,162	6,646	0.02	0.02	0.02

[1]Manitoba Conservation, 2010

[2]Appendix F: Forestry

The effects on standing timber are limited to the construction phase of the Project and will be limited to the Project Site/Footprint. The projected losses and the permanency of the effects are also accounted for in the Forest Damage Appraisal and Valuation process. Manitoba Hydro will compensate MCWS for the effects on productive forestlands as specified in the Forest Damage Appraisal and Valuation Policy (Manitoba Conservation, 2002).

Mitigation measures will be identified in the Construction and Operations EnvPPs for the Project.

Mitigation Measures

- Where possible and practical, construction, and operations and maintenance activities will be limited to frozen ground conditions.
- As much as possible, Project related activities will be limited to the Project Site/Footprint.
- Where practical, all merchantable timber will be salvaged.
- Where demand exists, an opportunity for local salvage of firewood will be provided to local communities.
- Debris piles will be placed on mineral soils where possible and will be piles at least 15 m from forest stands if disposal is by burning.
- Burning of debris piles should occur in the winter months under frozen ground conditions.
- Burn piles will be monitored to ensure all fires are extinguished prior to spring break-up.
- Weather conditions, including inversion and wind conditions, need to be considered to reduce potential smoke effects on local communities.
- Where possible, clearing should be limited to the removal of the above ground organic matters, leaving the root system in place.
- Cleared woody debris will be disposed of to prevent infestations of sawyer beetles.
- All elm wood will be immediately burnt, chipped or disposed of at designated sited to prevent the spread of Dutch Elm Disease.

High Valued Forest Sites

Construction and Operation

The measurable parameters defined for the effects assessment of this VEC include high value reforestation sites, research and monitoring sites, and private land forest values. No high value reforestation sites are affected by the Project Footprint, and there are no effects anticipated from construction of PW75. There are no permanent sample plots affected by the Project Footprint and there are no effects anticipated from construction of PW75.

The effects on private land forest values are minimal as the transmission line avoids most of the private, productive forestland within the Project Study Area. A total of 7.95 ha of private land is affected by the Project Footprint. However, all but 0.22 ha are owned by Manitoba Hydro and are contained within the P1 to P4 ROW or adjacent to the Seven Sisters Generating Station Table 7-13. One Manitoba Model Forest Demonstration site is adjacent to the Project Site/Footprint and may potentially be affected during construction. These sites will be identified in the Construction, and Operations and Maintenance EnvPPs for the Project.

Table 7-13: Effect on Private Land Natural Forest Areas

FRI ID #	Species	Strata	Age Class	Soft Volume (m^3/ha)	Hard Volume (m^3/ha)	Area (ha)	Total Soft Volume (m^3)	Total Hard Volume (m^3)	Total Volume (m^3)
453112	AS6BO2MM2	OTHHW	70	11.35	42.44	0.22	2.49	9.31	11.79

Source: MCWS FRI FMU 24 & 30 (1996)

- Number; AS = Black Ash; BO = Bur Oak; ha = hectare; ID = identification; m3 = cubic metre; m3/ha = cubic metre per hectare; MM = Manitoba Maple.

Timber volumes determined from FRIs are designed for forest management planning at a landscape level and may not be representative at a stand level. Actual effects from PW75 on private land natural forest areas will need to be determined during clearing of the ROW.

Mitigation Measures

- Limit all equipment to the ROW where feasible.
- Where debris disposal is by burning, pile at least 15 m from forest stands.
- Conduct burning under frozen ground conditions.

With respect to the private land natural forest area, in addition to the above:

- Clearing should be conducted under frozen ground conditions.
- Discuss mitigation with the landowner.

Residual Effects

The mitigation measures outlined above will minimize adverse effects on resource use. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on resource use are expected to be adverse, small in magnitude, local study area in geographic extent, and short to medium term in duration, and therefore not significant.

7.2.4.5.1 Residual Effects Summary

Table 7-14 provides a summary of the expected residual effects and assessment characteristics of PW75 on resource use.

Table 7-14: Residual Effects of PW75 on VECs for Resource Use

VEC	Phase	Residual socio-economic effect	Assessment characteristics
Mining & Aggregates	Construction & Operations	Potential Interference with Activities	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Short to Medium Term **Overall – Not Significant**
Trapping	Construction & Operations	Temporary Displacement of Wildlife; Increased Access	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Short to Medium Term **Overall – Not Significant**
Recreation & Tourism	Construction & Operations	Habitat Loss/Degradation; Temporary Displacement of Wildlife; Physical Presence of the Transmission Line; Increased Access	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Short to Medium Term **Overall – Not Significant**
Domestic Resource Use	Construction and operations	Minor reduction in harvester success rate for wildlife, plant/berry harvest	Direction: negative Magnitude: small Geographic Extent: local Duration: short-term **Overall – Not Significant**
Productive Forestland	Construction & Operations	Loss of Productive Forestlands	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Short to Medium Term

Table 7-14: Residual Effects of PW75 on VECs for Resource Use

VEC	Phase	Residual socio-economic effect	Assessment characteristics
			Overall – Not Significant
High Valued Forest Sites	Construction & Operations	Loss of Private Natural Forest Areas	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Short to Medium Term **Overall – Not Significant**

Follow-up and Monitoring

Prior to commencing or during construction the following monitoring/notifications should take place:

- Notify MIT, affected municipalities, private landowners, snowmobile clubs, Pinawa Trail (Trans Canada Trail) representative, RTL holders, lodge owners and outfitters regarding the construction schedule.
- Erect signage at the ROW intersection with affected snowmobile trails and the Trans Canada Trail.

Post construction monitoring and follow-up activities should take place:

- Following clearing activities, inspect snowmobile trail and Trans Canada Trail crossings to ensure the trails are unobstructed and safe for their intended use.
- After snow melt, follow-up with the Pinawa Trail (Trans Canada Trail) representative to ensure trail surface has been protected during construction or adequate repairs have take place.
- Follow-up with affected RTL holders regarding potential compensation under the Manitoba Hydro, Trapper Notification/Compensation Policy.
- Follow-up with MCWS regarding compensation due under the FDAV Guideline.

7.2.4.6 Heritage Resources

The construction phase of the Project has the greatest potential for impacts on unknown heritage resources primarily through clearing of the ROW, establishing tower foundations and use of heavy equipment. Known and designated heritage resources were identified as a routing issue during the Site Selection process. Most activities associated with the operations and

maintenance of PW75 are not expected to impact heritage resources. Through the HRIA, three areas of interest were identified in the vicinity of the FPR for PW75 as follows:

- The FPR of the Pointe du Bois to Whitemouth Stations passes close to Rice Lake, which is of archaeological and cultural resource importance. Site EbKw-38 is a stone "beehive" feature that is located near the southwest corner of the lake along the existing P1 to P4 ROW. This feature may be associated with the historic Winnipeg Electric Company tramway.
- The transmission line crossing of the Pinawa Channel passes south of a relic homestead dating to the 1930s. The building has fallen to disarray and represents a time period well-documented in the area. The area upstream of the crossing may contain evidence of past cultural occupations. However, nothing tangible was found during shovel testing and pedestrian survey in the area for the Project. The Winnipeg River/Whitemouth River crossing to the Whiteshell Station is through an area that contains several archaeological sites which have been well investigated in the past. These have been subjected to disturbance and modification through the construction of the Seven Sisters GS, the Whitemouth Falls Provincial Park, road systems, fibre optic cable installation and farming. All sites have been impacted by former development activities.

Mitigation Measures

- Rice Lake is to be avoided as a staging area for heavy equipment with no winter travel across or along the lake shores.
- The location of EbKw-38 (a stone beehive structure in the vicinity of Rice Lake) will be confirmed and if required, mitigation measures will be implemented during construction activities.
- The known archaeological sites at the Winnipeg River/Whitemouth River crossings of PW75 have been impacted by previous developments. However, because of the nature of archaeological sites, including burials, this area will be identified in the Construction EnvPP for the Project and will require monitoring during tower foundation construction within 30 m of the river banks.
- A Cultural and Heritage Resources Protection Plan (CHRPP) will be prepared as part of the EnvPP. The CHRPP will provide a set of protocols and guidelines to address any finds that may occur during construction.

In Manitoba, all heritage resources are protected by the *Heritage Resources Act* (1986) and burials further protected by Manitoba's Policy Concerning the Reporting, Exhumation and Reburial of Found Human Remains (1987). Should heritage resources be located during construction the Project archaeologist must be notified immediately. Should human remains be

inadvertently discovered during the construction, the Historic Resources Branch must be notified immediately and all work at that location cease until the site is assessed.

Residual Effects

The mitigation measures outlined above will minimize adverse effects on heritage and cultural resources. Using the criteria established to determine the significance of Project effects for regulatory purposes (see Chapter 3), the likely residual effects of the Project on heritage resources are expected to be adverse, small in magnitude, local study area in geographic extent, and short to medium term in duration, and therefore not significant.

7.2.4.6.1 Residual Effects Summary

Table 7-15 outlines the residual effects on heritage and cultural resources, and the effects assessment.

Table 7-15: Residual Effects of PW75 on VECs for Heritage Resources

VEC	Phase	Residual socio-economic effect	Assessment characteristics
Heritage Resources	Construction & Operations	Potential Destruction of Unknown Heritage Resources	Direction – Negative Magnitude - Small Geographic Extent - Local Study Area Duration – Short to Medium Term **Overall – Not Significant**

7.2.4.6.2 Follow-up and Monitoring

Prior to commencing construction archaeological site EbKw-38 (Stone “beehive” hut) will be located. Based on the location, relative to the ROW, additional mitigation will be discussed with the project archaeologist.

During construction the following monitoring should take place:

- Ground monitoring of construction activities adjacent to the shores of the Winnipeg River and the Whitemouth River for unknown archaeological sites.
- Adjacent to Rice Lake, prohibit winter travel across or along the lake shore and limit all equipment to ROW.

Pointe du Bois and Whiteshell Stations Modifications

Because modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, impacts on the biophysical and socio-economic environments are expected to be largely negligible. The potential impacts are typically related to the construction phase of the project. In terms of negative effects (e.g., noise, traffic), they are expected to be small, local study are in geographic extent, short-term in duration, and therefore not significant. During operation, the stations will continue to operate as they do now (not manned continually), and hence effects are expected to be negligible.

7.3 POINTE DU BOIS AND WHITESHELL STATION MODIFICATIONS

7.3.1 Physical Environment

As modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, effects on the physical environment are expected to be negligible.

Mitigation Measures

No mitigation measures are required.

7.3.2 Aquatic Environment

As modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, effects on the aquatic environment are expected to be negligible.

Mitigation Measures

No mitigation measures are required.

7.3.3 Terrestrial Environment

7.3.3.1 Terrestrial Ecosystems, Habitat and Plants

As modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, effects on the terrestrial environment are expected to be negligible. Station upgrades would not affect intactness, terrestrial habitat or ecosystem diversity since they are entirely contained within the existing footprints. Activities during construction and operation could introduce and or spread invasive plants.

Mitigation Measures

No mitigation measures are required.

7.3.3.2 Wildlife

No physical habitat effects are expected for wildlife VECs including moose, American marten, bald eagle, ruffed grouse and Canada warbler. Increased noise at the Pointe du Bois and Whiteshell Stations are also not expected to result in a measureable increase in loss of effective habitat near these stations. Exceptions for potential project effects at the stations are described below.

Barn swallow nesting is associated with human infrastructure including buildings (COSEWIC 2011), and could be present at the Whiteshell or Pointe du Bois stations. Although barn swallows are very tolerant of human disturbances (COSWECI 2011), if active barn swallow nests are located in either the Whiteshell or Pointe du Bois stations, mitigation recommendations include timing restrictions and the application of appropriate setback distances.

Mitigation Measures

No mitigation measures are required.

7.3.4 Socio-Economic Environment

7.3.4.1 Land Use

As modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, effects on land use are expected to be negligible. Although the Pointe du Bois Station is located in the Whiteshell Provincial Park, it is an existing station and the modifications will occur within the existing fenced area of the station. The potential effects from operations are expected to be negligible as the stations are existing and will continue to operate as they currently do.

Mitigation Measures

No mitigation measures are required.

7.3.4.2 Economy

Modifications to the stations will result in modest economic benefits to communities in the study area. Benefits will be short-term in duration as construction is expected to occur over a period of about 8 months for the Whiteshell Station and 1 ½ years for the Pointe du Bois Stations. For the Whiteshell Station, the workforce will range from 6 to a peak of 20 workers per month. For the Pointe du Bois Station, the workforce will range from 6 to a peak of 40 workers per month. Local employment opportunities are anticipated to be less than for the PW75 line as station

equipment installation tends to involve highly specialized labour. As well, Manitoba Hydro is planning on using internal civil, overhead design and electrical construction workforces for modifications to the stations although some components (e.g., drilling for foundations) maybe contracted out.

Indirect business effects can also be expected by communities in the vicinity of the stations through the purchase of meals, fuel, and accommodations by contractors. Incidental purchases of repairs and parts for construction vehicles and equipment could also produce small economic benefits in nearby communities.

Effects of the station modifications on the economy are expected to be positive, small in magnitude, regional in geographic extent and short-term in duration.

Mitigation Measures

No mitigation measures are required.

7.3.4.3 Services

Community Services (Emergency, Health)

There is a potential that construction activities could result in increased pressure on local community, health and emergency response services. As noted above, station modifications will require a relatively small workforce and will occur over a short period of time.

There are two RCMP detachments in the study area – in Pinawa and Lac du Bonnet. No effect is anticipated in terms of worker interactions with the local communities. However, should any concerns arise, Manitoba Hydro will address them directly. Pinawa also has a 17 bed acute care hospital with 24 hour emergency room and diagnostic services. Both Pinawa and Lac du Bonnet have ambulance services.

Mitigation Measures

- Local RCMP detachments and the hospitals will be notified with respect to construction schedules.

Travel and Transportation

During construction, it is anticipated that project traffic including transportation of equipment, materials and workers will utilize existing highways to access the ROW. This will include PR 313, PR 520 and PR 211. Other local roads such as Brookfield Road to the east of the Whiteshell Station will also be used for project traffic.

Mitigation Measures

In order to minimize potential effects:

- Manitoba Hydro will work with the appropriate agencies (e.g., MIT) to minimize traffic-related effects, and will comply with relevant regulations and by-laws. This will include notifying appropriate agencies about the schedule for equipment and material deliveries.
- All related movements will be subject to regulations governing load restrictions and transportation of dangerous goods.

Table 7-16 provides a summary of the expected effects of the station modifications on services.

Table 7-16: Residual Effects of Modifications to the Pointe du Bois and Whiteshell Stations on VECs for Services during Construction

VEC	Residual socio-economic effect	Assessment characteristics
Community Services	Increased Stress on Community Services	Direction – Negative Magnitude – Small Geographic Extent – Study Area Duration – Short Term **Overall – Not Significant**
Travel & Transportation	Increased Stress on Transportation Services	Direction – Negative Magnitude Small Geographic Extent - Regional Duration – Short Term **Overall – Not Significant**

7.3.4.4 Personal, Family and Community Life

The VEC selected to assess the effects of the Project on Personal, Family and Community Life are Human Health (public safety, noise, vibration, dust, EMF, herbicides) and Aesthetics. As the Pointe du Bois and Whiteshell Stations modifications will occur within the existing fenced station sites, aesthetic effects are expected to be negligible.

Human health issues that may arise during construction include public safety, noise, vibration and dust, and consequences of accidental spills of hazardous materials such as fuel. Accidents and malfunctions are discussed in Section 7.6. Construction activities will create noise, and cause vibration and dust, and hence result in disturbances to people in the vicinity of the stations. Noise generated during construction activities will typically fall within acceptable provincial noise level guidelines. Noise and other nuisance disturbances will occur in the vicinity of construction, and will be intermittent and short-term in duration. Table 7-17 provides a summary of the expected effects of the station modifications in terms of human health.

Table 7-17: Residual Effects of Modifications to the Pointe du Bois and Whiteshell Stations on VECs for Personal, Family and Community Life during Construction

VEC	Residual socio-economic effect	Assessment characteristics
Human Health	Construction site risks; noise, dust, vibration & other disturbance effects	Direction – Negative Magnitude – Small Geographic Extent – Local Study Area Duration – Short Term **Overall – Not Significant**

7.3.4.5 Resource Use

As modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, effects on resource use are expected to be negligible. Nuisance effects (noise, vibration, dust, etc.) are addressed under Personal, Family and Community Life.

Mitigation Measures

No mitigation measures are required.

7.3.4.6 Heritage Resources

As modifications to the Pointe du Bois and Whiteshell Stations will occur within the existing fenced station sites, effects on heritage and cultural resources are expected to be negligible.

Mitigation Measures

No mitigation measures are required prior to construction. The HRPP will address heritage resources that's may be found during construction.

7.3.4.7 Follow-up and Monitoring

Prior to commencing construction the following notifications should take place:

- Notify MIT regarding the construction schedule.

In addition, the station sites will be inspected annually during construction and operation to identify:

- Patches of highly invasive plants that require control or eradication; and,
- Measures will be implemented to control or eradicate patches of highly invasive plants identified by annual inspections.

7.4 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

7.4.1 Context

The effect of climate and climate change on the Project is part of the environmental assessment. To the extent that global climate change models can be scaled down to regional levels relevant to the Manitoba Hydro system, the research suggests that the probable outcome of current trends will be higher mean temperatures and precipitation, with the most dramatic changes predicted to occur in the winter. These changes could affect the existing environment and its susceptibility to the potential environment effects of the Project.

7.4.2 Potential Effects

Climate change effects on temperature and precipitation could indirectly affect the Project (e.g., through flooding). The potential for direct effects of climate change on the Project and Manitoba Hydro's transmission system arising from severe weather events are less clear.

Some studies and reports (Infrastructure Canada 2006; IPCC 2007 [Parry, et al]) have suggested that energy transmission infrastructure may be vulnerable to the possible influence of climate change in increasing the frequency and severity of extreme events. By the IPCC definition (IPCC 2007 [Solomon et al]), an extreme weather event is "an event that is rare at a particular place and time of year". Definitions of rare vary but, an extreme weather event would normally be as rare or rarer than the 10^{th} or 90^{th} percentile of the observed probability density function. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense. Single extreme events cannot be simply and directly attributed to anthropogenic climate change, as there is always a finite chance the event in question might have occurred naturally. When a pattern of extreme weather persists for some time, such as a season, it may be classed as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g., drought or heavy rainfall over a season).

Extreme weather events are not will simulated by global and regional climate change models. Model output is generally not specific as to the precise nature or location of such events, some of which (e.g., drought or heat waves) would involve little or no direct risk to transmission facilities.

Data on the frequency and severity of historical weather events in the Prairies are limited. Historical records for average and daily weather factors (i.e., temperature, wind speed and precipitation) do not indicate any specific trends in severe weather events but focus on averages. This is likely due to the infrequent nature of these events, an inability to accurately predict their location, duration and intensity, and a general lack of attention to their occurrence based on their acceptance as part of normal weather. Research commissioned by Manitoba Hydro characterizes the present situation as follows:

"In summary, the existing weather record is not conclusive, though highly suggestive and consistent with current climate change theory. The world appears to be in the early phases of a fundamental shift towards a climate in which extremes of many kinds are more prevalent though there remains a small possibility that the present cluster of extreme events is a temporary phenomenon. Changes in the frequency and intensity of extreme events is expected to be one of the most significant effects of continuing climate warming, but the natural variability in these phenomena precludes easy detection of the signal, and so must await the passage of time and more detailed analysis" (Dr. J. Hanesiak in Teshmont 2011).

The prospect of significant new effects arising from climate change over the short-term until the Project is in-service is unlikely. Similarly, the prospect of significant effects on operation of the Project arising from the indirect implications of changes in temperature and precipitation is considered manageable through the design of the Project. Given the nature of the Project and the history of floods in Manitoba, flooding is likely the main effect that could affect the Project. Increased incidence of flooding arising from the prospect of higher precipitation will be mitigated through provision of conductor to ground clearances in excess of applicable standards.

7.5 ACCIDENTS AND MALFUNCTIONS

7.5.1 Context

As a result of construction and operations, there is a potential for accidents or malfunctions that could affect the biophysical and socio-economic environments. If such a contingency event occurred, it could potentially create a risk to public health and safety, wildlife and fish, and terrestrial and aquatic habitats. To address potential accidents and malfunctions, Manitoba Hydro has fire response, and emergency preparedness for handling and use of hazardous materials and malfunctions in place.

In terms of transmission line design, Manitoba Hydro designs its transmission lines to meet or exceed the current CSA standard for overhead transmission systems (Canadian Standards Association 2010). Structures, insulators and hardware are selected to minimize the risk of failure. Regular patrols of the transmission line are undertaken to ensure potential problems are identified and rectified in advance of a failure or malfunction.

Hazardous materials are handled and generated by construction and operational activities. Some common types of hazardous materials that will be handled or generated during construction and operations of the Project include fuel, oil, lubricants, gasoline, solvents, herbicides and pesticides. As with any project involving construction and operations, there is a risk of contingency event such as spills or fires.

7.5.2 Mitigation

Potential effects and contingencies will be avoided or mitigated by application of design standards and established environmental construction and operations protocols. Current fire

protection, oil containment and materials handling/spill response standards will be applied through the design, construction and operations phases:

- Manitoba Hydro has developed practices and protocols, documented in the Spill Response Handbook (1995) to ensure that if a spill occurs, it is contained and remediated. Manitoba Hydro further undertakes to have personnel trained in emergency spill response techniques to respond in an event of an oil spill. Manitoba Hydro will also adhere to its Hazardous Waste Management Handbook (1994) pertaining to the transport and disposal of all hazardous products. Staff and contractors will also comply with all legislation, regulations respecting the transportation and handling of hazardous waste.
- The storage, handling and disposal of chemicals will be carried out in accordance with Manitoba Hydro guidelines, and relevant Federal and Provincial legislation and regulations. Manitoba Hydro has developed a Chemical Control Program that provides its workers with the information necessary for the safe use and disposal of chemicals. Manitoba Hydro also complies with the Federal Workplace Hazardous Materials Information System (WHMIS) regulations and Provincial Workplace Health Hazard Regulations. An inventory of materials covered by the WHMIS documentation will be displayed and available as required.

Adherence to Manitoba Hydro's General Environmental Protection Measures, the Construction and Operations EnvPPs and any additional mitigation measures identified as a condition of the Project Environment Act Licence will further minimize the potential impacts of accidents or malfunctions on the biophysical and socio-economic environments.

The approach to these potential accidents with hazardous materials involves good planning and prevention with the use of protocols, plans and mitigation measures. These are outlined in the EnvPPs in sections on hazardous material and petroleum product use, handling and storage, appropriate emergency preparedness and response. All spills and leaks will be reported to regulatory authorities in accordance with provincial requirements including regulations under *The Dangerous Goods Handling and Transportation Act*.

Some general mitigation measures to prevent and respond to accidental spills/releases of hazardous materials include the following:

- Construction crews will be adequately trained in spill prevention and clean-up procedures.
- Fuels, lubricants and other potentially hazardous materials will be stored and handled within dedicated areas at work sites and marshalling yards in full compliance with regulatory requirements.
- Harmful substances, such as fuels, chemicals and herbicides will be stored greater than 100 m form the ordinary high water mark of any waterbody.
- All storage sites will be located a minimum distance of 100 m from waterbodies.
- Marshalling yards will be located on low permeability soils and upland sites where possible.

- Transfer of fuel must be attended at all times.
- An Emergency Preparedness and Spill Response Plan will be developed and an emergency response spill kit will be kept on-site at all times in case of fluid leaks or spills from machinery.
- Only clean construction materials and equipment will be used.
- Vehicles, machinery and construction materials will arrive on-site clean and free of leaks.
- Equipment refueling and maintenance will be conducted greater than 100 m from the stream's ordinary high water mark and away from wetlands.
- When servicing equipment, waste products such as oil and antifreeze will be drained into appropriate containers and removed to an approved disposal ground.
- Machinery will remain above the high water mark, unless fording is required to transport equipment across a watercourse and will be done in accordance with DFO's Operational Statements.
- All fuel spills or leaks will be reported to the Manitoba Hydro Construction Supervisor or Site Manager or designate immediately upon discovery.
- Any spills of hazardous substances will be cleaned up immediately and reported to the local NRO.
- General clean-up in storage areas and sites where incidental spillage occurs, will be in accordance with regulatory standards.
- All soil is to be remediated or disposed of in a manner approved by regulatory authorities and Manitoba Hydro.
- Hazardous materials, fuel containers and other materials will be removed from the site and disposed of according to Manitoba Hydro's Hazardous Materials Management Handbook and in accordance with regulatory requirements.

The operation of oil containing electrical equipment, the burning of trees and brush for disposal and other potential sources of ignition creates a risk for accidental fires to start. Strict adherence to proper protocols to minimize the risk of accidental fires makes its occurrence highly unlikely. Mitigation for the potential effects of accidental fires, as outlined in the EnvPP, includes effective fire response management as part of emergency preparedness and response plans to be developed for the Project.

Worker safety is highly regulated under provincial legislation and all activities during construction and operations of the Project will be undertaken in compliance with current Workplace, Safety and Health requirements to prevent accidents and injuries. Manitoba Hydro is committed to safe workplaces and injury prevention through its Corporate goals.

7.6 CUMULATIVE EFFECTS

7.6.1 Introduction

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions. The Cumulative Effects Assessment (CEA) for the Project was developed based on guidance provided under the *Canadian Environmental Assessment Act* and the Cumulative Effects Assessment Practitioners Guide (Hegmann *et al*. 1999). Additional guidance is also provided by the Cumulative Effects Working Group (CEWG), which was established to give direction on conducting cumulative effects assessments in Canada. In addressing cumulative effects, the Cumulative Effects Practitioners Guide states that:

"… an assessment of a single project (which is what almost all assessments do) must determine if that project is incrementally responsible for adversely affecting a VEC beyond an acceptable point (by whatever definition). Therefore, although the total cumulative effect on a VEC due to many actions (identified as projects and activities) must be identified, the CEA must also make clear to what degree the project under review is alone contributing to that total effect. Regulatory reviewers may consider both of these contributions in their deliberation on the project application".

7.6.2 Cumulative Effects Assessment Scoping

Cumulative effects of the Project are assessed for adverse residual effects to VECs that have the potential to interact with the effects of other past, current or future projects and human activities. VECs with no residual effect or a positive residual effect (e.g., Economic Opportunities) are not included in the CEA. The CEA only includes adverse residual effects on VECs that overlap both spatially and temporally with the effects of other projects and human activities.

Projects and human activities were selected for inclusion in the CEA based on the following criteria:

- Past Projects: Projects in the Project Study Area whose ongoing effects can be reasonably expected to change in the future and, as a result of those changes, interact with this Project's adverse residual effects. If Past Project do not create ongoing effects, they are considered part of the baseline.
- Current Projects: Projects in construction, development or operation in the Project Study Area.
- Future Projects: Projects approved for construction/development or are in the approval stage in the Project Study Area.

- Prospective Projects: Projects in the Project Study Area that have been announced but are not yet moving along a development or approval pathway, and projects that result in any projected changes to land use patterns.

7.6.2.1 Past and Current Projects and Activities

Past and current projects and activities considered as influencing the existing environment include the following:

- The Pointe du Bois GS, the Slave Falls GS, the Seven Sisters GS, and other existing Manitoba Hydro facilities (e.g., other transmission facilities such as the Pointe du Bois and Whiteshell Switching Stations, existing transmission lines, the Pointe du Bois to Slave Falls road).
- The Pointe du Bois Spillway Replacement Project which is currently under construction at the site of the GS. The project is expected to be in-service in 2015.
- PRs 211, 214, 307, 313, 433, and 502, and other existing roads and trails/cut lines.
- Existing cottage developments in the Study Area.
- Area communities such as Pinawa, Seven Sisters and Lac du Bonnet.
- Provincial Parks and other Designated Protected Areas in the Study Area.
- Other activities in the Study Area such as resource use activities (e.g., trapping, and tourism and recreational initiatives).
- Decommissioning of the AECL facility in the LGD of Pinawa.
- Decommissioning of the Pointe du Bois townsite by Manitoba Hydro.
- Closure of Licensed and Rights Based Moose Hunting in GHA 26.

7.6.2.2 Future and Prospective Projects and Activities

The following provides a list of potentially foreseeable future projects that are considered in the CEA:

- Construction of a Lee River Distribution Supply Centre (DSC) along with a 66 kV sub-transmission line paralleling the north side of the proposed PW75 line. Manitoba Hydro is proposing to construct the project in order to ensure a reliable electrical supply to residences and cottages in the vicinity of the Lee River. DSC are an alternative to construction of conventional sub-stations. They are much smaller in size than conventional sub-stations (approximately 50 x 60 m). The project ISD is planned for the fall of 2016. Construction of a DSC typically takes about 40 days, while construction of the 66 kV lines is estimated to take about 120 days. Construction of the transmission line will occur during the winter months. An additional 20 m of ROW is required for PW75 to accommodate the 66 kV line. The

project has the potential to interact with: fish and fish habitat, transportation volumes, community services and infrastructure, terrestrial ecosystem and plants (including unknown locations of species of conservation concern), wildlife and wildlife habitat (including unknown locations of species of conservation concern), resource use – trapping, lodges, outfitting, domestic resource use, forestry - (i.e., productive forestlands), unknown heritage resources.

- Winnipeg River Bridge (PR 313) near Lac Du Bonnet – MIT identified structural issues requiring a partial closure of the bridge for safety reasons. All traffic currently uses the south side or eastbound lane of the bridge and is controlled with temporary traffic signals. Remedial works have not yet been identified but will occur sometime in the near future. This project could affect traffic volumes along 313 and affect community services.
- Slave Falls Rehabilitation - The project involves rehabilitation of powerhouse equipment and systems that are likely to fail or become obsolete in the next 20 years. This is expected to include internal sluiceway regulating gates as a result of safety concerns with operations of the gates. Roof mounted electrical equipment including disconnects, bushings, grounding arresters, roof mounted lines and electrical barriers will be replaced. New outbuilding and lay down areas will be required for construction activities. The Project is required to address safety, environmental, reliability, efficiency, and operational and dam safety issues. Slave Falls rehabilitation to occur potentially within the next five years. Potential for the project to act cumulatively with project-based transportation and community services.
- MCWS, Parks and Natural Areas, is proposing to amend the Whiteshell Provincial Park boundary and Land Use Category (LUC) boundaries. In 2009, the Tim Horton Children's Foundation proposed the development of a youth camp in the Whiteshell Provincial Park at Meditation Lake which is outside of the Study Area. In 2010, a site for the camp was chosen at Sylvia Lake which is in the Study Area and in the park. In response to a public review of the camp site, the province put policies in place to restrict further development at Sylvia Lake and to ensure the area around Meditation Lake remains undeveloped. A proposed boundary change, which is also partly in the Study Area, will connect the area around Heart Lake which is in the Study Area and the park, to protected areas at Whitemouth Bog. The areas of proposed change around Sylvia and Heart Lakes currently are "Resource Management" under the LUC. Under the proposed LUC changes, the area around Sylvia Lake is proposed to be primarily "Backcountry" (~840 ha), along with "Recreational Development" (~17 ha) for the camp and "Access" (~20 ha) to the camp and river. In terms of Heart Lake, the area around the lake in the park and the new area to be included in the park is proposed to be primarily "Backcountry" (~7545 ha). Other LUC are "Recreational Development" (~120 ha), "Access" (~115 ha) and "Winter Road Access" (~60 ha). The proposed addition to the park, part of which is in the Project Study Area is ~2950 ha. Parks and Natural Areas are currently conducting a Public Consultation program on the proposed amendments and LUC changes. The closure dates for public comments is January 13, 2014. If approved, the proposed changes would likely occur prior to the start of construction of the Project, and don't involve any development activity as they are land use

policy decisions which will increase the protection of lands in the Project Study Area. The presence of a workforce could impact traffic and community services, as well as has the potential to have a positive effect for wildlife through increased protection.

7.6.3 Cumulative Effects Assessment

The effects of past projects and activities have shaped the existing environment. The interactions between these past and current projects, and the Pointe du Bois Transmission Project are addressed in the existing environment (Chapter 5) and the effects assessment (Chapter 7, Sections 7.2 to 7.4). The construction and operation of the Project has been planned to first minimize, and then mitigate adverse effects to the extent possible. Based on the review of the existing environment and the effects assessment, the Project is expected to have small residual effects on the VECs affected by Project construction. Adverse residual effects from operations of the Project on many of the VECs is negligible. The physical presence of PW75 is the primary residual effect of the Project. PW75 will be located on existing ROW for close to half of its length and two existing 66 kV sub-transmission lines in that ROW are being decommissioned. Any potential for adverse residual effects of the Project on past and current projects are expected to be small with the application of the mitigative measures.

The CEA considers the adverse residual effects resulting from this Project in combination with reasonably foreseeable future projects and activities. VECs and the rationale for their selection is outlined in Chapter 3, Section 3.2. VECs are evaluated for potential interactions with future projects and activities if there is:

- A residual adverse effect of the Project on that VEC (Chapter 7, Sections 7.2 to 7.4) [VECs with no residual effect or a positive residual effect are not included].
- A spatial and temporal overlap of the residual effects of the Project on that VEC with the effects of other projects and human activities that are in the foreseeable future.

If VECs are further adversely affected by the Project in combination with other future projects and activities, additional mitigation may be required to address the cumulative effect and assess potential residual effects of the Project in combination with identified future projects and activities.

Table 7-18 summarizes the residual effect of the Pointe du Bois Transmission Project on each VEC and identifies which VECs are evaluated for potential interactions with future projects and activities. Table 7-19 summarizes the results of the CEA.

Table 7-18: Application of CEA with Future Projects and Human Activities to VECs

Component	VEC	Anticipated Residual Effect of Proposed Project	Overlap with Future Projects and Activities	Included in CEA (√)
Aquatic Habitat	Fish Habitat	Small decrease in riparian vegetation due to additional ROW clearing at 11 water crossing sites on the P1 to P4 ROW. Potential for small increase in bank erosion and TSS to water bodies.	• Lee River DSC • Winnipeg River Bridge remediation works	√
Terrestrial Ecosystems, Habitat and Plants	Intactness	Small reduction to percentage of Project Study Area in core areas larger than 200 ha.	• Lee River DSC	√
	Ecosystem Diversity	Terrestrial habitat loss and alteration. Priority habitat loss and alteration.	• Lee River DSC	√
	Priority Plants	Priority plant loss and disturbance. Priority plant habitat loss and alteration.	• Lee River DSC	√
Wildlife	Moose	Habitat alteration. Slight decrease in local abundance from mortality associated with access, harvest, predation, disease and sensory disturbance.	• Lee River DSC • Changes and expansion of PAI lands	√
	American Marten	Habitat alteration. Slight decrease in local abundance from mortality associated with access and harvest. Reduced movements of individuals in home range across ROW.	• Lee River DSC • Slave Falls Rehabilitation • Changes and expansion of PAI lands	√
	Bald Eagle	Habitat alteration. Slight increase in local abundance due to increased perching and nesting opportunities. Slight reduction in local abundance due to increased mortality from wire collisions.	• Lee River DSC • Slave Falls Rehabilitation • Changes and expansion of PAI lands	√

Table 7-18: Application of CEA with Future Projects and Human Activities to VECs

Component	VEC	Anticipated Residual Effect of Proposed Project	Overlap with Future Projects and Activities	Included in CEA (√)
	Ruffed Grouse	Habitat alteration. Slight decrease in local abundance from mortality associated with access, harvest, predation, collisions, and sensory disturbance.	• Lee River DSC • Slave Falls Rehabilitation • Changes and expansion of PAI lands	√
	Canada Warbler	Habitat alteration. Slight decrease in local abundance from mortality associated with increased predation along edges and from reduced recruitment into the population associated with increased brood parasitism.	• Lee River DSC • Slave Falls Rehabilitation • Changes and expansion of PAI lands	√
Land Use	Property & Residential Development	Physical Presence of PW75	• Lee River DSC • Changes and expansion of PAI lands	√
	Protected Areas Initiative Lands	Physical Presence of PW75 and development potential.	• Lee River DSC • Changes and expansion of PAI lands	√
	Infrastructure	Physical Presence of PW75	• Lee River DSC • Changes and expansion of PAI lands	no
Services	Community Services	Increased stress on services	• Lee River DSC • Winnipeg River Bridge remediation works • Changes and expansion of PAI lands	√

Table 7-18: Application of CEA with Future Projects and Human Activities to VECs

Component	VEC	Anticipated Residual Effect of Proposed Project	Overlap with Future Projects and Activities	Included in CEA (√)
	Travel & Transportation	Increased stress on transportation services	• Lee River DSC • Winnipeg River Bridge Remediation works • Slave Falls Remediation • Changes and expansion of PAI lands	√
Personal, Family & Community Life	Human Health	Site risks during construction; noise, dust, vibration & other disturbance effects during construction, and operations of the Project.	• Lee River DSC	√
	Aesthetics	Physical Presence of PW75	• Lee River DSC	√
Resource Use	Mining & Aggregates	Potential interference with activities	• No spatial overlap	No
	Trapping	Temporary displacement of wildlife; increased access	• Lee River DSC • Slave Falls Remediation	√
	Recreation & Tourism	Habitat loss/degradation; temporary displacement of wildlife; physical presence of PW75; increased access	• Lee River DSC • Changes and expansion of PAI lands	√
	Domestic Resource Use	Potential for decreased harvest success (plants and animals) through sensory disturbance, additional users (due to increased access),	• Lee River DSC • Slave Falls Remediation	√
	Productive	Loss of productive forestlands	• Lee River DSC	√

Table 7-18: Application of CEA with Future Projects and Human Activities to VECs

Component	VEC	Anticipated Residual Effect of Proposed Project	Overlap with Future Projects and Activities	Included in CEA (√)
	Forestland			
	High Valued Forest Sites	Loss of private natural forest areas	• No spatial overlap	No
Heritage Resources	Heritage Resources	Potential disruption of unknown Heritage Resources	• Lee River DSC	√

Table 7-19: Results of the CEA with Reasonably Foreseeable Future and Prospective Projects

Component	VEC	Summary of Cumulative Residual Effects of the Projects	CEA Conclusion
Aquatic Habitat	Fish Habitat	Small reduction of riparian vegetation at existing watercourse crossings due to widening of the P1 to P4 ROW and the additional 20 m for the Lee River DSC line. Potential for increased bank erosion and TSS to watercourses due to additional ROW clearing.	Not significant
Terrestrial Ecosystems, Habitat and Plants	Intactness	Will have a minor change to core area size due to the additional 20 m of ROW on the north side of the transmission line.	Not significant
	Ecosystem Diversity	Priority habitat loss and alteration due to the clearing of the Transmission and distribution line ROWs.	Not Significant
	Priority Plants	Disturbance of priority plants and their habitats due to clearing of the transmission and distribution line ROWs. Could increase the number of affected priority plant locations in the right-of-way. In areas of high potential for S1 plants, surveys in the area will be conducted to ensure S1 plants are not disturbed.	Not significant
Wildlife	Moose	Alteration of habitat and decreased local abundance due to ROW clearing (transmission and distribution) and increased sensory disturbance. Historic terrestrial physical habitat loss has likely affected riparian habitat favoured by	Not significant.

Table 7-19: Results of the CEA with Reasonably Foreseeable Future and Prospective Projects

Component	VEC	Summary of Cumulative Residual Effects of the Projects	CEA Conclusion
		moose. As the cumulative total terrestrial habitat loss totals 16% of the Project Study Area (Section 7.2.1), the residual effects on moose are not expected to be significant. Even with the Project, past and current habitat loss, alteration and fragmentation will remain low. The moose population in GHA26 has declined historically but appears to be recovering recently with intensive management. There are also Provincial Parks and wilderness areas set aside in part, for the preservation of wildlife found in the Project area, it is likely to remain sustainable. The number of individuals affected temporarily could increase at locations near disturbances, and increase the risk of mortality from vehicle collisions, but reduce effects to individuals if afforded harvest protection by PAIs.	
	American Marten	Loss and alteration of habitat, decreased movements and decreased local abundance due to ROW clearing (transmission and distribution) and increased sensory disturbance. Not expected to substantially change habitat loss or alteration. Could increase the number of individuals affected temporarily at locations near disturbances, but reduce effects to individuals if afforded harvest protection by PAIs. Changes to movements across the ROW are not anticipated to change	Not Significant.
	Bald Eagle	Alteration of habitat, and neutral change to local abundance due to ROW clearing (transmission and distribution) and increased sensory disturbance .	Not Significant
	Ruffed Grouse	Alteration of habitat and decreased local abundance due to ROW clearing (transmission and distribution) and increased sensory disturbance . Not expected to substantially change habitat alteration. Could increase the number of individuals affected temporarily at locations near disturbances, and increase risk of mortality from vehicle collisions, but reduce effects to individuals if afforded harvest protection by PAIs.	Not significant.
	Canada Warbler	Loss and alteration of habitat and decreased local abundance due to ROW clearing (transmission and distribution) and increased sensory disturbance. Not expected to substantially change habitat loss or alteration. Could increase the number of individuals affected temporarily at locations near disturbances.	Not significant.
Land Use	Property &	Physical Presence of PW75. PW75 and the 66 kV transmission line to the Lee River DSC	Not significant.

Table 7-19: Results of the CEA with Reasonably Foreseeable Future and Prospective Projects

Component	VEC	Summary of Cumulative Residual Effects of the Projects	CEA Conclusion
	Residential Development	will share an existing ROW although it needs to be widened. The P lines that occupy the ROW will be decommissioned. Manitoba Hydro owns the ROW and there are no residences in proximity due to considerations made during routing. The replacement of the P lines with PW75 and the sub-transmission to the Lee River DSC are incremental.	
	Protected Areas Initiative Lands	Physical Presence of PW75. Part of the ROW to be used for the Lee River DSC line crosses through the Whiteshell Provincial Park and would parallel PW75 to minimize disturbance in the park. Expansion of PAI lands will be positive effects for the area as well	Not significant.
Services	Community Services (Emergency, Health)	Increased stress on services during construction. Potential overlaps of construction workforce during construction of this Project with the Lee River DSC, works on the Winnipeg River bridge, and Slave Falls Rehabilitation works may lead to a small increase in the magnitude of effect for impact on community services (emergency, health). Effects on local accommodations could also be experienced with the increased workforce which could be result in positive effects for business owners	Not significant
	Travel & Transportation	Increased stress on transportation services during construction. Potential overlaps of construction workforce and associated traffic during construction of this Project with the Lee River DSC, works on the Winnipeg River bridge, and Slave Falls Rehabilitation works may lead to an increase in traffic having a minor increase in pressure on transportation routes.	
Personal, Family & Community Life	Human Health (public safety, noise, vibration, dust, EMF, herbicides)	Construction site risks; noise, dust, vibration & other disturbance effects. Potential overlaps of construction activities during construction of this Project with construction of the Lee River DSC may lead to a small increase in the magnitude of effect. However, as both are Manitoba Hydro projects, activities will be coordinated to minimize effects.	Not significant.
	Aesthetics	Physical Presence of PW75. PW75 and the 66 kV transmission line to the Lee River DSC will share an existing ROW although it needs to be widened. The P lines that occupy the	Not significant

Table 7-19: Results of the CEA with Reasonably Foreseeable Future and Prospective Projects

Component	VEC	Summary of Cumulative Residual Effects of the Projects	CEA Conclusion
		ROW will be decommissioned. Manitoba Hydro owns the ROW and there are no residences in proximity.	
Resource Use	Trapping and outfitting	Temporary displacement of wildlife; increased access. PW75 and the 66 kV transmission line to the Lee River DSC will share an existing ROW although it needs to be widened. The P lines which occupy the ROW will be decommissioned and activities are planned at Slave Falls for remediation. There is the potential for a minor increase in sensory disturbance during this time which could temporarily displace wildlife and, therefore, impact trapping and outfitting.	Not significant
	Recreation & Tourism	Habitat loss/degradation; temporary displacement of wildlife; physical presence of PW75; increased access. PW75 and the 66 kV transmission line to the Lee River DSC will share an existing ROW although it needs to be widened The P lines which occupy the ROW will be decommissioned and activities are planned at Slave Falls for remediation. There is the potential for a minor increase in sensory disturbance during this time which could temporarily displace wildlife and, therefore, impact trapping.	
	Domestic Resource Use	Decreased Harvest Success (Plants and Animals). For individuals who use the area, potential for sensory disturbance to animals during construction of multiple projects which could have a minor impact on harvest success rate	Not significant
	Productive Forestland	Loss of productive forestlands. PW75 and the 66 kV sub-transmission line to the Lee River DSC will share an existing ROW although it needs to be widened, and a short ROW cleared to connect from the PW75 ROW to the Lee River DSC. The replacement of the P lines with PW75 and the sub-transmission line are incremental.	Not significant.
Heritage Resources	Heritage Resources	Potential disturbance to unknown Heritage Resources. PW75 and the 66 kV transmission line to the Lee River DSC will share an existing ROW although it needs to be widened. There is the potential for unknown sites to be disturbed. A cultural and heritage resources plan with be established as part of the EnvPP as well as pre-construction surveys in areas of heritage potential along the Lee River DSC and associated lines	Not significant

No significant cumulative effects were identified for the Project in combination with the effects of other projects and human activities in the Project Study Area. No additional mitigation measures are required for any potential cumulative effects from the Project. The possible future amendments to the Whiteshell Provincial Park boundary and changes to LUC boundaries from "Resource Management" primarily to "Backcountry" are viewed as positive for the Project Study Area in terms of preserving the environment through policy measures.

7.7 SUSTAINABLE DEVELOPMENT

Manitoba Hydro implement sustainability practices during the planning, design, construction, operations and eventual decommissioning of the its Projects. The Corporation has developed sustainable development policies, and follows Manitoba's Principles and Guidelines of Sustainable Development, as scheduled under *The Sustainable Development Act* (SDA).

As part of the sustainability analysis and ensuring the criteria of the SDA have been met, aspects of the Project have been compared to sustainability indicators (Section 7.8.1). The indicators have been selected based on similar transmission projects.

7.7.1 Sustainable Development

The general definition of sustainable development has been adopted from the Brundtland Commission Report entitled *Our Common Future*, as to "meet the needs of the present without compromising the ability of future generations to meet their own needs" by the Province of Manitoba (United Nations World Commission on Environment and Development, 1987). Application of sustainable development is considered a general philosophy which includes the ethical approach to guide individual and collective behaviour with respect to the environment, the economy and social well-being. The SDA was established in 1998 creating a framework through which sustainable development is to be implemented by the provincial public sector and promoted in private industry and society. The SDA sets out principles and guidelines as a framework for implementing sustainable development within the Province. All of Manitoba's Crown Corporations are required to establish and adopt a corporate sustainable development policy to complement sustainable development.

Manitoba Hydro incorporates sustainability into all aspects of its operations to achieve environmentally sound and sustainable economic development. Manitoba Hydro has implemented a Plan-Do-Check Environmental Management System (EMS), registered to the International Standards Organization (ISO) 14001 Environmental Management System standard, as their method to enable environmental compliance and protection. An additional key component of the EMS is Manitoba Hydro's Environmental Management Policy that guides all of the corporation's operations (Manitoba Hydro, 2012).

Manitoba Hydro developed its corporate Sustainable Development Policy in 1993 to compliment the Provincial Framework. Manitoba Hydro's Sustainable Development Policy has 13 principles

(Manitoba Hydro, 1993) designed to meet the needs of the present without compromising the ability of future generations to meet their needs:

1) Stewardship of the Economy and the Environment;
2) Shared Responsibility;
3) Integration of Environmental and Economic Decisions;
4) Efficient Use of Resources;
5) Prevention and Remedy;
6) Conservation;
7) Waste Minimization;
8) Access to Adequate Information;
9) Public Participation;
10) Understanding and Respect;
11) Scientific and Technological Innovation; and
12) Global Responsibility.

In addition to Provincial and Corporate principles and policies, Manitoba Hydro is a member of the Canadian Electricity Association (CEA) Sustainable Electricity Program. This industry specific program is focussed on allowing the holistic management of sustainability by the Canadian electricity sector. As a condition of the program, Manitoba Hydro must report on sustainability indicators covering social, environmental and economic performance.

Manitoba Hydro has acknowledged that the construction of the Project involves significant environmental activity. This acknowledgement has led Manitoba Hydro to elevate the following commitments, as outlined in its Environmental Management Policy, above other corporate activities:

- Preventing or minimizing any adverse impacts on the environment and enhancing positive impacts;
- Continually improving our Environmental Management Policy;
- Meeting or surpassing regulatory, contractual and voluntary requirements;
- Considering the interests and utilizing knowledge of our customers, employees, communities, and stakeholders who may be affected by our actions;

- Reviewing our environmental objectives and targets annually to ensure improvement in our environmental performance; and
- Documenting and reporting our activities and environmental performance.

7.7.2 Project Sustainability Assessment

Manitoba Hydro and the Province of Manitoba's sustainable development principles and guidelines have been incorporated into the planning, design, construction, operations and eventual decommissioning of the Project, where applicable (Table 7-20). All of the core principles have been assessed and principles similar in nature have been amalgamated. The indicators will be finalized prior to commencing construction and will be incorporated into the Project Environmental Protection Program.

7.7.3 Conclusions

The sustainability assessment indicates that the Project is a good example of sustainable development. The Project demonstrates Manitoba Hydro's sustainable development policies and how they embody general sustainable development principles, ensuring that there is consideration of the environment, economy, health and social well-being through integrated decision-making during all phases of the Project. Appropriate design and implementation has avoided, minimized or compensated for environmental and socio-economic effects, as a result of a comprehensive environmental assessment process that included stakeholder, public and Aboriginal participations. In addition, plans will also be developed to minimize waste, protect the environment and rehabilitate construction sites.

Table 7-20: Project Sustainability Assessment

Manitoba Sustainable Development Principles and Guidelines	Comment
Integration of Environmental and Economic Decisions Economic decisions should adequately reflect environmental, human health and social effects. Environmental and health initiatives should adequately take into account economic, human health and social consequences.	The goal of Manitoba Hydro's Site Selection Process is to balance the choice of transmission line route from environmental, social and economic perspectives. Once the FPR was selected, environmental considerations are further considered in the environmental assessment.
Stewardship The economy, the environment, human health and social well-being should be managed for the equal benefit of present and future generations. Manitobans are the caretakers of the economy, the environment, human health and social well-being for the benefit of present and future generations. Today's decisions are to be balanced with tomorrow's effects. **Integrated decision-making and planning –** which means Encouraging and facilitating decision-making and planning processes that are efficient, timely, accountable and cross-sectoral and which incorporate an inter-generational perspective of future needs and consequences.	Two double circuit 66 kilovolt (kV) sub-transmission lines, P1/P2 and P3/P4, run from Pointe du Bois Station, in the Whiteshell Provincial Park, to Rover Station, in the City of Winnipeg. These lines have reached the end of their serviceable life – two of the lines are over 90 years old. In order to continue to deliver reliable power to customers, and protect public and employee safety, the P lines need to be decommissioned. The Project will provide economic benefits with the major economic benefit from the construction phase.
Shared Responsibility and Understanding Manitobans should acknowledge responsibility for sustaining the economy, the environment, human health and social well-being, with each being accountable for decisions and actions in a spirit of partnership and open cooperation. Manitobans share a common economic, physical and social environment. Manitobans should understand and respect differing economic and social views, values, traditions and aspirations. Manitobans should consider the aspirations,	Planning, designing, construction, operating and maintaining the Project involves many Manitoba Hydro departments, as well as external consultants and contractor staff. Awareness of technical and environmental issues associated with the Project and considered such concerns to arrive at balanced project decisions. A Construction EnvPP will be prepared for the Project, followed by an Operations EnvPP. The purpose of the EnvPPs is to provide for the effective implementation of mitigation measures and follow-up actions, as well as the application of regulatory requirements, environmental guidelines and best

Table 7-20: Project Sustainability Assessment

Manitoba Sustainable Development Principles and Guidelines	Comment
needs and views of the people of the various geographical regions and ethnic groups in Manitoba, including Aboriginal peoples, to facilitate equitable management of Manitoba's common resources.	practices. EnvPPs help ensure that contractors and field staff effectively fulfill their responsibilities for protecting the environment during the life of the Project. Environmental Inspectors will be conducting inspections during construction. Successful and effective implementation of EnvPPs is dependent on the shared responsibilities of Manitoba Hydro, regulators, contractors and stakeholders. Two rounds of public engagement were held for the Project. The purpose of Round 1 was to introduce the Project and gain input into the Site Selection Process. Round 2 presented the PPR, identified any outstanding routeing issues and obtain input on potential mitigative measures. Feedback obtained was key in identifying the route and issues to be addressed during the environmental assessment. Project information has been and will continue to be shared with all individuals and communities that are interested and/or potentially affected by the Project during regulatory review, and project construction and operations.
Efficient Use of Resources which means Encouraging and facilitating development and application of our systems for proper resource pricing, demand management and resource allocations together with incentives to encourage efficient use of resources; and Employing full-cost accounting to provide better information for decision-making.	The decision to proceed with the development of the Project was made after careful consideration of a range of other options. The Site Selection Process (Chapter 4) was employed to facilitate the selection of a route with minimal and efficient use of monetary resources and natural capital. During construction, all activities and personnel will be working under the auspices of the EMS framework and governance including Manitoba Hydro's Environmental Management Policy.
Prevention Manitobans should anticipate, and prevent or mitigate, significant adverse economic, environmental, human health and social effects of decisions and actions, having particular careful regard to decisions whose impacts are not entirely certain but which, on reasonable and	A proactive approach was taken through the Site Selection Process to avoid adverse environmental effects and enhance positive Project effects. Through the environmental assessment process, it has be determined that there will be no significant residual effects with application of mitigative

Table 7-20: Project Sustainability Assessment

Manitoba Sustainable Development Principles and Guidelines	Comment
well-informed grounds, appear to pose serious threats to the economy, the environment, human health and social well-being. **Rehabilitation and Reclamation** Manitobans should: Endeavour to repair damage to or degradation of the environment; and Consider the need for rehabilitation and reclamation in future decisions and actions.	measures. Remediation plans will be prepared to manage remediation activities and any contaminated sites disturbed as a result of the Project. Borrow areas, construction sites, access trails and other Project components that are no longer required will be decommissioned and lands will be restored as required. EnvPPs will be implemented during construction and operation of the Project to ensure that contractors and field staff can effectively fulfill their responsibilities for protecting the environment. An adaptive management approach will be implemented for the Project and what is learned through Project monitoring will be taken into account in making any necessary changes to activities to address issues in an expeditious manner, and to remedy any unforeseen issues.
Waste Minimization and Substitution which means Encouraging and promoting the development and use of substitutes for scarce resources where such substitutes are both environmentally sound and economically feasible; and Reducing, reusing, recycling and recovering the products of society.	It is recognized that hazardous and non-hazardous waste materials will be generated during construction. Waste generated by the Project will be collected, managed and disposed of in accordance with Provincial legislation and guidelines. Hazardous materials will be managed in accordance with Manitoba Hydro's Hazardous Material Management Policy. Opportunities to reduce, reuse and recycle non-hazardous wastes will be taken whenever possible.
Public Participation which means Establishing forums that encourage and provide opportunity for consultation and meaningful participation in decision-making processes by Manitobans. Endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions.	Two rounds of public engagement were held for the Project. The purpose of Round 1 was to introduce the Project and gain input into the Site Selection Process. Round 2 presented the PPR, identified any outstanding routeing issues and obtain input on potential mitigative measures. Feedback obtained was key in identifying the route and issues to be addressed during the environmental assessment. Project information has been and will continue to be

Table 7-20: Project Sustainability Assessment

Manitoba Sustainable Development Principles and Guidelines	Comment
Striving to achieve consensus among citizens with regards to decisions affecting them. **Access to Information** which means Encouraging and facilitating the improvement and refinement of economic, environmental, human health and social information. Promoting the opportunity for equal and timely access to information by all Manitobans.	shared with all individuals and communities that are interested and/or potentially affected by the Project during regulatory review, and project construction and operations.
Research and Innovation which means Encouraging and assisting the research, development, application and sharing of knowledge and technologies that further our economic, environmental, human health and social well-being.	A number of modern technologies and software were used in the design of PW75 that results in improved reliability and more cost effective solutions. The application of Reliability Based Design methods will deliver the design of the transmission line to a prescribed reliability level with higher confidence that traditional deterministic methods.
Global Responsibility Manitobans should think globally when acting locally, recognizing that there is economic, ecological and social interdependence among provinces and nations, and working cooperatively, within Canada and internationally, to integrate economic, environmental, human health and social factors in decision-making while developing comprehensive and equitable solutions to problems.	Manitoba Hydro considers the potential transboundary effects (e.g., Greenhouse Gas [GHG] emissions) from its projects and takes them into account during Project planning. Overall, it is anticipated that the Project will not have any significant adverse transboundary effects through GHG emissions.
Conservation and Enhancement Maintain the ecological processes, biological diversity and life-support systems of the environment. Harvest renewable resources on a sustainable yield basis. Make wise and efficient use of renewable and non-renewable resources. Enhance the long-term productive capability, quality and capacity of natural ecosystems.	The Project is subject to an environmental assessment to identify the effect on the people and the environment, and to mitigate any adverse effects. The conclusion of the EA Report is that the Project is not expected to result in any significant adverse effects with the implementation of mitigation measures. Any potentially sensitive sites along the FPR will be protected through specific measures for each site that were identified by discipline experts. These will be identified in the Project EnvPPs along with mitigative measures.