5.0 EXISTING ENVIRONMENT

5.1 INTRODUCTION

This chapter characterizes the existing environment for the physical, aquatic, terrestrial and socio-economic environments, and heritage resources in the Project Study Area. The 845 km^2 Project Study Area is located in southeastern Manitoba and encompasses part of the Whiteshell Provincial Park (Map 5-1). It is located in the northern portion of the Regional Study Area that is used to provide context for the physical and terrestrial environmental assessments.

Water comprises 10% of the surface area of the Project Study Area, more than three-quarters of which is contributed by the Winnipeg River. Historically, the Winnipeg River was an important travel route for Aboriginal peoples and during the fur trade. The Pointe du Bois, Slave Falls and Seven Sisters Generating Stations have been in operation on the Winnipeg River for over sixty years.

Most of the land in the Project Study Area is covered by natural vegetation (approximately 84%). Forest is the dominant natural vegetation, followed by tall shrub and marsh types. Human development is concentrated in the western third of the Project Study Area. Agriculture accounts for most of the human development. Settlements, cottage subdivisions and roads comprise the majority of the remaining developed area. The largest settlements are Lac du Bonnet, Pinawa, Seven Sisters Falls and Pointe du Bois.

Although the Project and Regional Study Areas are located entirely within the Lake of the Woods Ecoregion of the Boreal Shield Ecozone (Ecological Stratification Working Group 1996), the physical and terrestrial environments differ considerably in the western and eastern portions of the Project and Regional Study Areas. Approximately 59% of the Project Study Area is in the Pinawa Ecodistrict, 40% is in the Stead Ecodistrict and 1% is in the Whitemouth Ecodistrict. For the remainder of this report, areas within the Stead and Whitemouth Ecodistricts will be referred to as the western portion of the Project or Regional Study Area while areas within the Pinawa Ecodistrict will be referred to as the eastern portion of the Project or Regional Study Area.

5.2 PHYSICAL ENVIRONMENT

The following sections provides an overview of climate, physiography and hydrogeology.

5.2.1 Climate

The Regional Study Area has a continental climate that is characterized by short, warm summers and long, cold winters (Smith et al. 1998). The western portion of the Regional Study Area lies within the Subhumid Low Boreal Ecoclimatic Region while the remainder of the

Regional Study Area lies within the Subhumid Transitional Low Boreal Ecoclimatic Region. Climate parameters vary somewhat across the Regional Study Area with mean annual temperatures and total annual precipitation generally increasing from 1.9°C and 540 mm in the west, and 2.3°C and 650 mm in the east (Smith et al. 1998).

Table 5-1 provides mean temperature and precipitation parameters from 1981-2010 climate normals using data from the Pinawa weather station (Environment Canada 2013a), which is near the center of the Project Study Area. Mean annual temperature at Pinawa was 2.8°C over the 30 year period. Daily temperature ranged from 19.3°C in July to -16.6°C in January. The growing season in terms of total degree days above 5° C averaged 1,744 days. Mean total annual precipitation was about 580 mm, with approximately 460 mm falling as rain. Precipitation was highest during the growing season. Moisture deficits were higher in the eastern portion of the region, but the number of growing degree-days and growing season days were fairly consistent throughout the Regional Study Area at 1,600 and 180, respectively (Smith et al. 1998).

5.2.2 Physiography

The Physical Environment Regional Study Area lies within the Precambrian Shield physiographic region (Bostock 1970). The underlying geology is dominated by undulating eroded crystalline Archean bedrock, which controls physiography throughout the Regional Study Area (Smith et al. 1998; Manitoba Conservation 2002a). Where overburden covers the bedrock substrate, overburden thickness varies greatly and ranges up to 100 m in some areas. Overburden stratigraphy reflects the last glacier retreat eastward and subsequent inundation by Lake Agassiz, consisting mainly of glacial tills, pro-glacial lacustrine and marine sediments and organics (Betcher et al. 1995).

The Project and Regional Study Areas overlap a transition between flat to undulating terrain dominated by glaciolacustrine plains, glacial tills, and fluvial outwash plains in the west and the Canadian Shield, dominated by hummocky granitic rock outcrops, to the east. Exposed bedrock is much more common in the eastern portion of the study areas, forming broadly sloping uplands and lowlands, with low areas filled by glaciolacustrine sediments, glacial till and organics (Smith et al. 1998; Manitoba Conservation 2002a). Substrates toward the west are increasingly comprised of glacial till, glaciolacustrine, and peat deposits (Manitoba Conservation 2002a). In the south part of the Regional Study Area, glaciofluvial deposits become more prevalent in the west while peat-covered lowlands of fens and bogs become dominant toward the southeast (Smith et al. 1998).

Table 5-1: Climate Normals (1981-2010) from Pinawa Weather Station

Climate Parameter	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual
Mean daily temperature deg C	-16.6	-13.2	-5.7	3.9	11.2	16.4	19.3	18.2	12.3	5.1	-4.5	-13.1	2.8
Mean daily max temperature deg C	-11.1	-7.3	0.2	10.3	17.7	22.5	25.2	24.3	18.0	9.7	-0.7	-8.5	8.4
Mean daily min temperature deg C	-22.1	-19.0	-11.6	-2.5	4.6	10.3	13.2	12.0	6.7	0.4	-8.3	-17.6	-2.8
Mean days to last frost in spring	-	-	-	-	-	-	-	-	-	-	-	-	147
Mean days to first frost in fall	-	-	-	-	-	-	-	-	-	-	-	-	262
Mean length frost-free period in days	-	-	-	-	-	-	-	-	-	-	-	-	113
Days with daily max temperature GT 0 deg C	2.6	5.4	16.6	27.4	30.9	30.0	31.0	31.0	30.0	29.2	13.6	3.9	252
Total degree-days Above 0 deg C	0.6	2.8	27.1	148.1	346.7	492.8	596.7	563.9	373.4	172.5	24.8	1.0	2,750
Total degree-days Above 5 deg C	0.0	0.0	2.3	56.2	200.2	342.8	441.7	408.9	225.5	62.5	3.9	0.0	1,744
Total precipitation mm	22	17	26	29	67	99	89	65	62	48	30	26	578
Total rainfall mm	0	2	11	20	65	99	89	65	61	40	10	2	464
Total snowfall cm	21.4	14.6	14.9	9.4	2.1	0.0	0.0	0.0	0.5	7.9	19.2	24.0	114
Mean month end snow depth cm	26.0	25.6	5.6	1.6	0.0	0.0	0.0	0.0	0.0	0.7	11.6	18.8	7.5

Small scale surficial materials mapping (Matile and Keller 2007; 1:250,000 scale) indicates that the Regional Study Area is a relatively even mixture of mineral/bedrock and organic surface materials. Organic deposits comprised approximately 43% of the surface materials in the area (Table 5-2), and were most extensive in the south and west (Map 5-2). Glaciolacustrine and Glacio/morainal (tills) were the next-most abundant surface materials, comprising 22% and 19% of the area, respectively. The former occurred in extensive areas in the northwest of the Regional Study Area, while the latter was more discontinuous, and scattered throughout, but more abundant in the northern half. Exposed bedrock and glaciofluvial surface materials comprised most of the remaining area. The former was concentrated in the northeast, while the latter formed extensive areas in the southwest. Compared with the Regional Study Area, the Project Study Area includes substantially higher proportions of till and glaciolacustrine deposits and a substantially lower proportion of organic deposits (Table 5-2).

The western portion of the Regional Study Area supports a variety of soil types associated with the higher diversity of surface materials and drainage conditions compared with areas to the east (Smith et al. 1998). In upland areas, Dark Gray Chernozems have typically developed on calcareous tills and gravelly glaciofluvial materials. Gray Luvisols are primarily associated with glaciolacustrine deposits (Smith et al. 1964, 1967). In general, peaty Gleysols and Mesisols that are predominantly sedge peat have developed in depressional lowlands.

In contrast, most of the eastern portion of the Regional Study Area is bedrock-controlled terrain characterized by a repeating pattern of bedrock outcrops, thin mineral veneers on slopes and organics in the depressions. The dominant mineral soils are well to excessively drained Dystric Brunisols that have developed on discontinuous, sandy textured, stony veneers of glacial till. Gray Luvisols are found on clayey glaciolacustrine sediments along the Winnipeg River and in low-lying areas. Soils in the depressional peatlands are predominantly Typic (deep) and Terric (shallow) Mesisols and Fibrisols that have developed initially from sedge and then from sphagnum moss peat.

5.2.3 Hydrogeology

Betcher et al. (1995) describe the hydrogeology of southeastern Manitoba. Groundwater flow in the basal bedrock stratigraphic unit is predominantly through fractures. The zone of active groundwater circulation is generally thought to be confined to the upper 60 to 150 m of the bedrock where joints are more common and tend to be more open. Groundwater production is generally limited in areas where the overburden is thin or absent. Records from 196 water wells reported yields below 1.0 L/s for 85% of the wells, with most wells reporting specific capacities less than 0.02 L/s/m.

Aquifers in localized areas of thick sand and gravel deposits are the primary sources for the rural and community water supply. Well yields can exceed 5 L/s of high quality water. Surficial

aquifers elsewhere in southeastern Manitoba tend to be localized with little potential for substantial yields.

Table 5-2: Surficial Materials in the Regional and Project Study Areas

Surface Materials	Regional Study Area	Project Study Area	Local Study Area
Volcanic (exposed bedrock)	9.1	6.9	11.4
Glacial/morainal (till)	19.0	32.6	32.7
Glaciofluvial	6.5	0.5	-
Glaciolacustrine	21.7	34.1	29.4
Lacustrine	0.2	0.0	-
Alluvial	0.4	0.1	0.2
Eolian	0.3	-	-
Wetland (Organic)	42.9	25.7	26.3
Total classified area (ha)	*1,466,667*	*84,462*	*9,808*

Data source: Matile and Keller (2007; 1:250,000 scale).

5.3 AQUATIC ENVIRONMENT

5.3.1 Watersheds and Watercourses

The entire Project Study Area falls within the Winnipeg River watershed. The Winnipeg River watershed, more than 126,000 km^2 in size, covers part of northwestern Ontario, northern Minnesota and eastern Manitoba (North-South Consultants, 2006). The Winnipeg River and its tributaries drain into Lake Winnipeg. There are three generating stations along the Winnipeg River within the Project Study Area − Point du Bois, Slave Falls and Seven Sisters Falls.

There are two major river systems in the Project Study Area that drain into the Winnipeg River. The Whitemouth, with its headwaters in Whitemouth Lake in southeastern Manitoba, drains into the Winnipeg River, at Seven Sisters Falls, just downstream of the Seven Sisters Generating Station. The Lee River drains into Lac du Bonnet, part of the Winnipeg River system. The Pinawa Channel, which forms part of the Lee River, was originally constructed in the early part of the 1900s as a means to augment power production at the Pinawa Dam. Water is diverted from the Winnipeg River through the Pinawa Channel to the Pinawa Dam. While the dam has been decommissioned, water in the Pinawa Channel still flows northward through the Lee River. Boggy Creek, the only other flowing water system of notable size and which the proposed

transmission line will cross, flows into the Lee River. There are few lakes within the Project Study Area. Rice Lake, located in the northern portion of the Project Study Area, is a shallow lake that is approximately 1,200 ha in size.

5.3.2 Hydrology

Discharge of rivers in the Project Study Area has been monitored on a consistent basis only in the Winnipeg and Whitemouth Rivers (Table 5-3). Even though the Winnipeg River has several generating stations, the ability to store water is limited, and all dams operate as run-of-the-river designs. Discharge of the Winnipeg River can be quite variable between years, depending on snow pack and snowmelt patterns in its headwater areas, as well as rainfall events and more broad rainfall patterns (e.g., wet versus dry open water periods). Mean open water (April to November) discharge over the period of 1907-2010 at Slave Falls was 895 m^3/s (Water Survey of Canada, Table 5-3) with a minimum of 215 and a maximum of 2,334 m^3/s. Lowest discharge years occurred in 1931. The highest daily flow of 2,617 m^3/s was recorded in October, 1992 (Point du Bois Spillway Replacement Project EA, 2011). Peak flows generally occur in June and July in the Winnipeg River. Mean open water period discharge in the Whitemouth River, from 1942-2011 was 20.8 m^3/s, with a minimum flow of 0.36 and maximum flow of 80 m^3/s over this time period. Peak flows in the Whitemouth River typically occur anywhere from late April to the end of June. The effects of climate on discharge in the Whitemouth River is much more pronounced and noticeable than in the Winnipeg River.

Table 5-3: Discharge of Winnipeg and Whitemouth Rivers (April to November)[1]

Water Course	Year	Min (m^3/sec)	Max (m^3/sec)	Mean (m^3/sec)
Winnipeg River at Slave Falls (05PF063)	1907 to 2010	214.9	2333.8	894.8
Whitemouth River near Whitemouth (05PH003)	1942-2011	0.36	80.14	20.82

[1]Source Environment Canada 2013

5.3.3 Surface Water Quality

Recent water quality data for rivers in the Project Study Area is limited to the Winnipeg River (between Pointe du Bois and Nutimik Lake) and the Whitemouth River (at PR 307). Older water quality data is available for the Lee River from 1976 to 1984. No water quality data exists for other watercourses in the study area. Water quality can encompass a wide variety of parameters. Some water quality variables have direct relevance to fish habitat.

The degree of acidity of water is measured by pH. The Winnipeg River, Lee River and Whitemouth River all have circum-neutral to slightly basic pH (Table 5-4), ranging from 7.5 to almost 8.0. Conductivity is an indirect measure of the amount of inorganic dissolved

substances in water and is influenced by the geology of the area. Waterbodies that lie in watersheds dominated by granite tend to have low conductivity, as granite is composed of inert materials that do not ionize. The Winnipeg and Lee Rivers, with watersheds underlain mainly by Precambrian shield granite, have relatively low conductivity (Table 5-4). Conductivity in the Whitemouth River is 2.5 times higher than the Winnipeg River, and almost 6 times higher than the lakes located north of the Project Study Area.

Phosphorus is an important plant nutrient in aquatic ecosystems, and is usually the most limiting of all nutrients to algae and macrophytes (higher plants) growth in Canadian lakes and rivers (Schindler, 1972). Excessive amounts of phosphorus can create water quality problems by fueling massive algal blooms, which is the case for many Canadian prairie lakes, including Lake Winnipeg (Environment Canada and Manitoba Water Stewardship, 2011). In comparison to many prairie water bodies however, the Winnipeg River has a much lower total phosphorus concentration, ranging from 0.02 to 0.03 mg/L (Table 5-4). Based on phosphorus concentrations, the Winnipeg River can be considered as being on the high end of meso-trophic to the low end of meso-eutrophic using the Canadian Council of Ministers of the Environment (CCME) phosphorus guidance framework (CCME, 1999). Similarly, the Lee River has a relatively low phosphorus concentration. The Whitemouth River has a higher phosphorus concentration (0.06 mg/L), in part, due to more phosphorus-rich soils that occur in the river's watershed.

Table 5-4: Water Quality in Rivers in the Project Study Area

Water Course And Year	pH	Conductivity (µS/cm)	Total Phosphorus (µg/L)	Dissolved Organic Carbon (mg/L)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Winnipeg River							
Pointe du Bois (00MA05PF0022)[*1] 1996-2005	7.66	102	0.03	9.74	6.0	11.0	NR
Pointe du Bois (00MA05PF0022)[*1] 2006-2008	7.54	99.1	0.03	9.92	4.8	11.9	NR
WPG-2 (upstream of PdB GS)[*2] 2006-2008	7.96	97.1	0.02	NR	5.0	9.6	101
WPG-3 (downstream of PdB GS)[*2] 2006-2008	7.99	98.2	0.02	NR	4.0	9.0	95
Nutimik Lake[*2] 2006-2008	7.97	97.8	0.02	NR	5.0	9.0	93

Table 5-4: Water Quality in Rivers in the Project Study Area

Water Course And Year	pH	Conductivity (µS/cm)	Total Phosphorus (µg/L)	Dissolved Organic Carbon (mg/L)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)
Lee River							
PR#313 (MB05PFS064)[*3] 1976-1984	7.65	112.5	0.03	NR	1.9	10.5	NR
Whitemouth River							
PR#307 (MB05PHS001)[*3] 1973-2013	7.96	259.1	0.06	NR	14.8	8.6	NR

NR=not reported

µS/cm = microSiemens per centimeter; µg//L = micrograms per litre; mg/L = milligrams per litre; % = percent.

Source: [*1]Environment Canada, as reported in North-South Consultants Inc., 2011; [*2]North-South Consultants Inc., 2011; [*3]Manitoba Conservation and Water Stewardship, 2013a

Dissolved Organic Carbon (DOC) is a measure of the amount of colour in water. DOC concentrations in the Winnipeg River are relatively low (under 10 mg/L – Table 5-4) and the water is not heavily coloured. In contrast, small brown-water creeks in eastern Manitoba can have DOC concentrations of over 70 mg/L (Kotak et al., 2005). Data for DOC is not available for the Lee or Whitemouth Rivers, but would be expected to be similar to those of the Winnipeg River. Boggy Creek, which the proposed transmission line will cross, has brown-stained water (Brian Kotak, personal observation).

Turbidity is a measure of the amount of solids in the water and the degree to which they scatter and reflect light. The Winnipeg and Lee Rivers can be considered as having clear (low turbidity) water (Table 5-4), with turbidity values of less than 6 NTU. Turbidity in the Whitemouth River is slightly higher (almost 15 NTU), likely due to the clay-based soils in the watershed which are easily eroded from the land into the water.

Dissolved oxygen plays an important role in aquatic ecosystems. It can determine the types and biomass of aquatic organisms in lakes, rivers and creeks, and also can influence nutrient cycling. Dissolved oxygen can enter aquatic ecosystems through physical means (water turbulence such as waves or through aeration at rapids in creeks and rivers) or through photosynthesis (by algae and macrophytes). The Winnipeg and Lee Rivers are considered well oxygenated. The Whitemouth River has slightly lower dissolved oxygen, but still adequate for fish species.

5.3.4 Lower Trophic Levels

The lower trophic levels, including bacteria, algae (phytoplankton, periphyton), macrophytes and insects (zooplankton, benthic macroinvertebrates) form the base of the aquatic food web. Studies on lower trophic levels in aquatic ecosystems in the Project Study Area are lacking, with the exception of the Winnipeg River. The most recent studies were conducted from as part of the Manitoba Hydro Pointe du Bois Spillway Replacement Project from 2006 to 2008, from upstream of the Pointe du Bois Generating Station (e.g., Lamprey Falls), downstream to Nutimik Lake.

Chlorophyll a is a measure of the biomass of algae in aquatic ecosystems. Seasonal averages for chlorophyll in the Winnipeg River from 2006 to 2008 were low and ranged from 6 to 10 ug/L, with little variability between sampling stations located immediately upstream of the Pointe du Bois Generating Station, downstream to Nutimik Lake (North-South Consultants Inc., 2011). Chlorophyll a concentrations were generally highest in May and August, and was barely above detection limits during the winter. The seasonal averages are consistent with those obtained by Hughes (1983) for studies conducted in 1979 and 1982. From 2006 to 2008, the phytoplankton community was dominated by blue-green algae (cyanophytes) in the summer and fall, along with diatoms (bacillariophytes) in the fall (North-South Consultants Inc., 2011). Phytoplankton community composition was variable between years. Periphyton has not been studied extensively in the Winnipeg River. This algal community was studied immediately below the Pointe du Bois spillway in 2008. Periphyton biomass can be substantial below the spillway, especially under low flow conditions. However, high flows, scouring and drought can dramatically affect the amount of periphyton biomass (North-South Consultants Inc., 2011).

Aquatic macrophytes (plants) also play an important role in aquatic ecosystems by producing oxygen through photosynthesis, acting as a food source and by providing habitat to aquatic insects and fish. Rooted aquatic macrophytes in the Winnipeg River are most common in shallow, lentic (still water, non-flowing) sections of the river (particularly in bays) where exposure to waves and wind is low and where bottom substrates are dominated by silt and clay (North-South Consultants Inc., 2011). In the river section from Eight Foot Falls (just below the Pointe du Bois Generating Station) to the Slave Falls Generating Station, macrophyte communities were dominated by Potamogeton richardsonii, P. cuneata and P. gramineus.

Aquatic invertebrates are a food source for higher trophic levels, including other aquatic invertebrates, fish and terrestrial species (e.g., birds, mammals). Aquatic invertebrates can be divided into 2 broad groups: microinvertebrates (e.g., zooplankton) and macroinvertebrates (including a wide diversity of organisms such as water mites and spiders, crayfish, leeches, mayflies, dragonflies, bivalves, snails, worms). The zooplankton community from 2006 to 2008 in the Winnipeg River was dominated by cyclopoid copepods and cladocerans, with no significant difference in community composition between sampling sites (North-South Consultants Inc., 2011). A minimum of 42 sediment dwelling macroinvertebrates were identified

in off-current and on-current locations in 2006 and 2007 as part of the Pointe du Bois Spillway Replacement Project. The majority of species were found in shallow water habitats near the shoreline. Chironomids (non-biting midges) dominated the benthic macroinvertebrate community. Oligochaeta, Amphipoda, Ephemeroptera and Pisidiidae were also common. The corpulent rams-horn snail (Planorbella corpuleta), thought to have a distribution restricted to the Winnipeg River near Pointe du Bois, was also observed.

5.3.5 Fish Species and Distribution

Recent data on fish species and their distribution are available for the Winnipeg River as part of the Manitoba Hydro Pointe du Bois Spillway Replacement Project (North-South Consultants Inc., 2011), as well as from the Lac du Bonnet portion of the Winnipeg and Whitemouth River as part of the Manitoba Fisheries Inventory and Habitat Classification system (Manitoba Conservation and Water Stewardship, 2013b).

The Winnipeg River has a diverse fish community with 61 native and 11 introduced species (Stewart and Watlkinson, 2004). North-South Consultants Inc. (2011) documented 36 species of fish, representing 15 families, from Lamprey Falls (upstream of the Pointe du Bois Generating Station and slightly outside of the Project Study Area), to downstream of the Slave Falls Generating Station. The main large-bodied fish caught were walleye, sauger, northern pike, yellow perch, burbot, lake whitefish, cisco, longnose sucker, white sucker and lake sturgeon. The main small-bodied fish caught included spottail shiner, emerald shiner, trout perch and logperch. Lake Sturgeon, designated as Endangered in the Winnipeg River by Committee on the Status of Endangered Wildlife in Canada (COSEWIC), was the only fish species at risk captured in their Project Study Area (North-South Consultants Inc., 2011). Block (2001) also captured Lake Sturgeon in the Winnipeg River in the reach between Slave Falls Generating Station to Seven Sisters Generating Station. Appendix A provides a listing of fish species known to, or likely to inhabit the Project Study Area.

Fish surveys have also been conducted on the Lac du Bonnet section of the Winnipeg River through CAMP and HYDROnet. Fish species composition in Lac du Bonnet is very similar to that of the upstream reaches of the Winnipeg River, with a few exceptions. Species not observed upstream of Seven Sisters Generating Station by North-South Consultants Inc. (2011), but observed in Lac du Bonnet, include bluntnose shiner, mimic shiner, weed shiner, fathead minnow, quailback sucker, brown bullhead, channel catfish, tadpole madtom and chestnut lamprey. Lake Sturgeon was caught in the Lac du Bonnet surveys. As there are no obstructions between Lac du Bonnet and the Lee River, most species found in Lac du Bonnet should also be found in the Lee River (Ken Kansas, personal communication).

Fish species composition in the Whitemouth River, as indicated in the Fisheries Inventory and Habitat Classification System (FIHCS) includes at least 33 species, representing 10 families (Manitoba Conservation and Water Stewardship, 2013b). Small-bodied fish observed in the

Whitemouth River, but not observed in the Winnipeg River studies above, included hornyhead chub, pearl dace, common shiner and finescale dace. In addition, the carmine shiner (listed as Threatened under Schedule 1 of the federal Species at Risk Act-(SARA) and chestnut lamprey (listed as Special Concern under Schedule 3 of SARA for the Saskatchewan-Nelson River designatable unit, but is considered as "data deficient", SARA registry website, 2013) have been captured in the Whitemouth River (Manitoba Conservation and Water Stewardship, 2013b). The northern brook lamprey, also found in the Whitemouth River, listed as Special Concern under Schedule 3 of SARA, but its status is "not active" (SARA registry website, 2013). Further details on these species are found in Section 5.3.6 Aquatic Species at Risk.

The carmine shiner is also known to inhabit the Pinawa Channel (Lee River) downstream of the Old Pinawa Dam, the Bird River, Peterson Creek, Tie Creek and the Winnipeg River, downstream of Whitemouth Falls (Carmine Shiner Recovery Team, 2007).

5.3.6 Aquatic Species at Risk

Species at risk are those species listed under SARA, designated by COSEWIC, or listed under the Manitoba Endangered Species Act (MESA). Species can be listed as special concern, threatened, endangered or extirpated, but only those species listed under Schedule 1 of SARA or listed under MESA, receive protection. In addition, the Manitoba Conservation Data Centre (MBCDC) lists species according to their provincial (S1) or regional (S2) rarity. However, S1 and S2 species are not necessarily listed under SARA or MESA, and therefore do not necessarily receive protection. Table 5-5 provides a listing of those species listed under SARA or by COSEWIC, and their associated MBCDC rankings. There are no aquatic species at risk listed under MESA.

Table 5-5: Fish species at risk in watersheds of, and in the immediate area surrounding the Project Study Area

Species	SARA (Schedule 1)	COSEWIC	MCDC Rank	Watershed Distribution
Carmine Shiner (*Notropis percobromus*)	Threatened	Threatened	S2	Whitemouth River, Tie Creek, Pinawa Channel, Peterson Creek, Bird River[(a)]
Chestnut Lamprey (*Ichthyomyzon castaneus*)	Not Listed	Special Concern	S3/S4	Winnipeg River, Whitemouth River[(b,c,d)]
Shortjaw Cisco (*Coregonus zenithicus*)	Not Listed	Threatened	S3	Winnipeg River, George Lake[(b,e)]
Lake Sturgeon (*Acipenser fulvescens*)	Not Listed	Endangered	S2/S3	Winnipeg River

Table 5-5: Fish species at risk in watersheds of, and in the immediate area surrounding the Project Study Area

Species	SARA (Schedule 1)	COSEWIC	MCDC Rank	Watershed Distribution
Northern Brook Lamprey (*Ichthyomyzon fossor*)	Not Listed	Special Concern	S2	Whitemouth River[(d)]
Banded Killifish (*Fundulus diaphanous*)	Not Listed	Not Listed	S1	Crowduck Lake
Deepwater Sculpin (*Myoxocephalus thompsoni*)	Not Listed	Not Listed	S2/S3	George Lake

Note: refer to www.sararegistry.gc.ca for listing criteria and classifications under SARA.

Source:

a) Carmine Shiner Recovery Team, 2007.

b) EBM Science Team Report 2002.

c) COSEWIC, 2010a

d) Manitoba Conservation and Water Stewardship, 2013b

e) Todd 2003; Kotak et al. (2009); Stewart and Watkinson (2004).

The carmine shiner is listed as Threatened under Schedule 1 of SARA, and has a recovery strategy in place (COSEWIC, 2006). It is listed due to its restricted distribution and disjunct populations, not due to population decline. Threats to the species are thought to include species introductions, habitat loss and degradation, pollution and alteration in water flows as a result of stream regulation. The distribution of the carmine shiner in Manitoba is known to include the Whitemouth River (including tributaries of the Birch and Little Birch rivers), Winnipeg River immediately downstream of Whitemouth Falls, Pinawa Channel immediately downstream of the Old Pinawa Dam and the Bird River (first set of rapids upstream from Lac du Bonnet and at the mouth of Peterson Creek, a tributary of the Bird River).

The chestnut lamprey, a parasitic species that grows to 360 mm in size, is listed as Special Concern by COSEWIC. However, it is also listed as “data deficient”, indicating that insufficient information exists for assessment purposes. Chestnut Lamprey is known to inhabit the Winnipeg River (Lac du Bonnet reach) and the Whitemouth River (Manitoba Conservation and Water Stewardship, 2013b). The species can live up to 7-9 years, with the larval (non-parasitic) stage lasting 5-7 years (COSEWIC, 2010a). Adult lampreys feed on the blood and body fluids of host fish (northern pike, white sucker, lake sturgeon, walleye) and die after spawning. It is not an overly mobile species, with a home range thought to be less than 50 km. Population threats are thought to include destruction of spawning habitats, eutrophication and pollution

(DFO, 2010). The northern brook lamprey is also found in the Whitemouth River (Manitoba Conservation and Water Stewardship, 2013b), is listed as Special Concern by COSEWIC, but its status under COSEWIC is also listed as 'non active", meaning that assessment activities are not being undertaken at this time.

The shortjaw cisco is listed as Threatened by COSEWIC but is not listed under Schedule 1 of SARA. The shortjaw cisco is found in George Lake (immediately east of the Project Study Area – Murray and Reist, 2003) and in the Winnipeg River (EBM Science Team Report, 2002). The population status/trend in George Lake is unknown, but the species was found in deeper water (45+m) and may form an important component of the food base for lake trout and burbot in that lake (Murray and Reist, 2003).

There are eight Designatable Units (DUs) identified in Canada for Lake Sturgeon, based on genetic and biogeographic distinctions (COSEWIC, 2006). The lake sturgeon population in the Winnipeg River DU #5 (Winnipeg River-English River) is listed as Endangered by COSEWIC. However, it is not listed under Schedule 1 of SARA. Lake sturgeon was commercially fished in the Winnipeg River up to 1960. A conservation closure was implemented for the Manitoba portion of the river in 1993, however, there is still a popular catch and release fishery for lake sturgeon on the Winnipeg River, particularly downstream of the Pointe du Bois Generating Station (DFO, 2010). Population declines in lake sturgeon generally have been attributed to over-exploitation due to harvest, as well as habitat alteration, loss and fragmentation due to altered water regime and, in particular, hydroelectric dams (DFO, 2010). However, DFO considers the Lake Sturgeon in the Pointe du Bois Generating Station to Slave Falls Generating Station reach of the Winnipeg River (Management Unit 5 in the DFO classification) as healthy and the population trajectory is increasing.

The corpulent rams-horn snail (Planorbella corpulenta) is listed as a mid-priority species by COSEWIC for assessment. While not a listed species, the snail is thought to have a restricted distribution in Manitoba. Previous studies has shown that the species is restricted to the Winnipeg River, in the vicinity of the Pointe du Bois Generating Station (Pip, 2000). North-South Consultants Inc. (2011) found the corpulent rams-horn snail at 19 of 30 sites on the Winnipeg River in their 2007 survey, plus as by-catch in drift trap samples and in gill nets, from Lamprey Falls to just upstream of the Slave Falls Generating Station. This suggests that the range of this species may be larger than previously thought. No corpulent rams-horn snails were observed in 2008 in surveys conducted further downstream on the Winnipeg River, Sturgeon Falls to Nutimik Lake (North-South Consultants Inc. (2011).

5.3.7 Fish Habitat

Fish habitat, as defined under Section 34(1) of the *Fisheries Act*, is very broad. It can be any place that a fish relies on for food, shelter, growth, reproduction or migration. The definition takes into account all life stages (spawning, larval habitat, adult) and seasonal habitat

requirements (e.g., overwintering habitat). Fish habitat, therefore, can be found in a wide variety of water bodies. These include still water and flowing water environments, such as rivers, creeks, lakes, reservoirs, beaver ponds, marshes and swamps. Fish habitat includes both physical habitat attributes (flow, water velocity and discharge, physical structure) and the chemical environment (water quality attributes). Fish habitat can be described in terms of the degree of permanence of water or water flow throughout the year.

Ephemeral watercourses may only have water in their channels during periods of rainfall or snowmelt. Such watercourse are often un-named and do not provide fish habitat. In-stream habitat, such as boulders, large woody debris and rapids are generally absent.

Intermittent watercourses may hold water all year round, but flow may cease during dry years or seasons. These watercourses usually drain low-lying areas such as bogs, fens or marshes. They also tend to have beaver activity associated with them, which may dam up the watercourse, causing flooding upstream and much lower water levels (and often little flow) downstream. There is often a defined channel and water depths are less than 1 m. Discharge is usually less than 0.5 m^3/sec. Fish may inhabit intermittent watercourses seasonally (e.g., during spawning) and provide nursery habitat for larger-bodied fish species such as sucker and northern pike. Small-bodied fish may be found year-round if other factors permit (e.g., if there is sufficient dissolved oxygen or if the watercourse does not freeze to the bottom in winter). As a result, intermittent watercourses provide only marginal fish habitat.

Perennial watercourses/water bodies include larger creeks, rivers, lakes and reservoirs. In the case of flowing systems, water flows continuously for most years. They also have well-defined channels. Severe or prolonged drought may cause some sections of the watercourse to be dry for periods of time (or for flow to cease). Generally, this only occurs in smaller watercourses that have small watersheds. Perennial watercourses provide a diversity of year-round habitat for fish. This includes diversity of flow regime habitats (riffle, pool, run), waterfalls, rapids, diverse substrates (cobble, gravel, sand, silt, clay) and in-stream cover (macrophytes, boulders, undercut banks and large woody debris). Flood plains may or may not be present. Examples of perennial watercourse that PW75 will cross include Boggy Creek, Pinawa Channel, Winnipeg River and the Whitemouth River. With increasing size, the diversity of fish habitats increases, as can the diversity of fish species present. The Winnipeg River, with its very large size, volume and flow, has a very diverse fish community. Mean annual discharge of the Whitemouth River was 14.9 m3/sec (average from 1942-201) and 867 in the Winnipeg River at Slave Falls (average from 1907-2010) [Environment Canada, 2013].

5.3.8 Aquatic Invasive Species

Aquatic invasive species can be introduced to water bodies unintentionally (e.g., zebra mussels in the ballast water of boats) or intentionally (e.g., release of unused baitfish by fishermen). As

these foreign species usually have no indigenous enemies, they can quickly proliferate and displace native species. Once established, invasive species are often difficult to eradicate.

There are several aquatic invasive species present in the Project Study Area and in waters flowing into the Project Study Area. The rainbow smelt (Osmerus mordax) is found in the Winnipeg River in the Project Study Area (North-South Consultants Inc., 2011; Manitoba Conservation and Water Stewardship, 2013b) as well as Lake Winnipeg (Invasive Species Council of Manitoba, 2013; Environment Canada and Manitoba Water Stewardship, 2011). Eubosmina coregoni (Suchy and Hann, 2007) and the spiny water flea (Bythotrephes longimanus) [Environment Canada and Manitoba Water Stewardship, 2011] are aquatic invasive invertebrates which are present in the Winnipeg River. The rusty crayfish (Orconectes rusticus) has been observed in Lake of the Woods, Ontario since 2007 (Ontario Ministry of Natural Resources, 2013) and will likely enter the Manitoba portion of the Winnipeg River in the next decade. The species is already present in Falcon Lake, in southeastern Manitoba (Invasive Species Council of Manitoba, 2013). The zebra mussel, while not observed in Manitoba yet, has been recorded in the Red River watershed in Minnesota (Manitoba Conservation and Water Stewardship, 2012).

Purple loosestrife (Lythrum salicaria) is an invasive aquatic/riparian macrophyte that has been recorded in the RMs of Lac du Bonnet, Reynolds and Whitemouth. No data is available for the LGD of Pinawa.

5.4 TERRESTRIAL ENVIRONMENT

The following provides an overview of terrestrial ecosystems, habitat (vegetation, soils and site factors) and plants.

5.4.1 Overview

Mapped terrestrial habitat (i.e., combinations of vegetation and ecosite type) in the Project Study Area in 1996 was predominantly needleleaf treed vegetation (primary black spruce and jack pine) on a variety of mineral, exposed bedrock and peatland ecosite types. Broadleaf treed vegetation (approximately 26% of land area) was distributed throughout the Project Study Area (Map 5-3), predominantly as trembling aspen vegetation types. Ash, which is classified as a provincially rare plant species by the MBCDC, occurs as ash stands on 3% of the land area.

In the western portion of the Project Study Area, large peatland complexes dominated the area between the Winnipeg River and Pinawa Channel. Agriculture, settlements and cottages comprised much of the remaining area, primarily located along the Winnipeg River and Pinawa Channel. In contrast, the eastern portion of the Project Study Area was dominated by native habitat types, predominantly jack pine and trembling aspen treed vegetation on thin mineral

soils or black spruce on bogs. While not as abundant as black spruce bog, tamarack treed and tall shrub fens were common in the low-lying areas.

Mature post-fire plant communities on shallow mineral soils are characterized by a jack pine (*Pinus banksiana*) / black spruce (*Picea mariana*) overstory, sparse shrub and herb layers and a forest floor covered with feather and haircap mosses and reindeer lichens (Ehnes 1998). The percentages of jack pine, haircap mosses and reindeer lichens are highest on the driest sites while those of black spruce and feathermosses increases as soils become moister. Mature post-fire plant communities on bogs are characterized by a black spruce overstory, a low shrub layer dominated by Labrador tea (*Ledum groenlandicum*) and a ground cover of Sphagnum moss. Mature communities on fens are more variable but usually also include tamarack in the overstory and tall shrubs such as speckled alder and sedges in the understory.

5.4.2 Ecosystem Diversity

Ecosystem diversity is the variety of ecosystem types in a geographic area. Ecosystem diversity was selected as a VEC because maintaining native ecosystem diversity is key to maintaining ecosystem function and biodiversity. Given the indicators included for the ecosystem diversity VEC, this VEC also provides representation for potential Project effects on other important ecosystem components of interest such as wetland function and soil quantity and quality.

The indicators used for the ecosystem diversity VEC were stand level habitat composition and priority habitats. Priority habitats were those native habitat types that were of particular interest for ecological and/or social reasons.

The selected quantitative measures for the habitat composition indicator were total terrestrial habitat area and the area proportions of each of the native broad habitat types. Attention was paid to the spatial distribution of habitat patches representing regionally rare habitat types to determine whether the Project would be affecting the only patch in that portion of the Regional Study Area.

For priority habitats, the criteria used to identify the priority habitats that were of particular ecological interest included regionally rare habitat types, habitats with regionally rare tree species and habitat types or zones that typically make particularly high contributions to ecosystem function (e.g., marsh, riparian zone). Information that could be used to identify habitat types in the Project Study Area that were highly valued by local people was not available. Habitat types especially important to specific wildlife species were addressed by the wildlife assessments.

The Regional Study Area included 69 native broad habitat types, 59 of which occurred in the Project Study Area (see Table B-1, Appendix B). The distribution of area amongst the native broad habitat types was very uneven in both the Regional and the Project Study Area. In each study area, the 10 most common habitat types made up more than 60% of the land area. In

contrast, the 36 least common types made up only 10% of the land area. Twenty-three broad habitat types comprised 1% or greater of the total land area.

Black spruce dominant on wet peatland was the most abundant broad habitat type in the Project Study Area, at 12% of the land area (see Table B-1, Appendix B). This was the only broad habitat type that comprised more than 10% of the land area in both the Project and the Regional Study Area.

Five of the seven regionally rare or uncommon tree species occurred in 25 broad habitat types comprising 8% of the land area in the Project Study Area. Two habitat types, ash on all ecosites and trembling aspen mixture on mineral, comprised almost two-thirds of the habitat containing regionally rare tree species in the Project Study Area.

Eighteen of the 19 regionally rare to uncommon broad habitat types occurred within the Project Study Area. These included one uncommon habitat type, low vegetation on mineral, and 17 rare habitat types. The five rarest habitat types in the Project Study Area were balsam fir dominant on mineral (1 ha), cedar on all ecosites (2 ha), emergent on upper beach, Manitoba maple on all ecosites and tall shrub on mineral, all with less than 100 ha mapped in the study area. Ash on all ecosites was the most abundant regionally rare habitat type in the Project Study Area.

Riparian habitat, qualifies as priority habitat regardless of the specific habitat type. Riparian habitat, which comprised nearly two percent of the Project Study Area, included 52 of the 59 broad habitat types (see Table B-2 in Appendix B). While no individual habitat type comprised more than 10% of the riparian area, the most abundant types were jack pine mixture on outcrop, trembling aspen mixture on mineral, and trembling aspen mixedwood on outcrop.

Patterned peatland complexes were rare in the Project Study Area, with only 36 ha of one complex overlapping the southern edge of the area. This area was entirely comprised of the low vegetation on wet peatland broad habitat type.

Priority habitat patches may meet more than one of the priority habitat criteria. For example, a regionally rare habitat type may also contain rare or uncommon tree species, or may occur within riparian zones or patterned peat complexes. In the Project Study Area, 3% of the total area for regionally rare habitat types also occurred within a riparian zone. Similarly, almost 3% of habitat supporting uncommon to rare tree species overlapped riparian zones.

Cumulative loss in the amount of total native terrestrial habitat due to past and current projects totaled 11.4% of the Regional Study Area and 16.0% of the Project Study Area. Cumulative total terrestrial habitat loss varied considerably by Ecodistrict. For the Regional Study Area, cumulative losses ranged from 25.6% in Ecodistrict 375 to 1.8% in Ecodistrict 376. Similarly, cumulative losses were 15.0% in the western portion of the Regional Study Area compared with 1.8% in the eastern portion. Cumulative percentages of total native terrestrial habitat loss were

higher in the Project Study Area than in the broader Regional Study Area (see Table B-3, Appendix B).

5.4.3 Intactness

Intactness essentially refers to the degree to which an ecosystem has not been altered by human development and activities that remove habitat and increase fragmentation. Intactness was selected as a VEC because it is an umbrella indicator for human effects on ecosystem and wildlife habitat intactness. Effects on wildlife species that are highly sensitive to disturbance and/or fragmentation are not addressed by this VEC.

Linear feature density and core area abundance were the indicators used to evaluate intactness. Core area refers to the areas remaining after removing human features and all areas within 200 m to 500 m of these features. A 500 m buffer was used for all human features except those which typically have lesser ecological effects (for various reasons such as a much lower degree of human use. Features with low human use (transmission lines, trails, dykes and cutlines) were buffered by 200 m.

Linear Feature Density

The Project Study Area included approximately 1,456 km, or 1.92 km/km^2, of mapped linear features in 2012 (Table 5-6). This total length and density was distributed relatively evenly between roads, transmission lines and cutline/trails. Total linear feature density, road density and transmission line density were considerably higher in the western portion of the Project Study Area (Table 5-6; Map 5-4). Cutline/trail density was similar in both portions of the Project Study Area.

Although a linear features dataset was not developed for the rest of the Regional Study Area, visual inspection of the National Road Network dataset suggests that road density in the Project and Regional Study Areas are not greatly different.

Per lineal km, roads are the linear feature type that have the highest adverse effects on ecosystems and species, especially those linear features that are passable year round. In contrast, the ecological effects of cutlines and trails are expected to be lower than those of other linear features for a variety of reasons (e.g., narrower footprint, lower habitat disturbance). Regarding the access function of linear features, it was likely that portions of the mapped cutlines and transmission line rights-of-way were not being used as human or wildlife corridors because they were distant from any current human uses, were accessible only in winter due to natural barriers and/or were partially overgrown. Total linear feature density declined from 1.92 km/km^2 to 1.25 km/km^2 when cutlines and trails were not considered.

Total linear feature density was almost three times higher in the western compared with the eastern portion of the Project Study Area (Table 5-6). The difference was over four times higher when total linear feature density without cutlines and trails was considered.

Table 5-6: Linear Feature Length and Density by Degree of Human Use and Feature Type

Linear Feature		Length (km)			Density (km/km^2)		
Degree of Human Use	**Type**	**All**	**West**	**East**	**All**	**West**	**East**
High Use	Road- all weather	492	379	113	0.65	1.21	0.25
	Road- winter	16	14	2	0.02	0.04	0.00
	Railway	19	7	12	0.02	0.02	0.03
	Airport Runway	1	1	0	0.00	0.00	0.00
	Dyke	9	9	0	0.01	0.03	0.00
High Use Total		537	410	127	0.71	1.31	0.29
Transmission line		412	301	111	0.54	0.96	0.25
Cutline and trail		507	262	246	0.67	0.84	0.55
Total Linear Features		1,456	972	484	1.92	3.10	1.08
Total without cutline and trail		949	710	239	1.25	2.27	0.53

Core Areas

Before removing cutlines and trails, 16 core areas ranging in size from 202 ha to over 25,000 ha overlapped the Project Study Area (note that core areas were truncated after 4 km from the Project Study Area boundary). The total core area in core areas larger than 200 ha encompassed by the Project Study Area was 40,752 ha, or 54% of land area (Table 5-7). When minimum size was increased to 1,000 ha, these totals declined to 37,153 ha and 49% of land area.

Core area was much higher in the eastern two-thirds of the Project Study Area (Table 5-7; Map 5-4) due to the considerably lower degree of development.

The largest core area (25,699 ha) before removing cutlines and trails was in the west-central portion of the Project Study Area (Map 5-4). The two largest core areas (28,252 ha in total) contributed 69% of the core area inside of the Project Study Area.

When cutline and trail buffers were used to reduce core area, total core area in core areas larger than 200 ha encompassed by the Project Study Area declined to 30,336 ha, or 40% of land area. Increasing the minimum size for a core area to 1,000 ha further reduced core area to 31% of land area.

Table 5-7: Core Area Size as a Percentage of Project Study Area Land Area by Minimum Core Area Size, Before and After Removal of Cutline/trail Buffers

	Total Area (ha)			Percentage of Land Area		
Core Areas Larger Than:	**Project Study Area**	**West**	**East**	**Project Study Area**	**West**	**East**
Before Cutline/Trail Buffer Removed						
200 ha	40,752	6,116	34,636	54	20	78
1,000 ha	37,153	4,793	32,359	49	15	72
After Cutline/Trail Buffer Removed						
200 ha	30,336	2,223	28,114	40	7	63
1,000 ha	23,808	0	23,808	31	0	53
Difference When Cutline/Trails are Removed						
200 ha	-10,415	-3,893	-6,522	-14	-12	-15
1,000 ha	-13,345	-4,793	-8,552	-18	-15	-19

5.4.4 Plants

5.4.4.1 Plant Communities

The plant species found in the Regional Study Area are typical of the central Canadian boreal forest. Available information indicates that over 750 vascular terrestrial plant species could potentially occur in the Regional Study Area. Table B-4 in Appendix B provides species lists with common names, scientific names, MBCDC conservation concern ranking (i.e., S-Rank) and the number of locations where the species was found during field studies. Map B-1, Appendix B shows the locations where rare plant surveys were conducted.

5.4.4.2 Priority Plants

The priority plant list for the Regional Study Area consisted of 140 vascular plants and one lichen. Of this total, 27 species are known to occur in the Regional Study Area and 23 have been found in the Project Study Area (see Table B-5 in Appendix B for the species list, conservation concern ranking, the reasons for inclusion as a priority plant species, the number

of known locations in the Habitat Local Study Area and Project Study Area, and very general habitat associations).

Gattinger's agalinis (*Agalinis gattingeri*) was the only species listed as endangered under MESA, SARA and/or COSEWIC that had the potential to occur in the Project Study Area based on known ranges (listed as endangered under all three). This species has not been detected in Manitoba to date. No individuals of this species were observed during field surveys conducted for this Project.

Species listed as threatened under MESA, SARA and/or COSEWIC, and with even a limited potential to occur in the Project Study Area based on known ranges, included western silvery aster (*Symphyotrichum sericeum*; listed as threatened under all three), hackberry (*Celtis occidentalis*; listed as threatened under MESA) and flooded jellyskin lichen (*Leptogium rivulare*; listed as threatened under SARA and COSEWIC). Riddell's goldenrod (*Solidago riddellii*) is listed as threatened under MESA and as special concern under SARA and COSEWIC. Western silvery aster is known to occur approximately 60 km southwest of the Project Study Area. None of these species have been previously recorded in the Project Study Area, and were not encountered during rare plant surveys.

Three of the 26 provincially very rare species (i.e., ranked S1) that could potentially occur in the Project Study Area were found during field studies. Three of the 26 provincially very rare species that could potentially occur in the Project Study Area have been previously recorded there (Map 5-5). Merritt Fernald's sedge (*Carex merritt-fernaldii*) and rattlesnake grass (*Glyceria canadensis*) are known from four locations each and white wood aster (*Eurybia macrophylla*) has been recorded at nine locations. All of these recorded locations were situated outside the Habitat Local Study Area. These species were primarily observed along the Slave Falls tramway, prior to the construction of the access road and on the east side of the Winnipeg River, near the Pointe Du Bois spillway.

Field studies recorded nine of the 54 provincially rare (S2 species), or uncertain rare to very rare (S1S2) plant species that could potentially occur in the Project Study Area (see Map B-2 in Appendix B; Map 5-5), including Timber oat grass (*Danthonia intermedia*), northern flixweed (*Descurainia sophioides*), three-way sedge (*Dulichium arundinaceum*), wooly sweet cicely (*Osmorhiza claytonii*), hop-hornbeam (*Ostrya virginiana*), large-leaved pondweed (*Potamogeton amplifolius*), Robbin's pondweed (*Potamogeton robbinsii*), sessile-fruited arrowhead (*Sagittaria rigida*) and long-spurred violet (*Viola selkirkii*). Hop-hornbeam had the highest number of recorded locations (20 locations) within the Project Study Area, followed by long-spurred violet (6 locations).

Eleven of the remaining 61 priority plant species that could potentially occur in the Project Study Area) have been recorded in the Project Study Area, including leathery grape-fern (*Botrychium multifidum*), slender sedge (*Carex gracillima*), swollen sedge (*Carex intumescens*), stalked sedge (*Carex pedunculata*), black ash (*Fraxinum nigra*), yellow loosestrife (*Lysimachia*

terrestris), water-marigold (*Megalodonta beckii*), arrow-leaved tear-thumb (*Persicaria sagittata*), bog goldenrod (*Solidago uliginosa*), marsh St. John's-wort (*Triadenum fraseri*) and dwarf bilberry (*Vaccinium caespitosum*). Among the uncommon species, black ash was recorded most often within the Project Study Area (24 locations).

5.4.4.3 Invasive Plants

Invasive plants are widely considered a threat to species and ecosystems. Highly invasive plants can crowd out other plant species and, in extreme cases, extirpate species and alter vegetation composition, ecosystem diversity and other ecosystem attributes. Invasive plants are introduced and spread by human activities and natural dispersal mechanisms. Invasive plants are spreading in Manitoba (ISCM 2013).

Field studies detected 22 invasive plant species in the Project Study Area, incidentally during priority plant field surveys and during studies conducted in the Pointe Du Bois Spillway and Slave Falls tramway areas. Invasive species were recorded along the portion of the proposed route that follows an existing transmission line ROW and in cleared areas close to existing infrastructure.

Purple loosestrife (*Lythrum salicaria*) and leafy spurge (*Euphorbia esula*), two highly invasive species in Manitoba, were not encountered along the preliminary preferred route. Reed canary grass (*Phalaris arundinacea*) and ox-eye daisy (*Leucanthemum vulgare*), two other highly invasive species, have been recorded elsewhere in the Project Study Area (note that reed canary grass is classified highly invasive by White et al. (2003) but moderately invasive by ISCM (2013); ox-eye daisy is classified as highly invasive by ISCM (2013), but is not listed by White et al. (2003)). Yellow sweet clover (*Melilotus officinalis*) and Canada thistle (*Cirsium arvense*) were the only moderately invasive species (White et al. 1993) observed during field studies along the proposed preferred route. Canada thistle was the only species observed along the proposed preferred route that was considered a minor invasive in Manitoba (ISCM 2013), as well as a noxious weed (Government of Manitoba 1988).

5.4.5 Wildlife and Habitat

Wildlife species are an important part of the ecosystem. The region is diverse, with up to 342 species of mammals, birds, amphibians, and reptiles could range into the Project Study Area (Map 5-1). Insect species number in the tens of thousands. These include year-round residents, migrants, and occasional visitors. The study area is situated in the Boreal Shield Ecozone, which is dominated by broadly rolling uplands and lowlands. The western portion of the study area lies in the Stead Ecodistrict of the Lake of the Woods Ecoregion and the eastern portion lies in the Pinawa Ecodistrict of the Lake of the Woods Ecoregion (Smith et al. 1998). Project Study Area habitat is mainly forested, with areas of wetland, creeks and lakes (Map 5-3). For a description of the ecosystem and plant communities that comprise wildlife habitat, refer to

Sections 5.4.1 to 5.4.4. Wildlife species found in the Project Study Area and a brief description of their role in ecosystem function are summarized below.

5.4.5.1 Mammals

Mammals play an important role in the biophysical and socio-economic environments. Mammals are components of ecological cycles, provide economic benefits from hunting, guiding, and trapping, and provide a source of food and materials. Up to 51 mammal species could range into the Project Study Area (see Appendix Table C3-1). Mammal groups include small mammals, aquatic and terrestrial furbearers, large carnivores, and ungulates.

Small mammals include mice, voles, shrews, squirrels, and chipmunks, and are the primary food source for numerous species of carnivores, including red fox (*Vulpes vulpes*), arctic fox (*Alopex lagopus*), fisher (*Martes pennanti*), American marten (*Martes americana*), weasels (*Mustela* spp.) and to a lesser extent lynx (*Lynx canadensis*). As a result, the relative regularity of small mammal population cycles may influence predator populations (Korpimäki and Krebs 1996). Small mammals are generally short-lived, prolific breeders, with most species having more than one litter a year (Banfield 1987). In northern Canada, exceptions to this may include, the pygmy shrew (S*orex hoyi*), least chipmunk (*Eutamias minimus*), red squirrel (*Tamiasciurus hudsonicus*), and possibly northern bog lemming (*Synaptomys borealis*) (Banfield 1987).

Nineteen species of small mammals could occur in the Project Study Area. All small mammal species breed in the region. The former Whiteshell Nuclear Research Station operated by AECL conducted research on habitat and population characteristics for several small mammal species (Perrin 1979, Mihok et al. 1985, Vickery et al. 1989) and found that species use significantly different microhabitats, and their habitat separation varied from year to year. Factors that affected habitat selection included canopy and shrub cover abundance, elevation, debris and soil moisture among other factors. Six species of voles, mice, and shrews were observed during previous mammal studies conducted in the Project Study Area (Manitoba Hydro 2011). Red squirrel sign was observed incidentally during field studies. Only red squirrel is included in commercially trapped small mammals. Although data are not available, domestic resource use of small mammals may include red squirrel and other species. The presence of white-tailed jackrabbit (*Lepus townsendii*) is uncertain. Refer to Section 5.5.5.2 Trapping and Section 5.5.5.7 Domestic Resource Use for additional information.

Up to six species of bats could occur in the Project Study Area. The little brown myotis (*Myotis lucifugus*), big brown myotis (*Eptesicus fuscus*), and northern long-eared myotis (*Myotis septentrionalis*) are year-round residents in the study area. These species are able to hibernate underground, in caves and crevices, and mines. There are no known bat hibernacula in the Project Study Area (Manitoba Conservation Data Center records).

Recently, an emergency assessment by COSEWIC concluded that the little brown myotis and northern long-eared myotis are endangered and recommended the species be placed on

Schedule 1 of SARA due to the substantial mortality events occurring in North America caused by the fatal White-Nose Syndrome, a fungus *Pseudogymnoascus destructans,* which affects bats in their hibernacula (Turner et al. 2011, COSEWIC 2012a, COSEWIC 2012b).

The big brown bat is also susceptible to White-nose Syndrome as it is a hibernating species. However, this species has not been listed by COSEWIC. White-nose syndrome has not been detected in Manitoba bats. However, it has been confirmed in five provinces, including Ontario and 22 states, including Minnesota (MNDNR 2013). The Eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*) also occur in the Project Study Area during summer, but migrate to warmer climates in winter. As a result of their migratory behaviour, these species are less susceptible to white-noise syndrome.

Aquatic furbearers are medium-sized mammals that rely on water to provide habitat and access to food. Muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), mink (*Mustela vison*), and river otter (*Lontra candensis*) can be found in the Project Study Area. All are year-round residents and breed in the region. Beaver and muskrat are herbivorous. However, muskrat diet may also include shellfish, frogs, turtles, and salamanders, depending on their availability (Pattie and Hoffmann 1990).

Beaver and muskrat require permanent waterbodies with sufficient depth to allow for under ice access to food sources during winter. Permanent waterbodies with little water movement or fluctuation are preferred (Butler 1991; Clark 2000). Beaver are also able to modify their habitat by building dams and reservoirs, which also creates habitat for numerous other species.

Mink and river otter are carnivorous, with their diet consisting mainly of fish, but may include crustaceans, amphibians, birds, and small mammals (Reid et al. 1994; Perry 1982). These species require permanent waterbodies to provide habitat and access to food. River, streams, and beaver ponds provide suitable habitat (Banfield 1987; Melquist and Dronkert 1998).

Signs of beaver and river otter were observed during systematic aerial surveys conducted in late winter 2013. In subsequent summer surveys, beaver lodges were also prevalent near and within the P1-P4 ROW. Mink was not observed during field studies but was observed during previous mammal studies conducted in the Project Study Area (MMM Group 2008, Manitoba Hydro 2011). These species are trapped, and beaver was the most commonly trapped animal between 1996 and 2012 (Manitoba Conservation and Water Stewardship, unpubl. data). Although data are not available, domestic resource use of aquatic furbearers may include beaver and muskrat. Refer to Section 5.5.5.2 Trapping and Section 5.5.5.7 Domestic Resource Use for additional information.

Terrestrial furbearers spend the majority of their time and derive most or all of their food from upland (terrestrial) habitats. They are medium-sized mammals and include species such as American marten, coyote (*Canis latrans*), and lynx. Up to 17 species of terrestrial furbearers

could occur in the study area. Most terrestrial furbearer species are year-round residents and breed in the region.

Although the wolverine (*Gulo gulo*) may have been present historically in the Project Study Area, it is unlikely to occur today (COSEWIC 2003). No wolverine were trapped in the Project Study Area between 1996 and 2011.

Red fox, lynx, river otter, and mustelid sign was observed during systematic aerial surveys during late winter 2013. Mustelid signs could not be specifically identified but may be indicative of mink, American marten, fisher, or weasels. Coyote, fisher, and snowshoe hare were observed during previous mammal studies conducted in the Project Study Area (MMM Group 2008, Manitoba Hydro 2011).

Most terrestrial furbearers are trapped commercially, including American marten, which was the second most commonly trapped animal after beaver between 1996 and 2012. Although data are not available, domestic resource use of terrestrial furbearers may include snowshoe hare (*Lepus americana*) and many other terrestrial furbearer species. Refer to Section 5.5.5.2 Trapping and Section 5.5.5.7 Domestic Resource Use for additional information.

The presence of American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), long-tailed weasel (*Mustela frenata*), and white-tailed jackrabbit (*Lepus townsendii*) is uncertain. Of the four species, only bobcat is thought to breed in the area, but all could be residents of the region.

Large carnivores that could be found in the study area include black bear (*Ursus americana*), gray wolf (*Canis lupus*), and cougar (*Puma concolor*). The black bear and gray wolf breed in the region, whereas cougars are sparse in eastern Manitoba, and the Project Study Area is unlikely to have a breeding population.

Large carnivores, particularly the gray wolf, can have significant impacts on ungulate populations (Messier 1994), and is thought to be involved, among other factors, in the decline of the regional moose population. In 2012, 74 wolves were counted in Game Hunting Area (GHA) 26, distributed among approximately 25 packs (Manitoba Model Forest 2012). One gray wolf and numerous track signs of other gray wolves were observed during systematic aerial surveys in late winter 2013. These tracks were observed primarily in intact core habitat in the eastern portion of the Project Study Area.

The area can likely support approximately 1,200 black bears, but the black bear population is unknown (Manitoba Model Forest 2011a). Black bears are omnivorous, feeding on a wide variety of plant and animal matter. Occasionally, bears prey on moose calves (Bastille-Rousseau et al. 2011) and could be a significant contributor to moose calf mortality in GHA 26 (Manitoba Model Forest Committee for Cooperative Moose Management, Moose News 2011). One set of black bear tracks was observed incidentally during April 2013 aerial surveys. One

black bear was encountered during breeding bird surveys. Black bear hunting is important and includes recreational and guided hunts in the region.

Gray wolf and black bear are trapped commercially for their fur; however black bear are rarely trapped (Manitoba Conservation and Water Stewardship, unpubl. data). Although data are not available, domestic resource use of large carnivores may include gray wolf and black bear. Refer to Section 5.5.5.2 Trapping and Section 5.5.5.7 Domestic Resource Use and Section 5.5.6 Recreation and Tourism for additional information.

Ungulates are hoofed mammals that contribute to ecosystem function by consuming plants and are a main prey source for large carnivores. Ungulates that could occur in the Project Study Area include white-tailed deer (*Odocoileus virginianus*) and moose (*Alces alces*). Boreal woodland caribou (*Rangifer tarandus*) do not occur in the Project Study Area.

Both white-tailed deer and moose are residents and breed in the region. Moose are commonly found in forest, shrub, and wetland habitats and occupy much of Manitoba (Banfield 1987). The moose population in GHA 26, where the study area is located, is estimated to be 1,307 animals. Moose populations in the Project Study Area have declined and a number of GHAs have been closed to hunting in order to rehabilitate moose numbers (see Section 5.4.5.6 for additional detail).

White-tailed deer are common in the region, and may be expanding their range. To manage disease and parasites carried by deer in the southeast part of the province that have negatively affected moose, deer seasons in GHAs 26 have been extended to reduce deer numbers. A second and third deer licence has also been offered. Seventeen white-tailed deer and one moose were observed during systematic aerial surveys. Track signs for deer were frequent and moose signs were sparse. Hunting for white-tailed deer by lodge and non-lodge outfitting, and for recreational harvest is allowed almost anywhere in GHA 26. Although data are not available, domestic resource use of ungulates is expected. Refer to Section 5.5.6 Recreation and Tourism and Section 5.5.5.7 Domestic Resource Use for additional information.

5.4.5.2 Birds

Approximately 282 out of 400 Manitoba bird species could be found in the region (see Appendix Table C3-2), although some are occasional or rare migrants. Of these, 109 were found during field surveys and 178 have been observed in the region during independent breeding bird surveys for the Manitoba Breeding Bird Atlas (2013) and the Manitoba Model Forest (1997). The relative abundance of species by habitat type recorded during field studies is presented in Appendix C3-5.

Bird groups include waterfowl, waterbirds, birds of prey, upland game birds, woodpeckers, and songbirds and other birds.

Waterfowl and waterbirds are migratory, nesting in Manitoba in spring and wintering in the southern United States and Central and South America. For the purpose of the report, waterfowl include ducks, geese, swans, loons, and cranes; waterbirds include rails, grebes, pelicans, cormorants, herons, egrets, bitterns, gulls, terns, and shorebirds.

Up to 29 species of waterfowl and 65 species of waterbirds (Appendix Table C3-2) may occur in the Project Study Area (Map 5-1). These birds are associated with temporary and permanent waterbodies, and occasionally can be found along rivers, creeks, and beaver floods located in the study area. Although several waterfowl species are common and ecologically diverse, boreal forest wetlands have low overall species diversity and density (Schindler 1998), in contrast to species-rich wetlands of the prairies (Swanson and Duebbert 1989).

Five species of waterfowl (Canada goose (*Branta canadensis)*, common loon (*Gavia immer)*, mallard (*Anas platyrhynchos*), sandhill crane (*Grus canadensis*), and trumpeter swan (*Cygnus buccinator*) were observed during field studies. Ten other waterfowl species were during previous studies conducted in the Project Study Area (Joro Consultants Inc., 2008, Manitoba Hydro 2011, MMM Group 2008).

Ten species of waterbird (e.g., American bittern (*Botaurus lentiginosus*), black tern (*Chlidonias niger*), ring-billed gull (*Larus delawarensis*), yellow rail (*Coturnicops noveboracensis*)) were observed during field studies. Great blue heron (*Ardea herodias*) were observed but no heron rookeries were found during field surveys or were confirmed from listings in Manitoba Conservation Data Centre data in the Project Study Area. Waterbird species that were not observed during field studies for the Project but were observed during previous bird studies conducted in the Project Study Area include belted kingfisher (*Megaceryle alcyon)* and red-necked grebe (*Podiceps grisegena*) (Joro Consultants Inc., 2008, Manitoba Hydro 2011, MMM Group 2008).)

Up to 28 species of birds of prey can be found in the Project Study Area including falcons, hawks, owls, and osprey. Birds of prey occupy a variety of habitats and can be migratory or year-round residents. Rivers, wetlands and forest are important habitat for these species.

Bird of prey species observed during bird surveys include northern saw-whet owl (*Aegolius* acadicus), barred owl (*Strix varia*), long-eared owl (*Asio otus*), broad-winged hawk (*Buteo platypterus*), merlin (*Falco columbarius*), and bald eagle *(Haliaeetus leucocephalus*). Additional bird of prey species that were not observed during field studies but were observed during other bird studies conducted in the Project Study Area include Cooper's hawk (*Accipiter cooperii*) and northern goshawk (*Accipiter gentilis*) (Joro 2008, Manitoba Hydro 2011, MMM Group 2008). With the exception of burrowing owl, all owl species that occur in Manitoba have been recorded in the region (Manitoba's Nocturnal Owl Surveys 1991-2012 unpubl. data).

Nineteen large stick nests that were likely bird of prey or possibly corvid (i.e., American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*) nests were found throughout the Project Study Area, most of which were on the P1-P4 transmission line towers).

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

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

Songbirds and other birds, including passerines, are the most abundant of all bird groups in Manitoba. Some of the bird families in this group such as chickadees, nuthatches, and some finches and jays are year-round residents, while other groups including flycatchers, swallows, thrushes, kinglets, pipits, vireos, tanagers, blackbirds, sparrows, and warblers are migrants. Eighty-one of the 145 species that can be found in the Project Study Area were observed during field studies. The majority of these species are commonly found in the boreal forest, edges or wetlands. The relative abundance of species by habitat type recorded is presented in Appendix C, Table C3-5. Additional songbird species that were not observed during field studies but were observed during previous bird studies conducted in the Project Study Area included Cape May warbler (*Setophaga tigrina*) and cliff swallow (*Petrochelidon pyrrhonota*) (MMM Group 2008, Manitoba Hydro 2011).

Of the 278 bird species that could be found in the Project Study Area, 22 are listed by SARA, the MESA, and/or COSEWIC (Table 5-8). The yellow rail (*Coturnicops noveboracensis*), short-eared owl (*Asio flammeus*), common nighthawk (*Chordeiles minor*), eastern whip-poor-will (*Caprimulgus vociferus*), olive-sided flycatcher (*Contopus borealis*), Canada warbler (*Wilsonia canadensis*), and rusty blackbird (*Euphagus carolinus*) are the species most likely to breed in the Project Study Area. Listed bird species that were detected during 2013 field studies included: trumpeter swan, yellow rail, common nighthawk, eastern whip-poor-will, olive-sided flycatcher, golden-winged warbler (*Vermivora chrysoptera*), Canada warbler, barn swallow (*Hirundo rustica*), and eastern wood-pewee (*Contopus virens*).

Rice Lake is a small, shallow lake in the Project Study Area that potentially provides high quality staging and breeding habitat to a wide-variety of species including two Species at Risk, the yellow rail and the trumpeter swan. A pair of trumpeter swan was observed with young during field surveys. During the PEP process, another wetland was identified as important Canada goose breeding habitat. It is located near Pinawa, Manitoba. Important aquatic and riparian

habitat for waterbirds, waterfowl, terns, gulls and other species likely includes the Winnipeg River and Pinawa Channel.

5.4.5.3 Amphibians and Reptiles

Up to 14 species of amphibians and reptiles can be found in the Project Study Area (Appendix C,Table C3-3). Amphibians generally live and breed in or near water. This group includes salamanders, frogs, and toads.

Eighty-six sites in various wetland habitats were visited over a three-night period between May 29 and June 4, 2013. Eight species were detected. In descending order of abundance, spring peeper (*Hyla crucifer*) was heard most frequently, followed by gray tree frog (*Hyla versicolor*), American toad *(Bufo americanus*), northern leopard frog (*Rana pipiens*), boreal chorus frog (*Pseudacris triseriata*) and wood frog (*Rana sylvatica*). Wood frogs were detected less often as the earliest part of the breeding season where this species calls most frequently, was not sampled.

The northern leopard frog was recorded at 43% of all sample plots, and may be considered common in the Project Study Area. It is listed as a species of special concern by SARA due to habitat loss and degradation.

Green frog (*Hyla cinerea*) and mink frog (*Lihobates septentrionalis*) was not detected during amphibian surveys. Three green frogs were detected incidentally during breeding bird surveys at two plot locations and one mink frog was detected incidentally on automated recorders at one wetland location.

Mudpuppy (*Necturus maculosus*) (Dyzsy 2011) and blue-spotted salamander (*Ambystoma laterale*) (Taylor 2010, Dyszy 2011) are known to occur in the area but were not detected during field studies.

Reptiles, which occur in aquatic and terrestrial habitats, include turtles and snakes. The western painted turtle (*Chrysemys picta*) and red-sided garter snake (*Thamnophis sirtalis*) are found in the study area (MMM Group 2008, Manitoba Hydro 2011). Red-sided garter snake hibernacula are found in the Project Study Area (Manitoba Conservation Data Center). The common snapping turtle (*Chelydra serpentina*) is found in the study area and is listed by SARA as species of special concern due to reproductive loss as a result of adult mortality. One common snapping turtle and a red-sided garter snake was observed during field studies.

5.4.5.4 Insects

In terms of biomass and diversity, insects are the largest animal group. In Canada's boreal ecozone, there are an estimated 22,000 species of insect (Danks and Foottit 1989). In Manitoba, there are 483 species of spiders (Aitchison-Bennell & Dondale 2007), 208 species of

dragonflies (Nature North 2013a), 155 species of butterfly (Nature North 2013b), and 18 species of tiger beetle (Gibson et al. 1997). Two species of insect that may occur in the Project Study Area, the monarch butterfly (*Danaus plexippus)* and the mottled duskywing (*Erynnis martialis)* are listed by SARA and COSEWIC, respectively.

Both SARA and COSEWIC list the monarch butterfly as a species of special concern (SARA 2013, COSEWIC 2013). Monarch butterflies have a large distribution range across southern Manitoba, preferring habitats where milkweed and other wildflowers exist, and winters in forests in central Mexico and coastal California. As milkweed and other wildflowers are widely distributed across southern Manitoba and can be found in the study area, monarch butterflies are expected to occur in the study area.

The mottled duskywing is a medium sized dark-grey skipper found in the eastern United States and in portions of Canada, including southwestern Quebec, southern Ontario, and southeastern Manitoba (Layberry et al. 1998). This species is only found where its host plants New Jersey tea (*Ceanothus americanus*) and prairie redroot (*Ceanothus herbaceus*) (Layberry et al. 1998) are found. In Canada, *Ceanothus* colonies are known to occur within a variety of habitats including oak woodland, pine woodland, roadsides, river banks, oak savannahs, shady hillsides, tall grass prairies and alvars but is always associated with dry, sandy soils (USDA ARS National Genetic Resources Program 2013).

5.4.5.5 Listed Species

Several wildlife species that could occur in the study area have been listed federally by SARA, provincially by MBESA or COSEWIC.

Table 5-8 Wildlife species listed by SARA, MBESA, and/or COSEWIC that may occur in the Study Area. Species detected during field studies are denoted with an asterix.

Table 5-8: Listed Species that Could Occur in the Project Study Area

Group	Species	SARA	MBESA	COSEWIC
Mammals				
	Little Brown Myotis			Endangered
	Northern Long-eared Myotis			Endangered
	Wolverine (western population)			Special Concern
	American Badger			Special Concern
	Grey Fox	Threatened		
Birds				
Waterfowl	Trumpeter Swan*		Endangered	
Waterbirds	Yellow Rail*	Special Concern		
	Least Bittern	Threatened	Endangered	
	Piping Plover	Endangered	Endangered	
	Red Knot	Endangered	Endangered	
	Buff-breasted Sandpiper			Special Concern
	Horned Grebe			Special Concern
Birds of Prey	Peregrine Falcon	Threatened	Endangered	
	Short-eared Owl	Special Concern	Threatened	
Woodpeckers	Red-headed Woodpecker	Threatened	Threatened	
Songbirds and Other Birds	Common Nighthawk*	Threatened	Threatened	
	Eastern Whip-poor-will*	Threatened	Threatened	
	Chimney Swift	Threatened	Threatened	
	Olive-sided Flycatcher*	Threatened		
	Loggerhead Shrike	Endangered	Endangered	

	Golden-winged Warbler*	Threatened	Threatened	
	Canada Warbler*	Threatened	Endangered	
	Rusty Blackbird	Special Concern		
	Bank Swallow			Threatened
	Barn Swallow*			Threatened
	Bobolink			Threatened
	Eastern Wood-pewee*			Special Concern
Reptiles				
	Common Snapping Turtle*	Special Concern		
Amphibians				
	Northern Leopard Frog*	Special Concern		
Insects				
	Monarch Butterfly	Special Concern		Special Concern
	Mottled Duskywing			Endangered

*Species detected that are highly likely breeding in the Project Study Area.

Several of the species listed in Table 5-8 are not considered further in the effects assessment. The wolverine, gray fox and American badger are not discussed further as their ranges occur outside the study area and any occurrences of these species would be considered extra-limital (COSEWIC 2002). The piping plover (CWS 2005), red knot (COSEWIC 2007a), buff-breasted sandpiper (COSEWIC 2012c), and peregrine falcon (White et al. 2002) are not discussed further as no known nesting habitat is thought to exist in the study area and occurrences of these species would be unlikely during migration. Urban habitat, preferred by the chimney swift (Taylor 2003; COSEWIC 2011), does not exist in the amounts sufficient to support these species throughout the Project Study Area, and urban centers are likely to be avoided during routing. Similarly, prairie/farmland habitat needed by the red-headed woodpecker, loggerhead shrike, and bobolink does not occur in the quantities needed in the Project Study Area in proximity to the proposed transmission line for these species. With the exception of red-headed woodpecker, none of these species were recorded during Manitoba Model Forest surveys (Wildlife Resource Consulting Services MB Inc. and Silvitech Consulting 1997), field studies or with Manitoba Breeding Bird Atlas (2013) data; however, it is noted that the occasional occurrences of these species, although highly unlikely, cannot be entirely ruled out.

5.4.5.6 Valued Environmental Components

Moose

Moose extend throughout Manitoba (Banfield 1987). In southern Manitoba, moose occupy areas east of Lake Winnipeg to the Ontario border and south of the Winnipeg River (Pattie and Hoffmann 1990). During spring, summer, and fall moose use riparian habitats, which provide them with aquatic vegetation for browse and respite from hot weather and biting insects (Lankester and Samuel 2007). Additionally, riparian areas often support stands of willow (*Salix* spp.), which is a key forage species for moose (Peek 2007). Moose also prefer habitat with patches of dense, mature forest mixed with regenerating forest resulting from fires or harvest (Irwin 1975). The dense, mature forest offers thermal protection in the winter and summer, as well as sensory and physical barriers to predators (Dussault et al. 2006). Regenerating forest offers young regrowth and a dense shrub layer for forage. Use of regenerating forest typically peaks 11-30 years after a fire, corresponding with the peak growth of browse species (Maier et al. 2005).

Since 2000, moose populations in GHA 26, which contains the Project Study Area (Map 5-1), have been in decline (Table 5-9). From 2000-2010 the moose numbers in GHA 26 decreased from 2,350 animals to 823 (Manitoba Conservation and Water Stewardship unpublished data). This decline was thought to be a result of overharvest, high predator numbers, and the spread of "brainworm" caused by the parasite *Parelaphostrongylus tenuis* (Manitoba Model Forest 2011b); however, the proximal causes of the decline are still being investigated. As a result of the decline, moose hunting was closed for licensed hunters. Parts of GHA 26 (Figure 5-1) were also closed to treaty and Aboriginal rights-based hunters in January 2012 (Government of Manitoba 2012) in "moose protection zones." The most recent aerial survey for moose conducted in winter 2013, estimated 1,307 animals in GHA 26, indicating a potential increase in numbers (Manitoba Conservation and Water Stewardship unpublished data). Core areas and habitat intactness that is strongly associated with moose population size, is described in Section 5.4.3.

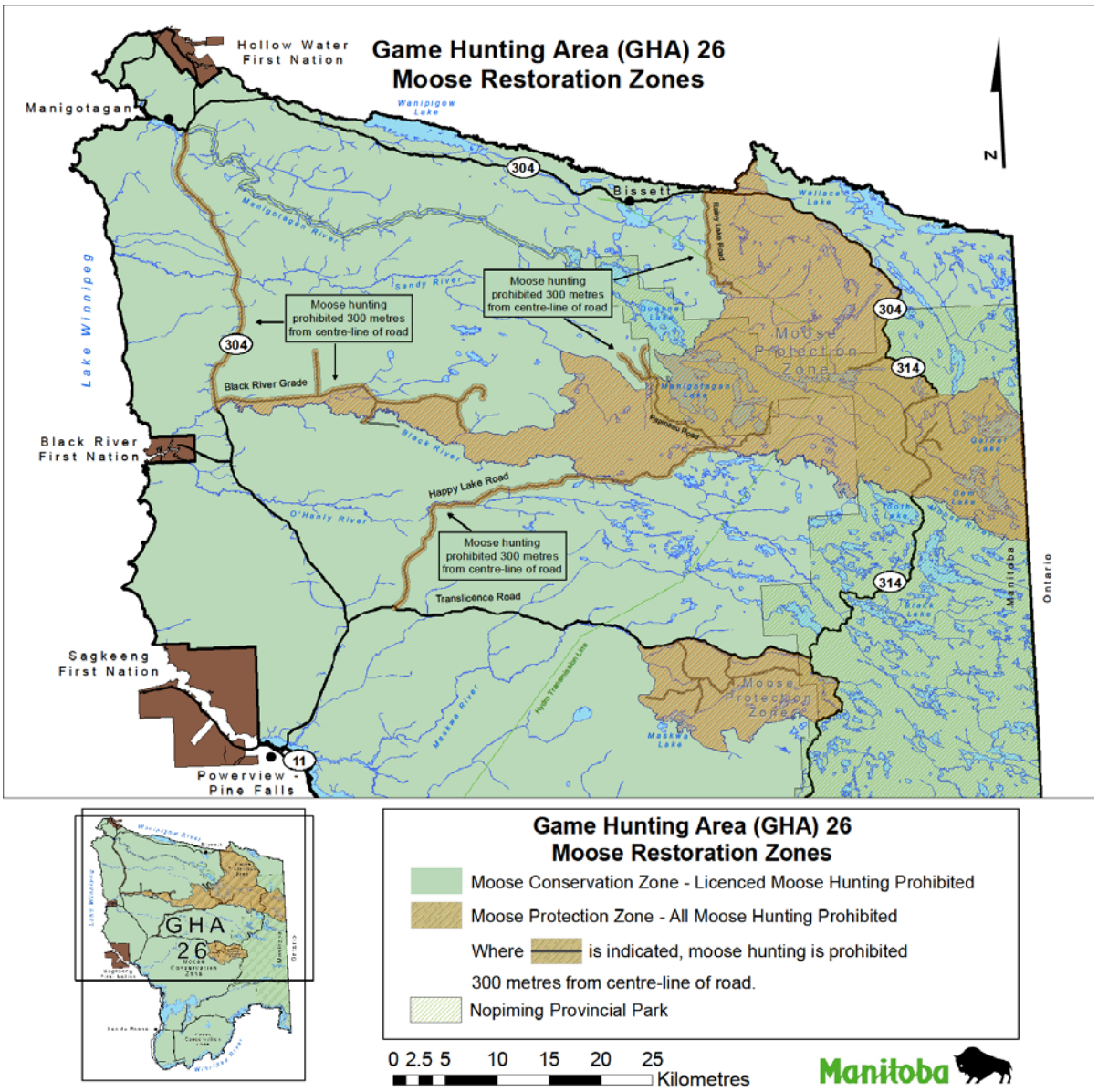
One moose was observed during systematic surveys and a bull was observed incidentally during the PW75 wildlife sensitive sites aerial survey. During late winter systematic surveys, moose tracks were observed primarily in intact core habitat in the eastern portion of the Project Study Area.

Table 5-9: Estimated Moose Population in Game Hunting Area 26, 1980s to 2013

Game Hunting Area	Survey Year	Survey Area (km²)	Overall Density (individuals/km²)	Population Estimate	Confidence Interval ± 95%	Population Range
26	1985/1986	5,469	0.16	850	29.9	647-1,011
	1992/1993	5,960	0.30	1,788	30.5	1,242-2,334
	1999/2000	6,862	0.34	2,350	17.8	1,933-2,767
	2005/2006	6,395	0.22	1,553	16.3	1,300-1,806
	2009/2010	7,702	0.11	823	18.0	675-972
	2012/2013	7,792	0.17	1,307	17.2	1,082-1,532

Source: MCWS unpublished data.

The moose population in the region was likely higher historically than they are today; however, variations in numbers were likely apparent given the effects of natural drivers such as fire that influences habitat quality and predation that limits moose population growth over time. Currently in the Project Study Area and in GHA 26, the moose population is relatively low. Recent management efforts, including the closing of licensed hunting and cooperative domestic resource harvest agreements, appears to have reversed the declining trend. With management, moose populations are anticipated to increase. Habitat in the Project Study Area does not appear to be a substantial limiting factor to moose; however the age of the forest and fire that affects the quality of habitat is important. Moose habitat appears to be abundant but potentially limited, given the increased age of the forest. In the eastern portion of the Project Study Area, unfragmented core areas are large, thereby limiting the potential effects of population drivers such as predators and the transference of disease from white-tailed deer. Because linear feature access is limited to a few highways, roads, cutlines and transmission lines, intact core area habitat is considered to be relatively high. Much of the intactness is associated with protected areas including Provincial Parks and Wildlife Management Areas. This is in contrast to the western portions of the region and in Project Study Area where little moose habitat exists because of anthropogenic development (i.e., agriculture and towns near the Winnipeg River). Major drivers and project linkages that affect predation, harvest and habitat quality are likely to continue playing a large role in limiting future moose populations in the area. Other factors likely to affect moose populations includes climate (e.g., the ability of moose to thermoregulate under increasing temperature, snow depth and fire frequency, under changing climate conditions).



Source: MCWS date unknown.

Figure 5-1: Game Hunting Area 26 Moose Restoration Zones

American Marten

American marten are widespread, abundant, and secure throughout their range in Manitoba (NatureServe 2012). American marten spend much of their time in trees, they also travel and hunt on the ground (Francis and Stephenson 1972; Buskirk and Ruggiero 1994). This species prefers contiguous, mature, or old forest (Chapin et al. 1998). Optimum habitat includes old

growth spruce/fir with a minimum of 30% canopy cover (Clark et al. 1987). A well-established understory of fallen logs and stumps for denning and dense shrub and forb vegetation able to support small mammal prey populations is preferred habitat (Clark et al. 1987). Core areas and habitat intactness that is associated with marten population size, is described in Section 5.4.3.

During extremely cold weather American marten will use den sites throughout their home range. Den sites may consist of squirrel middens, rock piles, hollow logs, and stumps (Buskirk 1984), with a preference for subnivean dens (Wilbert et al. 2000). In warmer weather, American martens may rest in the tree canopy (Buskirk 1984), or select dens in hollow trees (Strickland et al. 1998).

American marten diet varies seasonally (Takats et al. 1999). Voles are preferred prey (Strickland et al. 1998; Banfield 1987), but diet may also include, mice, shrews, snowshoe hare, squirrels, birds, amphibians, insects, fish, and berries (Banfield 1987; Ben-David et al. 1997; Takats et al. 1999). Specific studies were not conducted for American marten. Seven incidental observations of mustelid tracks were made during aerial surveys, most of which were likely left by marten.

Most terrestrial furbearers are trapped commercially, including American marten, which was the second most commonly trapped animal after beaver between 1996 and 2012. A total of 1,543 American martens were trapped in section 70 on registered trapline 21 and in section 60 on traplines 16, 17, 18, 21, 22, 23, 24, and 25 from 1996/1997 to 2011/2012 (MCWS unpublished data). On average, the number of American marten trapped per trapline between 1996 and 2012, was 5.4 (SD=1.79) marten per season (Figure 5-2). Although these data do not provide a comprehensive measure of species abundance because factors such as demand, market prices, fuel prices, and trapper effort influence the data, these data qualitatively suggest that American marten is likely common in the trapping region. In addition, American marten harvests (and by inference, populations) in Manitoba tend to cycle every 4 years or so, apparently in response to vole populations (Berezanski and Duncan 2001; D. Berezanski, pers. comm.), and the Whiteshell Registered Trapline Section data demonstrate this phenomena (Figure 5-3). Marten exhibit a ten year cycle related generally, but not solely, on the availability of food (Weckworth and Hawley 1962 and Cowan and MacKay 1950 in Hessey and Racey 1996).

American marten have been harvested in the Project Study Area in the past for their fur and continue to be harvested today. American marten populations are thought to be stable, and in some cases, have been increasing in Manitoba over the last 30 years. The American marten population is assumed to be stable in the Project Study Area (Map 5-1), although it cycles over time as it is driven primarily by food availability. A relatively large amount of American marten habitat is proportionally higher in the Regional Study Area compared to the Project Study Area where habitat is proportionally less common relative to the land area. The majority of its habitat occurs in the eastern portion of the Project Study Area, where large core areas are intact as compared to the western portions of the Region and Project Study Area where little marten habitat exists because of anthropogenic development (i.e., agriculture and towns near the

Winnipeg River). Linear features, anthropogenic disturbance and habitat availability will continue to play a role in future marten distribution, and its ability to move freely over the landscape. Other factors likely to affect marten populations includes climate (e.g., snow depth and fire frequency and how it may impact habitat under changing climatic conditions).

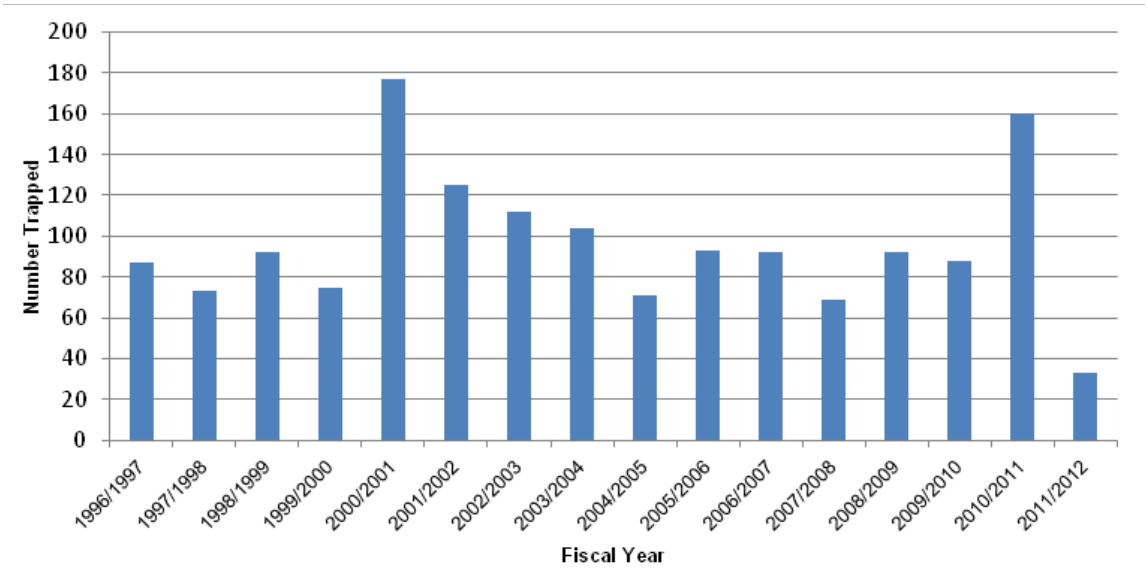


Figure 5-2: American Marten Harvest on Eight Registered Traplines Overlapping the Project Study Area, 1996/1997 to 2011/2012 (MCWS unpublished data)

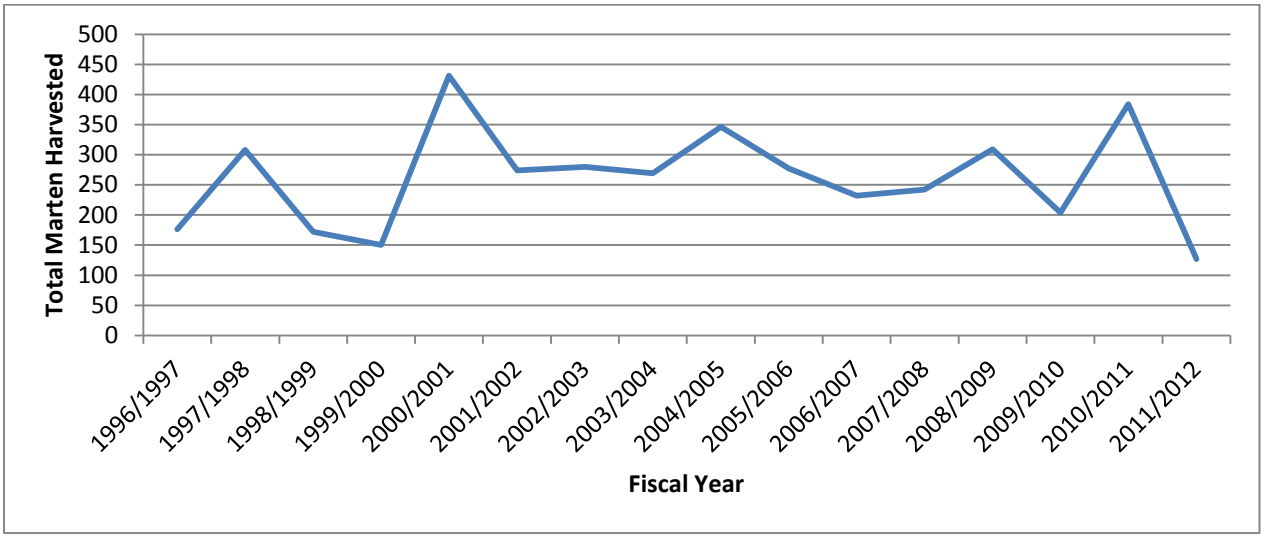


Figure 5-3: American Marten Population Cycle in the Whiteshell Registered Trapline Section, 1996/1997 to 2011/2012 (MCWS unpublished data)

Bald Eagle

Bald eagles are common in Manitoba and nest in all forested areas of the province, with some reports of pairs expanding into and nesting in agricultural areas (Koonz 2003). Historically, DDT was linked with population declines (Buehler 2000; Koonz 2003), but populations have recovered throughout North America. Bald eagle nests are commonly found in mature forests, usually within 2 km of a waterbody, likely associated with prey availability in the area (Buehler 2000). Bald eagle diet consists mainly of fish, but may include small mammals and other birds. They are also opportunistic feeders, scavenging on carrion or stealing food from other raptors (Bird Studies Canada 2013).

When nesting in the vicinity of human activity, bald eagles select nest sites away from the disturbance, often including a visual buffer in the form of existing tree stands (Andrew and Mosher 1982). Nests are usually constructed in large trees that are capable of supporting stick nests and that provide the pair with a view of the surrounding area (Buehler 2000). Bald eagle roosting sites are similar to nesting sites; individuals perch in trees close to waterbodies suitable for foraging. These roosts are generally located much further from waterbodies than nests (Buehler 2000).

Migration patterns are complex and associated with the age of the individual; immature eagles are generally nomadic due to the lack of an established nesting territory, while adult birds will migrate seasonally, usually due to food shortages as a result of seasonal weather changes (Buehler 2000). Some individuals have been known to spend the winter in Manitoba where food sources are readily available (Koonz 2003).

Twenty eight bald eagles and two active nests were observed incidentally during systematic aerial surveys in the Project Study Area. Most of the sightings were observed near large bodies of water, and in particular, along the Winnipeg River system. In August 2013, several adult and juvenile bald eagle were observed scavenging at the landfill disposal facility north of PR 211. During aerial surveys of the P1P4 sub-transmission lines, one bald eagle was observed roosting in a tree over 3 km east of Rice Lake. Other records in the area include observations by the Manitoba Breeding Bird Atlas (2013). The bald eagle was considered rare in Manitoba Model Forest studies (Wildlife Resource Consulting Services MB Inc. and Silvitech Consulting 1997).

Historically, bald eagle populations declined and recovered, and are stable throughout Manitoba today. The population is assumed to be stable in the region and in the Project Study Area (Map 5-1). A relatively large amount of bald eagle habitat occurs in the Project Study Area, but only near rivers and large lakes. It is proportionally more common here as compared to the Regional Study Area on a land area basis because of frequent occurrences of water bodies and watercourses. Within the Project Study Area the majority of bald eagle habitat occurs in the eastern and southern portions along the Winnipeg River. This is supported by the numerous observations of bald eagle in this area. Although habitat is available in the western portion of the Project Study Area as well, habitat may be more limited by anthropogenic disturbances and

habitat loss from agriculture and towns. It should be noted however, that bald eagle are adaptable and relatively tolerate of some human disturbance. For example, bald eagle are known to use human infrastructure for hunting perches and nesting.

Ruffed Grouse

Ruffed grouse are widespread and secure throughout their range (NatureServe 2012) and are common upland game bird hunted in Manitoba (MCWS 2013). Ruffed grouse can be found throughout Manitoba, with the exception of the taiga shield and Hudson plains portions of the province. Ruffed grouse inhabit deciduous and mixedwood forests and are closely associated with aspen (*Populus tremuloides*) (Rusch et al. 2000). Ruffed grouse populations vary considerably over time between the production of young in spring to potentially high mortality in harsh winters. Predators such as lynx, fox and coyote are thought to depress populations. Within a given region, ruffed grouse numbers tend to cycle over time roughly in a 10-year period (Rusch et al. 2000).

Ruffed grouse diet is comprised of herbaceous plant leaves, insects, and berries in summer, and buds, highbush cranberries, and acorns in autumn, and twigs, and catkins of trees in winter (Rusch et al. 2000; Holland et al. 2003a).

Females nest on the ground in concealed locations in hardwood stands and stands that are relatively open at ground level, typically at the base of a tree, stump or boulder and sometimes in deadfalls, brushpiles, in base of partially open stumps, and at the base of multiple-stem shrubs (Johnsgard and Maxson 1989).

The ruffed grouse was considered common in Manitoba Model Forest studies (Wildlife Resource Consulting Services MB Inc. and Silvitech Consulting 1997). Four ruffed grouse were detected during breeding bird surveys at four plots. Evidence of breeding has been confirmed in the Project Study Area by the Manitoba Breeding Bird Atlas (2013). Ruffed grouse are commonly harvested in Manitoba, with harvest limits set at 6 birds daily and 12 in possession for all Game Bird Hunting Zones (Manitoba Conservation and Water Stewardship 2013c). Population harvest statistics are not available.

Although there is uncertainty as to whether ruffed grouse where more common historically, ruffed grouse populations are stable in Manitoba. The ruffed grouse population is assumed to be stable in the Project Study Area (Map 5-1), although it cycles over time regionally in Manitoba as it is driven primarily by other predator-prey cycles. Ruffed grouse have been harvested in the Project Study Area in the past and continue to be harvested today. A relatively large amount of ruffed grouse habitat occurs in the Project Study Area. Habitat is widely distributed because this species tolerates edges, and with some limitations, this species is also found in human altered landscapes, wherever trembling aspen dominated forest and woodlots occur. Limiting factors generally include predators, habitat availability and weather, which are expected to continue to influence future ruffed grouse populations in the Project Study Area.

Canada Warbler

Canada warblers are listed as threatened by SARA and endangered by MBESA. Factors limiting Canada warbler populations may include habitat loss and degradation in wintering and breeding ranges, paved road development, habitat fragmentation, and decline in insect outbreak cycles (COSEWIC 2008c). There has been some indication that Canada warbler populations respond positively to spruce budworm outbreaks then experience population declines in following years (Sleep et al. 2009). There are an estimated 1.4 million Canada warblers in North America and 150,000 in Manitoba (Rocky Mountain Bird Observatory 2007). Breeding Bird Survey data for Canada suggest that the species has declined by 4.5%/year between 1968 and 2007, which amounts to a loss of approximately 85% of the population during that period (COSEWIC 2008c). Core areas and habitat intactness that is associated with Canada warbler population size, is described in Section 5.4.3.

Canada warblers are Neotropical migrants, traveling from their breeding range in the boreal regions of North America to wintering ranges in northern South America (Conway 1999). Fall migration is in August and September (Holland et al. 2003b). In spring, migrants arrive in Manitoba from mid-May to early June (Holland et al. 2003b).

Canada warblers are found in the southern half of the boreal forest in Manitoba, and more commonly in west-central Manitoba (Holland et al. 2003b). Preferred habitat includes moist, mixedwood forests with dense and diverse understory growth, often near open water such as lakes or rivers (Conway 1999). Nesting habitat is usually associated with wet, mossy, forested areas; the nest itself is located in tree stumps, fallen logs, and dense ferns (Conway 1999).

A total of 17 Canada warblers were recorded at 14 sites in the Project Study Area during breeding bird surveys. It was found most often in trembling aspen dominant and trembling aspen mixedwood habitat. Other records in the area include observations from the Manitoba Breeding Bird Atlas (2013). The Canada warbler was considered common in Manitoba Model Forest studies (Wildlife Resource Consulting Services MB Inc. and Silvitech Consulting 1997).

Canada warbler populations have declined in Canada and in Manitoba, although their local population status is unclear in the Project Study Area (Map 5-1). Habitat loss and degradation on wintering and breeding ranges have been postulated as possible causes, but few empirical data exist to support these hypotheses. Canada Warbler habitat is believed to be in decline primarily in its wintering range, where up to 95% of the primary mountain forests have been converted to agriculture since the 1970s. It is unclear if Canada warbler populations are directly sensitive to fragmentation effects; linear features appear to be associated with lower abundances but large-scale fragmentation effects from forestry are not, possibly because of high rates of vegetation regeneration which provides suitable habitat for Canada warbler. Brown-headed cowbird parasitism has also been implicated in affecting Canada warbler populations. A relatively large amount of Canada warbler breeding habitat occurs in the Project Study Area. Although habitat is widely distributed, the majority of Canada warbler habitat in the

Project Study Area is located in the eastern and southern portions, where larger core areas remain intact. Future Canada warbler populations are at risk of further declines from limiting factors that may include habitat loss and degradation, predation and brood parasitism unless steps are taken to reverse this trend.

5.5 SOCIO-ECONOMIC ENVIRONMENT

Map 5-1 shows the Project Study Area for the Project and includes boundaries of the Rural Municipalities (RMs) and the Local Government District (LGD) of Pinawa. It also shows communities in the study area. This section describes the elements of the socio-economic environment needed to understand and assess the potential effects from the Project.

5.5.1 Population

Table 5-10 provides Statistics Canada data on population for the RMs, LGD of Pinawa, and communities for which information is available in the Project Study Area. The table also provides data for the Unorganized Territory Division No. 1. It should be noted that only parts of the RMs of Alexander, Lac du Bonnet, Whitemouth and Reynolds are in the study area. In addition, the boundaries of Unorganized Territory Division No. 1 extend beyond the Project Study Area. It was included as the area encompasses Pointe du Bois and the Whiteshell Provincial Park.

From 2006 to 2011, the RMs of Alexander and Whitemouth, and the Town of Lac du Bonnet have shown growth in population. The Town of Lac du Bonnet had over a 30% growth, while the RM of Lac du Bonnet had a 5% decrease in population. The RM of Reynolds had the largest decrease in population at 8.9%. The LGD of Pinawa and the community of Pinawa also experienced decreases in population between 2006 and 2011. In terms of population density, the Town of Lac du Bonnet and the community of Pinawa had the highest at 590.8 and 378.5 people per square kilometer respectively.

Table 5-11 provides Statistics Canada data on Aboriginal and Non-Aboriginal population in 2006. The percentage of the population that identified as Aboriginal was highest in the RM of Alexander with 26.8%. This was followed by the Town of Lac du Bonnet (16.4%) and the RM of Lac du Bonnet (13.7%). The lowest were the RM of Whitemouth, Unorganized Territory Division No. 1 and the RM of Reynolds with 4.8%, 4.9% and 5.7% respectively.

Table 5-10: Population of Municipalities in the Project Study Area 2006 and 2011[1]

Census Subdivision[1]	Population 2011	Population 2006	Population change 2006 – 2011 (%)	Population Density per square kilometre	Land Area (square kilometre)	Manitoba Health Population 2012[2]
RM of Alexander	2,983	2,978	0.2	1.9	1,568.66	1,767
RM of Lac du Bonnet	2,671[3]	2,812	-5.0[3]	2.4	1,100.17	1,387
Town of Lac du Bonnet	1,328[3]	1,009	31.6[3]	590.8	2.25	2,949
LGD of Pinawa	1,444	1,450	-0.4	11.2	128.47	1,488
Pinawa Population Centre	1,416	1,430	-1.0	378.5	3.74	N/A
RM of Reynolds	1,285	1,410	-8.9	0.4	3,573.79	969
RM of Whitemouth	1,548	1,480	4.6	2.2	703.02	1,724
Unorganized Territory Division No. 1	967	1,130	-14.4	0.2	4,135.93	N/A

[1] Source for Data: Statistics Canada 2012. Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released October 24, 2012. http:/www12.statca.gc.ca/census-recensement/2011/dp:pd/prof/index.cfm?Lang=E.
[2] Source for Manitoba Health Data: Manitoba Health Population Report, June 1, 2012.
[3] After the release of the 2006 and 2011 Census population counts, errors are occasionally uncovered in the data. It is not possible to make changes to the 2006 or 2011 Census data in these tables. Statistics Canada advises to use with caution.

Table 5-11: Aboriginal and Non-Aboriginal Population 2006

Census Subdivision	Total Aboriginal and Non- Aboriginal Population [1]	Aboriginal Identity Population [2]	Non-Aboriginal Identity Population	% Aboriginal Identity Population	% Non-Aboriginal Identity Population
RM of Alexander	2,950	790	2,160	26.8	73.2
RM of Lac du Bonnet	2,770	380	2,390	13.7	86.3
Town of Lac du Bonnet	975	160	815	16.4	83.6
LGD of Pinawa	1,450	175	1,275	12.1	87.9

Table 5-11: Aboriginal and Non-Aboriginal Population 2006

Census Subdivision	Total Aboriginal and Non- Aboriginal Population [1]	Aboriginal Identity Population [2]	Non-Aboriginal Identity Population	% Aboriginal Identity Population	% Non-Aboriginal Identity Population
RM of Reynolds	1,410	80	1,330	5.7	94.3
RM of Whitemouth	1,455	70	1,385	4.8	95.2
Unorganized Territory Division No. 1	1,130	55	1,075	4.9	95.1

1 Grouping of total population into non-Aboriginal and Aboriginal population based on their responses to three questions on the 2006 Census form.

2 Included in the Aboriginal identity population are those persons who reported identifying with at least one Aboriginal group, that is, North American Indian, Métis or Inuit, and/or those who reported being a Treaty Indian or a Registered Indian, as defined by *the Indian Act of Canada*, and/or those who reported they are members of an Indian Band or First Nation.

Source: Statistics Canada 2007. 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. http:/www12.statca.gc.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E.

In terms of the Aboriginal identity population in 2006, information regarding Métis single response was available for the RMs of Alexander and Lac du Bonnet. Out of Aboriginal identity population of 790 in the RM of Alexander, 485 people identified themselves as Métis. In terms of the RM of Lac du Bonnet, 315 people out of an Aboriginal identity population of 380 identified themselves as Métis. This data was unavailable for the remaining census subdivisions in the Project Study Area.

5.5.2 Economy

Construction of the Pointe du Bois Generating Station began in 1909 and was completed in 1926. Winnipeg Hydro built the townsite of Pointe du Bois in the early 1900s. Manitoba Hydro acquired the Pointe du Bois Generating Station in 2002 and is currently replacing the station's spillway. Manitoba Hydro has indicated that it plans to close the community by 2015. Pointe du Bois is located in the Whiteshell Provincial Park. Businesses at Pointe du Bois include a grocery store and post office. Other businesses in the vicinity of Pointe du Bois include Trail End Camp and Outfitters (lodge), Eagle Nest Landing (lodge), George Lake Outfitters, Eight Foot Falls Campground and Sawmill Bay Campground. Recreation and tourism has been and continues to be a major part of the economy in the area. There are a number of cottage developments in the vicinity of Pointe du Bois.

Pinawa, which is located along the Winnipeg River, was originally established to support hydroelectric development in 1901. It was abandoned in 1951 and re-established by AECL in 1963 to house staff for the Whiteshell Laboratories research facility. The laboratory includes a nuclear disposal research and development facility built deep in the granitic rock. Although the Whiteshell Laboratories is in the process of being decommissioned, it still is one of the major employers for the community. Employees of Tantalum Mining Corporation, Manitoba Hydro, the North Eastman Health Authority and several other companies also live in Pinawa. Recreation and tourism is also important to the economy of the area because of Pinawa's location on the Winnipeg River and its proximity to the Whiteshell Provincial Park.

The local economy in the RM of Lac du Bonnet is fairly diverse. Agriculture is an important industry in the western part of the RM, but hydroelectric generation, mining, forestry, and recreation and tourism are also major industries in the RM (RM of Lac du Bonnet website). Recreation and tourism is important because of waterbodies such as the Winnipeg River, Lee River and Lac du Bonnet. These waterbodies support cottage developments. The Town of Lac du Bonnet is a major service centre in the region which provides services such as educational institutions, medical services, retail establishments and banking to the surrounding area.

There are a variety of industries in the RM of Whitemouth although only a small part of the RM is in the study area. The Seven Sisters Generating Station is located along the Winnipeg River, as is the community of Seven Sisters. Both are in the Project Study Area for the Project. The Seven Sisters Generating Station is the largest producer of electricity on the Winnipeg River. Construction of the generating station began in 1929 and was completed in 1952. Manitoba Hydro acquired it and other generating stations on the Winnipeg River when it acquired Winnipeg Hydro. The community of Seven Sisters was built by Winnipeg Electric to house Seven Sisters Generating Station employees. With automation of the station in the 1970s, staff were reduced and some houses removed. Subsequently, Manitoba sold existing homes and made vacant lots available for sale. Manitoba Hydro also invested money into area infrastructure (RM of Whitemouth website). Tourism and recreation are important to the community given its proximity to the Whiteshell Provincial Park.

The RM of Reynolds' economy is primarily based on agriculture and natural resources. Because of its proximity to the Whiteshell Provincial Park, tourism and recreation are also important. The portion of the RM in the Project Study Area borders the Whiteshell Provincial Park.

5.5.2.1 Employment

Table 5-12 provides information on the employment and labour force characteristics of RMs and the LGD in the Project Study Area. The data is also provided for the Province of Manitoba. The participation rate ranged from 52.7% in Alexander to 68.3% in Reynolds. The rate for Manitoba as a whole was 67.3%. Pinawa had the second lowest participation rate at 55.4%.

The employment rate ranged from 47.7% in Alexander to 64.0% in Whitemouth. Reynolds was similar to Whitemouth with an employment rate of 63.5%. Lac du Bonnet, Pinawa and Unorganized Territory Division No. 1 had employment rates between 50 and 60%. The employment rate for Manitoba was 63.6%. Unemployment rates ranged from 2.6% in Whitemouth to 9.6% in Alexander. The rate for Manitoba as a whole was 5.5%.

5.5.2.2 Employment by Sector and Occupation

Table 5-13 outlines employment by key occupational industries for RMs in the Project Study Area and the LGD of Pinawa. Data for the Province of Manitoba as a whole is also provided.

The top occupational categories in Alexander, Lac du Bonnet, and Reynolds were sales and services occupations, and trades, transport and equipment operations and related occupations. In Alexander, this was followed by business, finance and administration occupations, while in Lac du Bonnet and Reynolds it was occupations in primary industry.

In Pinawa, sales and services occupations were the highest, followed by business, finance and administration occupations, and trades, transport and equipment operators and related occupations. In Whitemouth, occupations in primary industry were the highest, followed by trades, transport and equipment operators and related occupations, and sales and services occupations. In Unorganized Territory Division No. 1, trades, transport and equipment operators and related occupations were highest, followed by management occupations, and sales and services occupations. For the Province of Manitoba, sales and services occupations were the highest, followed by business, finance and administration occupations, and trades, transport and equipment operators and related occupations.

Table 5-12: Employment, Participation and Unemployment in the Labour Force (2006)

Labour Force Characteristics [1,2,3]	Alexander (RM)	Lac du Bonnet (RM)	Pinawa (LGD)	Reynolds (RM)	Whitemouth (RM)	Unorganized Territory Division No. 1	Manitoba
Total population 15 years and over by labour force activity [4]	2,570	2,415	830	1,150	1,180	1,005	908,450
In the labour force [4]	1,335	1,495	460	785	780	605	611,280
Employed [5]	1,225	1,410	425	730	755	545	577,710
Unemployed [6]	130	90	35	55	20	55	33,575
Not in labour force [7]	1,215	925	365	360	400	400	297,170
Participation rate [8]	52.7%	61.9%	55.4%	68.3%	66.1%	60.2%	67.3%
Employment rate [9]	47.7%	58.4%	51.2%	63.5%	64.0%	54.2%	63.6%
Unemployment rate [10]	9.6%	6.0%	7.6%	7.0%	2.6%	9.1%	5.5%

1. In the labour force refers to persons who were either employed or unemployed during the week prior to Census Day. Enumeration occurred on May 16th for the 2006 census.
2. Labour force characteristics are derived from 20% sample data.
3. The figures have been subjected to a confidentiality procedure as random rounding whereby values are rounded either up or down to a multiple of 5 or 10.
4. Full time and part-time students were not differentiated. All students (elementary/secondary school) who were not employed were classified as "Not Available for Work".
5. Employed refers to persons 15 years and over, excluding institutional residents who, during the week prior to Census Day did any work at all for pay or in self-employment, or without pay in a family farm, business or professional practice, or were absent from their jobs or business, with or without pay, for the entire week because of vacation, an illness, a labour dispute at their place of work, or any other reasons (2006 Census Dictionary).
6. Unemployed refers to persons who, during the week prior to Census Day, were without paid work or without self-employment work, and were available for work and either had actively looked for paid work in the past four weeks or were on temporary lay-off and expected to return to their job or had definite arrangements to start a new job in four weeks or less (2006 Census Dictionary).
7. Not in the labour force refers to persons who, in the week prior to Census Day, were neither employed or unemployed. It includes students, homemakers, retired workers, seasonal workers in an off season who are not looking for work, and persons that could not work because of a long-term illness or disability (2006 Census Dictionary).
8. Participation rate refers to the number of persons in the labour force in the week prior to Census Day, as a percentage of the population 15 years and over, excluding institutional residents.
9. Employment rate refers to the number of persons employed in the week prior to Census Day, as a percentage of the population 15 years and over, excluding institutional residents.
10. Unemployment rate refers to the number of persons unemployed in the week prior to Census Day, as a percentage of the population 15 years and over, excluding institutional residents.

Source: Statistics Canada 2007.

Table 5-13: Occupational Classifications (2006)

Occupational Classification [1,2,3,4,]	Alexander (RM)	Lac du Bonnet (RM)	Pinawa (LGD)	Reynolds (RM)	Whitemouth (RM)	Unorganized Territory Division No. 1	Manitoba
All Occupations [2]	1,350	1,475	565	785	780	590	601,150
Management occupations	5.9%	7.8%	7.1%	11.5%	5.1%	21.2%	9%
Business, finance & administration occupations	14.8%	11.5%	15.9%	10.8%	10.9%	11.9%	17%
Natural and applied sciences and related occupations	3.0%	5.1%	8.8%	1.3%	3.8%	5.1%	5%
Health occupations	4.4%	4.7%	7.1%	0%	5.1%	5.9%	7%
Occupations in social science, education, government services, religion	10%	7.5%	9.7%	3.8%	1.3%	10.2%	9%
Occupations in art, culture, recreation and sport	1.5%	0.7%	1.8%	1.3%	1.3%	1.7%	2%
Sales and services occupations	24.8%	22%	29.2%	22.9%	18.6%	16.9%	25%
Trades, transport and equipment operators and related occupations	20.4%	22%	14.2%	28.7%	20.5%	25.4%	15%
Occupations in primary industry	9.6%	15.3%	5.3%	14.7%	27.6%	0%	6%
Occupations unique to processing, manufacturing and utilities	5.2%	3.4%	0%	3.2%	5.1%	1.7%	5%

[1] Statistics Canada uses the National Occupational Classification for Statistics 2006 – NOC-S 2006 which identifies jobs by type. Data based on a 20% sample.
[2] Refers to the experienced labour force population 15 years and over, excluding institutional residents who, during the week (Sunday to Saturday) prior to May16, 2006 were employed and the unemployed who had last worked for pay or self-employment in either 2005 or 2006.
[3] The figures in the table have been subjected to random rounding to a multiple of 5 and in some instances 10.
[4] Totals may not add due to rounding.
Source: Statistics Canada 2007.

5.5.3 Property Ownership and Land Use

Land use and property ownership is based on land parcels surveyed under the section-township-range system. Land ownership and tenure in the Project Study Area is a mixture of provincially-owned lands (i.e., Provincial Parks, Wildlife Management Areas [WMAs], ecological reserves), Federal lands and private lands. The majority of land in the Project Study Area is Crown-owned. Provincial Crown lands are designated under Order-in-Council and are administered under *The Crown Lands Act*. There are parcels of private land near the Pointe du Bois townsite, as well as in the Town of Lac du Bonnet, and along the Winnipeg and Lee Rivers. Manitoba Hydro has a lease with the Province of Manitoba for the area encompassing the Pointe du Bois townsite and generating station, extending to the Slave Falls Generating Station. Manitoba Hydro also owns the right-of-way for the P1 to P4 lines which cross east-west through the northern part of the Project Study Area from the Pointe du Bois Station.

5.5.3.1 Provincial Parks

The Province of Manitoba has developed a Parks System Plan under the *Provincial Parks Act* (1993) to conserve ecosystems and maintain biodiversity as well as preserve unique, representative natural, cultural and heritage resources, in addition to providing for outdoor recreational opportunities and experiences in a natural setting. There are four categories of parks listed under the *Provincial Parks Act*.

- Wilderness Park to preserve natural landscapes.
- Natural Park to protect landscapes and provide recreational and resource use opportunities.
- Recreation Park to provide outdoor recreational opportunities.
- Heritage Park to preserve lands of cultural and/or human heritage value.

The Provincial Parks Act by regulation provides Land Use Categories (LUC) to describe activities allowed in each park, an individual park may have one or more LUC. There are six land LUCs:

- Wilderness - to protect unique natural ecosystems in an undisturbed state and provide recreational opportunities that depend on a pristine environment.
- Backcountry - to protect natural landscapes and provide for nature-oriented recreation in a largely undisturbed environment.
- Resource Management - to permit commercial resource development or extraction in a manner that does not compromise the main purpose of the park classification.
- Recreational Development - to accommodate recreational development.

- Heritage - to protect sites containing a resource or resources of cultural or heritage value.
- Access - to provide a point / route of access or a location for a lodge and associated facilities.

The Parks System Plan designates one or more LUC for each park and identifies protected park lands as all parks classified as Wilderness and those portions of other classes of parks in the Wilderness, Backcountry, or Heritage Land Use Categories (Manitoba Natural Resources, 1998). The objective of these LUCs is the preservation of natural landscapes, enduring features and natural ecosystems as well as cultural or heritage sites. Resource development is not allowed in these areas (Richmond, pers. comm., 2013).

As illustrated in Map 5-6, the Project Study Area includes portions of the following four provincial parks: Whiteshell Provincial Park, Pinawa Dam Provincial Park, Pinawa Provincial Park, and Whitemouth Falls Provincial Park. The characteristics of these park lands are as follows:

- Whiteshell Provincial Park is the largest at 2,721 km2 and is designated a natural park under the Provincial Parks Designation Regulation. The park was established to preserve areas that are representative of the Lake of the Woods portion of the Manitoba Lowlands Natural Region and to accommodate a diversity of recreational opportunities and resource uses (Manitoba Natural Resources, 2008). In the Project Study Area the majority of the park is classified under the resource management land use category which provides for commercial resource use and extraction.
- Pinawa Dam Provincial Park is a small park covering an area of 0.25 km2 located on the Winnipeg River and is designated as a heritage park. The park commemorates the first hydro-electric generating station in Manitoba that operated from 1906 – 1951.
- Pinawa Provincial Park is the smallest park in Manitoba, less than 1 km2 (0.684 ha), located south of PR 211 immediately east of the bridge over the Winnipeg River. The park is designated for recreational development and provides a small picnic area and boat launch for day use.
- Whitemouth Falls Provincial Park covers 4.83 km2 and is located west of the junction of PTH 11 and PR 211. The park is divided into two parcels, the area south of the Winnipeg River is designated as recreational development, about 11% (52.35 ha) and the area north of the river as access and backcountry. The backcountry designation in the northern parcel is to protect the habitat of the Great Gray Owl and covers about 74 % (355.92 ha) of the park area with Access at 15.6% (75.07 ha).

5.5.3.2 Areas of Special Interest

Areas of Special Interest (ASIs) are landscapes that have unique ecological features and are under consideration as “candidate sites” for permanent protection. ASIs have generally been

selected for their potential to protect Enduring Features and associated natural, cultural or heritage values. They may include ecological reserves, park reserves, wildlife management areas or provincial forest reserves. Three ASIs are found in the Project Study Area (Map 5-6):

- AECL ASI located north of PR 211 east of the Winnipeg River. This is a large area formerly leased to AECL and returned to the provincial lands registry for consideration as a protected area.
- AECL Addition ASI is a smaller area located immediately north of the larger AECL ASI and adjacent to the west boundary of the Lee River WMA.
- Lee River Addition South ASI found east of Lac Du Bonnet and the Winnipeg River between the two existing land parcels of the Lee River WMA.

5.5.3.3 Wildlife Management Areas (WMAs)

WMAs are Crown land designated by the Province of Manitoba for management of natural habitat for the conservation and enhancement of wildlife. The conservation of biodiversity is an important objective but WMAs are not reserves or sanctuaries. WMAs generally permit hunting and trapping but in some areas restrictions may occur. In some areas access of roads or trails by motor vehicles, powerboats, or airboats may also be restricted. There are two WMAs found in the Project Study Area (Map 5-6):

- Lee River WMA is located east of Lac Du Bonnet, south of PR 313 and west of PR 520. The WMA is composed of two parcels one west of Pinawa Dam Provincial Park and the other just north of the first. The WMA serves to protect the breeding grounds and migration corridors of northern owls including the great gray, northern saw-whet and boreal owls.
- Whitemouth Bog WMA is found east of PR 408 and is composed of two parcels, one west and one east of the Whitemouth Bog Ecological Region. The south boundary of the study area is adjacent to the northern border of the eastern parcel of the WMA but does not include it. The WMA provides habitat for a variety of plants and animals including several rare and uncommon plant species.

5.5.3.4 Provincial Forests

The Province of Manitoba designates and manages Provincial Forests on Crown lands to ensure that forest resources are conserved and effectively managed. A licence or permit is required for harvesting trees in a reserve. Land use in a Provincial Forest may include designation of Ecological Reserves or WMAs and generally hunting, berry picking and recreational trails are allowed. There is one Provincial Forests found within the Project Study Area and one found adjacent (Map 5-6):

- Whiteshell Provincial Forest with an area of 3,422 km2 established in 1931. This forest includes Whiteshell Provincial Park and areas west of the park on the southern boundary of the Project Study Area near the junction of PR 211 and 520 and along the Lee River north of PR 211 just north of Pinawa.
- Agassiz Provincial Forest with an area of 795 km2 established in 1954 where both harvesting and peat moss extraction is allowed. The west border of the Project Study Area is adjacent to the east boundary of the Agassiz Provincial Forest southwest of Lac Du Bonnet at PR 214.

5.5.3.5 Ecological Reserves

The Ecological Reserves Act provides for protection of Ecological Reserves on Crown land designated for protection due to their unique ecological features. Ecological Reserves recognize areas of rare or sensitive species or habitats and provide restrictions on uses and activities to ensure that their natural region features are protected and will endure for future generations. Manitoba's Special Places Strategy and Protected Areas Initiative oversee the management of ecological reserves, ecologically significant areas and other natural or cultural heritage sites in the province.

There are no Ecological Reserves in the Project Study Area, however the Whitemouth Bog Ecological Reserve is located just south of the southern boundary buffered by lands of the Whitemouth Bog WMA. It is located south of PR 307 and was established in 2009 to protect a rich peatland bog, a calcareous fen and many rare or uncommon plants such as orchids and lady's slippers. The ER also supports many small mammals, owls and yellow rail which is a bird listed as a Species of Special Concern under SARA. The least bittern is also found here and is a provincial and nationally threatened species.

5.5.3.6 Conservation Districts

There are no Conservation Districts in the Project Study Area.

5.5.3.7 Reserve Lands

There is no reserve lands in the Project Study Area.

5.5.3.8 Treaty Land Entitlement (TLE)

There are no designated TLE lands located in the Project Study Area. However, there are areas of considerable interest to First Nations for cultural and heritage values in the Whiteshell Provincial Park within close vicinity to the existing Slave Falls transmission line ROW in the southeast section of the Project Study Area: Bannock Point Petroforms, Bannock Point

Rehabilitation Camp north of Betula Lake, Pine Point Petroforms and Tie Creek Petroforms east of Numao Lake (Stevenson, pers.comm., 2013).

In 2006, the 1997 Manitoba Hydro Acccord with Sagkeeng First Nation, expired and a Draft Hydro Accord 2010 is currently under further negotiation. In 2002 Manitoba Hydro purchased from the City of Winnipeg the Pointe du Bois and Seven Sisters Generating Stations which were not part of the 1997 Accord. However, Sagkeeng First Nation has made claim for addressing impacts from these generating stations on their traditional territory which may include a portion if not all the Project Study Area (Stevenson, pers. comm., 2013).

5.5.3.9 Municipal and Local Government District Controls

Local government jurisdiction is generally divided between RMs and urban centres (incorporated cities, towns and villages). Many smaller centres (i.e., Seven Sisters) have no independent municipal status. RMs have a council of elected officials which is represented by a Reeve. Each municipality is responsible for a broad range of land use, infrastructure and regulatory authority. RMs get their authority from the Province of Manitoba, which retains control over regional services such as PTHs and PRs. In some circumstances, certain areas of responsibility may also be subject to regional authorities such as planning districts. The following are the planning districts and their members in the Project Study Area (Map 5-7):

- The RM of Alexander is part of the Winnipeg River Planning District which includes the Town of Powerview-Pine Falls, the latter which is outside of the Project Study Area.
- The RM of Lac du Bonnet and the Town of Lac du Bonnet are part of the Lac du Bonnet Planning District.
- The RMs of Whitemouth and Reynolds are part of the Whitemouth River Planning District. Only a small portion of these RMs are within the Project Study Area.
- The Local Government District (LGD) of Pinawa is not part of a planning district.

Municipal jurisdictions in the Project Study Area have a variety of development controls in place (Table 5-14).

Pointe du Bois is located in the Whiteshell Provincial Park. Under the master plan for the park, the area is zoned recreational development. This designation allows for economic development related to tourism and recreation (Department of Natural Resources. 1983. Whiteshell Provincial Park Master Plan. Parks Branch, Winnipeg).

Under the Winnipeg River Planning District Development Plan, lands in the Project Study Area are designed as “Natural Resource Areas”. Under the RM of Alexander Zoning By-law, lands in the Project Study Area are zoned “Resource Development Zone”.

Under the Lac du Bonnet Planning District Development Plan, lands in the Project Study Area are designated as “Natural Resource” and “Agricultural”. Lands along the Winnipeg and Lee Rivers are generally designated as “Resort”, although some parcels of land along the rivers or in close proximity to the rivers are designated as “Rural Residential”. Under the Lac du Bonnet Zoning By-law, lands in the Project Study Area are generally zoned “RD – Resource Development” and “A40 – Limited Agricultural Zone”. Lands along the Winnipeg and Lee Rivers are zoned “SR – Seasonal Resort Zone”, “OS – Open Space Zone”, “SRC – Commercial Seasonal Recreation Zone”, and “RR – Rural Residential Zone”. Some areas along highways in the rural municipality are zoned “HC – Highway Commercial Zone”. Lands in the Town of Lac du Bonnet are zoned “RG – General Residential Zone”, as well as “M – Industrial Zone” and “HC – Highway Commercial Zone”.

Table 5-14: Development Controls in the Project Study Area

Municipality	Development Plan	Zoning By-Law
RM of Alexander	Winnipeg River Planning District Development Plan By-Law 68/10	RM of Alexander Zoning By-Law 08/98
RM of Lac du Bonnet	Lac du Bonnet Planning District Development Plan By-Law 98-09	Lac du Bonnet Zoning By-Law 19-03
Town of Lac du Bonnet	Lac du Bonnet Planning District Development Plan By-Law 98-09	Lac du Bonnet Zoning By-Law 53/06
RM of Whitemouth	Whitemouth-Reynolds Planning District Development Plan By-Law 27/10	RM of Whitemouth Zoning By-Law 372/03
RM of Reynolds	Whitemouth-Reynolds Planning District Development Plan By-Law 27/10	RM of Reynolds Zoning By-Law 11/03
LGD of Pinawa	LGD of Pinawa Development Plan By-Law 637-02	LGD of Pinawa Zoning By-Law 658-04

Under the LGD of Pinawa Zoning By-law, lands in the Project Study Area are generally zone “NA – Natural Areas Zone”. The Town of Pinawa is zoned for residential, commercial, light industrial, waste disposal and open space zones. Other zones in the LGD include “MH – Heavy Industrial Zone” which are part of the Atomic Energy of Canada Ltd. (AECL) facility. Areas along the Winnipeg River are zoned “RR – Rural Residential Zone” and “NA – Natural Areas Zone”.

Under the Whitemouth-Reynolds Planning District Development Plan, lands in the Project Study Area in the RM of Reynolds are designated as “Crown Land”. The community of Seven Sisters is designated as “P – Principle Centre Policy Area”. Whiteshell Station is designated as “RM2 – Rural Mixed Use 2 Policy Area”.

5.5.4 Infrastructure and Services

Infrastructure includes Provincial Trunk Highways (PTHs), Provincial Roads (PRs), railways, airports, transmission lines, and utilities and services. Map 5-8 shows infrastructure in the Project Study Area.

5.5.4.1 Provincial Trunk Highways and Provincial Roads

There are several PTHs and PRs that cross through the Project Study Area.

PTH 11 crosses north-south through the western part of the study area. It originates at the TransCanada Highway to the south of the Project Study Area and terminates at PTH 59 near Victoria Beach, to the north, which is outside of the Project Study Area.

PR 313 provides highway access to Pointe du Bois. It originates at Lac du Bonnet and terminates at Pointe du Bois. Portions of PR 313 east of the Lee River and in the vicinity of Pointe du Bois are in the Project Study Area.

PR 520 provides access to Pinawa from PR 313. PR 520 is located entirely within the Project Study Area.

A small portion of PR 433 which runs from PR 313 to cottages to along Lac du Bonnet to the north is in the Project Study Area. A portion of PR 307 which runs from PTH 11 easterly through the Whiteshell Provincial Park to the community of Rennie is in the Project Study Area. In addition, PR 211 which runs from PTH 11 to Pinawa is in the Project Study Area.

Highways in Manitoba are generally under the control of Manitoba Infrastructure & Transportation, and are classified as either RTAC routes, Class A1 or Class B1 highways. Each classification has its own maximum gross vehicle weight limits. For RTAC routes, it’s 62,500 kg, for Class A1 highways, it 56, 500 kg and for Class B1 highways, it’s 47,630 kg (*The Highway Traffic Act* 1988). PTH 11 is a RTAC route, while the other PRs in the Project Study Area are classified as Class B1.

Manitoba Hydro also has an access road that runs from the Pointe du Bois to Slave Falls Generating Stations. The road is a private road which is owned by Manitoba Hydro.

5.5.4.2 Oil and Gas Pipelines

There are no oil or gas pipelines in the Project Study Area.

5.5.4.3 Airports/Aerodromes

There is one airport in the Project Study Area – the Lac du Bonnet regional airport which maintained throughout the year by the Lac du Bonnet Airport Authority. The airport is located adjacent to the Winnipeg River and also has a water aerodrome with facilities to accommodate seaplanes.

5.5.4.4 Transmission Lines and Stations

There are several transmission lines and sub-transmission lines in the Project Study Area. There are also numerous distribution lines in the Project Study Area which provide power to communities such as Pinawa, Seven Sisters and Lac du Bonnet, as well as to cottages along the Winnipeg and Lee Rivers, and in the Whiteshell Provincial Park. The major transmission and sub-transmission lines are as follows:

Two double circuit (P1/P2 and P3/P4) 69 kV sub-transmission lines that connect the Pointe du Bois Station to the Rover Station in the City of Winnipeg.

Two 138 kV transmission lines that link the Slave Falls Generating Station to the Pointe du Bois Generating Station.

A portion of a 66 kV sub-transmission line (L78) that links the Pointe du Bois Generating Station to stations at Bernic and Bird Lakes, to the north of the Project Study Area.

Two 115 kV transmission lines (ST2/SR3) that connect the Seven Sisters Generating Station to Lac du Bonnet.

A small portion of two 115 kV transmission lines (GT1/SR3), to the north of Lac du Bonnet, that connect the Great Falls Generating Station to the Lac du Bonnet Station are within the Project Study Area. Other transmission lines egress from the Whiteshell Station to the City of Winnipeg (5 – 115 kV lines), Brereton Lake Station (1 – 115 kV line), and Kenora, Ontario (1 – 115 kV line).

A portion of a 230 kV transmission line which runs from the Slave Falls Generating Station to Scotland Station in the City of Winnipeg crosses through the Project Study Area.

5.5.4.5 Railway Lines

A small portion of the Canadian National Railway (CNR) crosses through the Project Study Area to the west of the Town of Lac du Bonnet. When the Pointe du Bois Generating Station was to

be constructed, a line was built from the CPR line at Lac du Bonnet for the transportation of construction materials and workers. This line, which crossed through the Project Study Area, was abandoned in 1962. An extension to the Slave Falls Generating Station was opened in 1929. Manitoba Hydro recently replaced the line with a private road connecting the two generating stations.

5.5.4.6 Communications Facilities

There are several communications towers in the Project Study Area. Most of the towers are located in the vicinity of the Town of Lac du Bonnet, the communities of Seven Sisters and Pinawa, as well as Pointe du Bois. There are other communications towers along the Winnipeg River and along lakes in the Whiteshell Provincial Park.

5.5.4.7 Utilities and Services

Utilities and services available in communities in the Project Study Area are shown in Table 5-15. Communities in the Project Study Area are Pinawa, Lac du Bonnet, Pointe du Bois, and Seven Sisters. The Town of Lac du Bonnet is incorporated whereas the other communities are not.

The communities of Lac du Bonnet and Pinawa both offer an extensive range of services. They offer emergency (police and fire), as well as medical services. The only hospital in the Project Study Area is in Pinawa which is open 24 hours a day.

Services are more limited at Pointe du Bois. Seven Sisters is a small unincorporated community in the RM of Whitemouth with approximately 180 residents (RM of Whitemouth website). Seven Sisters has a hotel/motel, curling rink, outdoor ice rink, post office, recreational hall and a gas bar/convenience store (RM of Whitemouth website). As with Pointe du Bois, the community of Seven Sisters was established because of the development of a generating station in proximity to the community.

Regional Health Authority

The Project Study Area is located in the Interlake Regional Health Authority (RHA) district. The area encompasses a large are – extending north of the City of Winnipeg to the 53rd parallel where it extends between Lake Manitoba and Lake Winnipeg. The Interlake RHA services care to 78,815 people (Manitoba Health 2010). Programs and services include hospitals and long term care, care homes, public health and other community-based programs. Infant mortality is 5.1 (per 1,000 live births of children under one year of age), life expectancy at birth is 78.7 years and 18.6 years at the age of 65 (Statistics Canada, Health Profiles, 2011). In the Province of Manitoba, the infant mortality rate was 6.6 (per 1,000 live births of children under one year of

age), while life expectancy at birth was 79.3 years and 19.4 years at the age of 65 years (Statistics Canada, Health Profiles, 2011).

Table 5-15: Utilities and Services in Communities in the Project Study Area

Utilities and Services	Pinawa	Lac du Bonnet	Pointe du Bois	Seven Sisters
Public Water System	√	√	√	√
Municipal Sewer	√	√	√	√
Hydro Electricity	√	√	√	√
Telephone	√	√	√	√
Internet	√	√	√	√
RCMP/Community Police	√	√		
Fire Department/Hall	√	√		
Hospital	√			
Ambulance Service	√	√		
Medical Clinic	√	√		
Bank/Financial Centre	√	√		
Community Centre	√	√	√	√
Arena	√	√		√
Hotels	√	√		√
Post Office	√	√	√	√
Garbage Services	√	√		
Recycling	√	√	√	

5.5.5 Resource Use

5.5.5.1 Forestry

For forest administrative purposes, MCWS, Forestry Branch has divided the Province into administrative units of Forest Sections which are comprised of Forest Management Units (FMU) [Manitoba Government website, 2013b]. The Project Study Area is contained predominately within FMU 24, except for the portion of Whiteshell Provincial Park, which is contained in FMU 30. Both FMUs are contained within Pineland Forest Section. Commercial timber harvesting is administered by MCWS through a crown land tenure system (Manitoba Government website, 2013b). Within the Project Study Area, there are currently five (5) Timber Sale Areas, of which three (3) are Timber Sale Agreements and two (2) are Timber Permits. The last commercial timber harvesting activity in the Project Study Area was in 2009, which corresponds with the

closure of the Tembec Industries Inc. newsprint mill in Pine Falls. Commercial timber harvesting in Whiteshell Provincial Park was prohibited by the Manitoba Government in 2009. Map 5-9 displays the FMU boundaries and Timber Sale Areas.

MCWS, Forestry Branch characterizes and quantifies the commercial forest area of Manitoba (Manitoba Government website, 2013b) through the development and are maintenance of Forest Resource Inventories (Manitoba Conservation, 2007). The Forest Resource Inventories are spatial and tabular database products developed from aerial photograph interpretation and maintained and managed within a Geographic Information System environment. The 1996 inventory for FMU 24 & 30 was updated by MCWS, up to and including 2009, for forest fires, timber harvest depletions and plantations. There have not been any forest disturbances or reforestation activities within the Project Study Area since the MCWS update; therefore, updates to the inventory were not required in order to conduct the Project assessment.

Productive Forestland

Productive forestland parameters have been selected to assess the potential effects of the Project on the commercial forest variables within FMU 24 & 30 of Pineland Forest Section. Productive forestland parameters include commercial forest area, Annual Allowable Cut, and the volume of standing timber.

The MCWS *Wood Supply Analysis Report, Forest Management Unit 24* (2010) provides an area summary for FMU 24 and the area summary for FMU 30 was provided by the MCWS Forestry Branch (Doig pers.comm., 2013), as presented in Table 5-16.

Table 5-16: Forest Management Unit 24 & 30 Area Classification

FMU	Classification	Area (hectares)	Percent of Total (%)
24	Non-forested	377,025	30.3
	Non-productive Forest	280,747	22.6
	Productive Forest	585,075	47.1
	Total	**1,242,847**	**100**
30	Non-forested	82,909	25.5
	Non-productive Forest	70,282	21.6
	Productive Forest	172,164	52.9
	Total	**325,355**	**100**

Source: Manitoba Conservation, 2010; Doig pers.comm., 2013

Annual Allowable Cut

The MCWS *Wood Supply Analysis Report, Forest Management Unit 24* (2010) provides the AAC for FMU 24. MCWS, Forestry Branch no longer has responsibility within the Whiteshell Provincial Park (Liu, pers. Comm., 2013). Therefore, no new AAC determinations will be conducted for FMU 30. The AAC for FMU 24 is presented in Table 5-17.

Table 5-17: Annual Allowable Cut for FMU 24 & 30

FMU	Net Harvest Level[1] – Total Harvest Scenario		
	Softwood (m^3)	Hardwood (m^3)	Total (m^3)
24	174,112	106,093	280,205
30	N/A	N/A	N/A
Total	174,112	106,093	280,205

Source: Manitoba Conservation, 2010 & Liu, pers. comm. 2013.

[1]Excludes spatial modeling and wildlife tree constraints

Standing Timber

The MCWS *Wood Supply Analysis Report, Forest Management Unit 24* (2010) provides approximations of Total Growing Stock for FMU 24. MCWS, Forestry Branch no longer has responsibility within the Whiteshell Provincial Park (Liu, pers. Comm., 2013). Therefore, total growing stock approximations are not available for FMU 30. The total growing stock approximations for FMU 24 is presented in Table 5-18.

Table 5-18: Total Growing Stock for FMU 24 & 30

FMU	Total Growing Stock[1]		
	Softwood (m^3)	Hardwood (m^3)	Total (m^3)
24	18,500,000	15,200,000	33,700,000
30	N/A	N/A	N/A
Total	18,500,000	15,200,000	33,700,000

Source: Manitoba Conservation, 2010 & Liu, pers. comm. 2013.

[1]Approximate values

High Value Forest Sites

High value forest areas, within the Project Study Area, have been identified for both crown and private land areas. High value forest areas are comprised of research and monitoring areas, plantation areas and privately managed woodlots and shelterbelts. The only research and monitoring areas contained within the Project Study Area are four (4) long-term permanent sample plots. MCWS maintains the permanent sample plots to measure and quantify tree and plant growth and monitor ecosystem changes over time. There are no other long-term monitoring sites or MCWS tree improvement program sites located within the Project Study Area. There are nine (9) plantation blocks (94.5 ha in total), established by MCWS in 2004, located within the Whiteshell Provincial Park portion of the Project Study Area. There are nine (9) managed woodlot areas of which one (1) was established under the Manitoba Model Forest program and the remaining eight (8) are located on private land and are delivered under the Manitoba Forestry Association, Private Land Resource Planning program (Manitoba Forestry Association website, 2013). The Private Land Resource Planning program promotes sustainable woodlot management through the delivery of comprehensive resource management plans. The FRI identified 5,441 ha of federal, municipal and private managed productive forestlands within the Project Study Area. Photo interpretation, within the Local Study Area, identifies 8.5 ha of natural forest shelterbelts. Map 5-10 displays the high value forest areas within the Project Study Area.

5.5.5.2 Trapping

The Project Study Area falls within the Eastern Registered Trap Line (RTL) district. Portions of the Whiteshell registered trapline section is within the Project Study Area. Within the RTL section, there are a number of individual RTLs that are located within the Project Study Area (Map 5-11). These include parts of # 16, 17, and 18, and # 21 to 25. Part of the Lac du Bonnet RTL #21 west of the Whiteshell Provincial Park is in the study area. There are no RTLs in the Project Study Area around Pinawa and Alexander as these areas are part of an Open Trapping Area Zone. Beaver is the most commonly trapped animal in the Project Study Area. Other commonly trapped animals include marten, muskrat, otter, mink and squirrels.

5.5.5.3 Bait Fishing

There are six bait blocks in the Project Study Area – 174, 175, 175A, 176, 177 and 178. The Pointe du Bois commercial bait block (176) encompasses an area that includes the generating station, as well as an area that extends along the Winnipeg River to Dorothy Lake. The bait block extends into the RM of Alexander west of the Whiteshell Provincial Park and south of PR 313. Bait blocks 174, 175A, 176 and 177 have either bait fishing and/or leech harvesting activities. There are no active operations in bait blocks 175 and 178.

5.5.5.4 Wild Rice Harvesting

Wild rice lakes are identified according to the section-township-range system and licenses are issued for development, production or block harvesting. Within the Project Study Area, there are several waterbodies where licences have been issued. This includes the Pinawa Channel (parts of the northern halves of section 9 and 10, part of the southwest quarter of section 16, part of section 17, part of the northeast quarter of section 18, part of the eastern half of section 19, part of the western half of sections 20 and 29, part of the northern and southern halves of section 32, township 14, range 12 EPM, and part of the western halves of section 5, 8 and 16, and parts of the southern halves of sections 17 and 21).

There is also wild rice harvesting on an unnamed lake lying north of Dorothy Lake (part of the eastern half of section 35 and the western half of section 36, township 14, range 13 EPM). It also occurs on Tar Lake (part of the western half of section 5, part of the eastern half of section 6, part of the southeastern of section 7, part of the northern half of section 8 and part of the southwest quarter of section 8). Rice Lake and Rice Creek also have wild rice licences (part of the northwest quarter of section 25, part of the northern and southern halves of section 26, 27 and 35, as well as part of the southwest quarter of section 36. There is also a license on an unnamed lake lying northeast of Rice Lake in the northern half of section 36, township 15, range 13 EPM. There is a facility that processes wild rice to the southeast of Rice Lake.

5.5.5.5 Aggregates and Mineral Deposits

There are a number of quarry leases in the Project Study Area (Manitoba Government, 2013d). Quarry leases occur in the vicinity of the Pointe du Bois Generating Station and northwest of the Slave Falls Generating Station. Quarry leases also exists to the south of Rice Lake and the north of the community of Lac du Bonnet in the northwest portion of the Project Study Area. Quarry leases also occur to the west of the Seven Sisters Generating Station in the southwest corner of the Project Study Area.

AECL holds a surface lease and an underground lease in the Lac du Bonnet granite batholith near Pinawa which will expire in 2014. The leases enable AECL to construct an underground research laboratory to conduct research regarding options for spent nuclear fuel waste. There are plans to decommission the laboratory.

5.5.5.6 Agriculture

The study is largely forested, although agriculture is present in the western and southwestern portions of the Project Study Area, in the vicinity of the Winnipeg River.

5.5.5.7 Domestic Resource Use

First Nations have rich traditions based on the ecological diversity of the boreal forest located in the Eastern region of Lake Winnipeg (Keewatin Tribal Council 2005). Historically, woodland caribou, moose, and deer were hunted in the forests, marten, fisher, lynx, wolf, bear, coyote, snowshoe rabbit, otter, mink, muskrat and beaver were taken not only for fur but for food as well (Elias et al 1997). In season, waterfowl (geese and ducks) and wild rice were harvested along with berries (blueberries, raspberries, etc.) and other fruits (wild plums) (Elias et al 1997). Plant medicines such as wild ginger, could also be found (Elias et al 1997).

As of 1993 domestic resource use included berry picking, hunting, fishing, harvesting wood for fuel, wild rice harvesting, and trapping (Elias et al 1997). The main traditional foods consumed in the region include lake whitefish, walleye, deer, moose, ducks, geese, blueberries, strawberries, raspberries, and wild rice (Chan et al 2010).

During the Public Engagement Program (PEP) for the Project, a number of trails used to access registered traplines in the Project Study Area were identified. Trails identified during the PEP are along the existing P1 to P4 sub-transmission line ROW, as well as the Slave Falls transmission line ROW. Other trails were identified in the vicinity of Pointe du Bois in the Whiteshell Provincial Park, as well as along the boundary of the park in the Project Study Area. Other trails were identified crossing north-south from the Whiteshell Provincial Parks boundary to PR 313 where it is outside of the Project Study Area.

Other information identified through the PEP included areas used by wildlife including deer and upland game bird high use areas, sensitive trapping areas and moose high use areas. These areas were primarily identified around Pointe du Bois, and in the area immediately east of Pointe du Bois, outside of the Whiteshell Provincial Park. Other areas identified were in the eastern portion of the LGD of Pinawa. A trapper's cabin was identified along the P1 to P4 sub-transmission line ROW. In addition, bear bait areas were identified along the P1 to P4 sub-transmission line ROW.

5.5.6 Recreation and Tourism

The Project Study Area is composed of provincially-owned lands with large tracts of crown land as well as organized communities and rural municipalities including Pinawa, Lac Du Bonnet, Seven Sisters, and Pointe Du Bois, in addition to private lands generally found in the community areas. Crown Lands of interest for recreation and tourism within the Project Study Area include Provincial Parks, ASIs and WMAs.

The study area is approximately 2,050 km^2 in size located in southeastern Manitoba with Pointe du Bois located in the northwest portion of the Whiteshell Provincial Park. It is a popular area for recreation and tourism being located in the Lake of the Woods Natural Region with a number of

diverse water ways emanating from the Winnipeg River system and attractive landscapes of the boreal forest. The Project Study Area is popular for recreation activities and provides tourism opportunities through lodges and outfitting operations.

Due to the network of lakes, rivers and streams in the Project Study Area, popular recreational activities include canoeing, fishing, jet-skiing, kayaking, power boating, sailing, swimming and water skiing. Other activities include camping, cottaging, lodge stays, hiking, cycling, golfing, berry picking wildlife viewing and birding. During various seasons of the year recreational hunting occurs in compliance with provincial regulations. The general study area also supports cross country skiing, snowshoeing, ice-fishing and snowmobiling in winter (Pointe du Bois Spillway Replacement Project EIS, June 2011). To the northeast of Seven Sisters and north of PR 211, there is a shooting range and gun club, as well as goose sanctuary owned by the Pinawa Game and Fish Association.

Cottage Developments

Cottage development in the Pointe du Bois area of the Whiteshell Provincial Park is provided by the Province of Manitoba through Crown land lease. In the vicinity of Pointe du Bois and in other parts of the Project Study Area there is intensive cottage development. The majority of cottages are not permanently occupied but a high number are used in all seasons. Cottagers most often occupy their properties in the summer season from June to end of August for vacation and recreational activities.

The Winnipeg River system is large and diverse flowing from Lake of the Woods in Ontario to Lake Winnipeg, a distance of about 235 km. The Winnipeg River through Whiteshell Provincial Park and beyond has many lakes where the river widens, including Numau, Nutimik, Dorothy, Margaret, Eleanor, Sylvia, Natalie, and Lac du Bonnet. Cottaging has been intensively developed along these waterways and in the vicinity of the communities of Pinawa, Seven Sisters, and Lac du Bonnet. Cottage properties are leased Crown lands in the Whiteshell Provincial Park and may be either leased or private lands outside the park.

Lodges, Outfitters and GHAs

The Winnipeg River has six commercial fishing lodges that operate in Whiteshell Provincial Park between Pointe du Bois and the Manitoba-Ontario border to the east and south to Slave Falls and the Pinawa area. The lodges are: Eagle Nest Landing, Eagle Nest Lodge, Kendall Point Lodge, Pine Island Lodge and Trail End Camp and Outfitters.

In close proximity to Pointe du Bois, Trail End Camp & Outfitters in addition to fishing services also offers non-resident hunting for black bear and white-tailed deer as well as accommodation with 11 cabins at Pointe du Bois and backcountry camping upstream from Pointe du Bois on the Winnipeg River. In addition, George Lake Outfitters offers fishing and back country camping on

George Lake southeast of Pointe Du Bois and the Winnipeg River as well as two cabins at Eight Foot Falls approximately 1.5 km south on the Winnipeg River.

GHAs in the Pointe du Bois Project Study Area include 26, 34 and 36 (Map 5-12) which are located as follows:

- GHA 26 – north from Seven Sisters G.S. along the Winnipeg River to the east shore of Lake Winnipeg north to Manigotogan then eastward south of Wanipigow Lake north of PR304 to the Manitoba – Ontario border including Nopiming Provincial Park.
- GHA 34 – west of PTH 11 and the Winnipeg River bounded on the south by PTH 44, on the north by the Winnipeg River to the Belair Forest Reserve and on the west by PTH 59 and PTH 12
- GHA 36 – east of PTH 11 bounded on the south by the Trans Canada Highway, on the north by PR 307 and the Winnipeg River with the east boundary being the Manitoba-Ontario border including a large portion of Whiteshell Provincial Park.

Hunting for white-tailed deer by both lodge and non-lodge outfitting is allowed almost anywhere in these three game hunting areas. The Outfitters providing white-tailed deer hunting by GHA are:

- GHA 26 – Big Woods Wilderness Outfitters, Hrechkosy's Trail End Camp, Big Game Outfitters, Parchland Outfitters, J.D. Jumbo Outfitting, and Black River First Nation Outfitters;
- GHA 34 – Bloodvein River Outfitters; and
- GHA 36 – Whiteshell Outfitters and George Lake Outfitters.

Black Bear outfitters and their operating areas include:

- GHA 26 - Bows, Bears & Bucks Outfitters east and west of Pointe du Bois in the park;
- GHA 26 - Hrechkosy's Trail End Camp in the Horseshoe and Echo Lakes area of the park, north of Pointe du Bois and east to the Lamprey Rapids area & north to the Winnipeg River;
- GHA 26 - Big Woods Wilderness Outfitters in the Pinawa area;
- GHA 36 - Parchland Outfitters in the vicinity of Echo Lake in the park;
- GHA 36 - Whiteshell Outfitters east of Nutimik and Numao lakes and PR 307 and generally south and west of Tie Creek to the Horseshoe and Big Whiteshell lakes area; and
- GHA 36 - Unassigned Allocation south of the Winnipeg River from Nutimik Lake to Eleanor Lake south of PR 307.

Designated Canoe Routes

There are two designated canoe routes in the Project Study Area, the Winnipeg River and the Pinawa Channel:

- The Winnipeg River Canoe Route is designated within Whiteshell Provincial Park and includes several canoe campsites on both island and shore locations in the Pointe du Bois Project Study Area. There is a portage designated on the west side of the river at the Ponte du Bois Generating Station. Canoeists enter the townsite at the boat launch and travel through town to the beach area where they re-enter the river. This is a challenging route and can be experienced in many formats in terms of days depending on selection of start and finish locations.
- The Pinawa Channel Canoe Route is approximately 11 km in length beginning at the Old Pinawa Dam Provincial Park off PR 529 at the rock dam on the north side of the channel and ending at PR 313 after the bridge at the wayside park. This is considered a novice route well suited for a day trip with two easy portages which are less than 25 m in length.

Camping

There are several campgrounds and facilities offering accommodation in the vicinity of Pointe du Bois. This includes two private campgrounds at Sawmill Bay and Eight Foot Falls offering daily and seasonal camping sites as well as day rental sites at Eaglenest Landing Lodge. At George Lake there is a Scouts Canada campsite generally accessed from the Eight Foot Falls area by canoe or motor boat in summer and snowmobile in winter. The Winnipeg River in winter is not usually accessible by snowmobile until at least mid-February for winter camping or other activities.

Trans Canada Trail

The Trans Canada Trail in eastern Manitoba begins at the Ontario border and travels through Whiteshell Provincial Park via West Hawk Lake through the boreal forest of the Canadian Shield offering a diverse array of experiences. The trail provides many recreational activities as well as ecological experiences in the Lake of the Woods portion of the Manitoba Lowlands Natural Region. The trail transects Whiteshell Provincial Park from southeast to the northwest where it enters the Pinawa portion of the trail. The park portion is approximately 115 km long and is suitable for bicycles, walking and snowmobiling on certain sections.

The Pinawa section includes the Winnipeg River through Seven Sisters Generating Station to the Pinawa Dam Provincial Park where it moves on to Great Falls and Pine Falls. The Pinawa section provides landscapes of mixed forest, and granite ridges as well as wildlife viewing from

beaver dams to bears and deer. The Pinawa section includes the Alice Chambers Trail, the Ironwood Trail and the Pinawa Channel Heritage Walk. Following the Winnipeg River system the trail also offers the traveler the experience of Manitoba's historical development of hydro-generating stations including Seven Sisters, Pinawa Dam, Great Falls and Pine Falls. The trail moves on from Pine Falls to Grand Beach Provincial Park on the east shore of Lake Winnipeg and then heads south along the lake. The eastern portion of the trail completes what is known as the "Border to Beaches" component.

Snowmobile Trails

The Pointe du Bois Project Study Area has a number of designated snowmobile trails to address this popular winter activity. Snowmobiling is a popular activity in the Project Study Area (Map 5-12). This includes trails east and west of Lac du Bonnet and the Winnipeg River. In addition, there are trails east of the Lee River and some extending through the LGD of Pinawa and the RM of Lac du Bonnet to the vicinity of Seven Sisters. The trails and extent of season are weather dependent and may change from year to year depending on local weather conditions, construction activity and available funding.

Trails are maintained in Whiteshell Provincial Park by the Province of Manitoba and in other areas by various snowmobiling clubs located throughout the region. Since 1975, Snoman (Snowmobilers Club of Manitoba) Incorporated has been dedicated to the development of safe and environmentally responsible snowmobile trails in Manitoba. It is composed of Regional Snowmobile Associations and member clubs across the province. In Eastern Manitoba the clubs found within the Project Study Area creating and maintaining groomed trails include: Eastman Sno Pals, Lee River Snow Riders, Maskwa Snowmobile Club and the Whiteshell Snowmobile Club.

Cross-Country Ski Trails

The Whiteshell Cross-Country Ski Club located in Pinawa maintains about 40 km of scenic trails. This includes tracked trails for classic skiing through the boreal forest north of the Pinawa channel, 6.5 km of trails packed for ski skating on the Pinawa golf course fairways, 0.5 km of lighted trails for night skiing and in addition also provides 3 warm-up huts with wood stoves.

The Trans Canada Trail is designated for snowshoeing and cross-country ski uses however only the Whiteshell Cross Country Ski Club provides grooming which is limited to a 26 km section. This section extends from the Pinawa Dam Provincial Park to the Pinawa Suspension Bridge and the east end of PR 211 along the Ironwood Interpretive Trail through the town of Pinawa and along Natalie Lake to Seven Sisters Falls. Snowshoeing is generally an informal localized activity which can occur anywhere there is access in the Project Study Area.

Golfing

There are two golf courses in the Project Study Area which are:

- The Pinawa Golf and Country Club located in the RM of Pinawa along the edge of the Winnipeg River and the Pinawa Channel. It is an 18 hole course of approximately 6,270 yards.
- Black Bear Golf Club is located northwest of Lac du Bonnet north of PR 313 and east of PR 433 on the west side of the Winnipeg River. Black Bear is a nine hole course of about 2,662 yards.

Hiking, Jogging and Cycling

The Trans Canada Trail and local roads within the Project Study Area offer opportunity for hiking, jogging and cycling. There are no designated hiking, jogging or cycling trails found in the study area, however these are known activities that occur on an informal basis by members of the local communities, cottagers and campers.

Swimming

In the Pointe Du Bois Project Study Area swimming is a wide spread popular activity for cottagers, campers, hikers and day users along the Winnipeg River system. There is both a swimming pool and a man-made beach near the Pointe Du Bois Sub Station switchyard, south of the powerhouse on the west side of the river.

5.6 HERITAGE AND CULTURAL RESOURCES

5.6.1 Cultural Occupation and Culture History

Record of post-glacial occupations was dependent on the position of glacial Lake Agassiz between 10,000 and 7,500 years ago. At any given time the position of the glacial lake would have dictated the hunting and foraging opportunities of the First People who lived at its edge. With glacial retreat many points of entry became available to the earliest people to explore the changing landscape (Figure 5-4).

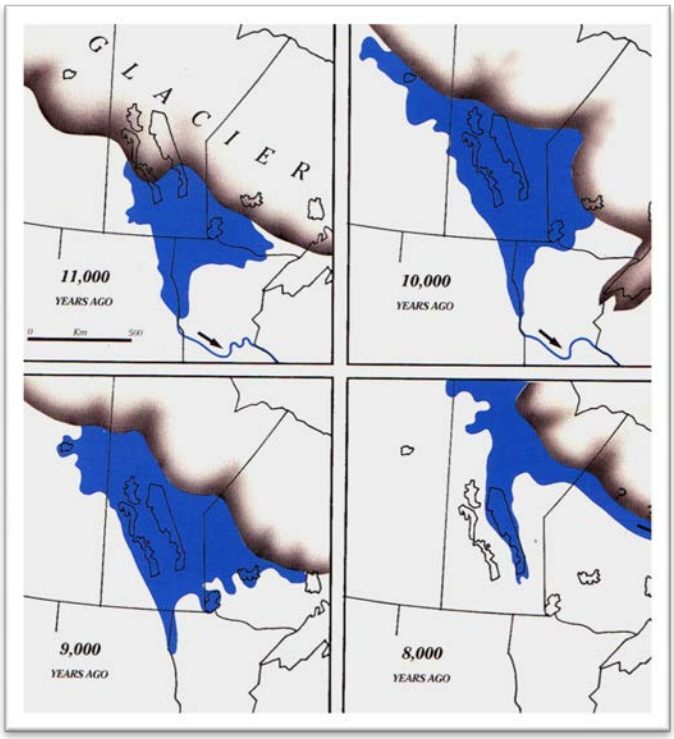


Figure 5-4: Four Stages of Glacial Lake Agassiz (Teller 1984)

Five patch-types or vegetation zones (aspen-birch forest, recent burn, aquatic vegetation, vegetation of lake margins, and aquatic) (Winterhalder 1981:232) constitute the major natural resource areas that were used by Algonquian peoples who inhabited the Boreal and Lake-Forest zones. These randomly distributed ecodistricts[6] compelled people to shift their locations seasonally. Thus we note that the spatial distribution of people is a response to the availability of natural resources over a larger geographic area.

The Ojibwa of Eastern Manitoba

From an archaeological perspective two eras exist: Pre-European Contact[7] and Historic. A chronology of Aboriginal occupation in Manitoba is presented in Table 5-18.

[6]Ecodistrict - a subdivision of an ecoregion characterized by a distinctive assemblages [sic] of relief, landforms, geology, soil, vegetation, waterbodies and fauna (Marshall and Schut 1999)

[7] The author prefers the term "Pre-European Contact" to "Precontact or Prehistoric" as it defines contact with a specific group of people. Prehistoric suggests that people had no history prior to European arrival and Precontact suggests that people lived in isolation and without contact of other Aboriginal groups. Precontact, Prehistoric and Pre-European Contact refer to the same time period.

Table 5-18: Chronology of Aboriginal Occupancy in Manitoba

	Archaeological Period	*Technology*	
		Container Type	***Food Procurement***
HISTORIC ERA	**Recent Historic Period** 70 B.P. - present	Plastic, earthenware, stoneware, metal	Repeating Rifles Automatic Shotguns
	Late Historic Period (*ca*. 130 – 70 B.P.)	Porcelain Tableware Earthenware Dinnerware Stoneware Storage Jars Tin Cans	Repeating Rifles Automatic Shotguns
	Middle Historic Period (*ca*. 179 – 130 B.P.)	Earthenware Dinnerware Stoneware Storage Jars Copper Pots/Kettles	Breach Loading Rifles/Shotguns Percussion Cap Muskets
	Early Historic Period (*ca*. 360 – 179 B.P.)	Copper Pots/Kettles	Flintlock Muskets/Shotguns Projectile Points • Metal • Side-notched
PRE-EUROPEAN CONTACT ERA	**Late Pre-European Contact Period** (*ca*. 2200 - 360 B.P.) Terminal Woodland Initial Woodland	Clay Vessels: • Clearwater Lake Punctate • Duck Bay Punctate • Selkirk • Blackduck • Laurel	Bow & Arrow Bone harpoons Nets Projectile Points • Side-notched • Eastern and Plains Triangular • Avonlea • Besant/Sonota
	Middle Pre-European Contact Period (*ca*. 6500 - 2500 B.P.)	Fiber Baskets/Bags Animal Viscera/Hide	Atlatl[8] Bone harpoons Nets? Projectile Points • Larter Tanged - Pelican Lake • Duncan/Hanna/McKean • Old Copper • Raddatz • Oxbow
	Early Pre-European Contact Period (*ca*. 12000 – 6500 B.P.)	Fiber Baskets/Bags Animal Viscera/Hide	Spear Bone harpoons? Projectile Points • Agate Basin • Plano

[8] Atlatl – a spear thrower or throwing board used as an extension of the thrower's arm to provide greater velocity and accuracy.

Pre-European Contact Era (ca. 12,000-350 BP)[9]:

The Pre-European Contact Era is divided into three periods: Early (*ca*. 12,000 – 7,000 BP, Middle (*ca*. 7,000 – 2,000 B.P.) and Late (2,000 – 350 B.P.). The Early Period is represented by the Palaeo-Indian and Plano traditions[10] and archaeologists can only speculate as to which cultural group these earliest people belonged, the language they spoke or what level of social organization they maintained. Evidence of Palaeo-Indian people is sparse and is represented by a few fluted points that have been collected from the surfaces of cultivated fields in southwestern Manitoba. Based on the archaeological record from the United States, where similar projectile points have been scientifically excavated, we can conclude however, that these people had adapted to the tundra-like climate at the edge of the glacier, pursuing a variety of large mammals.

By 7500 years ago, glacial Lake Agassiz had diminished and was replaced with a vast expanse of ecosystems in flux. The increased diversity of flora and fauna throughout newly exposed and unexplored lands allowed for the expansion of people into the four corners of the province.

Evidence for the Plano tradition is found at strategic animal migration corridors across the province and more specifically within the Fort Alexander resources area.

The Middle Period is often referred to as the Archaic, and is marked by adaptation to a broader, but changing, physical landscape with an inferred and tangible sophistication of technology. Archaeological evidence of three Archaic groups, Plains, Lake Forest and Shield are found in the vicinity of Fort Alexander. There is however, a marked heterogeneity[11] within the artifact assemblage especially that considered to be Shield Archaic. This may be due to the process of adaptation as groups of hunters became familiar with new animal resources, therefore exploring the use of various lithic[12] material and experimenting with various forms of tool technology.

Transition into the Late Period, identified for most of Manitoba as the Algonquian Woodland Tradition or sometimes the Eastern Woodland Tradition, is recognized by revolutionary changes to the technology. This is considered a critical period for determining the emergence of Cree and Ojibwa cultures as we know them today.

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

[10] Palaeo-Indian – a general term referring to either the earliest inhabitants of North America or the most ancient of the three stages or periods in North American Prehistory. Plano – a general term, which refers to the late Early Prehistoric (or Palaeo-Indian) complexes of the North American plains. (Manitoba 1989)

[11] Heterogeneity or marked variation suggests either movement of unrelated cultural groups into an area, or experimentation and frequent adjustments to the tool kit ultimately resulting in a distinctive artifact style.

[12] Lithic means pertaining to stone.

Based on differences in stylistic ceramic attributes, Dawson (1976a & b, 1981, 1983) established four Algonkian Culture Areas, which represented the "ethnic identity" of the various Algonkian populations: southwestern, southeastern, northwestern and southern (Figure 5-5).

Dawson's work is considered a major breakthrough in sorting out the cultural areas of four discrete, but related Algonkian people[13]. This has been further refined by Lenius and Olinyk (1990) and others through further archaeological evidence that has been discovered in the past 20 years. While there are areas of obvious overlap between Blackduck (Ojibwa) and Selkirk (Cree) ceramics, Blackduck is more prevalent on the east side of Lake Winnipeg, namely within the Fort Alexander traditional lands as described by the Elders of Fort Alexander (Petch 2004, 2005)

It must be stressed that the hypothetical geographic boundaries were not divisive; in fact, the fluidity of Algonkian kinship and clan relationships allowed for free movement amongst the various groups.

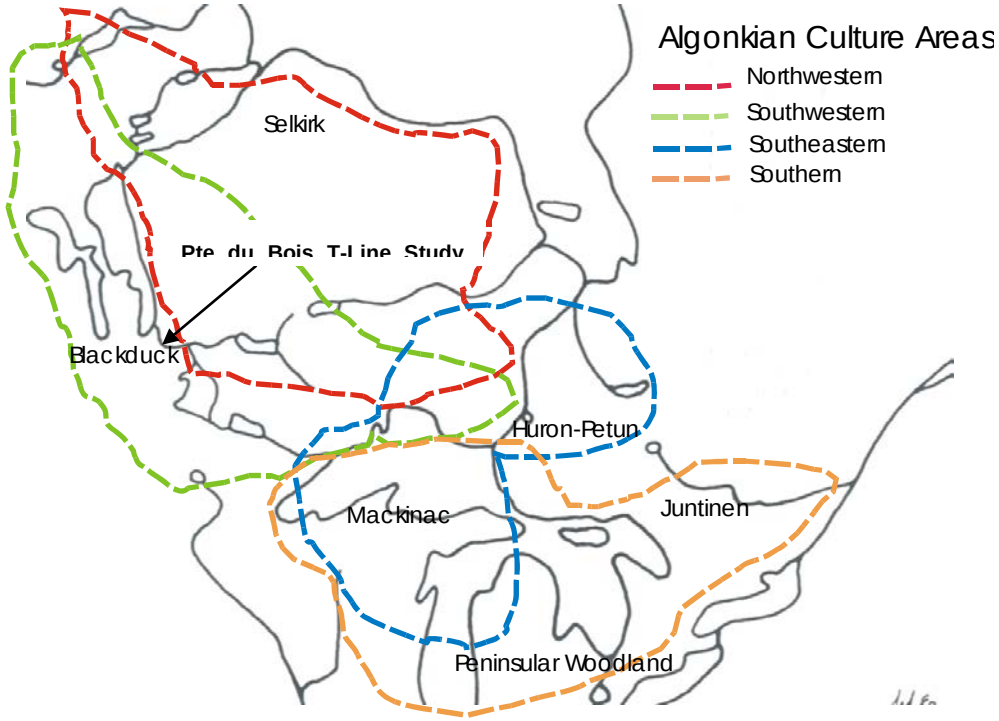


Figure 5-5: Approximate boundaries of Algonkian Terminal Woodland Culture Areas (based on Dawson 1981. Map base from Reid & Ross, 1981)

[13] MacNeish (1958), who conducted the earliest systematic analysis of ceramics in Manitoba, placed Blackduck pottery as a manufacture of Assiniboine people. It is now agreed upon by archaeologists that this is not the case.

Dawson's research identified the southwestern culture area by the presence of Blackduck ceramics, which he concluded represents early or proto-Ojibwa occupation in southeastern and central Manitoba, northern Minnesota, northern Michigan, and northwestern Ontario. Some Blackduck sites to the north contain associated Selkirk[14] ceramics; those to the south include Sandy Lake ware, and several to the east include Mackinac ceramics. It is not unusual to find different traditions of ceramics at one site.

Historic Era (*ca*. 1641-present):

For the purpose of this discussion the Historic Era is divided into four main periods: Early (*ca*. A.D.1642-1821), Middle (*ca*. A.D. 1821-1867), Late (*ca*. A.D. 1867-1930) and Recent (*ca*. 1930-present).

The Early Period marks the initial contact of First Nations with Europeans at Montreal, Quebec and on Hudson Bay. A metal technology is introduced but does not completely replace the stone/bone technology. The fur trade is central to this period, but the seasonal round of subsistence activities continues to follow much the same path as the late pre-European contact period (Tanner 1853).

The Middle Period commences with the amalgamation of the Hudson's Bay and North West Companies and terminates with the formation of the Confederation of Canada in 1867. During this time, the archaeological record at Aboriginal sites includes an increasing number of European and Canadian-made articles. However, the Ojibwa seasonal round of subsistence activities continues to be practiced in much the same manner as their ancestors.

The Late Period, or the period of government policy, marks the beginning of changes to seasonal movement of Aboriginal people with the signing of Treaties, establishment of reserves, *The Indian Act*, proclamation of *The Natural Resources Transfer Act* (1930) accompanied by what appears to be greater regulatory intervention by the provincial government, *The Family Allowances Act* (1946) and residential and day schools. Many aspects of European technology are found within the Aboriginal tool assemblage,

The Recent period is viewed as a continuation of the Late Period in terms of incorporation of western technology.

[14] Selkirk refers to the type-site where this particular ceramic tradition was first identified and named, that is in Selkirk, Manitoba. The vessel shares some attributes with Blackduck, namely it is constructed using the same manufacture techniques, it is globular in shape and is fabric-impressed. There is a slight constriction of the neck with gently flared rim. Unlike Blackduck ceramics, Selkirk pots lack elaborate decoration. Singular rows of punctates and/or minimal cord-wrapped stick design on the neck, rim and lip are often present. The remainder of the tool kit is similar to that of the Blackduck culture suggesting the same kind of resource strategies.

5.6.2 Current Archaeological Environment

Sixteen registered archaeological sites and one Centennial Farm were identified through the Historic Resources Branch (HRB) Heritage Resources Inventories as occurring within a three km buffer of the PPR (Table 5-19 and Map 5-13).

Table 5-19: Registered Archaeological Sites and Centennial Farm within the PPR

Identification	Site Type	Description	Legal	Location within Project
EbKv-11	Archaeology	Archaic, Woodland Campsite	NE-SE-25-15-14E	Pointe du Bois
EbKv-12	Archaeology	Kill, Butcher site	SW-NE-25-15-14E	Pointe du Bois
EbKv-40	Archaeology	Archaic uninterpreted	SE-25-15-14E	Pointe du Bois
EbKv-49	Archaeology	Spiritual (Thunderbird Nest)	Not available	Pointe du Bois
EbKv-50	Archaeology	Spiritual (Thunderbird Nest)	Not available	Pointe du Bois
EbKv-51	Archaeology	Undated Pre-European contact campsite	Not available	Pointe du Bois
EbKv-52	Archaeology	Undated Pre-European contact campsite	Not available	Pointe du Bois
EbKv-53	Archaeology	Historic	Not available	Pointe du Bois
EbKv-54	Archaeology	Undated Pre-European contact campsite	Not available	Pointe du Bois
EbKv-Y1	Archaeology	Archaic	Not available	Pointe du Bois
EbKw-38	Archaeology	Stone “beehive” hut	NE/NE/21-15-13E	Rice Lake
EbKx-3	Archaeology	Historic homestead	NW-NW-1-16-12E	Pinawa Channel
EaLa-1	Archaeology	Archaic burial	NE-NW-28-13-11E	Whitemouth Station
EaLa-2	Archaeology	Woodland campsite	NW-NW-28-13-11E	Whitemouth Station
EaLa-3	Archaeology	Archaic, Woodland burial	SW-SW-33-13-11E	Whitemouth Station
EaLa-5	Archaeology	Woodland campsite	SE-SE-33-13-11E	Whitemouth Station
PD1238	Centennial	Golke Family Farm	NW 21-13-11E	Whitemouth Station

The archaeological record for Winnipeg River region indicates a lengthy cultural occupation of Aboriginal people for at least 9,000 years (Steinbring 1970, 1980; Buchner, 1979, 1982, 1984). The record includes ancient campsites, work stations, butchering sites, burial grounds, pictographs and petroforms associated with Pre-European Contact people, as well as more

recent historical fur trade posts, homesteads, trapper cabins, centennial farms and other provincially and municipally-designated sites.

In addition, existing ATK and historic literature of the study area indicated traditional use of this area by the Fort Alexander Band (Sagkeeng First Nation) since the 1700s when written records first appear. The area of Rice Lake (RTL 21) contains a historic record of land use and occupancy by one family of Sagkeeng since 1889 (Petch 2005). This trapline has recently change hands.

Rice Lake is adjacent to, but not within the 3 km buffer. However, the lake is worth mentioning because of its archaeological record of burials, thunderbird nests, ancient and historic campsites and abundance of natural resources.