Photograph 6-12: Treed Bog (V33)

Photograph 6-13: Treed Poor Fen

Photograph 6-14: Shrub Rich Fen

Photograph 6-15: Graminoid Rich Fen

Photograph 6-16: Graminoid Poor Fen

6.1.4.4 Riparian Areas

Characterization of the shorelines, soil material and banks at all crossings of the proposed all-season road alignment was completed as part of the baseline Aquatic Environment Report, Existing Environment (**Appendix C-1**, **Section 4.1.1.5**; North/South Consultants Inc. 2017a). Soils within most riparian areas consisted of organic material, with some sites also having varying amounts of clay, silt and gravel. Due to the remoteness of the all-season road, soils along the proposed alignment are undisturbed and in their

original state with no known past use with the exception of the winter road. In general, banks at crossings range in height from 0 to 0.9 m. Bank shapes were often vertical, with some banks being sloped or undercut. Bank stability was assessed at each crossing with some being assessed at low, moderate and high stability.

Current flood risk areas were also identified for each crossing by measuring floodplain area. Floodplain distances ranged from 0.1 to 200 m, with most floodplains being less than 50 m (**Appendix C-1**; North/South Consultants Inc. 2017a). As part of detailed design bridges and culverts at watercourse crossings and equalization culverts would be designed to accommodate 1:50 year flood events such that future flood risk areas are not expected to change from the proposed Project.

6.1.4.5 Mammals

The wildlife species and populations in the area reflect the range of boreal forest habitats that have evolved through time in response to the geology, terrain, vegetation and climatic conditions that influence the region. Centuries of fire and other disturbances have created a montage of vegetation types in varying stages of succession and renewal across the landscape. This ability to adapt to the changing conditions and occupy the array of available boreal forest habitats at different stages of succession is also exhibited by the wildlife species that inhabit this area.

In addition to understanding the relationships among wildlife and their habitat, the assessment of potential environmental effects on wildlife requires knowledge of the movements and spatial range of the animals of interest. As such, the spatial boundaries used to assess potential environmental effects on wildlife may vary by species. For the assessment of wildlife related effects the Wildlife LAA generally considers the area within a 10 km corridor centred on the all-season road alignment (1,327 km^2), with the exception that a larger 20 km corridor was used for caribou and moose (2,503 km^2) (**Figure 6-1**). The Wildlife RAA (9,005 km^2) was determined using a multi-disciplinary approach incorporating both biophysical and social factors. Species of special importance to local communities were determined through workshops, open houses and community discussions. The RAA boundary was selected to ensure home ranges of large ranging species and areas of traditional use were considered **(Figure 6-2)**.

Wildlife data collection included aerial multi-species winter track surveys, deployment of trail camera, caribou and wolf collaring and telemetry, a trapper participation program and the gathering of local and TK though community resource user workshops.

Desktop review of published information for the area (ex: trapping and hunting records) show that mammals present in the RAA include woodland caribou (*Rangifer tarandus caribou,* both Pen Islands and Norway House ecotypes), moose (*Alces alces*), grey wolves (*Canis lupus*), black bear (*Ursus americanus*) and furbearers such as American beaver (*Castor canadensis*), American marten (*Martes americana*), American mink (*Neovison vison*), Canada lynx (*Lynx canadensis*), ermine (*Mustela erminea*), fisher (*Martes pennanti*), muskrat (*Ondatra zibethicus*), Northern river otter (*Lontra canadensis*), red fox (*Vulpes vulpes*),

red squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*) and wolverine (*Gulo gulo*). There are several other species of small furbearers or mammals that may be residents, migrants, or incidental occasional visitors to the RAA. These include, but are not limited to, least chipmunk (*Eutamias minimus*), least weasel (*Mustela nivalis*), masked shrew (*Sorex cinereus*), meadow jumping mouse (*Zapus hudsonius*), northern bog lemming (*Synaptomys borealis*), porcupine (*Erethizon dorsatum*), pygmy shrew (*Sorex hoyi*), raccoon (*Procyon lotor*), short-tailed shrew (*Blarina brevicauda*), silver-haired bat (*Lasionycteris noctivagans*), southern red-backed vole (*Clethrionomys gapperi*), striped skunk (*Mephitis mephitis*) and woodchuck (*Marmota monax*).

6.1.4.5.1 Summary of Field Investigations

6.1.4.5.1.1 Trail Cameras

Trail camera studies were designed to detect ungulate, predator and furbearer occupancy. Trail camera site selection was based on a hexagonal sampling grid overlain the Wildlife RAA. Camera locations were distributed across various representative habitat types based on habitat mapping using the Land Cover Classification mapping. Additional details regarding placement of trail cameras can be found in the Wildlife Characterization and Effects Assessment report (**Appendix D-1**, **Section 3.2**; Joro Consultants 2018b).

Caribou, moose, wolves and black bears were analysed by season to identify seasonal occupancy of the Wildlife RAA by species. Results of trail camera data analysis are summarized in **Table 6.7** and **Table 6.8**. Caribou and moose were the most common species observed from separate camera trap events. Snowshoe hare was the most common furbearer species recorded.

Table 6.7: Trail Camera data for caribou, moose, wolf and bear in the Wildlife RAA, March 1, 2016 to August 15, 2017

Species	Spring	Summer	Autumn	Winter	Total
Caribou	207 (87%)	17 (7%)	0 (0%)	14 (6%)	**238**
Moose	14 (21%)	43 (64%)	4 (6%)	6 (9%)	**67**
Grey Wolf	9 (41%)	9 (41%)	3 (14%)	1 (5%)	**22**
Black Bear	11 (55%)	7 (35%)	1 (5%)	1 (5%)	**20**
Total	**241 (69%)**	**76 (22%)**	**8 (2%)**	**22 (6%)**	**347**

Table 6.8: Trail Camera Counts for Furbearer in the Wildlife RAA, March 1, 2016 to March 31, 2017

Species	All Seasons in the RAA
Snowshoe Hare	10 (66.7%)
Lynx	1 (6.7%)
Marten	1 (6.7%)
Otter	1 (6.7%)
Wolverine	2 (13.3%)
Total	15

6.1.4.5.1.2 Multispecies Aerial Surveys

Aerial multispecies distribution surveys were conducted in the winters of 2012, 2014, 2015 and 2016 in the Wildlife RAA. Transects were spaced 5 km apart and were flown in an east-west direction using a helicopter, flying at an average speed of 90 km/hr. A crew of three biologists utilized hand-held GPS units to record locations of all tracks, animal observations, habitat type and other notable observations such as large stick nests. Two observers noted track observations within a 250 m wide strip along each side of the transect line, while the 3rd member of the team maintained detailed data sheets of species and location of each observation and assisted with navigation along the transect (**Appendix D-2**; Joro Consultants 2018b). Surveys were conducted during January and February, when snow and light conditions were favourable for observing tracks and larger wildlife. Species surveyed included caribou, moose, wolf, wolverine, martin, fisher, lynx, fox, mink, otter and snowshoe hare. Results of the aerial multi-species are summarized in **Table 6.9**. Maps showing location of mammal recordings can be found in the Wildlife Characterization and Effects Assessment report (**Appendix D-2**; Joro Consultants 2018b).

6.1.4.5.1.3 Caribou Collaring

Woodland caribou from two ecotypes were collared and tracked to learn the extent of their current range in the area. Eight caribou in the Wildlife RAA from the Pen Islands ecotype (part of Eastern Migratory) were collared and tracked in 2011 and collaring data from an additional 39 individuals collared by MI and MSD between 2010 and 2015 was used. A total of 61 Norway House (Boreal Woodland) caribou, part of the Molson Management Unit (MU) were collared between 2011 and 2016 (**Appendix D-2**; Joro Consultants 2018b).

Pen Islands Caribou Range/Population (Forest-tundra)

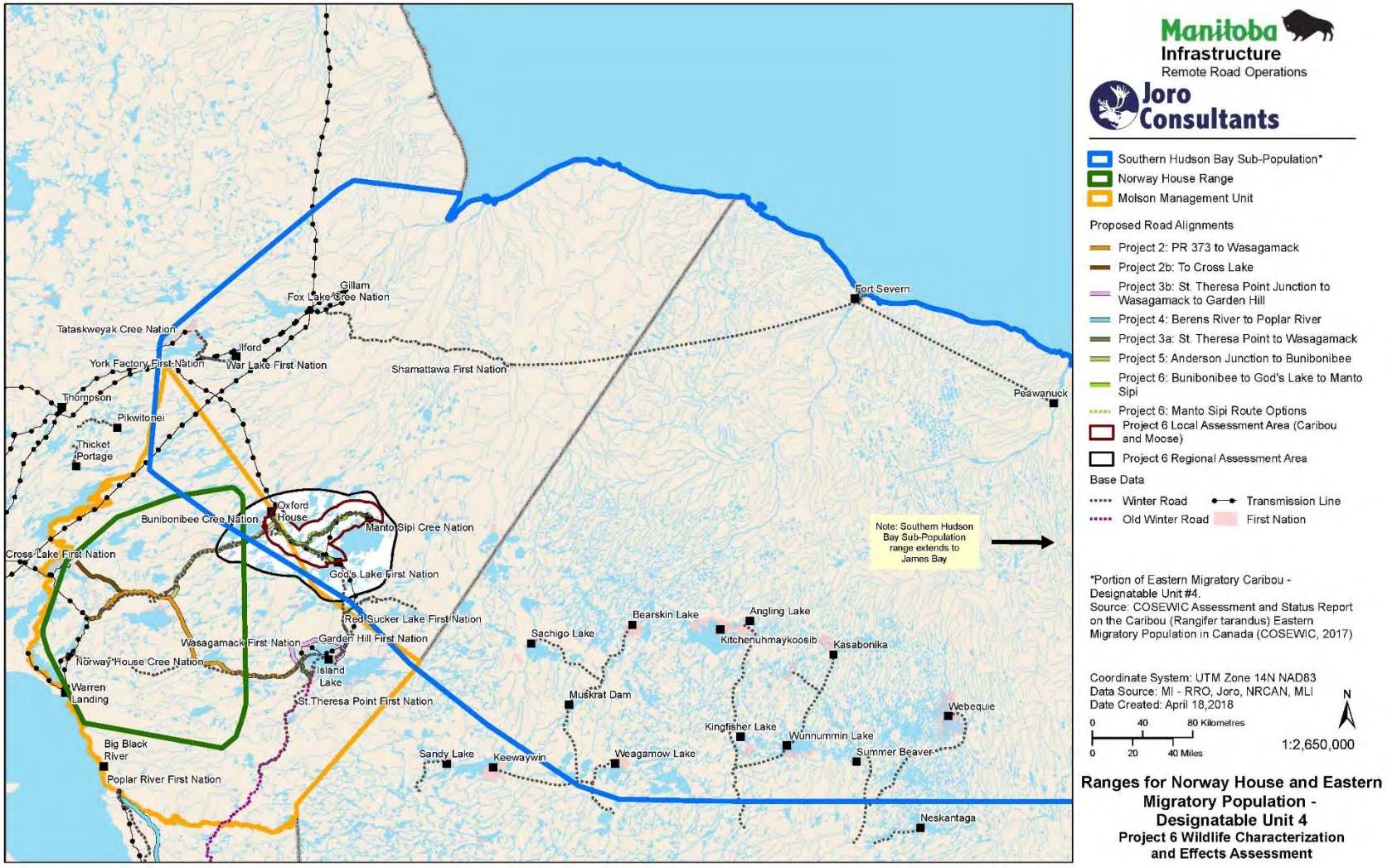
The migratory Pen Islands caribou range extends across northeastern Manitoba along the Hudson Bay coastline to northwestern Ontario and includes the Wildlife RAA (**Figure 6-12**). Early and late winter core use areas occur inland, while the calving core use area extends along the Hudson Bay coastline across Manitoba and Ontario. The Pen Islands core use area moves slightly more inland during summer and slightly further east during breeding. Pen Islands animals occur within the Wildlife RAA during all seasons with the largest portion of a seasonal core use area occurring in the Wildlife RAA in late winter. Pen Islands

Table 6.9: Aerial Multi-Species Surveys conducted in portions of the RAA, 2012 – 2016

Species	Scientific name	2012			2014			2015			2016			Total		
		Tracks	Animals	Total	Tracks	Animals	Total	Tracks	Animals	Total	Tracks	Animals	Total	Tracks	Animals	Total
Caribou	*Rangifer tarandus*	N/A	33	33	283	31	314	726	116	842	235	13	248	1244	193	1437
Moose	*Alces alces*	108	16	124	N/A	N/A	N/A	27	4	31	240	0	240	395	108	16
Snowshoe Hare	*Lepus americanus*	464	0	464	120	0	120	60	0	60	173	0	173	817	0	817
Marten	*Martes americana*	353	0	353	53	0	53	61	0	61	344	0	344	811	0	811
Otter	*Lontra canadensis*	139	0	139	37	0	37	27	0	27	130	0	130	333	0	333
Beaver lodge, dams		N/A	N/A	N/A	0	131	131	4	73	77	0	41	41	4	4	249
Wolf	*Canis lupus*	12	3	15	5	0	5	11	0	11	192	0	192	220	3	223
Lynx	*Lynx canadensis*	21	0	21	23	0	23	3	0	3	205	0	205	252	0	252
Fox	*Vulpes vulpes*	2	0	2	0	0	0	0	0	0	132	0	132	134	0	134
Fisher	*Martes pennanti*	8	0	8	1	0	1	2	0	2	51	0	51	62	0	62
Mink	*Neovison vison*	0	0	0	0	0	0	0	0	0	4	0	4	4	0	4
Wolverine	*Gulo gulo*	1	0	1	1	0	1	0	0	0	0	0	0	2	0	2

Note: Aerial multi-species surveys were conducted for several proposed ASR projects in the region which include portions of the RAA, therefore comparisons between years is not possible. However these data provide an account of species relative abundance and distribution for characterization purposes.

Source: Joro Consultants 2018b



Source: Joro Consultants 2018

Figure 6-12: Ranges for Norway House and Eastern Migratory Population – DU 4 (Wildlife LAA and RAA shown)

animals also occur within the Wildlife LAA during early and late winter, however, only a small proportion of its seasonal core use areas occur within the Wildlife LAA, primarily in early winter.

Norway House Caribou Range/Population (Forest-dwelling)

The Norway House core use areas occur to the west of the Wildlife RAA, with no seasonal core use areas occurring within the RAA (**Figure 6-12**). There is little seasonal movement in the Norway House caribou core use areas.

6.1.4.5.1.4 Moose Aerial Surveys

Aerial moose surveys were conducted in the winter of 2016 and 2017 to obtain baseline information on areas of high moose concentration and provide an estimate of the moose population. Moose surveys were conducted within a 2,430 km^2 survey area. When fresh moose tracks were encountered, a reasonable effort was made to find the animal(s). Additional methodological details and figures showing the location of moose observations are provided in the Wildlife Characterization and Effects Assessment report (**Appendix D-1**, **Section 3.4**; Joro Consultants 2018a). The number of individuals, age classification and gender were recorded for all animals. Results of the aerial moose surveys are summarized in **Table 6.10**.

Table 6.10: Aerial Moose Survey Results

Year	Cows	Bulls	Calves	Total Count	Calf-Cow Ratio	Standard Error	Calves Per Adults	Standard Error	Density Per Km^2
2016	30	23	10	63	0.33	0.09	0.19	0.05	0.02
2017	33	11	24	68	0.73	0.08	0.55	0.08	0.04

6.1.4.5.1.5 Incidental Observations

Incidental sightings were also recorded during aerial and ground-based wildlife surveys conducted between 2011 and 2017 in the Wildlife RAA. Incidental wildlife was defined as those qualitative observations that were secondarily recorded, but were not the primary focus of the individual survey. Incidental observations included caribou, grouse, snowshoe hare, lynx, marten, moose, wolf, wolverine and skunk (for additional details see **Appendix D-1**, **Section 3.2.6**; Joro Consultants 2018a).

6.1.4.5.1.6 Local and Traditional Knowledge

Wildlife workshops were conducted by Joro Consultants with local resource users (trappers and hunters) in the community of God's Lake First Nation on January 6, 2016, Bunibonibee Cree Nation on February 17, 2016 and Manto Sipi Cree Nation on March 24, 2016. The purpose of the wildlife workshops was to have an open dialogue with community members to gather information on wildlife movement and distribution, to establish those species that are important to community members and to better understand those habitats and other variables that may affect wildlife populations and distribution. Mammal observations provided by the communities are summarized in **Table 6.11**, while additional community-specific information is available in the Wildlife Characterization and Effects Assessment report (**Appendix D-1**, **Section 3.7**; Joro Consultants 2018a).

Table 6.11: Mammal Species Observation by Participants of Wildlife Workshops in Local Communities

Species	Scientific Name	Observed by Community
American beaver	*Castor canadensi*	GLFN, BCN, MSCN
American black bear	*Ursus americanus*	GLFN, MSCN
American marten	*Martes americana*	GLFN, BCN, MSCN
American mink	*Neovison vison*	GLFN
Canada lynx	*Lynx canadensis*	GLFN, BCN, MSCN
Chipmunk	*Neotamias minimus*	GLFN
Coyote	*Canis latrans*	GLFN
Fisher	*Martes pennanti*	GLFN, BCN, MSCN
Gray wolf	*Canis lupus*	GLFN, BCN, MSCN
Groundhog	*Marmota monax*	GLFN
Little brown bat (myotis)	*Myotis lucifugus*	GLFN, BCN, MSCN
Least weasel	*Mustela nivalis*	GLFN
Masked shrew	*Sorex cinereus*	GLFN
Moose	*Alces alces*	GLFN, BCN, MSCN
Muskrat	*Ondatra zibethicus*	GLFN, BCN, MSCN
North American porcupine	*Erethizon dorsatum*	GLFN, BCN, MSCN
Northern flying squirrel	*Glaucomys sabrinus*	GLFN, MSCN
Northern river otter	*Lontra canadensis*	GLFN, MSCN
Polar bear	*Ursus maritimus*	BCN
Raccoon	*Procyon lotor*	BCN
Red fox	*Vulpes vulpes*	GLFN, BCN, MSCN
Red squirrel	*Tamiasciurus hudsonicus*	GLFN
Snowshoe hare	*Lepus americanus*	GLFN, BCN, MSCN
Striped skunk	*Mephitis mephitis*	GLFN, BCN, MSCN
Wolverine	*Gulo gulo*	GLFN, BCN, MSCN
Woodland caribou	*Rangifer tarandus caribou*	GLFN, BCN, MSCN

Notes: GLFN = Gods Lake First Nation; BCN = Bunibonibee Cree Nation; MSCN = Manto Sipi Cree Nation
Source: Joro Consultants 2018a

6.1.4.5.2 Species at Risk

There were three mammal Species at Risk that were either recorded or are potentially present in the Wildlife RAA, which include woodland caribou (both Pen Islands and Norway House ecotypes), wolverine and little brown bat. They are discussed in **Section 6.1.8**.

6.1.4.5.3 Introduced Species

No introduced species were recorded during mammal surveys. The potential presence of white-tailed deer was assessed due to the potential to spread parasites and disease to other ungulate species. The northern limit of white-tailed deer persistence is greater than 350 km south of the Project. No white-tailed deer were observed during any field surveys, on trail cameras, or reported by local resource users.

6.1.4.5.4 Species of Local Interest

Resource users from the communities of God's Lake First Nation, Bunibonibee Cree Nation and Manto Sipi Cree Nation shared local knowledge on hunting, trapping, wildlife and rare species in the Wildlife RAA (**Appendix D-1**; Joro Consultants 2018a). Mammal species of importance to First Nations include caribou, moose and furbearers as described in the following paragraphs.

Caribou

Caribou are known to be a culturally important species for a number of community members in the Wildlife RAA (HTFC Planning & Design 2017b). Caribou are known to move southward from Churchill and Shamattawa First Nation in the winter to the Wildlife RAA, typically maintaining the same route annually. Community members indicated that caribou typically move from northwest to southeast, with large herds (tens to hundreds) migrating across God's Lake in January and February (**Appendix D-1**; Joro Consultants 2018a).

Smaller herds of migrating caribou (Pen Islands ecotype) are known to stay behind and overwinter, staying near the local communities throughout the summer. These summering herds re-connect with the larger herd in the following spring migration. Caribou calving is known to occur along the eastern edge of Edmund Lake and northwest towards Knee Lake (**Appendix D-2**; Joro Consultants 2018b).

Local Indigenous communities have supported the understanding of a diverse caribou population within the Wildlife RAA and have described two types of caribou as identified by physical and behavioural characteristics. Community members distinguish between resident and migratory caribou. Resident caribou tend to be larger as opposed to migratory herds observed in the region. These resident caribou are typically observed in herds of only 6 to 8 animals with a maximum herd size of approximately 15 animals (**Appendix D-2**; Joro Consultants 2018b).

Moose

Moose are an important species hunted by community members in the Wildlife RAA. Moose are typically hunted in the fall, however, hunting occurs opportunistically year round. Moose are typically found inland from the shoreline of lakes and other waterbodies. Moose are known to thrive in old burn and re-growth areas that provide good foraging habitat and use the habitat along the winter roads in the Wildlife RAA. Community members have noted that as compared to historic moose hunting effort, present day moose hunting requires travel further away from their communities and further inland from shorelines. Community members mentioned that at present there are fewer moose and an overabundance of hunters. The perceived decline in moose population has been observed over the last 20 years (**Appendix D-1**; Joro Consultants 2018a).

Furbearers

Although trapping is an important activity for resource users in the RAA, only a number of Registered Trap Lines (RTL) are well used in the Wildlife RAA. Fur pelts currently sell for much less compared to that of the past, decreasing the interest in trapping (**Appendix D-2**; Joro Consultants 2018b).

Beaver, muskrat and otter are trapped from spring (May) through to fall (August) as the fur is still prime. Community members indicated that despite their high population, beaver are not actively trapped due to the large amount of work and very low pelt price. Beaver play a key role in children experiencing and getting involved with trapping and occasionally trapped for Elders to eat. Although otter are historically one of the most important species trapped, primarily based on fur value, participants indicated there is currently no market for pelts (**Appendix D-2**; Joro Consultants 2018b).

Community members indicated that the mink population is abundant and stable, yet the market for mink pelts has been decreasing and as such, the species is not typically trapped (**Appendix D-2**; Joro Consultants 2018b).

Marten were historically not observed in the Wildlife RAA until the 1970's when they moved into the area and significantly decreased the rabbit population. In present day, marten are abundant, easy to trap and the pelt prices are good (higher than otter), which leads them to be one of the most important species trapped. Predator and prey dynamics may affect the marten population. Current predator populations appear to be low, while prey, including squirrel and rabbit, are high, resulting in an abundant marten population (**Appendix D-2**; Joro Consultants 2018b).

Although previously low, lynx population numbers in the Wildlife RAA have returned, likely as a result of limits put on trapping. Reproducing quickly and having up to three litters a year, rabbits provide an important food source for lynx and marten (**Appendix D-2**; Joro Consultants 2018b).

Historically a common observation, wolf tracks are now a rare sighting throughout the Wildlife RAA. Wolf pack observations tend to be cyclic in nature lending to an assumption that they are following big game movement. Wolves are currently not trapped, however, denning site locations, travel corridors and hunting patterns were shared by community members. Community members noted that wolves are hunting caribou more so than in the past. They suggested that this may be a result of the decreasing moose population (**Appendix D-2**; Joro Consultants 2018b).

6.1.4.6 Reptiles and Amphibians

The assessment of reptiles and amphibians in the Wildlife RAA included desktop investigations, monitoring via automated recording units (ARUs) and local and traditional wildlife knowledge gathered from community wildlife workshops as described in the following sections. The only reptile species potentially present in the Wildlife RAA is the red-sided garter snake (*Thamnophis sirtalis parietalis*). Amphibians (frogs and toads) that may occur within the Wildlife RAA include: American toad (*Anaxyrus*

americanus), boreal chorus frog (*Pseudacris maculata*), northern spring peeper (*Pseudacris crucifer*), northern leopard frog (*Lithobates pipiens*) and wood frog (*Lithobates sylvaticus*) (**Appendix D-2**; Joro Consultants 2018b).

6.1.4.6.1 Summary of Field Investigations

ARUs were deployed in 2016 within the preferred habitat for amphibian species in the Wildlife RAA. The recording units were scheduled for specific start and shut off times to capture peak amphibian call times in the evening and nights from April to May. Additional methodological details are described in the Wildlife Characterization and Effects Assessment report (**Appendix D-1, Section 3.5.1**; Joro Consultants 2018a). Spring peeper and northern leopard frogs were amongst the amphibian species targeted through the habitat-based placement of ARUs.

The northern spring peeper was selected as the representative amphibian VC for the purpose of this assessment, due to their characteristic presence in woodland ponds and their food web function. Spring peepers prefer forested habitat near ponds and other wetlands and are most commonly found east of Lake Winnipeg in south-eastern Manitoba. Although northern spring peepers are able to climb they are usually found on the ground or in leaf litter and rarely more than a meter above the ground. Northern spring peepers undergo short distance migrations, but individuals tend to breed, feed and hibernate within the vicinity of forested wetlands. During fall and winter, they hibernate under logs, behind loose bark and in tree- or knot-holes. Northern spring peepers require marshes, ponds or swamps to provide an aquatic environment for their eggs and tadpoles. During the breeding season, they are found primarily in forests and regenerating woodlands near temporary or semi-permanent freshwater wetlands (ex: swamps, temporary pools, marshes, ponds, flooded ditches) in which they lay their eggs (**Appendix D-2**; Joro Consultants 2018b).

Some of these species generally occupy habitats that are used by other amphibians such as boreal chorus frogs and wood frogs, which breed in various wetland types and occupy a wide range of summering habitats (Nature North 2017). Amphibians recorded during field investigations included boreal chorus frog, American toad, spring peeper and wood frog. The most commonly recorded frogs were wood frogs followed by spring peeper and boreal chorus frogs. The American toad was only recorded at one station.

6.1.4.6.2 Local and Traditional Knowledge

As part of the wildlife workshops, local community members noted that northern leopard frogs have been observed by each community. The garter snake was also noted to be present in the Wildlife RAA by each community with Bunibonibee Cree Nation noting the common garter snake, whereas God's Lake First Nation and Manto Sipi Cree Nation noted the red-sided garter snake.

6.1.4.6.3 Species at Risk

No amphibian or reptile Species at Risk are expected in the Wildlife RAA and none were recorded during field investigations or identified as part of community wildlife workshops. While the western boreal/prairie population of the northern leopard frog is a species of Special Concern under COSEWIC, the

proposed Project falls within the range of the eastern population that is considered not at risk (COSEWIC 2009c). These species generally require shallow ponds and puddles for breeding and moist environments in shrubby and wooded areas for the rest of the year.

6.1.4.6.4 Species of Local Interest

No amphibian or reptile species were identified as part of the wildlife workshops as having social, economic or cultural significance.

6.1.5 Groundwater and Surface Water

6.1.5.1 Surface Water

6.1.5.1.1 Drainage Areas

Surface waters in the area generally drain to the north-east as part of the Hayes River Drainage Basin. Oxford Lake (location of Bunibonibee Cree Nation) is situated on the Hayes River system and flows in a generally north-east direction until it discharges into Hudson Bay. God's Lake (location of Manto Sipi Cree Nation and God's Lake First Nation) outlets to God's River which flows north-east until it discharges into the Hayes River and on to Hudson Bay. Water levels in the region are not regulated. The extensive bogs and fens in this area provide considerable surface water storage and drain to area creeks, rivers and lakes via small, often undefined drainage paths. Additional details regarding drainage analysis is available in the Aquatic Environment – Existing Environment Report (**Appendix C-1**, **Section 4.1.1.2**; North/South Consultants Inc. 2017a).

6.1.5.1.2 Watercourse Crossings

The proposed Project would require construction of 53 crossings at watercourses along the all-season road alignment as described in **Chapter 3** (**Section 3.3.2**) and shown in **Figure 3-2**. The God's River and Magill Creek crossings would require bridges. Key attributes of these two major watercourses crossings are presented in **Table 6.12**. Smaller streams in the area are often part of boreal wetlands such as bogs and fens that drain local areas into larger creeks, rivers or lakes and are usually less than 1 m in depth. Details of each watercourse crossing potentially affected by the Project, including surface area, bathymetry, depths, water levels and type of substrate, are provided in the Aquatic Environment – Existing Environment Report (**Appendix C-1**, **Appendix 4 and 5**; North/South Consultants Inc. 2017a).

Table 6.12: Key Attributes of Major Watercourse Crossings Along the All-Season Road

River	Upstream Drainage Area (km^2)	Channel Width at Crossing (m)	Maximum River Depth at Crossing (m)	Substrate Type
God's River	12,861	97	5.5	Cobble with some fines, gravel, boulders and bedrock
Magill Creek	186.54	29.5	0.8	Predominantly fines with some gravel cobble, boulders and areas of bedrock

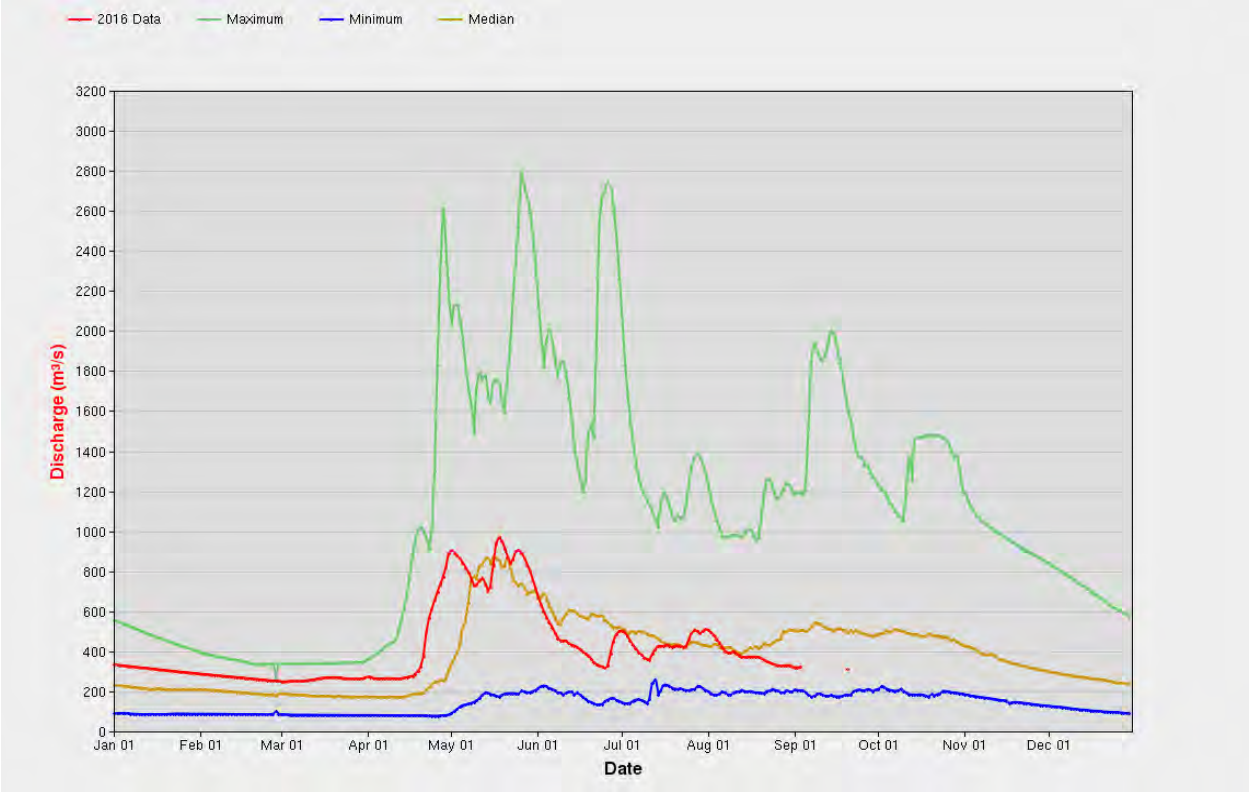
Source: North South Consultants, 2017a.

6.1.5.1.3 Hydrological Regimes

There are no active hydrometric data collection stations operated by the Water Survey of Canada on the rivers intersecting the proposed all-season road. Three Water Survey of Canada hydrometric stations are present in the watershed (Government of Canada 2017). The only station near the Aquatic LAA is on Back Lake adjacent to the Bunibonibee Cree Nation (Station #04AA003). Further downstream, stations are located on God's River near Shamatawa (Station #04AD002) and on the Hayes River downstream of the confluence with the God's River (Station #04AB001). Water levels on Back Lake remain relatively stable with slightly higher levels in late spring/early summer (**Figure 6-13**). Both of the river gauge stations show expected seasonal discharge patterns with a spring freshet flow increase beginning in April to May, generally peaking in May and reducing to a relatively stable level by summer for the remainder of the year (**Figures 6-14 and 6-15**). Additional information regarding Project stream types (wetland, stream, river) and flow regime (ephemeral, intermittent, perennial) is provided in **Section 6.1.6.1**.

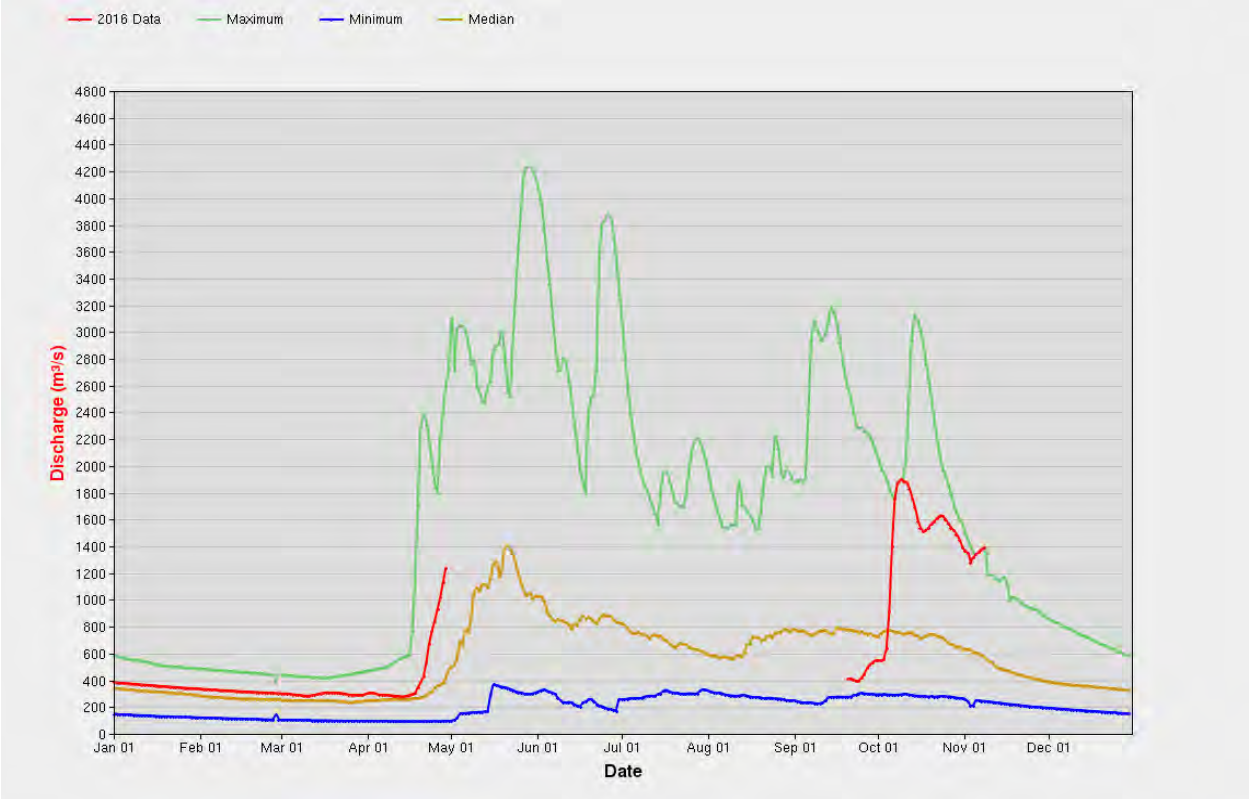
Source: Government of Canada 2017

Figure 6-13: Historical daily water levels for Back Lake (04AA003) Hydrometric Station (1970 to 2016)



Source: Government of Canada 2017

Figure 6-14: Historical daily discharge graph for the God's River at Confluence with Hayes River (04AD002) Hydrometric Station (1968 to 2016)



Source: Government of Canada 2017

Figure 6-15: Historical daily discharge graph for the Hayes River (04AB001) Hydrometric Station (1973 to 2016)

6.1.5.1.4 Water Quality

Water quality parameters measured at 24 stream crossings along the all-season road alignment indicated that conditions were relatively similar throughout the Project Footprint in June 2016. As is typical in boreal forest areas, waterbodies had slightly acidic pH values (low pH) however none exceeded Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG) (Manitoba Water Stewardship 2011) or CCME guidelines for the protection of aquatic life (CCME 1999). Specific conductance was also relatively low at all sites. Dissolved oxygen concentrations were variable with particularly low concentrations measured in the headwaters of bogs or beaver flooded areas, with concentrations at several sites below the protection for aquatic life objectives (Manitoba Water Stewardship 2011).

Laboratory-analyzed samples indicate that sites along the all-season road have relatively low nutrient concentrations, high clarity and low productivity. Ammonia, nitrate, and nitrite concentrations were within the MWQSOG and CCME guidelines and phosphorus was below the MWQSOG guidelines. Similar to TSS and turbidity, the CCME guideline for phosphorus is presented as an induced level of change from background. Because nutrient concentrations vary dramatically between seasons (ex: during freshet), concentrations could exceed the guidelines at other times of the year or under different flow conditions.

In situ water quality results for the two bridge crossing sites are summarized in **Table 6.13**. Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG) were referenced when identifying residual effects related to total suspended solids (TSS). The MWQSOG's for TSS (MWS 2011) are the same as the federal CCME guideline for total particulate matter (CCME 1999). Additional water quality details (temperature, pH, turbidity, specific conductance, dissolved oxygen) for each crossing site are provided in the Aquatic Environment Report – Existing Environment (**Appendix C-1, Appendix 4 and** 5; North/South Consultants Inc. 2017a).

Table 6.13: Key *In situ* Water Quality Measured at Major Watercourse Crossings Along the Proposed All-Season Road (June 2016)

Site	Temp. (°C)	Dissolved Oxygen (mg/L)	Oxygen Saturation (%)	Specific Conductance (µS/cm)	pH	Total Suspended Solids (mg/L)	Turbidity (NTU)
MWQ SOG	-	**6.0 to 6.5[1]**	-	-	**6.5 to 9.0[2]**	**10%, 5mg/L, or 25 mg/L induced change from background[3]**	-
CCME – PAL	-	**6.0 to 6.5[4]**	-	-	**6.5 to 9.0[2]**	**5mg/L, or 25 mg/L induced change from background[5]**	**2 NTU, or 8 NTU induced change from background[5]**
Gods River	15.4	8.0	89.3	97	7.7	<2.0	0.34
Magill Creek	17.1	7.2	75.1	131	7.4	3.2	2.68

Note: 1 – Cool and cold water objectives, respectively
2 – The lower and upper limits of the guideline for protection of aquatic life
3 – Objective depends on applicable period, average duration, allowable exceedance frequency, and design flow.
4 – Warm water biota early life stages present and cold-water biota, early life stages absent, respectively
5 – In clear flow, maximum increase for long-term (24hr - 30 d) and short-term (24hr period), respectively (CCME 1999)
Source: North/South Consultants Inc. 2017a.

The aquatics study was designed to collect the level of information that is consistent with the level of potential impact from the proposed development based on current understanding of effects on the aquatic environment from development and maintenance of all season road stream crossings. Additional baseline studies would provide little additional information upon which to base impact predictions or to select appropriate mitigation for the project. While seasonal water quality sampling (i.e. multitude of sampling over the same year) was not conducted for this project, such data is available for streams of similar physical characteristics within the same ecozone.

A comprehensive study of seasonal water quality in boreal forest streams was conducted for the Keeyask Generation Project in northern Manitoba. The Keeyask study area overlaps both the Boreal Shield and the Hudson Plain ecozones and was encompassed within the Nelson River drainage basin. Project 6 streams are within the Hayes River basin, immediately adjacent to the Nelson River basin and fall within the Boreal Shield ecozone. The Keeyask study examined routine water quality parameters (dissolved oxygen, pH,

turbidity, total suspended solids, specific conductance, phosphorous, organic carbon and chlorophyll *a*) in four small to medium sized rivers and eight small streams, and metals and major ions in medium to large rivers and lakes. Of these, the Aiken River (AK-1), Two Goose (TRIB-1), Portage (TRIB-2) and Rabbit (TRIB-3) creeks are within the Boreal Shield ecozone and most similar to streams in the P6 study area. The remaining small to medium rivers and small streams in the Keeyask study are immediately adjacent within the Hudson Plain. The results from the routine seasonal water quality studies conducted for Keeyask display a small level of seasonal variability in recorded parameters and can be found in Figures 2-1 through 2-10 of the Keeyask Generation Project Environmental Impact Statement Supporting Volume on Aquatic Environment (Keeyask Hydropower Limited, 2012). Based on total phosphorous, the Keeyask study streams were categorized to CCME trophic category ranging from mesotrophic to meso-eutrophic (Table 2-5, Keeyask Hydropower Limited, 2012).

6.1.5.1.5 Potable Water Sources

Potable water in the communities of Manto Sipi Cree Nation, Bunibonibee Cree Nation, God's Lake First Nation and God's Lake Northern Affairs Community is sourced from surface water and therefore surface water quality throughout the RAA can influence human health. Drinking water advisories are known to occur in Indigenous communities in the RAA. No current drinking water advisories are in effect for any of the Indigenous communities adjacent the Project (Health Canada 2018). A boil water advisory is ongoing for Gods River Lodge (Manitoba Water Stewardship 2018). During interviews conducted as part of TK studies, some members of Manto Sipi Cree Nation noted apparent pollution running into God's Lake from an abandoned gold mine on Elk Island. If water is being affected at Elk Island, the large distance (greater than 15 km) between Elk Island and local communities makes it unlikely that community drinking water would be affected.

6.1.5.1.6 Substrates

Streambed substrates were determined using side scan sonar and visual assessment as part of the Aquatic Environment Assessment (**Appendix C-1**; North/South Consultants Inc. 2017a). Streambed substrates at Project crossing locations are dominated by fine, highly organic sediments in the smaller and lower-gradient streams, with coarser material such as sand, gravel, cobble and boulders in the larger rivers. In particular, high proportions of coarser materials were present within streambed substrate at the P6a-X002, P6a-X019 (Magill Creek), P6b-X002, P6b-X007 and P6b-X015 (God's River) (**Figure 3-2**). Additional detail is provided in the Aquatic Environment Report – Existing Environment (**Appendix C-1, Appendix 4 and 5**; North/South Consultants Inc. 2017a).

6.1.5.2 Groundwater

The demand for groundwater in the physiographic region is low as surface water is abundant and consequently, there is little information known about the distribution of aquifers, their yield, or water quality. Anthropogenic contamination of groundwater in the RAA is expected to be negligible due to the remoteness of the Project and the absence of human settlement and industrial or commercial development. No regional information is available on aquifers and aquatards, fractures, fault locations,

areas of recharge and discharge, groundwater levels, flow regime and quality and springs in the vicinity of the Project. A search of the GW Drill database indicates that there are no known groundwater wells in the area (GW Drill 2016). Regional hydrogeological mapping in Manitoba, undertaken by the Geological Survey of Canada, Department of Energy Mines and Resources and the Prairie Province Water Board, does not extend into the northern part of the province (Betcher *et al.* 1995). Due to the lack of available regional groundwater information, a description of higher level information is provided below.

Supplies of groundwater are available from Precambrian crystalline igneous and metamorphic rocks and from sand and gravel materials in the overlying Quaternary sediments (Betcher *et al*. 1995). Unfractured crystalline igneous and metamorphic rocks typically have low hydraulic conductivity. Movement of groundwater commonly occurs through secondary permeability features such as faults, sheers or joints. The zone of groundwater circulation is thought to occur in the upper 60 to 150 m of bedrock where some features (joints) are more common. Where records exist in the south-eastern Precambrian Shield, more than 80% of wells indicate yields less than 1.0 litre per second. An estimate of the groundwater recharge rate in granitic bedrock is less than 5 mm per year (Betcher *et al*. 1995). In bedrock terrain, groundwater generally contains solutions of low dissolved solids, developed from unequal dissolution of aluminosilicate minerals. Dominant dissolved constituents typically include sodium, calcium, magnesium and bicarbonate; chloride and sulphate have lower concentrations (Betcher *et al*. 1995). Frozen ground affects northern hydrology through influence on infiltration, runoff and groundwater storage and flow (Woo *et al*. 1992). The presence of permafrost can restrict groundwater flow.

Relative to the Precambrian Shield groundwater aquifers there is a better understanding of the distribution of Quaternary sediments that can serve as a model for sand and gravel aquifer groundwater exploration throughout the region (Betcher *et al*. 1995). Although these surficial aquifers are scattered and local in nature and yields from most wells is small. In these sand and gravel aquifers, recharge is from rain and snow melt and the water quality tends to be excellent. Total dissolved solid concentrations in deep aquifers may exceed 1000 milligrams per litre (Betcher *et al*. 1995).

6.1.6 Fish and Fish Habitat

There are numerous watercourses and waterbodies located in the vicinity of and crossed by the all-season road alignment among Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation. As previously noted the locations of the proposed 53 watercourse crossings along the all-season road and shown in **Figure 3-2** with a list of the site names, locations and crossing structure required corresponding to each of the site numbers provided in **Table 3.2.** Crossings at fish-bearing watercourses include the bridges at God's River and Magill Creek as well as culverts at 23 streams. The remaining 28 crossings are non-fish bearing watercourses that would have equalization culverts to maintain existing water flow and drainage patterns. Where streams have been classified as not supporting fish, the rationale for that classification is provided within the Fish Habitat Classification section of the assessment booklet developed for each individual stream, and the reasons typically include absence of channel and no

connection to fish bearing waters. The assessment booklets are provided in Appendix 4 of the Aquatic Environment Report – Existing Environment (**Appendix C-1**; North/South Consultants Inc. 2017a).

In addition to assessing the effects on the aquatic environment within the Project Footprint at the watercourse crossings an Aquatic LAA was used that considers the area within a 10 km corridor centred on the all-season road alignment (**Figure 6-1**). The Aquatic RAA includes areas upstream and downstream of the LAA that are connected to watercourses potentially affected by the Project Footprint. This includes the headwater areas of the affected streams and downstream receiving waterbodies such as the Hayes River and God's Lake as shown in (**Figure 6-2**).

The aquatic environment in the Aquatic LAA includes a range of ephemeral, intermittent and perennial watercourses that provide a variety of low to high quality fish habitat. The quality of the fish habitat is based on the availability of the flows, depths, substrates, cover, water quality, food items and connectivity to other aquatic environments required by different fish species for their particular life cycle needs (ex: spawning, rearing, feeding, movement and overwintering). In general, fish habitat quality and species diversity increase as the size of the watercourse and permanence of flow (ephemeral, intermittent, or perennial) in the watercourse increases. Exceptions to this generality occur when there are barriers within the watercourse that affect flow patterns or fish movements (ex: beaver dams and waterfalls). Some fish species move from larger lakes and rivers to smaller tributaries and creeks for their reproductive or other life cycle requirements. As such, the importance of smaller watercourses as fish habitat is often related to the connectivity of the smaller upstream headwater areas to larger downstream habitats.

An assessment of fish and fish habitat was conducted with information sources including desktop studies, field investigations and from local communities on their traditional subsistence and cultural activities that involve the aquatic environment.

Based on existing information, including traditional knowledge studies, thirty-two fish species are known to occur within the major watercourses in the Aquatic RAA (**Table 6.14**). Twenty-four fish species have been previously recorded in the God's River and include a variety of large-bodied fish, such as brook trout, lake sturgeon, lake whitefish, northern pike, suckers and walleye (as cited in **Appendix C-1**, **Section 4.2.2**; North/South Consultants Inc. 2017a). Information on species presence was not found in the literature for the remaining study streams.

Table 6.14 Documented Fish Species Presence in Major Watercourses in the Aquatic RAA

Common Name	Scientific Name	God's River	God's Lake	Knee Lake	Hayes River	Bayly Lake
Blacknose dace	*Rhinichthys atratulus*		X			
Blacknose shiner	*Notropis heterolepis*	X				
Blackside darter	*Percina maculata*		X			
Brook stickleback	*Culaea inconstans*	X	X		X	
Brook trout	*Salvelinus fontinalis*	X	X		X	
Burbot	*Lota lota*	X	X		X	
Cisco	*Coregonus artedi*	X	X	X	X	
Deepwater sculpin	*Myoxocephalus thompsonii*				X	
Emerald shiner	*Notropis atherinoides*	X	X		X	
Fathead minnow	*Pimephales promelas*	X	X		X	
Johnny darter	*Etheostoma nigrum*	X	X		X	
Lake chub	*Couesius plumbeus*	X	X		X	
Lake sturgeon	*Acipenser fulvescens*	X	X		X	
Lake trout	*Salvelinus namaycush*	X	X	X		
Lake whitefish	*Coregonus clupeaformis*	X	X	X	X	X
Logperch	*Percina caprodes*				X	
Longnose dace	*Rhinichthys cataractae*	X	X		X	
Longnose sucker	*Catostomus catostomus*	X	X		X	
Mottled sculpin	*Cottus bairdii*		X			
Ninespine stickleback	*Pungitius pungitius*	X	X		X	
Northern pike	*Esox lucius*	X	X	X	X	
Pearl dace	*Margariscus margarita*		X		X	
River darter	*Percina shumardi*				X	
Sauger	*Sander canadensis*	X	X	X		
Shorthead redhorse	*Moxostoma macrolepidotum*	X			X	
Silver lamprey	*Ichthyomyzon unicuspis*				X	
Slimy sculpin	*Cottus bairdii*	X	X		X	
Spottail shiner	*Notropis hudsonius*	X	X		X	
Troutperch	*Percopsis omiscomaycus*	X	X		X	
Walleye	*Sander vitreus*	X	X	X	X	X
White sucker	*Catostomus commersonii*	X	X		X	
Yellow perch	*Perca flavescens*	X	X		X	

Source: North/South Consultants Inc. 2017a.

6.1.6.1 Summary of Field Investigations

North/South Consultants Inc. conducted detailed aquatic studies to identify and describe the aquatic habitats and aquatic species that may be potentially affected by the Project (**Appendix C-1**; North/South Consultants Inc. 2017a). Summary information from these studies is provided throughout this chapter.

Field surveys included the collection of fish, mussel and habitat data at proposed watercourse crossings along the all-season road alignment. Data collection included observations and measurements of in-stream parameters such as water depth, velocities and substrates, as well as information on the floodplain and/or riparian vegetation associated with the watercourses (North/South Consultants Inc. 2017a).

Fish sampling was conducted at each site to determine species presence and potential habitat use. Gear type was selected based on site-specific conditions and included backpack electrofishing, gillnetting, dip netting and angling. Additional methodological details are provided in the Aquatic Environment Report – Existing Environment (**Appendix C-1, Section 4**; North/South Consultants Inc. 2017a). Catch per unit effort was not calculated as fish sampling was done to confirm the presence of fish and provide information of species composition and not to estimate populations based on effort. No measurable effects are anticipated to fish populations provided mitigation measures such as maintaining fish passage and effective sediment control are applied. Individual crossings would be discussed with Fisheries and Oceans Canada (DFO) prior to construction and they would decide whether an authorization is required under the *Fisheries Act*. If an Authorization is required, offsetting may be also required.

6.1.6.1.1 Productivity

Primary productivity in watercourses in the Aquatic LAA was low during the June 2016 site investigations. Based on the river trophic classification system developed by Dodds *et al*. (1998), chlorophyll a and phosphorus concentrations would result in watercourses at the crossings being classified as primarily oligotrophic and sometimes mesotrophic at the time of sampling (**Appendix C-1**; North/South Consultants Inc. 2017a; Dodds *et al*. 1998). Water quality sampling was however one-time sampling event (at each crossing) therefore seasonal variation cannot be extrapolated. Concentrations could vary dramatically between seasons (ex: during freshet) and under different flow conditions.

It should be noted that the food web in boreal streams is based largely on detritus carried either in the streamflow from upstream areas or from leaf drop from riparian vegetation; primary production in the form of phytoplankton, attached algae or aquatic plants is generally not the major energy source. Secondary productivity of aquatic resources was not measured as part of site investigations.

Given the well-documented effects of road projects on aquatic ecosystems and well established measures for mitigation, additional site investigations to measure productivity are not necessary. It is anticipated that any effect on productivity would be negligible, given the small spatial scale of the area directly affected by the crossing and proposed mitigation measures.

The level of information on the aquatic environment collected by the studies is consistent with the nature of effect to the aquatic environment for the project. Additional water quality discussion can be found in **Section 6.1.5.1**.

6.1.6.1.2 No Fish Habitat

Habitat at 28 of the 53 watercourse crossing sites was assessed as not supporting fish. These unnamed streams are headwater wetland areas with no stream channel or channel connection to fish bearing waters. Habitat at the sites was characterized as a wetland with either no visible water or stagnant pools unsuitable to support any fish. Detailed descriptions of each of the individual sites assessed as not containing fish habitat are available in the Aquatic Environment Report – Existing Environment (**Appendix C-1, Appendix 4**; North/South Consultants Inc. 2017a).

6.1.6.1.3 Fish Habitat

Habitat at 25 of the 53 watercourse crossing sites was assessed as supporting fish. Fish habitat ranged from marginal habitat supporting only forage fish to sites with habitat supporting a greater diversity of fish species. Information on the flow regime, receiving waterbody, drainage area and whether the watercourse provides fish habitat for forage fish and large bodied fish is described in the following paragraphs and summarized in **Table 6.15**. Detailed descriptions of the aquatic habitat at the watercourse crossings, a description of presence of debris and obstructions, type of substrate, instream vegetation, fish habitat potential and maps are provided in the Aquatic Environment Report – Existing Environment (**Appendix C-1, Appendix 5**; North/South Consultants Inc. 2017a).

Of the 25 sites, 18 were assessed as marginal fish habitat, typically located on small first or second order streams that are often poorly connected to downstream fish-bearing waters due to numerous ephemeral barriers. These streams have small watersheds and limited flows which are often impounded by beaver dams. A defined stream channel is typically present with soft substrates, abundant instream vegetation and marshy floodplains. Site P6a-X002 was an exception, where coarse substrate (gravel/cobble) was abundant at the crossing; the coarse material presumably originating from the two existing winter road crossings. The flow conditions of theses streams may naturally result in degraded water quality due to low dissolved oxygen. Habitat at the majority of these sites is therefore considered unsuitable for large-bodied fish due to poor overwintering conditions and restricted access. Forage fish adapted to small boreal streams were frequently captured at these sites and include brook stickleback, fathead minnow and northern pearl dace. Where access is less restrictive (P6a-X031, P6b-X002, P6b-X003 and P6b-X009), large-bodied species such as northern pike are expected to make use of the crossings area for spawning, rearing and foraging. The coarse substrate at P6a-X002 may be used by suckers and walleye, but the small watershed and low water levels reduce the potential of the habitat.

Seven stream crossing sites were assessed as important habitat. These streams have larger upstream watersheds and connectivity to downstream and possibly upstream fish bearing waters. Habitat at these sites was suitable for a range of life requisites for a diversity of fish species, including both forage fish and large-bodied species. Habitat was similar at sites P6a-X008, P6a-X018, P6a-X023 and P6b- X013, which consisted of flat water, fine sediments and organic substrate and instream vegetation suitable for spawning, rearing and feeding of forage fish species and northern pike. Though small bodied fish tolerant

Table 6.15: Aquatic Environment Characteristics of Watercourse Crossings Along the All-Season Road Alignment.

Site (Figure 3-2)	Stream Name	Stream Type	Flow Regime	Receiving Waterbody	Distance to major downstream waterbody (km)	Upstream Drainage Area (km^2)	Fish Habitat	Fish Species
P6a-X001	Unnamed Tributary of Hayes River	Stream	Ephemeral	Hayes River	2.91	0.11	No	N/A
P6a-X002	Unnamed Tributary of Hayes River	Stream	Perennial	Hayes River	0.25	0.14	Yes	FF, LB
P6a-X003	Unnamed Tributary of Hayes River	Stream	Ephemeral	Hayes River	0.44	2.62	No	N/A
P6a-X004	Unnamed Tributary of Hayes River	Wetland	Ephemeral	Hayes River	1.71	N/A	No	N/A
P6a-X005	Unnamed Tributary of Hayes River	Stream	Perennial	Hayes River	1.49	3.31	Yes	FF
P6a-X006	Unnamed Tributary of Michikanes Lake	Stream	Ephemeral	Michikanes Lake	5.26	1.36	No	N/A
P6a-X007	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	2.17	0.00	Yes	FF
P6a-X008	Unnamed Tributary of Michikanes Lake	Stream	Perennial	Michikanes Lake	2.01	39.24	Yes	FF, LB
P6a-X009	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	1.61	0.95	No	N/A
P6a-X010	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	1.74	0.89	No	N/A
P6a-X011	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	1.91	0.83	No	N/A
P6a-X012	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	2.03	0.77	No	N/A
P6a-X013	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	2.09	0.74	No	N/A
P6a-X014	Unnamed Tributary of Michikanes Lake	Wetland	Perennial	Michikanes Lake	3.20	1.24	No	N/A
P6a-X015	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	4.91	4.63	No	N/A
P6a-X016	Unnamed Tributary of Michikanes Lake	Wetland	Ephemeral	Michikanes Lake	4.42	12.09	No	N/A
P6a-X017	Unnamed Tributary of Michikanes Lake	Stream	Ephemeral	Michikanes Lake	6.39	4.30	No	N/A
P6a-X018	Unnamed Tributary of Knee Lake	Stream	Perennial	Knee Lake	4.63	68.58	Yes	FF, LB
P6a-X019	Magill Creek	Stream	Perennial	Knee Lake	7.40	186.54	Yes	FF, LB
P6a-X020	Unnamed Tributary of Magill Creek	Stream	Intermittent	Knee Lake	7.81	0.36	Yes	FF
P6a-X021	Unnamed Tributary of Magill Creek	Stream	Ephemeral	Knee Lake	9.20	0.99	No	N/A
P6a-X022	Unnamed Tributary of Laird Lake	Wetland	Ephemeral	Laird Lake	14.00	1.06	Yes	FF
P6a-X023	Unnamed Tributary of Laird Lake	Stream	Perennial	Laird Lake	13.95	42.00	Yes	FF, LB
P6a-X024	Unnamed Tributary of Laird Lake	Stream	Ephemeral	Laird Lake	18.92	1.03	No	N/A
P6a-X025	Unnamed Tributary of Hawkins Lake	Wetland	N/A	Hawkins Lake	8.89	1.01	No	N/A
P6a-X026	Unnamed Tributary of Wanless Lake	Wetland	N/A	Wanless Lake	1.97	0.03	No	N/A

Site (Figure 3-2)	Stream Name	Stream Type	Flow Regime	Receiving Waterbody	Distance to major downstream waterbody (km)	Upstream Drainage Area (km^2)	Fish Habitat	Fish Species
P6a-X027	Unnamed Tributary of Wanless Lake	Stream	Perennial	Wanless Lake	3.34	2.26	Yes	FF
P6a-X028	Unnamed Tributary of Wanless Lake	Fen	Perennial	Wanless Lake	5.51	0.41	Yes	FF
P6a-X029	Unnamed Tributary of Hignell Lake	Stream	Perennial	Hignell Lake	2.33	4.40	Yes	FF
P6a-X030	Unnamed Tributary of Hignell Lake	Creek	Ephemeral	Hignell Lake	2.06	0.09	No	N/A
P6a-X031	Unnamed Tributary of Hignell Lake	Stream	Perennial	Hignell Lake	0.30	0.48	Yes	FF, LB
P6a-X032	Unnamed Tributary of Hignell Lake	Stream	Perennial	Hignell Lake	3.80	2.84	Yes	FF, LB
P6a-X033	Unnamed Tributary of an Unnamed Lake	Stream	Perennial	God's Lake	16.66	1.47	Yes	FF, LB
P6a-X034	Unnamed Tributary of an Unnamed Lake	Fen Stream	Perennial	God's Lake	15.19	7.51	Yes	FF, LB
P6a-X035	Unnamed Tributary of an Unnamed Lake	Stream	Ephemeral	God's Lake	13.12	1.58	No	N/A
P6a-X036	Unnamed Tributary of an Unnamed Lake	Stream	Ephemeral	God's Lake	5.91	1.64	No	N/A
P6a-X037	Unnamed Tributary of an Unnamed Lake	Stream	Perennial	God's Lake	4.06	0.54	Yes	FF
P6a-X038	Unnamed Tributary of an Unnamed Lake	Stream	Perennial	God's Lake	2.90	0.28	Yes	FF, LB
P6b-X001	Unnamed Tributary of Hawkins Lake	Stream	Ephemeral	Hawkins Lake	0.42	0.39	No	N/A
P6b-X002	Unnamed Tributary of Hawkins Lake	Stream	Perennial	Hawkins Lake	0.59	6.55	Yes	FF, LB
P6b-X003	Unnamed Tributary of Hawkins Lake	Wetland	Perennial	Hawkins Lake	3.99	16.37	Yes	FF, LB
P6b-X004	Unnamed Tributary of Hawkins Lake	Stream	Ephemeral	Hawkins Lake	5.53	0.30	No	N/A
P6b-X005	Unnamed Tributary of Opaskaykow Lake	Wetland	Perennial	Opaskaykow Lake	5.47	1.17	No	N/A
P6b-X006	Unnamed Tributary of Opaskaykow Lake	Stream	Perennial	Opaskaykow Lake	2.14	3.68	Yes	FF
P6b-X007	Unnamed Tributary of Opaskaykow Lake	Stream	Perennial	Opaskaykow Lake	2.43	134.31	Yes	FF, LB
P6b-X008	Unnamed Tributary of Bayley Lake	Wetland	Ephemeral	Bayley Lake	3.37	0.41	No	N/A
P6b-X009	Unnamed Tributary of Tapper Lake	Stream	Perennial	Tapper Lake	1.32	16.92	Yes	FF, LB
P6b-X010	Unnamed Tributary of Tapper Lake	Wetland	Ephemeral	Tapper Lake	4.06	9.00	No	N/A
P6b-X011	Unnamed Tributary of Tapper Lake	Wetland	Ephemeral	Tapper Lake	6.74	1.04	No	N/A
P6b-X012	Unnamed Tributary of God's Lake	Wetland	Ephemeral	God's Lake	3.86	1.91	No	N/A
P6b-X013	Unnamed Tributary of God's River	Stream	Perennial	God's River	0.76	9.87	Yes	FF, LB
P6b-X014	Unnamed Tributary of God's River	Stream	Ephemeral	God's River	0.59	0.31	No	N/A
P6b-X015	God's River	River	Perennial	Hayes River	287	12,861	Yes	FF, LB

Notes: a – FF = Forage Fish (ex: minnows), LB = Large Bodied (ex: northern pike, walleye, sucker spp.).

of low oxygen conditions may overwinter within the reach, large-bodied species (ex: northern pike) likely overwinter in downstream lakes.

Magill Creek is a long stream connecting a string of smaller lakes to the receiving waterbody, Knee Lake (**Photograph 6-17**). The P6a-X019 crossing is located 7.4 km upstream of Knee Lake. Habitat within the reach consists largely of fine sediments with boulders and instream vegetation. Habitat is suitable for spawning, rearing and feeding for northern pike and forage fish. There is some gravel/cobble habitat, suitable as spawning and rearing habitat for sucker and walleye. Overwintering of large bodied species likely occurs in deeper holes in the creek or in Knee Lake.

Photograph 6-17: Magill Creek (P6a-X019) – Upstream View Crossing Site

Habitat at crossing P6b-X007, an Unnamed Tributary of Opaskaykow Lake consists of run habitat with substrates dominated by fines but including some coarse material and abundant instream vegetation. This habitat supports a range of life requisites for northern pike and forage fish, including spawning, rearing and feeding and may be used by other large-bodied species such as burbot, walleye and suckers. Though fish species may overwinter within the reach, the lakes are better suited for overwintering of large-bodied species.

The God's River is a medium sized river flowing out of God's Lake (**Photograph 6-18**). The crossing (P6b-X015) is located 6.5 km downstream from God's Lake. The crossing is located at the existing winter road bridge where the river narrows resulting in increased water velocities. Habitat consists of run and pool

with areas of riffle upstream. The substrate was largely coarse material with larger cobble and boulder in the centre of the river and sand along the shore as well as downstream. The diversity of habitats, pool, run and riffle provide suitable habitat for a range of species, including northern pike, suckers, walleye and brook trout. Both adult and young-the-year brook trout were captured at the site indicating the presence of foraging and rearing habitat in the area as well as the likelihood of spawning habitat in the area.

Photograph 6-18: **God's River (Crossing P6b**-X015) **–** Upstream View at Crossing Site

6.1.6.1.4 Fish Species

During the June 2016 field surveys conducted by North/South Consultants Inc. a total of 12 species were recorded at crossings along the all-season road alignment with the highest number of fish recorded at God's River and Magill Creek. Fish species encountered at the God's River crossing site include brook trout, longnose sucker, northern pike, white sucker and sculpin spp. Species encountered at the Magill Creek crossing location include northern pike, shorthead redhorse and yellow perch. One or two species were identified at each of the 19 small low gradient boreal streams (unnamed tributaries) that the proposed all-season road crosses. Brook stickleback were found at 16 of the sites, northern pearl dace at four sites, northern pike at three sites, fathead minnow at two sites and burbot and johnny darter each at one site only (**Appendix C-1**; North/South Consultants Inc. 2017a). Fish presence was not confirmed through field sampling at the remaining 32 streams crossed by the all-season road as most did not have supporting fish habitat. Small waterbodies, boreal wetlands and headwater wetlands were identified as non-fish bearing due to the absence of a stream channel and upstream or downstream connectivity to larger fish-bearing

waterbodies. These small isolated waterbodies typically have shallow water depth with low pH and low dissolved oxygen levels and generally freeze through their depth; these conditions are not known to support fish populations. A full list of species recorded at each crossing is available in the Aquatic Environment Report – Existing Environment (**Appendix C-1, Appendix 2**; North/South Consultants Inc. 2017a).

6.1.6.1.5 Mussels

Mussel sampling was conducted by North/South Consultants Inc. in Class 1 streams. Class 1 streams include medium to large streams and rivers that maintain perennial flow and contain important fish habitat (**Appendix C-1**; North/South Consultants 2017a). Mussel sampling was targeted within all-season road crossing areas. Additional sampling was conducted outside of the crossing area, based on the presence and location of suitable habitat. The small tributary streams crossed by the all-season road alignment are unsuitable for mussels due to the shallow water depth that is prone to ice formation to the creek bottom. Mussels are typically found in medium to large river systems in areas predominately composed of silt/clay and sand and to a lesser extent gravel. Sampling methodology was selected based on site-specific conditions (ex: depth) and included mussel raking, visual inspection using a bathyscope in wadeable areas and shoreline surveys for empty valves. Captured mussels were identified and enumerated by species and replaced at the area of capture.

Mussels were only encountered at the God's River and Magill Creek crossing locations. Fat mucket (*Lampsilis siliquoidea*) and giant floater (*Pyganodon grandis*) mussels were captured using a mussel rake or through visual surveys in Magill Creek near the crossing site and giant floater was captured in the God's River near the crossing site (**Appendix C-1**; North/South Consultants Inc. 2017a).

6.1.6.2 Species at Risk

No aquatic Species at Risk were recorded during field investigations. Lake sturgeon has been previously documented in God's River, God's Lake and Hayes River. The Southern Hudson Bay-James Bay population is designated as Special Concern by COSEWIC (COSEWIC 2006b) and is currently under consideration for protection under SARA. Although they are not legally protected, the potential presence of lake sturgeon was assessed in consideration of potential future listing under SARA.

Rare aquatic species known to be present upstream in the Lake Winnipeg East drainage area include the mapleleaf mussel (*Quadrula quadrula*) (ESEA - Endangered) and the shortjaw cisco (*Coregonus zenithicus*) (COSEWIC - Threatened) (Manitoba Sustainable Development 2017d). No records indicate that either species have been encountered near the Aquatic LAA (Stewart and Watkinson 2004). Additional discussion related to aquatic species at risk is provided in **Section 6.1.8.2**.

6.1.7 Migratory Birds and Habitat

The spatial boundaries used to assess potential Project effects in relation to birds are the Wildlife LAA (**Figure 6-1**) and Wildlife RAA (**Figure 6-2**) as previously described in **Section 6.1.4.5**. An assessment of

birds and their habitat was conducted with information sources including desktop studies (including the Manitoba Breeding Bird Atlas [MBBA]), field investigations and from traditional knowledge from local communities.

A total of 152 bird species, including waterfowl, raptors, upland game birds and songbirds may be found in the Wildlife RAA (**Appendix D-2**; Joro Consultants 2018b). Of these species, 114 may breed in the RAA, while the remaining 38 are transient species that may occur within the RAA. A full list of the migratory and resident bird species potentially present in the Wildlife RAA is provided in the Wildlife Characterization and Effects Assessment report (**Appendix D-2, Appendix B**; Joro Consultants 2018b).

Characterization of ecosystems (ex: land cover types) in the project area that may be affected by the Project was previously discussed in **Section 6.1.4.1.1**. Habitat modelling/mapping for migratory bird VCs is detailed in the Wildlife Characterization and Effects Assessment of the Proposed All-Season Road Project 6 (**Appendix D-2. Sections 7.6 to 7.9**; Joro Consultants 2018b).

6.1.7.1 Summary of Field Investigations

A combination of ARUs, breeding bird point counts (done by MBBA) and aerial waterfowl surveys were used to collect information on the bird species present in the Wildlife LAA as described in the following paragraphs and detailed (ex: sample site locations) in the Wildlife Characterization and Effects Assessment report (**Appendix D-1, Section 3.5**; Joro Consultants 2018a).

6.1.7.1.1 Methods

6.1.7.1.1.1 Autonomous Recording Units

ARUs were deployed in 2016 within the different habitat types present in the Wildlife RAA representing the preferred habitat of a variety of different bird and amphibian species. The ARUs were scheduled for specific start and shut off times to capture peak bird call times. The units were scheduled to record daily at different times of day based on the species being sampled. From March to May they recorded in the evening and night when owls are potentially calling. From May to September they recorded during the morning, evening and night when various songbirds and other species are calling.

6.1.7.1.1.2 Manitoba Breeding Bird Atlas

The MBBA also conducted a series of bird surveys in 2014 within the vicinity of the Project. Species abundance was determined through point-count surveys to provide a rough measure of how many birds were in each survey block (ex: where they are breeding). Each point count involved standing in a pre-determined location (usually along the right-of-way [ROW], but a small number of off-road sites in different habitat types were also completed), waiting a 1-minute calming period prior to the survey and recording all birds heard or seen in an exact 5-minute period (as cited in **Appendix D-1, Section 3.5.3**; Joro Consultants 2018a).

6.1.7.1.1.3 Aerial Waterfowl Surveys

Aerial waterfowl surveys were conducted within the Wildlife RAA during the period of waterfowl breeding (June 16 to 17, 2016), brooding (July 20 to 21, 2016) and during the period of fall waterfowl migration (October 21 to 24, 2016). Flight transects were located along and within 5 km on either side of the alignment. The helicopter travelled at 30 to 40 m above the ground, with a ground speed of approximately 80 to 100 km/hr. Three biologists scanned the areas surveyed for wildlife as well as large stick nests and one of the biologists recorded the information collected onto data sheets. Survey data collection sites were recorded using hand-held GPS devices. While survey design followed Canadian Wildlife Service protocol for surveying waterfowl, other species of birds and wildlife were also observed. The objective of the fall survey was to document general areas of migratory waterfowl staging. Staging waterfowl (typically rafts of diving species) were documented and mapped, providing additional qualitative data pertaining to potential waterfowl staging areas near the Project alignment.

6.1.7.1.2 Results

Bird species recorded in the Wildlife RAA as part of the Wildlife Characterization and Effects Assessment are discussed in the following paragraphs with a full list, as compiled by **Appendix D-1, Appendix B (**Joro Consultants 2018a) provided in **Appendix 6-2**.

6.1.7.1.2.1 Autonomous Recording Units

The ARUs deployed in 2016 recorded over 66 species of birds. The most commonly recorded species were sandhill crane, Canada goose and Wilson's snipe (**Appendix D-1**; Joro Consultants 2018a). Two of the 66 bird species recorded, common nighthawk and olive-sided flycatcher, are Species at Risk (**Appendix D-1**; Joro Consultants 2018a).

6.1.7.1.2.2 Manitoba Breeding Bird Atlas

The MBBA point count surveys recorded 74 species of birds in the Wildlife RAA. The most common species observed were white-throated sparrow, Tennessee warbler, ruby-crowned kinglet, hermit thrush, chipping sparrow and dark-eyed junco. Forty-two of the 74 species observed were also recorded by the ARU program in 2016. Three of the 74 birds recorded were Species at Risk including common nighthawk, rusty blackbird and olive-sided flycatcher (Manitoba Breeding Bird Atlas 2015; **Appendix D-1**; Joro Consultants 2018a).

6.1.7.1.2.3 Aerial Waterfowl Surveys

Over 800 birds representing more than 20 species were observed during aerial waterfowl surveys conducted in mid-June 2016. The most commonly observed group of species observed in the Wildlife RAA were waterfowl (85.1%), most of which were ring-necked ducks (*Aythya collaris*, 37.0%) and common mergansers (*Mergus merganser*, 17.0%). The remaining species included other waterbirds (4.3%), shorebirds (2.8%) and other birds (7.8%). The 819 birds observed were almost equally distributed among bogs/marshes (33%), open water or lake shorelines (32%) and ponds (35%). The detailed observation

results from the June 2016 waterfowl survey are given in the Wildlife Characterization and Effects Assessment (**Appendix D-1**; Joro Consultants 2018a).

There were 48 young of the year amongst the 12 broods observed during the June aerial surveys. The average brood size was 4.0 (±2.5). Most of the 48 young within identified broods were Canada geese, (32), mallards (11) or swans (4) as strong evidence that they were nesting within the Wildlife RAA. In addition to the broods, several adult pairs of ring-necked ducks, mallards and Canada geese were observed.

During the second aerial waterfowl surveys conducted in mid-July 2016 a total of 328 birds representing over 12 species were observed. Waterfowl were most abundant (84%); rounded out by a small sample of waterbirds (10%), bald eagles (3%) and other birds (3%) comprised mainly of shorebirds and sandhill cranes. Ring-necked ducks and mergansers comprised 37% and 17% each respectively of the total observations. Open water or shorelines of lakes accounted for 55% of the bird observations, compared to 36% and 9% respectively for each of creeks and rivers. The detailed observation results from the July 2016 waterfowl survey are given in the Wildlife Characterization and Effects Assessment (**Appendix D-1, Section 3.6**; Joro Consultants 2018a).

There were 75 young of the year amongst the 25 broods observed during the July aerial surveys. The average brood size was 4.4 (±2.2). Of the broods identified to species, 36% were Canada geese, 21% ring-necked ducks and 11% mallards. Over half of the broods not identified to species (32%) were diving ducks. The results provide substantial evidence that they are nesting within or near the RAA. In addition to the broods observed, there were several adult pairs of ring-necked ducks, mallards and Canada geese.

No colonial waterbird nesting sites were recorded during the aerial waterfowl surveys or incidentally during any other surveys. Gull and tern colonies are not typically found on small waterbodies along the roads. A single raptor stick nest was observed during the waterfowl surveys; however, eight stick nests were recorded during the multi-species surveys (**Appendix D-1**; Joro Consultants 2018a).

6.1.7.1.2.4 Habitat Types

Of the total 6,760 individual bird observations from MBBA, ARUs and waterfowl surveys, the majority of birds were observed in wetland shrub (28.5%) or coniferous open (25.4%) habitat as summarized in **Table 6.16**. Due to different methods of collection data during the different surveys, the numbers cannot be directly compared, but are included to show the relative number of species observed during surveys in the Wildlife RAA.

Table 6.16: Total number of bird observations by habitat type

Habitat Type	ARU	MBBA Incidental Observations	MBBA Point Count Survey	Waterfowl Surveys	Total	Number of Species	Percent of Observations
Broadleaf Dense	146	0	11	11	168	37	2.20%
Broadleaf Open	0	0	0	0	0	0	0.00%
Coniferous Dense	316	240	298	188	1042	83	13.67%
Coniferous Open	329	543	749	169	1790	88	23.48%
Coniferous Sparse	72	68	366	24	530	58	6.95%
Exposed Land	0	0	32	1	33	20	0.43%
Mixedwood Dense	0	0	0	0	0	0	0.00%
Shrub Tall	0	61	0	3	64	17	0.84%
Water	21	128	43	1481	1673	57	21.95%
Wetland Herb	128	92	40	53	313	55	4.11%
Wetland Shrub	541	184	882	268	1875	95	24.60%
Wetland Treed	0	0	127	8	135	32	1.77%
Grand Total	**1553**	**1316**	**2548**	**2206**	**7623**	**-**	**100.00%**

Source: Joro Consultants 2018b

6.1.7.1.3 Species at Risk

Bird Species at Risk that were recorded, or may be present in the Wildlife RAA, include bank swallow, barn swallow, Canada Warbler, common nighthawk, eastern wood-pewee, olive-sided flycatcher, peregrine falcon, rusty blackbird, short-eared owl, horned grebe and yellow rail. These are discussed in **Section 6.1.8**.

6.1.7.2 Species of Local Interest

Waterfowl hunting is an important activity for resource users. Community participants indicated that geese and ducks are frequently in abundance in key habitat areas associated with waterbodies such as creeks and lakes. Geese typically congregate near rapids, close to open water in the spring and will pass by these same areas in the fall and find alternate locations to stage. Community members typically hunt mallard ducks in nearby creek habitats (**Appendix D-2**; Joro Consultants 2018b).

Loons and gulls are frequently observed near the communities. Loons may be hunted for food and gull eggs are occasionally harvested and eaten by community members. Community members indicated that bittern, tundra swan and blue heron are harvested, typically eaten by Elders in the community (**Appendix D-2**; Joro Consultants 2018b. Grouse (ruffed, spruce and sharp-tailed) are abundant in the RAA and are often observed and hunted in the fall on islands in nearby lakes (**Appendix D-2**; Joro Consultants 2018b).

During discussions on raptors, workshop participants mentioned that bald eagles maintain a healthy population along lakes and rivers in the RAA. Ospreys have also been observed by community members; however, sightings are less frequent than in the past. Peregrine falcons are only occasionally observed along riverbanks. Workshop participants noted that owl populations in the RAA have decreased over the

past several years. Owls observed by community members include snowy owls (in winter), great horned owls, short-eared owl and northern saw-whet owl (**Appendix D-2**; Joro Consultants 2018b).

6.1.8 Species at Risk [6]

At the federal level, SARA is intended to protect wildlife species at risk in Canada. Within the Act, COSEWIC was established as an independent body of experts responsible for identifying and assessing wildlife species considered at risk. Wildlife species that have been designated by COSEWIC may then qualify for legal protection and recovery under SARA, if listed under the Act. At the provincial level, ESEA was enacted to protect and enhance the survival of threatened and endangered species in Manitoba, to enable reintroduction of extirpated species into the province and to designate species as threatened, endangered, extirpated, or extinct.

Species are evaluated and ranked by the MBCDC on the basis of their range-wide (global - G) status and their province-wide (sub-national - S) status according to a standardized procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine protection and data collection priorities and are revised as new information becomes available. For each level of distribution - global and provincial - species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure). This reflects the species' relative endangerment and is based primarily on the number of occurrences of that species globally or within the province (Manitoba Conservation Data Centre 2017).

All provincially and federally listed wildlife species potentially occurring in the Wildlife RAA were assessed. Species accounts regarding habitat, life history and any potential issues relative to critical habitat (if identified) were developed for all SAR as listed below. Field assessments were undertaken for all SAR birds within the Wildlife RAA, using a combination of sources for data including ARUs, aerial waterfowl surveys and breeding bird point count surveys.

6.1.8.1 Terrestrial

6.1.8.1.1 Vegetation

There are an estimated 14 Species at Risk that occur within the Vegetation RAA and surroundings, based on records from the MBCDC, georeferenced specimens housed in the Manitoba Museum and the University of Manitoba herbaria, as well as literature data available (**Table 6.17**) (**Appendix B-1**; Szwaluk Environmental Consulting Ltd. *et al.* 2017a). None of these 14 Species at Risk are listed federally under the COSEWIC or SARA, or provincially protected under the ESEA. No plant Species at Risk were observed in the Vegetation RAA during field investigations (**Appendix B-1**; Szwaluk Environmental Consulting Ltd. *et al.* 2017a). None of plant Species at Risk potentially present in the Vegetation RAA were identified as

[6] As noted in **Section 6.1.4.1.4**, for the purpose of this Environmental Assessment, Species at Risk are defined as federal species listed under the Species at Risk Act or designated by COSEWIC for listing on Schedule 1 of SARA (extirpated, endangered, threatened and special concern); provincial species listed as Endangered or Threatened under the Manitoba ESEA; and species listed as very rare (provincial status of S1) or rare (provincial status of S2) throughout their range as listed by the MBCDC.

being plants of sustenance or cultural value to local communities (**Appendix B-1**; Szwaluk Environmental Consulting Ltd. *et al.* 2017a).

Table 6.17: Vegetation Species at Risk **previously recorded in the God's Lake area and** surrounding Hayes River Upland Ecoregion.

Scientific Name	Common Name	S Rank
Astragalus bodinii	Bodin's Milkvetch	S1
Botrychium matricariifolium	Daisy-leaf Moonwort	S1
Carex loliacea	Rye-grass Sedge	S2?
Carex maritima	Seaside Sedge	S2?
Carex microglochin	False Uncina Sedge	S2?
Diphasiastrum sitchense	Ground-fir	S1
Glyceria pulchella	Graceful Manna Grass	S2S3
Huperzia selago	Mountain Club-moss	S2S3
Impatiens noli-tangere	Western Jewelweed	S1
Oxytropis borealis	Boreal Locoweed	S1S2
Platanthera hookeri	Hooker's Orchid	S2S3
Potamogeton robbinsii	Robbin's Pondweed	S2S3
Potamogeton strictifolius	Straightleaf Pondweed	S2S3
Woodsia alpina	Northern Woodsia	S2

Source: Szwaluk Environmental Consulting Ltd. *et al.* 2017a

6.1.8.1.2 Mammals

Mammal Species at Risk identified in the project area include woodland caribou, wolverine and little brown bat (**Appendix D-2**; Joro Consultants 2018b). Each of these species is discussed in greater detail in the following sections. Their current conservation status, recovery strategy, critical habitat presence and potential occurrence are summarized in **Table 6.18**.

6.1.8.1.2.1 Woodland Caribou

Woodland caribou were identified in the Wildlife RAA through aerial surveys, trail cameras (**Photograph 6-19**) and wildlife workshops. They are a medium-sized ungulate with distinctive characteristics such as large crescent-shaped hooves, providing caribou the ability to walk in snow-covered landscapes and soft peat lands, as well as dig through snow to forage for lichens during the winter. Both male and female woodland caribou have antlers during part of the year. Woodland caribou prefer large, continuous tracts of undisturbed habitat with inherently low ecological diversity and low predator densities during critical calving and rearing periods (Environment Canada 2012).

Photograph 6-19: Woodland caribou captured on a trail camera in the Regional Assessment Area (Joro Consultants 2018b).

The Pen Islands (Eastern Migratory) and Norway House (Boreal Woodland) caribou ranges/populations overlap with the Wildlife RAA. The animals occupying both ranges are woodland caribou (*Rangifer tarandus caribou*), but due to differences in their migratory and calving behaviour they are recognized as belonging to different ecotypes. Pen Islands caribou are categorized as the migratory ecotype, also referred to as "forest-tundra" ecotype, whereas Norway House caribou are classified as the sedentary ecotype, also referred to as "forest-dwelling" or "boreal forest" ecotype (COSEWIC 2011b; Manitoba Boreal Woodland Caribou Management Committee 2015).

Forest-tundra (Pen Islands) caribou traditionally migrate and assemble in large groups near the Hudson Bay coast to calve. This is in contrast to forest-dwelling caribou (Boreal Woodland) that disperse and separate over large areas during calving. Forest-tundra caribou more closely resemble migration characteristics of barren-ground caribou (*Rangifer tarandus groenlandicus*), moving large distances between winter range and spring calving areas (COSEWIC 2011b; Berglund *et al*. 2014; Pond *et al.* 2016).

Table 6.18: Mammal Species at Risk That May Occur in the Wildlife Regional Assessment Area.

Species Common Name	Scientific Name	Species Listing Status (Federal and Provincial)					Is Critical Habitat in RAA?	Potential Occurrence in Local Assessment Area or Regional Assessment Area
		SARA	COSEWIC	MBCDC	ESEA	Recovery Strategy Plan		
Boreal Woodland Caribou	*Rangifer tarandus caribou*	Threatened, Schedule 1	Threatened	S2S3	Threatened	Yes (2012)	Yes - A small portion of the Molson Boreal Caribou Management Unit and the Norway House range are contained in the RAA.	Very Low Potential: Differentiation between boreal woodland caribou (Norway House) and Eastern Migratory (Pen Islands) caribou observations could not be confirmed. Low potential for boreal woodland caribou occurrence as the Norway House population range only overlaps slightly with the RAA.
Eastern Migratory Caribou	*Rangifer tarandus caribou*	No Schedule, No Status	Endangered	SNR	Not listed	COSEWIC Status report only (2017)	Yes, if/when listed under SARA using the definition of critical habitat for Boreal woodland caribou - The majority of the RAA and the entire LAA are included in the Pen Islands caribou range.	High potential: Pen Islands caribou occur within the RAA during all seasons with the largest portion of seasonal core use area occurring in the RAA in late winter. Only a small proportion of its seasonal core use area occurs within the LAA, with the largest portion of a seasonal core use area occurring in the LAA in early winter.
Little Brown Bat	*Myotis lucifugus*	Endangered, Schedule 1	Endangered	S2N, S5B	Endangered	Yes - combined for little brown bat, northern bat and tricolored bat (2015)	No critical habitat (bat hibernacula) in RAA (Recovery Strategy); closest is concentrated in the northwest of Lake Winnipeg, north of Grand Rapids.	Low Potential: Very low potential for hibernacula in RAA. Some potential to be used during the summer as roosting sites within the forested areas; habitat exists but there were no sightings of the species or hibernacula.
Wolverine	*Gulo gulo*	Special Concern, Schedule 1	Special concern	S3S4	Not listed	N/A	No - EC does not identify specific critical habitat.	High Potential: May occur in very low numbers dispersed in the RAA. Four species observations and 9 track observations were recorded through aerial multispecies surveys during 2011 – 2016 field studies. The trapper program (2016/2017) also recorded 10 occurrences of wolverine tracks within the RAA.

Source: Joro Consultants 2018b.

Regional importance:

Caribou are known to be a culturally important species for a number of community members (HTFC Planning & Design 2017b). Caribou are known to move southward from Churchill and Shamattawa First Nation in the winter to the Wildlife RAA, typically maintaining the same route annually. Community members indicated that caribou typically move from northwest to southeast, with large herds (tens to hundreds) migrating across God's Lake in January and February.

Smaller herds of migrating caribou (Pen Islands caribou) are known to stay behind and overwinter, staying near the local communities throughout the summer. These summering herds re-connect with the larger herd in the following spring migration. Caribou calving is known to occur along the eastern edge of Edmund Lake and northwest towards Knee Lake.

Information from local First Nation communities has supported the understanding of a diverse caribou population within the Wildlife RAA. Community members have described two types of caribou referred to as resident or migratory that are differentiated by physical and behavioural characteristics. Resident caribou tend to be larger as opposed to migratory herds observed in the region. These resident caribou are typically observed in herds of only 6 to 8 animals with a maximum herd size of approximately 15 animals.

6.1.8.1.2.1.1 Pen Islands Eastern Migratory Caribou Range/Population (Forest-tundra)

COSEWIC (2011) currently identifies the Pen Islands caribou range as part of Designatable Unit 4: Eastern Migratory Caribou. It is currently not listed under SARA, however COSEWIC has assessed the conservation status of Designatable Unit 4 as endangered (COSEWIC 2017). MBCDC (2017) has not ranked the Eastern Migratory Caribou. The Pen Islands population is estimated at 16,638 individuals in 2011 (COSEWIC 2017). The population of all Eastern Migratory caribou together is estimated to be 170,636 mature animals (COSEWIC 2017)

The Pen Islands caribou population has a range extending from northeastern Manitoba to northwestern Ontario within the Hudson Bay and Boreal Shield Ecozones (Magoun *et al.* 2005; Gunn *et al.* 2011; Abraham *et al.* 2012; Berglund *et al*. 2014). In recent years, caribou from the Pen Islands caribou population have been observed in the same geographical area as the proposed Project and to the area north and east within the Wildlife RAA on occasion. However, the actual numbers and frequency of Pen Islands caribou occupying and/or migrating through the Wildlife RAA has likely varied considerably over time.

Due to the migratory nature of the Pen Islands population, the use of this area by animals has been primarily on a seasonal basis (the winter months from November through to late April), though a very small number of female caribou may have remained in the Wildlife RAA during the summer months. The Wildlife RAA would be on the southern limit of the population's normal range. Within the Wildlife RAA

the animals would primarily be found in forested areas, but most commonly mature coniferous forests where quantities of lichen are available.

Critical Habitat

Critical habitat has not been identified for Eastern Migratory caribou (COSEWIC 2017). The Pen Island caribou range includes the majority of the Wildlife RAA and the entire Wildlife LAA (**Appendix D-2**; Joro Consultants 2018b.

Annual Movement Patterns

Path trajectory data were generated, as part of the Wildlife Characterization and Effects Assessment, for those Pen Islands animals that had sufficient annual movement locational data to determine annual movement patterns (**Appendix D-2**; Joro Consultants 2018b). A total of 32 animals, from the 42 collared Pen Islands caribou, had sufficient data for estimating annual measures, representing a total of 70 caribou-years of data. Pen Islands caribou travel large distances over the annual cycle with the average annual minimum path length estimated at 3,536 km (Standard Deviation of 920 km). Results of the path trajectory analysis indicate that Pen Islands caribou gradually move inward from the Hudson Bay coast during November and December, reaching the farthest inland from the coast by mid-January and February, then slowly returning to the Hudson Bay coast in March and arriving at calving grounds in April (Abraham and Thompson 1998; Berglund *et al*. 2014). During the calving season, Pen Islands caribou migrate large distances towards the Hudson Bay coast to calve. Caribou continue to approach the coast during summer but do not aggregate on the coast (Abraham *et al*. 2012; Berglund *et al*. 2014). During the breeding season, Pen Islands caribou are found at the edge of the Hudson Bay Lowlands boundary (Abraham and Thompson 1998).

Crossing event analysis was used to assess frequency of potential crossings of linear features in the Wildlife RAA, including the proposed all-season road alignment, winter roads and transmission lines. Pen Islands caribou only crossed the all-season road and winter road during early and late winter and most caribou crossing events for the transmission line occurred in early and late winter, with two crossings occurring during the calving season. A small overall number of caribou crossed linear features (**Appendix D-2**; Joro Consultants 2018b). Pen Islands caribou were primarily present in the Wildlife RAA during early and late winter, spending an average of 10.4 and 16.7 days of the 40-day seasons in the RAA, respectively. One Pen Islands caribou, animal was present in the eastern fringe of the RAA during all five seasons and was the only collared animal present during the calving, summer and breeding seasons.

Recovery Strategy

No recovery strategies have been developed for the Eastern Migratory caribou. There is currently no sustainable threshold of undisturbed habitat identified by Environment Canada (2012) for Eastern Migratory caribou. The disturbance analysis conducted on available data for the area indicated that the

Pen Islands range within Manitoba had a total disturbance of 23% in 2015 (**Appendix D-2**; Joro Consultants 2018b).

6.1.8.1.2.1.2 Norway House Boreal Woodland Caribou Range/Population (Forest-dwelling)

COSEWIC (2011) currently identifies the Norway House caribou range as part of Designatable Unit 6: Boreal Caribou and they are listed as "Threatened" under SARA. Boreal caribou are also listed as "Threatened" under ESEA and a process for developing an Action Plan for the Management Unit is provided in Manitoba's Boreal Woodland Caribou Recovery Strategy (MBWCMC 2015). A Management Unit is a geographical land base within which one or more caribou ranges will be managed in combination for population sustainability, connectivity and habitat goals (MBWCMC 2015). MBCDC lists the population as S2S3 (Manitoba Conservation Data Centre 2016). Norway House caribou population numbers and trends are unknown however the population was assessed to be self-sustaining (Environment Canada 2012). The total Boreal Woodland population is approximately 34,000 across Canada (Environment Canada 2012).

The Norway House population range overlaps slightly with the Wildlife RAA, restricted to the extreme western portion. Historical information on the forest-dwelling ecotype within the Wildlife RAA is sporadic and limited. Current range data from 2011 to 2017 provided by MSD have been reviewed as part of baseline wildlife monitoring. Both government reports and traditional ecological knowledge indicate the presence of caribou within the general geographical area but detailed information on historic distribution and numbers is lacking. As a result, the range delineation of this boreal caribou population has gone through several changes since the early 1990's (Johnson 1993; Rebizant *et al*. 2000; Manitoba Conservation 2006; MBWCMC 2015). Currently MSD, the provincial department responsible for boreal woodland caribou management, shows the western portion of the Wildlife RAA as being in the Molson Lake MU and a small part of the Norway House caribou range overlapping it (MBWCMC 2015). The Norway House range lies entirely within the Boreal Shield Ecozone.

Critical Habitat

Critical habitat was identified in the Wildlife RAA for a small portion of the Molson Boreal Caribou MU and the Norway House range (**Appendix D-2**; Joro Consultants 2018b). The 2015 Recovery Strategy for the Woodland Caribou Boreal population in Canada identified the critical habitat as:

- the area within the boundary of each boreal caribou range that provides an overall ecological condition that will allow for an ongoing recruitment and retirement cycle of habitat, which maintains a perpetual state of a minimum of 65% of the area as undisturbed habitat
- biophysical attributes required by boreal caribou to carry out life processes

Annual Movement Patterns

Of 60 collared Norway House caribou, 50 individuals had sufficient data for estimating annual measures of movement. Norway House caribou show small scale seasonal movement patterns and move independently (Berglund *et al*. 2014). Norway House caribou calve farther from the Hudson Bay coast than Pen Islands caribou and move from winter aggregations (west of the Wildlife RAA) to calve in isolation (also west of the RAA) (**Appendix D-2**; Joro Consultants 2018b). The average annual path length for these animals was 1,520 km (standard deviation of 297 km).

Crossing event analysis was used to assess frequency of potential crossings of linear features in the Wildlife RAA, including the proposed all-season road alignment, winter roads and transmission lines. Travel paths of the Norway House caribou range did not intersect the RAA, although they were observed to cross winter roads and transmission lines throughout the year within their main range.

Recovery Strategy

Environment Canada (2012) has developed a recovery strategy for the boreal population of woodland caribou. The goal of the recovery strategy is to achieve self-sustaining local populations in all boreal caribou ranges throughout their current distribution in Canada, to the extent possible. The recovery strategy identifies 65% undisturbed habitat in a range as the disturbance management threshold, which provides a measurable probability (60%) for a local population to be self-sustaining. This threshold is considered a minimum threshold because at 65% undisturbed habitat there remains a risk (40%) that local populations will not be self-sustaining (Environment Canada 2012). Based on a disturbance analysis conducted for the project, current disturbed habitat within the Molson House Unit is 28% (**Appendix D-2**; Joro Consultants 2018b). In the Manitoba Recovery Strategy (MBWCMC 2015) the population size for the Molson MU (Norway House population) is ranked as acceptable, with the population trend under review. The Molson MU has been identified as low risk (MBWCMC 2015). The natural disturbance is high, anthropogenic disturbance is limited and planned development is limited (MBWCMC 2015).

6.1.8.1.2.2 Wolverine

Wolverine (*Gulo gulo*) are globally abundant and apparently secure (G4) and provincially uncommon to widespread (S3S4). Prior to 2014 wolverine were considered to have an eastern and a western sub-population, with the western sub-population being present in the northern Manitoba. What was formerly referred to as the eastern population was ranked as Endangered under SARA and therefore a recovery strategy has been developed for this population (Environment Canada 2016e). In 2014 the populations were grouped into a single unit, which is currently ranked as a species of Special Concern under COSEWIC and under Schedule 1 of SARA[7] and provincially not listed by ESEA.

[7] At the time that the P6 Wildlife Existing Environment (Joro Consultants 2018a) and the P6 Wildlife Characterization and Effects Assessment (Joro Consultants, 2018b) were written, wolverine was not listed under SARA. As such, these reports only detail the COSEWIC assessment.

Wolverine are designated by COSEWIC due to declines in the southern part of the range (ex: British Columbia, Quebec, Labrador) and because population estimates are very limited and trends are not known (COSEWIC 2014). Wolverine habitat is also increasingly fragmented, especially in the southern part of its range and increased motorized access increases harvest pressure. Critical habitat for wolverine has not been identified (Environment Canada 2014).

Climate change is also thought to be affecting animals in the southern part of the range and this effect is expected to move northward (COSEWIC 2014). Additional reasons for designation include that the species has a low reproductive rate, is sensitive to human disturbance and requires vast secure areas to maintain viable populations (COSEWIC 2014). Population threats include potential overharvest associated with unknown harvest levels, increased snowmobile access and habitat loss and fragmentation due to forestry, agriculture, oil and gas development, hydroelectric reservoirs and roads (COSEWIC 2014). In southern limits of the range, functional habitat loss may result from disturbance caused by recreational activities (ex: ATVs, snowmobiles, hiking) during the denning period. Declining ungulate populations (especially caribou) represent loss of important source of food.

Wolverines are regionally important as they are actively trapped, however members of the Manto Sipi Cree Nation note that local trappers report only harvesting 1 or 2 per year (**Appendix D-1**; Joro Consultants 2018a).

Occurrence and Distribution

Two wolverines were observed on trail cameras in the Wildlife RAA (**Photograph 6-20**), one wolverine track was observed during the 2012 multispecies survey, one wolverine track was observed during the 2014 multispecies survey and ten tracks were observed during the trapper program (**Appendix D-2**; Joro Consultants 2018b).

Wolverines are found across northern North America and Eurasia. In Canada they are found in northern and western forested areas and in alpine and arctic tundra. Their current distribution includes Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, Nunavut, Northwest Territories, the Yukon and several western States. In Manitoba they are found in the northern part of the province (north of 53° latitude) with the highest density in the north-east.

Their population in Canada is thought to be greater than 10,000 animals. The population in Manitoba is estimated to be 1,100 to 1,600 animals (Berezanski 2004). Population trends are unknown but are thought to be stable nationally. The wolverine population in northern Manitoba is thought to be increasing (COSEWIC 2014).

Some participants of the Project wildlife workshops from Bunibonibee Cree Nation also indicated that wolverine populations are increasing in the area (**Appendix D-1**; Joro Consultants 2018a). Within the Wildlife RAA, members of the God's Lake First Nation state that wolverines are occasionally observed near

the community and along the winter road. Members of the Bunibonibee Cree Nation also noted that wolverines are known to begin using the winter road under frozen conditions before it opens in the winter, but once the road opens, they shift to using the river as a transportation corridor (Joro Consultants 2018b).

Photograph 6-20: Wolverine captured on a trail camera in the Regional Assessment Area (Joro Consultants 2018a).

Habitat Requirements

Wolverines use a wide variety of forested and tundra habitats at all elevations that contain an adequate year-round supply of small prey such as rodents and snowshoe hare, as well as carcasses of moose and caribou (COSEWIC 2014). Wolverines are associated with wolves, caribou and grizzly bears (*Ursus arctos*), as viable populations of large carnivores are an important source of ungulate carrion (COSEWIC 2014).

Female wolverines require snow-covered rocks, logs or snow tunnels for denning and reproduce in areas with snow cover persisting until April (COSEWIC 2014). Dens can be constructed in talus boulders, along eskers, under deadfall and logs and snow tunnels in higher elevations (Copeland 1996; Magoun and Copeland 1998; Cardinal 2004; Inman *et al.* 2007; COSEWIC 2014). Male wolverines primarily select habitat based on summer and winter food availability, while females select habitat based on food, predation risk and disturbance (COSEWIC 2014).

Adequate snow cover is critical for wolverine denning, as snow cover needs to be deep enough (ex: greater than one metre deep) to provide adequate insulation late into spring (Magoun and Copeland 1998).

Female wolverines leave their kits for long foraging trips and will select denning sites in talus, avalanche debris, or snowdrifts, which are typically found in ravines and leeward slopes; dens with spring snow cover allow thermoregulation for kits, provide protection from predators and have an abundance of small-mammal prey (Magoun 1985; Copeland 1996; Inman *et al.* 2007). Wolverines are known to reoccupy denning sites for several consecutive years (Magoun 1985).

6.1.8.1.2.3 Little Brown Bat

The little brown bat (*Myotis lucifugus*) are globally apparently secure to vulnerable (G3G4). In Manitoba their non-breeding status is rare while their breeding status is demonstrably widespread (S2N, S5B). They are federally listed as Endangered by SARA and provincially listed as Endangered by Manitoba ESEA. The little brown bat is not important to local communities for hunting.

Occurrence and Distribution

No little brown bat were observed during field studies. Community members have reported sightings of brown bats (**Appendix D-1**; Joro Consultants 2018a).

Habitat Requirements

Habitat requirements for little brown bat varies by season. The species requires overwintering habitat (hibernacula) for hibernation and overwinter survival; summering habitat including roosting habitat and foraging habitat; and swarming habitat in late summer and early fall for mating and socialization. Swarming sites are typically used as hibernacula as well (**Appendix D-2**; Joro Consultants 2018b).

As little brown bat are year-round residents, overwintering habitat is necessary for their survival in regions where ambient temperature declines and insects are not available in winter (Environment Canada 2015b). Hibernating bats are able to decrease their metabolic rate and body temperature within a few degrees of the hibernaculum ambient temperature (**Appendix D-2**; Joro Consultants 2018b). Underground openings such as caves, abandoned mines, wells and tunnels with an ambient temperature range from 2˚C and 10˚C and relative humidity levels greater than 80% are used as hibernacula (**Appendix D-2**; Joro Consultants 2018b). Structural features such as the number of openings, cave length and size and angle of chambers can influence the stability of the hibernacula and the humidity and temperature levels (**Appendix D-2**; Joro Consultants 2018b). Little brown bat will use hibernacula year after year due to the specific, stable microclimates required for overwintering habitat (Environment Canada 2015b).

Little brown bat' congregate in swarming habitat (often in and around entrances of hibernacula) in late summer and early fall, with swarming habitat functioning as mating sites, stopover locations during migration, social sites for information transfer and allow individuals to assess potential sites for overwintering (Environment Canada 2015b).

Roosts provide shelter from weather and predation, thermal regulation and provide social interaction (Environment Canada 2015b). Selection of roosting habitat occurs at several spatial scales (**Appendix D-**

2; Joro Consultants 2018b). At the roosting structure, scale tree species, height, diameter, stage of decay, sun exposure and availability of roosting medium affect roost selection **Appendix D-2**; Joro Consultants 2018b). At the stand scale, roosting habitat selection may be a function of number of available snags, tree density, proximity to water and canopy gaps (Environment Canada 2015b).

Forest age, composition and degree of fragmentation are all factors of roost selection at the landscape scale (**Appendix D-2**; Joro Consultants 2018b). Little brown bat may also use forested areas and man-made structures in urban and suburban areas for roosting. Little brown bat is one of the few bat species that uses buildings and other anthropogenic features (ex: bridges, barns and bat boxes) to roost (Environment Canada 2015b). Little brown bat preferentially roost in older forest stands over young forests as they likely provide increased snag availability for roosting and foraging habitat (**Appendix D-2**; Joro Consultants 2018b).

Foraging habitat for little brown bat is associated with open habitat such as ponds, roads, open canopy forests and vegetation along lake and stream margins (Environment Canada 2015b). Little brown bat is a short-distance migrant. In Manitoba and Ontario, little brown bat travelled 35 to 554 km moving from summer roosts to hibernacula (Norquay *et al.* 2013).

6.1.8.1.3 Birds

Eleven bird Species at Risk may occur in the RAA (**Appendix D-2**; Joro Consultants 2018b). The list of species and their status, recovery strategy, critical habitat presence and potential occurrence in the Wildlife RAA are summarized in **Table 6.19**. None of these 11 bird Species at Risk are important to local communities for hunting. Additional details regarding occurrence, distribution and habitat requirements are provided for each species in the following sections.

6.1.8.1.3.1 Bank Swallow

Occurrence and Distribution

No bank swallows were observed during the aerial waterfowl surveys, MBBA point count surveys, MBBA incidental observations and none were identified on ARU records (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Bank swallows breed in a variety of low-elevation natural and artificial man-made habitats such as lake and ocean bluffs, stream and river banks, reservoirs, sand and gravel pits, road cuts, sand piles, topsoil, sawdust, coal ash and other materials (COSEWIC 2013). Nest burrows are almost always in vertical or near-vertical cliffs, banks and bluffs (at least 0.75 m high with a slope between 75˚ and 105˚) in alluvial, friable soils (**Appendix D-2**; Joro Consultants 2018b). Bank swallows also nest in drain pipes and nesting structures specifically designed for bank swallows (**Appendix D-2**; Joro Consultants 2018b).

A large proportion of nesting locations occur in artificial sites across Canada. They were the dominant nesting habitat in British Columbia (87%) while in the Maritimes, only 25% of nests were in artificial sites.

Table 6.19: Bird Species at Risk That May Occur in the Wildlife Regional Assessment Area.

Species Common Name	Scientific Name	Rare Species Listing Status (Federal and Provincial)					Is Critical Habitat in Wildlife RAA?	Potential Occurrence in Wildlife Local or Regional Assessment Area
		SARA	COSEWIC	MBCDC	ESEA	Recovery Strategy Plan		
Bank swallow	*Riparia riparia*	Threatened, Schedule 1	Threatened	S5B	Not listed	COSEWIC Status report only	No – Environment Canada (EC) does not identify specific critical habitat.	Low Potential: May occur in RAA but the species were not observed during field studies.
Barn swallow	*Hirundo rustica*	Threatened, Schedule 1	Threatened	S4B	Not listed	COSEWIC Status report only	No - EC does not identify specific critical habitat.	Low Potential: May occur in RAA but the species was not observed during field studies.
Canada Warbler	*Cardellina canadensis*	Threatened, Schedule 1	Threatened	S3B	Threatened	Yes (2016)	No - EC does not identify specific critical habitat.	Low Potential: May occur in the RAA but the species were not observed during field studies.
Common Nighthawk	*Chordeiles minor*	Threatened, Schedule 1	Threatened	S3B	Threatened	Yes (2016)	No - EC does not identify specific critical habitat.	High Potential: No species were observed during aerial waterfowl surveys however 1 was recorded during MBBA point count surveys along with 2 MBBA incidental observations and 11 total identified on 2 of the 45 ARU sampling sites.
Eastern Wood-pewee	*Contopus virens*	Schedule 1, Special Concern	Special Concern	S4B	Not listed	COSEWIC Status report only	No -EC does not identify specific critical habitat; RAA on northern fringe of range	Low Potential: May occur in RAA however, the species was not observed during field studies.
Olive-Sided Flycatcher	*Contopus cooperi*	Threatened, Schedule 1	Threatened	S3B	Threatened	Yes (2016)	No - EC does not identify specific critical habitat.	Moderate Potential: The RAA is within the species range maps and habitat occurs in the LAA. No species were observed during aerial waterfowl surveys however 36 were recorded during MBBA point count surveys along with 8 MBBA incidental observations and 13 total identified on 3 of the 45 ARU sampling sites.

Species Common Name	Scientific Name	Rare Species Listing Status (Federal and Provincial)					Is Critical Habitat in Wildlife RAA?	Potential Occurrence in Wildlife Local or Regional Assessment Area
		SARA	COSEWIC	MBCDC	ESEA	Recovery Strategy Plan		
Peregrine Falcon	*Falco peregrinus*	Special Concern - Schedule 1	Special Concern	S1B	Endangered	Management plan (2015)	No – Known to migrate through the area; Management Plan illustrates breeding range.	Low Potential: Expected to be an occasional transient (not breeding) migrant within the RAA. May occur in the RAA but the species were not observed during field studies.
Rusty Blackbird	*Euphagus carolinus*	Special Concern - Schedule 1	Special Concern	S4B	Not listed	Management plan (2015)	No - EC does not identify specific critical habitat.	Moderate Potential: May occur in RAA. No species were observed during aerial waterfowl surveys however 13 were recorded during MBBA point count surveys along with 6 MBBA incidental observations and none were identified on ARU records.
Short-Eared Owl	*Asio flammeus*	Special Concern - Schedule 1	Special Concern	S2S3B	Threatened	No - Management plan (2016)	No - EC does not identify specific critical habitat.	High Potential: Migrate through the RAA in low numbers. No species were observed during aerial waterfowl surveys, MBBA point count surveys or through MBBA incidental observations; however 2 total were identified on 2 of the 45 ARU sampling sites.
Horned Grebe	*Podiceps auritus*	Special Concern - Schedule 1	Special Concern	S4B	Not listed	COSEWIC Status Report only	No - EC does not identify specific critical habitat.	Moderate Potential: May occur in RAA in low numbers. The species were not observed during field studies.
Yellow Rail	*Coturnicops noveboracensis*	Special Concern - Schedule 1	Special Concern	S3B	Not listed	No-Management plan	No- EC does not identify specific critical habitat.	Very Low Potential: May breed in the low numbers in RAA. The species were not observed during field studies.

Source: Joro Consultants 2018b.

The Prairie Provinces (including Manitoba) had 43% of nests in artificial sites (**Appendix D-2**; Joro Consultants 2018b). Bank swallows require eroding, vertical banks composed of unconsolidated substrates such as silty fine sands for nesting (COSEWIC 2013). Substrate penetrability and the proportions of substrate particle sizes are imperative for burrowing. Bank swallows use wide banks composed of well-drained, very fine sands (less than 900 µm) such as fine sandy loam soils (**Appendix D-2**; Joro Consultants 2018b). Bank swallow colony sizes are generally larger in areas with the greatest proportion of silt to sand (**Appendix D-2**; Joro Consultants 2018b).

Bank swallows are locally abundant breeders occurring throughout Manitoba, but with few northern breeding locations. Bank swallows are a common and locally distributed summer resident of southern Manitoba (**Appendix D-2**; Joro Consultants 2018b).

6.1.8.1.3.2 Barn Swallow

Occurrence and Distribution

No barn swallows were observed during the aerial waterfowl surveys, MBBA point count surveys, MBBA incidental observations and none were identified on ARU records (Joro Consultants 2018b).

Habitat Requirements

Prior to European settlement, barn swallows nested in natural features such as caves, crevices, holes and ledges associated with rocky cliff faces (COSEWIC 2011a). With the rapid expansion of the human population post-European settlement, barn swallows have shifted from natural to artificial nesting sites; with it being suggested that only 1% of barn swallows in Canada are using natural nesting sites (COSEWIC 2011a).

Barn swallows may continue to nest in traditional natural situations but are more closely associated with human structures in rural areas, nesting on a variety of artificial structures that provide a horizontal nesting surface (such as a ledge) or a vertical face with an overhang that provides shelter (COSEWIC 2011a). Barn swallows will nest in and around open barns, garages, sheds, boat houses, bridges, road culverts, verandas, wharfs and on beams, posts, light fixtures and ledges over windows and doors (COSEWIC 2011a). Barn swallows require wet sites with a nearby body of water that provides mud for nest-building (**Appendix D-2**; Joro Consultants 2018b).

Barn swallows were relatively rare in southern Manitoba in the late 19th century, however, their range now extends over nearly the entire province (**Appendix D-2**; Joro Consultants 2018b). Barn swallows are now widespread throughout Manitoba in agricultural regions, locally common in inhabited areas of the boreal forest and rare in or near northern communities (**Appendix D-2**; Joro Consultants 2018b).

6.1.8.1.3.3 Canada Warbler

Occurrence and Distribution

No Canada warblers were observed during the MBBA point count surveys, MBBA incidental observations and none were identified on ARU records (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Canada warblers inhabit a wide range of deciduous, coniferous and mixed forests with well-developed shrub layers and structurally complex forest floors (COSEWIC 2008a; **Appendix D-2**; Joro Consultants 2018b; Environment Canada 2016b). They are often found in shrub marshes, cedar stands, coniferous swamps dominated by black spruce (*P. mariana*) and tamarack (*L. laricina*), red maple (*Acer rubrum*) stands, moist spruce-birch (*Betula* spp.) forests and larch and riparian woodlands along rivers and lakes, often on steep brushy slopes and ravines near these habitats. Suitable habitat often has a developed layer of moss with an uneven forest floor (**Appendix D-2**; Joro Consultants 2018b).

Canada warblers breed in mature upland forests, with canopy gaps that have a well-developed shrub layer (COSEWIC 2008a). They can also be locally abundant throughout their breeding range in regenerating forests (6 to 30 years post-disturbance) following forest fires or anthropogenic disturbances (COSEWIC 2008a).

Female Canada warblers select nesting areas consisting of dense shrubs that provide high concealment and coarse woody debris and higher tree stem density are main structural features (Environment Canada 2016b). Canada warblers nest on or near the ground, often on slopes, knolls, in earthen banks, rotting tree stumps, holes of root masses, clumps of grass, or rocky areas (Environment Canada 2016b).

6.1.8.1.3.4 Common Nighthawk

Occurrence and Distribution

No common nighthawks were observed during the aerial waterfowl surveys, however one was recorded during the MBBA point count surveys along with 2 MBBA incidental observations and 11 total identified on 2 of 45 ARU sampling sites (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Common nighthawks require open ground or clearings for nesting and breed in a variety of open habitats including open forests (ex: mixedwood and coniferous stands, burns and clearcuts), grasslands (ex: short-grass prairies, pastures and grassy plains), sandy areas (ex: eskers, dunes and beaches), sagebrush, wetlands (ex: marshes, lakeshores and riverbanks), gravelly or rocky areas (ex: outcrops, barrens, gravel roads, railway beds, quarries, mines, bare mountain tops and ridges) and cultivated or landscaped areas (COSEWIC 2007a; **Appendix D-2**; Joro Consultants 2018bb; Environment Canada 2016c).

Common nighthawk nests have been observed near other common nighthawk nests (25 to 75 m apart), suggesting that small patches of suitable nesting habitat are not limited to only one breeding pair (Environment Canada 2016c). Common nighthawks do not make nests, but eggs are laid on the ground on sand, gravel, or rock in shaded areas with low or no vegetation and adequate camouflage from predators (Environment Canada 2016c).

Common nighthawks forage for flying insects in open areas during crepuscular periods and sometimes forage during the day. Foraging habitat needs are met in a wide range of habitats, but open water and artificial lighting are favoured, attracting flocks as large as several hundreds of individuals (COSEWIC 2007a). Tree limbs, the ground, fenceposts and rooftops with adequate shade and camouflage from predators are suitable roost sites (**Appendix D-2**; Joro Consultants 2018b).

6.1.8.1.3.5 Eastern Wood-pewee

Occurrence and Distribution

No eastern wood-pewees were observed during the aerial waterfowl surveys, MBBA point count surveys, MBBA incidental observations and none were identified on ARU records (**Appendix D-2**; Joro Consultants 2018b). The range of the Eastern wood-pewee also does not overlap with the Wildlife RAA and occurs typically in the far southern portion of Manitoba, but has been recorded on a species listing for the Hayes River Upland Ecoregion (MBCDC 2016). The northwestern range limit of the eastern wood-pewee is southern Manitoba and extreme southeastern Saskatchewan and is a fairly common breeder in the southern fifth of the province (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

In Canada, eastern wood-pewees primarily breed in mature and intermediate-age deciduous and mixed forests having an open understory, occasionally selecting more open coniferous woodland (COSEWIC 2012). Eastern wood-pewees are often associated with sugar maple (*Acer saccharum*), elm (*Ulmus* sp.) and oak (*Quercus* sp.) forests and are often associated with forest clearings and edges near nesting sites (COSEWIC 2012). Eastern wood-pewee select territory with fewer trees and greater forest openness to allow for bouts of aerial foraging activity (COSEWIC 2012).

Although often found in riparian areas in the Midwest, eastern wood-pewees reach higher breeding densities in upland sites compared to lowland forests and nesting in wet forests likely reflects preference for open space near the nest site (COSEWIC 2012). The size of forest fragments likely is not an important factor in habitat selection, but eastern wood-pewees occur less frequently in woodlots surrounded by residential development than in woodlots without houses (COSEWIC 2012).

6.1.8.1.3.6 Horned Grebe

Occurrence and Distribution

No horned grebes were observed during the aerial waterfowl surveys, MBBA point count surveys, MBBA incidental observations and none were identified on ARU records (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Horned grebes primarily breed in temperate zones such as parklands and prairies, but can also be found in boreal and subarctic zones (COSEWIC 2009a). Nesting occurs in freshwater (and occasionally in brackish water) on small ponds, shallow bays and marshes on lake borders. Horned grebes select ponds in both open and forested areas (COSEWIC 2009a). Horned grebes that inhabit the prairies prefer lakes and permanent or semi-permanent natural ponds lasting until autumn, as well as artificial ponds and reservoirs created by road excavation for construction, river damming or for retaining rain (COSEWIC 2009a). Horned grebes prefer small- to moderate-sized ponds, but will use a broad range of pond sizes (some as large as 18.2 ha) and ponds need to contain large areas of open water (over 40%) and beds of emergent vegetation (COSEWIC 2009a).

Horned grebes construct a nest comprised of a floating or emergent mass of plant material in the fringes of emergent vegetation in shallow water. Horned grebes primarily use eutrophic environments, but they can also successfully breed in oligotrophic ponds (COSEWIC 2009a).

6.1.8.1.3.7 Olive-sided Flycatcher

Occurrence and Distribution

No olive-sided flycatchers were observed during the aerial waterfowl surveys, whereas 36 were recorded during MBBA point count surveys along with 8 MBBA incidental observations and 13 total identified on 3 of 45 ARU sampling sites (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Olive-sided flycatchers are widely observed in open coniferous or mixed-coniferous forests, open to semi-open forest stands and forest edges near natural openings such as wetlands (COSEWIC 2007b; Environment Canada 2016d). Tall snags and residual live trees are essential for foraging, nesting and advertising territory (Environment Canada 2016d).

Olive-sided flycatchers prefer open areas such as post-burn areas or wetlands for foraging, often occurring where standing dead trees are present and natural edge habitat occurs, such as wooded shores of streams, lakes, rivers, beaver ponds, bogs and muskegs (Environment Canada 2016d). In the boreal forest portion of its range, olive-sided flycatchers are most common in open habitats of muskegs, swamps and bogs that are dominated by spruce (*Picea* spp.) and tamarack (*L. laricina*) (COSEWIC 2007b).

The highest densities of olive-sided flycatchers are supported in mature conifer stands within patchy landscapes that have been influenced by natural disturbance (Environment Canada 2016d). Although wet areas have a positive effect on olive-sided flycatcher density on a landscape scale, it has a negative effect at a local scale (Environment Canada 2016d).

Olive-sided flycatchers place nests near the tip of coniferous branches and are constructed of twigs, rootlets and arboreal lichens and may be lined with pine needles and grasses (Environment Canada 2016d).

6.1.8.1.3.8 Peregrine Falcon

Occurrence and Distribution

No peregrine falcons were observed during the aerial waterfowl surveys, MBBA point count surveys, MBBA incidental observations and none were identified on ARU records (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Peregrine falcons occur in a wide range of habitats from Arctic tundra to coastal islands, desert canyons and major urban centres (COSEWIC 2007c; Environment and Climate Change Canada 2017c). During the breeding season, peregrine falcons generally nest on cliff ledges or crevices (ranging from 50 to 200 m high) near good foraging areas (COSEWIC 2007c).

Peregrine falcons can nest on several different sites including escarpments, in quarries, open-pit mines, in trees, common raven (*Corvus corax*) nests and anthropogenic features such as transmission towers, churches, bridges, skyscrapers, open-pit mines and industrial stacks (COSEWIC 2007c). Peregrine falcons primarily feed on birds captured in the air and will select sites near seabird colonies, shorebird and waterfowl staging and nesting areas and areas with large numbers of songbirds or pigeons (Environment and Climate Change Canada 2017c). Peregrine falcons have been known to feed on small mammals in Labrador (Environment and Climate Change Canada 2017c).

Peregrine falcons are considered a potential transient migrant within the Wildlife RAA. The peregrine falcon has never been a common breeder in Manitoba (**Appendix D-2**; Joro Consultants 2018b). A pair of peregrine falcons were observed nesting in Churchill in 1957 and the species was considered to be a fairly common transient and summer resident in Churchill in the 1930s (**Appendix D-2**; Joro Consultants 2018b). During migration, peregrine falcons use a broad array of habitats (including urban areas), using leading lines such as barrier islands, sea coasts, lake edges, or mountain ranges (**Appendix D-2**; Joro Consultants 2018b). Peregrine falcons are commonly seen near concentrations of shorebirds and waterfowl during migration (COSEWIC 2007c).

6.1.8.1.3.9 Rusty Blackbird

Occurrence and Distribution

No rusty blackbirds were observed during the aerial waterfowl surveys and none were identified on ARU records, however 13 were recorded during MBBA point count surveys along with 6 MBBA incidental observations (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

The breeding range of rusty blackbirds corresponds with the boreal forest and taiga terrestrial ecozones (COSEWIC 2006a). Rusty blackbird habitat is generally characterized by conifer forest wetlands, frequenting fens, muskegs, beaver ponds, alder (*Alnus*)-willow (*Salix*) bogs and other forest openings such as swampy shores along streams and lakes (COSEWIC 2006a). Rusty blackbirds are generally not present in wetlands in regions above the tree line (such as the alpine tundra and Arctic tundra) and is uncommon in high mountain wetlands (COSEWIC 2006a; Environment Canada 2015a). Rusty blackbirds use strictly riparian habitat in forested areas, rarely using the forest interior (COSEWIC 2006a). They are primarily observed in wetlands associated with recent burns, peat bogs with or without ponds, wooded heathland, riparian scrub, open moss- and lichen-spruce woodlands, sedge meadows, alder and willow thickets, marshes and estuaries (COSEWIC 2006a; Environment Canada 2015a).

Rusty blackbirds select breeding sites in areas with a combination of freshwater bodies that have shallow water and emergent vegetation for foraging, adjacent to wetlands with conifers or tall shrubs with cover for nesting (Environment Canada 2015a). Nesting occurs in low conifers, living and dead trees and atop stumps usually at heights less than 3 m and generally near water (**Appendix D-2**; Joro Consultants 2018b).

6.1.8.1.3.10 Short-eared Owl

Occurrence and Distribution

No short-eared owls were observed during the aerial waterfowl surveys, MBBA point count surveys, MBBA incidental observations, however 2 were identified on 2 of 45 ARU sampling sites (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Short-eared owls breed in a variety of open habitats including grasslands, taiga, bogs, marshes, old pastures, Arctic tundra, coastal wetlands, coastal barrens, estuaries and grasslands dominated by sand-sage (*Artemisia filifolia*) (COSEWIC 2008b; Environment Canada 2016a). Short-eared owls are often associated with open habitats that support small animals (ex: voles and lemmings) that have fluctuating populations (Environment Canada 2016a). The density of prey populations is the primary indicator of short-eared owl habitat occupancy; the meadow vole (*Microtus pennsylvanicus*) is a primary prey item of short-eared owls and prefers natural prairie or meadows with large areas of vegetative cover (Environment Canada 2016a). A mosaic of grasslands and wetlands provide optimal breeding and foraging

habitats, with medium-to-tall grasses, some dry upland for nesting and hunting perches are all characteristics of sites occupied by short-eared owls (Environment Canada 2016a).

In Manitoba, short-eared owls primarily breed and nest in southern farmland and northern tundra, rarely lingering in the intervening forest during migration, but likely breed in extensive marshes and fens in the boreal plains (**Appendix D-2**; Joro Consultants 2018b). Short-eared owls select areas with small willows in the tundra of Churchill, Manitoba (**Appendix D-2**; Joro Consultants 2018b). Clark (1975) identified the mean territory size of short-eared owls in Manitoba as 74 and 121 ha in successive years, with smaller territories in years with higher food abundance. Nests from multiple breeding pairs may be clustered in areas where food resources are abundant (Environment Canada 2016a).

Short-eared owls nest on the ground, with females scraping out nest bowls that are then lined with grasses and downy features (Clark 1975; COSEWIC 2008b; Environment Canada 2016a). In wet nesting areas, short-eared owls build their nests on a small rise or knoll (COSEWIC 2008b). Short-eared owls select areas to nest where the previous year's residual vegetation is dead and matted down (**Appendix D-2**; Joro Consultants 2018b).

6.1.8.1.3.11 Yellow Rail

Occurrence and Distribution

No yellow rails were observed during the aerial waterfowl surveys, MBBA incidental observations and none were identified on ARU records, however one was recorded during MBBA point count surveys (**Appendix D-2**; Joro Consultants 2018b).

Habitat Requirements

Yellow rails inhabit shallow wetlands and other wet areas with extensive short, grassy vegetation, usually sedges (Cyperaceae, especially *Carex* spp.) as well as grasses (Poaceae) and rushes (Juncaceae) (COSEWIC 2009b; Environment Canada 2013). Yellow rails breed in various wetland habitats, including damp hay fields, damp meadows, floodplains, bogs, sedge meadows, salt marshes, upper levels of estuaries, shallow prairie wetlands and wet montane meadows (COSEWIC 2009b).

Yellow rails typically nest in sites with less than 15 cm of standing water, but may breed in areas with up to 50 cm of standing water (COSEWIC 2009b; Environment Canada 2013). Yellow rail abundance varies dramatically year to year due to their narrow tolerance for shallow water levels (Environment Canada 2013). Yellow rail breeding habitat requires an overlying layer of dead grass-like vegetation in order to create roofing over the nest and for hiding movements from predatory birds (COSEWIC 2009b; Environment Canada 2013).

Yellow rails are uncommon and local breeders in wetlands throughout Manitoba (Holland and Taylor 2003). The species' range extends northeastward to Churchill and the Hudson Bay coast (Holland and Taylor 2003).

6.1.8.1.4 Reptiles and Amphibians

No reptile or amphibian Species at Risk were identified to be potentially present in the Wildlife LAA as previously noted in **Section 6.1.4.6.3**. While northern leopard frogs may be found in the Wildlife LAA, the Project is located within the range of the eastern population which is not at risk (COSEWIC 2009c).

6.1.8.2 Aquatic

Lake sturgeon was the only Species at Risk identified as potentially present in the Aquatic LAA. Rare aquatic species known to be present upstream in the Lake Winnipeg East drainage area include the mapleleaf mussel (*Quadrula quadrula*) (ESEA - Endangered) and the shortjaw cisco (*Coregonus zenithicus*) (COSEWIC - Threatened). No records indicate that either species have been encountered near the Aquatic LAA (Stewart and Watkinson 2004).

6.1.8.2.1 Lake Sturgeon

While no lake sturgeon were encountered during field investigations, their distribution overlaps the Aquatic RAA and they have been previously documented in God's River, God's Lake and Hayes River. The Southern Hudson Bay-James Bay population is designated as Special Concern by COSEWIC (COSEWIC 2006b) and is currently under consideration for protection under SARA (**Appendix C-1**; North/South Consultants Inc. 2017a). Although they are not legally protected, the potential presence of lake sturgeon was assessed in consideration of potential future listing under SARA.

Lake sturgeon inhabit larger lakes and rivers, are typically benthic and commonly found over sand and fine substrates. They spawn in fast moving water, such as rapids or at the base of falls. In the boreal shield, with deep lakes and impassable falls and rapids, populations are naturally fragmented into the small spatial populations. Critical habitat for the species has not been identified by COSEWIC (**Appendix C-1**; North/South Consultants Inc. 2017a). Lake sturgeon are regionally important as they are considered to be a culturally important species to nearby communities (HTFC Planning & Design 2017b; d).

There is generally a poor understanding of lake sturgeon populations as far upstream in the Hayes drainage as the proposed Project, but overall Hayes River sturgeon populations are believed to be healthy (MCWS 2012; Manitoba Hydro 2014). Harvest is currently restricted to subsistence harvest by First Nations and is considered to be at a relatively low sustainable level (MCWS 2012).

Lake sturgeon have been reported in the upper Hayes River drainage including the upper God's River. Biological studies have documented lake sturgeon populations in the God's River up to its confluence with the Red Sucker River, approximately 150 km downstream of the Project (Koga 2014). Traditional knowledge from Shamattawa First Nation extends the distribution further upstream to a set of rapids 4 km downstream of the God's River crossing (Eaton 2012). In addition, God's Lake First Nation traditional knowledge indicates the species is found within God's Lake (HTFC Planning & Design 2017b). Surveys within the Hayes River have found lake sturgeon upstream of the confluence with the Fox River, but not

as far upstream as Knee Lake (Pisiak and MacLean 2007). Traditional knowledge from Bunibonibee Cree Nation report sporadic records of sturgeon harvest from Oxford Lake (HTFC Planning & Design 2017a).

The God's River crossing site provides moderate velocity run habitat with sand and rocky substrates. The immediate crossing area provides foraging habitat for adults. Potential spawning habitat is found at a set of large rapids 4 km downstream of the crossing (**Appendix C-1**; North/South Consultants Inc. 2017a).

6.1.9 Indigenous Peoples

For the assessment of Project effects on Indigenous Peoples and the Human Environment (**Chapter 6, Section 6.1.11**) the Indigenous LAA considers the area within a 10 km corridor centred on the all-season road alignment which includes the local communities and areas where measurable changes to land use are primarily expected. The Indigenous LAA is the same as what is used for fish, birds and furbearers. The Indigenous RAA is the area beyond the LAA that encompasses the Traditional Territories of Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation as identified by traditional knowledge studies (**Figures 6-1** and **6-2**). The Indigenous RAA boundary considers changes to the environment that may indirectly affect the traditional use areas and resources of the local communities and people in the region.

The spatial areas for the assessment of Project effects on archaeological and heritage resources differ from those identified for Indigenous Peoples and Human Environment. Project effects for archaeological and heritage resources are expected to be restricted to a relatively short distance from the all-season road. As such the Heritage LAA is a two km corridor centred on the all-season road alignment. Manitoba Historic Resources Branch (HRB) catalogues heritage resources and archaeological sites by National Topographic System (NTS) map sheets. Therefore, the Heritage RAA was based on the NTS map sheet boundaries within which the all-season road alignment is located, or were near the alignment and contain a sample to compare newly discovered sites to the baseline data (AMEC Foster Wheeler Environment and Infrastructure 2016a).

Information on the existing conditions and activities of Bunibonibee Cree Nation, Manto Sipi Cree Nation, God's Lake First Nation and God's Lake Narrows Northern Affairs Community, which are the communities connected by the proposed Project and located within the Indigenous RAA, is provided in **Section 6.1.9.1**. Data gathered from desktop studies and field studies were used along with information provided by the communities regarding their traditional and cultural activities through TK studies and the Indigenous and Public Engagement Program (IPEP) (**Chapter 5**). Linkages between Project components and activities and Indigenous Peoples were examined to determine the potential effects of the proposed Project on the natural environment that may then affect Indigenous Peoples as discussed in **Section 6.3.4**.

6.1.9.1 Overview of Communities in the Indigenous RAA

The locations of the three First Nations and one Northern Affairs Community within the Indigenous RAA are shown in **Figure 6-2**. With the exception of these four communities, a few lodges, transmission lines

and a sub-transmission line, which supply power to the communities and the existing winter road corridor, the area within the Indigenous RAA is largely undeveloped. Information on the existing Human Environment including the current land use in the Indigenous RAA (ex: commercial and recreational activities) is provided in **Section 6.1.11**. The First Nations exercise their treaty rights in the region and were signatories to the Adhesion of Treaty 5 in 1909 that established rights to hunt and trap throughout the surrendered tract (Treaty Relations Commission of Manitoba 2016). The First Nations are members of the Keewatin Tribal Council. No current or historical use by Métis persons has been identified in the vicinity of the all-season road alignment (**Section 6.1.9.2**). The Indigenous RAA is not anticipated to be used by members of other First Nations in the region (**Section 6.1.9.2**). Information on each community in the Indigenous RAA is provided in the following sections.

6.1.9.1.1 Manto Sipi Cree Nation

Manto Sipi Cree Nation (No. 302) (formerly God's River First Nation) is located on the northern shore of God's Lake near the inlet to God's River in the eastern part of the Indigenous LAA. Manto Sipi Cree Nation was originally part of God's Lake First Nation. In the mid 1940's, members moved from God's Lake Narrows to the northern shore of God's Lake. A Ministerial Order formed God's River First Nation on May 7, 1976 (Keewatin Tribal Council 2017). In June 1988, God's River was recognized as a Reserve. The Cree name of Manto Sipi translates into English as "God River" (HTFC Planning & Design 2017d). Manto Sipi Cree Nation uses a Custom Electoral System to elect Chief and Council.

Manto Sipi Cree Nation is located approximately 585 km (by air) northeast of the City of Winnipeg and 255 km (by air) from the City of Thompson. The community is currently serviced by a winter road which extends from Provincial Trunk Highway (PTH) 6 and Provincial Road (PR) 373. The community is also serviced by a regional airport with a 1,079 m runway. A sub-transmission line from God's Lake to God's River provides power to Manto Sipi Cree Nation.

6.1.9.1.1.1 Traditional Territory, Reserve Lands and Treaty Land Entitlement

Historically, Manto Sipi Cree Nation members lived and travelled on the lands and waters around God's Lake, God's River and northeast towards Shamattawa and the Hudson Bay coast. Manto Sipi Cree Nation's traditional territory is shown in **Figure 6-16**. The First Nation has cultural and social ties to other First Nations in the region including God's Lake First Nation, Bunibonibee Cree Nation, Shamattawa First Nation, War Lake First Nation, Fox Lake Cree Nation and York Factory First Nation (HTFC Planning & Design 2017d).

Manto Sipi Cree Nation has seven reserves – Allen Rapids (1.3 ha); Chepi Lake (107 ha); God's River 86A (225.7 ha); God's River Settlement (154 ha); Hurley Island (502 ha); Prominent Ridge (1,125 ha) and Wapisiw Sakahikan (370 ha). The most populated site is God's River 86A (**Figure 6-17**). Manto Sipi Cree Nation signed the Treaty Land Entitlement (TLE) Agreement on May 19, 1999. Under the TLE Framework

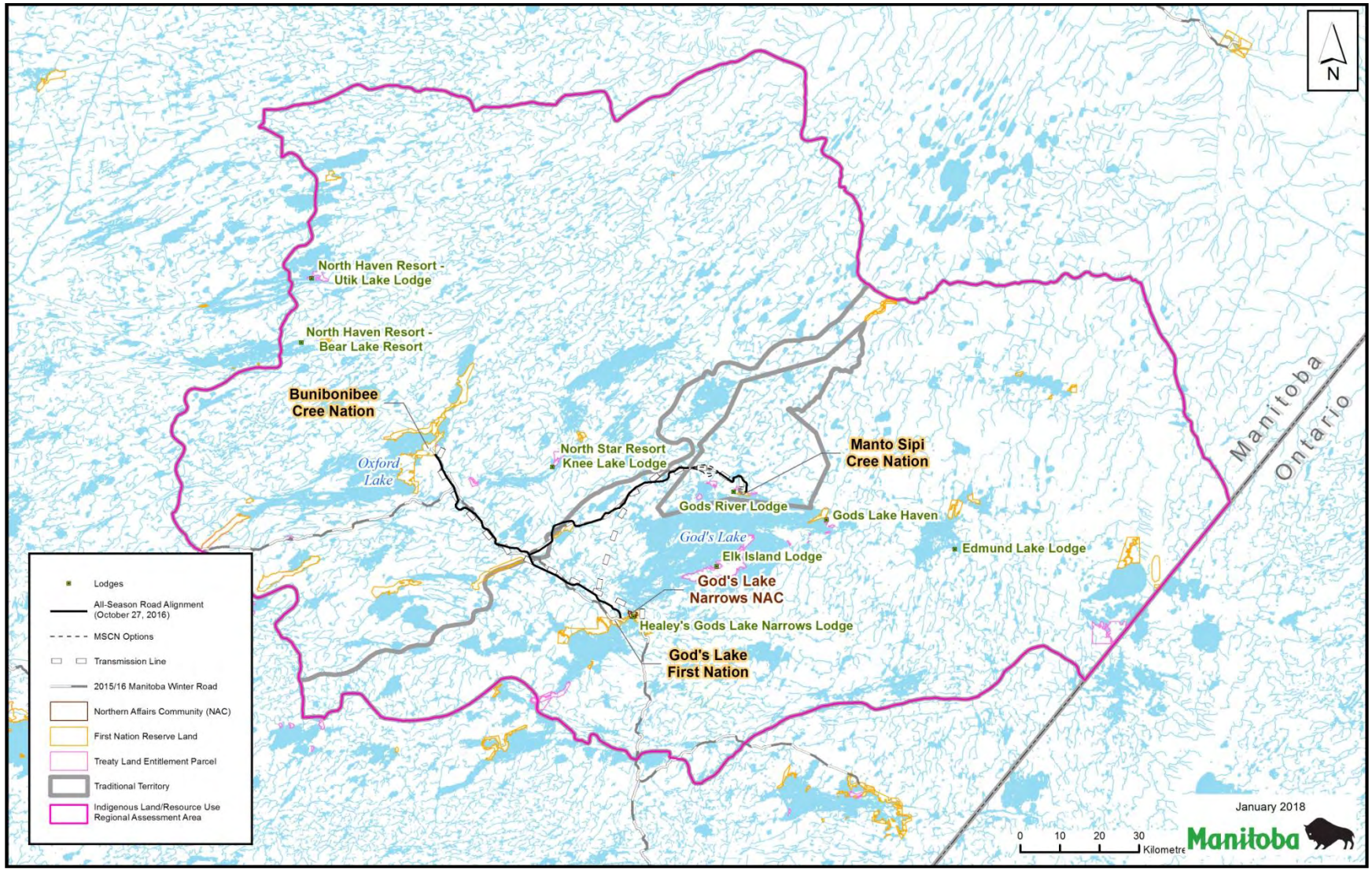


Figure 6-16: **Traditional Territories of Manto Sipi Cree Nation, Bunibonibee Cree Nation and God's Lake First Nation** and the lodge locations within the Indigenous RAA

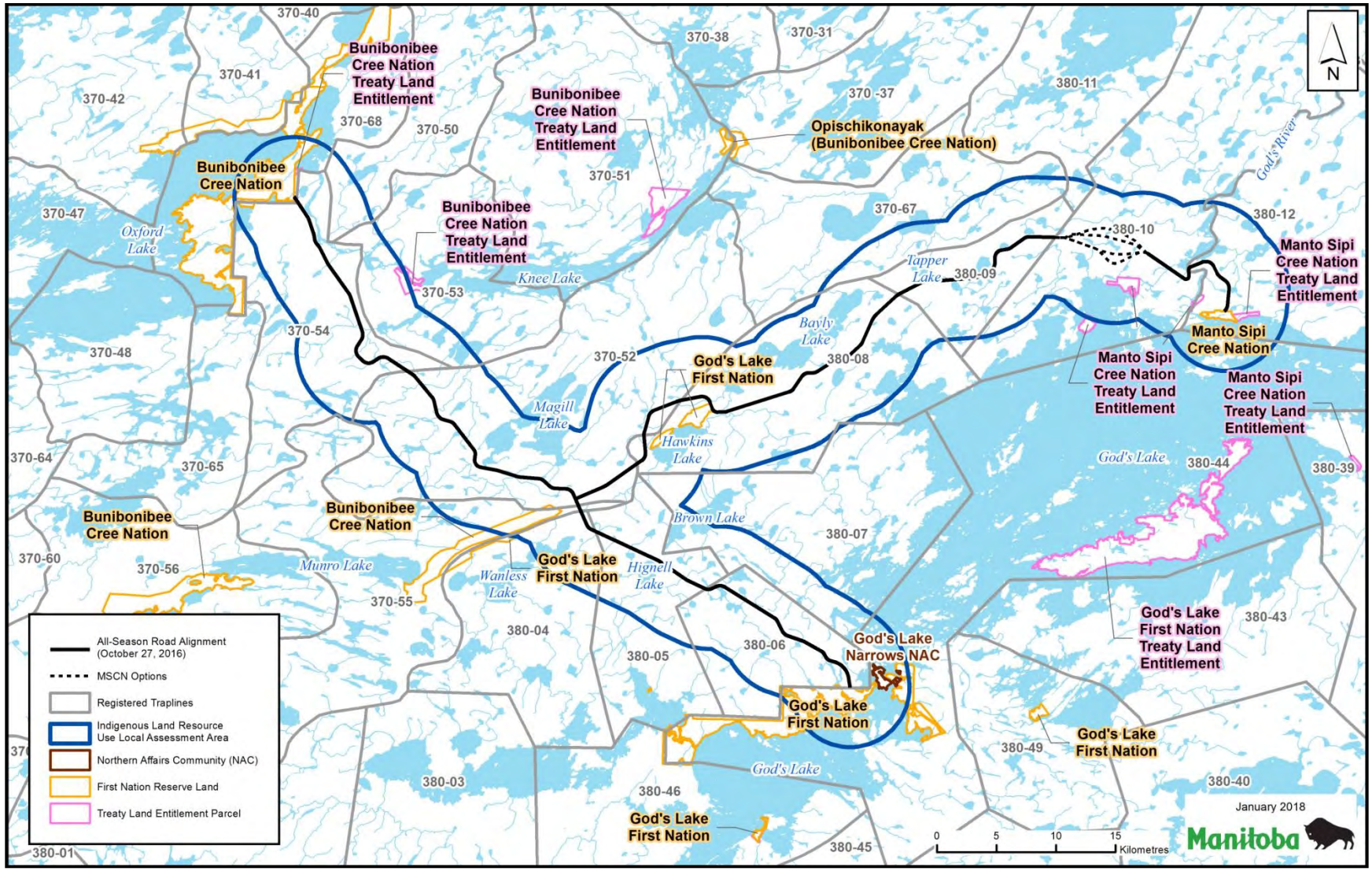


Figure 6-17: First Nation reserve land, Treaty Land Entitlements and Registered Traplines in the vicinity of the proposed Project

Agreement, Manto Sipi Cree Nation is entitled to 3,530.9 ha and, as of March 1, 2015, the First Nation had 1,733.8 ha converted to Reserve land (Indigenous and Northern Affairs Canada 2017b). Manto Sipi Cree Nation has two TLEs in the Indigenous LAA (**Figure 6-17**).

6.1.9.1.1.2 Demographics

As of May 2017, Manto Sipi Cree Nation's total population was 939, of which 800 live On-Reserve (Indigenous and Northern Affairs Canada 2017b). In 2016 the On-Reserve population was 643, a 7.9% increase since 2011 (**Table 6.20**) (Statistics Canada 2017e). Population growth in the Province of Manitoba over the same period was 5.8%.

Table 6.20: Manto Sipi Cree Nation: On-Reserve Population 2016 and 2011

	On-Reserve Population
Population in 2016	643
Population in 2011	596
% Change (2011 to 2016)	7.9%

Source: Statistics Canada 2017e

The total population median age in Manto Sipi Cree Nation in 2011 was 19.4 years (**Table 6.21**). This is substantially younger than the provincial total median age of 37.9 years. In 2011, there were few residents in the community over the age of 65 (2.5%) compared to approximately 13% for the Province of Manitoba. The majority of residents (98.3%) are registered under the *Indian Act*. In addition, there were slightly more males than females in Manto Sipi, while the opposite was true for the Province as a whole. In 2016, the average age in God's River (IR 86A) was 26.8 years compared in 39.2 years for Manitoba as a whole. In 2016, the average household size was 5.9 persons compared to 2.5 persons for the Province of Manitoba (Statistics Canada 2017e).

Table 6.21: Population Demographics for Manto Sipi Cree Nation, 2011

	Population		
	Total	**Male**	**Female**
Total All Persons	595	305	290
Status	585	300	285
Non-status	10	0	0
Age Characteristics			
Total All Persons	595	305	290
Age 0 to 19	310	150	155
Age 20 to 64	275	150	125
Age 65 and over	15	10	0
Median Age	19.4 years	20 years	18.9 years

Note: Data in the table is randomly rounded (either up or down) to a multiple of 5 and in some cases 10. This provides protection against direct residual or negative disclosure of individuals without adding significant error to the census data. Minor differences will occur in totals and cell values among census tabulations.

Source: Indigenous and Northern Affairs Canada 2017b

Education rates in Manto Sipi Cree Nation are much lower than those for the province as a whole, particularly for post-secondary education. In 2011, residents with a high school diploma (or equivalent) made up 14.2% of the population over 15 years of age compared to 27.7% for Manitoba as a whole. Residents with a university degree (Bachelor or higher) made up 2.8% of the population over 15 years of age compared to 17.8% in Manitoba (Indigenous and Northern Affairs Canada 2017b).

6.1.9.1.1.3 Economy

In 2011, income levels in Manto Sipi Cree Nation were much lower than the Manitoba average. The average total income for those over the age of 15 years was $11,565 compared to $36,696 for the Province of Manitoba. Government transfers made up a much larger proportion of income in Manto Sipi Cree Nation at 42% compared to 13% for the Province of Manitoba. The participation rate in Manto Sipi Cree Nation was 54.2% compared to 67.3% in Manitoba. The unemployment rate was 28.2% compared to 6.25% in Manitoba (Indigenous and Northern Affairs Canada 2017b).

The Manto Sipi Cree Nation economy includes a mix of wage, cash and traditional economic activities. The wage economy is largely derived from public sector employment including health care, education, social services and band activities. The cash economy accounts for the delivery of goods and services outside of registered businesses or companies. The traditional economy includes subsistence activities such as non-commercial hunting, gathering and fishing, as well as other resource-based activities (Indigenous and Northern Affairs Canada 2017b). Local businesses established in Manto Sipi Cree Nation are listed in **Table 6.22**. The locations of both of these businesses are shown in **Figure 6-18**.

Table 6.22: Select Local Businesses in Manto Sipi Cree Nation

Business Type	Business
Food, Lodging, Construction, Communications and Transportation	▪ God's River Lodge
Retail and other	▪ The Northern Store

6.1.9.1.1.4 Infrastructure, Utilities and Services

The community of Manto Sipi Cree Nation has modern water and wastewater services. Drinking water is sourced from God's Lake near the mouth of the God's River and is treated at a community water treatment plant and piped to houses and community buildings. Sewage is piped from houses and community buildings to a community waste water treatment plant. The other infrastructure and utilities in Manto Sipi Cree Nation are summarized in **Table 6.23** and shown in **Figure 6-18.**

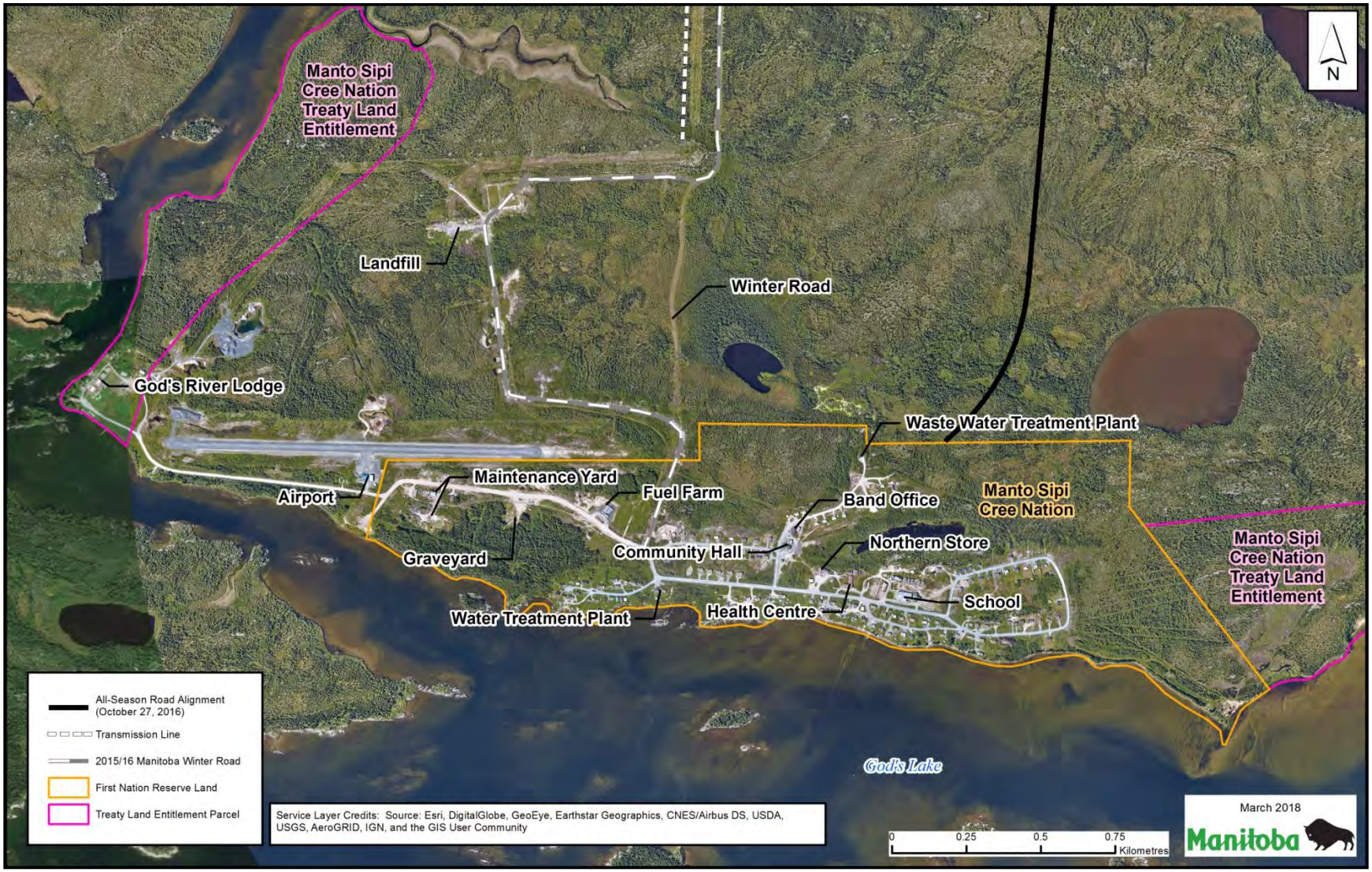


Figure 6-18: Manto Sipi Cree Nation businesses, services, infrastructure and utilities

Table 6.23: Overview of Infrastructure and Utilities – Manto Sipi Cree Nation

Infrastructure and Utilities	
Water	Water is obtained from God's Lake, then treated and piped to houses in the community.
Sewer	Houses and community buildings are connected by pipe to the sewage treatment plant.
Waste Management	One landfill site is located north of the community.
Roads	No permanent access route to the community; access is provided by winter road; the community has a small network of internal gravel roads.
Electricity	Manitoba Hydro – Sub-transmission line.
Telephone/Internet	MTS – Landline with internet by satellite as there is no cellular service.

The Amos Okemow Memorial School provides education for students up to Grade 11. A nursing station provides health care services to the community. The nearest hospitals are in Norway House and the City of Thompson. Police services are provided by the RCMP detachment located in God's Lake Narrows Northern Affairs Community. Recreational amenities in Manto Sipi include a community hall, outdoor skating rink, playing field and pool hall. Fire protection is provided via a fire truck. These local services are summarized in **Table 6.24**.

Table 6.24: Summary of Services in Manto Sipi Cree Nation

Services	
Postal Service	▪ Mail service is provided by air on weekdays.
Recreation	▪ Facilities include a community hall, an outdoor skating rink, playing field and pool hall.)
Health Care	▪ God's River – Manto Sipi Cree Nation Nursing Station.
Education	▪ Amos Okemow Memorial School (Frontier School Division: Nursery to Grade 11).
Government	▪ Manto Sipi Cree Nation Band Office.
Police	▪ RCMP God's Lake Narrows detachment.
Fire	▪ The First Nation has a Fire Hall and fire truck.

6.1.9.1.1.5 Transportation

Roads

Manto Sipi Cree Nation has no year round road access to a service centre. The majority of goods are delivered to the community via the winter road network that is operational for approximately two months each year. The network of gravel roads in the communities are maintained locally.

Airport

Manto Sipi Cree Nation is serviced by a regional airport with a 1,079 m gravel runway. The airport is operated by the Northern Airports & Marine Operations Division of MI. Aircraft movements (number of planes) for the 2015/2016 period were 1,296 and passenger traffic (number of people) for the same period was 4,896 (Manitoba Infrastructure 2017a). Scheduled service to the community is provided by Perimeter Airlines.

6.1.9.1.1.6 Resource Use

Indigenous people from Manto Sipi Cree Nation use the Indigenous LAA and RAA for traditional activities including fishing, hunting, trapping, camping, harvesting plants and berries, recreation activities and sacred/ceremonial use. Many activities occur around God's Lake which is mostly outside of the Indigenous LAA. Through Manto Sipi Cree Nation's TK study for the proposed Project, members indicated that activities on traditional lands are often conducted simultaneously (HTFC Planning & Design 2017d). For example, hunting and trapping may be done at the same time while traveling to or from hunting and trapping areas. Locations of areas where traditional activities are conducted, which were identified in the TK report, cannot be reported publicly.

During the TK interviews, members indicated that there are several common tenting areas used by the community. Many tenting areas and cabins are located on lands surrounding the community on God's Lake and God's River, as well as on small lakes close to the community in the Indigenous LAA. Some of the cabins are private cabins. In many instances, cabin owners let members know that anyone from the community can stay in their cabins when they are out on the land.

Travel routes in the Indigenous RAA are important to Manto Sipi Cree Nation as they provide seasonal access for traditional activities of cultural importance including hunting, trapping, fishing and gathering. In terms of access and travel routes, Manto Sipi Cree Nation members indicated that currently they travel on snowmobiles during winter or motorboats and sometimes canoes during summer. Historically resource use activities were conducted by dog sleds, walking and canoes. Travel routes in the Indigenous LAA and RAA include ATV and snowmobile trails, as well as open-water and frozen waterways. The majority of travel routes documented through the TK study were associated with the major waterways (ex: God's Lake and God's River). The winter roads operated by the Province of Manitoba also provide an important travel route for community members.

Manto Sipi Cree Nation holds a traditional youth camp during a week in the early fall in which youth can learn how to portage and fish. The community holds an annual Traditional Feast and also uses beaches in the region for swimming and cookouts. Important sites include the old Hudson's Bay Company Trading Post and other sites of cultural importance on God's Lake and lakes to the northeast of the community.

Moose is an extremely important food source for Manto Sipi Cree Nation members and is celebrated for its connection to their traditional way of life. Successful hunters will share the moose harvested with family and community members. Large groups of moose are often observed in old burn areas with beginnings of vegetation re-growth. Community members often travel large distances to preferred moose hunting areas while members opportunistically hunt and fish for other species. Moose hunting primarily occurs in the fall along the shoreline of lakes and rivers in the Indigenous RAA that extends east to the Ontario border. Moose are known to move around between the transmission line and the winter road. Members also indicated that moose use the winter road to escape wolf predation. During the TK interviews, members indicated that once a year, there is a community feast where people share moose

meat as well as other traditional foods like fish, blueberries, geese and ducks. Caribou is not a common part of the community's diet and is rarely hunted.

A variety of furbearers are abundant and trapped within Manto Sipi Cree Nation's traditional territory. This includes fox, lynx, marten, muskrat, rabbit, wolf and wolverine during the winter and beaver, otter and mink during the spring. The community has a long history of trapping and selling furs at the Hudson Bay Company's post in God's Narrows. Trapping has been a source of income for members. Marten are the primary furbearer targeted as they are easy to trap and process and provide the best fur price for harvest effort. Beaver are abundant and trapping occurs along rivers and creeks in the area. Lynx is often harvested for fur and food. Wolves are common throughout the God's River area and are not targeted in the trapping season due to the difficulty to harvest. Members from Manto Sipi currently trap at various places north and east of God's Lake within traplines 10 to 13, 15, 18, 20, 33 and 50. Manto Sipi Cree Nation shares the RTL District with God's Lake First Nation. Traplines within the God's Lake RTL District that are at least partially located within the Indigenous LAA are 4 to 12 and 44 (**Figure 6-17**).

Waterfowl hunting takes place primarily in the spring and early summer months because the body condition of migrating birds is preferred. Grouse, or chickens as they are known to community members, are hunted as well as duck and geese. Community members conduct gill netting, ice fishing, angling and fly fishing, both for recreation and when guiding for the God's River Lodge. The community has relied upon fish as a main source of food both historically and currently. Members also fish year round for species such as walleye, northern pike, trout and sturgeon. Waterfowl hunting and fishing primarily occurs around the community and God's Lake and in other areas outside of the Indigenous LAA.

Members from Manto Sipi Cree Nation identified at least 10 plant species used for food, medicine and other uses during the TK workshops and interviews (HTFC Planning & Design 2017d), as previously summarized in **Table 6.5**. Food berries include blueberries, raspberries, strawberries, saskatoons, cherries and cloudberries. Medicinal plants include plant parts (ex: leaves, roots) of several plants including Labrador tea, spruce and weekays (sweet flag). Plant harvesting occurs during the spring and summer, while berry picking occurs during the summer and early fall. Harvesting primarily occurs around the community and God's Lake and in areas outside of the Indigenous LAA. Members also indicated that woodcutting for firewood is important and occurs in the vicinity of God's Lake.

Through the TK study, Manto Sipi Cree Nation members indicated that they place great value on traditional activities and the environment that supports those activities. Traditional activities represent a connection to the past, reinforce social connections and are key to maintaining the community's cultural relationships with the land (HTFC Planning & Design 2017d).

6.1.9.1.2 Bunibonibee Cree Nation

Bunibonibee Cree Nation (No. 301), formerly known as Oxford House First Nation, is located along the eastern shoreline of Oxford Lake at the mouth of the Hayes River in the northern part of the Indigenous LAA. The reserve is located on a ridge of land between Oxford Lake to the west and Back Lake to the east. Oxford House was established in 1798 as a Hudson's Bay Company fur trading post on the fur trade route between York Factory and Norway House. Historical land use by Bunibonibee Cree Nation members took place over the area from Norway House area to the southwest, Beaver Hill Lake to the southeast, High Hill Lake to the northwest and the Hayes River north of Manto Sipi Cree Nation (HTFC Planning & Design 2017a). Bunibonibee Cree Nation uses the *First Nations Elections Act* to elect Chief and Council.

Bunibonibee Cree Nation is located approximately 576 km (by air) northeast of the City of Winnipeg and 186 km (by air) from the City of Thompson. The community is currently serviced by a winter road extending from PTH 6 and PR 373. The community is also serviced by a regional airport with a 1,158 m runway. The Kelsey Generating Station to Oxford House 138 kilovolt (kV) transmission line, which originates outside of the area, provides power to Bunibonibee Cree Nation.

6.1.9.1.2.1 Traditional Territory, Reserve Lands and Treaty Land Entitlement

Bunibonibee Cree Nation's traditional territory is shown in **Figure 6-16**. Bunibonibee Cree Nation has 14 reserves – Atihkosanik Cree Nation (530.4 ha); High Hill Lake (422 ha); Kisipikamak (1881.4 ha); Munroe Lake (1491 ha); Notin Sakahedun (2822.4 ha); Opischikonayak Nation (254.8 ha); Oxford House 24 (4876.7 ha); Oxford House 24A (146 ha); Oxford House 24B (1737.6 ha); Oxford House 24C (402 ha); Oxford House 24D (4.5 ha); Oxford Lake North Shore (1385 ha); Wapisew Lake (71 ha) and Whitemud Lake (2068 ha). The Bunibonibee Cree Nation Oxford House Reserve 24 was created in 1948. Under the TLE Framework Agreement, Bunibonibee Cree Nation is entitled to 14,339.6 ha and, as of March 1, 2015, the First Nation 12,683.8 ha converted to Reserve (Indigenous and Northern Affairs Canada 2017b). The location of Bunibonibee Cree Nation reserve land and TLE in the vicinity of the Indigenous LAA is shown in **Figure 6-17**.

6.1.9.1.2.2 Demographics

As of May 2017, Bunibonibee Cree Nation's total population was 3,118, of which 2,535 live On-Reserve (Indigenous and Northern Affairs Canada 2017b). In 2016 the On-Reserve population was 1,950, a 4.6% increase since 2011 (**Table 6.25**) (Statistics Canada 2017f). Population growth in the Province of Manitoba over the same period was 5.8%.

Table 6.25: Bunibonibee Cree Nation: On-Reserve Population 2016 and 2011

	On-Reserve Population
Population in 2016	1,950
Population in 2011	1,864
% Change (2011 to 2016)	4.6%

Source: Statistics Canada 2017f

The total population median age in Bunibonibee Cree Nation in 2011 was 21.3 years (**Table 6.26**). This is substantially younger than the provincial total median age of 37.9 years. In 2011, there were few residents in the community over the age of 65 (4.8%) compared to approximately 13% for the Province of Manitoba. The majority of residents (99.5%) are registered under the *Indian Act*. In addition, there were slightly more males than females in Bunibonibee, while the opposite was true for the Province as a whole. In 2016, the average age in Oxford House (IR 24) was 26.8 years compared in 39.2 years for Manitoba as a whole. In 2016, the average household size was 5.7 persons compared to 2.5 persons for the Province of Manitoba (Statistics Canada 2017f).

Table 6.26: Population Demographics for Bunibonibee Cree Nation, 2011

	Population		
	Total	**Male**	**Female**
Total All Persons	1,865	960	905
Status	1,855	955	905
Non-status	10	10	0
Age Characteristics			
Total All Persons	1,865	960	905
Age 0 to 19	895	465	430
Age 20 to 64	885	455	430
Age 65 and over	90	45	45
Median Age	21.3 years	21.0 years	21.7 years

Note: **D**ata in the table is randomly rounded (either up or down) to a multiple of 5 and in some cases 10. This provides protection against direct residual or negative disclosure of individuals without adding significant error to the census data. Minor differences will occur in totals and cell values among census tabulations.

Source: Indigenous and Northern Affairs Canada 2017b

Education rates in Bunibonibee Cree Nation are much lower than those for the province as a whole, particularly for post-secondary education. In 2011, residents with a high school diploma (or equivalent) made up 16.9% of the population over 15 years of age compared to 27.7% for Manitoba. Residents with a university degree (Bachelor or higher) made up 2.5% of the population over 15 years of age compared to 17.8% in Manitoba (Indigenous and Northern Affairs Canada 2017b).

6.1.9.1.2.3 Economy

In 2011, Income levels in Bunibonibee Cree Nation were much lower than the Manitoba average. The average total income for those over the age of 15 years was $11,489 compared to $36,696 for the Province of Manitoba. Government transfers made up a much larger proportion of income in Bunibonibee Cree Nation at 46% compared to 13% for the Province of Manitoba. The participation rate in the First Nation was 48.7% compared to 67.3% in Manitoba. The unemployment rate was 33.9% compared to 6.25% in Manitoba (Indigenous and Northern Affairs Canada 2017b).

The Bunibonibee Cree Nation economy includes a mix of wage, cash and traditional economic activities. The wage economy is largely derived from public sector employment including health care, education, social services and band activities. The cash economy accounts for the delivery of goods and services

outside of registered businesses or companies. The traditional economy includes subsistence activities such as non-commercial hunting, gathering and fishing, as well as other resource-based activities (Indigenous and Northern Affairs Canada 2017b). Local businesses established in Bunibonibee Cree Nation are listed in **Table 6.27**. The locations of a number of these businesses are shown in **Figure 6-19**.

Table 6.27: Select Local Businesses in Bunibonibee Cree Nation

Business Type	Business
Food, Lodging, Construction, Communications and Transportation	▪ Triple B Motel ▪ Super B's Convenience Story / restaurant ▪ Tim Hortons ▪ Chegus Auto Repair ▪ Arnason Construction Office ▪ JW Hauling
Retail and other	▪ The Northern Store

6.1.9.1.2.4 Infrastructure, Utilities and Services

The community of Bunibonibee Cree Nation predominately has modern water and wastewater services. Drinking water is sourced from Oxford Lake and is treated at a community water treatment plant and piped or trucked to houses. Sewage is generally piped or stored in septic tanks to be trucked from houses and community buildings to the community's wastewater treatment plant. The other infrastructure and utilities in Bunibonibee Cree Nation are summarized in **Table 6.28** and shown in **Figure 6-19.**

Table 6.28: Overview of Infrastructure and Utilities – Bunibonibee Cree Nation

Infrastructure and Utilities	
Water	Water is obtained from Oxford Lake, then treated and distributed to approximately half of the houses in the community via watermains; the remaining houses are serviced by truck and water is stored in tanks.
Sewer	The community has a sewage treatment plant connected to approximately half of the houses; the remaining houses are serviced by septic truck.
Waste Management	One landfill site located south of the community.
Roads	No permanent access route to the community; access is provided by winter road; the community has a small network of internal gravel roads.
Electricity	Manitoba Hydro – 138 kV transmission line.
Telephone/Internet	MTS – Landline with internet by satellite as there is no cellular service.

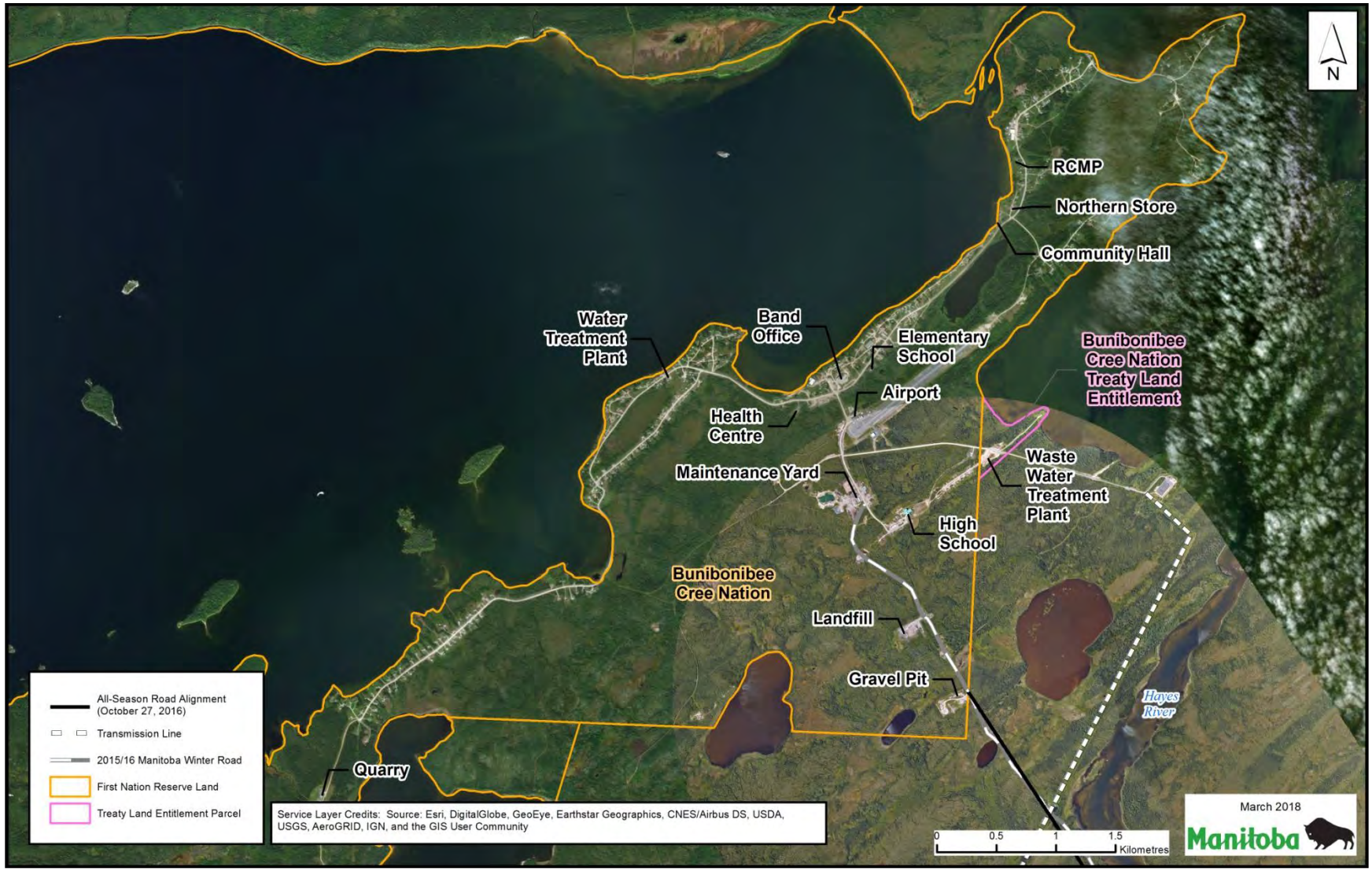


Figure 6-19: Bunibonibee Cree Nation businesses, services, infrastructure and utilities

The schools in the community provide education for students up to Grade 12. A nursing station provides health care services to the community. The nearest hospitals are in Norway House Cree Nation and the City of Thompson. Police services are provided by the RCMP. Recreational amenities include a community hall, an arena and outdoor rink. Fire protection is provided via a fire truck. These local services are summarized in **Table 6.29**.

Table 6.29: Summary of Services in Bunibonibee Cree Nation

Services	
Postal Service	▪ Mail service is provided by air on weekdays.
Recreation	▪ Facilities include a youth centre, an arena and outdoor rink.
Health Care	▪ Oxford House – Bunibonibee Cree Nation Nursing Station. ▪ George Colon Memorial Home Inc.
Education	▪ Oxford House Elementary School (nursery to Grade 6). ▪ Bunibonibee 1972 Memorial High School (Grades 7 to 12). ▪ University College of the North Centre.
Government	▪ Bunibonibee Cree Nation Band Office.
Police	▪ RCMP Oxford House detachment.
Fire	▪ The First Nation has a Fire Hall and fire truck.

6.1.9.1.2.5 Transportation

Roads

Bunibonibee Cree Nation has no year round road access to a service centre. The majority of goods are delivered to the community via the winter road network that is operational for approximately two months each year. The network of gravel roads in the communities are maintained locally.

Airport

Bunibonibee Cree Nation is serviced by a regional airport with a 1,158 m gravel runway. The airport is operated by the Northern Airports & Marine Operations Division of MI. Aircraft movements (number of planes) for the 2015/2016 period were 2,902 and passenger traffic (number of people) for the same period was 12,332 (Manitoba Infrastructure 2017a). Scheduled service to the community is provided by Perimeter Airlines.

6.1.9.1.2.6 Resource Use

Indigenous people from Bunibonibee Cree Nation use the Indigenous LAA and RAA for traditional activities including fishing, hunting, trapping, camping, harvesting plants and berries, recreation activities and sacred/ceremonial use. Many traditional activities occur around Oxford Lake and to the southeast of the community (HTFC Planning & Design 2017a). Through Bunibonibee Cree Nation's TK study for the proposed Project, members indicated that activities on traditional lands are often conducted simultaneously (HTFC Planning & Design 2017a). For example, hunting and trapping may be done at the

same time while traveling to or from hunting and trapping areas. Locations of areas where traditional activities are conducted which were identified in the TK report cannot be reported publicly.

Travel routes in the Indigenous RAA are important to Bunibonibee Cree Nation as they provide seasonal access for traditional activities of cultural importance including hunting, trapping, fishing and gathering. Travel routes generally include walking, ATV and snowmobile trails, as well as open-water and frozen waterways. The majority of travel routes documented through the TK study were associated with Oxford Lake and major waterways in the Indigenous LAA and RAA (ex: Knee Lake). The winter roads operated by the Province of Manitoba also provide an important travel route.

Members used to travel long distances by canoe, dog sled and on foot. People started to travel by snowmobiles and motorboats once they became available in the 1960s and 1970s. The most common summer transportation routes are still along waterways, while snowmobile trails and the winter road are common winter travel routes. During the TK interviews, members indicated that traveling and staying overnight on the traditional lands surrounding the community is common. Members identified a number of tenting sites and camping areas in the Indigenous RAA, as well as hunting and trapping cabins. Tenting and camping sites are generally located close to waterways. Resource users construct cabins on their traplines and family resource areas for trapping, fishing and hunting purposes.

As part of the Band Health Project, the community has an educational area outside of the community that is a land-based program for youth in the summer (ex: camping, outdoor activities). There are several culturally important areas in the region including the old settlement at Oxford House where Treaty 5 was signed (HTFC Planning & Design 2017a). These are located around Oxford House and other lakes in the region.

Members have stated that moose and geese are the most important species hunted by community members. Community members identified moose hunting areas as spanning entire watersheds and along the winter roads. Moose hunting primarily occurs in the fall. Migratory caribou are harvested by community members. Caribou hunting has historically occurred north of the community. Caribou migration routes often come right through Bunibonibee Cree Nation which provides opportunistic hunting opportunities.

Fishing occurs year-round with gillnets, angling and ice fishing. Walleye, whitefish and northern pike are fished in the spring, summer and fall, whereas, trout are fished in the summer and fall. Ice fishing takes place in winter on Oxford Lake, Knee Lake and lakes to the south of the community. During the TK interviews, members indicated that fishing occurs for food as well as recreation. Fish guiding at fishing lodges in the area has provided a source of employment for many members. However, the Knee Lake Lodge, once a significant employer of local guides, is closed and is currently being used as an outpost from Utik Lake Lodge (HTFC Planning & Design 2017a).

Trapping is still widely practiced by Bunibonibee Cree Nation members and is valued as a source of income and a connection to traditional practices. Trapping occurs in the winter and early spring. A variety of furbearers are trapped in the Oxford House area. Species noted include snowshoe hare, muskrat, marten, mink, fox, otter, fisher, wolf, wolverine, lynx and beaver. Trapping occurs throughout sections of RTLs within the Oxford House area. Trapline 68 is a community line that is used by elders and other members. During the TK study, it was noted that trapping practices have changed over time. Historically, members would go out to their traplines for the entire winter and return to the community at Christmas. Currently, most trappers go out onto traplines for day trips (HTFC Planning & Design 2017a). Traplines within the Oxford House RTL District that are at least partially located within the Indigenous LAA are 50, 52 to 54, 67 and 68 (**Figure 6-17**).

Waterfowl hunting occurs on lakes and rivers in the Oxford House and Knee Lake areas. Hunted species include ducks, geese, mallards, blue bills or scaup and ring-necked ducks. Game bird hunting occurs south of the community in the general area and includes spruce grouse and ptarmigan. Waterfowl hunting occurs in the spring and the fall. Birds not typically consumed by community members include loons, gulls, pelicans, herons, bitterns and swans.

Berry picking is an important traditional activity for Bunibonibee Cree Nation members. Some members continue to harvest berries in the summer and fall. Berries picked include strawberries, gooseberries, bog cranberry, raspberries and blueberries. Plant medicine harvesting is not as common as it was prior to the establishment of the Oxford House Reserve and the introduction of the biomedical system in the 1940s. During the TK interviews members indicated that medicinal plants such as Labrador tea and weekays (sweet flag) are harvested in the spring and summer. Most of the harvesting of plants occurs outside of the Indigenous LAA but there are a few small sites within the LAA. Members still collect firewood but since the transmission line was constructed, the community relies more on electricity to heat homes.

Through the TK study, Bunibonibee Cree Nation members indicated that they place great value on traditional activities and the environment that supports those activities. Traditional activities represent a connection to the past, reinforce social connections and are key to maintaining the community's cultural relationships with the land (HTFC Planning & Design 2017a).

6.1.9.1.3 God's Lake First Nation

God's Lake First Nation (No. 296) is located at the narrows of God's Lake in the southwestern part of the Indigenous LAA. Members historically lived and travelled on the lands and waters around God's Lake, God's River and northeast towards Shamattawa and the Hudson Bay coast. The First Nation has cultural and social ties to neighboring Cree communities including Manto Sipi Cree Nation, Bunibonibee Nation, Shamattawa First Nation, War Lake First Nation, Fox Lake Cree Nation and York Factory First Nation (HTFC Planning & Design 2017b). God's Lake First Nation uses the *Indian Act* Electoral System to elect Chief and Council.

God's Lake First Nation is located approximately 547 km (by air) northeast of the City of Winnipeg and 224 km (by air) from the City of Thompson. The community is currently serviced by a winter road extending from PTH 6 and PR 373. The community is also serviced by a regional airport with a 1,044 m runway. A 138 kV transmission line from Oxford House to God's Lake provides power to the community.

6.1.9.1.3.1 Traditional Territory, Reserve Lands and Treaty Land Entitlement

God's Lake First Nation's traditional territory is shown in **Figure 6-16**. God's Lake First Nation has fifteen reserves – Andrew Bay (68.2 ha); Chataway Lake/Knife Lake (112.1 ha); Esker Ridge A Indian Reserve (481 ha); Esker Ridge B (107 ha); God's Lake 23 (3696.1 ha); God's Lake Southeast of Community (425.3 ha); Hawkins (272.7 ha); Hill's Island (45.4 ha); Kenyan Lake (303 ha); North Prominent Ridge (2642 ha); Peter Burton's/Shorty Rapids (788 ha); Red Cross Lake East (271.8 ha); Red Cross Lake North (126.8 ha); Vermilyea Lake (3.3 ha) and Wapaminakoskak Narrows (950 ha). Under the TLE Framework Agreement, God's Lake First Nation is entitled to 17,239.6 ha and, as of March 1, 2015, the First Nation had 6,597.1 ha converted to Reserve (Indigenous and Northern Affairs Canada 2017b). God's Lake First Nation does not have any TLE's in the Indigenous LAA. The location of God's Lake First Nation reserve land in the vicinity of the Indigenous LAA is shown in **Figure 6-17**.

6.1.9.1.3.2 Demographics

As of June 2017, God's Lake First Nation's total population was 2,755, of which 1,455 live On-Reserve (Indigenous and Northern Affairs Canada 2017b). In 2016 the On-Reserve population was 982, a 26.8% decrease since 2011 (**Table 6.30**) (Statistics Canada 2017d). Population change in the Province of Manitoba over the same period was an increase of 5.8%.

Table 6.30: **God's Lake First Nation: On**-Reserve Population 2016 and 2011

	On-Reserve Population
Population in 2016	982
Population in 2011	1,341
% Change (2011 to 2016)	-26.8%

Source: Statistics Canada 2017d

The total population median age in God's Lake First Nation was 20.4 years (**Table 6.31**). This is substantially younger than the provincial total median age of 37.9 years. In 2011, there were few residents in the community over the age of 65 (4.1%) compared to approximately 13% for the Province of Manitoba. The majority of residents (98.3%) are registered under the *Indian Act*. In addition, there were slightly more males than females in God's Lake, while the opposite was true for the Province as a whole. In 2016, the average age in God's Lake (IR 23) was 27.8 years compared in 39.2 years for Manitoba as a whole. In 2016, the average household size was 4.0 persons compared to 2.5 persons for the Province of Manitoba (Statistics Canada 2017d).

Table 6.31: Population Demographics for **God's Lake First** Nation, 2011

	Population		
	Total	**Male**	**Female**
Total All Persons	1,340	720	625
Status	1,305	700	605
Non-status	35	15	20
Age Characteristics			
Total All Persons	1,340	720	625
Age 0 to 19	650	350	295
Age 20 to 64	635	340	300
Age 65 and over	55	30	25
Median Age	20.4 years	20.4 years	20.5 years

Note: Data in the table is randomly rounded (either up or down) to a multiple of 5 and in some cases 10. This provides protection against direct residual or negative disclosure of individuals without adding significant error to the census data. Minor differences will occur in totals and cell values among census tabulations.

Source: Indigenous and Northern Affairs Canada 2017b

Education rates in God's Lake First Nation are much lower than those for the province as a whole, particularly for post-secondary education. In 2011, residents with a high school diploma (or equivalent) made up 11.3% of the population over 15 years of age compared to 27.7% for Manitoba as a whole. Residents with a university degree (Bachelor or higher) made up 2.4% of the population over 15 years of age compared to 17.8% in Manitoba (Indigenous and Northern Affairs Canada 2017b).

6.1.9.1.3.3 Economy

In 2011, Income levels in God's Lake First Nation were much lower than the Manitoba average. The average total income for those over the age of 15 years was $12,057 compared to $36,696 for the Province of Manitoba. Government transfers made up a much larger proportion of income in God's Lake First Nation at 40% compared to 13% for the Province of Manitoba. The participation rate was 38.9% compared to 67.3% in Manitoba. The unemployment rate was 38.5% compared to 6.25% in Manitoba (Indigenous and Northern Affairs Canada 2017b).

The God's Lake First Nation economy includes a mix of wage, cash and traditional economic activities. The wage economy is largely derived from public sector employment including health care, education, social services and band activities. The cash economy accounts for the delivery of goods and services outside of registered businesses or companies. The traditional economy includes subsistence activities such as non-commercial hunting, gathering and fishing, as well as other resource-based activities (Indigenous and Northern Affairs Canada 2017b). Local businesses established in God's Lake First Nation are listed in **Table 6.32**. The locations of a number of these businesses are shown in **Figure 6-20**.