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# TERRESTRIAL ENVIRONMENT TECHNICAL SUPPORTING DOCUMENT FOR THE HOUND CHUTE PROJECT



Submitted To:

**ONTARIO** **POWER**  
GENERATION

Submitted By:

**Montreal River EA Consulting Team**

March 2007

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FOR THE HOUND CHUTE PROJECT**

Submitted to:

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## EXECUTIVE SUMMARY

Ontario Power Generation Inc. (OPG) is proposing to redevelop the Hound Chute Generating Station (GS), a run-of-the-river hydroelectric power plant located on the Montreal River in northeastern Ontario. The Hound Chute GS has been in operation for 98 years and is at the end of its designed service life. The existing nameplate capacity of Hound Chute GS is 3.6 megawatts (MW). The proposed undertaking will replace the existing generating facility and when completed, will provide an expected nameplate capacity of 9.5 MW, an increase of approximately 6.0 MW. In order to construct the new powerhouse, the existing powerhouse and associated water conveying and electricity connection facilities will be decommissioned. In addition to building a new generating station all existing civil structures on the site shall be rehabilitated or upgraded including the replacement of the flash boards with an automatic bladder type weir.

The proposed Hound Chute GS redevelopment on the Montreal River is subject to the Class Environmental Assessment for Modifications to Hydroelectric Facilities prepared under the Ontario *Environmental Assessment Act*. This terrestrial environmental assessment is being undertaken as part of this Class Environmental Assessment.

During proposed Hound Chute GS construction, potential effects on the terrestrial environment may occur due to soil erosion and fugitive dust, accidental spills, waste generation, vegetation clearing, blasting and noise. Based on an assessment of the available baseline information and potential effects, as well as the implementation of recommended mitigative measures, it is concluded that effects during construction will be minimal, localized and short-term.

During proposed Hound Chute GS operation, potential effects on the terrestrial environment may occur due to noise and accidental spills. This concern has been primarily addressed through the use of oil-free equipment such as Vacuum breakers and dry type transformers. However, during facility operation, there is still a risk of an accidental spill. If a spill should occur, it will be managed and adverse effects mitigated based on the Spills Emergency Preparedness and Response Plan. Based on assessment of the baseline information and potential effects, it is concluded that the operation of the proposed hydroelectric power plant will have minimal effects on the terrestrial environment.

Environmental protection during construction and operation will be ensured by adherence to the Environmental Management Plan, as well as compliance with regulatory standards and guidelines.

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## ACRONYMS AND ABBREVIATIONS

ACNBC	Associate Committee on the National Building Code
AES	Atmospheric Environment Service
ANSI	Area of Natural and Scientific Interest
AP	Acid potential
ARD	Acid rock drainage
BMP	Best Management Practice
CLI	Canada Land Inventory
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CUM	Cultural Meadow
CWS	Canadian Wildlife Service
DBC	Design-Build-Contractor
ECGM	Environmental Construction Guidelines Manual
e.g.	For example
ELC	Ecological Land Classification
ER	Environmental Report
ESA	Environmentally Sensitive Area
<i>et al.</i>	And others
FOM	Mixed Forest
GS	Generating station
i.e.	That is
LRIA	<i>Lakes and Rivers Improvement Act</i>
<	Less than
ML/ARD	Metal Leaching and Acid Rock Drainage
MNR	Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
N	North
NHIC	Natural Heritage Information Centre
NP	Neutralizing potential
OMMAH	Ontario Ministry of Municipal Affairs and Housing
OPG	Ontario Power Generation
pers. comm.	Personal communication
PWGSC	Public Works and Government Services Canada
S1	Extremely rare in Ontario; usually fewer than 5 occurrences (in a 10-km by 10-km Mercator square grid)
S2S3	Very rare to uncommon in Ontario
S3	Rare to uncommon in Ontario; usually between 20 to 100 occurrences (in a 10-km by 10-km Mercator square grid)
S3S4	Rare to common in Ontario
S4	Common in Ontario; apparently secure, usually more than 100 occurrences (in a 10-km by 10-km Mercator square grid)
S4S5	Common to very common in Ontario
S5	Very common in Ontario, demonstrably secure

SARA	<i>Species at Risk Act</i>
SE	Exotic; not believed to be a native component of Ontario's fauna
SENES	SENES Consultants Limited
SH	Historically known from Ontario, but not verified recently
sp.	One species
spp.	A number of species
SZN	Not of practical conservation concern as there are no clearly defined occurrences
W	West

**Measurement Units**

°	degree
°C	degree Celsius
°F	degree Fahrenheit
GWh	gigawatt-hour
Km	kilometre
Km/h	kilometre per hour
kV	kilovolt
M	metre
mm	millimetre
m <sup>3</sup> /s	cubic metre per second
MW	megawatt
'	minute
/km <sup>2</sup>	per square kilometre
%	percent
"	second

## **GLOSSARY**

Amphibole	A group of double chained inosilicate minerals whose basic chemical unit is the tetrahedron (SiO <sub>4</sub> ); they are common rock forming minerals and are found in most igneous and metamorphic rocks.
Arkose	A coarse-grained sandstone containing at least 25% feldspar and derived from the partial disintegration of feldspar-rich rocks such as granite and gneiss.
Avifauna	Birds.
Bog	Peatland with the water table at or near the surface with the surface often raised above the surrounding terrain; strongly acidic and extremely nutrient-poor; ground cover of <i>Sphagnum</i> , usually with ericaceous shrubs (of the family Ericaceae).
Boreal	Of the north.
Canal	A channel dug or built to carry water.
Capacity	The greatest load which a unit, station or system can supply (usually measured in kilowatts, megawatts, etc.).
Capacity Factor	Ratio of the actual energy produced to the maximum energy which could be delivered under continuous operation at maximum rating.
Chute	A steeply-inclined natural passageway or constructed pipe or channel which conveys water from a higher to a lower level.
Clast	Rock typically composed of broken rock fragments, e.g., conglomerate and sandstone.
Cofferdam	A temporary dam made of concrete, rockfill, sheet-steel piling, timber/timber-crib or other non-erodible material and commonly utilized during construction to exclude water from an area in which work is being executed.
Conglomerate	A clastic sedimentary rock consisting of more or less rounded rock particles at least 2 mm in diameter, embedded in a fine-grained matrix of sand or silt.
Coniferous Forest	The largest terrestrial biome on earth (also known as the Taiga or boreal forest) extending in a broad band across North America, Europe and Asia to the southern border of the arctic tundra and usually dominated by one or two species of evergreen trees,
Crag	A rough, steep, or broken rock rising or jutting out prominently.
Dam	A concrete or earthen barrier constructed across a river and designed to control water flow or create a reservoir.
Deciduous Forest	In the Northern Hemisphere, this forest type occurs to the south of the coniferous forest and is dominated by broadleaved deciduous hardwood trees typically with a five- to six-month growing period.

Diabase	A fine-grained, dark colored igneous rock composed of lath-shaped plagioclase (feldspar) crystals surrounded by smaller grains of pyroxene and olivine; it commonly occurs as tabular bodies (dikes and sills) intruded into surrounding rocks.
Dike	The vertical veins of igneous rock that form when magma enters and cools in fractures found within the crust.
Endangered	A species facing imminent extirpation (no longer existing in the wild in Canada, but occurring elsewhere) or extinction (no longer exists).
Eukaryotes	Organisms whose cells have a membrane-bound nucleus and many specialized structures located within their cell boundary; in these organisms, genetic material is organized into chromosomes that reside in the nucleus.
Extirpation	Elimination of a species in the wild of a particular area (e.g., Canada), but occurring elsewhere.
Feldspar	A group of common aluminum silicate minerals that contains potassium, sodium or calcium; the most important group of rock-forming minerals, making up about 60% of the rocks of the earth's crust.
Flash board	A wood plank, steel member or inflatable rubber membrane placed at the top of a spillway to increase the storage capacity of a reservoir.
Forage	Any food suitable for livestock.
Forebay	The part of a dam's reservoir that is immediately upstream from the powerhouse.
Freshet	High flows in a stream or river, usually occurring in the spring, caused by snow melt, runoff, heavy rains and/or high inflows.
Geotechnical	Concerned with the physical properties of soil, rock and groundwater usually in relation to the design, construction and operation of engineered works.
Glaciofluvial	Of glacial watercourses.
Glaciolacustrine	Of glacial lakes.
Gleysolic	An order of soils developed under wet conditions and permanent or periodic reduction.
Gneiss	A metamorphed coarse grained igneous rock with the recrystallization of quartz, feldspar, micas and amphiboles into bands.
Granite	Medium to coarse grained igneous rock that is rich in quartz and potassium feldspar.
Grey Wooded	Well to imperfectly drained soils that have developed under coniferous and mixed-forest vegetation, as have Podzolic soils, but differ from them in having an accumulation of clay in the B horizon, neutral to slightly acid A and B horizons, and an alkaline parent material.

Greywacke	A hard coarse-grained sandstone characterized by angular particles of quartz, feldspar and other rock fragments embedded in a matrix of clay-sized particles.
Head	The difference in elevation between the water surface at the intake and tailrace.
Headgate (Control Gate)	The gate that controls water flow into a hydroelectric dam.
Headpond	The reservoir from which water is extracted for power generation or spillage.
Herpetofauna (Herpetiles)	Amphibians and reptiles.
Igneous	Rocks formed from the solidification of molten magma either beneath (intrusive igneous rock) or at (extrusive igneous rock) the earths' surface.
Inosilicates	A silicate group in which the oxygen-silicon tetrahedra (SiO <sub>4</sub> ) are linked into chains by sharing oxygen ions.
Intake	A structure which regulates the flow of water into a water-conveying conduit.
Isostatic rebound	The upward movement of the Earth's crust following depression of the crust by the weight of ice during continental glaciation.
Lacustrine	Of lakes.
Lithification	Process by which sediments are consolidated into sedimentary rock.
Mafic magma	This type of magma solidifies to form rocks relatively rich in calcium, magnesium and iron but poor in silica.
Magma	Molten rock originating from the earth's interior.
Matrix	The small particles of sediment or rock material that occupy the spaces between the larger fragments forming the framework of the rock.
Metamorphic	A rock that forms from the recrystallization of igneous, sedimentary or other metamorphic rocks through pressure increase, temperature use, or chemical alteration.
Metamorphism	A process that produces a change in the chemistry, structure or mineralogic composition of solid rock, usually due to temperature and/or pressure changes.
Mica	Silicate mineral that exhibits a platy crystal structure and perfect cleavage.
Olivine	A common silicate mineral found in rocks formed from mafic magma with its chemical composition varying between magnesium silicate and iron silicate.
Organic	Soils that have developed from accumulations of organic materials such as grasses, reeds, rushes, sedges, mosses and ferns.

*Proposed Hound Chute Generating Station  
Redevelopment, Montreal River – Terrestrial Environment*

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Outwash	Detritus and waste materials carried away by the water of melting glaciers.
Overburden	The soil, rock and other material which lies on top of the underlying mineral or other deposit, e.g., bedrock
Palustrine	Of wetlands.
Peat	Partly decomposed plant material; refers to soil containing >30% organic matter by weight.
Pebbly wacke	A coarse-grained siliciclastic sedimentary rock containing less than 25 percent pebbles in a matrix of sand, silt and clay.
Peneplain	A low almost featureless surface reflecting a base level of erosion.
Penokean Orogeny	A major early Proterozoic mountain building episode that began soon after a rifting event along the southern edge of the Superior Province 2.4 billion years ago.
Perennial	Continuing, enduring or growing through the year or through many years.
Plagioclase	A type of feldspar that is rich in sodium and calcium.
Podzolic	Well and imperfectly drained soils that have developed under coniferous and mixed-forest vegetation and usually found in cold to temperature climates on acid parent materials.
Powerhouse	A primary part of a hydroelectric facility where the turbines and generators are housed and where power is produced by falling water rotating turbine blades.
Proterozoic	Geological eon that occurred from 570 to 2,500 million years ago when the first single-celled and multi-celled eukaryotic organism evolved and developed.
Pyroxene	A group of single-chained inosilicate minerals whose basic chemical unit is the silica tetrahedron (SiO <sub>4</sub> ). They are common rock forming minerals and are found in the igneous and metamorphic rocks.
Quartz	A mineral: an oxide of silicon which is abundant and widespread occurring as an important constituent in many igneous, sedimentary and metamorphic rocks.
Quartz arenite	A medium-grained siliciclastic sedimentary rock containing less than 5% sand-sized particles of feldspar and less than 5% sand-sized particles of rock fragments.
Quaternary Period	The second and youngest period of the most recent Cenozoic Era (also called the Age of Mammals); the Quaternary Period began 2 to 3 million years ago and consists of two epochs, the Pleistocene and the Holocene (known also as Recent).
Riparian	Of or on a river bank.
Run-of-the-River	A power plant that has no upstream storage capacity and must pass all flows as they come.

*Proposed Hound Chute Generating Station  
Redevelopment, Montreal River – Terrestrial Environment*

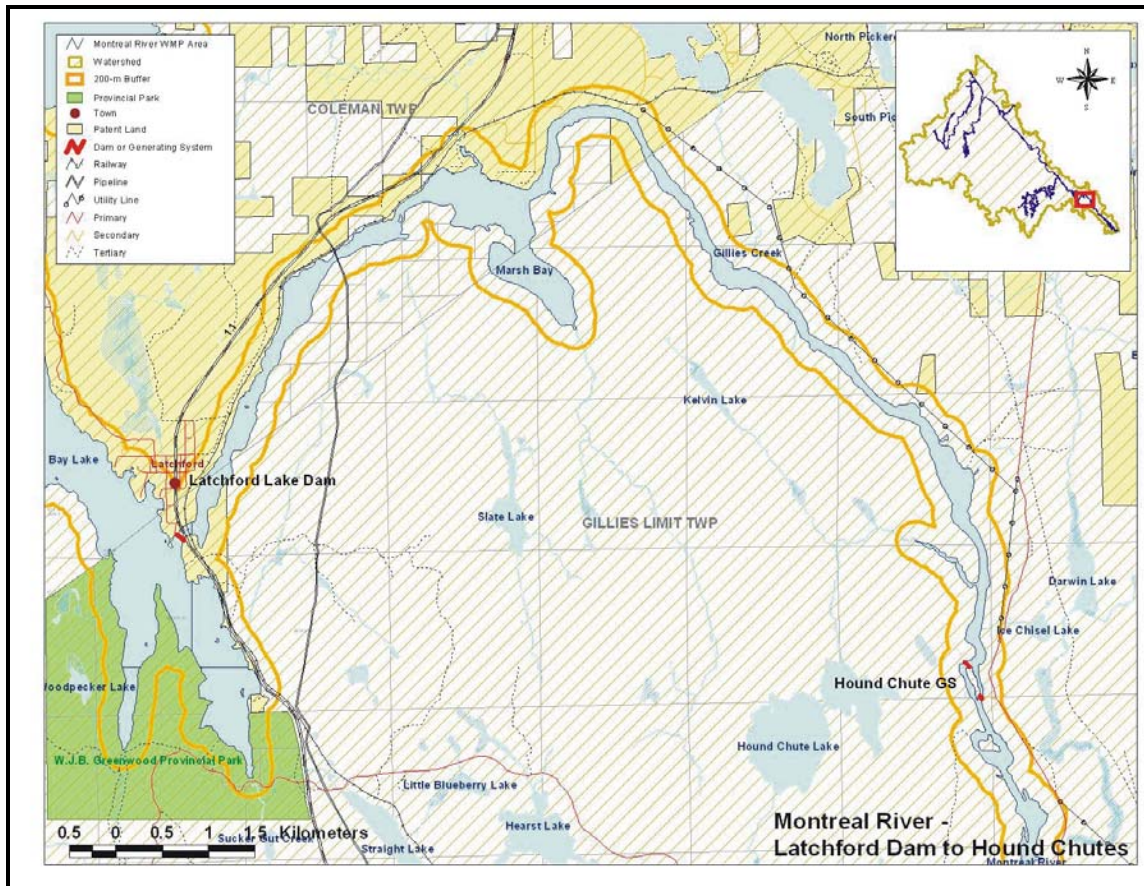
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Sandstone	A type of sedimentary rock that contains a large quantity of weathered quartz grains.
Sedimentary	Rock formed by the deposition, alteration and/or compression and lithification of weathered rock debris, chemical precipitates, or organic sediments.
Shale	Fine-grained sedimentary rock composed of lithified clay particles.
Siliciclastic sediment	Silica-based, noncarbonaceous sediments that are broken from pre-existing rocks, transported elsewhere and redeposited before forming another rock. Examples of common siliciclastic sedimentary rocks include conglomerate, sandstone, siltstone and shale.
Sill	Horizontal planes of igneous rock that run parallel to the grain of the original rock deposits; they form when magma enters and cools in bedding planes found within the crust.
Siltstone	Fine-grained sedimentary rock composed of lithified silt particles
Sluiceway (Sluice)	An open channel designed to divert excess water which could be within the structure of a hydroelectric dam or separate of the main dam (see spillway).
Special Concern	A species with characteristics that make it particularly sensitive to human activities or natural events.
<i>Sphagnum</i>	Moss.
Spillway	A passageway, or channel, located near or at the top of a dam through which excess water is released or “spilled” past the dam without going through the turbine(s); as a safety valve for the dam, the spillway must be capable of discharging major floods without damaging the dam while maintaining the reservoir level below some predetermined maximum level.
Stoplog	A gate (sometimes made from squared lumber) which can be placed into an opening to shut off or regulate the flow of water.
Tailrace	A channel through which the water flows away from a hydroelectric plant following its discharge from the turbine(s).
Terrestrial	Belonging, living on or growing in the earth or land.
Threatened	A species likely to become endangered if limiting factors are not reversed.
Turbine	A mechanism in an electrical generation facility which converts the kinetic and potential energy of water (in the case of hydroelectric turbines) into mechanical energy which is then used to drive a generator converting mechanical to electrical energy.
Weir	A dam in the river to stop and raise the water.
Wing-wall	A flaring vertical wall on either side of a weir.

## 1.0 INTRODUCTION

Ontario Power Generation Inc. (OPG) is proposing to redevelop the Hound Chute Generating Station (GS), a run-of-the-river hydroelectric power plant located on the Montreal River in northeastern Ontario (see Figure 1.1). The existing nameplate capacity of Hound Chute GS is 3.6 megawatts (MW). The proposed undertaking will replace the existing generating facility and when completed, will provide an expected nameplate capacity of approximately 9.5 MW, an increase of approximately 6 MW. The proposed Hound Chute GS will be connected to the existing 44-kilovolt (kV) feeder as part of the local distribution system. In order to construct the new powerhouse, the existing powerhouse and associated water conveying and electricity connection facilities will be decommissioned. In addition to building a new generating station, all existing civil structures on the site shall be rehabilitated or upgraded including the replacement of the flash boards with an automatic bladder type weir.

Figure 1.1: Hound Chute GS Location



The new facility will continue to operate under the existing operating regime that has been long established and more recently formalized in the Water Management Plan for the Montreal River (OPG *et al.*, 2004).

In 2000, the Ontario *Lakes and Rivers Improvement Act* (LRIA) was amended to establish the statutory authority of the Ministry of Natural Resources (MNR) to order the preparation of Water Management Plans for operation of waterpower facilities and associated control structures and ensure compliance with the Plans. The intent of the Water Management Plan is to provide certainty and clarity as to how waterpower facilities and control structures are operated with respect to levels and flows so as to balance environmental, social and economic objectives.

The Water Management Plan for the Montreal River system is the result of partnership between OPG, the MNR and Public Works and Government Services Canada (PWGSC) which operate hydroelectric generating facilities as well as flood control and civil structures along the river, as well as First Nations and the general public, which participated in the form of various advisory committees (OPG *et al.*, 2004).

The Water Management Plan was prepared in accordance with the Water Management Planning Guidelines for Waterpower (MNR, 2002). The Water Management Planning Guidelines were approved by the Minister of Natural Resources on 14 May 2002. The LRIA requires compliance by facility operators with the operating regimes established in the Water Management Plan.

## **1.1 PROJECT DESCRIPTION**

### Current Facilities

The 3.6-MW Hound Chute GS is located on the Montreal River straddling the townships of Latchford and Coleman in the District of Timiskaming, approximately 10 km southwest of the Town of Cobalt. This 4-unit plant, initially placed in service in 1908, is accessed by Silverfields Road which is maintained by OPG but open to public use. Photograph 1.1 depicts Hound Chute GS.

#### **Photograph 1.1: Hound Chute GS**



The Hound Chute GS has a cement-capped rockfill weir and a concrete spillway terminating in abutments at each end. Flash boards are removed each spring prior to the freshet to help mitigate flooding upstream. The dam diverts the river through a 427-m intake canal excavated along the east bank of the river, directly to the headgates (see Figure 1.2). The bottom of the large forebay is 0.3 m deeper than the intake. Two underflow sluices built at the south end of the powerhouse are large enough to take all of the water during very low water flow conditions. At the

intake of each turbine chamber, there is a gate 3 m high by 4.6 m wide with a pass and gate lifting apparatus as well as two stoplog checks.

Figure 1.2: Current Facilities, Hound Chute GS

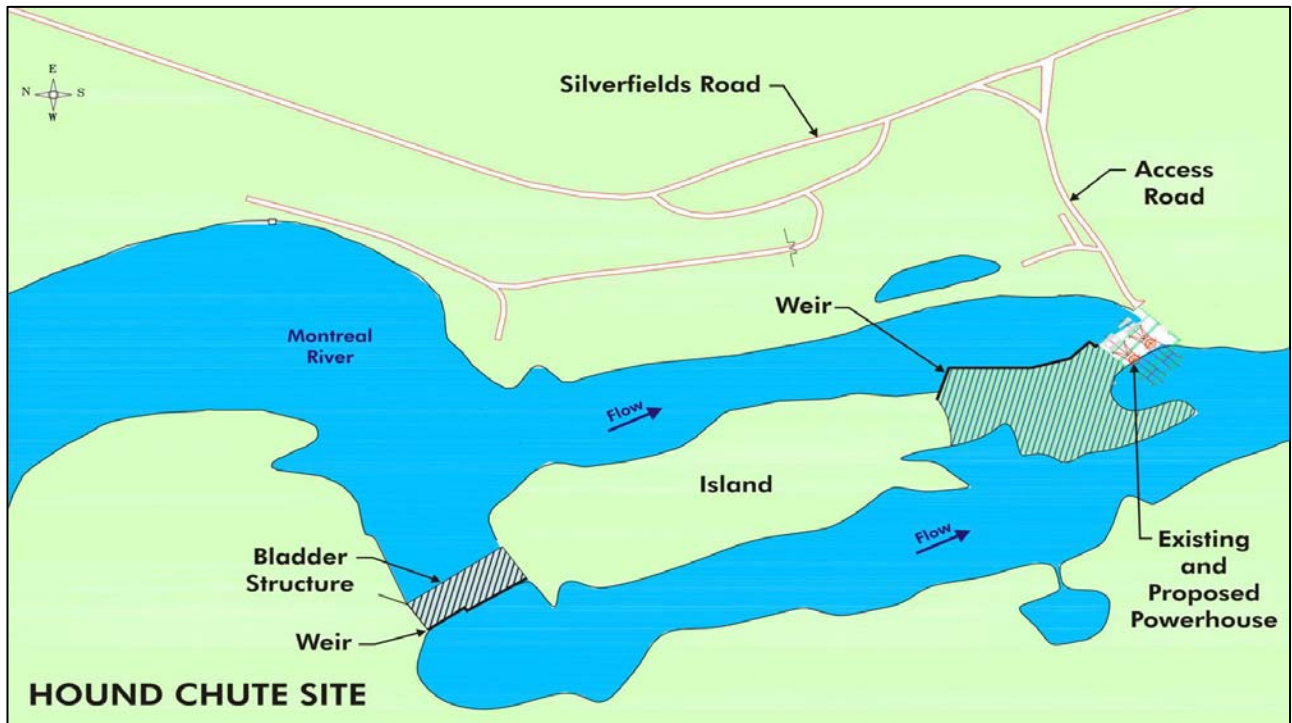
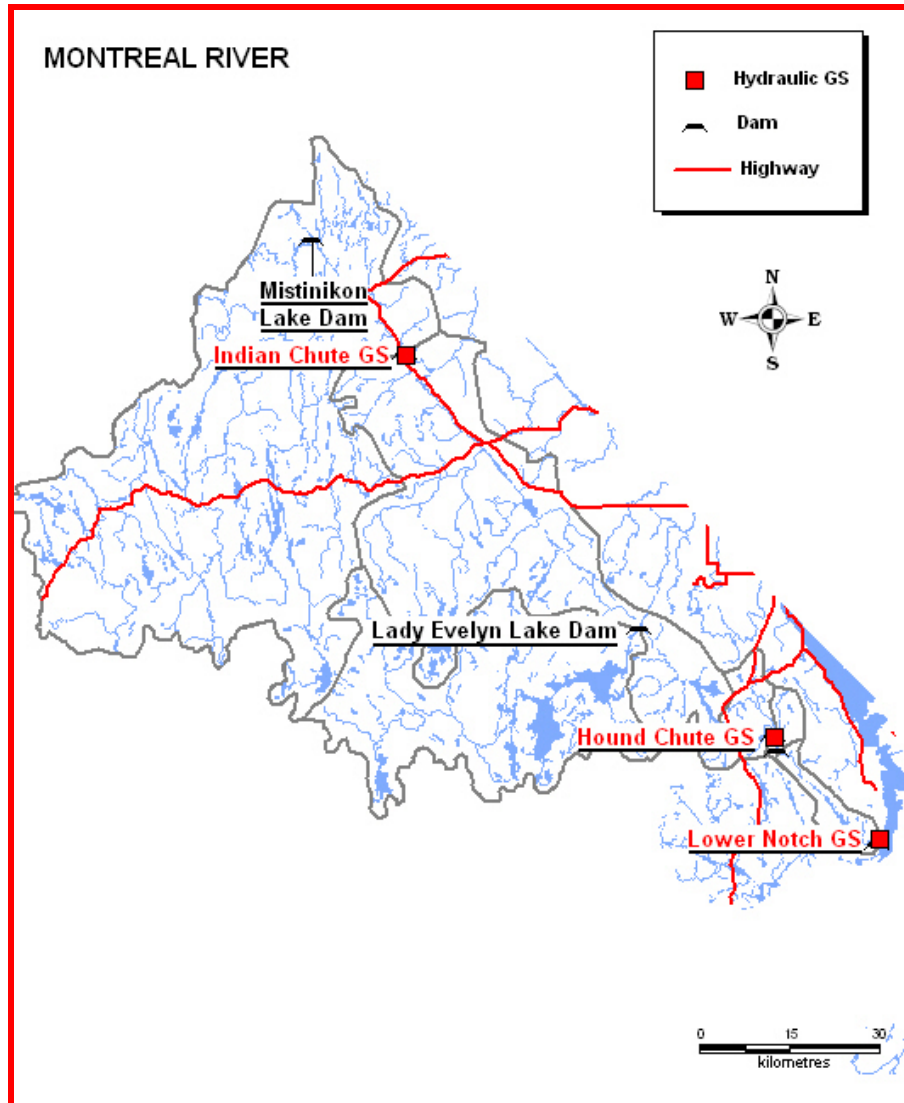


Figure 1.3: Montreal River Watershed and OPG Facilities



### Proposed Facilities

The proposed Hound Chute GS is planned to be located on the same footprint as the existing powerhouse and will consist of two units with a total expected nameplate capacity of approximately 9.5 MW. The existing powerhouse will be demolished followed by the construction of the new facility.

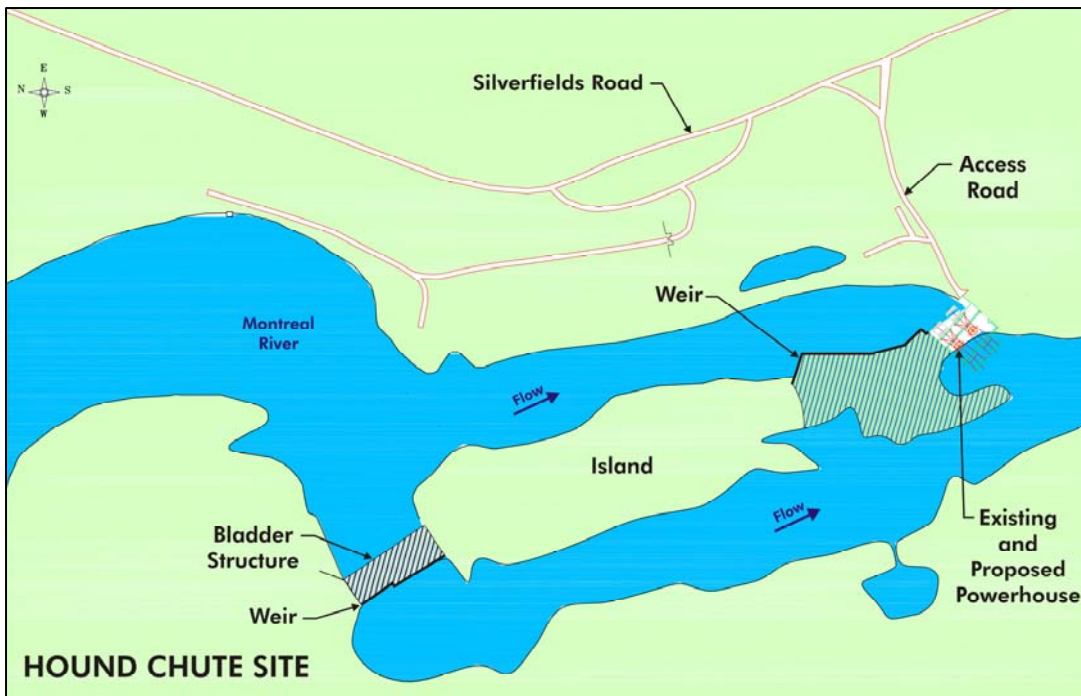
Water would continue to be conveyed from the forebay along the existing canal into a direct intake in the new powerhouse.

A small amount of excavation and slope stabilization will be required for the new powerhouse foundation and underground tailrace canal. Geotechnical studies at the new powerhouse site and the nearshore of the new tailrace outlet location have been undertaken and the rock is not acid generating (Martin, 2006).

A cofferdam is being proposed at the inlet of the forebay for a number of reasons. First, there is an existing submerged structure (remains of a former bridge) located in this area which can be utilized for cofferdam construction. Second, having the cofferdam in this location will allow for equipment and materials to be more easily transported to the island for the planned rehabilitation and modification work on the western channel weir. This will result in less impact to the trees and vegetation on the island. Third, it is recommended that upon construction completion, the cofferdam and submerged structural material be removed resulting in improved flow of water to the powerhouse. This cofferdam would likely be in place for 12 to 14 months and will result in a dewatered area of 13,900 m<sup>2</sup> (1.4 ha).

The cofferdam on the downstream side of the powerhouse is likely to be in place for 12 to 14 months as well and result in an area to be dewatered of approximately 1,000 m<sup>2</sup> (0.1 ha).

**Figure 1.4: Proposed Facilities and Cofferdam Locations, Hound Chute GS**



The submerged structure is visible at low water levels as indicated in Photograph 1.2.

**Photograph 1.2: Existing Submerged Structure at Low Water Levels, Hound Chute GS Forebay Inlet**



Refurbishments to the wing wall will be required and can be done in the dry while the powerhouse is being constructed.

The dam with flash boards on the western channel will also require rehabilitation and modifications. At this point it is not known whether a cofferdam will be required to refurbish this structure or whether this can occur in the wet. The need for this cofferdam will not be certain until a Design-Build-Contractor (DBC) is retained by OPG and this selection will not occur until 2007. While the cofferdam is an uncertainty, it is taken into account in this environmental assessment (EA). If a cofferdam is required, it likely will be in place for 3 to 4 months and the Department of Fisheries and Oceans (DFO) will be consulted. Should a cofferdam be required at this location it will be installed at the beginning of construction, with all the water in the river channelled through the forebay and powerhouse, and over the wing-wall weir. Once this dam is refurbished the water in the river will be directed down the western channel while the cofferdam at the forebay neck is built and subsequently the powerhouse constructed.

A new electrical substation will be built. The proposed facility will be connected to the existing 44-kV feeder.

Table 1.1 provides a summary of the existing and proposed plant operating characteristics. The gross head, i.e., the difference in elevation between the water surface at the intake and tailrace, will remain the same. However, the rated flow through the Hound Chute GS will increase from 57 to 105 m<sup>3</sup>/s, decreasing the frequency of spill over the Obermeyer (bladder type) weir from 40% to 20% of the time.

**Table 1.1: Existing and Proposed Plant Operational Summary**

Parameter	Hound Chute GS	
	Existing	Proposed
Number of Units	4	2
Capacity (MW)	3.6	9.5
Annual Energy Production (GWh)	26.2	50
Gross Head (m)	10.3	10.3
Rated Flow (m <sup>3</sup> /s)	57	105
Capacity Factor (%) <sup>1</sup>	74.0	55.0

<sup>1</sup> Ratio of the actual energy produced to the maximum energy which could be delivered under continuous operation at maximum rating.

## 1.2 DESCRIPTION OF THE STUDY AREAS

The Hound Chute GS is located on the Montreal River straddling the townships of Latchford and Coleman in the District of Timiskaming, approximately 10 km southwest of the Town of Cobalt. The location of the site is shown on Figure 1.1.

In the baseline description of the terrestrial environment, reference will be made to regional, local and site-specific study areas. These study areas are defined as follows.

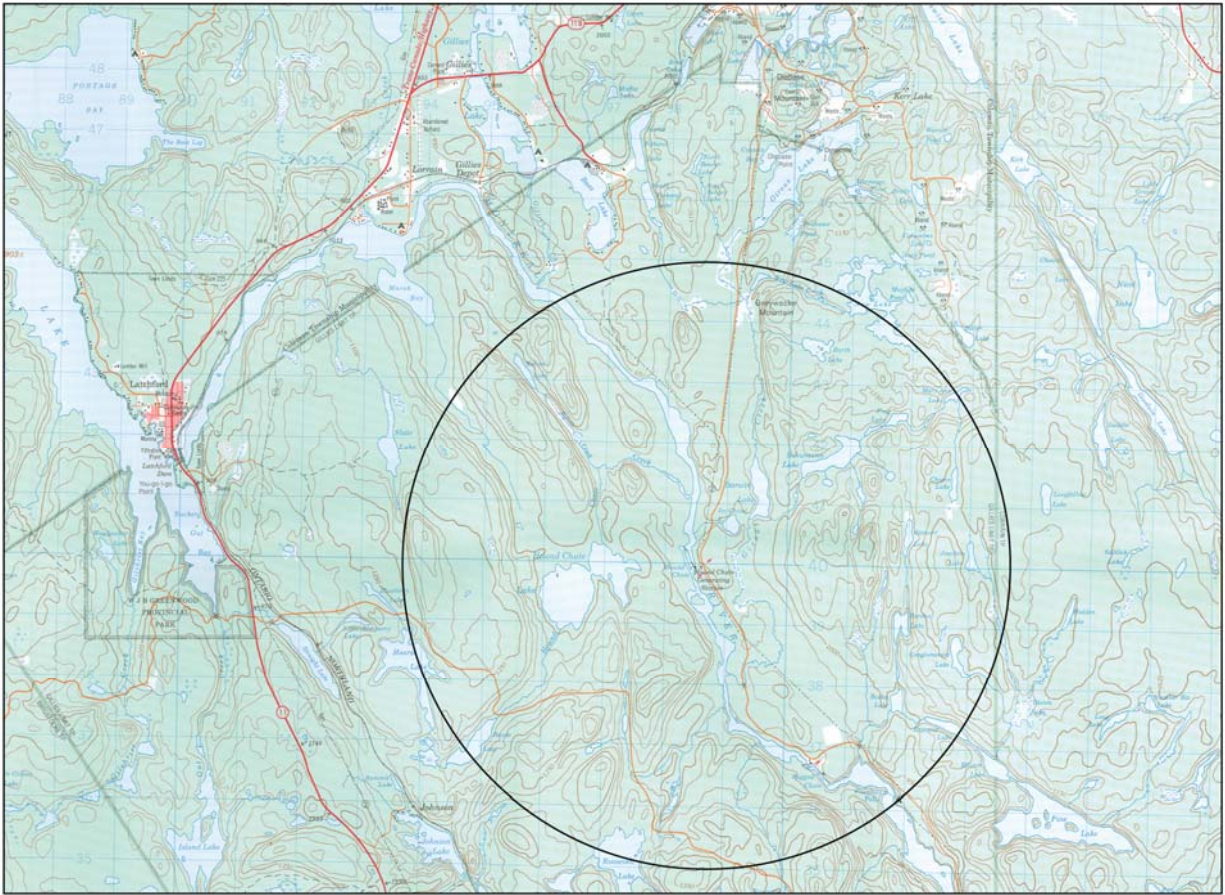
### Regional Study Area

The regional setting is generally defined by the Montreal River Drainage Basin (see Figure 1.3) and Lake Timiskaming. The regional setting provides for the baseline description of climate, geology, physiography and land uses.

### Local Study Area

The local study area is centred on the proposed Hound Chute GS redevelopment site extending 5 km in radius (Figure 1.5). The local setting encompasses the area possibly affected by the construction and operation of the proposed undertaking, and provides for the environmental baseline description of soils, vegetation, wildlife and environmentally sensitive areas.

**Figure 1.5: Local Study Area**



Site-Specific Study Area

The site-specific study area includes those areas on the Hound Chute GS property that will be affected by the proposed redevelopment.

**1.3 STUDY APPROACH**

The baseline setting for the terrestrial environment was prepared based on literature review and personal contacts. Environmental baseline conditions have been recently summarized by OPG *et al.* (2004). This information was augmented and updated by data requested from the MNR and the Ontario Ministry of the Environment (MOE). Moreover, a site-specific study has been undertaken addressing terrestrial vegetation communities.

This technical supporting document addresses the terrestrial environment to be affected by the construction and operation of the proposed Hound Chute GS redevelopment. Other technical supporting documents address the aquatic environment, archaeology, socio-economics, First Nation consultation and public consultation.

## **1.4 STRUCTURE OF REPORT**

This report was prepared by Environment & Energy Limited (EEL) as a Technical Support Document to the Environmental Report (ER) (SENES, 2006). The ER provides a description of the proposed undertaking, summarizes the overall baseline environmental setting and anticipated environmental effects, recommends appropriate mitigative measures to minimize or obviate these effects, and describes agency, public and First Nation consultation.

This Supporting Document is organized into four chapters:

- Chapter 1.0 **Introduction** – provides a description of the project, a description of the study area and the study approach;
- Chapter 2.0 **Baseline Terrestrial Environment Conditions** – describes the baseline terrestrial environment conditions in the study area;
- Chapter 3.0 **Impact Assessment and Mitigative Measures** – details the assessment of terrestrial environment effects, presents mitigative measures to minimize or obviate these effects and delineates the net effects; and
- Chapter 4.0 **Summary and Conclusions** – summarizes the potential effects and recommended mitigative/remedial measures.

## 2.0 BASELINE TERRESTRIAL ENVIRONMENTAL CONDITIONS

### 2.1 CLIMATIC CONDITIONS

The climate of this region of northeastern Ontario is classified as modified continental, moderated by the Great Lakes (Lake Huron and Georgian Bay) to the south and, to a lesser extent, by Lake Temagami to the south and Hudson Bay to the north (Chapman and Thomas, 1968). The modified continental climate is characterized by short, warm summers and long, cold winters, with moderate precipitation. In summer, warm humid air masses from the south alternate with cooler, drier air masses from the north to produce periods of clear, dry weather followed again by warm, humid weather. Winters are characterized by snow squalls and high winds alternating with clear, cold, dry weather.

The Hound Chute GS is situated within the Timiskaming Climatic Region (Chapman and Thomas, 1968). A summary of pertinent climatic and related growing season data for this region is given in Table 2.1. Due to the relatively strong influence of Arctic air masses and the cool temperatures they bring, the growing season of the Timiskaming Climatic Region is relatively short, i.e., 172 days.

**Table 2.1: Climatic Data for Timiskaming Climatic Region<sup>1</sup>**

<b>Climatic Parameters</b>	<b>Timiskaming Climatic Region</b>	
Mean Annual Temperature °C (°F)	2.2 (36)	
Mean Daily Temperature °C (°F)	<u>Minimum</u>	<u>Maximum</u>
January	-22.2 (-8)	-7.8 (18)
April	-4.4 (24)	7.8 (46)
July	11.7 (53)	25.0 (77)
October	0.6 (33)	11.1 (52)
Mean Date of Last Spring Frost	10 June	
Mean Date of First Fall Frost	13 September	
Mean Annual Frost-Free Days	96	
Mean Start of Growing Season	27 April	
Mean End of Growing Season	15 October	
Annual Length of Growing Season (Days)	172	
Mean Annual Growing Degree Days (°F)	2,600	
Mean Annual Freezing Degree Days (°F)	2,700	
Mean Annual Precipitation - mm (inch)	813 (32)	
Mean May to September Precipitation - mm (inch)	406 (16)	
Mean Annual Snowfall - mm (inch)	2,159 (85)	

<sup>1</sup> Source: Chapman and Thomas (1968).

Based on the Ecoclimatic Region classification system (Ecoregions Working Group, 1989), the proposed undertaking occurs within the Humid Low-Boreal Ecoclimatic Region of the Boreal Ecoclimatic Province. In this Ecoclimatic Region, summers are warm and winters are cold. Mean daily temperatures greater than 0°C last for approximately seven months, although frosts are common except from May to mid-September. Monthly precipitation ranges from 50 to 100 mm, with maximum amounts occurring during the summer months. Mean annual precipitation is about 800 mm.

Mean daily temperatures by month for the meteorological stations located in Ville Marie and Earlton Airport are presented in Table 2.2. The annual mean temperatures are 2.8°C and 2.3°C, respectively. The mean annual precipitation at the meteorological stations in Ville Marie, Englehart and Earlton Airport are 819.5, 855.6 and 785.1 mm, respectively (see Table 2.2). In general, precipitation is uniformly distributed throughout the year with no pronounced wet or dry seasons. Highest mean monthly precipitation (88.0 mm) in Ville Marie occurs in August, whereas in Englehart and at Earlton Airport highest mean monthly precipitation (96.5 and 88.7 mm, respectively) occurs in September. Highest average monthly snow depths (32 and 52 cm) in Ville Marie and at Earlton Airport, respectively, occur in February.

The mean frost-free period is 106 days (Table 2.3). The occurrence of frost is quite variable, depending on weather and local differences in vegetation, soil types, proximity to watercourses and topography. Frozen ground conditions usually occur between early December and early April.

The prevailing winds in the North Bay area, approximately 100 km south of the Hound Chute GS, usually have a southwesterly component (see Table 2.2). The annual maximum hourly wind speeds with 1:10, 1:30 and 1:100 probabilities of exceedance are 75.6, 86.4 and 97.2 km/h, respectively in Englehart; 79.2, 86.4 and 93.6 km/h, respectively, in Ville Marie; and 79.2, 90 and 100.8 km/h, respectively, in Earlton (ACNBC, 1980).

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**Table 2.2: Mean Temperature and Precipitation Data, 1971-2000<sup>1</sup>**

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual
<b>Ville Marie<sup>2</sup></b>													
Temperature (°C)	-15.2	-13.5	-6.5	2.6	10.4	15.5	18.2	17.0	11.9	5.7	-2.0	-10.5	2.8
Rainfall (mm)	10.0	4.1	18.7	46.7	73.9	87.0	87.1	88.0	87.4	74.9	37.3	10.0	625.1
Snowfall (cm)	41.2	33.1	33.1	13.0	0.2	0.1	0.0	0.0	0.1	3.5	27.1	43.2	194.6
Total precipitation (mm)	51.1	37.2	51.8	59.7	74.1	87.1	87.1	88.0	87.5	78.4	64.3	53.2	819.5
Days with precipitation <sup>3</sup>	13	10	11	12	12	14	13	13	15	15	14	14	156
Average snow depth (cm)	23	32	28	4	0	0	0	0	0	0	3	12	9
<b>Englehart<sup>4</sup></b>													
Rainfall (mm)	3.2	3.7	20.5	41.5	73.1	80.7	87.5	86.2	95.9	67.9	32.8	7.6	600.5
Snowfall (cm)	58.5	43.8	39.2	18.6	1.2	0.1	0.0	0.0	0.6	4.7	31.7	56.7	255.1
Total precipitation (mm)	61.7	47.4	59.7	60.1	74.3	80.8	87.5	86.2	96.5	72.6	64.5	64.3	855.6
Days with precipitation	11	9	9	9	10	12	12	12	13	13	11	12	132
<b>Earlton Airport<sup>5</sup></b>													
Temperature (°C)	-16.4	-13.8	-6.9	2.2	10.5	15.4	18.1	16.6	11.2	4.9	-2.9	-12.1	2.3
Rainfall (mm)	4.4	3.1	19.7	35.9	64.8	76.8	79.7	80.9	88.4	64.1	28.4	7.6	553.9
Snowfall (cm)	54.1	39.5	40.9	20.3	2.2	0.3	0.0	0.0	0.3	5.6	33.0	50.9	247.1
Total precipitation (mm)	54.0	39.8	59.1	55.5	67.0	77.1	79.7	80.9	88.7	69.4	60.1	53.9	785.1
Days with precipitation	18	13	13	11	12	13	14	12	14	15	17	18	169
Average snow depth (cm)	41	52	39	8	0	0	0	0	0	0	4	19	14
<b>North Bay Airport<sup>6</sup></b>													
Average Wind Speed	13.6	13.6	14.8	14.8	13.5	12.2	11.5	10.7	11.8	13.1	13.9	13.2	13.1
Most Frequent Direction	SW	N	N	N	SW	SW	SW	SW	SW	SW	SW	E	SW

<sup>1</sup> Source: [www.climate.weatheroffice.ec.gc.ca/climate\\_normals](http://www.climate.weatheroffice.ec.gc.ca/climate_normals)

<sup>2</sup> Latitude: 47°21'N; Longitude: 79°25'W; Elevation: 213.00 m.

<sup>3</sup> ≥0.2 mm.

<sup>4</sup> Latitude: 47°49'N; Longitude: 79°54'W; Elevation: 251.50 m.

<sup>5</sup> Latitude: 47°42'W; Longitude: 79°51'W; Elevation: 243.20 m.

<sup>6</sup> Latitude: 46°21'W; Longitude: 79°25'W; Elevation: 370.30 m.

**Table 2.3: Frost Data, 1951-1980<sup>1</sup>**

Parameter	Ville Marie <sup>2</sup>	Earlton Airport <sup>3</sup>
Mean Frost-Free Period (Days)	95	102
Average Last Frost (Spring)	06 June	31 May
Average First Frost (Fall)	10 September	11 September
Earliest Last Frost (Spring)	10 May	06 May
Latest Last Frost (Spring)	02 June	14 June
Earliest First Frost (Fall)	30 July	19 August
Latest First Frost (Fall)	05 October	04 October
Longest Frost-Free Period (Days)	139	134
Shortest Frost-Free Period (Days)	41	53

<sup>1</sup> Source: AES (1982).

<sup>2</sup> Based on minimum of 28 years of data.

<sup>3</sup> Based on minimum of 32 years of data.

## **2.2 GEOLOGY AND SOILS**

### **2.2.1 Geology**

From a geological standpoint, the proposed undertaking occurs within the Cobalt Plate Subprovince of the Superior Province of the Canadian Shield (Stockwell *et al.*, 1970). This area is characterized by low hummocky terrain controlled by flat-lying Precambrian sedimentary bedrock. Diabase ridges crosscut the sedimentary rocks, forming local relief of 150 to 180 m above the lowlands (Thurston, 1992).

The area around the Hound Chute GS is underlain by bedrock of the Precambrian Shield, specifically Middle Precambrian sedimentary rocks of the Cobalt Group of the Huronian Supergroup (Bennett *et al.*, 1992). The Cobalt Embayment is composed of sedimentary and volcanic rocks which underwent low-grade metamorphism during the Penokean Orogeny between 1.9 to 1.7 billion years ago. The Lorrain Formation, which underlies large areas of the Cobalt Embayment, is composed of arkose and quartz arenite and conformably overlies the Gowganda Formation. The Gowganda Formation consists of a diverse sequence of clast and matrix supported conglomerate, pebbly wacke, siltstone, mud and sandstone. Rock of the Gowganda Formation, consisting mostly of metamorphosed conglomeritic greywacke, is present at the Hound Chute GS site (Gartner Lee, 2001).

As indicated in Section 1.1, bedrock on the Hound Chute GS property has a low potential for acid rock drainage (Martin, 2006). Based on modified acid base accounting analyses, all rock samples tested had a low potential for acid rock drainage (ARD). Acid potential (AP) is calculated from sulphide sulphur content. The sulphide sulphur ranged from 0.07 to 0.12%. A sulphide sulphur level of less than 0.3% is used as a guideline by Price (1997) as having low potential for ARD, unless the rock has elevated metal levels and/or the levels of neutralizing potential (NP) are low. The NP/AP ratio is commonly used to assess the potential for ARD. Based on this ratio, the rock samples had negligible to low potential for ARD.

The potential for seismic activity at the proposed undertaking is low (ACNBC, 1980) as this area is located well within the North American continental plate. Areas at risk of seismic activity are traditionally located at continental plate margins, or in zones of active continental rifting or other deep-seated crustal disturbance. The geological record of this area is marked by ancient events of this nature, as represented in part by ancient regional faults. This type of activity, however, has not occurred within geologically recent time. Any seismic activity that may occur in this area is likely to be minor in nature and be related to crustal adjustments arising from isostatic rebound.

### **2.2.2 Physiography**

From a physiographic standpoint, the proposed undertaking occurs within the Abitibi Upland Subregion of the James Bay Physiographic Region (Bostock, 1970). In this area, the peneplained landscape typical of the Shield is modified by variable, and in some areas considerable, thicknesses of Quaternary glacial sediments, as well as by recent organic surficial materials. These sediments tend to obscure the already low relief of the underlying bedrock. The dominant physiographic feature is the New Liskeard Lowlands, which is a major fault-controlled plain trending northwest. The eastern part of the lowland is nearly flat and underlain by glaciolacustrine clay beds deposited by proglacial lakes during the waning of Quaternary glaciation, among them glacial Lake Barlow-Ojibway, forming the Little (Temiskaming) Clay Belt. Some parts of this clay plain are extensively gullied, and long, low linear scarps and indistinct beaches are common in clay watercourse valleys. A large section of the Montreal River follows a natural fault line (Montreal River Fault) running along the southwestern edges of the Little Clay Belt (OPG *et al.*, 2004). Extensive organic terrain occurs in flat, poorly drained areas of the plain.

Overburden on the Hound Chute GS property consists of a shallow layer of sandy or silty till, about 1.5 m thick, of glaciofluvial outwash origin (Gartner Lee, 2001).

### **2.2.3 Soils**

In the Little Clay Belt, gleysolic soils occur on poorly-drained sites, whereas grey wooded or podzolic soils are present on well- and imperfectly-drained sites (Webber and Hoffman, 1967). Extensive organic soil deposits also occur in this area.

Soils on the Hound Chute GS property and surrounding lands consist of the Temiskaming Complex, composed of Haileybury, Hanbury, New Liskeard and Milberta mineral soils, as well as organic soils and rock outcrop (Gillespie *et al.*, 1990). The Haileybury clay, silty clay and silty

clay loam soils are classified as Orthic Gray Luvisols. They are well-drained soils developed on varved lacustrine clays, with a clay content often higher than 60%. Because they occur on steeply rolling terrain, Haileybury soils are highly susceptible to erosion. The texture of the Hanbury soils, classified as Gleyed Gray Luvisols, ranges from silty clay loam to heavy clay, with a clay-stoney phase present in areas of stones and boulders. These imperfectly drained soils have developed on gently rolling, dissected, varved clays. Hanbury soils are susceptible to erosion and may suffer from poor surface physical condition. New Liskeard soils, classified as Orthic Humic Gleysols, are poorly drained clay, silty clay loam and clay-stoney phase soils developed on varved, calcareous, lacustrine clay. They occupy areas of flat terrain. Milberta soils, classified as Orthic Humic Gleysols, consist of organic material (up to 40 cm thick) over calcareous lacustrine clay. These very poorly drained soils developed in calcareous, varved, lacustrine clay occur in association with the New Liskeard soils, or on the periphery of deep organic soils. Overall, soils of the Timiskaming Complex are exceedingly stony. Topography ranges from undulating to gently to steeply rolling to hilly.

Agricultural land use in this area is only of local importance. The cold, moist climate limits the range of crops that can be grown and reduces productivity. The Canada Land Inventory (CLI, 1973a) has categorized the soils around the section of the Montreal River from Lake Timiskaming to Bay Lake upstream of Latchford as Class 7 with no capability for arable culture or permanent pasture due to stoniness and shallowness (<1 m) to solid bedrock.

The soils of the Little Clay Belt in the New Liskeard/Earlton area are classified as Class 2, 3, 4, 5 or 6 with limitations primarily due to adverse climate, low fertility, low moisture-holding capacity and/or excess water. The Class 2, 3 and 4 soils have moderate, moderately severe and severe limitations, respectively, that restrict the range of crops and/or require special conservation practices. Class 5 soils have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible. Class 6 soils are capable only of producing perennial forage crops, and improvement practices are not feasible.

Based on a Phase I Environmental Site Assessment, Gartner Lee (2001) observed oil stains at the base of the transformers in the distribution station yard, as well as in the oil storage shed. Spill containment is not provided in the yard or shed. Absorbent pads observed beneath some of the transformers appeared to be saturated. In addition, there is a potential for environmental issues associated with past applications of herbicides and oil to gravel cover and cinder storage areas on the Hound Chute GS property, as well as past herbicide applications on the adjacent Hydro One transmission corridor.

### **2.3 VEGETATION**

The proposed Hound Chute redevelopment site is located in the Temagami Forest Section of the Great Lakes-Saint Lawrence River Lowlands Forest Region (Rowe, 1972). The mixedwoods forest of the Great Lakes-Saint Lawrence Forest Region is a transitional type between the southern hardwood forests and the northern coniferous forests. It is characterized by the occurrence of eastern white pine (*Pinus strobus*), red pine (*Pinus resinosa*), eastern hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*), in association with a number of dominant broadleaved species such as sugar maple (*Acer saccharum*), red maple

(*Acer rubrum*), red oak (*Quercus borealis*), basswood (*Tilia americana*) and white elm (*Ulmus americana*). Other wide-ranging species are eastern white cedar (*Thuja occidentalis*) and large-toothed aspen (*Populus grandidentata*). Boreal species such as white spruce (*Picea glauca*), black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), jack pine (*Picea banksiana*), trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*) and white birch (*Betula papyrifera*), are intermixed and, in certain areas, red spruce (*Picea rubens*) becomes abundant.

Eastern white pine with scattered white spruce and white birch is a typical forest community in the Temagami Forest Section. Another common though variable association includes a mixture of white birch, eastern white pine and white spruce, with balsam fir, trembling aspen and large-toothed aspen. Red pine occurs along ridges, whereas jack pine is confined to dry, rocky sites. The tolerant hardwood species, yellow birch and sugar maple, have only a scattered occurrence. The presence of sandy soils has favoured the occurrence of white pine, red pine and jack pine in upland locations. The poorly-drained swamp lowlands are characterized by communities of black spruce, tamarack (*Larix laricina*) and eastern white cedar (Rowe, 1972).

Vegetation along the Montreal River shoreline varies but consists primarily of trembling aspen, balsam poplar, white birch, balsam fir, black spruce, white spruce, jack pine, red pine, white pine, white cedar, tamarack, speckled alder (*Alnus rugosa*), willow (*Salix* spp.), choke cherry (*Prunus virginiana*), pin cherry (*Prunus pensylvanica*), mountain maple (*Acer spicatum*), beaked hazel (*Corylus cornuta*), black ash (*Fraxinus nigra*) and alternate-leaved dogwood (*Cornus alternifolia*) (OPG *et al.*, 2004).

The Montreal River system is located within the Ontario Shield Ecozone and includes Ecoregions/Ecodistricts 3E-4 and 4E-4 (OPG *et al.*, 2004).

The CLI (1975) has categorized the lands on the west side of the Montreal River downstream of the Hound Chute GS as 20% Class 4, 50% Class 5 and 30% Class 6. The Class 4 lands have moderately severe limitations to the growth of commercial forests, whereas both the Class 5 and 6 lands have severe limitations, due to low soil fertility and restriction of rooting zone by bedrock. Lands on the east side of the river downstream of the Hound Chute GS are 30% Class 4 and 70% Class 6 with limitations of low soil fertility, rooting zone restriction by bedrock and/or soil moisture deficiency. At the Montreal River outlet, the lands are classified as 80% Class 4 again with limitations of low fertility, bedrock rooting zone restriction and deficient soil moisture, as well as 20% Class 6 limited by rooting zone restriction by dense or consolidated layers, other than bedrock and excess soil moisture. On the west side of the Montreal River upstream of the Hound Chute GS to Bay Lake upstream of Latchford, the lands are 90% Class 4 and 10% Class 6 limited by low fertility and bedrock rooting zone restriction. On the east side from the Hound Chute GS upstream to just west of Lorrain, the lands are categorized as 40% Class 4 due to low fertility and deficient soil moisture, 50% Class 5 due to deficient soil moisture and bedrock rooting zone restriction and 10% Class 5 due to low fertility and excess soil moisture. Further upstream to just west of Bay Lake, the lands are 10% Class 4 and 90% Class 5 with limitations of low fertility, bedrock rooting zone restriction and/or soil moisture deficiency.

### **2.3.1 Site-specific Vegetation Communities**

As the proposed powerhouse will be located on the existing Hound Chute GS site, the permanent displacement of vegetation and trees due to project construction will be minimal. However, additional areas beyond the existing parking lots will be needed as construction laydown areas. Photograph 2.1 depicts the proposed laydown area along Silverfields Road. An existing flat meadow area perimetered by an access road is located just north of the access road to the GS.

A small northern section of the island will be partially cleared to allow for refurbishment of the western channel weir. This area of the island has already been impacted by previous construction activities (see Photograph 2.2). A cofferdam is being proposed at the inlet of the forebay to take advantage of the presence of a submerged structure, facilitating the transport of equipment and materials for refurbishment of the weir. Photograph 2.3 depicts alder present on the shoreline adjacent to the submerged structure.

#### **Photograph 2.1: Proposed Staging Area Along Silverfields Road**



**Photograph 2.2: Typical Island Vegetation Communities**



**Photograph 2.3: Alder at Shoreline Adjacent to Submerged Structure  
(marked by orange flagging sticks)**



An area along an existing road that leads to the submerged structure will also likely need to be enlarged. The area is dominated by balsam poplar and alder (see Photograph 2.4).

**Photograph 2.4: Existing Road Area to be Enlarged**



A field survey was undertaken on 24 August 2006 to identify the vegetation communities and inventory the flora at the locations to be affected by construction activities. Community type designations were based on Ontario Ecological Land Classification (ELC) methodology (Lee *et al.*, 1998).

As indicated above, a number of open areas characterized as Cultural Meadow (CUM) will be used during construction for the layout of material and assembly of the proposed GS. These areas are situated near the existing GS but upland along Silverfields Road, as well as on bottomland along the Montreal River (i.e., along the driveway down from Silverfields Road). The areas along Silverfields Road are dominated by blue grasses, particularly bushy pasture spear grass (*Poa saltuensis*). Plant species observed within the grasses were all components of the surrounding forest. Common young tree species included white birch and trembling aspen. Large individual trees are grouped over the meadows, including a few white pine, white birch and white spruce. Among the shrub species, green alder (*Alnus viridis crispa*), red-osier dogwood (*Cornus stolonifera*), low sweet blueberry (*Vaccinium angustifolium*) and wild red raspberry (*Rubus idaeus melanolasius*) were common, forming small stands.

Along the Montreal River, the area east of the island (along the driveway down from Silverfields Road) contained the same CUM species described above for Silverfields Road. In addition, riparian plant species occurred in the meadow and along the shoreline. The shrubs included common blackberry (*Rubus allegheniensis*), slender willow (*Salix petiolaris*) and sweet gale

(*Myrica gale*). The herbs, which were adapted for wet terrains, included dark-green bulrush (*Scirpus atrovirens*), spotted joe-pye weed (*Eupatorium maculatum*) and a few grasses (*Carex* spp.). A driveway currently exists in this area but is likely to be expanded to facilitate construction.

The island upstream of Hound Chute GS is approximately 100 m wide by 400 m long. It is forested with a foot trail crossing along its major axis from the south dam to the north dam. As indicated above, a small open area of approximately 1,000 m<sup>2</sup> is present adjacent to the north dam containing debris, concrete and planks from previous construction activities. It is proposed that this open area be used during north dam reconstruction for the lay out of material and construction assembly.

The island vegetation is categorized as mature Mixed Forest (FOM). The dominant tree species are white spruce and white cedar, with white pine as the sub-dominant species. The shrub layer is comprised of numerous species due to the large amount of light that penetrates through the large trees and the surrounding river. The most abundant shrub species include green alder, bush honeysuckle (*Diervilla lonicera*), red-osier dogwood, low sweet blueberry and wild red raspberry. The ground layer is characterized by such species as wild sarsaparilla (*Aralia nudicaulis*), large-leaved aster (*Aster macrophyllus*), bunchberry (*Cornus canadensis*) and blue bead lily (*Clintonia borealis*).

Table 2.4 lists the 74 plant taxa (72 species) identified at the locations to be affected by construction activities.

Of the 72 species that could be ranked, 64 were S5, i.e., very common in Ontario and demonstrably secure (NHIC, 2006a). The remaining eight species were SE, i.e., exotic, not believed to be a native component of Ontario's flora. The percentage of exotic species (11%) was below the general proportion of non-native plants in the province, estimated around 28% (e.g., Kaiser, 1983).

**Table 2.4: List of Plants Observed at the Hound Chute GS Redevelopment Site**

Scientific Name <sup>1</sup>	Common Name <sup>1</sup>	Provincial Status <sup>2</sup>	Location <sup>3</sup>
<b>Trees</b>			
<i>Abies balsamea</i>	Balsam fir	S5	I, M
<i>Acer rubrum</i>	Red maple	S5	I, M
<i>Betula papyrifera</i>	White birch	S5	I, M
<i>Crataegus</i> sp.	Hawthorn	- <sup>4</sup>	I, M
<i>Picea glauca</i>	White spruce	S5	I, M
<i>P. mariana</i>	Black spruce	S5	I, M
<i>Pinus resinosa</i>	Red pine	S5	M
<i>P. strobus</i>	White pine	S5	I, M
<i>Populus grandidentata</i>	Large-tooth aspen	S5	I
<i>P. tremuloides</i>	Trembling aspen	S5	I, M
<i>Prunus serotina</i>	Rum cherry	S5	M
<i>Thuja occidentalis</i>	White cedar	S5	I, M
<b>Shrubs</b>			
<i>Acer spicatum</i>	Mountain maple	S5	I
<i>Alnus incana rugosa</i>	Specked alder	S5	M
<i>A. viridis crispa</i>	Green alder	S5	I, M
<i>Amerlanchier sanguinea</i>	Red-twiggged serviceberry	S5	I, M
<i>Cardamine concatenata</i>	Cut-leaved toothwort	S5	I
<i>C. diphylla</i>	Broad-leaved toothwort	S5	I
<i>Cornus stolonifera</i>	Red-osier dogwood	S5	I, M
<i>Diervilla lonicera</i>	Bush honeysuckle	S5	I
<i>Epigaea repens</i>	Trailing arbus	S5	I
<i>Juniperus communis</i>	Common juniper	S5	M
<i>Linnaea borealis</i>	Twinflower	S5	I
<i>Lonicera canadensis</i>	Fly honeysuckle	S5	I
<i>Myrica gale</i>	Sweet gale	S5	I, M
<i>Prunus pensylvanica</i>	Pincherry	S5	I
<i>Rosa acicularis sayi</i>	Prickly wild rose	S5	I, M
<i>Rubus idaeus melanolasius</i>	Wild red raspberry	S5	I, M
<i>R. pubescens</i>	Dwarf raspberry	S5	I, M
<i>Salix discolor</i>	Pussy willow	S5	I, M
<i>S. petiolaris</i>	Slender willow	S5	M
<i>Sorbus decora</i>	Showy mountain ash	S5	I, M
<i>Vaccinium angustifolium</i>	Low sweet blueberry	S5	I, M
<i>V. myrtilloides</i>	Velvet-leaf blueberry	S5	I, M
<b>Herbs</b>			
<i>Achillea millefolium</i>	Yarrow	SE	M
<i>Agrostis gigantea</i>	Black bentgrass	SE	M
<i>Anaphalis margaritacea</i>	Pearly everlasting	S5	M
<i>Apocynum androsaemifolium</i>	Spreading dogbane	S5	M
<i>Aralia nudicaulis</i>	Wild sarsaparilla	S5	I, M
<i>Aster macrophyllus</i>	Large-leaved aster	S5	I, M
<i>A. puniceus</i>	Purple-stemmed aster	S5	M

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Scientific Name <sup>1</sup>	Common Name <sup>1</sup>	Provincial Status <sup>2</sup>	Location <sup>3</sup>
<i>Carex</i> spp.	Sedges	- <sup>4</sup>	M
<i>Chrysanthemum leucanthemum</i>	Ox-eye daisy	S5	M
<i>Clintonia borealis</i>	Blue bead lily	S5	I
<i>Cornus canadensis</i>	Bunchberry	S5	I, M
<i>Elymus repens</i>	Quackgrass	SE	M
<i>Epilobium angustifolium</i>	Fireweed	S5	M
<i>Eupatorium maculatum</i>	Spotted joe-pye weed	S5	I, M
<i>Fragaria virginiana</i>	Common strawberry	S5	I, M
<i>Geum macrophyllum</i>	Large-leaved avens	S5	I, M
<i>Hieracium aurantiacum</i>	Orange hawkweed	SE	M
<i>H. caespitosum</i>	Yellow hawkweed	SE	M
<i>Maianthemum canadense</i>	Canada mayflower	S5	I
<i>Oenothera biennis</i>	Yellow evening primrose	S5	M
<i>Plantago major</i>	Common plantain	S5	I, M
<i>Poa saltuensis</i>	Bushy pasture spear grass	S5	M
<i>Rumex crispus</i>	Curly-leaf dock	SE	M
<i>Scirpus validus</i>	Softstem bulrush	S5	M
<i>Solidago canadensis</i>	Canada goldenrod	S5	M
<i>S. hispida</i>	Goldenrod	S5	M
<i>Taraxacum officinale</i>	Dandelion	S5	I, M
<i>Trifolium pratense</i>	Red clover	S5	I, M
<i>Verbascum thapsus</i>	Common mullein	SE	M
<b>Ferns and Allies</b>			
<i>Equisetum arvense</i>	Field horsetail	S5	I, M
<i>E. fluviatile</i>	Swamp horsetail	S5	I, M
<i>Osmunda claytoniana</i>	Interrupted fern	S5	I
<i>O. regalis</i>	Royal fern	S5	I
<i>Polypodium virginianum</i>	Rock fern	S5	I
<i>Pteridium aquilinum</i>	Bracken fern	S5	I
<b>Mosses</b>			
<i>Polytrichum commune</i>	Common hair cap moss	S5	I
<b>Lichens</b>			
<i>Cladina rangiferina</i>	Grey reindeer lichen	S5	I, M
<i>C. stellaris</i>	Coral lichen	S5	I, M

<sup>1</sup> Scientific and common names according to NHIC (2006a).

<sup>2</sup> NHIC (2006a): S5 = very common in Ontario and demonstrably secure; SE = exotic.

<sup>3</sup> Location: I = island; M = meadow.

<sup>4</sup> Status uncertain as taxonomy only at genus level.

### **2.3.2 Species at Risk**

Undisturbed areas of native vegetation within the local study area have the potential to support plant species which are at risk, i.e., species which are designated with special status under federal and/or provincial legislation. Federally, species at risk are recognized by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2006) and are protected under the *Species At Risk Act*, whereas provincially they are recognized by the Committee on the Status of Species at Risk in Ontario (COSSARO) under the Ontario *Endangered Species Act* and the Species at Risk in Ontario List (MNR, 2006). Species listed in regulation as endangered are afforded protection under the *Endangered Species Act*. The Provincial Policy Statement (OMMAH, 2005) provides protection of significant habitat of species listed by COSSARO (MNR, 2006) as endangered (not in regulation) or threatened. No protection is currently afforded to provincially designated species of special concern.

None of the flora species identified during the field survey are designated as species at risk by COSEWIC (2006) or COSSARO (MNR, 2006). Similarly, based on examination of the MNR Natural Heritage Information Centre (NHIC, 2006a) and the *Species at Risk Act* (SARA) Schedule 1 Species at Risk Web Mapping Application (Environment Canada, CWS, 2004) databases, there are no documented occurrences of species at risk within the local study area.

### **2.4 WETLANDS AND ENVIRONMENTALLY SIGNIFICANT AREAS**

Wetlands and other environmentally sensitive areas provide important habitat for a variety of wildlife and plant species. Further, wetlands provide water storage and control functions which reduce erosion and flooding, and improve water quality. Wetlands also increasingly provide areas for a range of recreational pursuits, including nature appreciation.

The Ontario Government (1992) issued a Wetlands Policy Statement intended to ensure that there will be no net loss of wetland functions of Provincially Significant Wetlands. Recently, the Wetlands Policy Statement was incorporated into the Provincial Policy Statement (OMMAH, 2005). A Provincially Significant Wetland is either a Class 1, 2 or 3 wetland situated south and east of the Canadian Shield, or a wetland in another area of the province that the OMNR has classified as Provincially Significant through an evaluation of biological, social, hydrological and special features of the area. Development and site alteration are not permitted in Provincially Significant Wetlands in Ecoregions 5E, 6E and 7E (OMMAH, 2005). North of Ecoregions 5E, 6E and 7E, development and site alteration are not permitted unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. The Montreal River system is located north of Ecoregions 5E, 6E and 7E.

Areas of Natural and Scientific Interest (ANSIs) and Environmentally Sensitive Areas (ESAs) have been identified by the MNR and conservation authorities, respectively, where it has been determined that the natural landscape and/or its features are in need of protection for heritage appreciation, scientific study or conservation education purposes. Life Science ANSIs are natural areas selected to protect outstanding landscapes, environments and biotic communities. Earth Science ANSIs are geological sites selected to protect outstanding examples of rock types, fossil localities, landform associations and areas containing significant groundwater

resources. ESAs are land and water areas with natural features or ecological functions of such significance as to require their protection or preservation.

Based on examination of the MNR Natural Heritage Information Centre (NHIC, 2006b) database, there are no environmentally significant areas within the 5-km radius local study area.

The Cliff Lake Conservation Reserve is located at the limit of the local study area approximately 5 km south of the proposed Hound Chute GS. The Conservation Reserve occurs within the Matabitchuan River watershed and encompasses a sugar maple/yellow birch Life Science ANSI and the Stoss Moraine Earth Science ANSI.

## **2.5 WILDLIFE**

Most of the land around the Hound Chute GS remains in native vegetation consisting of coniferous species such as eastern white pine, balsam fir and white spruce, as well as deciduous species such as white birch and poplars.

### **2.5.1 Mammals**

The two big game species of significance in northeastern Ontario are moose (*Alces alces*) and black bear (*Ursus americana*). Moose densities were estimated to be 0.35 and 0.23 moose/km<sup>2</sup> in Wildlife Management Units (WMUs) 28 and 40 in 1995-96 and 1996-97, respectively (Bisset *et al.*, 1997). (The Montreal River is the boundary between WMU 28 to the north and WMU 40 to the south). There are no areas of significant moose habitat (e.g., concentration areas, aquatic feeding areas) within the 5-km radius study area.

CLI (1973b) wildlife (ungulates) capability mapping indicates that the local study area lands are classified as Class 4 and Class 5 with moderate and moderately severe limitations, respectively, due to the poor water and soil fertility, soil moisture deficiency and shallow soil depth.

Although population density estimates for black bear in this area are not available, it is considered to be common. The MNR has established Wildlife Management Units (WMUs) across Ontario for the purpose of regulating hunting and more effective wildlife and habitat management. A relatively new development with respect to bear management in Ontario has recently been implemented with the introduction of Bear Management Areas (BMAs). These are areas in which licences to hunt bear are allotted.

The proposed Hound Chute GS redevelopment site is located near the northern extent of white-tailed deer (*Odocoileus virginianus borealis*) distribution. However, deer are becoming more common in this area. No significant deer concentration areas have been identified in the study area.

The small wetlands in the area may provide suitable habitat for a number of aquatic mammals such as beaver, otter and muskrat. Other furbearers that are relatively abundant throughout the area include mink, marten, weasel, fisher, lynx, red fox, coyote, wolf and squirrels. Table 2.5 provides a list of mammals that have reported sightings in the Temagami Planning Area (OPG

et al., 2004). Others species possibly present based on distribution maps are also presented in Table 2.5.

**Table 2.5: Mammal Species with Reported Sightings in the Temagami Planning Area<sup>1</sup>**

Common Name	Scientific Name	Provincial Status <sup>2</sup>
<b>Shrews</b>	<b>Soricidae</b>	
Masked (Common) shrew	<i>Sorex cinereus</i>	S5
Smoky shrew*	<i>S. fumeus</i>	S5
Pygmy shrew*	<i>S. hoyi</i>	S4
Water shrew*	<i>S. palustris</i>	S5
Northern short-tailed shrew*	<i>Blarina brevicauda</i>	S5
<b>Moles</b>	<b>Talpiae</b>	
Star-nosed mole	<i>Condylura cristata</i>	S5
<b>Bats</b>	<b>Vespertilionidae</b>	
Little brown bat	<i>Myotis lucifugus</i>	S5
Northern (Keen's) long-eared bat*	<i>M. septentrionalis</i>	S3?
Big brown bat	<i>Eptesicus fuscus</i>	S5
<b>Rabbits and Hares</b>	<b>Leporidae</b>	
Snowshoe hare	<i>Lepus americanus</i>	S5
<b>Squirrels</b>	<b>Sciuridae</b>	
Red squirrel	<i>Tamiasciurus hudsonicus</i>	S5
Northern flying squirrel	<i>Glaucomys sabrinus</i>	S5
Least chipmunk*	<i>Tamias minimus</i>	S5
Eastern chipmunk	<i>T. striatus</i>	S5
Woodchuck	<i>Marmota monax</i>	S5
<b>Beavers</b>	<b>Castoridae</b>	
Beaver	<i>Castor canadensis</i>	S5
<b>Mice, Rats and Voles</b>	<b>Muridae</b>	
Deer mouse	<i>Peromyscus maniculatus</i>	S5
Gapper's red-backed vole	<i>Clethrionomys gapperi</i>	S5
Heath vole*	<i>Phenacomys intermedius</i>	S4
Rock vole*	<i>Microtus chrotorrhinus</i>	S3S4
Meadow vole	<i>M. pennsylvanicus</i>	S5
Southern bog lemming*	<i>Synaptomys cooperi</i>	S4
House mouse *	<i>Mus musculus</i>	SE
Muskrat	<i>Ondatra zibethicus</i>	S5
<b>Jumping Mice</b>	<b>Dipodidae</b>	
Woodland jumping mouse*	<i>Napaeozapus insignis</i>	S5
Meadow jumping mouse*	<i>Zapus hudsonius</i>	S5

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Common Name	Scientific Name	Provincial Status <sup>2</sup>
<b>New World Porcupine</b> Common porcupine	<b>Erethizontidae</b> <i>Erethizon dorsatum</i>	S5
<b>Dogs</b> Eastern timber wolf <sup>3</sup> Coyote Red fox	<b>Canidae</b> <i>Canis lupus lycaon</i> <i>C. latrans</i> <i>Vulpes vulpes</i>	- S5 S5
<b>Bears</b> Black bear	<b>Ursidae</b> <i>Ursus americanus</i>	S5
<b>Raccoon</b> Raccoon	<b>Procyonidae</b> <i>Procyon lotor</i>	S5
<b>Weasels</b> Northern river otter Striped skunk Mink Long-tailed weasel Least weasel Ermine American marten Fisher	<b>Mustelidae</b> <i>Lutra canadensis</i> <i>Mephitis mephitis</i> <i>Mustela vison</i> <i>M. frenata</i> <i>M. nivalis</i> <i>M. erminea</i> <i>Martes americana</i> <i>M. pennanti</i>	S5 S5 S5 S4 SU S5 S5 S5
<b>Cats</b> Eastern cougar <sup>**4</sup> Lynx Bobcat*	<b>Felidae</b> <i>Felis concolor cougar</i> <i>Lynx canadensis</i> <i>L. rufus cougar</i>	SH S5 S4
<b>Deer</b> Moose White-tailed deer	<b>Cervidae</b> <i>Alces alces</i> <i>Odocoileus virginianus borealis</i>	S5 S5

\* Likely present in the study area based on distribution maps (Dobbyn, 1994).

\*\* The current presence of eastern cougar in Ontario is uncertain (Dobbyn, 1994).

<sup>1</sup> Source: OPG *et al.* (2004).

<sup>2</sup> NHIC (2006a): S5 = very common in Ontario, demonstrably secure; S4 = common in Ontario, apparently secure; S3S4 = rare to common in Ontario; S3? = likely rare to uncommon in Ontario; SE = exotic, not believed to be a native component of Ontario's fauna; SU = unranked; SH = historically known from Ontario, but not verified recently.

<sup>3</sup> Designated as a species of special concern by COSEWIC (2006), as well as by COSSARO (OMNR, 2006), but not listed in regulation under the *Endangered Species Act*.

<sup>4</sup> Designated as an endangered species by COSSARO (MNR, 2006) regulated under the *Endangered Species Act*.

Of the 45 native species listed in Table 2.5, 34 are ranked by the NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure; five are S4, i.e., common in Ontario and apparently secure; one is S3S4, i.e., rare to common in Ontario; one is S3?, i.e., possibly rare to uncommon in Ontario; one is SU, i.e., unranked; and one is SH, i.e., historically known from Ontario, but not verified recently. No ranking is provided for the eastern timber wolf.

## **2.5.2 Terrestrial Avifauna**

The terrestrial birds in the area of the proposed Hound Chute GS redevelopment site tend to be migratory. Very few species reside in the region year-round, e.g., grosbeaks, chickadees, woodpeckers, ravens, jays and grouse.

Table 2.6 lists terrestrial bird species observed in the Temiskaming area. Of the 152 species listed in Table 2.6, 98 are considered by the NHIC (2006a) to be S5, i.e., very common in Ontario and demonstrably secure; three are S4S5, i.e., common to very common in Ontario; 30 are S4, i.e., common in Ontario and apparently secure; five are S3S4, i.e., rare to common in Ontario; four are S2S3, i.e., very rare to uncommon in Ontario; two are S1, i.e., extremely rare in Ontario; six are SZN, i.e., no clearly definable occurrences; and four are SE, i.e., exotic, not believed to be a native component of Ontario's fauna.

Like its vegetation, breeding bird communities of the hemlock and pine forests of the Great Lakes – Saint Lawrence Forest Region are transitional between the boreal and eastern deciduous forests. The most obvious change from the spruce-fir communities to pine-hemlock stands is that the boreal chickadee is replaced by the black-capped chickadee (Erskine, 1977). Ruby-crowned kinglet, Tennessee warbler, Nashville warbler, American redstart, and purple finch are generally absent or at best scarce in hemlock forests. Three species of warbler, i.e., northern parula, black-throated green warbler and black-and-white warbler, first appear in this forest type. The most common birds found in the white spruce forests are black-capped chickadee, red-breasted nuthatch, Blackburnian warbler, pine warbler and ovenbird. In pine forests, the dark-eyed junco, the common sparrow of boreal habitats, is replaced by chipping sparrow. In balsam fir-dominated forests, the spruce grouse and grey jay are replaced by the ruffed grouse and blue jay, respectively. Species such as ruffed grouse, yellow-bellied sapsucker, least flycatcher, black-capped chickadee, American robin, hermit thrush, red-eyed vireo, black-and-white warbler, ovenbird, Canada warbler, American redstart and rose-breasted grosbeak are typical of northern poplar or birch stands.

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**Table 2.6: Terrestrial Bird Species Observed in the Temiskaming Area<sup>1</sup>**

Common Name	Scientific Name	Abundance <sup>2</sup>	Status <sup>3</sup>	Provincial Status <sup>4</sup>
<b>American Vultures</b> Turkey vulture	<b>Cathartidae</b> <i>Cathartes aura</i>	V	-	S4
<b>Ospreys, Eagles and Hawks</b>	<b>Accipitridae</b>			
Osprey*	<i>Pandion haliaetus</i>	C	B	S4
Bald eagle <sup>5</sup>	<i>Haliaeetus leucocephalus</i>	U	M	S4
Northern harrier*	<i>Circus cyaneus</i>	C	B	S4
Northern goshawk*	<i>Accipiter gentilis</i>	C	B	S4
Sharp-shinned hawk*	<i>A. striatus</i>	R	B	S5
Red-tailed hawk*	<i>Buteo jamaicensis</i>	C	B	S5
Rough-legged hawk	<i>B. lagopus</i>	C	B	S1
Red-shouldered hawk <sup>6</sup>	<i>B. lineatus</i>	R	B	S4
Broad-winged hawk*	<i>B. platypterus</i>	V	-	S5
Golden eagle <sup>7</sup>	<i>Aquila chrysaetos</i>	R	M	S1
<b>Falcons</b>				
Merlin*	<i>Falco columbarius</i>	C	B	S4
Peregrine falcon <sup>8</sup>	<i>F. peregrinus</i>	R	B	S2S3
American kestrel*	<i>F. sparverius</i>	C	B	S5
<b>Partridges, Pheasants and Grouse</b>	<b>Phasianidae</b>			
Spruce grouse*	<i>Falcapennis canadensis</i>	U	R	S5
Ruffed grouse*	<i>Bonasa umbellus</i>	C	R	S5
<b>Pigeons and Doves</b>	<b>Columbidae</b>			
Rock dove*	<i>Columba livia</i>	C	R	SE
Mourning dove*	<i>Zenaida macroura</i>	C	R	S5
<b>Cuckoos</b>	<b>Cuculidae</b>			
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	V	-	S4
Black-billed cuckoo*	<i>C. erythrophthalmus</i>	R	B	S4
<b>Typical Owls</b>	<b>Strigidae</b>			
Eastern screech-owl	<i>Otus asio</i>	R	B	S5
Great horned owl*	<i>Bubo virginianus</i>	C	R	S5
Snowy owl	<i>Nyctea scandiaca</i>	C	W	SZN
Northern hawk-owl	<i>Surnia ulula</i>	U	W	S4
Great grey owl <sup>5</sup>	<i>Strix nebulosa</i>	R	B	S3S4
Barred owl*	<i>S. varia</i>	R	B	S4S5
Short-eared owl <sup>6</sup>	<i>Asio flammeus</i>	C	B	S3S4
Long-eared owl	<i>A. otus</i>	U	B	S4
Boreal owl	<i>Aegolius funereus</i>	R	W	S4

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Common Name	Scientific Name	Abundance <sup>2</sup>	Status <sup>3</sup>	Provincial Status <sup>4</sup>
<b>Goatsuckers</b>	<b>Caprimulgidae</b>			
Common nighthawk*	<i>Chordeiles minor</i>	C	B	S4
Whip-poor-will	<i>Caprimulgus vociferus</i>	U	B	S4
<b>Swifts</b>	<b>Apodidae</b>			
Chimney swift	<i>Chaetura pelagica</i>	C	B	S5
<b>Hummingbirds</b>	<b>Trochilidae</b>			
Ruby-throated hummingbird*	<i>Archilochus colubris</i>	C	B	S5
<b>Kingfishers</b>	<b>Alcedinidae</b>			
Belted kingfisher*	<i>Ceryle alcyon</i>	C	B	S5
<b>Woodpeckers</b>	<b>Picidae</b>			
Yellow-bellied sapsucker*	<i>Sphyrapicus varius</i>	C	B	S5
Black-backed woodpecker*	<i>Picoides arcticus</i>	U	R	S4
Downy woodpecker*	<i>P. pubescens</i>	C	R	S5
Three-toed woodpecker*	<i>P. tridactylus</i>	U	R	S4
Hairy woodpecker*	<i>P. villosus</i>	C	R	S5
Northern flicker*	<i>Colaptes auratus</i>	C	B	S5
Pileated woodpecker*	<i>Oryzocopus pileatus</i>	C	R	S4S5
<b>Tyrant Flycatchers</b>	<b>Tyrannidae</b>			
Olive-sided flycatcher*	<i>Contopus borealis</i>	C	B	S5
Eastern wood-pewee	<i>C. sordidulus</i>	U	B	S5
Alder flycatcher*	<i>Empidonax alnorum</i>	C	B	S5
Yellow-bellied flycatcher*	<i>E. flaviventris</i>	C	B	S5
Least flycatcher*	<i>E. minimus</i>	C	B	S5
Eastern phoebe*	<i>Sayornis phoebe</i>	R	B	S5
Great crested flycatcher*	<i>Myiarchus crinitus</i>	R	B	S5
Scissor-tailed flycatcher	<i>Tyrannus forficatus</i>	V	-	SZN
Eastern kingbird*	<i>T. tyrannus</i>	C	B	S5
<b>Larks</b>	<b>Alaudidae</b>			
Horned lark	<i>Eremophila alpestris</i>	C	M	S5
<b>Swallows</b>	<b>Hirundinidae</b>			
Purple martin* <sup>9</sup>	<i>Progne subis</i>	-	-	S4
Tree swallow*	<i>Tachycineta bicolor</i>	C	B	S5
Northern rough-winged swallow	<i>Steigidopteryx serripennis</i>	R	M	S5
Bank swallow*	<i>Riparia riparia</i>	C	B	S5
Cliff swallow*	<i>Hirundo pyrrhonota</i>	C	B	S5
Barn swallow*	<i>H. rustica</i>	C	B	S5

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Common Name	Scientific Name	Abundance <sup>2</sup>	Status <sup>3</sup>	Provincial Status <sup>4</sup>
<b>Jays and Crows</b>	<b>Corvidae</b>			
Gray jay*	<i>Perisoreus canadensis</i>	C	R	S5
Blue jay*	<i>Cyanocitta cristata</i>	C	R	S5
American crow*	<i>Corvus brachyrhynchos</i>	C	R	S5
Common raven*	<i>C. corax</i>	C	R	S5
<b>Titmice</b>	<b>Paridae</b>			
Black-capped chickadee*	<i>Parus atricapillus</i>	C	R	S5
Boreal chickadee	<i>P. hudsonicus</i>	R	W	S5
<b>Nuthatches</b>	<b>Sittidae</b>			
Red-breasted nuthatch*	<i>Sitta canadensis</i>	C	R	S5
White-breasted nuthatch	<i>S. carolinensis</i>	C	R	S5
<b>Creepers</b>	<b>Certhiidae</b>			
Brown creeper*	<i>Certhia americana</i>	V	B	S5
<b>Wrens</b>	<b>Troglodytidae</b>			
Carolina wren	<i>Thryothorus ludovicianus</i>	V	-	S3S4
House wren*	<i>Troglodytes aedon</i>	R	B	S5
Winter wren*	<i>T. troglodytes</i>	U	B	S5
<b>Kinglets and Thrushes</b>	<b>Muscicapidae</b>			
Ruby-crowned kinglet*	<i>Regulus calendula</i>	C	B	S5
Golden-crowned kinglet*	<i>R. satrapa</i>	C	B	S5
Eastern bluebird	<i>Sialia sialis</i>	U	B	S4S5
Veery*	<i>Catharus fuscescens</i>	C	B	S4
Hermit thrush*	<i>C. guttatus</i>	C	B	S5
Gray-cheeked thrush	<i>C. minimus</i>	R	M	S3S4
Swainson's thrush*	<i>C. ustulatus</i>	C	B	S5
Wood thrush*	<i>Hylocichla mustelina</i>	R	B	S5
American robin*	<i>Turdus migratorius</i>	C	B	S5
Varied thrush	<i>Ixoreus naevius</i>	V	-	SZN
<b>Mockingbirds and Thrashers</b>	<b>Mimidae</b>			
Gray catbird*	<i>Dumetella carolinensis</i>	U	B	S5
Northern mockingbird	<i>Mimus polyglottos</i>	R	B	S4
Brown thrasher*	<i>Toxostoma rufum</i>	U	B	S5
<b>Pipits</b>	<b>Motacillidae</b>			
American (Water) pipit	<i>Anthus spinoletta</i>	C	B	S4
<b>Waxwings</b>	<b>Bombycillidae</b>			
Cedar waxwing*	<i>Bombycilla cedrorum</i>	C	B	S5
Bohemian waxwing	<i>B. garrulus</i>	C	W	S2S3



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Common Name	Scientific Name	Abundance <sup>2</sup>	Status <sup>3</sup>	Provincial Status <sup>4</sup>
Le Conte's sparrow	<i>Ammodromus leconteii</i>	R	B	SZN
Fox sparrow	<i>Passerella iliaca</i>	C	M	S4
Swamp sparrow*	<i>Melospiza georgiana</i>	C	B	S5
Lincoln's sparrow*	<i>M. lincolni</i>	C	B	S5
Song sparrow*	<i>M. melodia</i>	C	B	S5
White-throated sparrow*	<i>Zonotrichia albicollis</i>	C	B	S5
White-crowned sparrow	<i>Z. leucophrys</i>	C	M	S4
Dark-eyed junco*	<i>Junco hyemalis</i>	C	R	S5
Lapland longspur	<i>Calcarius lapponicus</i>	C	M	S5
Snow bunting	<i>Plectrophenax nivalis</i>	C	W	SZN
Bobolink*	<i>Dolichonyx oryzivorus</i>	C	B	S4
Red-winged blackbird*	<i>Agelaius phoeniceus</i>	C	B	S5
Eastern meadowlark	<i>Stumella magna</i>	V	-	S5
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	V	M	S2S3
Rusty blackbird	<i>Euphagus carolinus</i>	R	B	S5
Brewer's blackbird	<i>E. cyanocephalus</i>	C	B	S4
Common grackle*	<i>Quiscalus quiscula</i>	C	B	S5
Brown-headed cowbird*	<i>Molothrus ater</i>	C	B	S5
Northern oriole*	<i>Icterus galbula</i>	U	B	S5
<b>Finches</b>	<b>Fringillidae</b>			
Pine grosbeak*	<i>Pinicola enucleator</i>	C	W	S3S4
House finch	<i>Carpodacus mexicanus</i>	V	-	SE
Purple finch*	<i>C. purpureus</i>	C	B	S5
Red crossbill*	<i>Loxia curvirostra</i>	R	W	S5
White-winged crossbill*	<i>L. leucoptera</i>	U	W	S5
Common redpoll	<i>Carduelis flammea</i>	C	W	S4
Hoary redpoll	<i>C. harnemanni</i>	R	W	S4
Pine siskin*	<i>C. pinus</i>	C	R	S5
American goldfinch*	<i>C. tristis</i>	C	R	S5
Evening grosbeak*	<i>Coccothraustes vespertinus</i>	C	R	S5
House sparrow*	<i>Passer domesticus</i>	C	R	SE

\* Species listed by OPG *et al.* (2004) as confirmed sightings in the Temagami Planning Area.

<sup>1</sup> Source: Temiskaming Field Naturalists (1994).

<sup>2</sup> Abundance: C = common, U = uncommon, R = rare, V = very rare.

<sup>3</sup> Status: B = breeding, R = resident, M = migrant, W = winter resident.

<sup>4</sup> Source: NHIC (2006a); S5 = very common in Ontario, demonstrably secure; S4S5 = common to very common in Ontario; S4 = common in Ontario, apparently secure; S3S4 = rare to common in Ontario; S2S3 = very rare to uncommon in Ontario; S1 = extremely rare in Ontario; SZN = not of practical conservation concern as there are no clearly definable occurrences; and SE = exotic.

<sup>5</sup> Designated as a species of special concern by COSSARO (MNR, 2006) but not listed in regulation under the *Endangered Species Act.*

<sup>6</sup> Designated as a species of special concern by COSEWIC (2006), as well as by COSSARO (MNR, 2006) but not listed in regulation under the *Endangered Species Act.*

<sup>7</sup> Designated as an endangered species by COSSARO (MNR, 2006), regulated under the *Endangered Species Act.*

<sup>8</sup> Designated as a threatened species by COSEWIC (2006), as well as by COSSARO (MNR, 2006) but not listed in regulation under the *Endangered Species Act.*

### 2.5.3 Herpetofauna

Grouped together, amphibians and reptiles are called herpetiles. They are generally dependent on more mesic (wetter) habitats and particularly wetland habitats associated with mature forests. Table 2.7 provides a list of herpetiles with reported sightings in the Temagami Planning Area (OPG *et al.*, 2004), as well as possibly present in the study area based on distribution maps (Cook, 1984). Of the 21 species listed in Table 2.7, 12 are ranked by the NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure; and nine are S4, i.e., common in Ontario and apparently secure.

**Table 2.7: Amphibians and Reptiles with Reported Sightings in the Temagami Planning Area<sup>1</sup>**

Common Name	Scientific Name	Provincial Status <sup>2</sup>
<b>AMPHIBIANS</b>		
<b>Mudpuppy</b>	<b>Proteidae</b>	
Mudpuppy	<i>Necturus maculosus</i>	S4
<b>Newts</b>	<b>Salamandridae</b>	
Eastern newt	<i>Notophthalmus viridescens</i>	S5
<b>Mole Salamanders</b>	<b>Ambystomatidae</b>	
Blue-spotted salamander	<i>Ambystoma laterale</i>	S4
Yellow-spotted salamander	<i>A. maculatum</i>	S4
<b>Lungless Salamanders</b>	<b>Plethodontidae</b>	
Eastern redback salamander	<i>Plethodon cinereus</i>	S5
Four-toed salamander*	<i>Hemidactylium scutatum</i>	S4
Two-lined salamander*	<i>Eurycea bislineata</i>	S4
<b>Toads</b>	<b>Bufo</b>	
American toad*	<i>Bufo americanus</i>	S5
<b>Treefrogs</b>	<b>Hylidae</b>	
Spring peeper	<i>Hyla crucifer</i>	S5
Striped chorus frog	<i>Pseudacris triseriata</i>	S4
<b>True Frogs</b>	<b>Ranidae</b>	
Northern leopard frog	<i>Rana pipiens</i>	S5
Mink frog	<i>R. septentrionalis</i>	S5
Wood frog	<i>R. sylvatica</i>	S5
Green frog	<i>R. clamitans</i>	S5
American bullfrog	<i>R. catesbeiana</i>	S4
<b>REPTILES</b>		
<b>Snapping Turtles</b>	<b>Chelydridae</b>	
Snapping turtle	<i>Chelydra serpentina</i>	S5
<b>Pond and Marsh Turtles</b>	<b>Emydidae</b>	
Midland painted turtle	<i>Chrysemys picta</i>	S5
<b>Typical Snakes</b>	<b>Colubridae</b>	
Eastern gartersnake	<i>Thamnophis sirtalis</i>	S5
Redbelly snake	<i>Storeria occipitomaculata</i>	S5
Smooth green snake	<i>Couleuvre verte</i>	S4
Ringneck snake*	<i>Diadophis punctatus</i>	S4

\* Possibly present in study area based on distribution maps (Cook, 1984).

<sup>1</sup> Source: OPG *et al.* (2004).

<sup>2</sup> Source: NHIC (2006a); S5 = very common in Ontario, demonstrably secure; S4 = common in Ontario, apparently secure.

## 2.5.4 Species at Risk

Of the many terrestrial species that have been designated by COSEWIC (2006) or COSSARO (MNR, 2006) as endangered, threatened or of special concern, only nine have ranges in Ontario overlapping the regional study area (Table 2.8). Of the mammal species, the eastern cougar is designated as endangered by COSSARO regulated under the *Endangered Species Act*. Due to its wariness and mobility, it is unlikely to be encountered by the public. The cougar was designated by COSEWIC as endangered in 1978; however, its status was re-examined in 1998, resulting in a designation of “data deficient”, i.e., a species for which there is insufficient scientific information to support status designation (COSEWIC, 2006). This is based primarily on the lack of credible information on its presence in Ontario (Dobbyn, 1994).

The eastern wolf is designated as a species of special concern by COSEWIC (2006), as well as COSSARO (MNR, 2006) but not listed in regulation under the *Endangered Species Act*.

**Table 2.8: Wildlife Species at Risk with Ranges Overlapping the Study Area**

Common Name	Scientific Name	Habitat Requirements <sup>1</sup>	Status
Eastern cougar	<i>Felis concolor cougar</i>	Various, including swamps, wooded river valleys and coniferous forests	Endangered <sup>2</sup>
Golden eagle	<i>Aquila chrysaetos</i>	Sparsely treed rock crags and cliffs along rivers and lakes	Endangered <sup>2</sup>
Peregrine falcon	<i>Falco peregrinus</i>	Open forest, with cliffs and crags, especially near water	Threatened <sup>3</sup>
Eastern wolf	<i>Canis lupus lycaon</i>	Coniferous, mixedwoods and deciduous forests	Special concern <sup>2,3</sup>
Bald eagle	<i>Haliaeetus leucocephalus</i>	Forests (especially coniferous) near large rivers and lakes	Special concern <sup>2</sup>
Red-shouldered hawk	<i>Buteo lineatus</i>	Riparian forest, wooded swamp	Special concern <sup>2,3</sup>
Short-eared owl	<i>Asio flammeus</i>	Bogs, marshes	Special concern <sup>2,3</sup>
Great grey owl	<i>Strix nebulosa</i>	Coniferous, mixedwoods and deciduous forests	Special concern <sup>2</sup>
Monarch butterfly	<i>Danaus plexippus</i>	Open areas with milkweed	Special concern <sup>2,3</sup>

<sup>1</sup> References used to determine habitat requirements: Banfield (1974); Peck and James (1983); Godfrey (1986); Cadman *et al.* (1987); Opler (1992).

<sup>2</sup> MNR (2006).

<sup>3</sup> COSEWIC (2006).

Three avian species have been designated by COSEWIC (2006) and COSSARO (MNR, 2006). The peregrine falcon is considered to be threatened, whereas the red-shouldered hawk and short-eared owl are of special concern. All three species prefer larger palustrine, riverine and/or lacustrine habitat.

The golden eagle and bald eagle, designated by COSSARO as endangered and of special concern under the *Endangered Species Act*, have the potential to be present in the general area, particularly in the vicinity of large lakes and rivers (Peck and James, 1983; Cadman *et al.*, 1987). The great grey owl, designated as a species of special concern by COSSARO (MNR, 2006), may also be present in the general area. COSEWIC (2006) currently considers the golden eagle, bald eagle and great grey owl to be not at risk.

Based on the MNR environmental values database, there are no known nesting sites of the six avian species at risk within a 5-km radius of the proposed Hound Chute GS.

During the summer months, the monarch butterfly may also be found in the open habitats in the Latchford area. The monarch butterfly has been designated as a species of special concern by COSEWIC (2006) and COSSARO (MNR, 2006).

Based on the SARA Schedule 1 Species at Risk Web Mapping Application (Environment Canada, CWS, 2004), of the nine species listed in Table 2.8, only the occurrences of peregrine falcon, eastern wolf and monarch butterfly have been documented to overlap the Hound Chute GS property. The first two species are listed under Schedule 1 of the SARA.

As indicated in Table 2.8, the peregrine falcon prefers open forest habitat with cliffs and crags, especially near water. Nests are normally scrapes made on cliff ledges on steep cliffs, usually near wetlands. This type of habitat occurs along the shore of Chown Lake and Lake Timiskaming (e.g., Devil Rock) approximately 8 and 13 km northeast, respectively, of the Hound Chute GS, and possibly along Giroux Creek at Greywacke Mountain approximately 4.5 km north.

As indicated in Table 2.8, the eastern wolf prefers conifers, mixedwoods and deciduous forests. A mixedwoods forest is present in the local study area (see Section 2.3) potentially providing habitat for eastern wolf. However, this potential is minimized by the lack of significant habitat for moose or white-tailed deer (the principal prey) in the local study area (Section 2.5.1).

As indicated in Table 2.8, the monarch butterfly prefers open areas with milkweed (*Asclepius* spp.). Milkweed was not observed on the Hound Chute GS property (Table 2.4).

Examination of the NHIC (2006a) database indicated that no species at risk have been recorded within a 5-km radius of the Hound Chute GS.

### **3.0 IMPACT ASSESSMENT AND MITIGATIVE MEASURES**

The available environmental baseline information and site-specific vegetation inventory provided the basis for an assessment of potential construction and operational effects on the terrestrial environment, e.g., due to vegetation clearing, soil erosion, noise, blasting, increased human activity, etc.

Recommended mitigative measures for project effects on the terrestrial environment are based on standard environmental construction guidelines, relevant government guidelines for proposed hydroelectric power plant development, as well as government agency and other organization consultation.

The significance of potential impacts was based on their magnitude, duration and extent after the implementation of recommended mitigative measures.

#### **3.1 GEOLOGY AND SOILS**

The proposed Hound Chute GS is planned to be located on the same footprint as the existing powerhouse. The existing powerhouse will be demolished followed by the construction of the new facility. The concrete base of the existing powerhouse extends to depths of approximately 11 to 17 m (Hatch Acres, 2006). This fair to very poor quality concrete base will be removed prior to construction of the new powerhouse foundation.

Blasting may be required to excavate a base for the new powerhouse foundation.

Explosives used in construction will be closely controlled, with their use restricted to authorized personnel who have been trained in the use of explosives in a manner so as to minimize impacts on the environment. Appropriate government agencies and the local residents will be informed of the blasting schedule in advance of construction, as well as just prior to the detonation program. All necessary permits will be obtained by the DBC, who will also comply with all legal requirements in connection with the use, storage and transportation of explosives, including, but not limited to, the *Canada Explosives Act* and the *Transportation of Dangerous Goods Act*. The DBC will be required to retain a consulting engineer with technical expertise in blasting to provide advice on maximum loading of explosives for all blasting, as well as an engineering report indicating recommended charges and blasting methods to be used at specific locations. All blasting operations should adhere to DFO guidelines (Wright and Hopky, 1998) and blasting engineer recommendations.

No effects on geology are anticipated beyond the area currently affected by the existing powerhouse and possibly due to grading of rock outcrops in the proposed laydown/assembly and road/parking expansion areas.

As indicated in Section 1.1, sampling and analysis of bedrock at the proposed redevelopment site determined that it has low acid generation potential (Martin, 2006). As a result, no mitigative measures are recommended.

The physiography of the new powerhouse site will likely be altered due to requisite slope stabilization. The physiography of the proposed laydown/assembly and road/parking expansion areas are likely to be altered due to requisite grading. A Site Development Plan will be prepared by the DBC, including planning considerations; site development scheduling; site development; selection of construction equipment; and site development details.

As the effects of site development are expected to be negligible on overall physiography, no mitigation measures are required beyond those set out in the Site Development Plan.

No effects on geology and physiography are anticipated as a result of the operation of the proposed Hound Chute GS; therefore, no mitigation is required.

Soils in the Hound Chute GS property consist of the Timiskaming Complex, composed of mineral soils developed on lacustrine clays, as well as organic soils and rock outcrop (see Section 2.2.3). Overall, the mineral soils are exceedingly stony and susceptible to erosion.

During construction, soil erosion generally results from water or wind action on the disturbed terrain surfaces as a result of the removal of vegetative cover, alteration of topography and improper restoration. All construction work should be conducted so as to avoid unnecessary disturbance of the ground by the placement or excavation of materials, the disruption of established natural surface and subsurface, or the disturbance of natural vegetation cover that is to be preserved.

Till and gully erosion caused by channelized overland flow can be a major source of soil erosion. Sheet erosion can be an additional source of sediment.

Erosion and sediment control will be an integral component of the construction planning process. All personnel involved with the proposed works will be briefed on erosion and sediment control including engineers, contractors, inspectors and environmental staff. In general, the following guidelines will be applied in the development of the Erosion and Sediment Control Plan:

- fitting of proposed works to the terrain;
- timing of grading and construction activities to minimize soil exposure;
- retention of existing vegetation where feasible;
- restriction of the use of heavy construction equipment to within the approved work areas to minimize soil disturbance and vegetation destruction;
- storage of stripped soil at upland locations;
- implementation of erosion control measures, e.g., rip rap berms underlain by filter geotextile, straw bales used as filters, silt fencing along the shoreline and/or mulching for interim stabilization;
- diversion of runoff away from exposed areas;
- minimization of the length and steepness of slopes;
- maintenance of low runoff velocities;
- design of drainage works, such as ditches and outfalls, to handle concentrated runoff;

- retention of sediment on site;
- routine inspection and maintenance of erosion and sediment control measures; and,
- revegetation of disturbed areas by seeding and/or planting following construction as soon as seasonal conditions permit;

After construction of the proposed Hound Chute GS, the redevelopment site will be rehabilitated. A Site Rehabilitation Plan including planning considerations, soil stabilization and revegetation will be prepared.

Dust may be generated during the construction of the proposed Hound Chute GS due to heavy equipment movement. Dust generation during dry, windy conditions can be controlled by water trucks and/or sprinklers as necessary to reduce dust to acceptable levels (e.g., Cheminfo, 2005).

The implementation of the Erosion and Sediment Control Plan and Site Rehabilitation Plan during construction and rehabilitation will obviate or minimize potential effects on soils.

Incidental spills of oil, gas, diesel fuel and other liquids to the environment could occur during construction. In addition, sanitary and other wastes will be generated during construction. Fuelling and lubrication of construction equipment should be carried out in a manner that minimizes the possibility of releases to the environment. Measures for containment and cleanup of contaminant releases should be followed to minimize contamination of the natural environment, e.g., placement of fuel tanks and generators on plastic sheets bermed around the edges, and use of suitable hydrocarbon absorbent material for cleanup and approved landfill or other disposal. Any spills with the potential to create an impact to the environment should be reported to the MOE as required by provincial spills legislation. Interim sanitary waste collection and availability of treatment facilities should be arranged for the duration of the construction period. All construction waste, washwater and wastewater should be disposed of in accordance with regulatory requirements.

A Hazardous Materials Management Plan, Waste Management Plan and a Spills Emergency Preparedness and Response Plan will be developed for the proposed redevelopment project as part of the broader Environmental Management Plan.

The implementation of these pollution prevention plans will obviate or minimize the environmental effects of accidental releases to the natural environment.

The operation of the hydroelectric facility is not expected to have an effect on property soils. Therefore, no mitigation is required.

### **3.2 Vegetation**

As indicated in Section 2.3.1, permanent displacement of vegetation and trees due to project construction will be minimal. However, additional areas, predominantly CUM, beyond the existing parking lots will be needed as construction laydown areas. In addition, a small northern section of the island will be partially cleared to allow for the refurbishment of the western channel weir. This area of the island has already been impacted by previous construction

activities. An area, dominated by balsam poplar and alder, along an existing road that leads to the submerged structure will also likely need to be enlarged.

Based on the vegetation survey of those locations likely to be affected by construction activities, no significant or unusual areas of native vegetation were identified that would preclude or be affected by the construction of the proposed Hound Chute GS. In addition, no floral species documented at these construction locations during the field survey or within the local study area based on examination of the Environment Canada, CWS (2004) and NHIC (2006a) databases are designated to be at risk by COSEWIC (2006) or COSSARO (MNR, 2006). In fact, all of the species observed during the field survey were either ranked by NHIC (2006a) as S5, i.e., very common in Ontario and demonstrably secure, or SE, i.e., exotic, not believed to be a native component of Ontario's flora. Removal of these plant species will have negligible effect on their overall populations in Ontario.

Vegetation clearing will adhere to standard construction practices as listed below:

- vegetation clearing should be restricted to the minimum necessary for construction activities;
- brush and trees should be felled into the area to be cleared to prevent damage to adjacent vegetation;
- branches overhanging the cleared area should be cut (pruned) cleanly and stubs should not be dressed;
- merchantable timber should be cut and neatly stacked for removal as requested by the MNR;
- specimen trees marginal to the cleared area should be identified prior to construction, flagged and protected from damage, where possible;
- clearing should not take place between 01 May and 31 July in northern Ontario (this issue is further discussed in Section 3.4 with respect to migratory birds);
- all slash, brush, roots and stumps are typically raked into piles for burning or disposed in a manner prescribed by the MNR; and
- slash material should not be stored near the Montreal River.

Cutting of merchantable timber and burning of slash will require approval (permits) of the MNR.

After construction of the proposed Hound Chute GS, the cleared areas of natural vegetation that have not been displaced by permanent re-development infrastructure will be rehabilitated as described in the Site Rehabilitation Plan, emphasizing use of native plant species for revegetation of disturbed areas.

Overall, with the implementation of the standard vegetation clearing and revegetation construction practices, the construction and operation of the proposed Hound Chute GS will have minimal effect on vegetation communities or species.

### **3.3 WETLANDS AND ENVIRONMENTALLY SIGNIFICANT AREAS**

As indicated in Section 2.4, Cliff Lake Conservation Reserve is located 5 km south of the proposed Hound Chute GS redevelopment. Due to the geographic separation and its location on a different watershed (Matabitchuan River), construction and operation of the proposed Hound Chute GS will have no effect on this environmentally significant area.

As indicated in Section 2.4, based on the Provincial Policy Statement (OMMAH, 2005), development and site alteration shall not be permitted in significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. There are no significant wetlands within the local study area of the proposed Hound Chute GS redevelopment.

### **3.4 WILDLIFE**

As indicated in Section 2.5, most of the land around the Hound Chute GS remains in native vegetation. On the Hound Chute GS property, the primary vegetation community is a mixedwoods forest (FOM) with some open meadow areas (CUM).

As indicated in Section 2.5.1, the local study area lands are designated as Class 4 and Class 5 with moderate and moderately severe limitations, respectively, for the production of ungulates. There are no areas of significant moose or white-tailed deer habitat within the study area.

As indicated in Table 2.5, most native mammal and avian species likely present in the local study area are ranked by the NHIC (2006a) as S5 and S4, i.e., very common and common in Ontario, respectively. All of the herpetofauna species are ranked by the NHIC (2006a) as S5 and S4.

As indicated in Sections 2.3.2 and 2.5.4, the occurrence of three SARA species at risk, the peregrine falcon, eastern wolf and monarch butterfly, has been documented to overlap with the Hound Chute GS property (Environment Canada, CWS, 2004). The absence of preferred cliff habitat, lack of significant prey habitat and the local absence of milkweed minimizes the potential for the occurrence of peregrine falcon, eastern wolf and monarch butterfly, respectively, which have not been recorded within the local study area (NHIC, 2006a).

Based on its location relative to any environmentally significant areas (see Section 2.4), the proposed Hound Chute GS will not affect significant wildlife habitat; thereby conforming with the Wildlife Policy of Canada (CWS, 1990) and the Provincial Policy Statement (OMMAH, 2005).

The construction disturbance will be sufficiently local that little displacement of wildlife will occur. Any resident animals can relocate temporarily to avoid noise and disturbance associated with construction activities.

As indicated in Section 2.5.2, a number of terrestrial bird species are likely locally resident and may nest on the Hound Chute GS property. Most of these species are protected under the *Migratory Birds Convention Act*. Recently, the Canadian Wildlife Service (CWS) has stipulated that vegetation clearing should not be undertaken during the breeding season of migratory birds

in order to avoid the destruction of any bird nests. Specifically, clearing should not take place between 01 May and 31 July in northern Ontario. Otherwise, a breeding bird survey must be conducted by a qualified avian biologist and any nests found must not be disturbed by the clearing activity until the young have fledged. A buffer zone with a 50 m allowance restricting active construction activities is usually applied around a nest. The CWS will be consulted on the appropriate mitigation measures. To preclude the potential institution of a buffer zone that may affect construction activities, it is recommended that vegetation be removed prior to nesting season initiation, i.e., 01 May, or after nesting season completion, i.e., 31 July.

Once construction of the proposed redevelopment of Hound Chute GS is completed, any displaced animals could reoccupy the habitat created on the rehabilitated areas of the property and the habitat associated with the natural and cultural vegetation communities not directly affected by construction activities.

During operation, noise will be generated from the proposed redevelopment of Hound Chute GS. This steady noise from the proposed plant will be similar to that of the existing facility and not elicit an adverse reaction from nearby habituated wildlife.

Overall, the construction and operation of the proposed redevelopment of Hound Chute GS will have minimal effect on wildlife populations or wildlife-carrying capacity of the area.

## **4.0 SUMMARY AND CONCLUSIONS**

This technical supporting document provides a terrestrial environmental baseline, as well as the potential environmental effects of the proposed redevelopment of Hound Chute GS on the terrestrial environment and the recommended mitigative measures to minimize these effects.

During proposed Hound Chute GS construction, potential impacts on the terrestrial environment may occur due to soil erosion and fugitive dust; accidental spills; noise and human activity; and vegetation clearing. Based on an assessment of the available baseline information and potential effects, as well as the implementation of the recommended mitigative measures, SENES concludes that effects during construction will be minimal, localized and short-term.

During proposed Hound Chute GS operation, potential impacts on the terrestrial environment may occur due to noise and human activity. Based on assessment of the baseline information and potential effects, SENES concludes that the operation of the proposed Hound Chute GS will have negligible effects on the terrestrial environment.

Environmental protection during proposed generating station construction and operation will be ensured by adherence to the Environmental Management Plan, as well as compliance with regulatory standards and guidelines.

The Environmental Management Plan for each redevelopment project ensures that environmental protection will be achieved by describing government agency requirements, OPG policy, project commitments and recommended mitigation measures to be undertaken. The Environmental Management Plan will include the Erosion and Sediment Control Plan, Spills Emergency Preparedness and Response Plan, Hazardous Materials Management Plan, Waste Management Plan and Site Rehabilitation Plan.

Table 4.1 summarizes potential construction and operation effects, the recommended mitigative/remedial measures to minimize or obviate these impacts and the net effects.

**Table 4.1: Summary of Potential Effects and Recommended Mitigative/Remedial Measures**

Effect	Recommended Mitigative/Remedial Measure	Net Effect
<b>Construction</b>		
Soil erosion	<ul style="list-style-type: none"> <li>Adherence to Erosion and Sediment Control Plan.</li> </ul>	Negligible effect
Fugitive dust	<ul style="list-style-type: none"> <li>Use of water trucks and/or sprinklers (e.g., Cheminfo, 2005).</li> </ul>	Negligible effect
Incidental spills of oil, gasoline and other liquids during construction	<ul style="list-style-type: none"> <li>Adherence to Spills Emergency Preparedness and Response Plan.</li> </ul>	Negligible effect
Hazardous Materials/Waste	<ul style="list-style-type: none"> <li>Adherence to Hazardous Materials Management Plan and Waste Management Plan.</li> <li>Waste disposal in accordance with regulatory requirements.</li> </ul>	Negligible effect
Displacement of nesting birds	<ul style="list-style-type: none"> <li>Vegetation clearing to be undertaken outside the migratory bird breeding season (01 May to 31 July).</li> </ul>	Negligible effect
Vegetation clearing	<ul style="list-style-type: none"> <li>Implementation of the Site Rehabilitation Plan.</li> </ul>	Net benefit
Blasting	<ul style="list-style-type: none"> <li>Adherence to blasting engineer recommendations.</li> </ul>	Negligible effect
Noise	<ul style="list-style-type: none"> <li>Use of well-maintained equipment and noise silencers (as required).</li> </ul>	Negligible effect
<b>Operation</b>		
Noise	<ul style="list-style-type: none"> <li>Ambient noise levels to remain unchanged.</li> </ul>	Negligible effect
Incidental spills of oil, gasoline and other liquids during operation	<ul style="list-style-type: none"> <li>Adherence to Spills Emergency Preparedness and Response Plan.</li> </ul>	Negligible effect

## **5.0 REFERENCES**

- Associate Committee on the National Building Code (ACNBC). 1980. The Supplement to the National Building Code of Canada. National Research Council of Canada. NRCC No. 17724: 293 p.
- Atmospheric Environment Service (AES). 1982. Canadian Climate Normals, 1951-1980. Volume 6, Frost. Environment Canada. 276 p.
- Banfield, A.W.F. 1974. The Mammals of Canada. National Museum of Natural Sciences, Ottawa, Ontario. 438 p.
- Bennett, G., B.O. Dressler and J.A. Robertson. 1991. The Huronian Supergroup and Associated Intrusive Rocks, pp. 549-591. *In:* P.C. Thurston, H.R. Williams, R.H. Sutcliffe and G.M. Stott [Eds.]. Geology of Ontario. Ontario Geological Survey, Special Volume 4, Part 1.
- Bisset, A., M. McLaren, C. Edmonds, W. Sawyer, W. Gluhushkin, K. Morrison and C. Davies. 1997. Report on the 1995-96 and 1996-97 Moose Population Surveys: With Considerations for Future Surveys. Ministry of Natural Resources, Northwest Science & Technology, NWST Technical Report TR-113: 20 p.
- Bostock, H.S. 1970. Physiographic subdivisions of Canada, pp. 11-30. *In:* Geology and Economic Minerals of Canada, Geological Survey of Canada, Economic Geology Report No. 1.
- Cadman, M.D., P.F.J. Eagles and F.M. Helleiner. 1987. Atlas of Breeding Birds of Ontario. University of Waterloo Press, Waterloo, Ontario. 617 p.
- Canada Land Inventory (CLI). 1973a. Land Capability for Agriculture, Ville-Marie 31 M. Environment Canada.
- Canada Land Inventory (CLI). 1973b. Land Capability for Wildlife-Ungulates, Ville-Marie 31 M. Canada Department of the Environment.
- Canada Land Inventory (CLI). 1975. Land Capability for Forestry, Ville-Marie - 31 M. Environment Canada.
- Canadian Wildlife Service (CWS). 1990. A Wildlife Policy of Canada. Wildlife Ministers' Council of Canada. 29 p.
- Chapman, L.J. and M.K. Thomas. 1968. The Climate of Northern Ontario. Canada Department of Transport, Climatological Studies No. 6: 58 p.
- Cheminfo Services Inc. (Cheminfo). 2005. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities. Construction and Demolition Multi-stakeholder Working Group Report to Environment Canada, Transboundary Issues Branch. 49 p.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2006. Canadian Species at Risk. 25 April 2006. Ottawa, Ontario. 76 p.

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Redevelopment, Montreal River – Terrestrial Environment*

---

- Cook, F.R. 1984. Introduction to Canadian Amphibians and Reptiles. National Museum of Natural Sciences, Ottawa, Ontario. 200 p.
- Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists, Don Mills, Ontario. 118 p.
- Ecoregions Working Group. 1989. Ecoclimatic Regions of Canada, First Approximation. Ecoregion Working Group of the Canada Committee on Ecological Land Classification. Environment Canada, Ecological Land Classification Series No. 23: 119 p.
- Environment Canada, Canadian Wildlife Service (CWS). 2004. Species at Risk Web Mapping Application ([http://www.sis.ec.gc.ca/ec\\_species/ec\\_species\\_e.phtml](http://www.sis.ec.gc.ca/ec_species/ec_species_e.phtml)), accessed on 22 February 2007.
- Erskine, A.J. 1977. Birds in Boreal Canada: Communities, Densities and Adaptations. Canadian Wildlife Service Report Series No. 41: 71 p.
- Gartner Lee Limited (Gartner Lee). 2001. Phase I Environmental Site Assessments – Northeast Plant Group - Hound Chute Generating Station. Report to Ontario Power Generation. 19 p.
- Gillespie, J.E., E.W. Presant, J. Rowsell and C.J. Acton. 1990. The Soils of the Ville-Marie Map Sheet (Ontario Section). Ontario Institute of Pedology Publication 90-2: 64 p.
- Godfrey, W.E. 1986. The Birds of Canada. National Museum of Natural Sciences, Ottawa, Ontario. 595 p.
- Hatch Acres Incorporated (Hatch Acres). 2006. Hound Chute GS Redevelopment Borehole Reports. Reports to OPG.
- Kaiser, J. 1983. Native and exotic plant species in Ontario: A numerical synopsis. The Plant Press 1: 25-26.
- Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southwestern Ontario: First Approximation and its Application. Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch, SCSS Field Guide FG-02: 225 p.
- Martin, J. 2006. Interpretation of ML/ARD Analyses at Proposed Hydroelectric Power Plant Redevelopments. SENES Consultants Limited Memorandum, 30 July 2006. 3 p.
- Ministry of Natural Resources (MNR). 2002. Water Management Planning Guidelines for Waterpower. 79 p.
- Ministry of Natural Resources (MNR). 2006. Species at Risk in Ontario List. 9 p.
- Natural Heritage Information Centre (NHIC). 2006a. Species Information. <http://nhic.mnr.gov.on.ca/MNR/nhic/species.cfm>
- Natural Heritage Information Centre (NHIC). 2006b. Natural Areas Information. [http://nhic.mnr.gov.on.ca/MNR/nhic/areas\\_rep.cfm](http://nhic.mnr.gov.on.ca/MNR/nhic/areas_rep.cfm)

*Proposed Hound Chute Generating Station  
Redevelopment, Montreal River – Terrestrial Environment*

---

- Ontario Government. 1992. Wetlands Policy Statement. A Statement of Ontario Government Policy Issued Under the Authority of Section 3 of the Planning Act 1983. 15 p.
- Ontario Ministry of Municipal Affairs and Housing (OMMAH). 2005. 2005 Provincial Policy Statement. 37 p.
- Ontario Power Generation Inc., Canadian Hydro Developers Inc., Public Works and Government Services Canada and Ministry of Natural Resources (OPG *et al.*). 2004. Montreal River System Water Management Planning. Draft Report, Volume 1 – Parts A & B, Final Report, Volume 2 – Parts C, D & Appendices.
- Opler, P.A. 1992. A Field Guide to Eastern Butterflies. Houghton Mifflin Co., Boston, Massachusetts. 396 p.
- Peck, G.K. and R.D. James. 1983. Breeding Birds of Ontario Nidology and Distribution. Volume 1: Nonpasserines. Royal Ontario Museum, Toronto, Ontario. 321 p.
- Price, W.A. 1997. Draft Guidelines and Recommended Methods for Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. B.C. Ministry of Employment and Investment. 141 p.
- Rowe, J.S. 1972. Forest Regions of Canada. Canadian Forestry Service, Publication No. 1300: 172 p.
- SENES Consultants Limited (SENES). 2006. Environmental Report: Proposed Hound Chute Generating Station Redevelopment, Montreal River. Report to Ontario Power Generation Inc.
- Stockwell, C.H., J.C. McGlynn, R.F. Emslie, B.V. Sanford, A.W. Norris, J.A. Donaldson, W.F. Fahrig and K. L. Currie. 1970. Geology of the Canadian Shield, pp. 44-150. *In: Geology and Economic Minerals of Canada, Geological Survey of Canada, Economic Geology Report No. 1.*
- Temiskaming Field Naturalists. 1994. Birds of the Little Claybelt. Checklist.
- Thurston, P.C. 1991. Introduction, pp. 3-25. *In: P.C. Thurston, H.R. Williams, R.H. Sutcliffe and G.M. Stott [Eds.]. Geology of Ontario. Ontario Geological Survey, Special Volume 4, Part 1.*
- Webber, L.R. and D.W. Hoffman. 1967. Origin, Classification and Use of Ontario Soils. Ontario Department of Agriculture and Food, Publication 51: 58 p.
- Wright, D.G. and G.E. Hopky. 1998. Guidelines for the Use of Explosives in and near Canadian Fisheries Waters. Canadian Technical Report of Fisheries and Aquatic Sciences 2107: 34 p.