



**GOLDCORP CANADA LTD.
HOLLINGER PROJECT**

**PRE-FEASIBILITY ENVIRONMENTAL
BASELINE STUDIES**

TERRESTRIAL BASELINE REPORT

Submitted to:
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1.0 INTRODUCTION

Porcupine Gold Mines (PGM), a joint venture between Goldcorp Canada Ltd. (51%) and Goldcorp Inc. (49%) (Goldcorp), is conducting pre-feasibility level studies to determine the potential for re-developing the former Hollinger and McIntyre Mines area, in Timmins (Figure 1.1), as a new open pit mine and underground (UG) mining complex. For the purpose of this report, this undertaking is referred to as the Hollinger Project.

The former Hollinger Mine is located immediately adjacent to downtown Timmins and the urban area of Schumacher, on the south side of Highway 101. The former McIntyre Mine is located directly north and east of the former Hollinger Mine site. Ore from the proposed Hollinger Project would be processed at the existing Dome ore processing facility (Dome Mill), located approximately 5 km east of the former Hollinger Mine site. Considerable residual gold resources have been identified at the Hollinger Project Site, and development of the Site would have the added advantage of removing a number of known mine hazards (open stopes, mini pits, and near surface underground workings) that are associated with past activities.

This document deals with Terrestrial Environment, and is one of a series of baseline and modelling reports prepared to describe existing environmental conditions, associated with the Hollinger site area, in part to assist with obtaining future environmental approvals to re-open the Hollinger Mine; as well as to assist with project planning and to provide further information for Closure planning.

This introduction, or an abbreviated version of it in some instances, is included in each document, such that the reports can be read independent of one another. Baseline reports are being prepared to describe the following environmental aspects:

- Air Quality;
- Aquatic Environment;
- Cultural Heritage Environment;
- Noise;
- Hydrology;
- Hydrogeology;
- Socio-Economic Setting;
- Terrestrial Environment; and,
- Vibration.

The reports have been prepared by AMEC Earth & Environmental, a Division of AMEC Americas Limited (AMEC), with the exception of the baseline reports related to noise and vibration (Valcoustics Canada Ltd.), the cultural heritage environment (Woodland Heritage Services Limited), and the socio-economic setting (planningAlliance). The latter three entities worked under the direction of AMEC to ensure an appropriate level of study integration.

1.1 Site History

The Hollinger gold deposit was discovered in 1909, as one of the three original major Timmins properties, along with that of the Dome and McIntyre Mines. The main Hollinger Mine operated from 1910 to 1968 and further mining took place in the 1970's and 1980's. The Hollinger, McIntyre and Coniaurum underground mine workings are all interconnected, along with those of a number of other smaller mines in the area.

Because of their connection to the McIntyre Mine, the Hollinger underground workings were kept dry while McIntyre operations continued until 1988, when the McIntyre Mine was shut down. The pumps at Hollinger and McIntyre Mines were shut down in 1991, and the underground working allowed to flood. A surface pump was installed in the McIntyre No. 11 Shaft in 2000 and currently the upper mine levels are dewatered to a level ranging between 24 to 34 m below ground surface (mbgs), to help manage near-surface groundwater levels in the area. Mine water from the Hollinger, McIntyre and Coniaurum Mines is managed through the McIntyre No. 11 Shaft, with discharge to Little Pearl Tailings Pond. The McIntyre Mine operated from 1911 to 1988.

1.2 Project Overview

Goldcorp, through PGM, is planning to develop the Hollinger Project by redeveloping the former Hollinger and McIntyre Mines area as a new open pit and UG mining complex. The open pit complex would involve the sequential development of an open pit, through a series of phased pushbacks that would be used to access shallow ore zones within 200 to 250 mbgs. The UNDERGROUND portion of the mine complex would involve the potential development of two new UG ramps and associated ventilation raises that would be used to access deeper ore zones.

Development of the new Hollinger Project would require comparatively limited new infrastructure, as ore from the Project Site would be hauled to and processed at the existing Dome Mill, with tailings from ore processing to be discharged to the existing Dome Mine tailings deposition area.

The UG operations would consist of the Millerton and Central Porphyry Zone (CPZ) UG operations. Ramps developed at the Millerton and CPZ locations would be developed to approximately 400 mbgs. Mining beyond that point would likely involve shaft hoisting. Opportunities to use existing infrastructure for the deeper mining could potentially involve using the existing Hollinger No. 26 Shaft to develop the Millerton UG, and the McIntyre No. 11 Shaft to develop the CPZ UG. Ramp development and associated UG exploration would be used to confirm UG ore resources, and the viability of UG mining.

Under the current open pit design, there would be a requirement for the disposal of approximately 37,000,000 m³ of mine rock. The majority of the mine rock (estimated at 20,000,000 - 30,000,000 m³) would be retained on the Hollinger Project Site and would be used

to backfill and overfill the initially excavated phased mine pits. Rock will also be used to build the Environmental Control Berm and the Transportation Corridor with the remainder being stored at the Dome Mine site.

Infrastructure used and/or developed to support the Hollinger Project would include:

- At the Hollinger Project Site:
 - permanent mine rock and overburden stockpiles;
 - site water collection and drainage systems (if required);
 - potentially some small fuel and petroleum product storage facilities (if required);
 - electrical connections from nearby, currently in place, Hydro One infrastructure; and,
 - natural gas (if required) from nearby, currently in place, Union Gas infrastructure.

- Off the Hollinger Project Site:
 - the approximately 4.8 km long Transportation Corridor linking the Hollinger Project Site with the Dome Mill;
 - potentially additional mine rock stockpiles (at the Dome site) (if required); and,
 - mine dewatering system from McIntyre No. 11 Shaft to Little Pearl Tailings Pond.

In addition, the Project would include the construction of an Environmental Control Berm around the Hollinger Project Site. This is a key feature of the Project with the main purpose of the Environmental Control Berm being to manage noise and other effects on nearby receptors.

Throughout the operations phase, mine rock material would be used to progressively backfill the phased mined pits. At closure, the remaining pit will be allowed to flood, and the pit discharge will likely be routed by gravity flow south to either the Skynner Creek or Perch Lake systems, both of which drain to the Mountjoy River. All remaining Project infrastructure would be removed at closure, and the Project Site would be rehabilitated in accordance with established mine closure protocols. In addition, closure will be carried out such that existing safety hazards would be removed. Part of the Closure Plan would be to ensure, through stakeholder input and working collaboration with the City of Timmins' Planning Department, that the Project Site would be landscaped in an aesthetically pleasing manner.

1.3 General Setting

The Timmins area is characterized by a mix of urban and industrial development superimposed on a forested background. The City of Timmins consists of a major downtown urban area, as well as a number of other smaller urban centres scattered throughout the area, with Schumacher, South Porcupine, and Porcupine being the more prominent of these smaller centres. Various other smaller hamlets also occur throughout the area. All of these areas were amalgamated in 1973 to form the City of Timmins.

South Porcupine and other communities to the east are linked to Timmins by Highway 101, with a commercial strip occurring along this highway between downtown Timmins and Schumacher.

Highway 655 extends north from Highway 101, with linkages to the Timmins airport via Airport and Laforest Roads, and linkages further north to Xstrata Copper's Kidd Mine site and Highway 11. Several major transmission, gas, water and sewer lines pass through the area, as well as local services.

Timmins was founded as a mining centre, with the three prominent original mines being the Hollinger Mine, the McIntyre Mine, and the Dome Mine. Of these, only the Dome Mine is still in operation. Numerous other smaller mines also operated in the local area (Section 1.4); many of which were or became linked to the three major mines at one time or another. None of these smaller historic mines are currently active. Above and below grade tailings, associated with these active and former mine sites, are widespread throughout the study area (Figure 1.1). Prominent waste rock piles are associated with the Dome Mine. There is little evidence of waste rock piles associated with the other mining operations, because all the mines, except for the Dome open pit operation, were underground mines. Waste rock produced by these underground mines was typically used as material for construction and backfill operations.

Topography in the Timmins area is dominated by its location at the transition of Precambrian Shield terrain to the south and southwest, and by flat-lying glaciolacustrine silt and clay plains to the north and east. An extensive glaciolacustrine sand plain area lies to the south of Timmins, including dune formations, and extends into the lower, southwest portion of the study area (Figure 1.2). A prominent esker system extends immediately adjacent and parallel to the east side of Highway 655, north from Highway 101. The local topography reaches a maximum of about 365 m above mean sea level (amsl) in the area just southeast of the Hollinger site and north of Gold Mine Road. Further east towards South Porcupine, and within the glaciolacustrine silt and clay plains, the local topography decreases to as little as 280 m elevation.

The geology of the Timmins area is structurally complex, and includes several major fault zones, and anticline/syncline systems, many of which control surface topographic expressions. The Pearl Lake/Little Pearl Pond and the Gillies Lake area are controlled by these features, and as a result are the location of deeper sediment accumulations. Bedrock exposures are widespread and frequent throughout the major portion of the study area, but with much reduced expression in the areas dominated by glaciolacustrine silt, clay and sand plains.

Several small lakes and numerous ponds are scattered throughout the area, with larger numbers of ponds having formed along low gradient creek valleys as a result of beaver activity. Most of the area's drainage is captured by the Porcupine and South Porcupine Rivers, which flow east, converging just upstream of Porcupine Lake, northeast of the Dome Mine site. The Porcupine River is a low gradient system that has its headwaters in the area just north and east of the Hollinger site. The Porcupine River drains into Night Hawk Lake and the Frederick House River system. Areas south and west of the Hollinger site drain to either the Skynner Creek or Perch Lake systems, both of which drain to the Mountjoy River, which flows into the Mattagami River. Areas north and west of the Hollinger site drain to Gillies Lake and the Town Creek system, which drains to the Mattagami River; or slightly further north there are a number of smaller drainages that drain directly west to the Mattagami River.

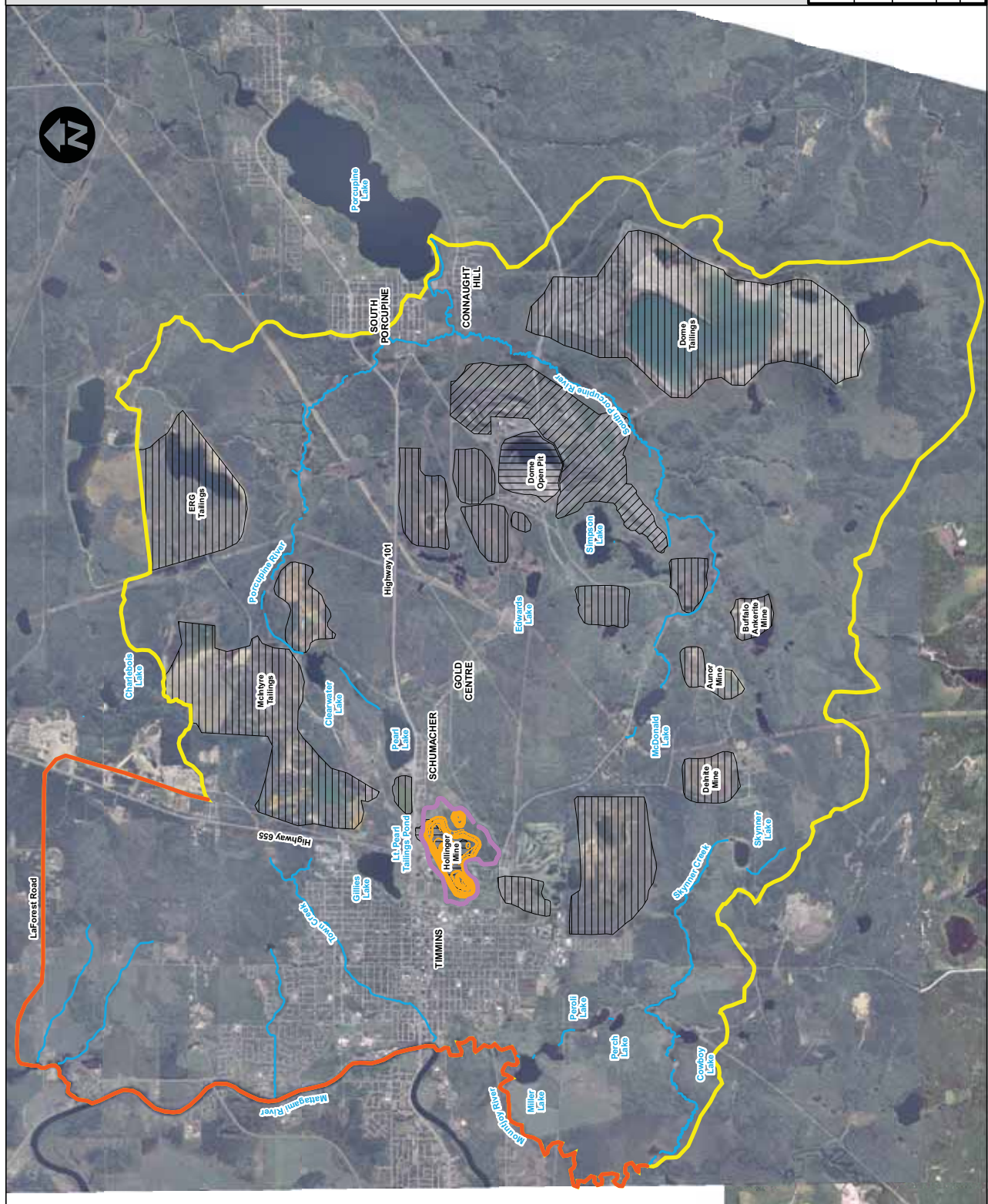
Virtually all drainages in the area have been affected by existing or past mining activities, which have affected water quality, and to a lesser extent drainage patterns themselves.

The majority of the landscape that has not been developed for urbanization or mining remains in forest cover, with the exception of principal agricultural areas to the north and south of Timmins, near to the Mattagami River, and a number of smaller parcels of land in and around the Porcupine Lake area. Forest communities in the area are virtually all second growth as a result of past logging activities, and fires. Throughout the generally lower-lying, eastern portion of the study area, forest communities are dominated by varying mixtures of Black Spruce and poplar (Trembling Aspen and Balsam Poplar), with White Spruce, Jack Pine, Balsam Fir, Larch and White Birch as common associates. Central portions of the study area, where rock outcroppings are common, show similar forest community types but with a somewhat stronger representation of Jack Pine. Sandy areas north of Gillies Lake bordering Highway 655, and south and west of the Kayorum (Hollinger) tailings stack, show a dominance of Jack Pine, or Jack Pine with poplar. The abundance of poplar in the area is indicative of the level of past disturbance, as poplar species are typically successional and not characteristic of mature forest communities. Virtually all major forest blocks are transected by roads, transmission lines, trails, or other such linear features.

1.4 Spatial and Temporal Boundaries

To encompass all potential development areas and immediate drainages there from, Local Study Area (LSA) boundaries for natural environment investigations were focused on watershed and riverine boundaries, with the exception of the northwest study area boundary, which was defined by Laforest Road and a narrow strip of land bordering the east side of Highway 655 (Figure 1.1). The narrow strip of land bordering the east side of Highway 655 was included because this area includes a small trailer park and a single residence north of the trailer park, which have the potential to be affected by possible Hollinger related developments. Biophysical environmental studies are limited to this larger area, but depending on the specific discipline, may focus only on the relevant portions of the LSA.

The socio-economic study area (SESA) is based on the City of Timmins limits, which encompass both urban and rural areas (Figure 1.3).

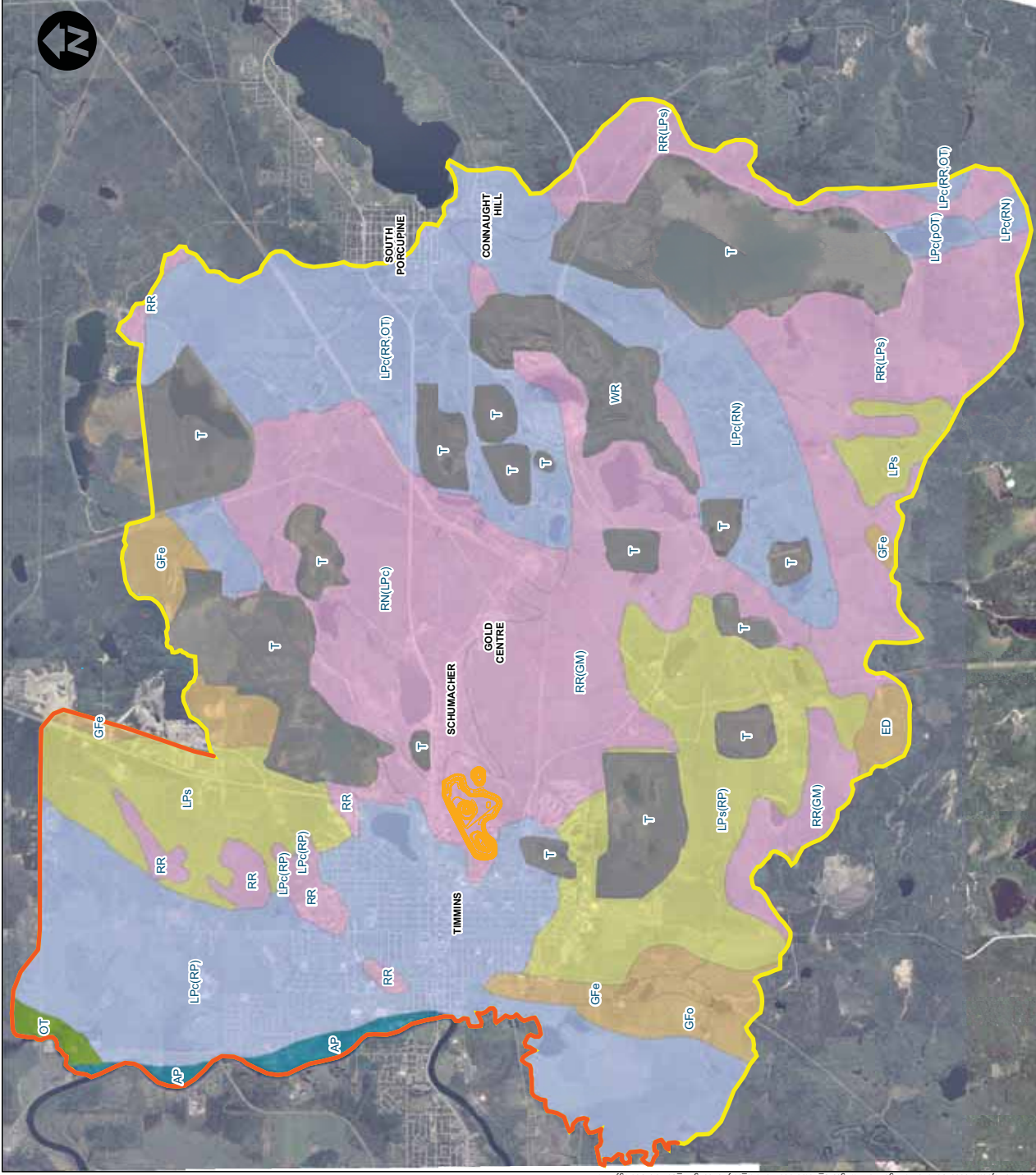


Legend:

- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- Mine Openings to Surface
- Existing Tailings Deposits
- Existing Waste Rock Deposits
- Proposed Open Pit
- Environmental Control Berm Outline
- River or Creek



HOLLINGER BASELINE STUDIES	
TIMMINS	ONTARIO
Site Location and Study Area	
SCALE: 1:52,500	DATE: September 2007
PROJECT No: TC171607	FIGURE: 1.1
	REV: 2



Legend:

- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- Proposed Open Pit

Surficial Geology Types

- 1, RR - Rock ridge
- 2, RR(GM) - Rock ridge (ground moraine) (subordinate landform types are shown in brackets)
- 3, RN(LPc) - Rock knob (lacustrine plain - clay/silt)
- 4, RR(LPc) - Rock ridge (lacustrine plain - sand)
- 5, LPc(RR, OT) - Lacustrine plain - clay/silt (rock ridge/organic terrain)
- 6, LPc(RN) - Lacustrine plain - clay/silt (rock knob)
- 7, LPc(RP) - Lacustrine plain - clay/silt (rock plain)
- 8, LPs(RP) - Lacustrine plain - sand (rock plain)
- 9, LPs - Lacustrine plain - sand
- 10, LPc(OT) - Lacustrine plain - clay/silt (organic terrain)
- 11, GFe - Glacial-fluvial outwash - sand
- 12, GFe - Glacial-fluvial esker - sand
- 13, ED - Dunes - sand
- 14, AP - Alluvial plain
- 15, OT - Organic terrain
- 16, T - Tailings
- 17, WR - Waste rock

SOURCE: Northern Ontario Engineering Geology Terrain Study Base Maps - Timmins (Map 5025) and parmour (Map 5026)



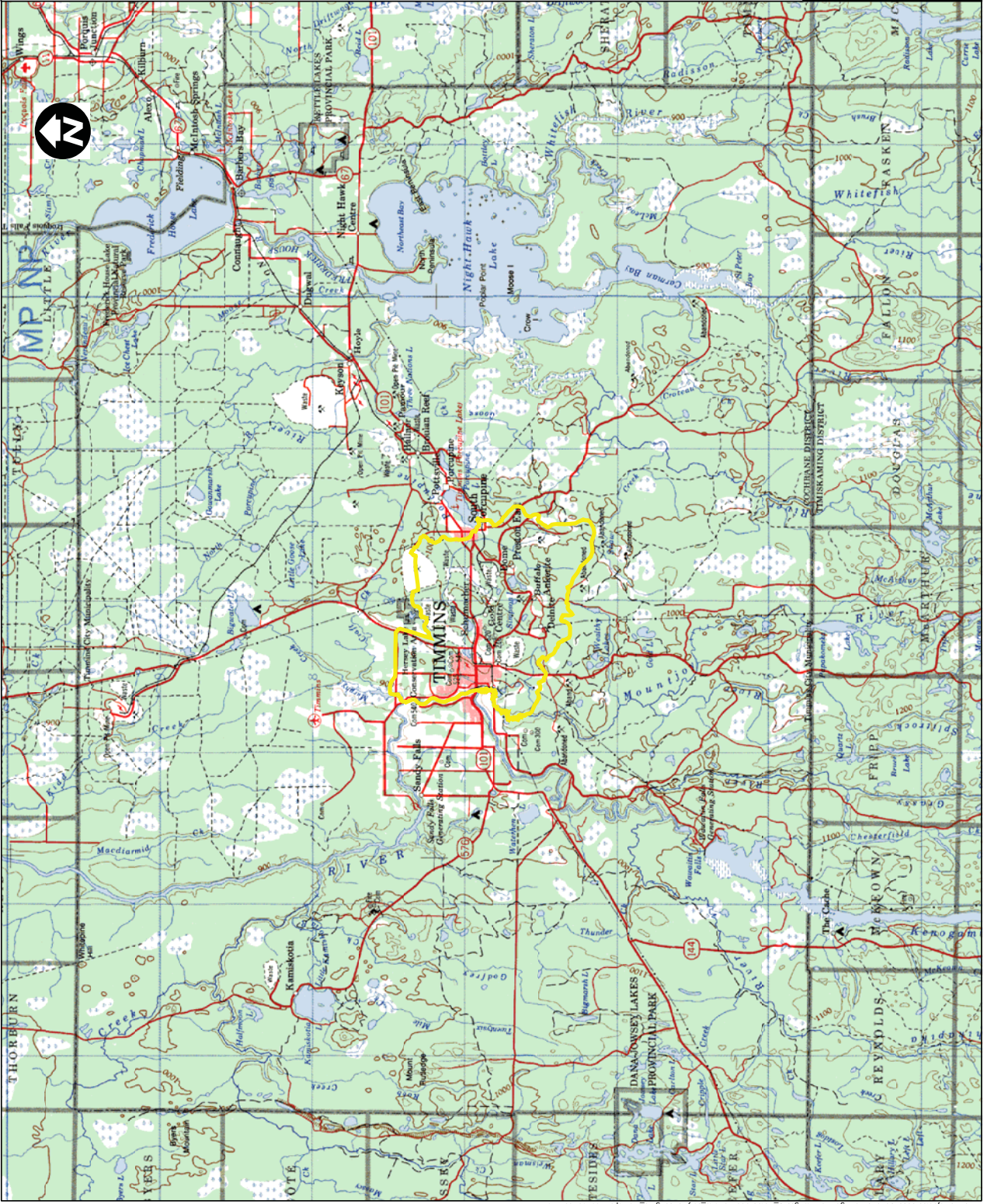
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HOLLINGER BASELINE STUDIES
TIMMINS ONTARIO

Surficial Geology

SCALE: 1:53,000 DATE: October 2007

PROJECT No: TC171507 FIGURE: 1.2 REV: 2

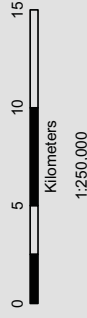


Legend:



Study Area

NOTE: Base map supplied by Geomatics Canada,
Department of Natural Resource



HOLLINGER BASELINE STUDIES
TIMMINS ONTARIO

**Study Area and
City of Timmins Municipal Boundary**

SCALE: 1:250,000 DATE: October 2007

PROJECT No: TC71507 FIGURE: 1.3 REV: 2

2.0 METHODOLOGY

AMEC conducted a terrestrial biophysical inventory of the study area to characterize and evaluate the existing environment and to provide baseline data as input to pre-feasibility designs and to support the EA process and permitting for the Hollinger Project. The inventory comprised of a review of existing data sources directly relevant to the study area, as well as a number of specific field surveys, which were conducted during spring and summer of 2007. The existing data sources were used to obtain a general understanding of the biophysical site characteristics. Existing information on flora and fauna of the study area was also applied in the development of preliminary habitat delineations and in the design of specific wildlife surveys. Field surveys were completed during the weeks of June 5 to 8 and June 25 to 29, 2007 and included a total of 180 hours.

2.1 Existing Data Sources

Material relevant to the biophysical inventory of the study area was reviewed at the start of the inventory. Reviewed documents, together with a brief synopsis of the key content and relevance of the individual sources to the Project, are presented in Table 2.1. These reports provided information with respect to biophysical site characteristics, habitat, wildlife, rare species and communities, and general cultural/historic aspects of the study area.

**TABLE 2.1
 EXISTING DATA SOURCES**

Organization	Data Type	Natural Features/Values
Ontario Ministry of Natural Resources	Natural Heritage Information Centre (NHIC)	Lists and locations of ANSI's, PSW's and ESA's, lists provincial ranks for species and plant communities found in Ontario.
Bird Studies Canada	Bird species of conservation concern, regional rarity ranks	Species lists
Environment Canada - <i>Migratory Birds Convention Act</i>	Bird species list that fall under this act.	Species lists
Environment Canada - <i>Fish and Wildlife Conservation Act</i>	Wildlife that falls under this act.	Species lists
Environment Canada	<i>Species-at-Risk Act</i> and wildlife that fall under this act.	Species lists
Ontario Ministry of Natural Resources	Ontario Herpetofaunal Summary Atlas	Amphibian and Reptile species conservation ranks and range maps.

Notes: ANSI – Area of natural and Scientific Interest
 PSW – Provincially Significant Wetland
 ESA – Environmentally Sensitive Area

2.2 Vegetation Community Mapping and Inventory

Prior to undertaking the classification of habitats from field inventories, recent LIDAR images (May 2006) and Forest Inventory Maps (Ontario Ministry of Natural Resources, 1981 & 1992) were utilized to generate a preliminary map of vegetation communities. The vegetation boundaries were then checked in the field and adjusted as necessary. A Provincially standardized approach based on vegetation, soil and hydrological site characteristics was used to classify all vegetation communities. This approach also provides a standardized geographic reference for wildlife and plant species surveys. For each vegetation community type, several representative polygons were selected for detailed study and all relevant ecological site data were recorded and documented. New vegetation communities identified during the field survey were also recorded.

Timmins is located within the northeastern region of Ontario (Ecoregion 3E). Characteristic vegetation communities for this region are described by the *Field Guide to Forest Ecosystems of Northeastern Ontario* (FECO; Taylor *et al.*, 2000). The FECO classifies mature, undisturbed forests. Other vegetation types such as, wetlands, cliffs, rock barrens and communities created by human disturbance are not covered by the FECO. The Ecological Land Classification (ELC) system (Lee *et al.* 1998) was used to describe communities not included in the FECO.

Wetlands were evaluated and classified based on the methodology outlined in the Northern Wetland Evaluation Manual which delineates wetlands to the community level (fen, bog, swamp and marsh; Ontario Ministry of Natural Resources, 2002). Northeastern Ontario does not have specific guides describing wetland vegetation communities. For this reason, the ELC system was used to describe wetland communities.

Vegetation surveys were conducted in June of 2007. All distinct vegetation communities were delineated in map format. Ecosystems were classified based on the composition of dominant species (Taylor *et al.* 2000; Lee *et al.* 1998). Species were identified using field guides (Taylor *et al.* 2000; Soper and Heimburger, 1982; Voss, 1972). Each community type was documented with photographs (Appendix A). During the vegetation surveys, the study team also recorded any signs of wildlife or wildlife activity encountered.

The field inventory information was used in the preparation of a map delineating the boundaries of the vegetation communities. Mapping was conducted using LIDAR aerial photographs and entered into a Geographic Information System (GIS), ARC View 9.1. The GIS database allowed calculations of the absolute and relative areas for each plant community within the study area.

2.3 Wildlife Surveys

Specific wildlife surveys were undertaken in June of 2007 with the aim of confirming the presence/absence and habitat utilization of breeding birds. Incidental wildlife observations (based on tracks, calls and scat) of other wildlife such as mammals, amphibians and reptiles were also recorded during the vegetation surveys. Significant wildlife habitat was identified,

including snags, burrows and other habitat features. Particular care was taken during the field work to detect any federally or provincially designated species.

2.3.1 Birds

Species specific bird surveys were conducted throughout the breeding season. Distinct methods were used based on the groups of species targeted.

Playback Surveys

Marsh bird surveys were based on the monitoring procedures from standard protocols outlined in the *Marsh Monitoring Program* (Gartshore et al. 1995; Bird Studies Canada 2001). Survey stations were separated by a minimum of 250 m in an attempt to eliminate the possibility of pseudoreplication at multiple stations. Each of the marsh sites was visited between the hours of 6:00 pm and 9:00 pm between June 25 and 29, 2007 (Figure 2.1 and Appendix B).

A five minute broadcast tape consisting of a series of playback calls from: Virginia Rail (*Rallus limicola*), Sora (*Porzana carolina*), Pied-billed Grebe (*Podilymbus podiceps*) and a combination of Common Moorhen (*Gallinula chloropus*) and American Coot (*Fulica americana*) were played at each survey station. Prior to and after playing the recordings, five minutes of silence was observed to determine if any species were calling naturally. For each species that responded to the recordings, the number of individuals heard and the approximate call location was recorded. To ensure accurate comparisons, survey techniques across marsh sites were identical in the sequence of calls played.

Breeding Bird Surveys

Breeding bird surveys were undertaken in accordance with the protocols described for the *Ontario Breeding Bird Atlas* (Cadman et al., 1987; Birds Ontario, 2007). A single visit was made to 40 individual point count stations located a minimum of 300 m apart (Figure 2.2 and Appendix B). Surveys were completed between 5:00 am and 10:00 am during the weeks of June 5 to June 8 and June 25 to June 29, 2007. The point count protocol was modified to include counts of 10 minutes duration at a stationary point. All bird surveys were undertaken in good weather with warm temperatures, no precipitation, and little or no wind.

Species were identified through their unique vocalizations, as well as visual observations. Breeding behaviour and evidence was noted and recorded following the coding for "Possible", "Probable" and "Confirmed" breeding used in the *Ontario Breeding Bird Atlas* (Cadman et al. 1987). Incidental records were made throughout all hours of the day during the other surveys.

Visual Surveys

Binocular searches were conducted daily throughout the field program. Individuals displaying breeding behaviours such as agitated behaviour, or the maintenance of permanent territories

(presumed through detection of a territorial song on at least two separate occasions, a week or more apart, in the same location), were used to report “probable” breeding activity. The presence of nests, young, or individuals carrying food was reported as “confirmed” breeding activity (Birds Ontario, 2007).

2.3.2 Mammals

During the vegetation surveys incidental observations of mammals and evidence of mammalian activity were recorded to provide distribution data on any mammal species present in the study area.

2.3.3 Amphibians and Reptiles

Any amphibian or reptile species seen or heard incidentally throughout the course of the study were noted as supplemental observation. Particular care was taken during the Marsh Bird Surveys as well as the vegetation surveys of wetlands, to focus searching in locations where these species were likely to be found. Binocular searches of wetlands, roads and rock barrens were conducted during the day to detect basking turtles and snakes. Also, coarse woody debris, including fallen logs and branches were flipped over during the vegetation surveys to check for salamanders or other amphibians.

2.3.4 Invertebrates

Invertebrate records of butterfly species are based on incidental observations made during the course of other fieldwork.

2.4 Species at Risk

The terrestrial baseline study also considered the presence of species protected under federal and provincial legislation. These species, if present, had a reasonable likelihood of being detected during the Breeding and Marsh Bird Surveys. Table 2.2 lists the national and provincial Species at Risk which are potentially present in the region. Species at risk are plant or animal species whose individuals or populations are considered Extirpated, Endangered, Threatened, or of Special Concern in Canada, as determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2006). Species at risk and activities within their critical habitat are regulated by the federal *Species At Risk Act (SARA)*. Wildlife species that are considered at risk have been listed under either Schedules 1, 2, or 3 of *SARA*. On private land, these prohibitions apply **only** to listed **aquatic species** and listed **migratory birds** that are also listed in the Migratory Birds Convention Act (*MBCA*, 1994).

**TABLE 2.2
 SPECIES AT RISK POTENTIALLY LOCATED ON STUDY SITE**

Species	SARA Rank	SARO Rank	Breeding Habitat	Potential Polygons on Site	Total Area (ha)
Peregrine Falcon	Special Concern	Threatened	Cliff walls, Open pit mines	155	111.88
Yellow Rail	Special Concern	Special Concern	Moist areas dominated by low herbaceous vegetation - sedges, grasses and rushes	6,13,30,123,126	25.14
Short-eared Owl	Special Concern	Special Concern	Extensive grasslands or grassy marshes	6,13,30,123,126	25.14*
Golden Eagle	N/A	Endangered	Cliff walls, Open pit mines	155	111.88
Black Tern	N/A	Special Concern	Wet areas with dense vegetation such as freshwater marshes and wet meadows	6,13,30,37,39,40,42,54,75,86,88,116,117,118,123,125,126,128,142,149,150,172,186,189,191,229	539.33
Bald Eagle	N/A	Special Concern	Large trees near open water	64,65,110,152,153,196,198,199,200,201,202,203	N/A**
Great Gray Owl	N/A	Special Concern	Open or treed bogs, uses abandoned nest from other large raptor or squirrel	10,239	26.33

* In future, if tailings areas regenerate into grasslands an additional 1123 ha of suitable habitat could be available

** Cannot calculate area as we only have area for entire polygons while Bald Eagles would most likely utilize only the trees nearest the shoreline.

The Province of Ontario has its own species assessment body, the Committee on the Status of Species at Risk in Ontario (COSSARO). The national and provincial species lists are similar; however, the scope of assessment differs. Species designated as Endangered (regulated) on the Species at Risk in Ontario (SARO) list are protected under Ontario's *Endangered Species Act (ESA)*. Species designated as Endangered (not regulated) on the SARO list are eligible for consideration for regulated endangered status under the *ESA*. The *Act* operates to protect vulnerable species themselves, as well as the habitat they depend on for survival and recovery (Ontario Ministry of Natural Resources, 2006).

2.5 Survey Equipment and Standardization

Prior to the initiation of the call-response surveys, the acoustic range of the CD player was checked to ensure that the broadcast CD could be heard up to 500 m away as prescribed by *Bird Studies Canada* guidelines (Crewe and Badzinski, 2006). All call-response surveys were conducted using portable Sony MP3 players and Amp Can 15 VDC 400mA amplifiers. All visual searches were conducted using Nikon Monarch 8 x 42 and Nikon Monarch 10 x 42 binoculars. Locations of call-response playback stations and auditory stations were recorded using a

Garmin GPS 76 unit. Species identification was determined using Sibley (1999) and the official bird call registry from the *Ontario Breeding Bird Atlas* (Salvadori 1995).

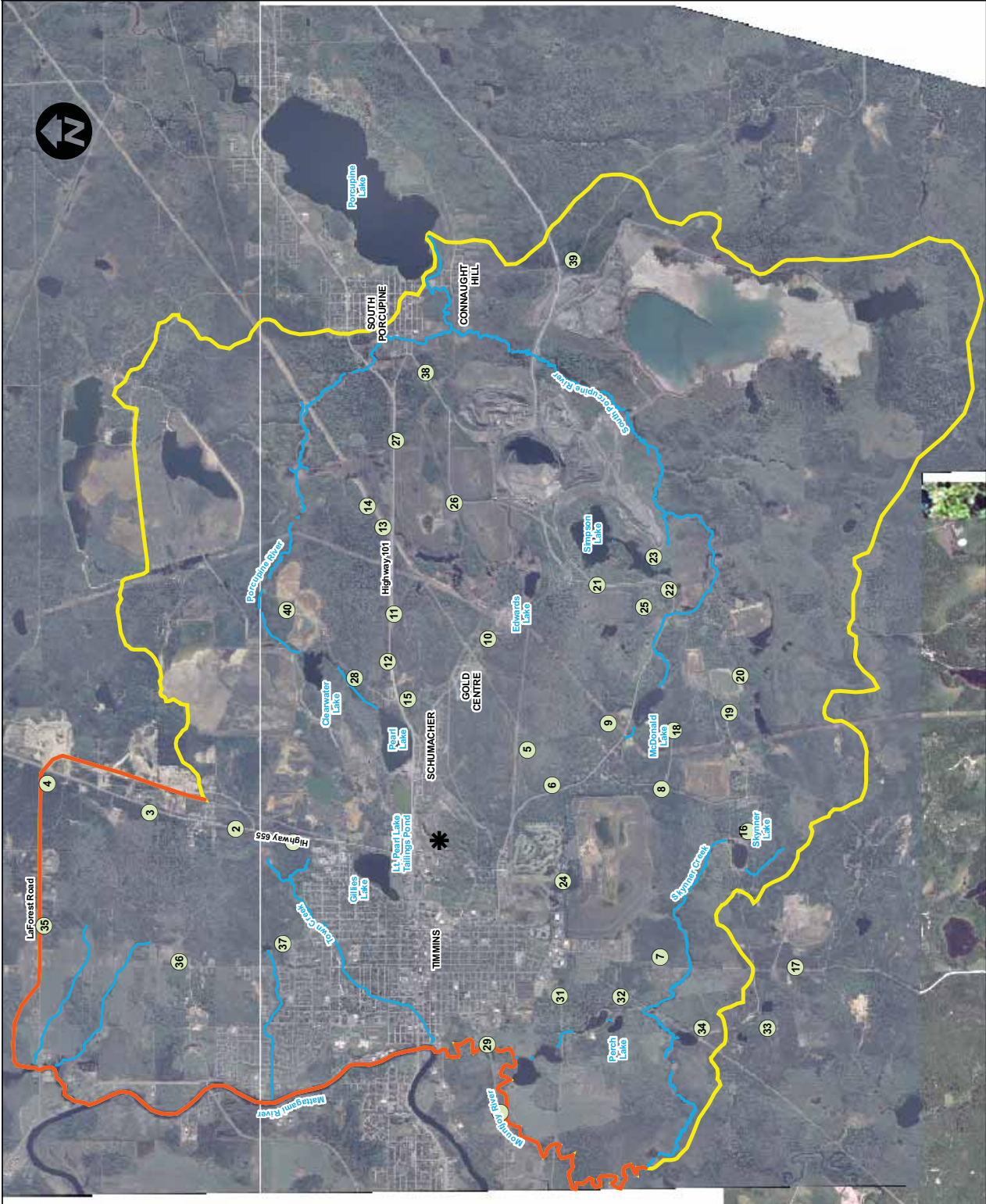


Legend:






- * Proposed Hollinger Pt Centroid
- 1 Playback Survey Locations
- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- River or Creek



amec	
HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Bird Call Playback Survey Locations	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 2.1
	REV: 1



Legend:

-  Proposed Hollinger Pit Centroid
-  Survey Station Location
-  Study Area (Watershed Boundary)
-  Study Area (Riverine and Road Boundary)
-  River or Creek



	
HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Breeding Bird Point Count	
Survey Locations	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 2.2
	REV: 1

3.0 RESULTS

3.1 General Site Description

As described in Section 1.3, the study area is located on the border of two distinct terrain types; to the south and west is Precambrian Shield terrain and to the north and east are the low lying clay plains. Local topography reaches a maximum elevation of about 365 m above average sea level in the area just southeast of the Hollinger Mine site and north of Gold Mine Road. Within the clay plains, near the community of South Porcupine, the local topography is as low as 280 m in elevation.

The LSA is dominated by deciduous forest comprised of Trembling Aspen (*Populus tremuloides*) and White Birch (*Betula papyrifera*). Black Spruce (*Picea mariana*), and Trembling Aspen - Jack Pine (*Pinus banksiana*) stands are also relatively common. The understory is dominated by Beaked Hazel (*Corylus cornuta*), Mountain Maple (*Acer spicatum*) and Bush Honeysuckle (*Diervilla lonicera*). The wetlands on site are most commonly marshes comprised of Wide-leaved Cattail (*Typha latifolia*).

There is extensive history of mining, forestry and urbanization on the study site which is reflected in many vegetation communities present. The city of Timmins and several smaller urban communities are located within the study site. On site there is one active mine (Dome Mine) as well as numerous historic tailings areas and mine structures. This history of general area disturbance is reflected in the vegetation communities on the site as many are characterized by young stands of Trembling Aspen, Balsam Poplar (*Populus balsamifera*) and White Birch, all of which are considered pioneer species, colonizing newly disturbed areas.

3.2 Vegetation Communities

The study area is comprised of 27 distinct plant communities as summarized in Table 3.1 and depicted in Figure 3.1. Figure 3.1 shows the vegetation communities in areas where proposed development is possible; areas where vegetation information is not available are due to a combination of no development proposed for that site area and a lack of accessibility due to safety restrictions. Table 3.1 lists all of the vegetation polygons and their associated vegetation community classifications. Appendix C lists all of the vegetation communities as well as the area covered by each vegetation type. A photographic record and detailed descriptions of the frequently observed vegetation communities in the study area is contained in Appendix A.

3.2.1 Deciduous Forest

Five different deciduous forest vegetation community types occur within the study area: White Birch–Mountain Maple stands (V2); Trembling Aspen–Bush Honeysuckle–Large-leaved Aster Stands (V5); Trembling Aspen–White Birch–Beaked Hazel–Bracken Fern stands (V6); Trembling Aspen–Balsam Poplar–Speckled Alder stands (V10); and Balsam Poplar–Trembling Aspen–Mountain Maple–Ferns stands (V13) (FEC-NE).

**TABLE 3.1
 VEGETATION COMMUNITY TYPES**

Habitat Type	Polygon Numbers	Vegetation Type	Code
Deciduous	159,160,161,162,163,164,165,174,175	White Birch – Mountain Maple	V2
	48,55,56,74,168,169,170,213,222,224	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5
	19,24,25,31,32,34,41,43,51,65,66,68,72,77,83,94,107,109,110,114,130,131,140,141,152,156,157,166,171,181,182,184,187,192,195,199,201,202,203,204,205,206,208,209,211,212,230,231,246	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6
	64,67,217,218,219,220,221,225,226,227	Trembling Aspen – Balsam Poplar – Speckled Alder	V10
	22,45,46,57,58,59,60,61,62,79,108,111,127,129	Balsam Poplar – Trembling Aspen – Mountain Maple - Ferns	V13
Mixedwood	29,158	White Birch – White Spruce	V1
	7,28	Trembling Aspen – Black Spruce – Bush Honeysuckle – Herb Rich	V11
	73,143,178	White Spruce – Jack Pine – Trembling Aspen	NAC1
	1,44,223	Balsam Fir – Trembling Aspen	NAC2
	12,17,18,80,84,100,101,102,119,121,132,137,153,185	Jack Pine – Trembling Aspen	NAC3
	179,180	White Birch – Jack Pine	NAC4
Coniferous	9,47,49,50,52,53,120,122,133,134,135,167,176,177,193,194,196,200,210,216	Black Spruce – Herb Rich	V15
	2,4,5,15,35,103,113	Jack Pine – Black Spruce – Feathermoss	V17
	3,36,38,78,82,	Black Spruce – Jack Pine – Feathermoss	V20
Sand Barren	33,70,124,144,145,147,235,236,237,245,248,249	Cultural Shrub Sand Barren	SBS1
Cultural Plantation	16,20,81,89,90,91,97,98,106,136,207	Jack Pine Coniferous Plantation Type	CUP3-4
Cultural Meadow	112	Mineral Cultural Meadow Ecosite	CUM1
Cultural Thicket	96,99,154,242	Mineral Cultural Thicket Type	CUT1
Mine	155,238,240,241,243,244,247	Mine Structures	
Cultural	115	Golfcourse	
Swamp	93,95,104,	Black Spruce Organic Coniferous Swamp	SWC4-3
	8,92,105,198	Tamarack – Black Spruce Organic Coniferous Swamp	SWC4-1
	214,215	Alder Mineral Thicket Swamp Type	SWT2-1
Fen	13,30,123	Open Fen	FEO1
	11	Leatherleaf – Forb Shrub Fen Type	FES1-4
Bog	10,239	Black Spruce Treed Bog Type	BOT1-1
Marsh	6,126	Horsetail Mineral Meadow Marsh Type	MAM2-7
	37,39,40,42,54,75,86,88,116,117,118,125,128,139,142,149,150,172,186,189,191,229	Cattail Shallow Marsh Type	MAS2-1
Open Water	14,26,27,63,69,71,76,85,87,138,146,173,183,188,190,197,228,234	Open Aquatic	OAO

Lower stories consist of the same species found in the canopy, as well as scattered White Spruce (*Picea glauca*) and Balsam Fir (*Abies balsamea*). Beaked Hazel, Bush Honeysuckle, Speckled Alder (*Alnus incana*) and Prickly Rose (*Rosa acicularis*) are common shrub species. Bracken Fern (*Pteridium aquilinum*) and Large-leaved Wood-Aster (*Eurybia macrophylla*) are common species found in the herbaceous layer.

Balsam Poplar dominated stands were found in association with areas that were wet and had poor drainage regimes, typically areas comprised heavy clay soils. These stands were often found adjacent to streams and had abundant speckled alder in the understory.

Trembling Aspen – White Birch- Beaked Hazel – Bracken Fern stands (V6) are the most abundant community type throughout the study area with an area of approximately 1,306 ha (Table 3.1). The current and historical mine sites across the study area are surrounded by this young forest type (Figure 3.1). Most of the Trembling Aspen and White Birch stands are young and show evidence of recent disturbance. These pioneer species are fast growing and are the first to colonize a disturbed area, creating the distribution of these stands across the heavily disturbed study site.

3.2.2 Mixed Forest

The mixed forest on site is comprised in varying proportions of: Trembling Aspen, Jack Pine, White Birch, White Spruce, Black Spruce and Balsam Fir. There are six mixed forest vegetation types, of which only two are described in the FECO: White Birch-White Spruce (V1) and Trembling Aspen-Black Spruce-Bush Honeysuckle-Herb Rich (V11). The remaining four mixed forest vegetation types documented during the field surveys are not described in the guide: 1) White Spruce-Jack Pine-Trembling Aspen; 2) Balsam Fir-Trembling Aspen; 3) Jack Pine-Trembling Aspen; 4) White Birch-Jack Pine. This discrepancy is due to the disturbed nature of this site.

Jack Pine – Trembling Aspen stands (NAC3) are the most abundant mixedwood forest type covering an area of approximately 280 ha. Trembling Aspen – Black Spruce – Bush Honeysuckle – Herb Rich (V11) stands were only slightly less common, covering an approximate area of 254 ha.

Common species found in the understory of the mixed forest stands included; Eastern White Cedar (*Thuja occidentalis*), Mountain Maple, Bush Honeysuckle, Red-osier Dogwood (*Cornus stolonifera*), Bracken Fern, Wild Sarsaparilla (*Aralia nudicaulis*) and Bunchberry (*Cornus canadensis*).

3.2.3 Coniferous Forest

There are three types of coniferous forest communities present within the study area: Black Spruce-Herb Rich (V15); Jack Pine-Black Spruce-Feathermoss (V17); and Black Spruce-Jack Pine-Feathermoss (V20).

Black Spruce – Herb Rich stands (V15) are the most abundant coniferous forest type occupying an area of approximately 383 ha. Black Spruce – Jack Pine – Feathermoss (V20) has the next highest abundance with an approximate area of 250 ha.

Trembling Aspen, White Birch, Balsam Fir, White Spruce and White Cedar were occasionally present in the canopy level as well. Subcanopy and shrub layers in these forest types contained mainly those species listed above in conjunction with several species of ericaceous shrub including Laurel (*Kalmia angustifolia*, *K. polifolia*) and Blueberry (*Vaccinium angustifolium*, *V. myrtilloides*) species as well as Snowberry (*Gaultheria hispidula*).

3.2.4 Cultural Plantation

These are highly disturbed areas that have been planted. The dominant species, Jack Pine, are all of uniform age and planted in rows. Most of these stands were mature, containing large trees and diverse understories. White Birch and Trembling Aspen (fast growing pioneer species) are often present in the subcanopy and shrub layers. Small Balsam Fir can be found in the shrub layer joined by Willow species (*Salix sp.*) and Bush Honeysuckle. The ground layer is covered by moss (*Sphagnum sp.*, *Dicranum sp.*, *Pleurozium schreberi*) and Lichen species (*Cladonia sp.*). The majority of Jack Pine Plantations on the study site were found in the south west corner (Figure 3.1) where the terrain is characterized by predominantly sandy conditions suited to the growth of this species. Cultural Plantations take up a fairly large area within the study site, approximately 251 ha. This value is similar to that of many of the natural forest types.

3.2.5 Cultural Thicket

Cultural thickets are regenerating areas previously cleared or disturbed and often dominated by Trembling Aspen, Balsam Poplar, White Birch and Willow species. Other common species forming the upper canopy can include; both Alder species, both Cherry species (*Prunus virginiana*, *Prunus pensylvanica*), Red-osier Dogwood and Black Spruce. Lower stories consist of the same species found in the canopy. Ground cover is dominated by grasses.

This site type has a long history of disturbance and most of the disturbed areas have regenerated past the thicket stage. The thickets present are adjacent to the Dome mine and the waste management facility in the south west corner of the study area. The thickets contain pioneer species which are fast growing and are the first to colonize a disturbed area; explaining the distribution of these stands across the heavily disturbed study site.

3.2.6 Cultural Meadow

There is one grass meadow community located behind a housing community surrounded by forest. The meadow was comprised mainly of grass and contained such species as Ox-eyed Daisy (*Chrysanthemum leucanthemum*) and Orange Hawkweed (*Hieracium aurantiacum*) which were present in other disturbed areas on the project site.

3.2.7 Sand Barren

There are several tailings areas within the study area scattered around the various mine sites (Figure 1.1 and 3.1). The tailings areas examined all seemed to have moderate levels of regeneration. Some hardy shrubs had begun to grow, however the ground layer was still very open and vegetation was sparse. Species that were present include; Bird's Foot Trefoil (*Lotus corniculata*), Yarrow (*Achillea sp.*), Hawkweed and Ox-eye Daisy. In the shrub layer, naturally regenerating species included Balsam Poplar, Willow and Serviceberry (*Amelanchier sp.*). Small White Spruce and White Birch were also present.

The Sand Barrens on the study site occupied a combined area of 1123 ha. Making them the second most abundant plant community type; exceeded only by the most prevalent community type on the site (Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern forest type).

3.2.8 Swamp

There were two coniferous swamp types present within the study area; Tamarack-Black Spruce; and Black Spruce. These wet communities have extensive vernal pools amid the Sphagnum mosses which make up the ground cover. In the shrub layer, Speckled Alder is present along with various ericaceous shrubs including; Labrador Tea (*Ledum groenlandica*), Sheep Laurel, Small Cranberry (*Vaccinium oxycoccos*) and Blueberry.

The total area occupied by Tamarack – Black Spruce swamp is notably large at approximately 290 ha. This value exceeds that of many of the forest types.

On the study site there was one area with a large Alder Thicket Swamp which followed the South Porcupine River (Figure 3.1). This area is a wet community with extensive vernal pools and hydrophilic shrubs. Speckled Alder is dominant with Willow, Balsam Poplar, Choke Cherry, Red-osier Dogwood and young White Birch also abundant. Ground cover includes numerous Sedge species (*Carex sp.*), Canada Bluejoint (*Calamagrostis canadensis*), Joe Pye-weed (*Eupatorium maculatum*), Reed Canary Grass (*Phalaris arundinacea*) and Blue Flag (*Iris versicolor*). Many of the wetlands along the rivers and creeks within the study site contained small areas of Alder Thicket Swamp around their periphery; however this was the only Alder Thicket Swamp large enough to be classified as a separate ELC community.

3.2.9 Fen

There were four fens present on the study site, three of which were open fens. These wet communities are dominated by numerous species of sedges, grasses, bulrushes (*Trichophorum alpinum*, *Schoenoplectus sp.*) and horsetails (*Equisetum palustre*, *Equisetum variegatum*). Substrate is thick mix of mosses and sedge peat. Species found in the sparse shrub layer include Black Spruce, Willow and White Cedar. The one shrub fen present is dominated by Leatherleaf (*Chamaedaphne calyculata*) and other species of ericaceous shrubs including; Labrador Tea, Bog Laurel and Bog Rosemary (*Andromeda polifolia*). Speckled Alder is also common in the shrub layer.

3.2.10 Bog

Only two bogs were detected within the study area. These are wet communities dominated by *Sphagnum* mosses and low ericaceous shrubs. Black Spruce dominates the sparse canopy and Tamarack (*Larix laricina*) and Eastern White Cedar join in the subcanopy and shrub layers. The shrub layer also includes; Speckled Alder, Willow, Labrador Tea, Leatherleaf, Sheep Laurel, Late Lowbush Blueberry and Creeping Snowberry.

3.2.11 Marsh

All but two of the marshes within the study area were dominated by Wide-leaved Cattail. As a result the level of diversity seen within these wetlands was low. The two different communities were meadow marsh types dominated by Water Horsetail (*Equisetum fluviatile*). Both marsh types were populated by hydrophilic sedges and shrubs most notably Speckled Alder and Willow species, together with Black Spruce and Balsam Poplar.

Cattail marshes were the most abundant wetland type with an area of approximately 528 ha and are the third most abundant vegetation community on site. The marshes within the study area track the waterways. Most of the creeks, rivers, ponds and lakes are lined with cattail marsh communities (Figure 3.1). Most notable are the predominately cattail marshes along the South Porcupine River and Skynner Creek.

3.2.12 Open Water

Plant species present in this vegetation community live either in, on or near the water. Speckled Alder and Black Spruce are found growing around the edges of open water. Other species found frequently near open water include; Canada Bluejoint, Sedges and Bulrushes. Species found in or on the water include Cattails, Pondweed (*Potamogeton sp.*, *Stuckenia filiformis*), Water Plantain (*Alisma triviale*), Broadleaf Arrowhead (*Sagittaria latifolia*) and Yellow Pond-Lily (*Nuphar variegatum*).

3.3 Plants

The compiled plant species list with their associated federal and provincial ranks are presented in Table 3.2. No provincially or federally threatened or endangered species were found during the field surveys.

**TABLE 3.2
 COMPILED LIST OF PLANT SPECIES**

Family	Latin Name	Common Name	Global Status	Provincial Status
Aceraceae	<i>Acer rubrum</i>	Red Maple	G5	S5
	<i>Acer spicatum</i>	Mountain Maple	G5	S5
Alismataceae	<i>Alisma triviale</i>	Northern Water Plantain	G5	S5
Apiaceae	<i>Aegopodium podagraria</i>	Goutweed	G?	SE5
	<i>Heracleum lanatum</i>	Cow-Parsnip	G5	S5
Apocynaceae	<i>Apocynum androsaemifolium</i>	Spreading Dogbane.	G5	S5
Araliaceae	<i>Aralia nudicaulis</i>	Wild Sarsaparilla	G5	S5
Asteraceae	<i>Anaphalis margaritacea</i>	Pearly Everlasting	G5	S5
	<i>Centaurea</i> sp.	Cornflower sp.		
	<i>Chrysanthemum leucanthemum</i>	Ox-eye Daisy	G?	SE5
	<i>Cirsium muticum</i>	Swamp Thistle	G5	S5
	<i>Eupatorium maculatum</i>	Spotted Joe-pye-weed	G5?	S5
	<i>Eurybia macrophylla</i>	Large Leaf Wood-Aster	G5	S5
	<i>Hieracium aurantiacum</i>	Orange Hawkweed	G?	SE5
	<i>Hieracium caespitosum</i>	Yellow Hawkweed	G?	SE5
	<i>Petasites frigidus</i>	Sweet Coltsfoot	G5	S5
	<i>Solidago</i> sp.	Goldenrod sp.		
	<i>Solidago Canadensis</i>	Canada Goldenrod	G5T5	S5
	<i>Solidago rugosa</i>	Rough-stemmed Goldenrod	G5	S5
	<i>Solidago uliginosa</i>	Bog Goldenrod	G4G5	S5
	<i>Taraxacum officinale.</i>	Common Dandelion	G5	SE5
Betulaceae	<i>Alnus incana</i>	Speckled Alder	G5	S5
	<i>Alnus viridis</i>	Green Alder	G5	S5
	<i>Betula pumila</i>	Swamp Birch	G5	S5
	<i>Betula papyrifera</i>	Paper Birch	G5	S5
	<i>Corylus cornuta</i>	Beaked Hazelnut	G5	S5
Boraginaceae	<i>Mertensia paniculata</i>	Tall Northern Bluebells	G5	S5
Campanulaceae	<i>Campanula rotundifolia</i>	American Harebell	G5	S5
	<i>Campanula aparinoides</i>	Marsh Bellflower	G5	S5
	<i>Lobelia kalmii</i>	Kalm's Lobelia	G5	S5
Caprifoliaceae	<i>Diervilla lonicera</i>	Northern Bush Honeysuckle	G5	S5
	<i>Linnaea borealis</i>	Twinflower	G5	S5
	<i>Lonicera Canadensis</i>	Canada Fly-Honeysuckle	G5	S5
	<i>Lonicera hirsute</i>	Hairy Honeysuckle	G4G5	S5
	<i>Lonicera oblongifolia</i>	Swamp Fly-Honeysuckle	G4	S4S5

Family	Latin Name	Common Name	Global Status	Provincial Status
	<i>Sambucus racemosa pubens</i>	European Red Elder	G5	S5
	<i>Viburnum acerifolium</i>	Maple-leaf Viburnum	G5	S5
	<i>Viburnum trilobum</i>	Highbush Cranberry	G5T5	S5
Cornaceae	<i>Cornus Canadensis</i>	Bunchberry	G5	S5
	<i>Cornus rugosa</i>	Round-leaved Dogwood	G5	S5
	<i>Cornus stolonifera</i>	Red-osier Dogwood	G5	S5
Cupressaceae	<i>Thuja occidentalis</i>	Eastern White Cedar	G5	S5
Cyperaceae	<i>Carex</i> sp.	Sedge sp.		
	<i>Carex aquatilis</i>	Water Sedge	G5	S5
	<i>Carex aurea</i>	Golden-fruited Sedge	G5	S5
	<i>Carex intumescens</i>	Bladder Sedge	G5	S5
	<i>Carex viridula</i>	Little Green Sedge	G5	S5
	<i>Eriophorum vaginatum</i>	Tussock Cottongrass	G5	S5
	<i>Schoenoplectus pungens</i>	Three-Square	G5	S5
	<i>Scirpus</i> sp.	Bulrush sp.		
	<i>Scirpus cyperinus</i>	Wool Grass	G5	S5
	<i>Trichophorum alpinum</i>	Alpine Leafless-bulrush	G5	S5
Dennstaedtiaceae	<i>Pteridium aquilinum</i>	Bracken Fern	G5	S5
Dryopteridaceae	<i>Athyrium filix-femina</i>	Lady Fern	G5T5	?
	<i>Dryopteris intermedia</i>	Evergreen Woodfern	G5	S5
	<i>Gymnocarpium dryopteris</i>	Oak Fern	G5	S5
	<i>Matteuccia struthiopteris</i>	Ostrich Fern	G5	S5
	<i>Onoclea sensibilis</i>	Sensitive Fern	G5	S5
	<i>Woodsia ilvensis</i>	Rusty Woodsia	G5	S5
Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail	G5	S5
	<i>Equisetum fluviatile</i>	Water Horsetail	G5	S5
	<i>Equisetum palustre</i>	Marsh Horsetail	G5	S5
	<i>Equisetum sylvaticum</i>	Woodland Horsetail	G5	S5
	<i>Equisetum variegatum</i>	Variegated Horsetail	G5	S5
Ericaceae	<i>Andromeda polifolia</i>	Bog Rosemary	G5T5	S5
	<i>Arctostaphylos uva-ursi</i>	Bearberry	G5	S5
	<i>Chamaedaphne calyculata</i>	Leatherleaf	G5	S5
	<i>Epigaea repens</i>	Trailing Arbutus	G5	S5
	<i>Gaultheria hispidula</i>	Creeping Snowberry	G5	S5
	<i>Gaultheria procumbens</i>	Wintergreen	G5	S5
	<i>Kalmia angustifolia</i>	Sheep Laurel	G5	S5
	<i>Kalmia polifolia</i>	Bog Laurel	G5	S5

Family	Latin Name	Common Name	Global Status	Provincial Status
	<i>Ledum groenlandicum</i>	Labrador Tea	G5	S5
	<i>Vaccinium angustifolium</i>	Late Lowbush Blueberry	G5	S5
	<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	G5	S5
	<i>Vaccinium oxycoccos</i>	Small Cranberry	G5	S5
Fabaceae	<i>Lotus corniculatus</i>	Birds-foot Trefoil	G?	SE5
	<i>Lupinus polyphyllus</i>	Large-leaved Lupine	G5	SE4
	<i>Mellilotus</i> sp.	Sweet Clover sp.		
	<i>Vicia cracca</i>	Tufted Vetch	G?	SE5
Gentianaceae	<i>Gentiana</i> sp.	Gentian sp.		
Geraniaceae	<i>Geranium bicknellii</i>	Bicknell Northern Crane's-bill	G5	S4
Grossulariaceae	<i>Ribes glandulosum</i>	Skunk Currant	G5	S5
	<i>Ribes lacustre</i>	Bristly Black Currant	G5	S5
	<i>Ribes triste</i>	Swamp Red Currant	G5	S5
Iridaceae	<i>Iris versicolor</i>	Blueflag	G5	S5
	<i>Sisyrinchium montanum</i>	Common Blue-eyed Grass	G5	S5
Juncaceae	<i>Juncus balticus</i>	Baltic Rush	G5	S5
	<i>Juncus brevicaudatus</i>	Narrow-panicked Rush	G5	S5
Liliaceae	<i>Clintonia borealis</i>	Blue Bead Lily	G5	S5
	<i>Maianthemum canadense</i>	Canada Mayflower	G5	S5
	<i>Maianthemum stellatum</i>	Starflower False Solomon's Seal	G5	S5
	<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	G5	S5
	<i>Streptopus lanceolatus</i>	Rose Twisted-Stalk	G5	S5
	<i>Trillium</i> sp.	Trillium sp.		
	<i>Trillium cernuum</i>	Nodding Trillium	G5	S5
Lycopodiaceae	<i>Lycopodium</i> sp.	Club Moss sp.		
	<i>Lycopodium annotinum</i>	Stiff Club Moss	G5	S5
	<i>Lycopodium dendroideum</i>	Tree-like Club Moss	G5	S5
	<i>Lycopodium digitatum</i>	Fan Clubmoss	?	?
	<i>Lycopodium obscurum</i>	Tree Clubmoss	G5	S4
Myricaceae	<i>Comptonia peregrina</i>	Sweet Fern	G5	S5
	<i>Myrica gale</i>	Sweet Bayberry	G5	S5
Nymphaeaceae	<i>Nuphar variegatum</i>	Yellow Pond-Lily	G5T5	S5
Onagraceae	<i>Epilobium angustifolium</i>	Fireweed	G5	S5
Orchidaceae	<i>Corallorhiza maculata</i>	Spotted Coralroot	G5	S5
	<i>Corallorhiza striata</i>	Striped Coralroot	G5	S4
	<i>Liparis loeselii</i>	Loesel's Twayblade	G5	S4S5
	<i>Platanthera aquilonis</i>	Northern Green Orchid	G5	S5
Osmundaceae	<i>Osmunda claytoniana</i>	Interrupted Fern	G5	S5

Family	Latin Name	Common Name	Global Status	Provincial Status
Pinaceae	<i>Abies balsamea</i>	Balsam Fir	G5	S5
	<i>Larix laricina</i>	American Larch	G5	S5
	<i>Picea glauca</i>	White Spruce	G5	S5
	<i>Picea mariana</i>	Black Pruce	G5	S5
	<i>Pinus banksiana</i>	Jack Pine	G5	S5
	<i>Pinus strobus</i>	Eastern White Pine	G5	S5
Poaceae	<i>Bromus</i> sp.	Brome Grass sp.		
	<i>Calamagrostis</i> sp.	Calamagrostis sp.		
	<i>Phalaris arundinacea</i>	Reed Canary Grass	G5	S5
	<i>Poa compressa</i>	Canada Bluegrass	G?	SE5
Polygonaceae	<i>Polygonum cilinode</i>	Fringed Black Bindweed	G5	S5
Potamogetonaceae	<i>Potamogeton</i> sp.	Pondweed sp.		
	<i>Stuckenia filiformis</i>	Threadleaf Pondweed	G5	S5
Primulaceae	<i>Trientalis borealis</i>	Northern Starflower	G5	S5
Pyrolaceae	<i>Pyrola asarifolia</i>	Pink Wintergreen	G5	S5
	<i>Pyrola elliptica</i>	Shinleaf	G5	S4
	<i>Pyrola minor</i>	Lesser Wintergreen	G5	S4
Ranunculaceae	<i>Actaea rubra</i>	Red Baneberry	G5	S5
	<i>Anemone canadensis</i>	Canada Anemone	G5	S5
	<i>Anemone quinquefolia</i>	Wood Anemone	G5	S5
	<i>Caltha palustris</i>	Marsh Marigold	G5	S5
	<i>Coptis trifolia</i>	Goldthread	G5	S5
	<i>Ranunculus</i> sp.	Buttercup sp.		
	<i>Thalictrum pubescens</i>	Tall Meadow Rue	G5	S5
Rhamnaceae	<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	G5	S5
Rosaceae	<i>Amelanchier</i> sp.	Serviceberry sp.		
	<i>Amelanchier humilis</i>	Running Serviceberry	G5	S4S5
	<i>Amelanchier sanguinea</i>	Round-leaved Serviceberry	G5T5	S5?
	<i>Fragaria vesca</i>	Woodland Strawberry	G5	S5
	<i>Fragaria virginiana</i>	Common Strawberry	G5	S5
	<i>Geum aleppicum</i>	Yellow Avens	G5	SE
	<i>Geum rivale</i>	Purple Avens	G5	S5
	<i>Physocarpus opulifolius</i>	Eastern Ninebark	G5	S5
	<i>Potentilla palustris</i>	Marsh Cinquefoil	G5	S5
	<i>Prunus pensylvanica</i>	Pin Cherry	G5	S5
	<i>Prunus virginiana</i>	Choke Cherry	G5	S5
	<i>Rosa acicularis</i>	Prickly Rose	G5	S5
	<i>Rubus flagellaris</i>	Northern Dewberry	G5	S4
<i>Rubus idaeus</i>	Red Raspberry	G5T5	S5	

Family	Latin Name	Common Name	Global Status	Provincial Status
	<i>Sorbus decora</i>	Showy Mountain-Ash	G4G5	S5
	<i>Spiraea alba</i>	Narrow-leaved Meadowsweet	G5	S5
	<i>Waldsteinia fragarioides</i>	Barren Ground Strawberry	G5	S5
Rubiaceae	<i>Galium asprellum</i>	Rough Bedstraw	G5	S5
	<i>Galium mollugo</i>	Smooth Bedstraw	G?	SE5
	<i>Galium triflorum</i>	Fragrant Bedstraw	G5	S5
Salicaceae	<i>Populus balsamifera</i>	Balsam Poplar	G5	S5
	<i>Populus tremuloides</i>	Trembling Aspen	G5	S5
	<i>Salix sp.</i>	Willow sp.		
	<i>Salix candida</i>	Hoary Willow	G5	S5
	<i>Salix humilis</i>	Tall Prairie Willow	G5	S5
Santalaceae	<i>Geocaulon lividum</i>	Northern Comandra	G5	S5
Saxifragaceae	<i>Mitella nuda</i>	Naked Bishop's Cap	G5	S5
	<i>Parnassia palustris</i>	Marsh Grass of Parnassus	G5	S5
Scrophulariaceae	<i>Rhinanthus minor</i>	Yellow Rattle	G5T?	SE5
Taxaceae	<i>Taxus canadensis</i>	Canadian Yew	G5	S4
Thelypteridaceae	<i>Thelypteris palustris</i>	Marsh Fern	G5	S5
Typhaceae	<i>Typha angustifolia</i>	Narrow-leaved Cattail	G5	SE5
	<i>Typha latifolia</i>	Broad-leaf Cattail	G5	S5
Violaceae	<i>Viola sp.</i>	Violet sp.		
	<i>Viola mackloskeyi</i>	Northern White Violet	G5	S5
	<i>Viola renifolia</i>	Kidney-leaf White Violet	G5	S5
	<i>Viola septentrionalis</i>	Northern Blue Violet	?	?
Characeae	<i>Chara sp.</i>	Stonewort (algae)		
Cladoniaceae	<i>Cladonia sp.</i>	Pixie Cup Lichen		
	<i>Cladonia cristatella</i>	British Soldiers	G5?	S5
	<i>Cladonia mitis</i>	Reindeer Lichen sp.		
	<i>Cladonia rangiferina</i>	Reindeer Lichen sp.		
	<i>Cladonia stellaris</i>	Reindeer Lichen sp.		
Entodontaceae	<i>Pleurozium schreberi</i>	Schreber's Moss	G5	S5
Sphagnaceae	<i>Sphagnum sp.</i>	Sphagnum Moss sp.		
Umbilicariaceae	<i>Umbilicaria sp.</i>	Rock Tripe sp.		
?	?	Feathermoss		

3.4 Wildlife

Compiled results for the avian surveys are presented in Tables 3.3 and 3.4. Compiled species lists of wildlife observed during the investigation are presented in Tables 3.5 to 3.8. The tables list the species, their associated federal and provincial ranks and their protective status (if any). No provincially or federally threatened or endangered species were found during the site investigation. Maps showing the distributions of wildlife are presented in Figures 3.2 to 3.6. Appendix B lists the dates and times of all wildlife surveys.

**TABLE 3.3
 RESULTS OF MARSH BIRD SURVEY**

Marsh Bird Species	Marsh Monitoring Station						
	1	2	3	4	5	6	7
Pied-billed Grebe						•	•
Red-necked Grebe					•		•
Double-crested Cormorant			•				
Mallard				•	•		
American Kestrel				•			
Virginia Rail					•		
Killdeer					•		
Herring Gull		•					
Ruby-throated Hummingbird					•		
Northern Flicker			•	•			
Least Flycatcher						•	
Eastern Kingbird				•	•	•	
Tree Swallow					•	•	•
Brown Thrasher			•				
European Starling		•					
Yellow Warbler		•			•		
Common Yellowthroat	•		•				
Eastern Towhee				•			
Savannah Sparrow				•			
Song Sparrow	•	•	•	•	•	•	
Swamp Sparrow	•	•	•	•	•	•	•
Red-winged Blackbird	•	•	•		•	•	•
Common Grackle					•		•
American Goldfinch			•	•		•	

**TABLE 3.4
 RESULTS FROM BREEDING BIRD SURVEY**

Common Name	Habitat Types			
	Deciduous	Mixed	Coniferous	Wet
Common Loon				•
Pied-billed Grebe				•
Red-necked Grebe				•
American Bittern				•
Great Blue Heron				•
Mallard				•
Ring-necked Duck				•
American Kestrel				•
Ruffed Grouse	•			
Sandhill Crane				•
Spotted Sandpiper				•
Herring Gull	•			•
Rock Dove	•			
Mourning Dove			•	
Black-billed Cuckoo	•			
Belted Kingfisher			•	
Northern Flicker	•	•	•	
Yellow-bellied Sapsucker	•	•	•	
Downy Woodpecker	•		•	
Pileated Woodpecker		•		
Alder Flycatcher	•	•	•	•
Eastern Kingbird				•
Warbling Vireo	•			
Red-eyed Vireo	•	•	•	•
Blue Jay		•		
Gray Jay			•	
American Crow	•	•		•
Common Raven	•	•	•	•
Tree Swallow	•	•		
Black-capped Chickadee	•	•	•	•
Brown Creeper	•		•	
Red-breasted Nuthatch	•	•		
Winter Wren	•	•		
Golden-crowned Kinglet	•	•	•	
Ruby-crowned Kinglet	•	•	•	•
Veery	•	•	•	•
Swainson's Thrush	•	•	•	
Hermit Thrush	•	•	•	
American Robin	•	•	•	•
Cedar Waxwing	•		•	•
Tennessee Warbler		•		
Nashville Warbler	•	•	•	•
Chestnut-sided Warbler	•	•	•	•
Magnolia Warbler	•	•	•	•
Yellow-rumped Warbler			•	
Black and White Warbler	•	•	•	

Common Name	Habitat Types			
	Deciduous	Mixed	Coniferous	Wet
Black-throated Blue Warbler	•			
Blackburnian Warbler		•	•	
Yellow Warbler	•			
Connecticut Warbler	•			
Mourning Warbler	•	•		•
Ovenbird	•	•	•	
Common Yellowthroat	•	•		•
American Redstart	•	•		
Chipping Sparrow				•
Savannah Sparrow	•			
Song Sparrow	•	•		•
Lincoln Sparrow			•	
Swamp Sparrow				•
White-throated Sparrow	•	•	•	•
Dark-eyed Junco	•	•	•	
Red-winged Blackbird	•			•
Common Grackle	•	•		•
Pine Siskin	•	•		
American Goldfinch	•	•	•	•

**TABLE 3.5
 COMPILED MAMMAL SPECIES LIST**

Family	Latin Name	Common Name	Global Rank	Provincial Rank	Protection Acts
Soricidae	<i>Sorex cinereus</i>	Masked Shrew	G5	S5	FWCA
Leporidae	<i>Lepus americanus</i>	Snowshoe Hare	G5	S5	
Sciuridae	<i>Tamiasciurus hudsonicus</i>	Red Squirrel	G5	S5	
Castoridae	<i>Castor canadensis</i>	Beaver	G5	S5	FWCA. Dams are protected
Erethizontidae	<i>Erethizon dorsatum</i>	Porcupine	G5	S5	
Canidae	<i>Vulpes vulpes</i>	Red Fox	G5	S5	
Ursidae	<i>Ursus americanus</i>	Black Bear	G5	S5	FWCA. Dens are protected
Cervidae	<i>Alces alces</i>	Moose	G5	S5	

**TABLE 3.6
 COMPILED BIRD SPECIES LIST**

Family	Latin Name	Common Name	Global Rank	Provincial Rank	Breeding Code	Evidence	Number of Observations
Gaviidae	<i>Gavia immer</i>	Common Loon	G5	S4B,SZN	Possible	H	1
Podicipedidae	<i>Podilymbus podiceps</i>	Pied-billed Grebe	G5	S4B,SZN	Possible	S	2
Podicipedidae	<i>Podiceps grisgena</i>	Red-necked Grebe	G5	S3B, SZN	Probable	P	3
Phalacrocoracidae	<i>Phalacrocorax auritus</i>	Double-crested Cormorant	G5	S4B, SZN	Observed	X	1
Ardeidae	<i>Botaurus lentiginosus</i>	American Bittern	G4	S4B,SZN	Possible	H	1
Ardeidae	<i>Ardea herodias</i>	Great Blue Heron	G5	S5B,SZN	Observed	X	1
Anatidae	<i>Anas crecca</i>	Green-winged Teal	G5	S4B,SZN	Probable	P	1
Anatidae	<i>Anas platyrhynchos</i>	Mallard	G5	S5B,SZN	Probable	P	3
Anatidae	<i>Aythya collaris</i>	Ring-necked Duck	G5	S5B,SZN	Probable	P	1
Accipitridae	<i>Circus cyaneus</i>	Northern Harrier	G5	S4B,SZN	Possible	H	1
Falconidae	<i>Falco sparverius*</i>	American Kestrel	G5	S5B,SZN	Possible	H	2
Phasianidae	<i>Bonasa umbellus</i>	Ruffed Grouse	G5	S5	Possible	H	1
Rallidae	<i>Rallus limicola</i>	Virginia Rail	G5	S4B, SZN	Possible	H	2
Gruidae	<i>Grus canadensis</i>	Sandhill Crane	G5	S4B,SZN	Observed	X	1
Charadriidae	<i>Charadrius vociferous*</i>	Killdeer	G5	S5B,SZN	Possible	H	1
Scolopacidae	<i>Actitis macularia</i>	Spotted Sandpiper	G5	S5B,SZN	Possible	H	1
Laridae	<i>Larus argentatus</i>	Herring Gull	G5	S5B, SZN	Possible	H	6
Columbidae	<i>Columba livia</i>	Rock Pigeon	G5	SE	Observed	X	1
Columbidae	<i>Zenaida macroura</i>	Mourning Dove	G5	S5B, SZN	Possible	S	1
Cuculidae	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	G5	S4B,SZN	Possible	S	2
Trochilidae	<i>Archilochus colubris</i>	Ruby-throated Hummingbird	G5	S5B,SZN	Possible	H	1
Alcedinidae	<i>Ceryle alcyon</i>	Belted Kingfisher	G5	S5B,SZN	Confirmed	NU	1
Picidae	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	G5	S5B,SZN	Confirmed	CF	3
Picidae	<i>Picoides pubescens</i>	Downy Woodpecker	G5	S5	Confirmed	NY	2
Picidae	<i>Colaptes auratus</i>	Northern Flicker	G5	S5B,SZN	Possible	S	7
Picidae	<i>Dryocopus pileatus</i>	Pileated Woodpecker	G5	S4S5	Possible	S	1
Tyrannidae	<i>Empidonax alnorum</i>	Alder Flycatcher	G5	S5B,SZN	Probable	D	7
Tyrannidae	<i>Empidonax minimus</i>	Least Flycatcher	G5	S5B,SZN	Possible	S	1
Tyrannidae	<i>Tyrannus tyrannus</i>	Eastern Kingbird	G5	S5B,SZN	Probable	P, T	4
Vireonidae	<i>Vireo gilvus</i>	Warbling Vireo	G5	S5B,SZN	Possible	S	1
Vireonidae	<i>Vireo olivaceus</i>	Red-eyed Vireo	G5	S5B,SZN	Possible	S	26
Corvidae	<i>Perisoreus canadensis</i>	Gray Jay	G5	S5	Possible	S	1

Family	Latin Name	Common Name	Global Rank	Provincial Rank	Breeding Code	Evidence	Number of Observations
Corvidae	<i>Cyanocitta cristata</i>	Blue Jay	G5	S5	Possible	S	1
Corvidae	<i>Corvus brachyrhynchos</i>	American Crow	G5	S5B,SZN	Possible	S	10
Corvidae	<i>Corvus corax</i>	Common Raven	G5	S5	Possible	S	12
Hirundinidae	<i>Tachycineta bicolor</i>	Tree Swallow	G5	S5B,SZN	Possible	S	5
Paridae	<i>Poecile atricapillus</i>	Black-capped Chickadee	G5	S5	Possible	S	4
Sittidae	<i>Sitta canadensis</i>	Red-breasted Nuthatch	G5	S5B,SZN	Possible	S	6
Sittidae	<i>Certhia americana</i>	Brown Creeper	G5	S5B,SZN	Possible	S	3
Troglodytidae	<i>Troglodytes troglodytes</i>	Winter Wren	G5	S5B,SZN	Possible	S	5
Regulidae	<i>Regulus satrapa</i>	Golden-crowned Kinglet	G5	S5B,SZN	Probable	A	9
Regulidae	<i>Regulus calendula</i>	Ruby-crowned Kinglet	G5	S5B,SZN	Possible	S	12
Turdidae	<i>Catharus fuscescens</i>	Veery	G5	S4B,SZN	Possible	S	11
Turdidae	<i>Catharus ustulatus</i>	Swainson's Thrush	G5	S5B,SZN	Possible	S	14
Turdidae	<i>Catharus guttatus</i>	Hermit Thrush	G5	S5B,SZN	Possible	S	5
Turdidae	<i>Turdus migratorius</i>	American Robin	G5	S5B,SZN	Possible	S	18
Mimidae	<i>Toxostoma rufum</i>	Brown Thrasher	G5	S5B,SZN	Possible	S	1
Sturnidae	<i>Sturnus vulgaris</i>	European Starling	G5	SE	Possible	H	1
Bombycillidae	<i>Bombycilla cedrorum</i>	Cedar Waxwing	G5	S5B,SZN	Confirmed	FY	4
Parulidae	<i>Vermivora peregrine</i>	Tennessee Warbler	G5	S5B,SZN	Possible	S	1
Parulidae	<i>Vermivora ruficapilla</i>	Nashville Warbler	G5	S5B,SZN	Possible	S	27
Parulidae	<i>Dendroica petechia</i>	Yellow Warbler	G5	S5B,SZN	Possible	S	3
Parulidae	<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	G5	S5B,SZN	Possible	S	15
Parulidae	<i>Dendroica magnolia</i>	Magnolia Warbler	G5	S5B,SZN	Confirmed	CF, FS, NE	17
Parulidae	<i>Dendroica caerulescens</i>	Black-throated Blue Warbler	G5	S5B,SZN	Possible	S	1
Parulidae	<i>Dendroica coronata</i>	Yellow-rumped Warbler	G5	S5B,SZN	Possible	S	1
Parulidae	<i>Dendroica fusca</i>	Blackburnian Warbler	G5	S5B,SZN	Possible	S	2
Parulidae	<i>Mniotilta varia</i>	Black and White Warbler	G5	S5B,SZN	Possible	S	8
Parulidae	<i>Setophaga ruticilla</i>	American Redstart	G5	S5B,SZN	Possible	S	8
Parulidae	<i>Seiurus aurocapillus</i>	Ovenbird	G5	S5B,SZN	Possible	S	17

Family	Latin Name	Common Name	Global Rank	Provincial Rank	Breeding Code	Evidence	Number of Observations
<i>Parulidae</i>	<i>Opororis agilis</i>	Connecticut Warbler	G4	S4B, SZN	Possible	S	1
<i>Parulidae</i>	<i>Oporornis Philadelphia</i>	Mourning Warbler	G5	S5B, SZN	Possible	S	7
<i>Parulidae</i>	<i>Geothlypis trichas</i>	Common Yellowthroat	G5	S5B, SZN	Probable	P	14
<i>Emberizidae</i>	<i>Pipilo erythrophthalmus</i>	Eastern Towhee	G5	S4B, SZN	Possible	H	1
<i>Emberizidae</i>	<i>Spizella passerine</i>	Chipping Sparrow	G5	S5B, SZN	Possible	S	1
<i>Emberizidae</i>	<i>Passerculus sandwichensis</i>	Savannah Sparrow	G5	S5B, SZN	Possible	S	2
<i>Emberizidae</i>	<i>Melospiza melodia</i>	Song Sparrow	G5	S5B, SZN	Possible	S	18
<i>Emberizidae</i>	<i>Melospiza lincolni</i>	Lincoln's Sparrow	G5	S5B, SZN	Probable	P, A	1
<i>Emberizidae</i>	<i>Melospiza georgiana</i>	Swamp Sparrow	G5	S5B, SZN	Possible	S	8
<i>Emberizidae</i>	<i>Zonotrichia albicollis</i>	White-throated Sparrow	G5	S5B, SZN	Probable	P, A	34
<i>Emberizidae</i>	<i>Junco hyemalis</i>	Dark-eyed Junco	G5	S5B, SZN	Possible	S	9
<i>Icteridae</i>	<i>Agelaius phoeniceus</i>	Red-winged Blackbird	G5	S5B, SZN	Probable	P	11
<i>Icteridae</i>	<i>Quiscalus quiscula</i>	Common Grackle	G5	S5B, SZN	Confirmed	FS	7
<i>Fringillidae</i>	<i>Carduelis pinus</i>	Pine Siskin	G5	S5B, SZN	Possible	S	4
<i>Fringillidae</i>	<i>Carduelis tristis</i>	American Goldfinch	G5	S5B, SZN	Possible	S	16
<i>Fringillidae</i>	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	G5	S5B, SZN	Possible	S	1

**TABLE 3.7
 COMPILED AMPHIBIAN SPECIES LIST**

Family	Latin Name	Common Name	Global Rank	Provincial Rank	Other Protective Acts
Ranidae	<i>Rana clamitans</i>	Green Frog	G5	S5	
Ranidae	<i>Rana septentrionalis</i>	Mink Frog	G5	S5	

**TABLE 3.8
 COMPILED INVERTEBRATE SPECIES LIST**

Family	Latin Name	Common Name	Global Rank	Provincial Rank	Other Protective Acts	COSEWIC
Nymphalidae	<i>Danaus plexippus</i>	Monarch	G4	S4	FWCA	Special Concern, Schedule 1
Papilionidae	<i>Papilio glaucus</i>	Tiger Swallowtail	G5	S4S5	FWCA	
Nymphalidae	<i>Limenitis arthemis</i>	White Admiral	G5	S5		
Nymphalidae	<i>Phycodes pascoensis</i>	Northern Crescent	G5	S5		

3.4.1 Mammals

The federal and provincial ranks and protective status for each mammalian species detected during the site investigation are presented in Table 3.5.

There was little evidence of mammals recorded during the site investigation; there were only 16 records from the two weeks of surveys conducted on the site. Beaver (*Castor canadensis*) was the most common species noted; with dams and lodges located throughout the study area. The species with the second highest abundance during our investigations was Black Bear (*Ursus americanus*), one record was identified by tracks; the other three records were sightings of individuals. Numerous Red Squirrels (*Tamiasciurus hudsonicus*) were observed on the study site as well.

Other species noted on site were Masked Shrew (*Sorex cinereus*), Snowshoe Hare (*Lepus americanus*), Porcupine (*Erethizon dorsatum*), Red Fox (*Vulpes vulpes*) and Moose (*Alces alces*). See Figure 3.2 for location of mammal species on the study site.

Moose scat was found in the south west corner in a coniferous swamp. Three of the four bear sightings were located in the vicinity of the Dome Mine (Figure 3.2).

3.4.2 Birds

In total, 75 bird species were observed on the study site throughout the investigation. These species were compiled through the breeding bird point counts, marsh bird survey and incidental observations. Table 3.6 lists all of the bird species observed on site, their federal and provincial ranks, their breeding code status, their protective status and the number of times they were observed.

A single Virginia Rail responded to the marsh bird playback surveys from one of the marshes near the Golf Course. Two Pied-billed Grebes responded; one from Simpson Lake adjacent to a large waste rock pile and the other from a marsh near the historic tailings piles from the Aunor-

Delnite mines. Other noteworthy sightings are the three pairs of Red-necked Grebe (*Podiceps grisgena*) observed at various marshes on the study site (Figure 3.5).

Table 3.4 breaks down the bird species observed in each main habitat type by summing species observations across point count stations located in comparable habitats. Overall, deciduous forests had the highest species richness with 43 species, followed by mixed forest with 34 species, wetlands with 33 species, and coniferous forests with 29 species.

The varied vegetation habitats across the study site support a diverse breeding bird population. There were 67 different species detected though the breeding bird point count surveys. Figure 3.3 depicts the compiled species richness observed at each point count station. Species richness is simply the total number of species detected at each point count station. The values for species richness varied between 4 and 16, with an average of 9.7. Areas exhibiting the highest bird species diversity are distributed evenly over the study area. The three highest values were all from within large Birch and Poplar forests.

During the site investigations several species were only observed once; some of these species however had multiple individuals seen. For example, the European Starling (*Sturnus vulgaris*); approximately 50 individuals were seen once. Therefore this information cannot be used to predict species abundance. The species with the largest numbers of sightings (≥ 10 sightings) were all habitat generalists, which were expected given the disturbed nature of the site. Ten of the 16 species were found in all four habitat types (deciduous, mixed, coniferous and wetland) including: White-throated Sparrow (*Zonotrichia albicollis*), American Robin (*Turdus migratorius*), Red-eyed Vireo (*Vireo olivaceus*), Nashville Warbler (*Vermivora ruficapilla*) and Chestnut-sided Warbler (*Dendroica pensylvanica*). Five of the species were found in three of the four habitat types, including: American Crow (*Corvus brachyrhynchos*), Swainson's Thrush (*Catharus ustulatus*) and Song Sparrow (*Melospiza melodia*).

There were 11 different species of birds identified as probable breeders and 5 species of birds that were confirmed breeders on site (see Appendix D for definitions of the breeding bird codes). This list of species can be found in Table 3.6 and the locations of the breeding observations are depicted in Figures 3.4 and 3.5. A Cedar Waxwing (*Bombycilla cedrorum*) with fledged young and a Magnolia Warbler (*Dendroica magnolia*) nest with 3 eggs were both seen near the large waste rock pile near the Dome Mine.

Other Notable Bird Species Observed

Regionally rare breeding bird species lists are generated from an analysis of data from the *Atlas of Breeding Birds of Ontario* (Cadman *et al.* 1987) and based on Hills' Site Regions. This information has been updated in 1999 through a review by the Natural Heritage Information Centre (NHIC), as well as by specialists in breeding birds and presented in the Northern Ontario Wetland Evaluation Guide.

Regionally rare species observed included a group of Sandhill Cranes (*Grus canadensis*) which flew over the study site during a breeding bird survey. Also a pair of Green-winged Teal (*Anas crecca*) was found on a marsh by the ERG tailings area in the northeast of the study site. Singing males were recorded for several regionally rare species including; Black-billed Cuckoo (*Coccyzus erythrophthalmus*), Brown Thrasher (*Toxostoma rufum*), Warbling Vireo (*Vireo gilvus*), and Connecticut Warbler (*Opororis agilis*). The other regionally rare species detected on site include Pied-billed Grebe, Virginia Rail, Mourning Dove (*Zenaida macroura*) and Black-throated Blue Warbler (*Dendroica caerulescens*).

3.4.3 Amphibians and Reptiles

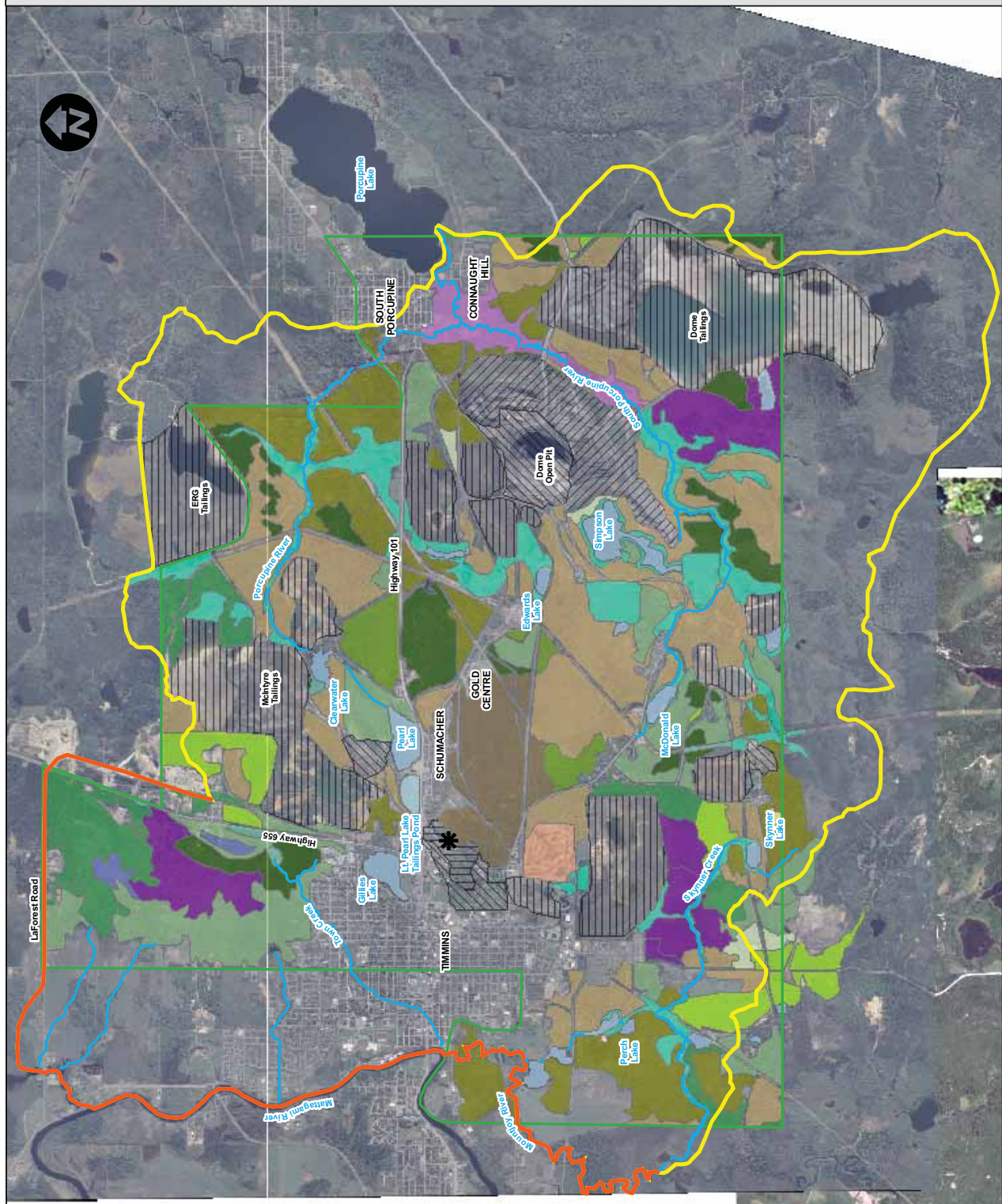
Only two species of amphibians were detected during the site investigation; Green Frog (*Rana clamitans*) and Mink Frog (*Rana septentrionalis*) were incidental observations that occurred in late June (Table 3.7 and Figure 3.6).

No reptiles were observed within the study area during the AMEC survey.

Species of amphibians and reptiles with ranges that include the Hollinger Project site include: Blue-spotted Salamander (*Ambystoma laterale*), Spotted Salamander (*Ambystoma maculatum*), American Toad (*Bufo americanus*), Spring Peeper (*Pseudacris crucifer*), Wood Frog (*Rana sylvatica*), Northern Leopard Frog (*Rana pipiens*) and Common Gartersnake (*Thamnophis sirtalis*) (MacCulloch, 2002). None of these species are ranked as rare federally or provincially (NHIC, 2007).

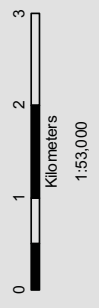
3.4.4 Invertebrates

Four species of butterflies were observed on site (Table 3.8). The most notable of these is the Monarch butterfly (*Danaus plexippus*), which is currently listed as a Special Concern, Schedule 1 SARA species as well as being ranked provincially as a species of Special Concern. This listing has been caused by the increasing destruction of their habitat due to logging activities, human disturbance and pesticide use (Environment Canada, 2007). Monarchs were seen in various locations including around the open, disturbed habitats near the current and historic, mine and tailings sites.



Legend:

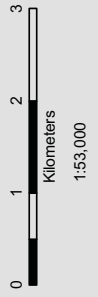
- Proposed Hollinger Pit Centroid
- River or Creek
- Study Area (Watershed Boundary)
- Original Study Area
- Study Area (Riverine and Road Boundary)
- Vegetation Classification**
 - 1. White Birch Dominated Hardwood
 - 2. Poplar Dominated Hardwood
 - 3. Poplar - Birch Dominated Hardwood
 - 4. Black Spruce Dominated Coniferous
 - 5. Black Spruce - Jack Pine Dominated Coniferous
 - 6. White Birch Dominated Mixedwood
 - 7. Poplar Dominated Mixedwood
 - 8. Tree Swamp
 - 9. Alder Thicket Swamp
 - 10. Fen
 - 11. Bog
 - 12. Marsh
 - 13. Open Water
 - 14. Cultural Thicket
 - 15. Cultural Jack Pine Plantation
 - 16. Cultural Meadow
 - 17. Existing Tailings Deposits
 - 18. Existing Waste Rock Deposits
 - 19. Mine openings to Surface
 - 20. Mine Structures
 - 21. Cultural Land Use



HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Vegetation Distribution	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC171507	FIGURE: 3.1
	REV: 1



- Legend:**
- Proposed Hollinger Pit Centroid
 - Beaver
 - Black Bear
 - Masked Shrew
 - Moose
 - Porcupine
 - Red Fox
 - Snowshoe Hare
 - Study Area (Watershed Boundary)
 - Study Area (Riverine and Road Boundary)
 - River or Creek



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HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Distribution of Mammal Observations	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 3.2
	REV: 1



Legend:

- Proposed Hollinger Pt. Centroid
- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- River or Creek

Species Richness (number of species)

- 4
- 5
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 15
- 16



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HOLLINGER BASELINE STUDIES
TIMMINS ONTARIO

Distribution of Bird Species Richness

SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 3.3
	REV: 1

Legend:

- Proposed Hollinger Pit Centroid
- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- River or Creek

Species, Evidence

- Alder Flycatcher, Courtship Display
- Common Yellowthroat, Pair
- Eastern Kingbird, Pair
- Eastern Kingbird, Territory
- Golden-crowned Kinglet, Agitated
- Green-winged Teal, Pair
- Lincoln's Sparrow, Pair, Agitated
- Mallard, Pair
- Red-necked Grebe, Pair
- Red-winged Blackbird, Pair
- Ring-necked Duck, Pair
- White-throated Sparrow, Pair, Agitated



HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Distribution and Location of Probable Breeding Birds	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 3.4
	REV: 1



Legend:

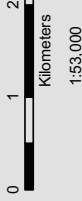
- Proposed Hollinger Pt. Centroid
- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- River or Creek

Breeding Bird Evidence

- Belted Kingfisher, Recently Used Nest Hole
- Cedar Waxwing, Fledged Young
- Common Grackle, Carrying Fecal Sac
- Downy Woodpecker, Nest with Young Heard
- Magnolia Warbler, Carrying Fecal Sac
- Magnolia Warbler, Carrying Food
- Magnolia Warbler, Nest with Eggs
- Yellow-bellied Sapsucker, Carrying Food

Notable Species

- Black-billed Cuckoo
- Black-throated Blue Warbler
- Brown Thrasher
- Connecticut Warbler
- Green-winged Teal
- Mourning Dove
- Pied-billed Grebe
- Red-necked Grebe
- Sandhill Crane
- Virginia Rail
- Warbling Vireo



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HOLLINGER BASELINE STUDIES
TIMMINS ONTARIO







Locations of Notable Bird Species and Confirmed Breeding

SCALE: 1:53,000 DATE: October 2007


PROJECT No: TC171507 FIGURE: 3.5 REV: 1



Legend:

-  Proposed Hollinger Pt Centroid
-  Green Frog
-  Mink Frog
-  Study Area (Watershed Boundary)
-  Study Area (Riverine and Road Boundary)
-  River or Creek



	
HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Distribution of Amphibian Observations	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 3.6
	REV: 1

4.0 EVALUATION AND DISCUSSION

4.1 Rarity and Protective Status of Plant Communities and Plant Species

None of the forested and wetland vegetation communities within the study area are provincially and/or federally rare (NHIC, 2007).

None of the plant species observed within the study area are provincially rare.

4.2 Rarity and Protective Status of Observed Wildlife

There was only one species detected on site that is a federal and provincial conservation concern. The Monarch Butterfly is a species currently designated as a special concern on both the COSEWIC and COSSARO lists. It is a schedule 1 SARA species. It was observed in various habitats which included the disturbed areas around the mine and tailings areas. SARA protects wildlife found on federal lands as well as their critical habitat and contains prohibitions that make it an offence to directly harm wildlife or their critical habitat for any “species listed in Schedule 1 of SARA as endangered, threatened or extirpated” (Environment Canada, 2007). As the Project site is not on federal land and the Monarch Butterfly is currently designated as a species of special concern (federally and provincially), these considerations do not apply.

4.3 Migratory Birds Convention Act and Fish and Wildlife Conservation Act

All migratory birds listed under the *MBCA* are protected. This act prohibits harming and/or killing these birds and/or destroying or collecting their eggs or nests. The Fish and Wildlife Conservation Act (*FWCA*) protects several species of birds and in particular raptors and other species such as Blackbirds which are not included in the *MBCA*. The *FWCA* also protects certain amphibians, reptiles and mammals from hunting, collection or the collection of their eggs. It prohibits the destruction of bear dens and/or the dens of fur bearing animals as well as the destruction of beaver dams (unless a trapper’s license is obtained). Species that fall under the protection of the above named acts are noted by individual species (Tables 3.5, 3.6, and 3.7).

4.4 Non-detected Species of Concern

There are a few species of conservation concern that were not detected during the AMEC 2007 surveys, but have a reasonable probability of occurring on site. Species distributions are temporally dynamic and as such these species may occur on site in the future.

Peregrine Falcon (*Falco peregrinus*) does occur in the surrounding areas and has been observed nesting in abandoned, open pit mines (pers. comm. T. Armstrong 2007). This species has very recently been removed from the list of species in regulation under the *ESA*. Its status has been down-listed from endangered to threatened both provincially and federally; however, the species will continue to be protected as a Specially Protected Raptor under the Fish and

Wildlife Conservation Act (FWCA). This act protects it from being hunted or trapped and also protects nests and eggs.

Yellow Rail (*Coturnicops noveboracensis*) is designated both federally and provincially as a special concern, schedule 1 species under SARA and SARO. It is also protected under the Migratory Bird Conservation Act (MBCA). It breeds in moist areas dominated by low herbaceous vegetation such as sedges, grasses and rushes. Breeding habitats include the edges of marshes or marshes with little or no standing water, damp fields or meadows, floodplains, and open bogs (Environment Canada, 2007). The breeding range of the Yellow Rail includes all Ontario but the majority of the population breeds around the Hudson Bay Lowlands. There has been confirmed breeding evidence of the Yellow Rail within 150 km of the study area. This indicates that our site is within the potential breeding range for this species (Birds Ontario, 2007). Our study site, while within the potential breeding range for Yellow Rail, exhibited limited suitable breeding habitat and therefore is not likely to support a breeding pair.

Short-eared Owl (*Asio flammeus*) is currently listed provincially and federally as special concern. This species nests on the ground in extensive grasslands or grassy marshes and avoid heavily treed areas (ROM, 2007). They prefer areas with short grass with just enough vegetation to conceal the incubating female. Most of the breeding evidence for this species is on the James and Hudson Bay coastlines; however they do breed locally scattered across all of Ontario (Cornell University, 2007). Reports of breeding evidence near our study area include four possible and two confirmed reports within 150 km of the study area (Birds Ontario, 2007). After regeneration, the tailings areas surrounding the mine sites could become suitable nesting habitat for Short-eared Owls.

Golden Eagle (*Aquila chrysaetos*) is listed provincially as endangered under SARO, this species is also protected under the FWCA. The stick nests of this species are often constructed on cliff ledges although they will occasionally build them in the tops of large trees or on man made structures such as hydro-line poles (Royal Ontario Museum, 2007; Cornell University, 2007). This species ranges across northern Ontario; most confirmed breeding evidence is from the northwest region near James Bay (Birds Ontario, 2007). Our site is within the summer range for this species, the lack of breeding evidence in close proximity may be a result of the current breeding bird surveys not being completed within suitable Golden Eagle habitat (Cornell University, 2007).

Black Tern (*Chlidonias niger*) is currently listed provincially as a species of special concern under SARO, this species is also protected under the MBCA. This species generally breeds in small colonies but will occasionally nest individually. The nests are often constructed on top of floating vegetation or debris, on the ground or on the top of muskrat houses. Black Terns prefer wet areas with dense vegetation such as freshwater marshes, wet meadows, and around the edges of lakes (Cornell University, 2007). The breeding population in Ontario is extensive with breeding evidence all across the province (ROM, 2007). The reports of breeding evidence near our study area include three confirmed reports in addition to numerous probable and possible reports (Birds Ontario, 2007).

Bald Eagle (*Haliaeetus leucocephalus*) is currently listed as special concern in northern Ontario under SARO. This species builds large stick nests in the tops of trees located near water bodies. This species is widespread across its range however the population in southern Ontario is still low enough to warrant a special designation of endangered. The Bald Eagle is protected under the FWCA as well as the Endangered Species Act (ESA) which protects the species as well as its important habitat. The reports of breeding evidence near our study area include 5 confirmed reports within approximately 200 km of the study area as well as a few probable and numerous possible reports (Birds Ontario, 2007).

Great Gray Owl (*Strix nebulosa*) is currently listed provincially as special concern under SARO. This species uses abandoned nests from other large birds or squirrels and prefers to nest in bogs. The breeding range for these species is the boreal forests from British Columbia across to Quebec and as far south as Lake Superior. Forestry and mining activity in the boreal forests pose the biggest threat to this species population status (ROM, 2006). The reports of breeding evidence near our study area include one confirmed and one probable report within 150 km of the study area, as well as numerous possible reports (Birds Ontario, 2007).

4.5 Valued Ecosystem Components

There are no Areas of Scientific and Natural Interest (ANSI), Environmentally Sensitive Areas (ESA) or Provincially Significant Wetlands (PSW) within the study area. There are two Provincially Significant Wetlands within 15 km of the study area; the Kraft Creek/Murphy Creek Wetland to the north and the Gold-Lake Wetland to the south. There is also the Little Goose Lake Wetland to the North of the Project site which is listed as a significant wetland, though not provincially significant. Due to the distance of these areas from the Hollinger Project site these wetlands would not be affected by the proposed development.

There are three Conservation Areas within the study area; Gillies Lake Conservation Area and Hersey Lake Conservation Area, which are on either side of Highway 655 located just north of Highway 101. The White Waterfront Conservation Area is on the East side of South Porcupine on the west edge of Porcupine Lake (Figure 4.1).

4.6 Significant Wildlife Habitat and Linkages

The Ontario Ministry of Natural Resources defines significant wildlife habitat as ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (MNR 2000). Areas such as Moose over wintering habitat, snake hibernacula, bat roosts, Marten (*Martes americana*) and Fisher (*Martes pennanti*) dens, habitat for species of conservation concern, rare vegetation communities, interior forest habitat, animal movement corridors and woodlands supporting amphibian ponds are all examples of significant wildlife habitat as listed by the MNR in Significant Wildlife Habitat a Technical Guide (2000). These areas should be given consideration in the planning and mitigation of proposed development activities on any site.

Significant habitat is a relative term as different species have distinct habitat requirements. Many species thrive in anthropogenically disturbed habitats whereas others require contiguous tracts of mature forest or wetlands. It is these latter species that are typically the focus of conservation and management practices as they are generally the species negatively affected by human development activities. They also tend to be the species that are designated for protection because their populations continue to be threatened by anthropogenic disturbance. The following paragraphs outline significant habitat located within the study area and the rationale for inclusion.

Wetlands of all types provide an important habitat that is often utilized by species that can survive nowhere else. In particular, aquatic areas with a gradual shift to more terrestrial characteristics incorporate numerous regions with varying moisture levels; providing a high diversity of habitats, which support a large number of species. Wildlife that exclusively use these specialized habitats include amphibians and many types of insect larvae.

Forest birds such as Pileated Woodpecker (*Dryocopus pileatus*), Hairy Woodpecker (*Picoides villosus*), Veery (*Catharus fuscescens*), Hermit Thrush (*Catharus guttatus*), Black-throated Blue Warbler, Blackburnian Warbler (*Dendroica fusca*), Mourning Warbler (*Oporornis philadelphia*) and Ovenbird (*Seiurus aurocapillus*) are good indicators of healthy forest ecosystems and/or interior forest. Interior forest is the sheltered, secluded environment within a woodlot that is not influenced by the forest edge and open habitats (MNR, 2007). These species were detected in a few areas of the study area, characterized by larger areas of semi-mature forest.

Large ungulates such as Deer and Moose find it hard to move about in deep snow so take shelter in dense conifer stands. Correspondence with the MNR has indicated that there are no important over-wintering grounds for moose within or adjacent to the study site (Glen McFarlane pers comm. October 29 2007). There are numerous Black Spruce stands on the study site (Figure 3.1) of which many fit the description for moose over-wintering habitat being comprised of dense canopies and understories. These communities provide nourishment through the winter as well as protection from predators and the elements.

There were no old growth or mature forest stands noted on the study site. No areas with notably large snags or old trees were located. The highly disturbed nature of the entire area means that none of the forest stands surveyed can be considered undisturbed. The most mature stands appeared to be some of the Jack Pine Plantations.

The 2007 AMEC survey observed several Black Bears within the study area. There appeared to be plenty of food for bears as abundant forage species such as Low Sweet Blueberry, Raspberry (*Rubus idaeus*) and Cherry species were distributed throughout the study area.

The site is relatively disturbed with many roads and trails breaking up contiguous habitat. Road kill was commonly observed during the field surveys, suggesting that there are not many suitable alternatives to moving around the landscape other than road crossings. Of the few

mammals observed during the study, Porcupine and one of the two Red Fox records were from carcass' found at the same location on the main highway.

4.7 Environmental Constraints and Sensitivities Affecting Project Development

4.7.1 Avoidance of Wetlands

Wetland communities are areas of significant wildlife habitat because they provide unique and specialized habitat utilized by large numbers of species that can survive nowhere else. Once a wetlands ecological function has been compromised it is hard to regenerate due to the complexity of wetland ecosystems. Thus, as a general principle, all reasonable efforts should be made where possible to avoid or limit negative impacts to wetland communities.

4.7.2 Minimize Impacts to Large, Intact and Diverse Block of Forest

Many plant and animal species require interior forest habitat for survival. Interior forest is the sheltered, secluded environment within a woodlot that is not influenced by the forest edge and open habitats (MNR, 2007). Interior forest habitat is found in large contiguous tracts of mature forests as the centres of smaller woodlots often are not far enough away from the edges to produce interior forest habitat. Thus, wherever possible impact to large and diverse forest tracts should be minimized to maintain a sufficient level of interior forest habitat (MNR, 2000).

4.7.3 Avoidance of Major Tree Clearing during the Breeding Bird Season

Major tree clearing efforts should be avoided during the breeding bird season. For some species such as the Great Horned Owl (*Bubo virginianus*) the breeding season begins as early as February, and the songbird breeding season extends until late July (Cadman *et al.*, 1987). If possible, tree clearing should be done through the fall and winter months to avoid disrupting any species during their nesting season.

4.8 Recommendations

The site has an extensive history of mining, forestry and urbanization. The vegetation communities reflect this history of disturbance; consequently there is very little left that is considered ecologically significant. No additional or follow-up studies are warranted for the Hollinger Project.



Legend:

- Proposed Hollinger Pit Centroid
- Conservation Area (centroid)
- Study Area (Watershed Boundary)
- Study Area (Riverine and Road Boundary)
- River or Creek



HOLLINGER BASELINE STUDIES	
TIMMINS ONTARIO	
Valued Ecosystem Components	
SCALE: 1:53,000	DATE: October 2007
PROJECT No: TC71507	FIGURE: 4.1
	REV: 1

5.0 REFERENCES

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APPENDIX A

VEGETATION COMMUNITY PHOTO RECORD

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Vegetation Cover Types

Hollinger Project

Habitat Type: White Birch – White Spruce V1

Polygons: 29, 158

Description:

A mixed forest dominated by White Birch (*Betula papyrifera*) and White Spruce (*Picea glauca*). Other canopy species commonly found in this forest type include Trembling Aspen (*Populus tremuloides*) and Balsam Fir (*Abies balsamea*). These species can also be found in the subcanopy layer. Eastern Cedar (*Thuja occidentalis*) and Mountain Maple (*Acer spicatum*) are often found in the shrub layer. Large Leaf Wood-Aster (*Eurybia macrophylla*) is the dominant ground flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: White Birch – Mountain Maple V2

Polygons: 159, 160, 161, 162, 163, 164, 165, 174, 175

Description:

A hardwood forest dominated by White Birch (*Betula papyrifera*). Trembling Aspen (*Populus tremuloides*), Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*) and White Cedar (*Thuja occidentalis*) join the Birch in the subcanopy and shrub layer. Beaked Hazel (*Corylus cornuta*) and Bush Honeysuckle (*Diervilla lonicera*) are also commonly represented in the shrub layer. Bracken Fern (*Pteridium aquilinum*) and Large Leaf Wood-Aster (*Eurybia macrophylla*) are the common herbaceous flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: Trembling Aspen – Bush Honeysuckle – Large-leaved Aster V5

Polygons: 48, 55, 56, 74, 168, 169, 170, 213, 222, 224

Description:

A hardwood forest dominated by Trembling Aspen (*Populus tremuloides*). Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*) and White Birch (*Betula papyrifera*) join the Aspen in the subcanopy and shrub layer. Beaked Hazel (*Corylus cornuta*), Bush Honeysuckle (*Diervilla lonicera*) and Prickly Rose (*Rosa acicularis*) are also commonly represented in the shrub layer. Large Leaf Wood-Aster (*Eurybia macrophylla*) is the predominant herbaceous flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern V6

Polygons: 19, 24, 25, 31, 32, 34, 41, 43, 51, 65, 66, 68, 72, 77, 83, 94, 107, 109,
110, 114, 130, 131, 140, 141, 152, 156, 157, 166, 171, 181, 182, 184, 187,
192, 195, 199, 201, 202, 203, 204, 205, 206, 208, 209, 211, 212, 230, 231,
246

Description:

A hardwood forest dominated by Trembling Aspen (*Populus tremuloides*) and White Birch (*Betula papyrifera*). Jack Pine (*Pinus banksiana*), Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*) and Black Spruce (*Picea glauca*) are also commonly found in the canopy. All of these species are also found in the subcanopy and shrub layers as well. Beaked Hazel (*Corylus cornuta*), Bush Honeysuckle (*Diervilla lonicera*), Blueberry species (*Vaccinium sp.*), Mountain Maple (*Acer spicatum*), Serviceberry species (*Amelanchier sp.*) and Speckled Alder (*Alnus incana*) are also commonly represented in the shrub layer. Bracken Fern (*Pteridium aquilinum*), Large Leaf Wood-Aster (*Eurybia macrophylla*), Blue Bead Lily (*Clintonia borealis*) and Wild Sarsaparilla (*Aralia nudicaulis*) are the predominant herbaceous flora. This is a very species rich forest type and was very common in our study area.



Vegetation Cover Types

Hollinger Project

Habitat Type: Trembling Aspen – Balsam Poplar – Speckled Alder V10

Polygons: 64, 67, 217, 218, 219, 220, 221, 225, 226, 227

Description:

A hardwood forest dominated by Trembling Aspen (*Populus tremuloides*) and Balsam Poplar (*Populus balsamifera*). Balsam Fir (*Abies balsamea*) and White Spruce (*Picea glauca*) are also common in the canopy. White Birch (*Betula papyrifera*), Black Spruce (*Picea mariana*) and Jack Pine (*Pinus banksiana*) are also possible canopy species. All of these species are also present in the subcanopy and shrub layer. Speckled Alder (*Alnus incana*), Serviceberry species (*Amelanchier sp.*) and Red-osier Dogwood (*Cornus stolonifera*) are common in the shrub layer as well as Prickly Rose (*Rosa acicularis*), Currant species (*Ribes sp.*) Red Raspberry (*Rubus idaeus*). Bracken Fern (*Pteridium aquilinum*) and Large Leaf Wood-Aster (*Eurybia macrophylla*) are the common herbaceous flora.



Vegetation Cover Types

Hollinger Project

**Habitat Type: Trembling Aspen – Black Spruce – Bush Honeysuckle – Herb Rich
V11**

Polygons: 7, 28

Description:

A mixedwood forest dominated by Trembling Aspen (*Populus tremuloides*) and Black Spruce (*Picea mariana*). Balsam Fir (*Abies balsamea*) and White Spruce (*Picea glauca*) are also common in the canopy. Black Spruce (*Picea mariana*) joins these species in the subcanopy; Eastern White Cedar (*Thuja occidentalis*) and Tamarack (*Larix laricina*) are also occasionally present. All of these species are also present in the shrub layer. Bush Honeysuckle (*Diervilla lonicera*), Balsam Poplar (*Populus balsamifera*), Speckled Alder (*Alnus incana*), Serviceberry species (*Amelanchier sp.*), Prairie Willow (*Salix humilis*) and Red-osier Dogwood (*Cornus stolonifera*) are common in the shrub layer. Bracken Fern (*Pteridium aquilinum*) and Large Leaf Wood-Aster (*Eurybia macrophylla*) are the common herbaceous flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns V13

Polygons: 22, 45, 46, 57, 58, 59, 60, 61, 62, 79, 108, 111, 127, 129

Description:

A hardwood forest dominated by Trembling Aspen (*Populus tremuloides*) and Balsam Poplar (*Populus balsamifera*). Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*), Black Spruce (*Picea mariana*) and White Birch (*Betula papyrifera*) are also common in the canopy. All of these species are also present in the subcanopy and shrub layer. Speckled Alder (*Alnus incana*), Prickly Rose (*Rosa acicularis*), Choke Cherry (*Prunus virginiana*), Bush Honeysuckle (*Diervilla lonicera*) and Beaked Hazel (*Corylus cornuta*) are common in the shrub layer. The common herbaceous flora is quite varied.



Vegetation Cover Types

Hollinger Project

Habitat Type: Black Spruce – Herb Rich V15

Polygons: 9, 47, 49, 50, 52, 53, 120, 122, 133, 134, 135, 167, 176, 177, 193, 194, 196, 200, 210, 216

Description:

A coniferous forest dominated by Black Spruce (*Picea mariana*). Trembling Aspen (*Populus tremuloides*), Balsam Fir (*Abies balsamea*), White Spruce (*Picea glauca*), White Birch (*Betula papyrifera*), Jack Pine (*Pinus banksiana*) and White Cedar (*Thuja occidentalis*) can also be found in the canopy. All of these species are also present in the subcanopy and shrub layer but Black Spruce, White Birch and Balsam Fir are the most prevalent. Speckled Alder (*Alnus incana*), Prickly Rose (*Rosa acicularis*) and numerous ericaceous shrubs are dominant in the shrub layer. The herbaceous ground cover is made up of diverse species typical of this area including Bunchberry (*Cornus canadensis*), Canada Mayflower (*Maianthemum canadense*) and Woodland Horsetail (*Equisetum sylvaticum*).



Vegetation Cover Types

Hollinger Project

Habitat Type: Jack Pine – Black Spruce – Feathermoss V17

Polygons: 2, 4, 5, 15, 35, 103, 113

Description:

A coniferous forest dominated by Jack Pine (*Pinus banksiana*) and Black Spruce (*Picea mariana*). The Black Spruce is found even throughout the forest but can also be found clustered in dense wet patches. White Birch (*Betula papyrifera*) can also be found in the canopy. Along with the species above Balsam Fir (*Abies balsamea*), and White Spruce (*Picea glauca*) can be found in the subcanopy. Showy Mountain Ash (*Sorbus decora*), Green Alder (*Alnus viridis*) and Mountain Maple (*Acer spicatum*) are dominant in the shrub layer. The herbaceous ground cover is made up of diverse species typical of this area including Bunchberry (*Cornus canadensis*), Twinflower (*Linnaea borealis*) and Bracken Fern (*Pteridium aquilinum*).



Vegetation Cover Types

Hollinger Project

Habitat Type: Black Spruce – Jack Pine – Feathermoss V20

Polygons: 3, 36, 38, 78, 82

Description:

A coniferous forest dominated by Black Spruce (*Picea mariana*) with Jack Pine (*Pinus banksiana*) also present in the canopy. White Birch (*Betula papyrifera*), White Cedar (*Thuja occidentalis*) and Pin Cherry (*Prunus pensylvanica*) make up the subcanopy and shrub layer. The ground cover is made up of a mixture of Sphagnum and feathermoss (*Sphagnum sp.*), ferns (*Gymnocarpium dryopteris*, *Matteuccia struthiopteris*) and Small Cranberry (*Vaccinium oxycoccos*).



Vegetation Cover Types

Hollinger Project

Habitat Type: White Spruce – Jack Pine – Trembling Aspen NAC1

Polygons: 73, 143, 178

Description:

A mixedwood forest dominated by White Spruce (*Picea glauca*), Jack Pine (*Pinus banksiana*) and Trembling Aspen (*Populus tremuloides*). White Birch (*Betula papyrifera*) and Balsam Fir (*Abies balsamea*) can also be found in the canopy. These species are joined in the subcanopy and shrub layers by Eastern White Cedar (*Thuja occidentalis*). Bush Honeysuckle (*Diervilla lonicera*), Red-osier Dogwood (*Cornus stolonifera*) and Late Lowbush Blueberry (*Vaccinium angustifolium*) are the dominant species in the shrub layer. Bunchberry (*Cornus canadensis*), Bracken Fern (*Pteridium aquilinum*) and Large Leaf Wood-Aster (*Eurybia macrophylla*) are the common herbaceous flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: Balsam Fir – Trembling Aspen NAC2

Polygons: 1, 44, 223

Description:

A mixedwood forest dominated by Balsam Fir (*Abies balsamea*) and Trembling Aspen (*Populus tremuloides*). Both Spruce species (*Picea mariana*, *P. glauca*), Jack Pine (*Pinus banksiana*) and Balsam Poplar (*Populus balsamifera*) can also be found in the canopy. These species can also be found in the subcanopy and shrub layers. The shrub layer is dominated by deciduous shrubs such as Bush Honeysuckle (*Diervilla lonicera*), both Alder species (*Alnus incana*, *A. viridis*), Choke Cherry (*Prunus virginiana*) and Mountain Maple (*Acer spicatum*). Bunchberry (*Cornus canadensis*), Large Leaf Wood-Aster (*Eurybia macrophylla*) and Wild Sarsaparilla (*Aralia nudicaulis*) are the common herbaceous flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: Jack Pine – Trembling Aspen NAC3

Polygons: 12, 17, 18, 80, 84, 100, 101, 102, 119, 121, 132, 137, 153, 185

Description:

A mixedwood forest dominated by Jack Pine (*Pinus banksiana*) and Trembling Aspen (*Populus tremuloides*). White Pine (*Pinus strobes*) can also occasionally be found in the canopy. Balsam Fir (*Abies balsamea*), Balsam Poplar (*Populus balsamifera*) and White Birch (*Betula papyrifera*) join these species in the subcanopy and shrub layer. The shrub layer is quite diverse with the species above as well as; both Spruce species (*Picea glauca*, *P. mariana*), Tamarack (*Larix laricina*), Red-osier Dogwood (*Cornus stolonifera*), Willow (*Salix sp.*), Choke Cherry (*Prunus virginiana*), Green Alder (*Alnus viridis*), Prickly Rose (*Rosa acicularis*) and Velvetleaf Blueberry (*Vaccinium myrtilloides*). Large Leaf Wood-Aster (*Eurybia macrophylla*) and Sweet Fern (*Comptonia peregrina*) are the common herbaceous flora with Lichen species (*Cladonia sp.*) as the dominant ground cover.



Vegetation Cover Types

Hollinger Project

Habitat Type: White Birch – Jack Pine NAC4

Polygons: 179, 180

Description:

A mixedwood forest dominated by White Birch (*Betula papyrifera*) and Jack Pine (*Pinus banksiana*). Balsam Fir (*Abies balsamea*), and Trembling Aspen (*Populus tremuloides*) can also be found in the canopy. All the species above can also be found in the subcanopy and shrub layers. The shrub layer is dominated by deciduous shrubs such as Bush Honeysuckle (*Diervilla lonicera*), Mountain Maple (*Acer spicatum*) and Beaked Hazel (*Corylus cornuta*). Bunchberry (*Cornus canadensis*), Large Leaf Wood-Aster (*Eurybia macrophylla*) and Wild Sarsaparilla (*Aralia nudicaulis*) are the common herbaceous flora.



Vegetation Cover Types

Hollinger Project

Habitat Type: Open Aquatic

Polygons: 14, 26, 27, 63, 69, 71, 76, 85, 87, 138, 146, 173, 183, 188, 190, 197,
228, 234, 243

Description:

An area of open water that is greater than 2 m deep and is always present. Plant species present live either in, on or near the water. Speckled Alder (*Alnus incana*) and Black Spruce (*Picea mariana*) are shrubs that are found growing around the edges of open water. Other species found frequently near open water include; Canada Bluejoint (*Calamagrostis canadensis*), Sedges (*Carex sp.*), Bulrushes (*Schoenoplectus sp.*). Species found in or on the water include Cattails (*Typha sp.*), Pondweed (*Potamogeton sp.*, *Stuckenia filiformis*), Water Plantain (*Alisma triviale*), Broadleaf Arrowhead (*Sagittaria latifolia*) and Yellow Pond-Lily (*Nuphar variegatum*).



Vegetation Cover Types

Hollinger Project

Habitat Type: Cattail Shallow Marsh

Polygons: 37, 39, 40, 42, 54, 75, 86, 88, 116, 117, 118, 125, 128, 139, 142, 149, 150, 172, 186, 189, 191, 229

Description:

A wet community with water less than 2 metres deep. Does not dry up like the meadow marsh. Large-leaved cattail (*Typha latifolia*) was the dominant species in these communities. The surrounding shrub layer included; Black Spruce (*Picea mariana*), Speckled Alder (*Alnus incana*), Willows (*Salix sp.*) and Balsam Poplar (*Populus balsamifera*). Canada Bluejoint (*Calamagrostis canadensis*), various sedge species (*Carex sp.*) and Water Horsetail (*Equisetum fluviatile*) were also present.



Vegetation Cover Types

Hollinger Project

Habitat Type: Horsetail Mineral Meadow Marsh

Polygons: 6, 126

Description:

A wet community with flooding in the spring and becoming moist to dry by summer. Populated by species less tolerant to flooding than those found in shallow marshes. This community is dominated by Water Horsetail (*Equisetum fluviatile*). Wool Grass (*Scirpus cyperinus*), Sedges (*Carex sp.*) and Cattails (*Typha sp.*) are also present. The shrub layer, which is mostly around the edges consists mainly of Speckled Alder (*Alnus incana*), Black Spruce (*Picea mariana*), Tamarack (*Larix laricina*), Red-osier Dogwood (*Cornus stolonifera*), Balsam Poplar (*Populus balsamifera*) and Willow (*Salix sp.*).



Vegetation Cover Types

Hollinger Project

Habitat Type: Organic Coniferous Swamp

Polygons: (Black Spruce) 93, 95, 104
(Tamarack - Black Spruce) 8, 92, 105, 198

Description:

A wet community with extensive vernal pools. Dominant species are hydrophilic such as Black Spruce (*Picea mariana*) and Tamarack (*Larix laricina*) in the canopy; and in the shrub layer Speckled Alder (*Alnus incana*) joins various ericaceous shrubs; Labrador Tea (*Ledum groenlandica*), Sheep Laurel (*Kalmia angustifolia*), Small Cranberry (*Vaccinium oxycoccos*) and Blueberry (*Vaccinium sp.*). Sphagnum Mosses (*Sphagnum sp.*) are the abundant ground cover



Vegetation Cover Types

Hollinger Project

Habitat Type: Alder Mineral Thicket Swamp

Polygons: 214, 215

Description:

A wet community with extensive vernal pools and hydrophilic shrubs. Speckled Alder (*Alnus incana*) is dominant with Willow species (*Salix sp.*), Balsam Poplar (*Populus balsamifera*), Choke Cherry (*Prunus virginiana*), Red-osier Dogwood (*Cornus stolonifera*) and young White Birch (*Betula papyrifera*) also abundant. Ground cover includes numerous Sedge species (*Carex sp.*), Canada Bluejoint (*Calamagrostis canadensis*), Joe Pye-weed (*Eupatorium maculatum*), Reed Canary Grass (*Phalaris arundinacea*) and Blue Flag (*Iris versicolor*).



Vegetation Cover Types

Hollinger Project

Habitat Type: Black Spruce Treed Bog

Polygons: 10, 239

Description:

A wet community dominated by *Sphagnum* mosses and low ericaceous shrubs. Black Spruce (*Picea mariana*) dominates the sparse canopy and Tamarack (*Laix laricina*) and Eastern White Cedar (*Thuja occidentalis*) join in the subcanopy and shrub layers. The shrub layer also includes; Speckled Alder (*Alnus incana*), Willow (*Salix sp.*), Labrador Tea (*Ledum groenlandicum*), Leatherleaf (*Chamaedaphne calyculata*), Sheep Laurel (*Kalmia angustifolia*), Late Lowbush Blueberry (*Vaccinium angustifolium*) and Creeping Snowberry (*Gaultheria hispidula*). *Sphagnum* Mosses (*Sphgnum sp.*) make up most of the ground layer.



Vegetation Cover Types

Hollinger Project

Habitat Type: Fen

Polygons: Open - 13, 30, 123
Leatherleaf - 11

Description:

Fen - A wet community with a substrate that is a thick mix of mosses (*Sphagnum sp.*, *Dicranum sp.*, *Pleurozium schreberi*) and sedge peat.

Open Fen - dominated by numerous species of sedges (*Carex sp.*), grasses (*Scirpus cyperinus*) Bulrushes (*Trichophorum alpinum*, *Schoenoplectus sp.*) and Horsetails (*Equisetum palustre*, *E. variegatum*). Species found in the sparse shrub layer include Black Spruce (*Picea mariana*) Willow (*Salix sp.*) and White Cedar (*Thuja occidentalis*).

Leatherleaf Fen - A wet community dominated by Leatherleaf (*Chamaedaphne calyculata*) and other species of ericaceous shrubs including; Labrador Tea (*Ledum groenlandicum*), Bog Laurel (*Kalmia polifolia*) and Bog Rosemary (*Andromeda polifolia*) Speckled Alder (*Alnus incana*) is also common in the shrub layer.



Vegetation Cover Types

Hollinger Project

Habitat Type: Cultural Jack Pine Coniferous Plantation

Polygons: 16, 20, 81, 89, 90, 91, 97, 98, 106, 136, 207

Description:

This is a disturbed area that has been planted, the dominant Jack Pine (*Pinus banksiana*) are all of uniform age and are planted in obvious rows. White Birch (*Betula papyrifera*) and Trembling Aspen (*Populus tremuloides*) (fast growing pioneer species) are often present in the subcanopy and shrub layers. Small Balsam Fir can be found in the shrub layer joined by Willow species (*Salix sp.*) and Bush Honeysuckle (*Diervilla lonicera*). The ground layer is covered by moss (*Sphagnum sp.*, *Dicranum sp.*, *Pleurozium schreberi*) and Lichen species (*Cladonia sp.*).



Vegetation Cover Types

Hollinger Project

Habitat Type: Cultural Thicket

Polygons: 96, 99, 154, 242

Description:

A regenerating area previously cleared or disturbed. Dominated by Trembling Aspen (*Populus tremuloides*), Balsam Poplar (*Populus balsamea*), Paper Birch (*Betula papyifera*) and Willow species (*Salix sp.*). Other common species forming the upper canopy include; Alder species (*Alnus incana*, *A. viridis*), Choke Cherry (*Prunus virginiana*), Pin Cherry (*Prunus pensylvanica*), Red-osier Dogwood (*Cornus stolonifera*) and Black Spruce (*Picea mariana*). Lower stories consist of the same species found in the canopy. Ground cover is dominated by grasses.



Vegetation Cover Types

Hollinger Project

Habitat Type: Cultural Shrub Sand Barren

Polygons: 33, 70, 124, 144, 145, 147, 235, 236, 237, 245, 248, 249

Description:

Areas of bare sand with moderately advanced regeneration. The sand barrens in this area were highly disturbed areas (cultural); piles of tailings rock. While some hardy shrubs had begun to grow the ground layer was still very open and vegetation was sparse. Species that were present include; Bird's Foot Trefoil (*Lotus corniculata*), Yarrow (*Achillea* sp.), Hawkweed (*Hieracium aurantiacum*, *H. caespitosum*) and Ox-eye Daisy (*Chrysanthemum leucanthemum*). In the shrub layer natural regeneration species included Balsam Poplar (*Populus balsamea*), Willow (*Salix* sp.) and Serviceberry (*Amelanchier* sp.). Small White Spruce (*Picea glauca*) and White Birch (*Betula papyrifera*) were also present.



APPENDIX B

LOCATIONS, DATES AND TIMES OF WILDLIFE SURVEYS



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Table 1: Breeding Bird Survey Station Locations, Dates and Times

Station #	Habitat	Easting	Northing	Date	Time
1	Coniferous	476970	5371000	June 6	05:29
2	Wet	477147	5371797	June 6	05:50
3	Coniferous	477377	5372991	June 6	06:20
4	Coniferous	477781	5374412	June 6	06:46
5	Deciduous	478250	5367750	June 6	07:18
6	Mixedwood	477760	5367412	June 6	07:54
7	Coniferous	475382	5365908	June 6	09:30
8	Coniferous	477704	5365896	June 6	08:50
9	Mixedwood	478621	5366628	June 6	08:18
10	Coniferous	479783	5368299	June 8	07:26
11	Coniferous	480136	5369601	June 26	06:40
12	Mixedwood	479476	5369687	June 26	06:24
13	Deciduous	481336	5369753	June 26	07:19
14	Deciduous	481629	5369964	June 26	07:02
15	Mixedwood	478949	5369415	June 26	06:05
16	Mixedwood	477117	5364684	June 8	06:29
17	Coniferous	475234	5364030	June 8	06:54
18	Coniferous	478521	5365717	June 8	05:37
19	Deciduous	478763	5364952	June 8	05:51
20	Wet	479279	5364795	June 8	06:08
21	Wet	480534	5366784	June 8	09:05
22	Wet	480470	5365782	June 8	08:17
23	Wet	480916	5366003	June 28	08:11
24	Wet	476421	5367253	June 26	08:10
25	Mixedwood	480225	5366131	June 8	08:41
26	Wet	481675	5368766	June 8	09:20
27	Mixedwood	482547	5369577	June 8	09:40
28	Deciduous	479251	5370151	June 26	07:45
29	Deciduous	474160	5368308	June 26	08:33
30	Deciduous	473214	5368131	June 26	08:47
31	Deciduous	474830	5367298	June 26	09:08
32	Deciduous	474819	5366455	June 26	09:28
33	Coniferous	474383	5364423	June 26	09:55
34	Deciduous	474378	5365325	June 27	06:33
35	Mixedwood	475809	5374455	June 27	07:49
36	Mixedwood	475309	5372583	June 27	07:28
37	Mixedwood	475561	5371146	June 27	07:09
38	Deciduous	483475	5369162	June 27	08:20
39	Mixedwood	485042	5367118	June 27	08:44
40	Mixedwood	480190	5371088	June 27	09:50

Table 2: Marsh Survey Station Locations, Dates and Times

Station	Easting	Northing	Date	Time
1	480016	5365878	June 25	18:04
2	480474	5365784	June 25	18:22
3	480523	5366731	June 25	18:41
4	481680	5368770	June 25	19:02
5	476420	5367253	June 26	18:16
6	480709	5365944	June 28	18:09
7	479804	5364734	June 28	18:38

APPENDIX C

INDEX OF POLYGONS



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
1	Balsam Fir – Trembling Aspen	NAC2		VEG, GT	29.91
2	Jack Pine – Black Spruce – Feathermoss	V17		GT	19.41
3	Black Spruce – Jack Pine – Feathermoss	V20		GT	151.31
4	Jack Pine – Black Spruce – Feathermoss	V17		GT	8.44
5	Jack Pine – Black Spruce – Feathermoss	V17		GT	12.03
6	Horsetail Mineral Meadow Marsh Type		MAM2-7	VEG, GT	0.86
7	Trembling Aspen – Black Spruce – Bush Honeysuckle – Herb Rich	V11		VEG, GT	195.67
8	Tamarack – Black Spruce Organic Coniferous Swamp		SWC4-1	VEG, GT	119.11
9	Black Spruce – Herb Rich	V15		VEG, GT	68.03
10	Black Spruce Treed Bog		BOT1-1	VEG, GT	9.18
11	Leatherleaf-Forb Shrub Fen		FES1-4	VEG, GT	6.44
12	Jack Pine – Trembling Aspen	NAC3		VEG, GT	34.58
13	Open Fen		FEO1	GT	3.71
14	Open Aquatic		OAO	GT	20.98
15	Jack Pine – Black Spruce – Feathermoss	V17		GT	14.43
16	Jack Pine Coniferous Plantation		CUP3-4	GT	11.34
17	Jack Pine – Trembling Aspen	NAC3		GT	11.54
18	Jack Pine – Trembling Aspen	NAC3		GT	4.32
19	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	17.71
20	Jack Pine Coniferous Plantation		CUP3-4	GT	77.65



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
22	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	14.93
24	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	1.93
25	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	11.08
26	Open Aquatic		OAO	GT	11.41
27	Open Aquatic		OAO	GT	26.60
28	Trembling Aspen – Black Spruce – Bush Honeysuckle – Herb Rich	V11		VEG, GT	59.04
29	White Birch – White Spruce	V1		VEG, GT	71.56
30	Open Fen (Horsetail)		FEO1	VEG, GT	3.72
31	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	24.72
32	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	25.38
33	Cultural Shrubby Sand Barren		SBS	GT	360.62
34	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	25.02
35	Jack Pine – Black Spruce – Feathermoss	V17		GT	10.20
36	Black Spruce – Jack Pine – Feathermoss	V20		GT	24.38
37	Cattail Mineral Shallow Marsh		MAS2-1	GT	14.98
38	Black Spruce – Jack Pine – Feathermoss	V20		GT	43.37
39	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	6.49
40	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	21.13
41	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	56.95
42	Cattail Mineral Shallow Marsh		MAS2-1	GT	14.74



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
43	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	96.72
44	Balsam Fir – Trembling Aspen	NAC2		VEG, GT	9.65
45	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	2.80
46	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		VEG, GT	28.10
47	Black Spruce – Herb Rich	V15		VEG, GT	20.40
48	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		VEG, GT	47.14
49	Black Spruce – Herb Rich	V15		GT	3.31
50	Black Spruce – Herb Rich	V15		GT	7.76
51	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	57.70
52	Black Spruce – Herb Rich	V15		GT	25.92
53	Black Spruce – Herb Rich	V15		AP, FIR	5.14
54	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	89.02
55	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		AP, FIR	66.85
56	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	20.09
57	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	6.21
58	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	5.67
59	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	6.47
60	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		VEG, GT	49.29
61	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		VEG, GT	0.38
62	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		VEG, GT	3.74



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
63	Open Aquatic		OAO	AP	15.42
64	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		AP, FIR	22.57
65	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	17.30
66	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	9.91
67	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		VEG, GT	135.13
68	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	40.17
69	Open Aquatic		OAO	AP	6.45
70	Cultural Shrubby Sand Barren		SBS	GT	187.39
71	Open Aquatic		OAO	VEG, GT	2.98
72	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	7.02
73	White Spruce – Jack Pine – Trembling Aspen	NAC1		VEG, GT	15.98
74	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	6.35
75	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	36.84
76	Open Aquatic		OAO	AP	4.87
77	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	7.45
78	Black Spruce – Jack Pine – Feathermoss	V20		GT	28.85
79	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	39.06
80	Jack Pine – Trembling Aspen	NAC3		VEG, GT	9.48
81	Jack Pine Coniferous Plantation		CUP3-4	GT	56.66
82	Black Spruce – Jack Pine – Feathermoss	V20		AP, FIR	2.36



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
83	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	26.81
84	Jack Pine – Trembling Aspen	NAC3		VEG, GT	30.85
85	Open Aquatic		OAO	VEG, GT	1.33
86	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	1.01
87	Open Aquatic		OAO	VEG, GT	1.82
88	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	0.89
89	Jack Pine Coniferous Plantation		CUP3-4	GT	14.59
90	Jack Pine Coniferous Plantation		CUP3-4	VEG, GT	16.46
91	Jack Pine Coniferous Plantation		CUP3-4	VEG, GT	25.26
92	Tamarack – Black Spruce Organic Coniferous Swamp		SWC4-1	VEG, GT	8.52
93	Black Spruce Organic Coniferous Swamp		SWC4-3	VEG, GT	27.59
94	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	16.26
95	Black Spruce Organic Coniferous Swamp		SWC4-3	GT	22.53
96	Mineral Cultural Thicket Ecosite		CUT1	GT	19.34
97	Jack Pine Coniferous Plantation		CUP3-4	GT	4.36
98	Jack Pine Coniferous Plantation		CUP3-4	GT	8.69
99	Mineral Cultural Thicket Ecosite		CUT1	GT	8.15
100	Jack Pine – Trembling Aspen	NAC3		GT	18.72
101	Jack Pine – Trembling Aspen	NAC3		GT	36.44
102	Jack Pine – Trembling Aspen	NAC3		GT	12.41



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
103	Jack Pine – Black Spruce – Feathermoss	V17		VEG, GT	26.09
104	Black Spruce Organic Coniferous Swamp		SWC4-3	GT	26.73
105	Tamarack – Black Spruce Organic Coniferous Swamp		SWC4-1	GT	37.19
106	Jack Pine Coniferous Plantation		CUP3-4	VEG, GT	31.59
107	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	6.28
108	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	8.58
109	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	9.46
110	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	18.81
111	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	69.71
112	Mineral Cultural Meadow Ecosite		CUM1	GT	4.23
113	Jack Pine – Black Spruce – Feathermoss	V17		VEG, GT	39.77
114	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	38.82
115	Golfcourse		**	GT	50.83
116	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	0.91
117	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	5.11
118	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	3.60
119	Jack Pine – Trembling Aspen	NAC3		VEG, GT	25.30
120	Black Spruce – Herb Rich	V15		VEG, GT	7.27
121	Jack Pine – Trembling Aspen	NAC3		VEG, GT	6.35
122	Black Spruce – Herb Rich	V15		VEG, GT	4.22



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
123	Open Fen		FEO1	VEG, GT	4.61
124	Cultural Shrubby Sand Barren		SBS	GT	47.69
125	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	3.45
126	Horsetail Mineral Meadow Marsh		MAM2-7	VEG, GT	12.24
127	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		VEG, GT	9.15
128	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	2.86
129	Balsam Poplar – Trembling Aspen – Mountain Maple – Ferns	V13		GT	4.47
130	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	1.65
131	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	8.09
132	Jack Pine – Trembling Aspen	NAC3		VEG, GT	19.21
133	Black Spruce – Herb Rich	V15		VEG, GT	1.88
134	Black Spruce – Herb Rich	V15		VEG, GT	5.20
135	Black Spruce – Herb Rich	V15		VEG, GT	8.38
136	Jack Pine Coniferous Plantation		CUP3-4	VEG, GT	1.59
137	Jack Pine – Trembling Aspen	NAC3		VEG, GT	35.93
138	Open Aquatic		OAO	GT	11.26
139	Cattail Mineral Shallow Marsh		MAS2-1	GT	7.66
140	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	10.31
141	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	80.03
142	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	14.24



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
143	White Spruce – Jack Pine – Trembling Aspen	NAC1		VEG, GT	19.63
144	Cultural Shrubby Sand Barren		SBS	GT	34.03
145	Cultural Shrubby Sand Barren		SBS	GT	62.08
146	Open Aquatic		OAO	GT	6.42
147	Cultural Shrubby Sand Barren		SBS	VEG, GT	28.12
149	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	111.08
150	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	31.26
152	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	26.33
153	Jack Pine – Trembling Aspen	NAC3		GT	4.77
154	Mineral Cultural Thicket Ecosite		CUT1	GT	7.84
155	Placer Dome Mine		**	GT	111.88
156	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	2.38
157	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	115.12
158	White Birch – White Spruce	V1		VEG, GT	33.21
159	White Birch – Mountain Maple	V2		VEG, GT	22.52
160	White Birch – Mountain Maple	V2		GT	12.88
161	White Birch – Mountain Maple	V2		GT	27.15
162	White Birch – Mountain Maple	V2		GT	7.80
163	White Birch – Mountain Maple	V2		VEG, GT	152.56
164	White Birch – Mountain Maple	V2		GT	4.79



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
165	White Birch – Mountain Maple	V2		VEG, GT	2.52
166	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	17.26
167	Black Spruce – Herb Rich	V15		VEG, GT	89.54
168	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	12.03
169	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	20.91
170	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	7.50
171	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	17.45
172	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	66.07
173	Open Aquatic		OAO	AP	4.70
174	White Birch – Mountain Maple	V2		GT	8.69
175	White Birch – Mountain Maple	V2		GT	3.29
176	Black Spruce – Herb Rich	V15		GT	3.73
177	Black Spruce – Herb Rich	V15		GT	4.43
178	White Spruce – Jack Pine – Trembling Aspen	NAC1		VEG, GT	19.70
179	White Birch – Jack Pine	NAC4		GT	3.48
180	White Birch – Jack Pine	NAC4		GT	9.05
181	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	5.15
182	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	8.50
183	Open Aquatic		OAO	AP	5.95
184	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	149.43



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
185	Jack Pine – Trembling Aspen	NAC3		VEG, GT	30.42
186	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	7.48
187	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	10.62
188	Open Aquatic		OAO	AP	2.82
189	Cattail Mineral Shallow Marsh		MAS2-1	AP	38.38
190	Open Aquatic		OAO	VEG, GT	43.66
191	Cattail Mineral Shallow Marsh		MAS2-1	VEG, GT	22.33
192	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	52.96
193	Black Spruce – Herb Rich	V15		GT	22.30
194	Black Spruce – Herb Rich	V15		GT	49.11
195	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	104.12
196	Black Spruce – Herb Rich	V15		AP, FIR	22.13
197	Open Aquatic		OAO	AP	9.41
198	Tamarack – Black Spruce Organic Coniferous Swamp		SWC4-1	AP, FIR	125.17
199	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	12.05
200	Black Spruce – Herb Rich	V15		AP, FIR	20.04
201	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	3.47
202	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	7.15
203	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	1.98
204	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	53.24



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
205	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		AP, FIR	3.47
206	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		VEG, GT	18.02
207	Jack Pine Coniferous Plantation		CUP3-4	GT	3.41
208	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	4.03
209	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	4.79
210	Black Spruce – Herb Rich	V15		GT	12.87
211	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	19.12
212	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	25.65
213	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	33.34
214	Alder Mineral Thicket Swamp		SWT2-1	VEG, GT	94.91
215	Alder Mineral Thicket Swamp		SWT2-1	VEG, GT	38.16
216	Black Spruce – Herb Rich	V15		AP, FIR	1.79
217	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		AP, FIR	8.26
218	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		VEG, GT	17.45
219	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		GT	2.68
220	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		GT	9.34
221	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		VEG, GT	13.74
222	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	5.82
223	Balsam Fir – Trembling Aspen	NAC2		VEG, GT	36.91
224	Trembling Aspen – Bush Honeysuckle – Large-leaved Aster	V5		GT	52.92



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
225	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		VEG, GT	27.30
226	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		GT	3.23
227	Trembling Aspen – Balsam Poplar – Speckled Alder	V10		GT	5.79
228	Open Aquatic		OAD	GT	5.98
229	Cattail Mineral Shallow Marsh		MAS2-1	GT	28.90
230	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	15.02
231	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	10.20
234	Open Aquatic		OAD	GT	11.26
235	Cultural Shrubby Sand Barren		SBS	AP, FIR	72.68
236	Cultural Shrubby Sand Barren		SBS	AP, FIR	38.68
237	Cultural Shrubby Sand Barren		SBS	AP, FIR	37.47
238	Hollinger Mine			AP, GT	33.40
239	Black Spruce Treed Bog		BOT1-1	AP, FIR	17.15
240	Delnite Mine			AP,web	13.27
241	McIntyre Mine			AP	24.78
242	Mineral Cultural Thicket Ecosite		CUT1	VEG, GT	8.33
243	Hollinger Mine			AP, GT	41.70
244	Cultural Waste Rock Tailings			GT, AP	279.61
245	Cultural Shrubby Sand Barren		SBS	VEG, GT	5.65
246	Trembling Aspen – White Birch – Beaked Hazel – Bracken Fern	V6		GT	3.06



Polygon ID	Habitat Type	FEC	ELC	Method	Area (Ha)
247	Cultural Waste Rock and Tailings Pond			AP	624.76
248	Cultural Shrubby Sand Barren		SBS	GT, AP	220.64
249	Cultural Shrubby Sand Barren		SBS	GT, AP	28.02

APPENDIX D
BREEDING BIRD CODES

Avian Breeding Evidence Codes (Cadman *et al.* 1987)

Breeding Level	Code	Evidence
Observed	X	Observed in its breeding season; no evidence of breeding.
	SH	Observed in its breeding season in suitable nesting habitat.
Possible	SM	Singing male heard in suitable nesting habitat in breeding season.
	P	Pair in suitable nesting habitat in nesting season.
Probable	T	Territorial behavior on at least 2 days, at least one week apart.
	D	Display or courtship.
	V	Visiting probable nesting site.
	A	Agitated behaviour.
	FY	Recently fledged young.
Confirmed	AE	Adults entering or leaving nest site.
	FS	Adults carrying faecal sac or food for young.
	NE	Nest containing eggs.