

## Chapter 4 – Project Setting

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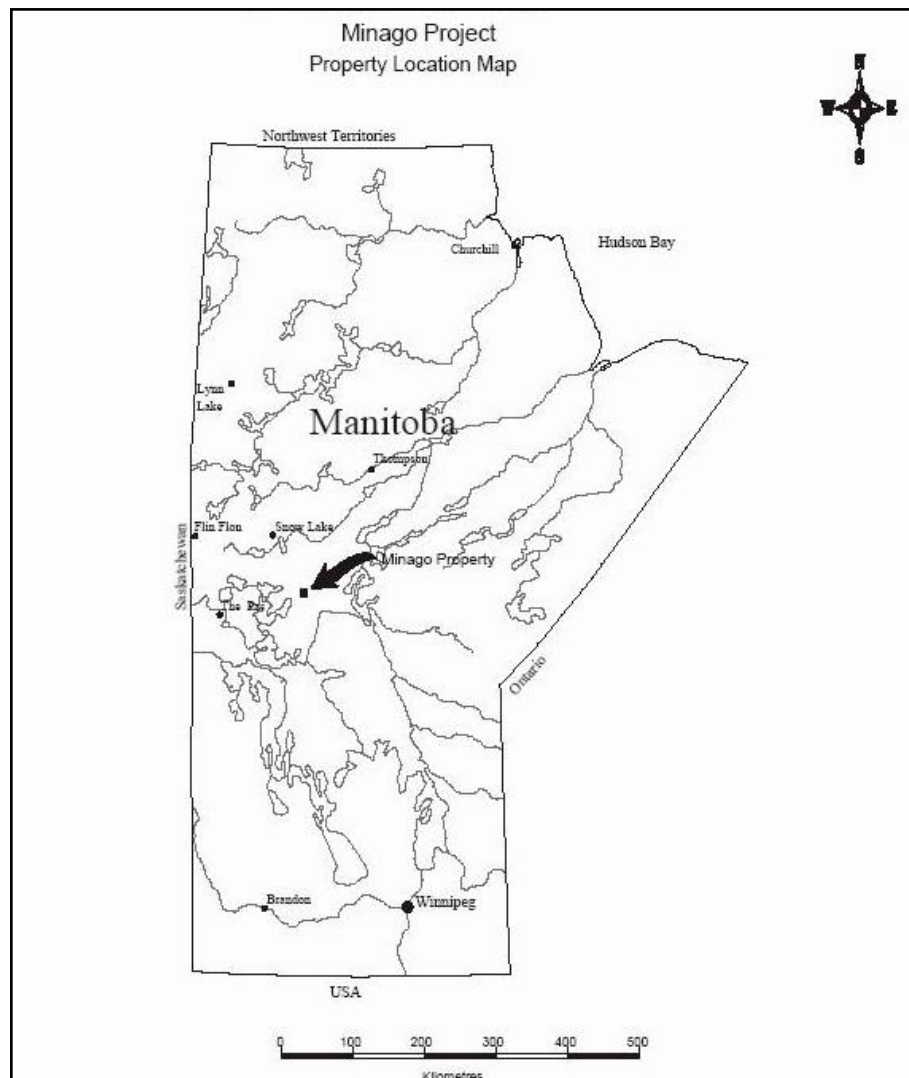
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## 4. PROJECT SETTING

### 4.1 Project Location

The Minago Nickel Property (Property) is located 485 km north-northwest of Winnipeg, Manitoba, Canada and 225 km south of Thompson, Manitoba on NTS map sheet 63J/3. The property is approximately 100 km north of Grand Rapids off Provincial Highway 6 in Manitoba. Provincial Highway 6 is a paved two-lane highway that serves as a major transportation route to northern Manitoba. The site location is shown in Figure 4.1-1.



Source: Wardrop, 2006

**Figure 4.1-1 Property Location Map**

## 4.2 Physical Environment

The Minago Project is located within the Nelson River sub-basin, which drains northeast into the southern end of the Hudson Bay. The Minago River and Hargrave River catchments, surrounding the Minago Project Site to the north, occur within the Nelson River sub-basin. The William River and Oakley Creek catchments at or surrounding the Minago Project Site to the south, occur within the Lake Winnipeg sub-basin, which flows northward into the Nelson River sub-basin. The topography in these watersheds varies between elevation 210 and 300 m.a.s.l.

The topography in the Minago Project Area is relatively flat with extensive low-lying areas containing wetlands covering approximately one-half the ecoregion. Fens and bogs are poorly drained and frequently covered in tamarack and black spruce. Sites that are well drained consist mostly of plateaus above 265 m.a.s.l. covered by limestone, tills and fluvio-glacial sands. These plateaus are usually colonized by an open conifer forest (Roche, 2008a).

Surficial materials of the Minago Project site consist essentially of three types: fine grained glaciolacustrine, till blanket and organic deposits. Glaciolacustrine deposits are sediments deposited in glacial lakes, which formed when meltwater was trapped between the front of a glacier and a moraine or rock wall that prevented drainage. Glaciolacustrine deposits consist primarily of well-stratified fine sand, silt and clay. Till is any sediment that was transported and deposited by a glacier without being sorted by meltwater. It consists of clay, sand and large rock fragments that were deposited in irregular sheets or in ridges called moraines. Organic deposits are rich in partially decomposed plant matter. They usually form and accumulate in poorly drained environments such as swamps and peat bogs (Roche, 2008a).

The Minago Project Site is located within the sub-arctic climate zone (i.e., Dfc zone under the Koppen-Geiger climate classification; Peel et al., 2007). This zone is characterized by a cold climate with relatively humid winters and summers, and less than four months with average monthly temperature above 10 °C (Kottke et al., 2006). At Minago, the annual mean temperature is expected to be about 0 °C (Prowse, 1990), with significant seasonal variations. Mean monthly temperatures are expected to be between -20 and -25 °C in January, and between 15 and 20 °C in July (EMRC, 1995). Mean annual total precipitation is expected to be between 400 and 600 mm, with a mean annual snowfall between 1,000 and 2,000 mm (EMRC, 1995). It is noteworthy that the freshet or breakup of the snowpack in the vicinity of the Minago Project is also one of the driest periods of the year in terms of precipitation (Wardrop, 2009b).

The study area lies within the Localized Permafrost Zone, which was defined by Zoltai (1995). In that zone, permafrost occurs as small isolated lenses in peat. The hydrological and ecological impacts of their melting have been proven to have no significant effect on the surrounding area (Thibault and Payette, 2009). Moreover, Thibault and Payette (2009) have shown that over the last 50 years the southern limit of permafrost distribution has significantly

migrated towards the north. Nowadays, it is therefore unlikely to observe permafrost in the Minago area.

To date, all surface water 2006-2008 samples collected from the vicinity of the Minago Project were alkaline with a pH ranging from 7.01 to 8.84. The average and median field pH were 7.82 and 7.81, respectively. The total alkalinity ranged from 56.6 to 703.0 mg/L with average and median concentrations of 166.3 mg/L and 161.5 mg/L (as CaCO<sub>3</sub>), respectively. The recorded hardness ranged from 61.5 to 715 mg/L and the average and median hardness were 173.9 mg/L and 170 mg/L (as CaCO<sub>3</sub>), respectively. The field specific conductivity (conductivity measured at in situ water temperature corrected to 25°C) ranged from 127 to 580 µS/cm with average and median values of 214.2 and 215.5 µS/cm, respectively.

### 4.3 Ecological Characterization

The Minago Project Area occupies approximately 2,428 hectares, west of Highway 6, and is located within the Mid-Boreal Lowland ecoregion of the northern section of the Manitoba Plain with extensive wetlands covering approximately half the area (URS, 2008d). Underlain by flat-lying, limestone bedrock, the project site area is covered almost entirely by a glacial and lacustrine overburden of fine material, and extensive peat deposits. The cold and poorly drained fens and bogs are covered with tamarack and black spruce (URS, 2008d).

The Mid-Boreal Lowland eco-region is replaced to the north and east by the Hayes River Upland eco-region. Standing vegetation in this region consists predominantly of dense medium to tall black spruce and jack pine with some paper birch. The shrub layer is dominated by ericaceous shrubs, willow, and alder. The ground cover consists of mosses and lichens, low ericaceous shrubs, and some herbs (URS, 2008d).

Vegetative species diversion in the project area is relatively uniform. No rare, threatened, endangered, or special-status plant species were found. The Project Area contains vegetation consisting of mostly evergreen trees (primarily black spruce and tamarack) of intermediate (>3-15 m) to dwarf (3 m) heights. Intermediate closed evergreen tree is most dominant (34%) vegetation classification, followed by dwarf open evergreen tree (25%).

Among the several wildlife species which are likely to occur in the area, including birds, mammals, reptiles and amphibians, none has a special status under provincial and/or federal legislations, except woodland caribou. A list of species potentially occurring in the Minago project Area was completed and it includes 136 birds, 39 mammals, 6 amphibians and 1 reptile. Among those, 45 birds, 17 mammals, 4 amphibians and 1 reptile were observed during field campaigns. A low density of furbearers was observed on the Project Site even if many beaver dams were observed. The Grand Rapids region is well-known for its caves and bat hibernacula; however, the nearest from the Project Site is located 16 km away.

The Minago Project area is underutilized by all wildlife species but shore birds, sharp-tailed grouse, small forest carnivores and black bear, beaver, and amphibians (and likely the red-sided garter snake) (URS, 2008e). None of the project area habitat is particularly critical to the survival of these species.

With rare exceptions, such as grouse, all of the birds that occur in the Minago Project vicinity are migratory and most occur at the Minago Project site only during their nesting seasons (URS, 2008e). None of the birds occurring in the Minago Project area have special status other than that conferred by the various treaties and conventions between Canada, the U.S., Japan, Mexico, and the former Soviet Union for the protection of migratory birds and by hunting seasons established by federal, provincial, and First Nations resource management agencies.

Moose populations in the Minago Project vicinity are concentrated north, south, and west of the Minago Project area. There is currently some summer and winter utilization of riparian habitat along Oakley Creek, bog habitat between the Moose Lake Winter Road and Oakley Creek, and bog and post-fire shrub habitat along the western edge of the Minago Project area.

Woodland Caribou (*Rangifer tarandus caribou*) was not observed in 2007 and 2008 wildlife surveys. The boreal population of woodland caribou is listed as "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in the Species at Risk Act and Manitoba's boreal woodland caribou populations were listed as "threatened" in The Manitoba Endangered Species Act in June, 2006.

The habitat at Minago is of limited value to woodland caribou because treed islands of black spruce do not occur within open muskegs and any individual caribou migrating south from the Wabowden herd would encounter a large area of burned-over land to the north and west of the project area that is occupied by moose, a species they are not competitive with (URS, 2008e). In addition, the moose population may have increased wolf densities and the primary forage in these areas is shrub habitat, rather than the niche forage of lichens utilized by woodland caribou. Any woodland caribou entering the Minago Project area are likely to be stray individuals from the main bodies of nearby herds (Wabowden and William Lake) and the project area is not likely to provide critical habitat for either herd (URS, 2008e).

During the fish sampling program conducted in May/June 2007 after the spawning migrations of Walleye (*Sander vitreus*) and Northern pike (*Esox lucius*), the following species were encountered: Central mudminnow (*Umbra limi*), Brook stickleback (*Culaea inconstans*), both lake-run and dwarf resident White sucker (*Catostomus commersoni*), Pearl dace (*Margriscus margarita*), Iowa darter (*Etheostoma exile*), Emerald shiner (*Notropis atherinoides*), Johnny darter (*Etheostoma nigrum*), Rainbow smelt (*Osmerus mordax*), and Blacknosed shiner (*Notropis heterolepis*) (URS, 2008b).

During a 2008 fisheries assessment program conducted between May 6-9, 2008, a total of 1,184 fishes were caught using experimental nets installed in Cross Lake, Hill Lake and Limestone Bay of Lake Winnipeg (Roche, 2008a). Rainbow smelts (*Osmerus mordax*) represented 86.8 % of all fishes caught in Limestone Bay and 86.99% of the overall May 2008 catch. Northern pikes (*Esox lucius*) were the second most abundant species, representing 9.5 % of the overall catch. Northern pikes (*Esox lucius*) represented 73.3% of the non Rainbow smelt species caught (Roche, 2008a).

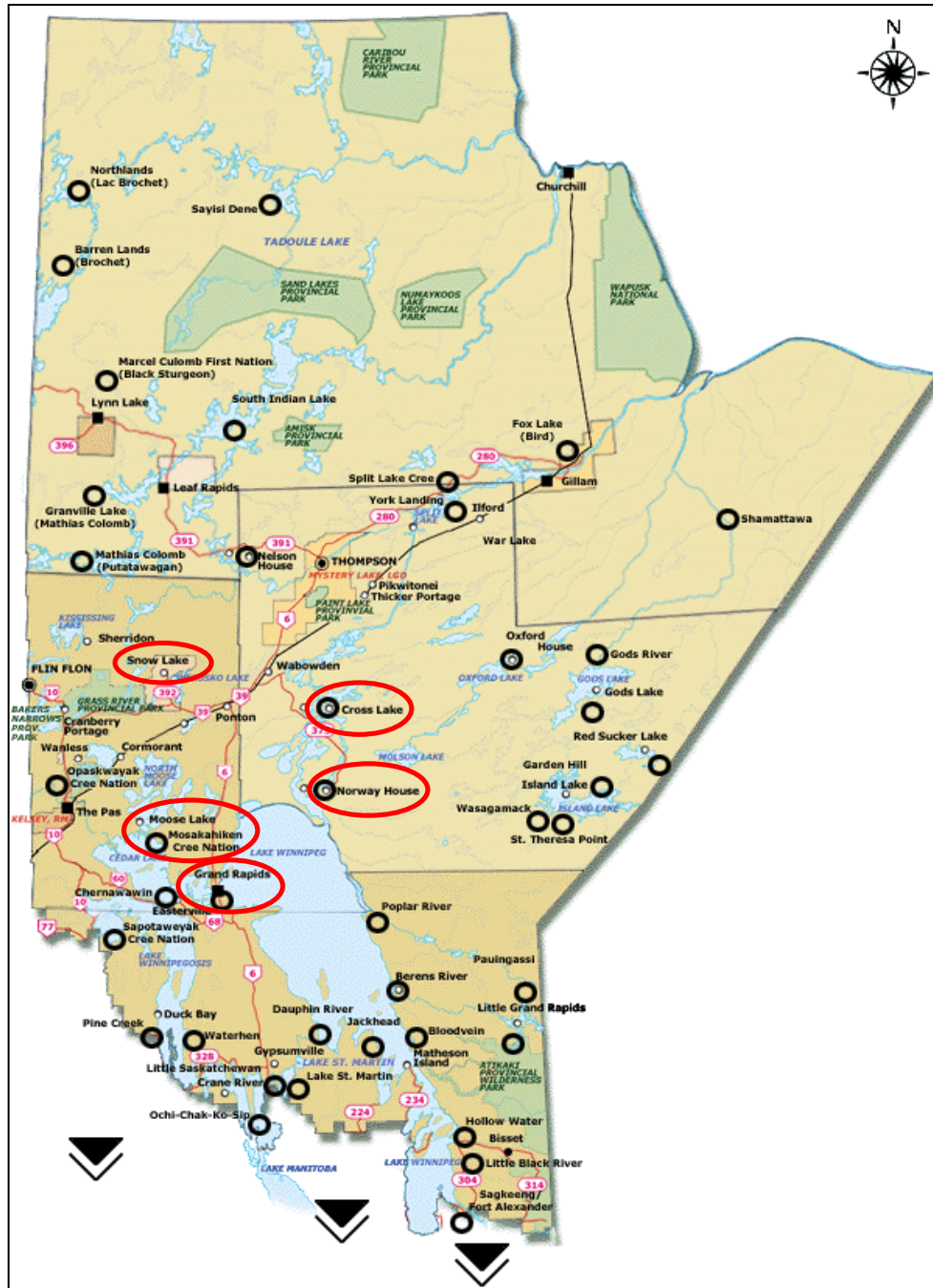
#### 4.4 Social and Cultural Environment

The Minago Project area falls within the Treaty 5 traditional territory and specifically the Norway House Resource Management Area. Neighbouring communities to the Minago Property include Grand Rapids (GR), Moose Lake (ML), Cross Lake (CL), Snow Lake (SL) and Norway House (NH). The closest community is Grand Rapids, approximately 100 km south of the site. All of these communities, with the exception of Snow Lake, are members of Treaty 5. The communities outside Treaty 5 have their own community councils and mayors. The First Nations are Cree and have their own governing structure with one Chief and several councillors. The Cree are Canada's largest native group, with 200,000 registered members and dozens of self-governed nations. Traditionally, the Cree were primarily hunting people.

VNI has been conducting community engagement meetings and consultations with the First Nations, Métis, the government and the general public. Victory Nickel participated in community engagement in Norway House (Norway House Cree Nation (NHCN) and Norway House Community (NHC), Grand Rapids (Misipawistik Cree Nation) and Grand Rapids Community (GRC), Cross Lake (Pimicikamak Cree Nation) and Cross Lake Community (CLC), Moose Lake (Mosakahiken Cree Nation) and Moose Lake Community (MLC), Snow Lake (public), and The Pas (Métis). Métis are of mixed-blood Cree, French, and other Canadian ancestry. There are more than 100,000 Métis in Canada (American Native Languages, 2010).

The assessed communities are illustrated in Figure 4.4-1 and include: Snow Lake (SL), Grand Rapids (GR), Cross Lake (CL), Moose Lake (ML), and Norway House (NH).

Based on the archaeological studies conducted at the site, it was concluded that it is virtually impossible that any use could have been made of the Minago Project area during Pre-contact times (Quaternary Consultants Ltd., 2008). The area is located at a considerable distance from lakes or navigable rivers and access at any time of the year would have been very difficult. Any use of this location that might have occurred would have happened during the winter months and probably would have been related to the fur trade. It is impossible to predict where such activity would have taken place as traplines are relocated every year to accommodate animal movement. Even if evidence from this activity were present, it would be buried deep in the sphagnum moss that covers the area and would be impossible to locate.



Source: Manitoba Government, Manitoba Community Profiles

Figure 4.4-1 Communities of Interest Surveyed



Based on a 2007 survey of the communities of interest, the largest communities were Cross Lake with 3,854 Pimicikamak Cree Nation and 3,455 residents in the Cross Lake Community and Norway House with 4,071 residents. The populations of the other communities were much smaller; 837 residents lived in Snow Lake, 700 lived in Mosakahiken Cree Nation (Moose Lake), 651 lived in Misipawistik Cree Nation (Grand Rapids), and 336 lived in the Town of Grand Rapids (DHR Associates, 2007).

One striking difference between the communities of interests is that the populations of the primarily native communities of Mosakahiken Cree Nation (Moose Lake), Pimicikamak Cree Nation (Cross Lake), Misipawistik Cree Nation (Grand Rapids), and Norway House Cree Nation are much younger with a median age ranging from 20.1 to 22.1 than the populations of Cross Lake community, Snow Lake, and Manitoba as the whole. The median age of the populations of the Cross Lake Community, Snow Lake, and Manitoba as the whole were 35.5, 41.9, and 38.1 respectively (DHR Associates, 2007).

Another difference between the communities of interests is that the rate of unemployment in the primarily native communities of Mosakahiken Cree Nation (Moose Lake), Pimicikamak Cree Nation (Cross Lake), Misipawistik Cree Nation (Grand Rapids), and Norway House Cree Nation was much higher (ranging from 18.8% to 33.3% in 2006) than in Snow Lake, the Town of Grand Rapids, and Manitoba as the whole. The unemployment rate was 5.1% in Snow Lake, 0% in the Town of Grand Rapids, and 5.5% in Manitoba (DHR Associates, 2007).

Another difference between the communities of interests is their median income. For the primarily native communities of Mosakahiken Cree Nation (Moose Lake), Pimicikamak Cree Nation (Cross Lake), and Norway House Cree Nation the median income ranged from \$27,456 to \$32,704 in 2005. This median income was \$15,000 to \$20,000 below the provincial median income of \$47,875 in 2005. All other communities considered had higher median incomes than the provincial average. In 2005, the median incomes were \$51,286 for the Town of Grand Rapids, \$51,461 for Division No. 22 of the Cross Lake Community, \$60,750 in Division No. 1 of the Cross Lake Community, and \$75,515 in Snow Lake (DHR Associates, 2007).

The educational attainment was below the provincial average for all communities of interest, except for the Town of Grand Rapids. In the Town of Grand Rapids, 39% of the population older than 15 years had a university certificate, diploma or degree compared to the provincial average of 19%. The percentage of the population 15 years and older that had a university certificate, diploma or degree ranged from 4.1% in Pimicikamak Cree Nation (Cross Lake) to 16.3% in Norway House Cree Nation in the primarily native communities.

In total, residents of the communities of interest possessed 31 different vocational skills. In 2007, the highest number of skilled people (354) resided in Norway House, followed by Grand Rapids (79), Cross Lake (55), Snow Lake (42), and Moose Lake (35). The top three vocational skills were truck driver, heavy equipment operator, and carpenter. The top three industries were 'Health Care and Social Services', 'Educational Services', and 'Agriculture and other Resource-based Industries' (DHR Associates, 2007).

Norway House Cree Nation and Community offer several public services. In fact, Norway House is one of the most well developed reserves and in many ways in Canada. There are several restaurants, two hotels, a Royal Bank with ATM facilities, an insurance company (Ranger Insurance Broker), two Northern stores, a full service post office, a video store, a school (kindergarten to high school) and paved roads within the community (DHR Associates, 2007). The Kinosao Sipi Mall and the recently added cell phone service are improvements to this northern community. It is home to a regional centre of the University College of the North and has a satellite degree programming from Brandon University's Faculty of Education and the University of Manitoba.

Among other aspects, the socio-economic assessment concluded that despite the socio-economic differences in the COI (population, age, unemployment, median income, education, vocational skills, and available public services), these communities face common social issues such as drug and alcohol abuse and other social problems. The socio-economic problems are predominant in communities with low levels of education and high unemployment rates.