ROCKRIDGE QUARRY
110 COUNTY ROAD 507
LOT 21, CONCESSION 8
(FORMERLY TOWNSHIP OF GALWAY-CAVENDISH & HARVEY TOWNSHIP) \
MUNICIPALITY OF TRENT LAKES
COUNTY OF PETERBOROUGH

NATURAL ENVIRONMENT
LEVEL 1 & Level 2 TECHNICAL REPORTS

Prepared for:	2329059 Ontario Inc.
Submitted by:	Niblett Environmental Associates Inc.
File:	PN 12-030
Date:	June 2017

Niblett Environmental Associates Inc.
Biological Consultants

June 6, 2017 PN 12-030

2329059 Ontario Inc.
363 Queen Street
Peterborough Ontario
K9H 3J6

Subject: **ROCKRIDGE QUARRY**
110 COUNTY ROAD 507
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MUNICIPALITY OF TRENT LAKES
COUNTY OF PETERBOROUGH

NATURAL ENVIRONMENT LEVEL 1 and 2 TECHNICAL REPORT

Dear Mr. Sir

We are pleased to submit our NETR reports for the proposed quarry.

After a thorough review of our field data and existing literature we have assessed the impacts of the proposed development on the natural features. We have made several recommendations to mitigate any potential impacts.

Please contact us if you or the agencies require any additional information.

Sincerely,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

55 Mary Street West, Suite 112, Lindsay, Ontario K9V 5Z6 Tel: (705) 878-9399 Fax: (705) 878-9390
e-mail: mail@niblett.ca Website: www.niblett.ca

Niblett Environmental Associates Inc.
Biological Consultants

J. Christopher Ellingwood

President and Sr. Terrestrial/Wetland Biologist

Education

Terrain & Water Resources Technologist
Fleming College, Lindsay, 1996
Dean's List & President's Honour Roll

Bachelor of Environmental Studies (B.E.S.)
University of Waterloo, 1985

Employment History

2009-present	Niblett Environmental Associates, President
1996-present	Niblett Environmental Associates, Sr. Terrestrial & Wetland Biologist
1996-2009	Fleming College, Instructor Part-time, ecology, environmental assessment
1997-2000	Acres & Associates Environmental Ltd., part time, Biologist
1996	The Greer Galloway Group, Biologist
1996	J.E. Hanna and Associates, Biologist
1988-93	Canadian Wildlife Service, Conservation & Protection, Ontario & Atlantic Regions, Biologist and biological technician
1986-88	Canadian Nature Federation
1984-85	Federation of Ontario Naturalists, Atlas biologist
1983	Ontario Ministry of Natural Resources, Biologist

55 MARY STREET WEST, Suite 112 LINDSAY, ONTARIO K9V 5Z6
Tel (705) 878-9399 Fax (705) 878-9390 Email: cellingwood@niblett.ca

Experience

Aggregate Permits and Licenses

Pits and Quarries - He has conducted numerous Natural Environment Level 1and Level 2 Technical Reports as per the Aggregate Resources Act and the Aggregate Resources of Ontario Provincial Standards. Project sites include aggregate pits, quarries, aggregate permits and wayside pits throughout Central and Eastern Ontario. He has also been involved in municipal peer reviews of Level 1 and 2 reports. Projects include dimensional stone quarries in the Buckhorn, Bobcaygeon and Peterborough area. Key issues addressed by NEA included Species at Risk (snakes, turtles, alvars and rare plants and butternut trees), fish habitat, provincially significant wetlands, unevaluated wetlands, amphibian habitat and woodlands and groundwater seepage zones. Our work included working with the study team on the phasing, mitigation measures, rehabilitation plan, plantings and species list and recommendations/notes regarding potential effects on Species at Risk during the operation. Species where additional targeted surveys and mitigation was required to date include: eastern hognose snake, loggerhead shrike, bobolink, eastern meadowlark, barn swallow, Blanding's turtle, snapping turtle, whip-poor-will, common nighthawk, five-lined skink and least bittern. Our role includes pre-consultation meetings, public meetings, study team discussions, peer review responses and OMB hearings as an expert witness.

Municipal Infrastructure Projects

Bridges and Culverts- He has conducted numerous projects involving municipal infrastructure such as bridges and culverts on rural roads, highways, entrances and side roads. Our role includes checking culvert for Species At Risk (barn swallows) and other bird species, fish habitat, mussels, bats and other wildlife. Reporting includes Environmental Study Reports, technical reports and engineering assessments. We have completed this type of survey for MTO, City of Ottawa (Bytown Bridges, Minto Bridges), York Region, County of Peterborough, City of Kawartha Lakes and contractors for crossing replacements, repairs and removal. We complete Species at Risk compensation plans, fish salvage and Fisheries Act authorizations, as well as construction and post-construction. monitoring, plantings and shoreline restoration measures.

Water Supply - Mr. Ellingwood has conducted the natural heritage component of Class EA's for Municipal Water Projects for water mains and water intake structures in Whitby, Pickering, Ingleside, Kagawong, Peterborough, North Glengarry and Elizabethtown, Ontario. He was responsible for determination of impact of alternative routings on flora and fauna, significant features such as wetlands and Species At Risk. Current projects include the Orleans Watermain Link, Glengarry Water Main in Eastern Ontario, North Kanata water main and the Otonabee Water Main in Peterborough.

Sewage/Wastewater - Mr. Ellingwood has conducted the natural heritage component of

Class EA for Municipal Wastewater Projects for sewage effluent discharge pipes in Lancaster and Lindsay, as well as trunk sewers and pollution control plant and STP upgrades and expansions. He was responsible for determination of impact of alternative routings on flora and fauna and significant features. He has completed benthic data collection (biomonitoring) using the BioMap protocols for the Lindsay STP under their C of A since 2004.

Municipal Solid Waste - Mr. Ellingwood has conducted impact assessments under the Environmental Assessment Act for landfill expansions in North Lancaster, Township of Charlottenburgh and Moose Creek. He was responsible for the natural environment component data collection and impact assessment and baseline data collection. He has conducted benthic monitoring for landfills at Moose Creek, Bracebridge and Lindsay.

Transportation - He has conducted natural environment studies including examination of significant features and plants and animals and impact assessment for new roads and improvements to existing roads. Numerous provincial highway construction projects (Schedule B and C) for the Ministry of Transportation Ontario have been completed under the Class EA for Provincial Transportation Facilities. Municipal road projects include intersection and road widening as well as extensions of road in new urban areas. Projects include Salem Road extension, Ajax; Rossland Road extension, Oshawa; Rideau River Collector, Ottawa; Bensfort Road upgrades and the Nassau Mills Road bridge, in Peterborough; and Bytown Bridge reconstruction in Ottawa. Our role includes identifying constraints, recommending mitigation measures and designing rehabilitation and compensation, as well as obtaining environmental clearances from MTO, MNR and DFO. He has also conducted an evaluation of environmental impacts of a proposed runway expansion to the Peterborough airport under CEAA. He worked on the east-west Ottawa Light Rapid Transit (LRT) EA for a new transit link and public transportation system.

Stormwater Management - He has assessed the impact of stormwater management facilities on the natural environment during review of numerous plans of subdivision and commercial buildings.

Natural Resource Planning

Municipal Planning - He has completed the natural environment component of Functional Planning Studies, Secondary Plans, expansion areas and annexation lands in Peterborough, Kanata, Orleans and Craighurst. Studies included assessment of existing natural heritage features, constraints and recommendations. He has worked on the natural heritage policies for municipal official plan update in Haliburton. He has completed numerous peer reviews of EIS reports for municipalities.

Wetland Restoration and Design

NEA has completed a number of projects involving restoration of wetlands and creation of new compensation wetlands. This includes biological inventories and ecological function analysis, design, site plant lists, habitat structure design, construction supervision, wildlife

salvages and long term post-construction monitoring. Projects completed to date include 0.3-1.7 acre wetlands in Peterborough, Bowmanville, Courtice, Ottawa and Fenelon Falls. Wetlands are designed specifically for replacement of unevaluated wetlands and include spring breeding frog habitat. In all cases we work closely with the landscape architects, engineers, contractors and planners on the approval process and the site design.

Biological Inventories

NEA has a full time staff of professional fisheries and aquatic biologists, terrestrial/wetland biologists and GIS expert with extensive experience as consultants and previous work at government agencies.

As such we are very familiar with most government protocols and have training to complete a wide range of biological inventories.

Examples include Marsh Monitoring Program, Forest Bird Monitoring Program, Breeding Bird Survey, Grassland Bird Surveys, Species at Risk surveys (bobolink, meadowlark, loggerhead shrike, whip-poor-will, Benthic Monitoring Program, BioMap benthic sampling, Ontario Stream Assessment Protocol, MTO/DFO fish sampling, Ontario Wetland Evaluation System, Ecological Land Classification, Butternut Health Assessments.

Botanical inventories

Botanical inventories are conducted for all projects to describe the vegetation communities using ELC, as well as for identification of all species and to determine if regional, provincial or federal significant species are present. Specialized/targeted inventories are conducted for wetlands (fens, bogs), Great Lakes coastal marshes/pannes, alvars, rock barrens and limestone ridges. Targeted surveys are also conducted for rare plants such as American ginseng, as well as long term monitoring and health assessments under ESA permits.

Plant salvages, restoration and monitoring

Projects regularly include the need to salvage or transplant regionally rare species, rehabilitate or restore sites and monitor these works. NEA has conducted numerous plant salvages, including supervising the removal, identifying transplant locations and monitoring the success. This includes wetland, alvar plants, orchids, ferns and regionally area species.

Wetland Studies - Mr. Ellingwood has conducted Environmental Impact Studies (EIS) according to the Wetlands Policy Statement and Provincial Policy Statement for plans of subdivision, utilities and commercial developments adjacent to or within provincially significant wetlands throughout southern and northern Ontario. Studies include delineating wetland boundaries and biological inventories of wetlands (plants, birds, reptiles, amphibians, fish); performing impact assessment of aggregate pit water discharge on wetland ecosystems (Kemptville, ON); littoral zone and wetland mapping and inventory for High Falls Redevelopment Project Public Information Package (Wawa, ON); completing

full wetland re-evaluation for Fernbank wetland, Stittsville using third edition manual, Southern Ontario; and completing two wetland evaluations on Michipicoten River, using Northern Manual. He is a certified wetland evaluator (MNR supported course through Sir Sandford Fleming College), summer 1996. He was an instructor for wetland evaluation courses, Sir Sandford Fleming College, Lindsay annually 1996-2009.

Species At Risk - He has conducted baseline inventories for Species At Risk for numerous properties and projects in Ontario. He developed and completed mitigation plans and long term monitoring projects where Species At Risk or sensitive species were involved. Projects include annual heronry monitoring program for a decorative limestone quarry as part of their license conditions and loggerhead shrike habitat monitoring in the Carden Plain for a quarry. He is also a certified MNR butternut health assessor (trained Aug. 2009). He is currently working for several developers in Ottawa completing impact studies on the effects of high rise construction on a nesting pair of Peregrine Falcons. Mitigation plans and monitoring of various species including hog-nose snake, ginseng, Blanding's turtles, snapping turtles, loggerhead shrike, five-lined skink, milk snake, map turtles and whip-poor-will. He is experienced in the original and latest ESA regulations including the documentation necessary for Species At Risk using the transition policies, Overall Benefit Permit and regulations. He has obtained authorizations from MNR for several projects after submitting Information Gathering Forms, Avoidance Alternatives, impact studies and mitigation plans/planting plans.

Avifaunal Studies - He has undertaken baseline studies of seabird movement through the Northumberland Strait, New Brunswick. He has conducted long term monitoring of waterfowl brood production in a constructed wetland, Sackville, N.B. as well as long term monitoring of bird movement through Innis Point Bird Observatory, Kanata, ON. He was co-ordinator of the 1988 Ottawa Peregrine Falcon Reintroduction Program and worked on the Toronto Peregrine Falcon Reintroduction Program (1983).

Renewable Energy

Hydroelectric - Mr. Ellingwood has conducted baseline wetland inventories for proposed increases in headpond elevations for upgrades to existing hydroelectric facilities in High Falls, Michipicoten River. He has completed work on a 2.5 MW run-of-the-river facility in Peterborough that involved extensive field inventories, CEAA screening and design, permitting, construction and monitoring of a compensatory wetland and amphibian pond. Currently working on two run-of-the-river facilities in Elliot Lake and Norland where Species at Risk, wildlife habitat, wetlands and aquatic habitat are key issues.

Dams and other Water Control Structures - He has conducted baseline wetland evaluations for proposed removal and repairs to two dams on the Big East River under a Class EA for MNR Projects. The impact assessment of the design options included detailed plant, bird, mammal and herpetile surveys and wetland community delineation.

Wind Power Generation - He has completed bird surveys for proposed wind power projects on Wolfe Island (Kingston), for Stelco (Port Dover) and the Huron-Kinloss Windpower Project (Kincardine). Mr. Ellingwood was involved in detailed spring and fall migration surveys of waterfowl and passerines, as well overwintering raptors surveys. He also conducted detailed breeding bird surveys using Point Count methodologies and area searches for all optioned properties, hydro connections and turbine locations.

Solar Power- He is currently working on 3 sites in south-central Ontario for proposed solar facilities. He has MNR training (Jan. 2011 and 2013) in preparation of the Natural Heritage Assessment reporting and is familiar with the Renewable Energy Act and project types. Work includes multi-season inventories for birds, plants, woodlands, rare species, amphibians, fish and wildlife as per established protocols; as well as preparation of the impact study and other documentation (Records Review, Site Investigation, Evaluation of Significance, EIS, Oak Ridges Moraine compliance, Monitoring plan, watercourse evaluation and Species at Risk permitting). He acts as the project manager for the NHA.

Housing and Recreational Developments

Mr. Ellingwood has completed numerous (1400 +) Environmental Impact Studies (EIS) for plans of subdivision, severances, golf courses, institutional and commercial developments in Ontario. Locations of projects include most of Eastern and Central Ontario. In most cases the EIS was requested by the Municipality or Township due to the proximity of the development to a provincially significant wetland (adjacent lands). Impact studies included detailed biological inventories of vegetation, birds, mammals, reptiles and amphibians and fish. Assessments included determining compliance with Provincial Policy Statement guidelines for significant features such as wetlands, ANSI's, woodlands, valleylands and wildlife habitat. Numerous wetland boundary delineations and wetland re-evaluations have also been conducted for developments (300 +) using the Wetland Evaluation System Southern Manual (Third Edition). He has also conducted tree preservation/conservation plans to meet municipal requirements.

Oak Ridges Moraine

He is a specialist in the Oak Ridges Moraine Conservation Plan and assessing impacts of developments, severances, lot expansions, additions and building permits within the ORM and preparation of Natural Heritage Evaluations (120+). He has worked in many municipalities where ORM zoning by-laws are in place and require specific processes including pre-consultation meetings.

Expert Testimony

Mr. Ellingwood has testified as an expert witness at thirteen Ontario Municipal Board Hearings, specifically: a proposed Commercial and Demolition (C& D) waste disposal site in Peterborough County; Ferma Quarry in Kirkfield; Quarry Forest subdivision in Orleans; Westwood subdivision in Stittsville; Campitelli subdivision in Ajax; Miller severances at Stony Lake; Lang severances in Peterborough county; OPA in Glengarry for a wetland

designation; Gilson Point subdivision in City of Kawartha Lakes; recent Joint hearing for expropriation and rezoning to district park for the Municipality of Clarington; Dewdney quarry in Harvey Township, Stonescape Quarry in Buckhorn and OPA 76-Ottawa. Experience includes pre-hearing meetings, negotiations for settlements, testimony at hearing, site visits and expert advice on provincially significant wetlands, ANSI's, wildlife habitat, alvars and Species at Risk (e.g. Loggerhead shrike, Blanding's turtles, hognose snake, whip-poor-will, least bittern and bobolink/meadowlark).

Teaching Experience

Mr. Ellingwood was a part-time instructor at Sir Sandford Fleming College, Frost Campus, Lindsay Ontario in the Terrain and Water Resources and Fish and Wildlife Programs from 1996-2009. Courses taught included Applied Ecology, Environmental Applications, Bioengineering, Environmental Principles, Wetland Evaluation Course, Environmental Planning and Impact Assessment and Bird Studies.

Volunteer Activities

Mr. Ellingwood is involved annually in various volunteer projects including the Ontario Breeding Bird Survey, Forest Bird Monitoring Survey, Breeding Bird Census, Ontario Breeding Bird Atlas, Maritime Breeding Bird Atlas, Ontario Marsh Monitoring Program (amphibian and bird surveys), Spring Red-shouldered Hawk and Woodpecker Survey, Nocturnal Owl Survey, Ontario Nest Record Scheme, Christmas Bird Counts, Ontario Rare Breeding Bird Program, Project Feederwatch, Canadian Lakes Loon Survey, Loggerhead Shrike Survey (1987), Couchiching Conservancy volunteer monitoring Shrike Survey, Ontario Grassland Bird Survey, Central Ontario Whip-poor-will survey and the Peregrine Falcon Reintroduction Program.

He acted as Regional Coordinator (Region 14) for the second Ontario Breeding Bird Atlas project (2001-2005) and is currently the volunteer regional coordinator for Bird Studies Canada's Marsh Monitoring Program in the Kawartha Lakes area. He is also the coordinator for the Lindsay Christmas Bird Count.

He regularly conducts workshops for birding by ear, leads nature tours and participates in the Carden Challenge (a 24 hr birding event) in the Carden Plain.

NATURAL ENVIRONMENT
LEVEL 1 TECHNICAL REPORT

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110 COUNTY ROAD 507
LOT 21, CONCESSION 8
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MUNICIPALITY OF TRENT LAKES
COUNTY OF PETERBOROUGH

NATURAL ENVIRONMENT
LEVEL 1 TECHNICAL REPORT

1.0 Introduction

1.1 Study Rationale

Niblett Environmental Associates Inc. (NEA) was retained by 2329059 Ontario Inc. to complete the necessary natural environment reports as part of a proposed Aggregate License (Category 4) Application. The quarry is located near Buckhorn, Ontario.

This report will meet the content requirements of a Natural Environment Level 1 Technical Report. Under the Aggregate Resources Act Provincial Standards (Gov. Ont., 1997), a license application must be accompanied by a Natural Environment Level 1 Technical Report. Recently the MNRF Lands and Waters Branch issued a draft policy document dealing specifically with Aggregate Permit Applications: Natural Environment Report Standards (Policy ARA 2.01.7, March 2006). The policy provides a detailed outline of the content of the report.

This report has been prepared for the ARA application primarily, but also to meet the EIS requirements of the County of Peterborough and the Municipality of Trent Lakes for any planning approvals.

1.2 Site Location

The proposed site is for a Category 4 – Class 'A' Licence, Quarry Above the Water Table on Lot 21, Concession 8. The property is located approximately 10 km north of the Hamlet of Buckhorn in Ontario, specifically northeast of the County Road 36/County Road 507 intersection (Figure 1). The property is located in the former Township of Harvey now

part of the Municipality of Trent Lakes in Peterborough County. The proposed licensed area encompasses approximately 95.5 hectares and the total extraction area is 84.2 ha.

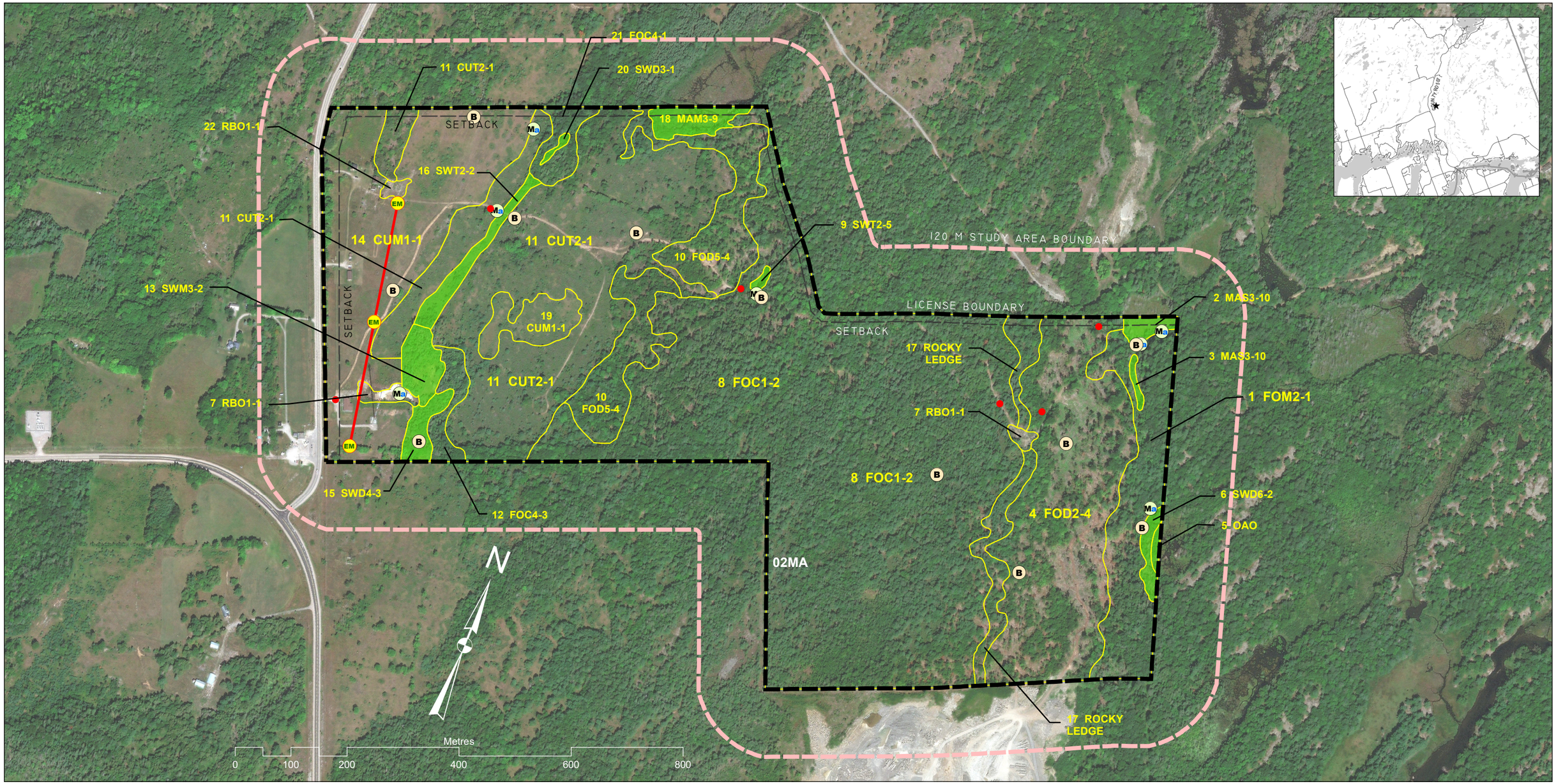
The property is located within the MNRF Eco-district 6E-9, south and east of the Canadian Shield.

1.3 Study Area

The study area for the identification of significant species and natural heritage features extended 120 m beyond the boundary of the proposed licensed area as per the requirements of the Aggregate Resources Act Provincial Standards (Government of Ontario, 1997). The search for significant natural features was also extended to 5 km to determine if other features are present in the surrounding area. In addition, this distance also captures other Species at Risk records that may assist in determining if similar habitat is present on the subject property.

1.4 Adjacent Land Use Description

The proposed Rockridge Quarry is generally found in a rural landscape surrounded by open meadows, wetlands, forested areas and several existing aggregate operations. Lands immediately adjacent to the south consist of an existing licensed aggregate extraction operation. . Lands located to the southwest are also part of an existing licensed aggregate operation. A gas station is located to the west, just north of the Highway 36 and County Road 507 intersection. A proposed residential golf course development is located directly across from the property, on the west side of County Road 507. A communication tower is located on the property at the southwest corner. A few residential dwellings are located north and northwest of the property with three dwellings on the subject property, fronting on County Road 507. The Kawartha Highlands Provincial Park is located immediately to the east.



LEGEND

- Trail Cam Monitoring
- Breeding Bird Survey
- MMP Amphibian Survey
- Eastern Meadowlark Survey Location
- License Line
- 120m Study Area
- License Setback
- Eastern Meadowlark Transect Location
- Vegetation Community
- Wetland Community

Extrapolated from 1601-1 & 1601-2.dwg, 2016.
Composite satellite imagery acquired in tje spring of 2013. SCOOP.

ELC TYPES (1ST APPROXIMATION)

CODE	TYPE DESCRIPTION
CUM1-1	Dry-moist old field meadow
CUT1-2	Serviceberry cultural thicket
FOC1-2	Dry-fresh white pine-red pine coniferous forest
FOC4-1	Fresh-moist white cedar coniferous forest
FOC4-3	Fresh-moist white cedar-balsam fir coniferous frst
FOD2-4	Dry-fresh oak-hardwood deciduous forest
FOD5-4	Dry-fresh sugar maple-ironwood deciduous forest
FOM2-1	Dry-fresh white pine-oak mixed forest
MAM3-9	Forb organic meadow marsh
MAS3-10	Forb organic shallow marsh
OAO	Open aquatic
RBO1-1	Dry carbonate open rock barren
SWD3-1	Red maple mineral deciduous swamp
SWD4-3	White birch-poplar mineral deciduous swamp
SWD6-2	Silver maple organic deciduous swamp
SWM3-2	Poplar-conifer mineral mixed swamp
SWT2-5	Red-osier mineral thicket swamp
SWT3-2	Willow organic thicket swamp

FIGURE 1: VEGETATION COMMUNITIES & SURVEY LOCATIONS

Lot 21, Con 8, Township of Trent Lakes
County of Peterborough
Peterborough District

UTM Zone 17
WKID: 26917 Authority: EPSG
Transverse Mercator
GCS North American 1983, ESRI ArcGIS 10.1

REVISIONS

NO	BY	DATE	DESCRIPTION
1	W.P.	15/03/2017	Initial map creation.
2	W.P.	27/04/2017	Added survey locations.
3	W.P.	01/05/2017	Updated vegetation communities.
4	W.P.	06/06/2017	Added categories 2 & 3 to the map.

CONTACT: Will Pridham, GIS Specialist & Cartograper
PHONE/FAX: T: 1 (705)-878-9399 F: 1 (705)-878-9390
EMAIL: Will Pridham: wpridham@niblett.ca General Inquiries: mail@niblett.ca

PROJECT NO: PN12-030
REVISION NO.: RV-04
PROJECT: Stonescape III
CLIENT: N/A

SCALE: 1:6,800 CENTIMETERS

NIBLETT ENVIRONMENTAL ASSOCIATES INC.

WWW.NIBLETT.CA

2.0 Environmental Policy

Documents reviewed to gain an understanding of the natural heritage features and application legislation/regulations that are relevant to the proposed quarry application consisted of the following:

- The ARA (Ontario, 2009) and the Provincial Standards of Ontario – Category 4 – Class 'A' Licence, Quarry Above Water (MNR, 1997);
- Aggregate Permit Applications: Natural Environment Report Standards (Policy ARA 2.01.7, March 2006, MNR)
- The Provincial Policy Statement (MMAH, 2014);
- The Species at Risk Act (2002);
- The Endangered Species Act (2007);
- Migratory Bird Convention Act (1994);
- Peterborough County Official Plan and Schedules (February, 2013);
- Municipality of Trent Lakes Official Plan and Schedules (August, 2013);
- Municipality of Trent Lakes Comprehensive Zoning By-law (B2014-070)

An overview of the above noted legislation and policy documents are discussed in Sections 2.1 to 2.7.

2.1 Provincial Policy Statement

The extent of Natural Heritage features found on or adjacent to the study area have been investigated within this Natural Environment Level 1 Technical Report (NETR) and specifically Sections 2.1.4-2.1.6 of the Provincial Policy Statement (2014) apply to this project.

2.1.4 Development and site alteration shall not be permitted in:

a) significant wetlands in Ecoregions 5E, 6E and 7E1; and

b) significant coastal wetlands.

2.1.5 Development and site alteration shall not be permitted in:

a) significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E1;

b) significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River)1;

c) significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River)1;

d) significant wildlife habitat;

e) significant areas of natural and scientific interest; and

f) coastal wetlands in Ecoregions 5E, 6E and 7E1 that are not subject to policy 2.1.4(b)

unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

2.1.7 Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.2 Aggregate Resources Act

Under the Aggregate Resources Act (ARA) Provincial Standards (MNR, 1997) and Policy 2.01.7 (MNR, 2006), applicants are required to prepare a Natural Environment Level 1 Technical Report. The Aggregate Resources of Ontario Provincial Standards for Natural Environment Level I Section 2.2.1 for a Category 4 -Class 'A' Quarry Above Water provides the information requirements:

2.2.1 Natural Environment Level 1: determine whether any of the following features exist on and within 120 metres of the site: significant wetland, significant portions of the habitat of endangered or threatened species, fish habitat, significant woodlands (south and east of the Canadian Shield), significant valley lands (south and east of the Canadian Shield), significant wildlife habitat and significant areas of natural and scientific interest;

Where significant natural environment features occur on or adjacent to (i.e. within 120 m) the proposed operation, applicants are required to prepare a Natural Environment Level 2 Technical Report. The requirements for this report are:

2.2.2 Impact assessment where the Level 1 study identified any features on or within 120 m of the site in order to determine any negative impacts on the natural

features or ecological functions for which the area is identified, and any proposed preventative, mitigative, or remedial measures (MNR 1997).

2.3 Species at Risk

2.3.1 Species at Risk Act (SARA)

SARA is a federal level piece of legislation whereby the status of species occurring in Canada are reviewed and designated as species at risk as determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk (COSEWIC, 2016). A list of these species can be found on Schedule 1 which shows the designation under which they were assessed including Extinct, Extirpated, Endangered, Threatened, Special Concern and Not at Risk (NAR). Species listed as 'endangered' or 'threatened' on Schedule 1 are afforded protection including the critical habitat on federal lands under the Species at Risk Act (SARA). Only aquatic species and migratory bird species listed as 'threatened' or 'endangered' under the Act are protected on private or provincially-owned lands, unless ordered by the Governor in Council.

2.3.2 Endangered Species Act (ESA)

For species found in Ontario, species at risk designations are determined by the Committee on the Status of Species at Risk in Ontario (COSSARO). If approved by the Minister of Natural Resources and Forestry (MNRF), species are added to the provincial Endangered Species Act (ESA) which came into effect June 30, 2008 (Ontario 2007).

Subsection 9(1) of the ESA prohibits the killing, harming or harassing of species identified as 'endangered' or 'threatened' in the various schedules to the Act. Subsection 10(1) (a) of the ESA states that *"No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario (SARO) list as an endangered or threatened species".*

Under the ESA, general habitat protection is provided to all threatened and endangered Species. The MNRF Has Established Species-Specific General Habitat Protection guidelines which are now passed into law as a regulation of the ESA. There is a permitting process where alterations to protected species and/or their habitats may be considered.

2.3.3 Migratory Birds Convention Act (1994)

The Migratory Bird Convention Act protects migratory birds, their eggs and nests. The Act applies to most birds that breed in Canada and prohibits the removal of vegetation used by nesting birds (trees, shrubs, groundcover etc.) during the peak breeding season (April 15th to August 15th in this area).

2.4 Peterborough County Official Plan

The County of Peterborough Official Plan was approved by the Ministry of Municipal Affairs on November 8, 1994 and an Office Consolidation on June 2016 which sets a land use and planning framework for local Official Plans and decision making. The Municipality of Trent Lakes has chosen to maintain separate, free standing planning documents, which for the purposes of this report where referred to for more detailed planning issues.

2.5 Municipality of Trent Lakes Official Plan, Zoning By-Law and Schedules

The Trent Lakes official plan complements the Peterborough County Official Plan by providing detailed strategies, policies and land use designations for the planning and development at a local municipal level.

An application for an amendment to the Official Plan is required to permit the establishment of a new mineral aggregate operation. This includes an Environmental Impact Study (EIS) in accordance with Section 5.1.10 of the OP. Schedule 'A' of the Trent Lakes Zoning By-Law No. B2014-070 Map 7 designates the property as Rural (RU12). A Trent Lakes zoning by-law amendment will also be required.

3.0 Background Review

3.1 Literature Review

A review of background documents included the examination of existing reports and literature regarding known natural heritage features relevant to the subject lands and vicinity. Ministry of Natural Resources and Forestry mapping and a geographic query of the NHIC database was conducted to identify element occurrences of any designated natural features in the study area including wetlands, provincially significant wetlands (PSW's), Areas of Natural and Scientific Interest (ANSI's), rare vegetation communities, the presence of Species at Risk and provincially rare species. A search of the following information sources was also conducted to identify species that may be present on or adjacent to the subject property. These included:

- Ontario Breeding Bird Atlas (OBBA) (Cadman et al, 2007)
- Reptiles and Amphibians of Ontario range maps (Ontario Nature, 2016)
- Atlas of Mammals of Ontario (Dobbyn, 1994)
- Natural Heritage Information Centre (NHIC) database maintained by MNRF (2016)
- Make-a-Map: Natural Heritage Areas Application – NHIC (MNRF, 2016)

Additional literature reviewed for the Level 1 Report included:

- Significant Wildlife Habitat Eco-region Criteria Schedules (MNR, 2015)
- Significant Wildlife Habitat Technical Guide (MNR, 2000)
- Provincial Policy Statement (Ont. Gov., 2014)
- Municipality of Trent Lakes Official Plan (2010) schedules and Zoning By-Laws (B2014-070)
- Recent and historical Aerial Imagery
- Key Natural Heritage Features GIS Mapping (MNR 2008 – 2011)
- Peterborough County OP (2014)
- Trent Lake OP (2013) schedules

In addition, EIS and NETR Level 1 and 2 reports prepared by NEA for three adjacent properties were also reviewed.

3.2 Designated Natural Areas

The MNRF Make-a-Map: Natural Heritage Areas Application (MNRF, 2014a) was used to identify designated natural areas located on or in the vicinity of the Study Area. This included provincially significant wetlands (PSW's), Areas of Natural and Scientific Interest (ANSI's), and Environmentally Significant Areas (ESA's). The subject property is located immediately west of the Kawartha Highlands Provincial Park.

3.2.1 Areas of Natural and Scientific Interest (ANSI)

An Area of Natural and Scientific Interest (ANSI) is defined as an area of land and/or water containing natural landscapes or features that have been scientifically identified (by OMNR) as having life science or earth science values related to protection, scientific study or education (MNRF, 2014b). ANSI's are designated as earth science (geological) or life science (biological) depending on the features present (MNRF, 2014b). There are no ANSI's located within (within 120 m) the study area. There are only two ANSI's located outside but within the vicinity of the study area. Table 1 below provides a summary of these ANSI's and descriptions of their significance.

Table 1. ANSIs in the Vicinity of the Study Area

Area Type	ANSI Name	Significance	Distance from Site
ANSI, Life Science	Wolfe Island	Regional	9.3 km to the SE
ANSI, Life Science	Big Island (Boyd Island)	Regional	11 km to the SW
ANSI, Life Science	Moore Lake Wetlands	Regional	13.3 km to the S

3.2.2 Wetlands

Wetlands are described as "lands that are seasonally or permanently flooded by shallow water, as well as lands where the water table is close to the surface and present an abundance of water that has caused the formation of hydric soil, which supports primarily hydrophytic or water tolerant plants" (PPS, 2014). The MNRF utilizes a standardized method of assessing wetland functions and societal values to rank their significance through the science-based ranking system known as the Ontario Wetland Evaluation System (OWES). This evaluation system uses a scoring system to assign values to four principal components of the wetland (biological, social, hydrological and special features. Based on the results, an evaluated wetland can be designated as Provincially Significant or Locally Significant (MNRF, 2013).

There are no provincially significant wetlands (PSW) located within or in the immediate vicinity of the study area. The nearest PSW is the Big Bald Lake East Wetland No. 53 that is located approximately 3.5 km to the south of the subject property and the Mississauga River Mouth Wetland located 4.5 km to the south and east of the Big Bald Lake wetland.

MNRF mapping also shows a number of small topographic wetlands (non-evaluated) located on the property and within the study area. These wetlands have been examined, their boundaries delineated and vegetation/habitat documented while conducting field investigations. Some of the wetlands identified in MNRF's mapping were found to be 'not present' as the sites contained upland vegetation species and were considered well drained and dry.

1.1.1 Significant Woodland

The Natural Heritage Reference Manual (2010) identifies the criteria used to determine provincial significance with respect to woodlands. The following criteria are used:

- Woodland size;
- Ecological functions including interior habitat, proximity to other woodlands, linkages, water protection and diversity;
- Woodlands that provide uncommon features; and
- Woodland economic and social values

The County of Peterborough and the Township have not undertaken the required exercise to identify 'significant woodlands' as laid out in the provincial guidelines. As such the site currently does not contain ' significant woodlands".

1.2 Linkages and Corridors

In the broadest sense, habitat corridors are described as components of the landscape that facilitate the movement of organisms and processes between areas of intact habitat. This includes the movement of wildlife, plant propagation, genetic exchange as well as abiotic elements such as water, energy and materials (Jongman & Pungetti 2004).

Simply stated, a wildlife corridor is a protected route that allows wildlife to move safely between areas of suitable habitat in which they carry out their life processes. Large carnivores (bear, wolf, cougar, lynx) require the greatest movement needs to ensure their life sustaining requirements are met. Ungulates (deer, moose) also require large areas with suitable habitat to meet their life resources.

Linkages on the other hand, technically refers to broader regions of connectivity important to facilitate the movement of multiple species and maintain ecological processes. Existing wildlife corridors in the area have not been specifically identified by MNRF. The natural features and topography dictate primary wildlife corridors that would include large wetlands, lakes and man-made linear features such as County Road 507 and Highway 36.

The occurrence of linkages and corridors was assessed based on photo interpretation, field work, existing literature, sign of dense track patterns or well-worn paths, aerial photography and discussions with local trail users. Observations of bird, mammal and herpetozoan movement were made during field investigations and information from previous reports, air photos and GIS natural features mapping were reviewed to determine the presence of regional and local linkages across the landscape and between core natural areas.

3.4 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) was produced by the MNR (OMNR, 2000). This document was developed to support the Provincial Policy Statement (Government of Ontario, 2014) and the Natural Heritage Reference Manual (MNR, 2010) providing information on the identification, description and prioritization of significant wildlife habitat. A desktop exercise was conducted using the Significant Wildlife Habitat Technical Guide for Ecoregion 6E (OMNR, 2012) using the Candidate Criteria laid out in the NHR manual (OMNR, 2010). Each wildlife habitat was examined to determine the potential for significance based on ELC Codes present and Habitat Criteria and Information sources.

After determining which habitats met the criteria for candidate SWH, the criteria under confirmed SWH was examined. In most cases the criteria to confirm an SWH requires specific survey protocols, depending on the habitat in question. Additional site visit(s) were conducted to target the species supported by the habitat.

3.5 Species at Risk and Other Significant Species

Species at Risk (SAR) considered for this report consist of those identified during background literature reviews and information compiled from Bird Studies Canada (BSC, 1987 and 2007), Royal Ontario Museum Species at Risk (ROM, 2015) as well as those listed in the ESA, SARA and the NHIC database including regionally rare species.

Two emails have been received from Graham Cameron, Management Biologist with MNRF providing a list of potential SAR that should be targeted during field investigations. The first email was received on July 14th, 2016 after a SAR screening request was submitted by NEA, while the second email, received on February 24, 2017 provided an updated list of species known to occur within 5km of the site. A number of inconsistencies were noted between the two lists however, in order to ensure NEA incorporates the greatest spectrum of species noted, the species from both lists were combined to provide a comprehensive assessment of all possible species, in this Level 1 report.

Finally, the recently released MNRF 'Make a Map: Natural Heritage Features' on –line GIS system was reviewed by NEA for all records with 5 km of the licensed boundary (Feb. 2, 2017).

4.0 Methodology

4.1 General Approach

The preparation of the natural environment technical report was conducted in four phases. The first phase was a pre-consultation meeting with MNRF to exchange information on natural heritage features and to discuss the scope of the studies and regulatory requirements. This meeting was held on July 13, 2016. Representatives from WSP Canada Inc., NEA and the MNRF were in attendance. Our findings as of that date were shared with MNRF staff, including preliminary mapping and Species At Risk found on the site during our surveys.

The second phase included the collection of background information on the property. This included a review of available Official Plan schedules (Trent Lakes, 2013) Trent Lakes Zoning By-Laws and maps, aerial photography of the site, the Ontario Breeding Bird Atlas (Cadman et al., 1987; Bird Studies Canada; BSC, 2005), Reptiles and Amphibians of Ontario range maps (Ontario Nature, 2015), Atlas of Mammals of Ontario (Dobbyn, 1994), the Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Center internet database for significant features and species (NHIC, 2016), MNRF Make-a-map Natural Heritage Areas Application (MNRF, 2016) and the Species at Risk Act database (Environment Canada, 2009).

The ARA Natural Environment Report Standards (A.R. 2.01.07, 2006) requires a Level 1 report to determine if any significant features exist on the site or within 120 metres of the site (licensed area). These features include:

- Significant woodlands
- Significant valley lands
- Significant wetlands
- Significant Coastal wetlands
- Significant Areas of Natural and Scientific Interest (ANSI)
- Habitat of endangered or threatened species
- Fish habitat
- Significant wildlife habitat

The location of natural heritage features on or within 120 metres of the property and within 5 kilometres was reviewed using the MNRF Make-a-map Natural Heritage Areas Application and MNRF GIS database (2009) that NEA has a data sharing agreement with

the Ministry to utilize and the NHIC database.

In the third phase, site visits were conducted on March 6th, 2012; October 29th, 2014; February 18th, April 20th, May 3rd, 24th and 30th, June 3rd, 14th, 16th and 30th, July 19th and October 19th, 2016 by our terrestrial and wetland biologists to identify general habitat characteristics, vegetation communities and Species at Risk. The presence or absence of significant species identified in the first and second phase was the focus of the study. The determination of Significant Wildlife Habitat as per the Provincial Policy Statement (Government of Ontario, 2014) requires a review of site features and a site walk to show the presence or absence of significant concentrations of wildlife or significant habitat. The onus is on the proponent to show that there is significant wildlife habitat, particularly when Township and County OP's and mapping do not specifically identify these features.

Detailed inventories of all vegetation communities on the property and the area within 120 metres of the property were conducted. Surveys included botanical inventories, breeding bird surveys, surveys for eastern meadowlark/bobolink and whip-poor-will following appropriate standard MNRF survey protocols, stick nest surveys, reptile searches including Blanding's turtle basking surveys, salamander searches, amphibian surveys and use of the property by wildlife and occurrence of linkages and corridors. Additionally, the property was scanned for evidence of bats during evening surveys conducted on the property, as well as completing bat cavity tree plots.

The final phase was the compilation of the background information, the site visit information and a review of aerial photography to complete the Level 1 report.

The list of plant, bird, herpetozoa and mammal species recorded by NEA during the site visits were compared to standard status lists including COSEWIC (2016), SARO (2016), Species at Risk Act Schedule 1 (2016), MNR (1993 & 2002 updates), Ontario Endangered Species Act (ESA) (2007 and updates) and NHIC (2016).

4.2 Detailed Study Methods

4.2.1 Vegetation

Preliminary mapping was completed via desktop analysis of air photos to identify vegetation communities (in particular wetlands) within the study area. The community boundaries were reviewed and reconfirmed during field investigations. Aerial photographs were initially used to determine general forest types and location of wetland areas prior to field visits. Polygons were drawn on an aerial photograph based on preliminary visual

interpretation of different vegetation types. All vegetation communities were visited and species composition of dominant species determined. Particular effort was conducted within the proposed extraction area to identify smaller communities, especially wetland pockets, rock outcrops, open areas and vernal pools.

Where ever possible and without trespassing onto private properties off site, areas adjacent to the property were visited to ascertain the extent of community boundaries.

Community type criteria followed that of the MNRF's Ecological Land Classification for Southern Ontario (ELC), First Approximation program (Lee et al., 1998) and was completed to the Vegetation Type level. Detailed plant inventories of each community were conducted. Surveys were completed by botanists and field biologists and covered all upland and wetland areas, ponds, rock ledges, forests, regenerating habitats, road edges and disturbed areas within the study area. Surveys were conducted throughout the spring, summer and fall growing season to coincide with peak flowering period for plants.

Targeted surveys were conducted for specific species on an ongoing basis (e.g. American ginseng (*Panax quinquefolius*) and butternut (*Juglans cinereal L.*) trees, both listed as "Endangered" provincially. Areas of suitable habitat along the rock ledge and within the mature deciduous and mixed forest communities were actively searched in multiple seasons and years, in search of ginseng plants and butternut. MNRF notes that it is found in "rich, moist, but well-drained, and relatively mature deciduous woods dominated by sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*) and American basswood (*Tilia americana*). It usually grows in deep, nutrient rich soil over limestone or marble bedrock".

As well, a search for lichen species was conducted on an ongoing basis, during any field visits. Surveys were conducted by botany staff with experience in identification of these two species. Two species in particular included the pale-bellied frost lichen (*Physconia subpallida*), listed as endangered provincially and the flooded jellyskin (*Leptogium rivulare*). However the latter species was formerly listed as threatened under Species at Risk Act in Ontario and has now been removed from the SARO list and is Not at Risk (NAR) (December 31, 2014, EBR Registry Number: 012-3629). Pale-bellied frost lichen is found on mature ironwood (hop hornbeam, black walnut, white ash and American elm, especially in high moisture areas/environments). Areas of forest with those species were targeted, especially within the proposed extraction area and adjacent wetland communities. Flooded jellyskin is found in mature deciduous swamps, especially those with spring flooding and traditional prolonged periods of deep water flooding. It can be found on a variety of trees including but not limited to silver maple, red maple and ash species.

Field survey dates were October 29th, 2014, April 20th, June 16th, July 19th, and October 19th, 2016. Photographs and/or specimens were taken of plants requiring verification of identification. Notes were made on soil type, depth, topography, drainage and present disturbance in each community.

National, provincial and regional significance of species and communities was determined from accepted status lists and published reference lists such as Species at Risk Act (SARA, December 2016; Schedule 1), Committee on the Status of Endangered Wildlife in Canada COSEWIC (2017), Species at Risk in Ontario (SARO (2017), Natural Heritage Information Centre (NHIC, 2017), Ontario Endangered Species Act (enacted June 30th, 2008), Argus et al. (1982-1990), Newmaster et al. (1998), Riley (1989) and Oldham (1996).

4.2.2 Birds

Three different survey methods were applied: dawn breeding bird surveys, eastern meadowlark/bobolink surveys and nocturnal bird surveys.

4.2.2.1. Dawn Breeding Bird Surveys

Breeding bird surveys were conducted during the breeding season (June 3rd and 30th, 2016) on and adjacent to the study site. Surveys were timed to coincide with the dawn chorus (5-9 am). Methodology for the surveys was modelled after the Ontario Breeding Bird Atlas (2nd) point count methodology (OBBA, 2005) and using the 100m radius circle of the Canadian Wildlife Service's Forest Bird Monitoring Program (FBMP, 2004). The Forest Bird Monitoring Protocol recommends conducting point counts at least 250 m apart and at least 100 m from the edge of a habitat type. Our surveys were a combination, counting all birds heard or seen up to a 100 – 200 m distance. The survey stations were also selected to provide field data on specific community types and to target the full range of ELC sites including wetlands, forests and regenerating and open meadow communities on the property. Standardized NEA breeding bird survey data collection forms were used. All birds heard or seen (unlimited distance) over a 5-10-minute period were recorded. Incidental observations of birds were also made during all field visits over the study period. Area searches and wandering transects were also conducted on other portions of the site.

Breeding evidence was noted for each species observed during the surveys as per the OBBA breeding evidence codes (BSC, 2001). Categories of breeding evidence consist of confirmed (CONF), probable (PROB), possible (POSS) and none (NONE). Confirmed breeding evidence includes observations of young or eggs; adult birds carrying food, nesting material or a fecal sac; observations of an adult bird in an agitated behaviour or

distraction display; or observations of an adult bird with evidence of a brood patch. Probable breeding evidence includes observations of a bird occupying territory for at least 7 days, visiting a nest or exhibiting territorial behaviour; observing a pair in appropriate habitat; or a pair copulating. Possible breeding evidence includes observations of a singing male or a bird in suitable breeding habitat. Migrants or vagrant birds are considered to have no breeding evidence.

Particular effort was taken to listen and search for Species at Risk and their locations were marked by GPS, including a bearing and distance from the station locations. Targeted species for this property based on our pre-screening of habitat included Canada warbler, olive-sided flycatcher, golden-winged warbler, eastern wood-pewee, wood thrush, eastern meadowlark, bobolink and bald eagle whose presence may be possible within the study area. Potential habitat was assessed in those locations where specifically targeted surveys for these species would be conducted.

4.2.2.2. Eastern Meadowlark / Bobolink Surveys

The protocol followed the bobolink survey protocol established by MNRF, which was also adopted for the eastern meadowlark surveys. Surveys were conducted with no precipitation, no or low wind speed and good visibility. Parallel transects length wise across the fields were established. Point counts were located along the transects at 250m intervals. GPS locations were recorded for each point count.

Surveys began at dawn and continued until no later than 9 AM. Each point contained a ten-minute observation period where upon calls were listened for (either bobolink or eastern meadowlark). Information was recorded including bobolink or eastern meadowlarks observed or heard and where they were located, sex, direction, distance and interactions with other bird species.

Targeted surveys were conducted on June 3rd, 16th and 30th, 2016. Habitat was documented including general field conditions where the locations of the bobolinks/eastern meadowlarks were observed. Habitat descriptors such as, fence lines, field hedgerows, height of vegetation and dominant vegetation species were recorded. Photographs of the site were taken. Searches for nest sites were not completed.

The following information was recorded when bobolinks/eastern meadowlarks were observed on site:

-location (GPS)
-number of males
-breeding evidence
-behaviour
-general habitat characteristics
-name of surveyors and qualifications
-level of effort table
-weather during surveys
-time and date
-photo documentation of habitat.

To ensure we collected sufficient information in case registration or a permit from MNRF is necessary for the activity as per the Endangered Species Act (2007 and updates), we collected data that is outlined in the Information Gathering Form for Activities That May Affect Species and/or Habitat Protected Under the Endangered Species Act, 2007.

The evidence documented included the following information:

- *the number of species and habitat observations recorded on and/or surrounding the activity location, the dates, times and geographic coordinates (UTM or longitude/latitude coordinates) of each species/habitat observation;*

- *the habitat features found on and/or surrounding the activity location (e.g. vernal pools, dens, nests, cobble spawning shoals, roost trees, wetlands, etc.). How the habitat found on and/or surrounding the activity location is being used by the species to carry out its life processes (e.g. habitat for reproduction, rearing, hibernation, overwintering, migration, feeding, resting (including predator avoidance), dispersal, daily movement, any other life process (please specify), or unknown (if it is not clear which life process the habitat is supporting).*

- *any other evidence that suggests the effects of the activity overlaps with protected species occurrences and/or habitat occurrences (e.g. species experts' opinion, etc.).*

4.2.2.3. Nocturnal Bird Surveys

The primary purpose of these surveys was to determine the presence or absence of SAR birds (i.e. eastern whip-poor-will (*Antrostomus vociferus*) and common nighthawk (*Chordeiles minor*)). An NEA bird biologist conducted whip-poor-will surveys on the site on May 24th, May 30th, and June 14th, 2016. Whip-poor-will surveys followed the protocol established in the latest MNRF Ontario Whip-poor-will survey protocols (August 2013) Although the protocol suggests surveys be conducted during the May 13-29 and June 12-27 period to coincide with the full moon (May 21st and June 20th, 2016), timing of site visits were conducted as close to this time frame as was possible. Research indicates that the birds are more easily detected during the full moon phase, as their calling is increased at that time. Whip-poor-will calls are easily heard over several hundred metres under ideal conditions. The birds also call continuously making detection very easy.

Surveys included three (3) evening surveys on May 24th, 30th and June 14th, 2016 with 4 stations across the property. The direction (bearing) of the calls was noted using a digital compass and the distance to the bird estimated. The locations of birds close to the biologist or flushed were rechecked during the daylight hours on subsequent field visits to search for roosting sites. The General Habitat Description technical document prepared by MNRF (2015) was used to map the habitat types. The approximate centroid of the individual territories was determined based on the field surveys and call locations of each individual bird.

Table 2. Nocturnal Bird Surveys 2016– Times & Conditions

Date	Temp	Start time	Cloud Cover	Wind	Moon phase	Moon above horizon
May 24	20	2130	0	calm	94%	yes
May 30	19	2142	0	calm	40%	yes
June 14	18	2130	0	calm	75%	yes

As no formal guidelines exist for surveying the common nighthawk survey protocol, NEA staff adapted from that of the whip-poor-will survey protocols as they are both active in the evening and overnight. Refer to whip-poor-will surveys above for protocol.

Significance on a national, provincial or regional level was based on SARA (2016, Schedule 1), COSEWIC (2016), ESA (2007, Regulation 242/08 and updates), SARO (2016) and MNR (1993 and 2000, 2002 updates).

4.2.3 Amphibian Surveys

NEA biologists conducted amphibian surveys on May 3rd, 30th and June 14th, 2016. Surveys were focused on wetland communities found on the subject property consisting of seven (7) stations: three stations were located in the wetlands and large pond in the eastern portion of the property; two stations located in the central portion of the property; one station located along the northern property boundary and the last located at the south-western portion of the property.

The modified Marsh Monitoring Program (MMP) protocol (BSC, 2008/2013) for spring amphibian surveys was utilized to assess the use of the wetlands by amphibian species. Surveys are dependent on weather conditions; with required night air temperatures above 5^0C, 10^0C then 17^0C and little wind for each of the three visits required. These temperature requirements are in place because amphibian calling intensity is strongly associated with season, time of day and weather conditions. Each survey must begin 30 minutes after sunset and end by midnight. Typical Marsh Monitoring Protocol requires stations to be visited three times per year between April 1st and July 31st with a minimum of 15 days between visits. Monitoring stations must be at least 500 m apart using a semi-circular sampling area within a 100 m radius. As NEA staff were identifying habitats for breeding frogs, survey stations were instead located within 50 m of specific vernal pools, wetland pockets and ponds. Three minute surveys were completed at each station. Call level codes are assigned to all calling frog and toad species.

- Code 1: individual calls do not overlap and calling individuals can be discretely counted;
- Code 2: calls of individuals sometimes overlap, but numbers of individuals can still be estimated;
- Code 3: overlap among calls seems continuous (full chorus), and a count estimate is impossible

Seven (7) stations were established to represent different habitat variables including elevation or vegetation community. Evening surveys were completed at least 30 minutes after sunset and completed by midnight. Field conditions were recorded upon arrival (cloud cover, temperature, wind, precipitation) and within evening temperatures at a minimum of 5ºC, 10ºC and 17ºC. Observations at each station were sustained for 3 minutes where Call level codes were determined.

It was determined whether the species were located within or outside of 100 meters of the survey station.

Additional information was recorded regarding the amphibian station during daylight hours to determine and document the habitat type and whether egg masses and/or tadpoles were present or not.

Incidental observations of reptiles and amphibians were also made during all field investigations with appropriate weather conditions including initial site visits on Oct. 29th, 2014, as well as during the May 3rd, 24th and 30th, and June 3rd, 14th, 16th and 30th, 2016 field visits. Incidental observations of all other habitats within the study area including adjacent upland habitats and ephemeral pools were noted during all site visits. In addition, roadsides will be checked for turtle nests and logs and rocks, woody debris and refuse turned over in all habitats to look for salamanders and snakes. A specific effort was made to time visits to coincide with peak activity times (early morning, afternoons and peak season) to maximize the chances of detecting the individual species at risk, particularly snakes, skinks and turtles.

4.2.4 Reptile Surveys

Blanding's Turtle

Blanding's turtle (*Emydoidea blandingii*) is a threatened Species at Risk in Ontario and recently upgraded (Nov. 2017) nationally to endangered. Its habitat consists of a complex of essential aquatic and terrestrial components. Aquatic habitats typically consist of fresh, shallow, open or vegetated water features such as ponds, marshes, shrub swamps, bogs, ditches and streams with slow-moving water (COSEWIC, 2016; COSSARO, 2016; MDNR, 2008). Terrestrial habitats consist of upland forests and meadows although females will often travel through agricultural fields and cross roadways while moving between habitat types (MDNR, 2008).

Blanding's turtles will utilize different habitat types depending on their seasonal movements. This includes their primary residential habitat where they carry out the majority of their life cycle as well as breeding, nesting and overwintering habitats.

Overwintering habitats are generally located in permanent water bodies between 1.5 to 2 metres in depth to ensure there is a sufficient amount of open water under the ice during winter months. The substrate consists of soft mud or detritus and abundant vegetation.

The surveys for Blanding's turtles followed the recently released MNR survey protocols (Occurrence Survey Protocol for Blanding's Turtle in Ontario, August 2015, Ontario Ministry of Natural Resources and Forestry, Species at Risk Branch). Visual basking surveys

were conducted June 16th in search of the Blanding's turtles within the study area. All wetlands on the property were surveyed including any open water areas, swamps and ponds. Potential basking sites were searched (wetland, shoreline, logs and hummocks) in addition to small roadside ditches and suitable nesting habitat (gravel roads running along wetlands or the edge of a sandy exposed area or mossy area in proximity to a pond/wetland/ or watercourse closest to wetlands).

No large, deep open water ponds exist on the subject lands however two ponds are located adjacent to the property, east of the eastern boundary. One large pond is located outside the property boundary, in the southeast corner and is approximately 0.43 ha in size. Another larger pond approximately 2.70 ha in size, is located along the northern property line in the western portion of the property.

In addition, wetland communities were continually examined and searches conducted while conducting other field investigations including vegetation surveys, amphibian surveys and breeding bird surveys during the 2016 season. Any turtles found during those other surveys are noted, photographed if possible, and a GPS location taken.

Other Turtle Species and Reptiles

Areas of potential suitable habitat for reptile species (i.e. wetlands and rocky areas) were investigated during field studies to check for the presence of significant species. Specific effort was made to conduct field visits to coincide with suitable basking. Particular effort for targeted species including common snapping turtle was made by looking in suitable habitat and at times of year when they would be most active.

Only two areas located on the property appeared to contain suitable habitat for turtles. The two marsh communities located at the eastern end of the property were used as stations, one station on either side of the existing pathway that bisected wetlands at that location. NEA staff positioned themselves adjacent the wetlands to maximize the visibility of the surrounding shoreline. At each station, basking surveys were completed by scanning the perimeter of the wetland with a pair of 10x50 wide angle Bushnell binoculars. The number of turtles and species were noted and photographed if possible.

Mortality surveys were conducted along the highway to search for reptiles and amphibians

Eastern Hog-nosed Snake

The eastern hog-nosed snake (*Heterodon platirhinos*), listed as a threatened species provincially (SARO, 2016) is a non-venomous snake that prefers habitats with sandy, well-drained soils and open vegetative cover such as open woods, fields, beaches, forest edges and disturbed sites where they can lay their eggs and hibernate. The snakes preferred prey includes toads, frogs and lizards and will also feed on molluscs, birds and crustaceans.

The Recovery Strategy for eastern hog-nosed snake in Canada acknowledges that "critical habitat has not yet been defined for the eastern hog-nosed snake" (Seburn, 2009). It has been documented that this species does not hibernate communally and will often use burrows in sandy or rocky soils that have previously been constructed by other animals. As hognose snakes are active in the evening, searches were conducted during our amphibian and whip-poor will survey dates (May 24th, 30th and June 14th, 2016).

This species along with any other snakes was actively searched for while conducting other survey investigations. This included searching the access route on every occasion the site was visited, as well as being observant while conducting vegetation surveys or breeding bird surveys.

The searches including looking for evidence of shed skins and hibernacula, including concentrations of snakes in the spring (emergence) and fall throughout the proposed license area. Several cavities/fissures were observed in the rock barren and exposed rock areas, including one with emerging mist in winter. This area was checked in early spring and fall as a possible hibernaculum.

Five-lined Skink

Surveys for five-lined skink were conducted throughout the study period and targeted areas of open rock (rock outcrops, broken rock, ledges). Searches were conducted in the active summer season. Method included active methods, turning over slab rocks, woody debris and other material on the open rock areas and rocky ledge, searching areas of exposed broken rock and adjacent vegetation.

4.2.5 Mammals

Incidental observations of mammals were made during all site visits from (2012 to 2016). Observations included direct sightings and indirect evidence such as calls, scat, tracks, browse, burrows, dens and nests. Species significance on a national, provincial, regional

and local level was based on COSEWIC (2016), COSSARO (June 2016), Dobbyn (1994) and Sutherland (1994).

Winter mammal surveys were conducted on March 6, 2012 and February 18, 2016. The purpose of the surveys was to determine the presence of mammalian and other winter wildlife species using the subject lands. The entire property was walked and observations or evidence (tracks, scat, browse etc.) of wildlife activity was recorded.

A winter deer survey was also completed on February 18th, 2016 to assess the suitability of the vegetation communities on the subject lands as deer wintering habitat. Data collected included: snow conditions (depth, crust conditions, air temperature, hours since last snowfall), vegetation community (ELC code – dominant species), the number of deer tracks/trails observed, and the occurrence of browse, which included an estimation of the preference (low to high) of various browse indicator species.

The occurrence of wildlife linkages and corridors was assessed based on field work during all field visits (2014 and 2016); existing literature; sign of dense track patterns or well-worn paths and aerial photography. Observations of bird, mammal and herpetozoa movement were made throughout the spring, summer and fall periods.

Two trail cameras were placed in strategic locations on the property from April until October 2016) to capture evidence of wildlife utilizing the property. The cameras were placed along the access road in the eastern half of the property. One was located on the north side of the access road, above the rocky ledge and faced southwest while the second camera was place at the base of the rocky ledge, also on the north side of the access road and faced southeast. Both cameras were placed specifically to document wildlife usage of the area, which also assisted in determining if wildlife corridors were present. Cameras were in operation for a total of approximately 122 days (2928 hrs) capturing 722 video clips (2.0 hrs +/-) and 2,472 images in 2016.

4.2.6 Linkages and Corridors

The occurrence of linkages and corridors was assessed based on field work and existing literature. Observations of bird, mammal and herpetozoa movements were made through the study period and information from previous reports and air photos and GIS natural features mapping reviewed to determine the presence of linkages across the landscape and between core natural areas.

4.2.7 Wetlands

All wetlands within the study area were visited and details on each collected during NEA field visits. No provincially or locally significant wetlands designated by MNRF are located on the subject lands. A number of topographical wetlands (non-evaluated) were delineated initially by conducting a desktop analysis and photo interpretation exercise. The wetland boundaries were confirmed in the field by our NEA wetland biologists following the methodologies in the Ontario Wetland Evaluation System Southern manual, Third Edition, Version 3.2 (MNRF, 2013 and updates). Those boundaries would form the constraint used for the development of the existing features site plan and operations plan.

4.2.8 Significant Wildlife Habitat (SWH)

Wildlife habitat is defined as the physical, ecological environment which provides for the life sustaining requirements for all living plants, animals and other organisms, which includes adequate amounts of food, water, shelter and space. Habitat types include forests, grasslands, wetlands and deserts in the terrestrial spectrum while freshwater habitats include rivers, streams, lakes ponds, marshes and bogs. Specific wildlife habitats include areas which may provide an important function to migratory and non-migratory species such as winter deer yards or waterfowl stopover areas.

Guidelines and criteria for the identification of Significant Wildlife Habitat (SWH) are detailed in the Significant Wildlife Habitat Technical Guide (SWHTG) and Decision Support System (OMNR, 2000) and the Natural Heritage Reference Manual (OMNR, 2010). A desktop exercise was conducted using the Significant Wildlife Habitat Technical Guide for Ecoregion 6E (OMNR, 2012) using the Criterion Schedule laid out in the manual. Each wildlife habitat was examined to determine the potential for significance based on ELC Codes present and Habitat Criteria and Information sources. Those significant wildlife habitats that were not present on the site were ruled out. The remaining significant wildlife habitats were cross-referenced with the vegetation communities and habitat features present on the site. Those that matched the descriptions in the guide were investigated further to determine significance. In most cases the criteria to confirm an SWH contained specific survey protocols, depending on the habitat in question. Additional site visits were conducted to target the species supported by the habitat.

SWH is described under four main categories:

- Seasonal concentrations of animals;
- Rare vegetation communities or specialized habitats for wildlife;

- Wildlife movement corridors; and,
- Habitats of species of conservation concern.

4.2.8.1. Seasonal Concentration Areas

Seasonal concentration areas are those areas where a large number of a species congregate at one particular time of the year. For example, deer yards, amphibian breeding habitat, bird nesting colonies, bat hibernacula, raptor roosts and passerine migration concentrations. Significant Wildlife Habitat identified in the SWHTG included:

- Winter deer yards;
- Moose late winter habitat;
- Colonial bird nesting sites;
- Waterfowl stopover and staging areas;
- Waterfowl nesting areas;
- Shorebird migratory stopover areas;
- Landbird migratory stopover areas;
- Raptor winter feeding and roosting areas;
- Wild turkey winter range;
- Turkey vulture summer roosting areas;
- Reptile hibernacula;
- Bat hibernacula;
- Bullfrog concentration areas; and
- Migratory butterfly stopover areas.

No seasonal concentration areas were identified within the study area therefore, no further analysis is warranted.

Targeted surveys were conducted for specific Significant Wildlife Habitat based on the Candidate status and comments by MNRF. Targeted surveys were conducted on Oct. 29th, 2014, April 20th, May 3rd, 24th, 30th, June 3rd, June 14th, June 16th, June 30th, July 19th and October 19th, 2016 for bat hibernacula, bat maternity colonies, reptile hibernacula, turtle and lizard nesting and denning sites and furbearer movement corridors. Methodology for each SWH is outlined below:

Bat Hibernacula

Area searches were conducted throughout the proposed quarry area and 120 meters beyond that on May 3rd, 24th, 30th, and June 14th, 2016 for potential hibernacula (i.e. caves, mine shafts, underground foundations or karsts).

Bat Maternity Colonies

Snag density surveys were conducted using Bat and Bat Habitats: Guidelines for Wind Power Projects (MNR, 2011). Snag density plots were randomly chosen throughout the deciduous and mixed forest communities using ELC to determine the presence of mixed wood forests or deciduous communities. Surveys were conducted through a fixed area with a 12.6 metre radius. The number of snags/cavity trees greater than 25cm dbh were recorded. The formula $A = \pi r^2$ was used to determine the number of snags per hectare. A minimum of 10 plots for sites < 10 hectares is the key criteria in the methodology. At total of 71 plots were identified throughout the property based on the ELC communities present. Surveys were conducted on May 3rd, 2017. If the snag/cavity tree density was > 10 snags per hectare of trees > 25 cm dbh, then the site was considered a candidate for maternity colony roosts. Acoustic devices are to be placed on site in June 2017 to confirm presence/absence of endangered species. This will form part of the ESA compliance permit that will be sought once the license is conditionally approved.

Reptile Hibernacula

Area searches were conducted on April 20th, June 3rd, 16th, 30th, and July 19th, 2016 across the property focusing on the rock outcroppings in search for potential reptile hibernacula. All rock fissures, rock piles and crevices which could provide potential habitat were investigated. The rock barren communities (Communities 7 & 22) and the rocky ledge (Community 17) was searched and all suitable rock crop openings with fissures providing cover were searched for skinks and snakes. Evidence of emergence that is searched for includes shedded skins, resting snakes, snakes in higher numbers in one area and snakes found under nearby cover.

Turtle and Lizard Nesting

Area searches were conducted on April 20th, June 3rd, 16th, 30th, and July 19th, and October 19th, 2016 across the proposed quarry area and the 120-meter study area for turtle and lizard nesting areas. In particular areas of unconsolidated materials (roads & moss) were searched that would provide suitable nesting material for nesting turtles.

Denning Sites and Furbearer Movement Corridors

All regions of the study area were searched for evidence such as tracks and, scat on October 29th, 2014; April 20th, June 3rd, 16th, 30th, and July 19th, 2016. Denning sites were documented if observed during field investigations. Winter surveys were completed on March 6, 2012 and February 18, 2016, to observe movement of mammals by track and/or scat identification. Trail cameras were installed in 2016, above and below the rocky ledge and adjacent to the existing roadway at the eastern end of the property to capture wildlife movement along this roadway.

4.2.8.2. Specialized Habitats

Fourteen (14) specialized habitats have been identified in the SWHTG which provide a critical resource to some groups of wildlife that may be considered significant wildlife. These include:

- Habitat for area-sensitive species;
- Forests providing a high diversity of habitats;
- Old-growth or mature forest stands;
- Foraging areas with abundant mast;
- Amphibian woodland breeding ponds;
- Turtle nesting habitat;
- Specialized raptor nesting habitat;
- Moose calving areas;
- Moose aquatic feeding areas;
- Mineral licks;
- Mink, otter, marten and fisher denning sites;
- Highly diverse areas;
- Cliffs; and
- Seeps and springs

Three specialized habitats were found to be located within the study area: habitat for sensitive species, amphibian woodland breeding ponds and turtle nesting areas. There were no other specialized habitats confirmed in the study area.

4.2.8.3. Rare Vegetation Communities

This category includes vegetation communities that are considered rare in the province and are typically assigned an S-Rank of S1 to S3 (extremely rare to rare-uncommon) by the Natural Heritage Information Centre (NHIC). The majority of the vegetation communities in the study area are cultural or anthropogenic and therefore not ranked. One rare vegetation community was observed in the study area: rock barren.

4.2.8.4. Habitat for Species of Conservation Concern

The Significant Wildlife Habitat Criteria Schedules (SWHCS) for Ecoregion 6E states: "Habitats of Species of Conservation Concern include wildlife species that are listed as Special Concern or rare, that are declining, or are featured species. Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened species as identified by the Endangered Species Act 2007 "(SWHCS, 2015).

Three species of special concern, or their habitat, were identified in the study area. The common nighthawk was observed/heard in the eastern portion of the property, below the limestone ridge, while conducting evening amphibian surveys. The eastern wood-pewee and wood thrush were identified in the forested areas of the property while conducting breeding bird surveys.

4.2.9 Species at Risk Surveys

The Ontario Endangered Species Act places the onus on proponents to determine if Species at Risk are present or absent on a property through targeted in-season field surveys by a qualified biologist. As part of our desktop analysis and screening of the study area, a search of the MNRF Natural Heritage Information Centre (NHIC) database was conducted to determine the existence of recorded elemental occurrences of Species at Risk in the area. Six (6) one square kilometre (1 km2) squares encompassing the subject lands were checked to ensure potential species at risk were accounted for during field investigations. The six (6) squares identified are listed in Table 3. The MNRF has developed a new numbering system and therefore the table below shows the new numbering system with the comparable old numbering system.

Table 3. NHIC 1 km^2 Squares Encompassing the Subject Lands.

NHIC Old Number	NHIC New Number
17QK0743	1056307
17QK0744	1056308
17QK0843	1056317
17QK0844	1056318
17QK0943	1056327
17QK0944	1056328

The search yielded five (5) element occurrences, of which none are listed as Endangered (END), three are listed as Threatened (THR) (bobolink, eastern meadowlark, Blanding's turtle) on the Species at Risk in Ontario list (COSSARO, 2016) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists. One lichen species is ranked S1 in Ontario and was last observed in 1984. One species listed is considered a 'Restricted Species' whereby no data or species name is shared.

NEA also conducted a 5 km search utilizing the MNRF – NHIC Make-a-map application for any additional SAR that may potentially be found in the area. The search yielded the previous 5 species listed as well as the following: one-sided rush (S3), butternut (END), flooded jellyskin (NAR provincially but Special Concern nationally, (COSEWIC, 2016)), tapered vertigo, a small land snail listed as (S2S3); three dragonfly species: cyrano darner (S3), harlequin darner (S3) and Mottled darner (S3); pine warbler (S3B) and eastern milksnake (S3).

In addition, the Ontario Breeding Bird Atlas (OBBA; Bird Studies Canada, 2005), Ontario Reptile and Amphibian Atlas (Ontario Nature, 2011) and the Atlas of Mammals (Dobbyn, 1994) were analysed to determine if any Endangered or Threatened bird species are known to be present within the vicinity of the site. The subject lands lie within the 10 km x 10 km breeding bird atlas square identified as 17QK04. Based on the information from this square, the following additional Endangered, Threatened and Special Concern species have the potential to breed in the general area: eastern whip-poor-will (*Antrostomus vociferus*), chimney swift (*Chaetura pelagica*), olive-sided flycatcher (*Contopus cooperi*), eastern wood-pewee (*Contopus virens*), bank swallow (*Riparia riparia*), barn swallow (*Hirundo rustica*), wood thrush (*Hylocichla mustelina*), golden-winged warbler (*Vermivora chrysoptera*), cerulean warbler (*Setophaga cerulea*), Canada warbler (*Cardellina canadensis*), bobolink (*Dolichonyx oryzivorus*) and eastern meadowlark (*Sturnella magna*).

The MNRF was contacted July 14th, 2016 for information pertaining to species at risk in the general area. The Bancroft District Management Biologist, identified the following species: eastern hog-nosed snake (*Heterodon platirhinos*), Blanding's turtle (*Emydoidea blandingii*), eastern whip-poor-will (*Antrostomus vociferus*), bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), barn swallow (*Hirundo rustica*), bank swallow (*Riparia riparia*), American ginseng (*Panax quinquefolius*), pale-bellied frost lichen (*Physconia subpallida*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), eastern small-footed myotis (*Myotis leibii*), wood thrush (*Hylocichla mustelina*), eastern wood-pewee (*Contopus virens*), common five-lined skink (*Eumeces fasciatus*) and snapping turtle (*Chelydra serpentina*).

A second list was provided by MNRF on February 24, 2017 which noted a few additional species including least bittern (*Ixobrychus exilis*), butternut (*Juglans cinerea*), black tern (*Chlidonias niger*), Canada warbler (*Cardellina canadensis*), one-sided rush (*Juncus secundus*) and eastern ribbon snake (*Thamnophis sauritus sauritus*).

A summary of identified possible Species at Risk and habitat for SAR species is found in Table 4.

Table 4. Possible SAR and SAR Habitat on the Rockridge Property.

Species	Ranking COSSARO (2016) ESA (2008)	Ranking COSEWIC (2016)	Ranking SARA (2016)	Identifying Source for on or within 5 km of Study Area*	Survey Completed
VEGETATION					
American ginseng	END	END	END	MNRF, 2016	√
Butternut	END	END	END	MNRF, 2017	
BIRDS					
Bald Eagle	SC				√
Least Bittern	THR	THR	THR	MNRF, 2017	N/H
Common Nighthawk	SC	THR	THR	OBBA, 2005	√
Loggerhead Shrike	END	END	END	OBBA, 2005	N/H
Golden-winged warbler	SC	THR	THR	OBBA, 2005	√
Canada Warbler	SC	THR	THR	OBBA, 2005 MNRF, 2017	√
Eastern Whip-poor-will	THR	THR	THR	OBBA, 2005; MNRF, 2016	√
Bobolink	THR	THR	No status	OBBA, 2005; MNRF, 2016	√

Chimney Swift	THR	THR	THR	OBBA, 2005	√
Eastern Wood-pewee	SC	SC		OBBA, 2005; MNRF, 2016	√
Red-headed Woodpecker	SC	THR	THR	OBBA, 2005	√
Grasshopper Sparrow	SC	SC		OBBA, 2005	√
Barn Swallow	THR	THR	No status	OBBA, 2005; MNRF, 2016	√
Olive-sided Flycatcher	SC	THR	THR	OBBA, 2005	√
Bank Swallow	THR	THR		OBBA, 2005; MNRF, 2016	N/H
Wood Thrush	SC	THR		OBBA, 2005; MNRF, 2016	√
Eastern Meadowlark	THR	THR		OBBA, 2005; MNRF, 2016	√
Black Tern	SC	NAR	No status	OBBA, 2005 MNRF, 2017	N/H
REPTILES/AMPHIBIANS					
Eastern Musk Turtle	THR	THR	THR	MNRF, 2016	N/H
Eastern Hog-nosed Snake	THR	THR	THR	MNRF, 2016	√
Blanding's Turtle	THR	THR	THR	MNRF, 2016	√
Western Chorus Frog	Not listed	THR	THR		√
Northern Map Turtle	SC	SC	SC		N/H
Snapping Turtle	SC	SC	SC	MNRF, 2016	√
Milksnake	SC	SC	SC		√
Eastern Ribbonsnake	SC	SC	SC	MNRF, 2017	√
Five-lined Skink (Southern Shield population)	SC	SC	SC	MNRF, 2016	√
MAMMALS					
Gray Fox	THR	THR			√
Southern Flying Squirrel	NAR	NAR			√
Eastern Wolf (Algonquin)	THR	THR			√
Tri-coloured Bat		END			√
Little Brown Myotis	END	END	END	MNRF, 2016	√
Northern Myotis	END	END	END	MNRF, 2016	√
Eastern Small-footed Myotis	END			MNRF, 2016	√
OTHER/UNKNOWN					
Monarch	SC	END	SC		√
Pale-bellied Frost Lichen	END	END	END	MNRF, 2016	√
Flooded Jellyskin		SC	THR		√
Sensitive Species	THR	THR	THR		√

*N/H: No suitable habitat present on the property. No surveys were undertaken.

Targeted surveys were conducted using specific techniques and protocols for the following species identified as significant on a national/provincial level. Surveys were timed to maximize detection and where applicable using standard and recognized survey methodologies.

The targeted species as identified in an email received from MNRF on July 14, 2016 included: American ginseng, pale-bellied frost lichen, little brown myotis, northern myotis, eastern small-footed myotis, eastern whip-poor-will, bobolink, eastern meadowlark, barn swallow, bank swallow, wood thrush, eastern wood-pewee, Blanding's turtle, eastern hog-nosed snake, five-lined skink and snapping turtle.

4.3 Search Effort

A total of 64.5 hours of field time was completed by the three biologists that worked on this project. A record of the field work conducted was documented including details such as the date and time of day the field work took place, the type of survey administered and for what the survey was intended to target.

Table 5. Search Effort for Terrestrial Field Work in the Study Area (2012-2016)

Date	Time of Day	Weather	Survey Type	Target Species	Effort (hours)
March 6, 2012	Afternoon	1 °C, no precipitation	Winter tracks survey	mammals	2 biologists *1.5 hours
Oct. 29, 2014	10:00-15:30	10 °C, overcast	ELC, wetland delineation, SAR	Vegetation, SAR	2 biologists * 5.5 hours
Feb. 18, 2016	13:00-15:00	-4 °C, sunny	Winter tracks survey, Winter raptor survey (SWH), Winter deer yard survey (SWH)	Mammals, raptors, white-tailed deer	2 biologists * 2 hours
April 20, 2016	10:00-11:30	6°C, no precipitation	Recon	Vegetation, SAR	1 biologist * 1.5 hours
May 3, 2016	20:00-22:30	12°C, Wind scale-0, Clear	MMP amphibian survey #1; Scanned for bats (SWH)	Breeding amphibians; any bat species	2 biologists * 2.5 hours
May 24, 2016	21:30-22:30	20°C, Wind scale-0, Clear	Whip-poor-will/ common nighthawk survey #1; scanned area for bats (SWH); snake survey (SWH)	Whip-poor-will, common nighthawk, any bat , hog-nosed snake species (END)	2 biologists * 1 hour

May 30, 2016	21:30-24:00	19°C, Wind scale-0, Clear	-Whip-poor-will/common nighthawk survey #2 -MMP amphibian survey #2 - scanned area for bats (SWH) -snake survey (SWH)	Whip-poor-will, common nighthawk and breeding amphibians; any bat species; hog-nosed snakes	2 biologists * 2.5 hours
June 3, 2016	6:00-9:00	17°C, Wind scale-1, clear	-Breeding Bird Survey #1 -Eastern meadowlark survey #1	Breeding birds, eastern meadowlark,	2 biologists * 3 hours
June 14, 2016	21:30-23:00	18°C, Wind scale-0, clear	-MMP amphibian survey #3 -Whip-poor-will/common nighthawk survey #3; Scanned area for bats (SWH); snake survey (SWH)	Amphibians, whip-poor-will, common nighthawk, any bat species, hog-nosed snakes	2 biologists * 1.5 hours
June 16, 2016	8:30-12:00	22 °C, Wind scale-1, Partly Cloudy	-Eastern meadowlark survey #2 -ELC -Blanding's turtle survey	Eastern meadowlark, ELC – vegetation, Blanding's turtle	2 biologists * 3.5 hours
June 30, 2016	6:30-8:30	11°C, cloudy, wind scale-0-1	BBS #2 and eastern meadowlark survey #3	Breeding birds and eastern meadowlark ELC – vegetation	2 biologists * 2 hours
July 19, 2016	1000 - 1400	20 - 22 0C; sunny, clear, Wind scale - 1	ELC – vegetation Search for Ginseng Search for Reptiles/amphibians	ELC – Vegetation SAR	2 biologists * 4 hrs
Oct. 19, 2016	1300 – 1530	18oC; sunny, wind scale - 2	ELC – vegetation, Significant Wildlife Habitat (SWH)	ELC – Vegetation SWH – corridors, habitats	2 biologists *2.5 hrs

5.0 Resource Inventory

5.1 Physical Description

The property is located just south and west of the contact line between the Canadian Shield and shallow limestone plain. The majority of the property's geology is limestone plain and consists of very shallow sandy soils or exposed rock at the surface. The property was relatively flat on the western two thirds with a 5 – 10 m limestone ledge cutting through the eastern part of the property in a north/south orientation. The western portion consisted mainly of open fields, exposed limestone and juniper thickets. The central portion of the property was dominated by a coniferous forest with a stand of deciduous forest on the western edge between the juniper thicket. The area below the limestone ledge was recently cleared of forest. The eastern most edge of the property contained a number of small wetland pockets and a mixed forest community. The southwestern corner of the property contained a small rock barren, deciduous swamp and narrow band of eastern white cedar (Figure 1).

The majority of the western half of the property consists of Farmington Sandy Loam soils, typically less than 30.5 cm (12 in) of well drained sandy loam underlain by limestone rock. The central portion consists of Douro Sandy Loam, with between 30.5 and 76 cm (12 – 30 inches) of stony soil underlain with limestone rock. This soil group is classified as being very rocky as was evident by the area surrounding the limestone ledge. The soils in the eastern portion of the property are described as Rockland - Organic with rock outcrops where the soils occur at a depth of less than 10 cm below the surface and small pockets of undifferentiated peat found in depressions (Ontario Institute of Pedology, Report No. 45 – Soils of Peterborough County, 1981).

5.2 Vegetation

The subject property was comprised of a diversity of vegetation community types (Figure 1). These included a variety of deciduous, coniferous and mixed forest types, cultural meadows, exposed limestone plains, a limestone ledge and small wetlands and drainage features.

The forest types varied and included, white pine/sugar maple mixed forest, oak/hardwood deciduous forest, white pine coniferous forest, white cedar coniferous forest, white cedar/balsam fir coniferous forest and sugar maple/ironwood deciduous forest. The area also included open meadows, exposed limestone areas or rock barrens, juniper thicket and a number of small wetland communities. A total of 22 vegetation communities were

delineated within the study area (Figure 1) with a total of 252 plants identified (Appendix I-A).

Community 1: Dry-Fresh White Pine – Oak Mixed Forest (ELC Code: FOM2-1)

This community was located in the far eastern portion of the property. This mixed forest community was dominated by eastern white pine (*Pinus strobus*) and red oak (*Quercus rubra*) with associates of white spruce (*Picea glauca*), eastern hemlock (*Tsuga canadensis*), eastern white cedar (*Thuja occidentalis*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*). The shrub layer consisted of common juniper (*Juniperus communis var. depressa*), prickly gooseberry (*Ribes cynosbati*), Alleghany blackberry (*Rubus allegheniensis*), leatherwood (*Dirca palustris*) and staghorn sumac (*Rhus typhina*). The herbaceous layer contained numerous fern species including spinulose wood-fern (*Dryopteris carthusiana*), marginal wood-fern (*D. marginalis*), eastern bracken fern (*Pteridium aquilinum*) and rock polypody fern (*Polypodium virginianum*). Other herbaceous plants found included field horsetail (*Equisetum arvense*), starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), large-leaved aster (*Eurybia macrophylla*), bluebead lily (*Clintonia borealis*) and helleborine (*Epipactis helleborine*).

Photo 1: View looking south – mixed forest. (Photo date: June 16, 2016)

Community 2: Forb Organic Shallow Marsh (ELC Code: MAS3-10)

This community was located on the far eastern portion of the subject lands, on the north side of an existing trail. This small wetland pocket contained a number of wetland species including water horsetail (*Equisetum fluviatile*), marsh fern (*Thelypteris palustris*), water willow-herb (*Decodon verticillatus*), purple loosestrife (*Lythrum salicaria*), American water-horehound (*Lycopus americanus*), few-fruited sedge (*Carex oligocarpa*), awl-fruited sedge (*C. stipata*), tussock sedge (*C. stricta*), three-way sedge (*Dulichium arundinaceum*), wool-grass (*Scirpus cyperinus*) and common cattail (*Typha latifolia*). There were many dead trees found in the centre of the area as well as a number of living tree and shrub species on the perimeter including eastern white cedar, pussy willow (*Salix discolor*), slender willow (*S. petiolaris*), narrow-leaved meadowsweet (*Spiraea alba*) and red-osier dogwood (*Cornus stolonifera*).

Photo 2: Community 2 – view looking north. Photo date: June 28, 2012

Community 3: Forb Organic Shallow Marsh (ELC Code: MAS3-10)

This community was located directly south of the previous community, on the south side of the existing trail. This small wetland pocket contained standing water which flowed north into Community 2. The vegetation found in this community consisted of similar species as Community 2 as well as bullhead pond-lily (*Nuphar variegata*), spotted jewelweed (*Impatiens capensis*), rough bedstraw (*Galium asprellum*), boneset (*Eupatorium perfoliatum*), common duckweed (*Lemna minor*) and fowl manna grass (*Glyceria striata*).

Photo 3: View looking south in Community 3. Photo date: October 29, 2014

Community 4: Dry-Fresh Oak – Hardwood Deciduous Forest (ELC Code: FOD2-4)

This community was located in the eastern portion of the property, at the base of the limestone ledge and west of the mixed forest community (Community 1). This community was logged sometime between October 29, 2014 and February 18, 2016 as depicted in the photos below. Although the majority of trees have been cleared, a number of specimen trees, representative of the original forest type were still standing. The herbaceous plants which covered the forest floor were still found growing and were able to be identified. Trees found in this community included red oak, white ash (*Fraxinus americana*), American beech, white birch, ironwood (*Ostrya virginiana*), bitternut hickory (*Carya cordiformis*), sugar maple, American elm (*Ulmus americana*), eastern white pine, eastern hemlock and balsam fir (*Abies balsamea*).

The shrub layer consisted of Japanese barberry (*Berberis thunbergii*), prickly gooseberry, Allegheny blackberry, leatherwood, wild red raspberry (*Rubus idaeus*) and purple-flowering raspberry (*Rubus odoratus*). The herbaceous layer was quite diverse especially after the clearing of trees. Plants found included ground-pine (*Lycopodium obscurum*), northern maidenhair fern (*Adiantum pedatum*), maidenhair spleenwort (*Asplenium trichomanes ssp. quadrivalens*), spinulose wood-fern, rock polypody fern, wild columbine (*Aquilegia canadensis*), round-lobed hepatica (*Hepatica americana*), blue cohosh (*Caulophyllum giganteum*), yellow corydalis (*Corydalis flavula*), black bindweed (*Polygonum convolvulus*), barren strawberry (*Waldsteinia fragarioides*), wild sarsaparilla, herb Robert (*Geranium robertianum*), bitter nightshade (*Solanum dulcamara*) and zig-zag goldenrod (*Solidago flexicaulis*).

Photo 4. Forest community observed prior to logging. (Photo date: October 29, 2014)

Photo 5: View looking south of Forest community observed after logging occurred. (Photo date: June 16, 2016)

Photo 6: View looking south of forest community regenerating. (Photo date: Oct. 19, 2016)

Community 5: Open Aquatic (ELC Code: OAO)

This open water community was located in the southeast corner of the eastern portion of the property. Bullhead pond-lily and fragrant white water-lily (*Nymphaea odorata*) was observed floating on the pond surface. The perimeter of the pond consisted of water horsetail, marsh fern, water smartweed (*Polygonum amphibium*), hemlock water parsnip (*Sium suave*), common lake sedge (*Carex lacustris*), cypress-like sedge (*C. pseudo-cyperus*), tussock sedge, three-way sedge, wool-grass, fowl manna grass, narrow-leaved meadowsweet and wild blue flag (*Iris versicolor*).

Photo 7: View looking east at pond community. (Photo date: July 19, 2016)

Community 6: Silver Maple Organic Deciduous Swamp (ELC Code: SWD6-2)

This swamp community surrounded the open water pond community and was dominated by silver maple (*Acer saccharinum*) with associates of red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis Britt.*), white birch, eastern white pine, eastern white cedar, white spruce and balsam fir. The shrub layer was dominated by speckled alder (*Alnus rugosa*) along with crack willow (*Salix fragilis*) and choke cherry (*Prunus virginiana*). The herbaceous layer consisted of interrupted fern (*Osmunda claytoniana*), royal fern (*Osmunda regalis*), marsh fern, sensitive fern (*Onoclea sensibilis*), swamp milkweed (*Asclepias incarnata*), rough bedstraw, boneset and tussock sedge.

Photo 8: View looking east into swamp community surrounding the pond. (Photo date: July 19, 2016)

Community 7: Dry Carbonate Open Rock Barren (ELC Code: RBO1-1)

This community was located on top of the limestone ridge, along the existing roadway that leads from the front of the property to the eastern property boundary. For the most part, the bare open rock contained pockets reindeer-moss (*Cladina rangiferina*) and a few low growing shrubs including staghorn sumac and common juniper. The areas surrounding the bare rock consisted of eastern white cedar, white birch, balsam poplar (*Populus balsamifera*), trembling aspen (*Populus tremuloides*) and eastern white pine. Other herbaceous plants found growing here included creeping cinquefoil (*Potentilla reptans*), white-sweet clover (*Melilotus alba*), Queen-Anne's lace (*Daucus carota*), common yarrow (*Achillea millefolium*), orange hawkweed (*Hieracium aurantiacum*), gray goldenrod (*Solidago nemoralis*), poverty oatgrass (*Danthonia spicata*) and acuminate panic grass (*Panicum acuminatum*).

Photo 9: View looking north at Community 7 from existing roadway. Photo date: October 29, 2014

Community 8: Dry - Fresh White Pine Coniferous Forest (ELC Code: FOC 1-2)

This community comprised the majority of the central portion of the property and was dominated by eastern white pine in the upper canopy while the ground layer was dominated by common juniper. Other trees found included balsam fir, white spruce, eastern white cedar, white birch, red oak, bur oak (*Quercus macrocarpa*), American basswood (*Tilia americana*) and white ash. Herbaceous plants found consisted of eastern bracken fern, marginal wood-fern, rock polypody fern, goldthread (*Coptis trifolia*), wintergreen (*Gaultheria procumbens*), bunchberry (*Cornus canadensis*), creeping partridge-berry (*Mitchella repens*), large-leaved aster and helleborine.

Photo 10: View looking south into white pine forest community. (Photo date: October 29, 2014)

Photo 11: View looking north at white pine forest. (Photo date: October 29, 2014)

Community 9: Red-osier Dogwood Mineral Thicket Swamp (ELC Code: SWT2-5)

This small wetland pocket was located in the western edge of Community 8 in the central portion of the property; more specifically on the north side and adjacent to the existing roadway. This wetland contained some standing water as noted during the fall field investigations in October 2014 (photo 12) however, no standing water was observed during 2016 field surveys. The community was dominated by red-osier dogwood and also contained pussy willow, slender willow and narrow-leaved meadowsweet. Trees surrounding the shrub thicket included balsam poplar, red maple and eastern white cedar. The herbaceous layer consisted of meadow horsetail (*Equisetum pratense*), sensitive fern, marsh fern, bulbet bladder fern (*Cystopteris bulbifera*), swamp milkweed, rough bedstraw, common lake sedge, few-fruited sedge, spotted joe-pyeweed (*Eupatorium maculatum*), grass-leaved goldenrod (*Euthamia graminifolia*), fowl manna grass and poison ivy (*Rhus rydbergii*).

Photo 12: View looking north at red-osier dogwood thicket. Photo date: April 20, 2016.

Community 10: Dry-Fresh Sugar Maple – Ironwood Deciduous Forest (ELC Code: FOD 5-4)

This woodland community was also recently logged as was evident by the numerous cut logs and stumps found during 2016 field investigations. This narrow band of deciduous forest is found in the western portion of the property, along the eastern edge of the common juniper thicket (Community 11). This community was dominated by sugar maple and ironwood with associates of American elm, American basswood, red oak and white ash. Shrubs found consisted mainly of European buckthorn (*Rhamnus cathartica*) and common juniper. The herbaceous layer contained marginal wood-fern, round-lobed hepatica, common St. John's-wort (*Hypericum perforatum*), yellow avens (*Geum aleppicum*), barren strawberry, Queen-Anne's lace, common mullein, large-leaved aster, white trillium (*Trillium grandiflorum*), fowl meadow grass (*Poa palustris*) and bottle-brush grass (*Elymus hystrix*).

Photo 13: View looking north at maple/ironwood deciduous forest. Photo date: June 28, 2012.

Community 11: Common Juniper Cultural Alvar Thicket (ELC Code: CUT 2-1)

This community formed the majority of the western portion of the subject property and was dominated by common juniper. A number of small specimen trees were scattered throughout the area including eastern white pine, white spruce, eastern white cedar, American elm, white ash, trembling aspen and rock elm (*Ulmus thomasii*). A few shrubs were also found growing throughout the area and consisted of Japanese barberry, apple (*Malus domestica*), choke cherry, European buckthorn and staghorn sumac. The herbaceous layer contained sweet-fern (*Comptonia peregrina*), mossy stonecrop, common strawberry (*Fragaria virginiana*), white sweet-clover, red clover (*Trifolium pratense*), white clover (*Trifolium alba*), Queen-Anne's lace, common milkweed, common yarrow, tall goldenrod (*Solidago altissima*), calico aster (*Symphyotrichum lateriflorum*), awnless brome grass (*Bromus inermis*) and timothy (*Phleum pratense*). Small patches and scattered stems of poverty oat grass were found in the open patches of this community.

Photo 14: View looking east across the common juniper thicket. Photo date: July 19, 2016

Community 12: Fresh-Moist White Cedar – Balsam Fir Coniferous Forest (ELC Code: FOC 4-3)

This coniferous community was located in the southwest corner of the property, and east of the communication tower. This community was dominated by eastern white cedar and balsam fir along with eastern white pine, white spruce, eastern hemlock, red oak, American basswood, ironwood, white ash and green ash (*Fraxinus pennsylvanica*). The shrub layer contained slender willow, European buckthorn and poison ivy. The herbaceous layer consisted of field horsetail, sensitive fern, tall buttercup (*Ranunculus acris*), wild sarsaparilla, common gromwell (*Lithospermum officinale*) and helleborine.

Photo 15: Looking southwest at Community 12; juniper thicket in foreground (Photo date: July 19, 2016)

Community 13: Poplar – Conifer Mineral Mixed Swamp (ELC Code: SWM 3-2)

This wetland community was also located in the southwest corner of the property, northeast of the communication tower. This area was more open in nature and was dominated by balsam poplar, trembling aspen, balsam fir and eastern white cedar. Other species of trees found included American elm, American basswood and green ash. The herbaceous layer consisted of marginal wood-fern, sensitive fern, white baneberry (*Actaea pachypoda*), common St. John's-wort, fringed loosestrife (*Lysimachia ciliata*), swamp milkweed, American water-horehound (*Lycopus americanus*), large-leaved aster, livid sedge (*Carex livida*), awl-fruited sedge, few-fruited sedge, rose-twisted stalk (*Streptopus roseus*) and helleborine.

Photo 16: View looking north at mixed swamp community. (Photo date: July 19, 2016)

Community 14: Dry – Moist Old Field Meadow (ELC Code: CUM 1-1)

This community was located in the western edge of the property and was dominated by grasses and a variety of typical successional species including awnless brome grass, orchard grass (*Dactylis glomerata*), poverty oatgrass (*Danthonia spicata*), quack grass (*Elymus repens*), timothy, fowl meadow grass, thimbleweed (*Anemone virginiana*), sheep sorrel (*Rumex acetosella*), common strawberry, black medick (*Medicago lupulina*), white-sweet clover, low hop clover (*Trifolium agrarium*), red clover, cow vetch (*Vicia cracca*), Queen-Anne's lace, field bindweed (*Convolvulus arvensis*), Viper's bugloss (*Echium vulgare*),

narrow-leaved plantain (*Plantago lanceolata*), common mullein, common yarrow, field pussytoes (*Antennaria neglecta*), ox-eye daisy (*Chrysanthemum leucanthemum*), tall goldenrod, gray goldenrod, field sow thistle (*Sonchus arvensis*), common dandelion (*Taraxacum officinale*) and goat's-beard (*Tragopogon dubius*). A few tree and shrub species were scattered throughout the area and included bur oak, eastern white pine, sugar maple, white ash, staghorn sumac, European buckthorn, choke cherry, common juniper and hawthorn species (*Crataegus spp*.).

Photo 17: View looking north of open field meadow community. June 16, 2016

Community 15: Poplar Mineral Deciduous Swamp (ELC Code: SWD 4-3)

This community was located in the southwest corner of the property, due east of the communication tower. A small portion of this community was removed to accommodate the tower's guidelines. This small wetland community was dominated by trembling aspen and balsam poplar. Other tree species found consisted of American elm, red maple, balsam fir, eastern white cedar, green ash and black ash (*Fraxinus nigra*). The shrub layer contained pussy willow, crack willow, slender willow, red-osier dogwood and European buckthorn. The herbaceous layer consisted of meadow horsetail, bulbet bladder fern, sensitive fern, dwarf raspberry (*Rubus pubescens*), poison-ivy, wild basil (*Clinopodium vulgare*), boneset, bladder sedge (*Carex intumescens*), livid sedge, wool-grass, fowl manna grass, reed canary grass (*Phalaris arundinacea*) and timothy.

Photo 18: View looking north at poplar swamp community. (July 19, 2016)

Community 16: Willow Mineral Thicket Swamp (ELC Code: SWT 2-2)

This narrow thicket community was located along a drainage feature leading from the northern portion of the property south towards the wetland communities located east of the communication tower. This narrow band of vegetation was dominated by slender willow and pussy willow. Herbaceous plants found included thimbleweed, common strawberry, spotted joe-pyeweed, calico aster, awl-fruited sedge, wool-grass, reed canary grass and timothy.

Photo 19: View looking north along the drainage feature. (Photo date: Oct. 29, 2014)

Photo 20: View looking south along drainage feature from access road. (Photo date: Oct. 29, 2014)

Community 17: Rocky Ledge (No ELC Code Applicable)

This community was defined by the limestone ridge that cut across the eastern portion of the property in a generally north/south direction. Trees found growing immediately above and below this ridge included white spruce, red oak, white birch, ironwood, American basswood, red maple, sugar maple and white ash. The shrub layer contained common juniper, prickly gooseberry, red currant (*Ribes rubrum*), leatherwood, alternate-leaf dogwood (*Cornus alternifolia*), round-leaved dogwood (*Cornus rugosa*), tartarian honeysuckle (*Lonicera tatarica*) and red-berried elderberry (*Sambucus racemosa*). The herbaceous layer included northern maidenhair fern, spinulose wood-fern, marginal wood-fern, rock polypody fern, walking fern (*Asplenium rhizophyllum*), wild columbine, blue cohosh, sheep sorrel, foam flower (*Tiarella cordifolia*), wild sarsaparilla, cleavers (*Galium aparine*), zig-zag goldenrod, Canada mayflower (*Maianthemum canadense*), rose-twisted stalk and helleborine.

Photo 21: View looking northeast along limestone ridge. (Photo date: Oct. 29, 2014)

Community 18: Forb Organic Meadow Marsh (ELC Code: MAM 3-9)

This small, shallow wetland is located on the northern property boundary, in the northeast corner of the western portion of the property. Aquatic vegetation included bullhead pond lily, water-shield (*Brasenia schreberi*) and stonewort (*Chara spp*.). Other herbaceous plants consisted of marsh fern, bulbet bladder fern, sensitive fern, marsh St. John's-wort (*Triadenum fraseri*), marsh cinquefoil (*Potentilla palustris*), bulbous water-hemlock (*Cicuta bulbifera*), rough bedstraw, spotted joe-pyeweed, boneset, common lake sedge, awl-fruited sedge, three-way sedge, softstem bulrush (*Scirpus validus*) and fowl manna grass. A few small trees and shrubs were growing in the perimeter of this area and included red maple, balsam poplar, eastern white cedar, speckled alder, pussy willow, slender willow, red-osier dogwood and European buckthorn.

Photo 22: View looking northwest at forb meadow marsh. (Photo date: July 19, 2016)

Community 19: Dry – Moist Old Field Meadow (ELC Code: CUM 1-1)

This open field meadow community was located in and surrounded by the common juniper thicket community (Community 11) in the central, western portion of the property. Species found here are similar to Community 14 located farther to the west. This area consisted of common strawberry, sulfur cinquefoil (*Potentilla recta*), white sweet-clover, red clover, white clover, cow vetch, common milkweed, Viper's bugloss, common yarrow, ox-eye daisy, Philadelphia fleabane (*Erigeron philadelphicus*), large-leaved aster, orange hawkweed, black-eyed Susan (*Rudbeckia hirta*), tall goldenrod, gray goldenrod, New England aster (*Symphyotrichum novae-angliae*), goat's-beard, poverty oatgrass and timothy.

Photo 23: View looking west at small opening within the surrounding common juniper community. (July 19, 2016)

Community 20: Red Maple Mineral Deciduous Swamp (ELC Code: SWD 3-1)

This community is a small wetland inclusion located within the cedar forest community (Community 21), located near the northern property boundary in the west half of the property. This small, narrow wetland was dominated by red and silver maple surrounded by eastern white cedar, American elm, ironwood and red-osier dogwood. The ground cover included sphagnum moss species (*Sphagnum spp.*), sensitive fern, poison-ivy, bulbous water-hemlock, spotted joe-pyeweed, bladder sedge, few-fruited sedge, wool-grass, Canada bluejoint grass (*Calamagrostis canadensis*) and fowl manna grass.

Photo 24: View looking north at red maple wetland inclusion. (Photo date: July 19, 2016)

Community 21: Fresh – Moist White Cedar Coniferous Forest (ELC Code: FOC 4-1)

This community, located along the northern boundary of the western portion of the property was almost entirely dominated by eastern white cedar with very little ground cover in the denser areas of the woodland. In areas where sunlight was able to penetrate the canopy, herbaceous plants found included spinulose wood-fern, evergreen wood-fern (*Dryopteris intermedia*), kidney-leaved violet (*Viola renifolia*), dwarf enchanter's nightshade (*Circaea alpina*), herb Robert (*Geranium robertianum*), Canada mayflower, rose-twisted stalk and helleborine.

Photo 25: View looking north at white cedar forest community. (Photo date: July 19, 2016)

Community 22: Dry Carbonate Open Rock Barren (ELC Code: RBO 1-1)

Two open rock barren communities are found in the western portion of the property. One in the north, located immediately to the east of an abandoned farm building and shed while the second rock barren was located immediately to the east of the communication tower in the southern portion of the property. Both areas contained numerous bare rock areas with vegetation growing in cracks and fissures and on the perimeter of the area. Tree species found included bur oak and American basswood. Shrubs consisted of prickly gooseberry, staghorn sumac, tartarian honeysuckle, common juniper, European buckthorn and eastern red cedar (*Juniperus virginiana*). The herbaceous layer contained tall buttercup, bladder campion (*Silene vulgaris*), mossy stonecrop, common strawberry, white-sweet clover, low hop clover, red clover, common milkweed, Viper's bugloss, narrow-leaved plantain (*Plantago lanceolata*), common burdock (*Arctium minus*), goat's-beard, field brome (*Bromus arvensis*), awnless brome grass, orchard grass, timothy and acuminate panic grass.

Photo 26: View looking northwest at rock barren area behind abandoned buildings in north portion of the property. (June 3, 2016)

Photo 27: View looking west of rock barren area located east of communication tower and abandoned building. (Photo date: July 19, 2016)

5.3 Birds

A total of 67 bird species were recorded, representing forest, field and wetland species (Appendix II). All species were breeding either on the property or within the greater study area. Bird species found in the forested areas of the property included American robin (*Turdus migratorius*), black capped chickadee (*Poecile atricapillus*), blue jay (*Cyanocitta cristata*), cedar waxwing (*Bombycilla cedrorum*), chipping sparrow (*Spizella passerina*), song sparrow (*Melospiza melodia*), indigo bunting (*Passerina cyanea*), Nashville warbler (*Vermivora ruficapilla*), black-throated blue warbler (*Dendroica caerulescens*), black-throated green warbler (*Dendroica virens*), ovenbird (*Seiurus aurocapillus*), ruffed grouse (*Bonasa umbellus*), scarlet tanager (*Piranga olivacea*) and pileated woodpecker (*Dryocopus pileatus*).

Species found in the open field area included killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), eastern kingbird (*Tyrannus tyrannus*), gray catbird (*Dumetella carolinensis*), brown-headed cowbird (*Molothrus ater*), clay-coloured sparrow (*Spizella pallida*), field sparrow (*Spizella pusilla*), American goldfinch (*Carduelis tristis*) and common grackle (*Quiscalus quiscula*).

Other forest birds recorded in and around the juniper thicket and rocky barrens included prairie warbler (*Dendroica discolor*), black-and-white warbler (*Mniotilta varia*), eastern whip-poor-will (*Antrostomus vociferous*), pine warbler (*Dendroica pinus*), eastern towhee (*Pipilo erythrophthalmus*) and northern flicker (*Colaptes auratus*).

All species recorded are found in Appendix II of this report.

5.4 Wildlife and Herpetozoa

A total of 16 mammal species have been recorded on the site during field investigations over the past few years (Appendix III). Wildlife recorded on site included white-tailed deer (*Odocoileus virginianus),* moose (*Alces alces*), coyote (*Canis latrans*), common porcupine (*Erethizon dorsatum*), American beaver (*Castor canadensis*), eastern gray squirrel (gray phase and black phase – *Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), meadow jumping mouse (*Zapus hudsonius*), and eastern chipmunk (*Tamias striatus*). Other species recorded indirectly by sign included: black bear (*Ursus americanus*), ermine (*Mustela erminea*), long-tailed weasel (*Mustela frenata*), red fox (*Vulpes vulpes*), eastern cottontail (*Sylvilagus floridanus*) and snowshoe hare (*Lepus americanus*).

A total of seven (7) amphibian species were observed on the property (Appendix IV) through area searches and targeted spring surveys conducted in 2014 and 2016. One (1) salamander, the eastern red-backed salamander (*Plethodon cinereus*) and six (6) frog species were identified during field investigations including gray treefrog *(Hyla versicolor)*, green frog *(Rana clamitans),* western chorus frog (*Pseudacris triseriata*), northern leopard frog (*Rana pipiens*), American bullfrog (*Lithobates catesbeianus*) and spring peeper (*Pseudacris crucifer*). Marsh Monitoring Amphibian Survey results are detailed in Table 6 detailing recorded locations, species, calling code and approximate numbers.

Table 6: Amphibian Survey Results

Date	Species	Location	Calling Code	Inside 100m	Outside 100m	Number of Individuals	Comments
May 2, 2016	Spring Peepers (SPPE) Chorus Frog (CHFR) Wood Frog (WOFR)	**Station 1:**	None heard				
		Station 2: SPPE SPPE CHFR	 Code 1 Code 2 Code 1	 X X	 X	 4 10 2	
		Station 3: SPPE SPPE	 Code 3 Code 1	 X	 X	 >25 3	
		Station 4: SPPE	 Code 3		 X	 >25	
		Station 5: SPPE SPPE	 Code 1 Code 3	 X	 X	 1 >25	
		Station 6: SPPE	 Code 3	 X		 >25	
		Station 7: SPPE	 Code 3	 X		 >20	
May 30, 2016	Spring Peeper (SPPE) Grey Tree Frog (GRTR) Bullfrog (BULL	**Station 1:** SPPE GRTR GRFR BULL BULL	 Code 1 Code 2 Code 1 Code 1 Code 1	 X X X X X		 3 8 3 1 1	
		Station 2: SPPE	 Code 1	 X		 2	
		Station 3: SPPE	 Code 2		 X	 5	
		Station 4: None					Dry – no standing

							water
		Station 5: None					Dry – no standing water
		Station 6: None					Dry – no standing water
		Station 7: None					Dry – no standing water
June 14, 2016	Grey Tree Frog (GRTR) Green Frog (GRFR)	**Station 1:** GRFR GRTR GRTR	 Code 2 Code 1 Code 1	 X X X		 8-10 1 1	
		Station 2: GRFR GRTR	 Code 1 Code 1	 X X		 2 1	
		Station 3: GRFR GRTR	 Code 1 Code 1	 X X		 1 1	
		Station 4: None					Dry
		Station 5: None					Dry
		Station 6: GRTR	 Code 2	 X		 12	
		Station 7: None					Dry

Despite considerable effort to search rock piles, debris piles and roadways, only one snake species was observed during field visits, the common garter snake (*Thamnophis sirtalis*). Wetland communities were also scanned during field visits while conducting targeted surveys for other species however, these resulted in no turtle species being observed.

6.0 Natural Heritage Features

6.1 Significant Wetlands

No provincially significant wetlands or unevaluated wetlands were identified on or within 120 metres of the site (MNR, 2009; field visits).

There were a number of small topographic wetland areas located on the property (Communities 2, 3, 5, 6, 9, 13, 15, 16, 17, 19 and 20) (Figure 1). These wetlands have not been evaluated by MNRF under the Ontario Wetland Evaluation System.

6.2 Area of Natural and Scientific Interest (ANSI)

There are no confirmed regional or provincially significant Life Science or Earth Science ANSI's located on or within 120m of the proposed area for the quarry. The lands to the east of the quarry are part of the Kawartha Highlands Provincial Park and are regulated under the Provincial Park and Conservation Reserves Act (PPCRA).

6.3 Significant Habitat for Endangered or Threatened Species

Habitat for endangered or threatened species (provincially and nationally) was identified on or within 120 metres of the site (MNR, 2009; NHIC 2016; site visits). Possible habitat for eastern milksnake (*Lampropeltis triangulum*), eastern hog-nosed snake (*Heterodon platirhinos*), Blanding's turtle (*Emydoidea blandingii*), American ginseng (*Panax quinquefolius*), pale-bellied frost lichen (*Physconia subpallida*), little brown myotis (*Myotis lucifugus*), northern long-eared myotis (*Myotis septentrionalis*), eastern small-footed myotis (*Myotis leibii*), tri-coloured bat (*Perimyotis subflavus*), bank swallow (*Riparia riparia*) and bobolink (*Dolichonyx oryzivorus*) occurred in the study area however none were identified during field investigations. Habitat and individuals that were recorded on the property included eastern whip-poor-will (*Antrostomus vociferous*), eastern meadowlark (*Sturnella magna*) and barn swallow (*Hirundo rustica*).

There were a number of Elemental Occurrences (EO's) listed as "restricted species" on the NHIC database, for the area within 5km of the study area (NHIC 2016). Due to the sensitive nature of the species and the lack of suitable habitat on the site, it is unnecessary to provide the identity of the species with EO ID 4851, 13213, 13227, 34710, 66713, and 93760" (MNRF, Bancroft, Personal Communication, 2017). The Management Biologist of the Ministry of Natural Resources and Forestry, Bancroft District MNRF staff were contacted and responded in an email providing a list of SAR that may be present on or in proximity to

the site.

6.4 Vegetation

A review of the list of species found by NEA that one species, the butternut (*Juglans cinerea*), was considered significant on a national and provincial level (COSEWIC, 2017; SARO, 2017; SARA, 2016) (Appendix II-B). There was no evidence of American ginseng or pale-bellied frost lichen.

A total of three (3) plant species were considered regionally significant (Oldham, M.J. 1999). These species included walking fern (*Asplenium rhizophyllum*), rock elm (*Ulmus thomasii*) and Japanese barberry (*Berberis thunbergii*).

One rare vegetation community was observed on site, the rock barren (Community 7 and 22) (Bakowsky, 1997).

6.5 Birds

A review of the bird species list (Appendix II) found six species that was significant on a provincial (COSSARO, 2017) and federal (COSEWIC, 2017) level, common nighthawk (*Chordeiles minor*), eastern whip-poor-will (*Antrostomus vociferous*), eastern wood-pewee (*Contopus virens*), barn swallow (*Hirundo rustica*), wood thrush (*Hylocichla mustelina*) and eastern meadowlark (*Sturnella magna*).

Four common nighthawk were heard in the eastern portion of the property while conducting evening amphibian surveys on June 14th, 2016. These birds were likely foraging over the property in the area of the recently cleared forest (Community 4). Common nighthawk was not however, heard or observed during the evening whip-poor-will surveys.

Approximately six (6) whip-poor-will territories were identified during evening surveys in May and June of 2016. The majority of the birds were calling in the eastern portion of the property, in the area of the limestone ledge and the recently cleared forest. No birds were observed or heard calling in the far western portion of the property, open field communities.

The eastern wood-pewee and wood thrush were identified in the mixed forest and coniferous forest communities in the eastern portion of the property during breeding bird surveys (Communities 1 and 8).

Barn swallows were observed flying over the old field community (Community 14) in the western portion of the property. One barn swallow nest was observed inside the small wooden shed located in the northwest corner of the property. Another nest was located on the rear of the abandoned administrative building, in a corner under the eaves, in the southwest corner of the property.

The eastern meadowlark was observed in the open field community (Community 14) in the western portion of the property. Targeted surveys, following standard MNRF protocol for eastern meadowlark were conducted in June 2016. Information on methodologies and survey results are detailed in the Natural Environment Level 2 Technical Report.

A review of the bird species list (Appendix II) found nineteen (19) area sensitive species within the study area. Area sensitive species are species that require a minimum hectarage of contiguous suitable habitat to successfully breed (MNR, 2000). The species recorded included broad-winged hawk (*Buteo platypterus*), red and white-breasted nuthatch (*Sitta canadensis and S. carolinensis*), pileated woodpecker (*Dryocopus pileatus*), hairy woodpecker (*Picoides villosus*), least flycatcher (*Empidonax minimus*), winter wren (*Troglodytes troglodytes*), veery (*Catharus fuscescens*), hermit thrush (*Catharus guttatus*), magnolia warbler (*Dendroica magnolia*), black-throated blue warbler (*Dendroica caerulescens*), black-throated green warbler (*Dendroica virens*), blackburnian warbler (*Dendroica fusca*), pine warbler (*Dendroica pinus*), black-and-white warbler (*Mniotilta varia*), American redstart (*Setophaga ruticilla*), ovenbird (*Siurus aurocapillus*), scarlet tanager (*Piranga olivacea*) and the eastern whip-poor-will (*Antrostomus vociferous*).

The broad-winged hawk inhabits forests. Suitable habitat for this species can be found within all forest communities on the property (Communities 1, 8, 10, 12, 13, 15, 19, 20) (Figure 1).

The red-breasted nuthatch inhabits coniferous woods. Also in forests of oak, hickory, maple, birch and other deciduous trees. Suitable habitat may be found in all forest communities on the property (Communities 1, 8, 10, 12, 20) (Figure 1).

The white-breasted nuthatch inhabits mature woods and woodland edges. Particularly associated with deciduous stands. Suitable habitat may be found in all forest communities on the property (Communities 1, 8, 10) (Figure 1).

The pileated woodpecker inhabits mature deciduous or mixed deciduous coniferous woodlands. They can also be found in younger forests with large scattered dead trees or

dead wood. Suitable habitat for this species can be found within all forest communities on the property (Communities 1, 8, 10, 12, 13, 15, 19, 20) (Figure 1).

The hairy woodpecker inhabits mature forests but also suburbs, parks and cemeteries, forest edges and open woodlands of oak and pine. Suitable habitat for this species can be found within all forest communities on the property (Communities 1, 8, 10, 12, 13, 15, 19, 20) (Figure 1).

The least flycatcher inhabits semi-open woodlands, orchards and shrubby fields. Potential habitat exists within all forest communities and cultural thickets on the property (Communities 4, 10, 11, 13, 15) (Figure 1).

The winter wren inhabits many different habitat types including cliff faces to riparian areas to various forest types, especially coniferous forests. Suitable may be found in all riparian areas and forest communities on the property (Communities 1, 4, 8, 10) (Figure 1).

The veery inhabits rich deciduous woodland and forest with a well-developed understory. Potential habitat may be found in any of the forest communities identified on the property (Communities 8, 10) (Figure 1).

The hermit thrush inhabits forest understories, especially around forest edges or openings. Suitable habitat may be found within any of the forest communities identified on the property (Communities 1, 8, 10) (Figure 1).

The magnolia warbler breeds in small conifers, especially young spruces, in purely coniferous stands or mixed forest. Suitable habitat may be found within any of the forest communities identified on the property (Communities 1, 8, 10, 12, 20) (Figure 1).

The black-throated blue warbler breeds in mature deciduous and mixed coniferous-deciduous woodlands with a thick understory, often in hilly terrain. Suitable habitat may be found within any of the forest communities identified on the property (Communities 1, 8, 10) (Figure 1).

The black-throated green warbler inhabits coniferous forest and transitional coniferous-deciduous forest. Suitable habitat may be found within the coniferous and mixed forests on the property (Communities 1, 8, 10, 12, 20) (Figure 1).

The blackburnian warbler inhabits mature coniferous and mixed forests. Suitable habitat may be found within the coniferous and mixed forests on the property (Communities 1, 8,

12, 20) (Figure 1).

The pine warbler inhabits pine forests or deciduous woods with a pine presence. Suitable habitat may be found within Communities 4, 8, 10) (Figure 1).

The black-and-white warbler inhabits deciduous forest and mixed forests. Suitable habitat may be found within all deciduous and mixed forests on the property (Communities 1, 8, 10, 12, 13) (Figure 1).

The American redstart inhabits open woodland habitats, particularly dominated by deciduous trees. Potential habitat may be found within any of the woodlands on the property (Communities 4, 10, 13, 15) (Figure 1).

The ovenbird inhabits closed-canopy forests, particularly deciduous and mixed woods. Suitable habitat may be found in any of the deciduous and mixed forest communities on the property (Communities 1, 8, 10) (Figure 1).

The scarlet tanager inhabits deciduous and mixed forests and prefer undisturbed forests. Suitable habitat may be found in any of the deciduous and mixed forest communities on the property (Communities 1, 4, 8, 10) (Figure 1).

The eastern whip-poor-will breeds in dry deciduous or evergreen-deciduous forest with little or no underbrush, close to open areas. Suitable habitat exists within all forest communities and cultural thickets on the property (Communities 1, 4, 8, 10, 11) (Figure 1).

The OBBA list for the 10 x 10 km atlas squares (17QK04) that includes the subject property included records of twelve (12) species that are listed nationally and/or provincially as Species At Risk: whip-poor-will (*Antrostomus vociferus*), chimney swift *(Chaetura pelagica)*, olive-sided flycatcher (*Contopus cooperi*), eastern wood-pewee (*Contopus* virens), bank swallow (*Riparia riparia*), barn swallow (*Hirundo rustica*), wood thrush (*Hylocichla mustelina*), golden-winged warbler *(Vermivora chrysoptera)*, cerulean warbler (*Setophaga cerulean*), Canada warbler (*Cardellina canadensis*), bobolink (*Dolichonyx orizivorus*) and eastern meadowlark (*Sturnella magna*).

The whip-poor-will (*Antrostomus vociferous*) was recently listed as threatened nationally and provincially. This nocturnal species is found in mixed forest and deciduous forests, typically with clearings. Targeted surveys were conducted for this species (BSC, 2010) in 2016. A detailed analysis of the survey information and mapping of territories and habitat is presented in the Level 2 report.

The chimney swift (*Chaetura pelagica*) is listed federally and provincially as a threatened species (COSEWIC, 2016, COSSARO, 2016). The chimney swift is usually found within 1 km of a waterbody and, as its name implies, predominantly nests within old chimneys in urban and suburban areas. Prior to European settlement, chimney swifts nested in old growth forests. As an aerial forager, the species feeds on insects in urban and rural areas. This property would not support nesting habitat for the chimney swift.

The olive-sided flycatcher (*Contopus cooperi*) is listed as a species of special concern provincially (COSSARO, 2016) and is threatened nationally (COSEWIC, 2016). This species prefers semi-open coniferous or mixed forests near swamps and extensive bog and fen communities. There is no suitable habitat on the property for this species.

The eastern wood-pewee is designated nationally and provincially as Special Concern by COSEWIC and COSSARO (2016). This medium sized flycatcher is grayish olive in colour, pale below with a darker wash on the breast and sides and whitish wingbars. Breeding habitat is deciduous, mixed woods, or pine plantations. They feed on insects and other arthropods in flight. (CLO, 2011). There is suitable habitat for this species on the property within the mixed forest community and coniferous forest (Communities 1, 8 and 10). NEA did observe this species on the property (Appendix II).

The bank swallow has recently been assessed by COSEWIC and has listed this species as Threatened. This species breeds in a wide variety of natural and artificial sites with vertical banks, including riverbanks, lake and ocean bluffs, aggregate pits, road cuts, and stock piles of soil (COSEWIC, 2016). There is no suitable habitat for this species on the subject property.

The barn swallow has recently been listed as a threatened species nationally (COSEWIC, 2016) and provincially (COSSARO, 2016). This species prefers open rural and urban areas where bridges, culverts and buildings are found near rivers, lakes, marshes or ponds. There is suitable nesting habitat for this species in the study area. One nest was located in the small wooden shed located in the northwest corner of the property. Another nest was located on the rear of the abandoned building located in the southwest corner of the property. Birds were observed flying over the fields foraging for insects.

The wood thrush is listed as a federally threatened species (COSEWIC, 2016), and has recently been listed as Special Concern provincially (COSSARO, 2016). This species breeds in deciduous and mixed forests in areas with large trees, moderate understory abundant in leaf litter and shade present. There is suitable habitat for this species on the property within the mixed forest and sugar maple forest (Communities 1, 8 and 10). NEA did

observe this species on the property (Appendix II).

The golden-winged warbler is listed as a species of special concern provincially (COSSARO, 2016) and is a federally threatened species (COSEWIC, 2016). This species can be found in early successional habitat of old fields with low deciduous trees bordered by wooded swamps; alder bogs; and shrubby clearings amidst deciduous forests. It requires greater than 10 ha of suitable habitat. Swamps bordered by early successional fields exist within the study area. Suitable habitat for this species may be found on this property as it contains both forests and early successional habitats. This bird however, was not observed or heard during breeding bird surveys.

The cerulean warbler is listed as a provincially threatened species (COSSARO, 2016) and is nationally an endangered species (COSEWIC, 2016). This species prefers mature deciduous forest with large specimen trees. Preferred woodlands are contiguous areas of greater than ten hectares. The property although forested, does not contain large specimen deciduous trees suitable for this species. No evidence of this species could be found on-site.

The Canada warbler is listed as a special concern provincially (COSSARO, 2016) and is threatened on a national level (COSEWIC, 2016). The Canada warbler breeds in wet deciduous and coniferous forests with a thick shrub under-story. Nests are usually found on mossy logs or roots, along stream banks or hummocks. The treed swamp portions of the property would support breeding and nesting habitat for the Canada warbler comprised of a mixed deciduous and coniferous woodland forest adjacent to the wetland pockets in the eastern portion of the property.

The bobolink, listed as threatened on a national and provincial level (COSEWIC, 2016; COSSARO, 2016) prefers tall, grassy meadows and ditches, hayfields and some croplands. The proposed licensed area does contain grassy meadows however no hayfields that would support habitat for this species. No bobolinks were heard or seen during targeted surveys.

The eastern meadowlark has been recently added to the national list as a threatened species (COSEWIC, 2013). This species prefers grassy meadows and pastures; also in some croplands, weedy fields, grassy roadsides and old orchards. The proposed licensed area does contain grassy meadows that would support habitat for this species. This species was observed while conducting targeted surveys. Details of the methodologies and survey results are found in the Natural Environment Level 2 Technical Report.

6.6 Mammals and Herpetozoa

A review of the mammal and herpetozoa lists (Appendix III & IV) recorded on and adjacent the proposed quarry area identified no significant mammal or reptile species (COSEWIC, 2016; COSSARO, 2016). One amphibian species recorded on the property, the western chorus frog (*Pseudacris triseriata*) is currently listed as Not at Risk under the Ontario Endangered Species Act (2007) however is listed as Threatened under the Federal Species at Risk Act. Refer to Table 8 for more detailed information on habitat and the SAR identified.

A review of MNRF's Make-a-map feature identified there were two (2) herpetozoa species and one (1) restricted species listed under COSEWIC (2016) and/or SARO (2016) for the areas within 5km of the study area, the eastern milksnake and Blanding's turtle.

The eastern milksnake is a special concern species federally (COSEWIC, 2016) and has recently been re-designated as Not at Risk (NAR) provincially (COSSARO, 2016). This species habitat preference includes farmlands, meadows, hardwood or aspen stands; pine forest with brush or woody cover; river bottoms or bog woods. They typically hide under logs, stones or boards or in outbuildings. Given the number of wetland communities within the study area and the abundance of food (amphibians and small fish), the property would support ideal habitat for this species. None were observed on the property during field visits.

The Blanding's turtle is listed as threatened both federally and provincially (COSEWIC, 2016; COSSARO, 2016). This species prefers shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation. They bask on logs, stumps or banks. The surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats. This species was not observed during field visits.

6.7 Significant Woodlands, Valleylands and Wildlife Habitat

The identification and evaluation of these features is a planning authority responsibility. This exercise has not been completed by the Township or the County.

However, the presence of Significant Wildlife Habitat can be determined during an environmental impact assessment process through use of the criteria and categories in the MNR Significant Wildlife Habitat Technical Guide (MNR, 2000). Some of these categories have been identified by MNR through their GIS mapping. The criteria include four main

categories: seasonal concentration areas; rare vegetation communities or specialized habitats for wildlife; habitats of species of concern; and animal movement corridors.

Table 7 shows the presence of significant wildlife habitat in Ecoregion 6E on the subject property.

Table 7. Presence and/or Absence of Significant Wildlife Habitat in Ecoregion 6E on Subject property

Potential or Confirmed Significant Wildlife Habitat based on Criteria in the SWH Eco-Region Criterion Schedule for 6E			
Seasonal Concentration Areas of Animals			
Significant Wildlife Habitat	**Description**	**Found-Yes**	**Found-No**
Waterfowl Stopover and Staging Areas (Aquatic)	Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration.		No suitable habitat on property-ponds small; no waterfowl observed within the study area
Raptor Wintering Area	Combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.		Red-tailed hawk and American kestrel observed during summer breeding bird surveys, although none observed during winter raptor surveys.
Turtle Wintering Areas	Permanent water bodies where water is deep enough not to freeze and contains soft mud substrates (large wetlands, bogs, fens)	Potential-within wetland areas, especially the large wetland on the southeast corner of the property (Community 5).	
Reptile Hibernaculum	In sites below frost lines in burrows, rock crevices and other natural locations, areas of broken and fissured rock are preferred	Potential-crevasses in rocks and broken rock ledges may provide for hibernacula within rock barren communities 7, 21 and 22	
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	Nests in live or dead standing trees in wetlands, lakes, islands and peninsulas		No -no great blue heron colonies or swallow colonies observed in study area

Deer Yarding Areas	Mixed or deciduous forest with browse available, also agricultural lands. Core deer yard-coniferous (pine, hemlock, cedar, spruce)		No - Deer yard not identified by MNRF within the study area
Deer Winter Congregation	Deer Congregating in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions		No-MNRF did not consider or map any part of the study area as Deer winter congregation area

Specialized Habitats **1. Areas that support wildlife species with highly specific habitat requirements** **2. Areas with exceptionally high species diversity or community diversity** **3. Areas that provide habitat that greatly enhances a species' survival**			
Areas that contain a provincially rare vegetation community	**Areas that contain a vegetation community that is rare within the planning area**	**Found-Yes**	**Found-No**
Alvar	Naturally open habitats with either a thin covering of soil or no soil over a base of limestone	Yes – confirmation of three small areas within study area. Small patches within Communities 7 and 22.	
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands-intermediate-aged to mature		No nests were identified during field surveys
Turtle and Lizard Nesting Areas	Shorelines (sand/gravel), wetlands	Possible- along shorelines of wetlands or trail edges.	

Amphibian Breeding Habitat (Woodland)	Forests; often associated with wetlands, but may be in upland forests;	Yes- Confirmation of greater than 20 individuals of a listed species (SPPE) within the wetland communities	
Area Sensitive Bird Breeding Habitat	Habitats where interior forest breeding birds are breeding, typically large mature forest stands >30 ha and interior forest habitat of at least 200m from forest edge habitat.	Yes – confirmation of 19 area sensitive species documented during breeding bird surveys	

Habitat of Species of Conservation Concern			
Wildlife	**Habitat Criteria**	**Found-Yes**	**Found-No**
Marsh Bird Breeding Habitat	Nesting in wetlands		No confirmed nesting waterfowl were identified
Special Concern and Rare Wildlife Species	A special concern species inventoried within the study area	Yes- common nighthawk, wood thrush and eastern wood-pewee	

Animal Movement Corridors			
Habitat	**Habitat Criteria**	**Found-Yes**	**Found-No**
Amphibian Movement Corridor	Breeding habitat confirmed, movement between terrestrial and breeding habitat identified	Possible-breeding habitat confirmed	
Deer Movement Corridor	Confirmed Deer Wintering Habitat with corridors that lead to deer wintering habitat unbroken by roads, 200m wide		No confirmed Deer Wintering Habitat by MNRF

6.8 Species At Risk

Species identified in Table 8 below are from the list NEA generated by searching the NHIC site within a 5km radius of the study area and from a list provided by MNRF that could be expected on the subject lands and for which there is possible habitat. Additional bird species listed in the Ontario Breeding Bird Atlas as found in the larger study area (10km radius) were also added to this table and are identified in bold.

The determination of habitat presence was based on field observations, inventories completed, ELC community codes known to be used by specific species and knowledge of habitat preferences and ranges.

Table 8. Species at Risk Identified within 5 KM Radius of Property in Literature Review

Common Name	Latin Name	National Status (COSEWIC)	Provincial Status (COSSARO)	Preferred Habitat	Habitat Present
Sensitive Species	N/A	END	END	N/A	Yes – habitat present however none were observed on the property during NEA investigations despite intensive multi-season searches
Blanding's turtle	Emydoidea blandingii	THR	THR	Forest and meadow habitats and marshes, will travel long distances in search of mates and new habitats	None-NHIC Records were reviewed for a 10km Radius. MNRF EO records located on County Road 507 immediately adjacent to site and on Highway 36 to west at large wetland crossing
Common five-lined skink	*Plestiodon fasciatus*	SC	SC	Open shoreline with rock outcrops, clearings and open woodlands	None- Poor habitat on site; small exposed limestone rock barrens with juniper, no loose slab rock or logs to act as cover, none observed.
Eastern hog-nosed snake	*Heterodon platirhinos*	THR	THR	Inhabit sandy, well-drained habitats such as beaches and dry woods with access to swamps	Possible, portions of property with sandy soils and/or near swamps. No individuals, hibernacula or oviposition sites found.
Eastern ribbon snake	*Thamnophis sauritus*	SC	SC	Tend to be found along shorelines or near rivers, as well as vernal pools, wetlands and ponds.	Possible in adjacent wetland ponds and in wetlands on site.
Snapping turtle	*Chelydra serpentine*	SC	SC	Prefer shallow waters to hide under the soft mud and leaf litter. During the nesting season, (early to mid-summer) females travel overland in search of a suitable nesting site, (gravely or sandy areas along streams or along railway lines and shoulders of roadways)	Pond located in southeast corner of property and larger marsh with open water area north of extraction area. No turtles or nest sites observed during field investigations.

Common Name	*Latin Name*	National Status (COSEWIC)	Provincial Status (COSSARO)	Preferred Habitat	Habitat Present
Eastern milksnake	*Lampropeltis triangulum*	SC	NAR	Forest, fields, farms and rural areas	Possible, suitable habitat present on the property
American ginseng	*Panax quinquefolius*	END	END	Rich, moist, undisturbed and relatively mature deciduous woods (usually dominated by Sugar Maple, White Ash, Bitternut Hickory & Basswood) in areas of neutral soil (i.e. limestone) Colonies often found near the bottom of gentle south facing slopes with microhabitat warm and well drained soils.	Possible habitat along limestone ridge in eastern portion of property however none found after considerable search effort along the ridge (above and below) during field investigations.
Pale-bellied Frost lichen		END	END	Grows on the bark of hardwood trees such as White ash, Black walnut, and American elm. In Ontario, it grows on Ironwood trunks at a height of 0.5 to 2 metres in wooded areas with high pH and moisture holding capabilities.	Possible – none observed during extensive searches, especially on Ironwood trees (Community 10).
Butternut	*Juglans cinerea*	END	END	Found scattered at low densities, in forests.	Yes-three trees found on the eastern and central portions of the property
One-sided rush	*Juncus secundus*	N/A	N/A	Found in damp or dry, open situations; in acid, sandy, rocky, or clay soil: prairies, clearings, sandstone cliffs, and along railroads.	Ranked S3; Last observation was in 2000; This plant was not found during vegetation surveys.
Whip-poor-will	*Antrostomus vociferus*	THR	THR	Mix of open and forested areas within open woodlands or openings in more mature, deciduous, coniferous and mixed forests.	6 adults were heard/observed on site in eastern portion of the property during NEA targeted surveys.

Common Name	*Latin Name*	National Status (COSEWIC)	Provincial Status (COSSARO)	Preferred Habitat	Habitat Present
Common nighthawk	*Chordeiles minor*	THR	SC	Found in open areas such as sand dunes, recently logged or burned over areas, pastures, open forest, gravel roads, rocky outcrops and rocky barrens, and even military bases and airports. Seeks clouds of insects over fields and urban areas.	Yes, found on the property during evening amphibian surveys in June 2016.
Chimney swift	*Chaetura pelagica*	THR	THR	Found within 1 km of a waterbody and, as its name implies, predominantly nests within old chimneys in urban and suburban areas.	No nesting habitat present (natural or man-made)
Olive-sided flycatcher	*Contopus cooperi*	THR	SC	Found along natural forest edges and openings with snags, breeding habitat is coniferous or mixed forests adjacent rivers or wetlands	Possible in swamp to north of property or other swamps on site. None observed or heard during field surveys.
Eastern wood-pewee	*Contopus virens*	SC	SC	Breeding habitat is deciduous, mixed woods, or pine plantations. They feed on insects and other arthropods in flight.	Yes - identified in mixed forest communities during NEA surveys
Bank swallow	*Riparia riparia*	THR	THR	Streamside banks	None. No eroding banks on site.
Barn swallow	*Hirundo rustica*	THR	THR	Prefers open rural and urban areas where bridges, culverts and buildings are found near rivers, lakes, marshes or ponds.	Yes – species observed flying over fields, Previous nesting attempts in small wooden shed (northwest corner) and nesting habitat around abandoned building in southwest corner of property.
Wood thrush	*Hylocichla mustelina*	THR	SC	Breeds in deciduous and mixed forests where there are large trees, moderate understory, shade and abundant leaf litter for foraging.	Yes – identified during NEA surveys in woodlands

Common Name	*Latin Name*	National Status (COSEWIC)	Provincial Status (COSSARO)	Preferred Habitat	Habitat Present
Golden-winged warbler	*Vermivora chrysoptera*	THR	SC	Found in early successional habitat of old fields with low deciduous trees bordered by wooded swamps; alder bogs; and shrubby clearings amidst deciduous forests. It requires greater than 10 ha of suitable habitat (OMNR, 2000)	None. Mostly forested with small rock openings, tall shrub growth very limited in rock outcrops (juniper)
Cerulean warbler	*Dendroica cerulea*	END	THR	Prefers mature deciduous forest with large specimen trees. Preferred woodlands are contiguous areas of greater than ten hectares.	None: No mature forest on site
Canada warbler	*Cardellina canadensis*	THR	SC	Breeds in wet deciduous and coniferous forests with a thick shrub under-story. Nests are usually found on mossy logs or roots, along stream banks or hummocks (OMNR, 2009)	Possible habitat within the forested areas of the property (SWD and SWM). None recorded during NEA surveys.
Bobolink	*Dolichonyx orizivorus*	THR	THR	Prefers tall, grassy meadows and ditches, hayfields and some croplands.	No hayfields on property. Marginally suitable habitat present in meadows in western portion of property; none observed during targeted surveys.
Eastern meadowlark	*Sturnella magna*	THR	THR	This species prefers grassy meadows and pastures; also in some croplands, weedy fields, grassy roadsides and old orchards	Habitat present in western portion of property; Species observed during targeted surveys.
Northern long-eared bat	*Myotis septentrionalis*	END	END	Associated with boreal forests, choosing to roost under loose bark and in the cavities of trees (MNRF, 2016).	No boreal forest. No bats observed during evening field surveys conducted in 2016.
Little brown myotis	*Myotis lucifugus*	END	END	Formerly a widespread species, is commonly found near waterbodies, in buildings, attics, roof crevices and loose bark on trees and under bridges (Eder, 2002).	Possible – abandoned buildings; none observed during any evening field surveys conducted in 2016.

Common Name	*Latin Name*	National Status (COSEWIC)	Provincial Status (COSSARO)	Preferred Habitat	Habitat Present
Eastern small-footed myotis	*Myotis leibii*	END	END	Roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees (MNRF, 2016).	Possible – abandoned buildings, limestone rocky ridge, rock barrens; none observed during any evening field surveys conducted in 2016.
Tri-coloured bat	*Perimyotis subflavus*	END	END	Found in a variety of forested habitats. Day roosts/maternity colonies in older forest, sometimes in barns or other structures. Forage over water and along streams in the forest.	Possible habitat – forest communities, abandoned buildings; none observed during any evening field surveys conducted in 2016.
Tapered vertigo	*Vertigo elatior*	N/A	N/A	Found in open calcareous sites including fens, cobble beaches, moist alvar, and conifer swamps dominated by white-cedar or tamarack.	None: Ranked - S2S3; Last observation 1941 (NHIC, 2016)
Cyrano darner	*Nasiaeschna pentacantha*	N/A	N/A	Sheltered forest ponds, streams and lake coves.	Ranked - S3; May find suitable habitat in pond SE corner of property
Harlequin Darner	*Gomphaeschna furcillata*	N/A	N/A	Bogs, swamps, esp. cypress, alder, cedar swamps.	Possible – small wetlands; Ranked – S3; Last observed 2001 (NHIC, 2016)
Mottled Darner	*Aeshna clepsydra*	N/A	N/A	Found in marshes and bogs with open water, ponds, lakes and bays	Possible – small wetlands; Ranked – S3; Last observed 2000 (NHIC, 2016)
Monarch butterfly	*Danaus plexippus*	END	SC	Habitat includes agricultural fields, pasture land, prairie remnants, urban and suburban residential areas, gardens, trees, and roadsides	Possible – some open fields in western portion of property however very few milkweed plants observed (required for larvae)

7.0 Conclusions

The Aggregate Resources of Ontario Provincial Standards requires that a Level 1 Natural Heritage Report be completed to determine whether any of the listed significant features exist on or within 120 metres of the site (Government of Ontario, 1997). According to the manual, a Natural Environment Level 2 report or impact assessment should be completed where the Level 1 report identifies any significant features.

The Level 1 study identified the presence of eight (8) Species at Risk:

Table 9. Species at Risk Identified as Present by NEA in Level 1 Study

Common Name	Scientific Name	National Status (COSEWIC)	Provincial Status (COSSARO)
Eastern whip-poor-will	*Antrostomus vociferous*	THR	THR
Common nighthawk	*Chordeiles minor*	THR	SC
Eastern wood-pewee	*Contopus virens*	SC	SC
Barn swallow	*Hirundo rustica*	THR	THR
Wood thrush	*Hylocichla mustelina*	THR	SC
Eastern meadowlark	*Sturnella magna*	THR	THR
Western chorus frog	*Pseudacris triseriata*	THR	NAR
Butternut	*Juglans cinerea*	END	END

This study also found that there is significant wildlife habitat on or within 120 m of the licensed area. The features identified through the literature and our field visits include:

- Habitat for area-sensitive bird species (19 species),
- Habitat for regionally rare plant species (3 species)
- Amphibian breeding areas
- Rare vegetation community (Rock barren)
- Amphibian breeding habitat (woodlands)
- Amphibian breeding habitat (wetlands)
- Turtle wintering area
- Habitat for Special Concern species (5 species)
- Special concern and rare wildlife species (3 species)

Habitat for several Endangered and/or Threatened species was also identified on the property including species that were not identified during NEA surveys (eastern hog-nosed snake and four (4) bat species (northern myotis, little brown myotis, small-footed myotis and tri-coloured bat).

We conclude that a Level 2 study is required for the development of these lands. The Level 2 report should determine whether there will be *"any negative impacts on the natural features or ecological functions for which the area is identified and any proposed preventative, mitigative or remedial measures"* (Government of Ontario, 1997).

The Level 2 report will focus on the significant natural features and significant species and habitats determined within this report. As determined above, habitat or species presence on the property for the following species and/or habitats will be examined in further detail in the Level 2 report (Table 10).

Table 10. Significant Natural Features, Significant Species and Their Habitats for Discussion in Level 2 Report

Category	Species
Presence of Species at Risk (in study area)	Whip-poor-will Common nighthawk Eastern wood-pewee Barn swallow Wood thrush Eastern meadowlark Butternut Western chorus frog
Habitat for Threatened and/or Endangered Species	Eastern meadowlark Eastern hog-nosed snake Northern myotis Little brown myotis Small-footed myotis Tri-coloured bat
Area Sensitive Bird Species	19 species
Regionally Rare Vegetation Species	3 species
Significant Wildlife Habitat (SWH)	Turtle wintering habitat (*assumed significant) Rock barren (confirmed) Amphibian breeding habitat (woodland)-confirmed Amphibian breeding habitat (wetland)-confirmed Habitat for Special Concern Species – (snapping turtle, olive-sided flycatcher, Canada warbler, monarch butterfly) Special Concern and rare wildlife species (common nighthawk, eastern wood-pewee, wood thrush)
*Note Assumed Significant refers to SWH where detailed surveys were conducted however habitat was not identified yet evidence of the species was found on the property therefore NEA assumed it was significant without confirming active use.	

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NATURAL ENVIRONMENT
LEVEL 2 TECHNICAL REPORT

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ROCKRIDGE QUARRY
110 COUNTY ROAD 507
LOT 21, CONCESSION 8
(FORMERLY GALWAY-CAVENDISH & HARVEY TOWNSHIP)
MUNICIPALITY OF TRENT LAKES
PETERBOROUGH COUNTY

NATURAL ENVIRONMENT
LEVEL 2 TECHNICAL REPORT

1.0 Introduction

1.1 Study Rationale

Niblett Environmental Associates Inc. (NEA) was retained by 2329059 Ontario Inc. to complete a Natural Environment Level 2 Technical Report for a proposed quarry near Buckhorn, in the Municipality of Trent Lakes, Peterborough County.

The Aggregate Resources Act and the Aggregate Resources of Ontario Provincial Standards manual (Government of Ontario, 1997) require the completion of a Natural Environment Level 1 Technical Report to determine whether any significant natural heritage features exist on or within 120 metres of the site of a proposed quarry. More recently the Ontario Ministry of Natural Resources and Forestry (MNRF) Lands and Waters Branch implemented a policy document dealing specifically with Aggregate Permit Applications: Natural Environment Report Standards (Policy AR2.01.07, March 2006). The policy provides a detailed outline of the content of the report.

The Level 1 report completed by NEA (February 2017) identified the presence of eight (8) Species at Risk (SAR) on the property as well as habitat for other species at risk, regionally rare vegetation species, area sensitive bird species and Significant Wildlife Habitat (SWH). According to the Natural Environment Report Standards, a Natural Environment Level 2 or Impact Assessment, should be completed where the Level 1 report identified any such features on or within 120 metres of the site. The Level 2 report should determine whether there will be *any negative impacts on the natural features or ecological functions for which the area is identified and any proposed preventative, mitigative or remedial measures* (Government of Ontario, 1997).

This report focuses on the potential ecological impacts of the quarry on Species at Risk (SAR), in particular the impact of tree clearing and loss of habitat in the extraction area on these species, their habitat and the presence of significant wildlife habitat features.

The Level 1 study found that there is significant wildlife and/or associated habitat on the licensed area. The features identified through the literature and our field visits have been listed in Table 1.

Table 1. Significant Natural Features, Significant Species and Their Habitats for Discussion in Level 2 Report

Category	Species
Presence of Species at Risk (in study area)	Whip-poor-will Common nighthawk Eastern wood-pewee Barn swallow Wood thrush Eastern meadowlark Butternut Western chorus frog
Habitat for Threatened and/or Endangered Species	eastern meadowlark eastern hog-nosed snake Northern myotis Little brown myotis Small-footed myotis Tri-coloured bat
Area Sensitive Bird Species	19 species
Regionally Rare Vegetation Species	3 species
Significant Wildlife Habitat (SWH)	Turtle wintering habitat (*assumed significant) Rock barren (confirmed) Amphibian breeding habitat (woodland) - confirmed Amphibian breeding habitat (wetland) - confirmed Habitat for Special Concern Species – (snapping turtle, olive-sided flycatcher, Canada warbler, monarch butterfly) Special Concern and rare wildlife species (common nighthawk, eastern wood-pewee, wood thrush)
*Note Assumed Significant refers to SWH where detailed surveys were conducted, however habitat was not identified yet evidence of the species was found on the property therefore NEA assumed it was significant without confirming active use.	

In addition, the wetlands found within the study area (Communities 2, 3, 5, 6, 9, 13, 15, 16, 18 and 20) have not been evaluated by the MNRF under the Ontario Wetland Evaluation System and are not currently designated as provincially or locally significant. This report

will assess the impact of the proposed quarry operation on the natural features and ecological functions of these wetland areas.
This Level 2 report also examines the potential impacts of the operational plan on the identified features and functions and provides recommendations and notes to be incorporated into the rehabilitation plan. The report includes an assessment of hydrological impacts on the wetlands from pump discharge during dewatering periods.

1.2 Study Area

The proposed site is for a Category 4 – Class 'A' Licence, Quarry Above the Water Table on Lot 21, Concession 8, located approximately 10 km north of the Hamlet of Buckhorn, ON, specifically northeast of the County Road 36/County Road 507 intersection at Flynn's Corners (Figure 1). The property is located in the Municipality of Trent Lakes (former geographic Township of Harvey), Peterborough County. The proposed licensed area encompasses approximately 95.5 hectares and a total extraction area of 84.20 ha. The study area for the identification of significant species and natural heritage features extended a minimum of 120 m beyond the boundary of the proposed licensed area as per the requirements of the Aggregate Resources Act Provincial Standards and policy AR 2.01.07 (Government of Ontario, 1997).

2.0 Study Methodology

The methodology for collecting the biological field data was included in the Level 1 report. The Level 2 report only addresses the significant features identified in that report and the impact on those natural features. The data collected during the Level 1 study (natural features) was overlaid on a topographic map of the property and the draft operational plan. The impact of the proposed licensed area and extraction area on each of the natural features was assessed individually.

Additional field visits were conducted in 2017 to confirm the presence or absence of Significant Wildlife Habitat (SWH), Blanding's turtle, butternut and bats.

Mitigation measures and options for protecting or retaining these features were examined and alternatives reviewed. Constraints to the licensed area have been included in the report based on the requirement in the Provincial Standards to determine if there will be "*any negative impacts on the natural features or ecological functions for which the area is identified"* (Government of Ontario, 1997).

To ensure compliance with the Endangered Species Act and the possibility of a permit from MNRF to operate the quarry, a series of discussions were held.
NEA, the client and study team met with MNRF Bancroft District staff on July 13, 2016, to present our findings on a number of Species at Risk and discuss options in terms of compliance with the Endangered Species Act. The meeting included a presentation to MNRF biologists and planners.

NEA will complete the necessary documentation under the ESA including the Information Gathering Form, Avoidance Alternative and Overall Benefit Permit forms and submit to Bancroft District MNRF once a license is to be issued.

3.0 Aggregate Pit Operational Plan

The operational plans for the license have been prepared by the applicant. NEA reviewed the existing condition, operation and final rehabilitation plan as part of our assessment. These plans are not duplicated in this report.

The extraction area encompasses approximately 84.2 hectares with the total licensed area of 95.5 hectares. The maximum number of tonnes of aggregate to be removed from the site in any calendar year is 1,500,000 tonnes.

The quarry will be extracted in a number of phases (currently proposed at 5) and may vary with material quality, site hydrology and hydrogeology or market demand. The current operational plan shows extractions originating from the southern property limits (east portion of property) and proceed in a radial fashion toward the northern and western boundaries respectively. Extraction will generally follow this sequence of extraction however, depending on demand for certain products or blending of materials, some deviation in the extraction and rehabilitation phasing may be required. The excavation and phasing was discussed with the study team, aggregate planner and NEA biologists.

Specifically, extraction of the Bobcaygeon formation will take place in one +/- 6.5 – 7.0 metre bench. The extraction of the underlying Gull River formation will take place in two or three benches of +/- 7.0 to 10.0 m to a maximum depth of +/- 287.00 to 293 m A.S.L (2m above the water table). Benches may be combined but will not exceed 25m in height. Extraction activities will include drilling and blasting of bedrock, loading with front end loaders and transporting materials by truck or conveyor to the plant for further processing.

Once extraction of the limestone deposits have been completed, the extraction area will be rehabilitated as per the Rehabilitation Plan. The Rehabilitation Plan shows the type of rehab to be completed and plantings recommended.

Prior to excavation activities, the topsoil and overburden from the extraction area will be stripped and stored in the form of berms. These will be located along the western boundary limits of the site, adjacent to County Road 507. The berms at this location will be designed by the acoustic engineers. Berms will not exceed a 1:1 slope and will be seeded with rye/timothy/clover mixture immediately upon completion to minimize erosion and keep the soil fertile for use in the rehabilitation process. Any excess on-site overburden will also be used in the progressive rehabilitation of the site.

Internal roadways within the site will vary depending on location of the type of materials to be extracted (i.e. dimensional stone vs. smaller limestone products). The primary access

shall be via an entrance off County Road 36 and will utilize a service road through Quarry Licence No. 127479 as per an agreement with the adjacent licensee. A secondary entrance off County Road 507 will be used if the County Road 36 entrance is no longer available. This entrance will be used for maintenance, delivery and logging access in the meantime and will be maintained and gated.

Currently the majority of the boundaries of the area to be licensed are fenced. The setback along the south and east boundaries is reduced to 0m as per an agreement. Additionally, fencing has been omitted along the south boundary as per agreement with adjacent licensee and along the northeast boundary from the wetland to the northeast corner and east boundary due to topographical conditions.

During quarry operations, portable scales, scale house, and portable containers may be located on site as required. Processing of materials may require the use of portable screeners, crushers and associated haulage equipment. There are no limitations to the type or location of equipment. Equipment may include hydraulic/excavating equipment, bulldozers, dump trucks and loaders. All processing equipment on site must comply with applicable zoning and regulations from other agencies.

Fuel tanks on the site will be maintained in accordance with the Technical Standards and Safety Act, (TSSA, 2000) and the Ontario Liquid Fuel Handling Code including ensuring compliance with the Environmental Management Protocol (August 2012 or as amended) as published by the Technical Standards and Safety Authority (TSSA). As well, any on-site refueling will be in accordance with the Technical Standards and Safety Act (TSSA).

4.0 Impact Assessment

4.1 Wetlands

Several wetlands were identified on or adjacent to the proposed quarry. These wetlands have not been evaluated by MNRF under the Ontario Wetland Evaluation System. A 50 metre buffer will be implemented from the four wetland communities located in the eastern portion of the study area (Communities 2, 3, 5 and 6; Figure 1). The extraction area line follows that buffer line.

These wetlands provide the following ecological functions:

- Significant Wildlife Habitat (turtle wintering habitat, amphibian breeding habitat)
- Water storage
- Potential Category 1 and/or 2 Blanding's turtle habitat
- Wetland habitat and ecosystem

A small wetland pocket (Community 9) was located in the central portion of the study area and will be removed or relocated as part of the operations. This particular wetland community did not contain any rare or significant species and provided limited functions. A larger wetland (Community 18) located along the northern boundary limits of the western portion of the property will be afforded a 30m buffer. These buffers will protect the features and functions of the wetlands.

A heavy duty silt and sediment fencing should also be installed on the western side of the extraction limit prior to the stripping of the Phase 1 area in order to prevent sedimentation and or rock from encroaching on the protective buffer. This can be attached to the permanent page wire fence to be installed along the limit of extraction. Priority should be placed in protecting the four wetland communities in the eastern portion of the study area as extraction phases will be originating in this area first.

A narrow drainage swale is located in the western portion of the subject lands which originates in the north and ends in the southwest corner of the property, behind the telecommunications tower. A number of small wetland communities associated with this feature (Community 13, 15, 16 and 20) will likely be removed in the future, when extraction phases occur in this portion of the property.

The features and functions of the wetlands located in the eastern portion of the property will be maintained during and after extraction of the proposed quarry area. No anticipated impacts will occur as a result of the extraction provided our mitigation measures and

recommendations are implemented. A number of measures and recommendations are contained in this report and additional ones may be included in future Endangered Species Act permits for the quarry. A detailed discussion and assessment of these features is presented in the following sections.

4.2 Presence of Species at Risk and Species at Risk Habitat

The following information is taken from Table 7 in the Level 1 report and includes only those species for which suitable habitat may be present on the site or that were found during our surveys.

Species identified by an asterisk (*) beside them in the table below are from the list NEA generated by searching the NHIC site and Make-a-map; Natural Heritage Features GIS system within a 5km radius of the study area. A list of Species at Risk identified by OMNRF for which there is possible habitat is also outlined in Table 2 identified by underlining. Species in bold were identified in the Ontario Breeding Bird Atlas as found in the larger study area (10 x 10 km atlas squares km radius). More detailed descriptions of the habitat preferences and the potential impacts on the habitat for each species are provided in Section 5.2. National status is as per COSEWIC (2016) with provincial status as per COSSARO (2016).

Table 2: Species at Risk compiled from NHIC, OMNRF and Ontario Breeding Bird Atlas

Common Name	Latin Name	Status (National)	Status (Provincial)	Preferred Habitat	Habitat Present
*Sensitive Species	N/A	END	END	N/A	Yes – habitat present however none were observed on the property during NEA investigations despite intensive multi-season searches
*Blanding's turtle	Emydoidea blandingii	THR	THR	Forest and meadow habitats and marshes, will travel long distances in search of mates and new habitats	Yes - NHIC Records were reviewed for a 10km Radius. One record of a Blanding's Turtle was found within 2km of the Study area on Cty Road 507.
Eastern hog-nosed snake	*Heterodon platirhinos*	THR	THR	Inhabit sandy, well-drained habitats such as beaches and dry woods with access to swamps	Possible, portions of property with sandy soils and/or near swamps. No individuals, hibernacula or oviposition sites found.

Common Name	*Latin Name*	Status (National)	Status (Provincial)	Preferred Habitat	Habitat Present
*Eastern ribbonsnake	*Thamnophis sauritus*	SC	SC	Found close to water, especially in marshes, vernal pools and wetlands	Possible habitat near wetland communities.
Snapping turtle	*Chelydra serpentine*	SC	SC	Prefer shallow waters to hide under the soft mud and leaf litter. During the nesting season, (early to mid-summer) females travel overland in search of a suitable nesting site, (gravely or sandy areas along streams or along railway lines and shoulders of roadways)	Pond located in southeast corner (outside of property boundary) and larger marsh with open water area north of extraction area. No turtles or nest sites observed during field investigations.
*Eastern milksnake	*Lampropeltis triangulum*	SC	NAR	Forest, fields, farms and rural areas	Possible, suitable habitat present on the property
American ginseng	*Panax quinquefolius*	END	END	Rich, moist, undisturbed and relatively mature deciduous woods (usually dominated by Sugar Maple, White Ash, Bitternut Hickory & Basswood) in areas of neutral soil (i.e. limestone) Colonies often found near the bottom of gentle south facing slopes with microhabitat warm and well drained soils.	Possible habitat along limestone ridge in eastern portion of property however none found after considerable search effort along the ridge (above and below) during field investigations.
Pale-bellied Frost lichen		END	END	Grows on the bark of hardwood trees such as White ash, Black walnut, and American elm. In Ontario, it grows on Ironwood trunks at a height of 0.5 to 2 metres in wooded areas with high pH and moisture holding capabilities.	Possible – none observed during extensive searches, especially on Ironwood trees (Community 10). Ironwood is sparsely distributed on this property.

Common Name	*Latin Name*	Status (National)	Status (Provincial)	Preferred Habitat	Habitat Present
*Butternut	*Juglans cinerea*	END	END	Found scattered at low densities, in forests.	Yes-several trees found on the eastern and central portions of the property
Whip-poor-will	*Caprimulgus vociferus*	THR	THR	-mix of open and forested areas within open woodlands or openings in more mature, deciduous, coniferous and mixed forests.	6 adults were heard/observed on site in eastern portion of the property during NEA targeted surveys.
Common nighthawk	*Chordeiles minor*	THR	SC	Found in open areas such as sand dunes, recently logged or burned over areas, pastures, open forest, gravel roads, rocky outcrops and rocky barrens, and even military bases and airports. Seeks clouds of insects over fields and urban areas.	Yes, found on the property during evening amphibian surveys in June 2016.
Olive-sided flycatcher	*Contopus cooperi*	THR	SC	Found along natural forest edges and openings with snags, breeding habitat is coniferous or mixed forests adjacent rivers or wetlands	Possible in swamp to north of property or other swamps on site. None observed or heard during field surveys.
Eastern wood-pewee	*Contopus virens*	SC	SC	Breeding habitat is deciduous, mixed woods, or pine plantations. They feed on insects and other arthropods in flight.	Yes - identified in mixed forest communities during NEA surveys

Common Name	*Latin Name*	Status (National)	Status (Provincial)	Preferred Habitat	Habitat Present
Barn swallow	*Hirundo rustica*	THR	THR	Prefers open rural and urban areas where bridges, culverts and buildings are found near rivers, lakes, marshes or ponds.	Yes – species observed flying over fields, Previous nesting attempts in small wooden shed (northwest corner) and nesting habitat around abandoned building in southwest corner of property.
Wood thrush	*Hylocichla mustelina*	THR	SC	Breeds in deciduous and mixed forests where there are large trees, moderate understory, shade and abundant leaf litter for foraging.	Yes – identified during NEA surveys in woodlands
Golden-winged warbler	*Vermivora chrysoptera*	THR	SC	Found in early successional habitat of old fields with low deciduous trees bordered by wooded swamps; alder bogs; and shrubby clearings amidst deciduous forests. It requires greater than 10 ha of suitable habitat (OMNR, 2000)	None. Mostly forested with small rock openings, shrub areas are very limited in study area (mostly juniper)
Canada warbler	*Cardellina canadensis*	THR	SC	Breeds in wet deciduous and coniferous forests with a thick shrub under-story. Nests are usually found on mossy logs or roots, along stream banks or hummocks (OMNR, 2009)	Possible habitat within the forested areas of the property (SWD and SWM). None recorded during NEA surveys.
***Eastern meadowlark**	*Sturnella magna*	THR	THR	This species prefers grassy meadows and pastures; also in some croplands, weedy fields, grassy roadsides and old orchards	Habitat present in western portion of property; Species observed in fields during targeted surveys.

Common Name	*Latin Name*	Status (National)	Status (Provincial)	Preferred Habitat	Habitat Present
Little brown myotis	*Myotis lucifugus*	END	END	Formerly a widespread species, is commonly found near waterbodies, in buildings, attics, roof crevices and loose bark on trees and under bridges (Eder, 2002).	Possible – abandoned buildings; none observed during any evening field surveys conducted in 2016. Additional bat surveys as per MNRF protocols completed in April 2017.
Eastern small-footed myotis	*Myotis leibii*	END	END	Roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees (MNRF, 2016).	Possible – abandoned buildings, limestone rocky ridge, rock barrens; none observed during any evening field surveys conducted in 2016. Additional bat surveys as per MNRF protocols to be completed in 2017.
Tri-coloured bat	*Perimyotis subflavus*	END	END	Found in a variety of forested habitats. Day roosts/maternity colonies in older forest, sometimes in barns or other structures. Forage over water and along streams in the forest.	Possible habitat – forest communities, abandoned buildings; none observed during any evening field surveys conducted in 2016. Additional bat surveys as per MNRF protocols to be completed in 2017.
*Cyrano darner	*Nasiaeschna pentacantha*	N/A	N/A	Sheltered forest ponds, streams and lake coves.	Ranked - S3; May find suitable habitat in pond SE corner of property
*Harlequin Darner	*Gomphaeschna furcillata*	N/A	N/A	Bogs, swamps, esp. cypress, alder, cedar swamps.	Possible – small wetlands; Ranked – S3; Last observed 2001 (NHIC, 2016)
*Mottled Darner	*Aeshna clepsydra*	N/A	N/A	Found in marshes and bogs with open water, ponds, lakes and bays	Possible – small wetlands; Ranked – S3; Last observed 2000 (NHIC, 2016)
Monarch butterfly	*Danaus plexippus*	END	SC	Habitat includes agricultural fields, pasture land, prairie remnants, urban and suburban residential areas, gardens, trees, and roadsides	Possible – some open fields in western portion of property however very few milkweed plants observed (required for larvae)

4.3 Habitat for Species at Risk

4.3.1 Butternut

Butternut trees are listed both federally and provincially by COSEWIC (2016) and COSSARO (2016) as an endangered species. Butternut trees are experiencing a dramatic decline in numbers due to the presence of the Butternut Canker fungus. The fungus infects the trees and effectively cuts off the flow of water and nutrients to branches and stems causing branch and crown die-back (Forest Gene Conservation Association). In Ontario butternuts are protected under the Endangered Species Act regulations (2007).

While conducting ELC vegetation surveys, a total of 3 butternut trees were found on the property or within the 120 metre study limit from the licensed boundary. Each tree was marked with a GPS coordinate. These trees were assessed using the protocols outlined by the Ministry of Natural Resources and Forestry Butternut Health Assessment manual and updates (2014). Measurements of each tree included diameter-at-breast-height (dbh), and an assessment of health, which noted the presence or absence of any cankers. Where possible, photographs were taken of most of the butternut tree(s) to record health and placement of cankers.

Butternut Health Assessments were conducted in accordance with Butternut Health Assessment in Ontario. Detailed information was collected on each tree including:

- Crown class (i.e. dominant, co-dominant or intermediate);
- Crown vigour (i.e. Healthy <10%; Light decline 10-25%, Moderate 25-50% or Heavy decline >50% dieback);
- Type of dieback (i.e. twig dieback, branch dieback, defoliation, discolouration);
- Signs of seed production (i.e. male and/or female flowers, seed set or no signs);
- Diameter at breast height (dbh);
- Number of stems (above breast height and below canopy);
- Length of main stem below canopy;
- Presence and number of both the tree's percent live and dead epicormic stems, crown vigor (as defined by North American Maple Decline Program), symptoms of canker on the trunk and branches/twigs;
- Bark type (i.e. shallow or deeply furrowed);
- The presence and number of cankers in 3 regions of the main stem below the canopy: the root flares, below 2 m, and above 2 m. Cankers were divided into 2 types: younger sooty cankers and more advanced open cankers. If one canker type was very abundant in one of the regions, it was recorded as greater than 10;
- Number of callused wounds on main stem below canopy;

- Distance to nearest dead, cankered butternut tree; and,
- Competing tree species.

4.3.2 Snapping turtle

The snapping turtle inhabits ponds, lakes or streams. Although none were observed, there is potential for this species to inhabit the larger pond in the southeast corner of the study area. Standing water existed within this pond year-round however the pond is surrounded by mixed forest and very little sandy areas for suitable nesting sites. A second pond that may be suitable for this species is located along the northern property boundary, in the central portion of the property. This large marsh is for the most part, located outside the property boundary and is also surrounded by forest however a roadway exists at the northern perimeter of this marsh. This may provide suitable nesting habitat for this species.

Snapping turtle was not recorded on the property by NEA during any field investigations. The proposed extraction area does not extend into either pond or wetland site. A 50m buffer is incorporated into the operational plan to define the eastern limits of extraction, as well as a 30m buffer from the marsh along the northern property boundary which defines the northern limits of extraction. There is no anticipated negative impact to the snapping turtle from the proposed quarry operation.

4.3.3 Eastern Hog-nosed Snake

The eastern hog-nosed snake prefers sandy, well-drained habitats including beaches and dry woods with access to wet areas such as swamps. The property contained a portion of the snake habitat requirements in that it contained various swamps and marshes along the perimeter of the property, however the soils were not sandy as preferred by this species for laying their eggs in burrows and hibernation. Overall for this site, the soils are very shallow with exposed rock near the surface, particularly along the limestone ridge in the eastern portion and in the western portion of the property. This species was not observed on the property during field visits and has not been observed by the landowner. No hibernacula or oviposition sites were identified during our surveys.

The rehabilitation plan includes forests, fields and wetlands to be created after each phase. The protected wetland areas previously mentioned, that are located in the surrounding area provides suitable wetland habitat for the eastern hog-nosed snake. Habitat will continue to exist adjacent to the property during all phases of operation. It is possible that hog-nosed snake would find habitats on this property, post-rehabilitation. Mitigation

measures and monitoring by the licensee have been included, in the event a hog-nosed snake does cross the site or find habitat post-rehabilitation.

4.3.4 Eastern Ribbon Snake

The ribbon snake which is designated special concern under both the ESA and SARA, is found close to water, especially along the shorelines of shallow marshes (Ontario Nature, 2013). The property supports habitat in proximity to wetlands as they exist on and adjacent to the property. There is suitable habitat for this species on the property, however none were found during any field visits. The only marsh found on the property is on the northern edge and is to be protected with a 30m buffer from the northern limits of the proposed extraction area. There is no anticipated negative impact to the eastern ribbon snake from the quarry operation as there is no suitable habitat in the proposed extraction limits. All mitigation measures that will be implemented to preclude other species from entering the site will also apply to eastern ribbon snake. Post-rehabilitation, this species may find habitat in the new shallow wetlands to be constructed as part of the rehabilitation plan.

4.3.5 Blanding's Turtle

Blanding's turtles utilize forest and meadow habitats and marshes, and will travel long distances in search of mates and new habitats. The species is primarily aquatic and occupies ponds, marshes and other wetlands of sufficient size with organic content, abundant aquatic vegetation and basking sites. Adults will travel outside the main marsh to forage in nearby wetlands and can travel long distances in search of nesting sites and dispersal to other wetlands.

This species was reported on the NHIC database as well as MNRF's SAR screening. No Blanding's turtles were observed during any NEA field investigations. The most suitable habitat is the larger wetland located along the northern limits of the extraction area in the central area of the adjacent property. The open water community (Community 5) located in the southeast corner of the property, contains open water however the substrate is assumed to be rocky as was evident by the large rock outcrops adjacent to the south side of the pond.

The General Habitat Description mapping will be completed for this species and submitted to MNRF as part of the ESA documentation. The removal of Category 2 and 3 habitat will likely contravene Sections 9 and 10 of the ESA and require an overall benefit permit. Discussions and submission of an IGF and AAF form will be conducted.

The operational plan includes notes regarding mitigation measures for this threatened species. This includes training of staff in identification, incident reporting, contact information for MNRF biologists, knowing how to handle turtles for relocating out of harm's way and other measures such as silt fencing to limit access to the active quarrying area. Sand piles will be established adjacent to the southeastern wetland (Community 5) within the 50m buffer, as part of the rehabilitation plan in providing additional nesting habitat opportunities for turtle species, which may include use by Blanding's turtles.

4.3.6 Eastern Milksnake

The eastern milksnake is a habitat generalist, found in forests, fields, open grasslands, meadows, rock barrens, farms and fields in rural areas. Although there are no records or OMNRF reports of this species on the property, its presence is possible, as there is suitable habitat. Given its wide range of habitat preferences, this species would be able to continue to utilize unused portions of the property during quarry operations. The key habitat is in the open grassland which is in the western portion of the property and includes grassy areas around the existing abandoned houses and outbuildings.

A number of mitigation measures and contingency plans can be put in place to limit encounters and potential harm to snakes that may wander into the excavation area. The measures include the creation of rock piles or hibernacula at the edge of the forested areas which may provide habitat for overwintering snakes and cover during daytime hours.

4.3.7 Common Five-lined Skink (Frontenac Axis population)

Common five-lined skink can be found in rocky outcrops in mixed coniferous and deciduous forests hiding in rock crevices and fissures.

Targeted surveys for this species in suitable habitat, underneath rocks and in crevices was conducted during all field site visits. No skinks were observed in the study area during any of NEA's field investigations. The rock barrens and limestone ridge lacked the typical loose surface slabs and woody debris typically associated with skink habitat. The rock barrens were small and in most cases covered in common juniper and mosses in the places where soil accumulated.

As this project is for a proposed quarry, the rock barrens where this species would most likely be found will be removed as part of the extraction phase. If any skinks are observed prior to excavation activities, all efforts will be made to move skinks out of the excavation area. Additional efforts will be made to create more habitat of rocky outcrops once excavation is completed. Rocks and logs will be collected around the property and placed

on excavated areas to create habitat that would be suitable for this species. As adjacent forested areas are also used by the skinks, after excavation large loose rock will be placed in strategic locations in open areas which will provide areas where skink can find refuge from the elements and predators.

4.3.8 Eastern Wood-pewee

This species breeds in all woodland types and winters in partially cleared shrubby habitats and secondary forests. This species was identified on the property within the forested habitats in several locations during the breeding bird surveys conducted on June 3rd and 30th, 2016. The logged areas, stands of forest and open sub-canopy nature of some of the forest communities, provide ideal habitat for this species. The habitats will be removed as part of the clearing and extraction phases.

The rehabilitation plan includes the re-creation of forests. Habitat for this species will occur in the future, once vegetation is established on the rehabilitated areas in each phase.

It is recommended that clearing and grubbing be done outside of the peak breeding bird window (April 15th – August 15th) and if clearing must be conducted during this time a qualified bird biologist should conduct a nest search for any evidence of active nests within the area to cleared.

4.3.9 Wood Thrush

This species breeds in deciduous and mixed forests in areas with large trees, moderate understory abundant in leaf litter and shade present. This species was also identified on the property within the forested habitats in several locations while conducting breeding bird surveys in June. The habitats will be removed as part of the clearing and extraction phases.

The rehabilitation plan includes the re-creation of forests. Habitat for this species will occur in the future, once vegetation is established on the rehabilitated areas in each phase.

4.3.10 Olive-sided Flycatcher

The olive-sided flycatcher is found along natural forest edges and openings and commonly uses forests that are logged or burned, using the snags as perches. These birds breed in coniferous or mixed forests adjacent to water bodies or within beaver ponds and flooded wetlands. The property contains several coniferous and/or mixed forests adjacent to wetlands. However, no olive-sided flycatcher were observed during NEA field visits. The

habitat on the property is not typical for this species, lacking the snags and open perches this species prefers.

The rehabilitation plan includes the re-creation of forest and wetland habitats providing a diversity of open and forested habitats. Potential habitat for this species will be present, once vegetation is established on and adjacent the property during all phases of operation.

4.3.11 Canada Warbler

The Canada warbler inhabits deciduous and coniferous forests and swamps with a well developed, dense shrub layer. There are some areas of deciduous and coniferous forests and treed swamps on the property, that have not been logged, therefore there is potential for this species to use the area. However, during NEA field surveys, no Canada warblers were observed or heard. Selective logging of the forests has been ongoing and regeneration is patchy, limiting the habitat available for this species.

The rehabilitation plan includes the re-creation of forest and wetland habitats. Habitat will be present, once vegetation is re-established, on and adjacent to the property during all phases of operation as the forest pockets are proposed throughout several areas of the property.

4.3.12 Barn Swallow

The barn swallow is listed as a threatened species nationally and provincially (COSEWIC, 2016, COSSARO, 2016). This species prefers open rural and urban areas where bridges, culverts and buildings are found near rivers, lakes, marshes or ponds. During site visits, one individual was observed flying around the abandoned building by the telecommunication tower on June 3rd, 2016 and two individuals observed in the same area on June 30th, 2016. The abandoned house had a single nest located in the rear of the building under the eaves trough. If this building is to be demolished in the future, and if barn swallow nests still exist, the removal of any nests will require approval under the Endangered Species Act and compensation for the nests.

4.3.13 Whip-poor-will

Whip-poor-wills can be found in areas with a mix of open and forested areas within open woodlands or openings in more mature, deciduous, coniferous and mixed forests. It forages in these open areas and uses forested areas for roosting (resting and sleeping) and nesting.

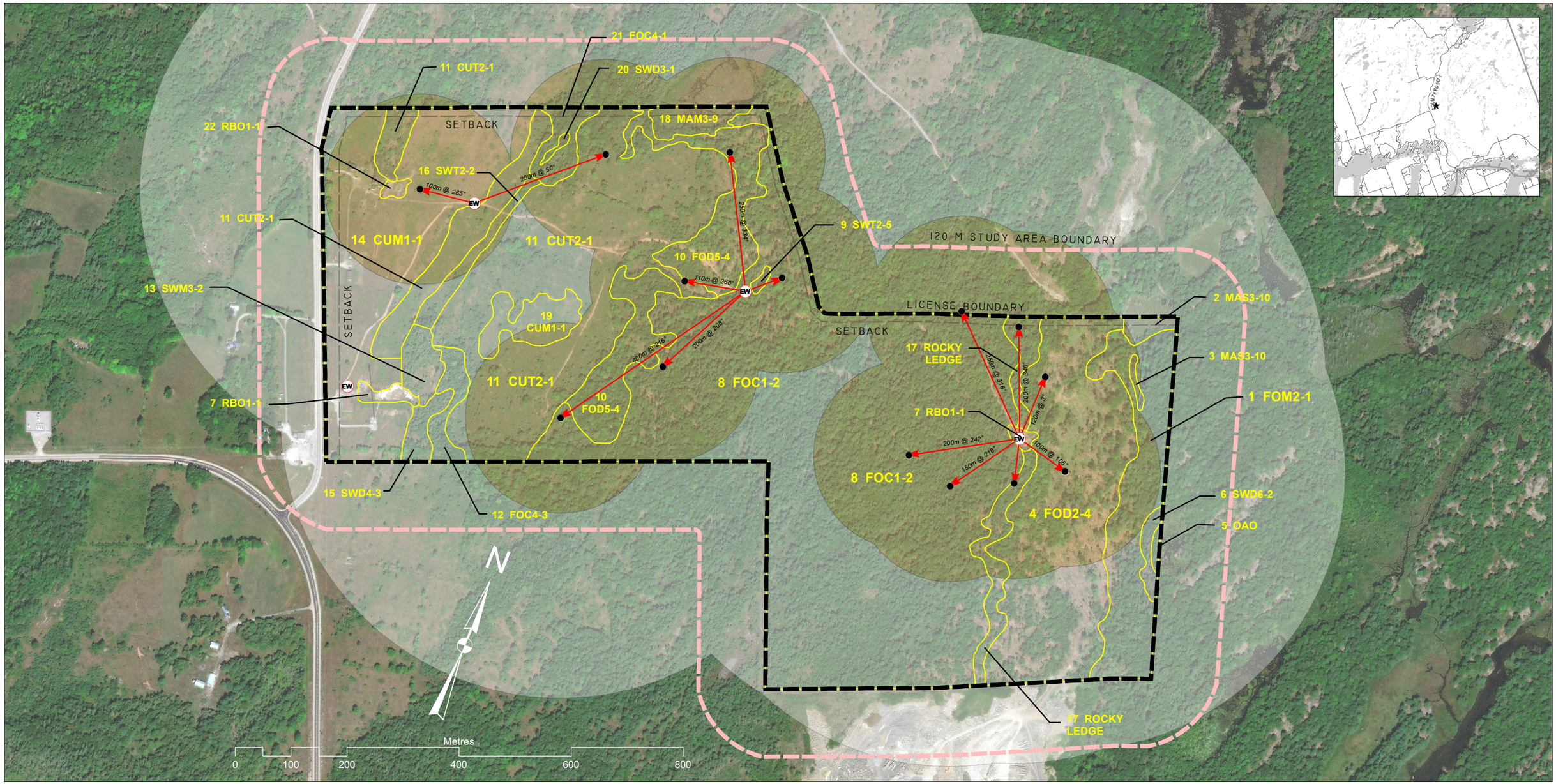
Targeted surveys for this species and for possible nest sites were part of the field program.

Whip-poor-will surveys were conducted on May 24th, 30th, and June 14th, 2016 in which a total of 14 occurrences of birds were heard calling within the study area over the three survey dates (Figure 2). Six (6) birds were heard on May 24th, three (3) birds heard on May 30th and five (5) birds heard on June 14th, 2016. Based on the numbers of birds heard on each survey date, it is estimated that there are four (4) defended territories on the property, particularly in the eastern portion near the limestone ridge and cleared forest community (Community 4). There is suitable nesting and foraging habitat present for this species on the property. The cleared forested area immediately east of the limestone ridge contained suitable tree species composition with a few standing white pine and deciduous trees, small clearings of previously forested areas and bare rock outcrops, above and below the ridge.

Figure 2 shows the habitat mapping for whip-poor-wills in the study area. Almost all of the fourteen (14) birds heard calling, were on or within the 120m study area from the licensed boundary. Based on the surveys conducted, there was a concentrated population around the cleared forest and limestone ridge in the eastern portion of the property.

To determine the territory size and the number of pairs present, NEA completed a few stages of analysis. The first stage was to map the locations of all the calling birds, triangulate the records from each station and determine if the same bird was recorded from two different stations. Based on this and the records from the roosting sites observed the following morning, it was determined that four (4) defended territories are present (Figure 3). The limestone ridge area had a concentration of records including flying adult at night, calling at night and a visual observation of one individual during surveys. This is assumed to be the same bird and one territory (possibly two) that encompasses the cleared forest and limestone ridge area.

In the next step, it was assumed that each bird calling from different locations, especially birds recorded at one station, were defending separate territories. An article by Wilson and Watts (2008) analyzed patch conditions for a number of whip-poor-will in timber harvesting sites. The researchers found birds venturing up to 100 m from forest edges, nested near the forest edge and used a mix of open habitat and forest edge for their territories. A similar approach was taken for our mapping, with territories including rock outcrops and fields for foraging habitat, forest edge for nesting habitat and an approximate 3-9 ha territory size. As the calling activity was concentrated, it was assumed the territories were 3 ha or less in size. The habitat within the licensed area includes several forest types that are typical for whip-poor-will, for example open deciduous and coniferous forest.



LEGEND

- E. Whip poor will Occurrence
- EW E. Whip poor will Station
- E. Whip poor will Species Bearing
- License Line
- I20m Study Area
- License Setback
- Category 2
- Category 3

Extrapolated from 1601-1 & 1601-2.dwg, 2016.
Composite satellite imagery acquired in tje spring of 2013. SCOOP.

ELC TYPES (1ST APPROXIMATION)

CODE	TYPE DESCRIPTION
CUM1-1	Dry-moist old field meadow
CUT1-2	Serviceberry cultural thicket
FOC1-2	Dry-fresh white pine-red pine coniferous forest
FOC4-1	Fresh-moist white cedar coniferous forest
FOC4-3	Fresh-moist white cedar-balsam fir coniferous frst
FOD2-4	Dry-fresh oak-hardwood deciduous forest
FOD5-4	Dry-fresh sugar maple-ironwood deciduous forest
FOM2-1	Dry-fresh white pine-oak mixed forest
MAM3-9	Forb organic meadow marsh
MAS3-10	Forb organic shallow marsh
OAO	Open aquatic
RBO1-1	Dry carbonate open rock barren
SWD3-1	Red maple mineral deciduous swamp
SWD4-3	White birch-poplar mineral deciduous swamp
SWD6-2	Silver maple organic deciduous swamp

SWM3-2	Poplar-conifer mineral mixed swamp
SWT2-5	Red-osier mineral thicket swamp
SWT3-2	Willow organic thicket swamp

FIGURE 2: EASTERN WHIP-POOR-WILL HABITAT

Lot 21, Con 8, Township of Trent Lakes
County of Peterborough
Peterborough District

UTM Zone 17
WKID: 26917 Authority: EPSG
Transverse Mercator
GCS North American 1983, ESRI ArcGIS 10.1

REVISIONS

NO	BY	DATE	DESCRIPTION
1	W.P.	15/03/2017	Initial map creation.
2	W.P.	27/04/2017	Added survey locations.
3	W.P.	01/05/2017	Updated vegetation communities.
4	W.P.	06/06/2017	Added categories 2 & 3 to the map.

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PROJECT NO: PN12-030
REVISION NO.: RV-04
PROJECT: Stonescape III
CLIENT: N/A

SCALE: 1:6,800 CENTIMETERS

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The MNRF General Habitat Description for the Eastern Whip-poor-will (*Caprimulgus vociferous*) guideline was applied to each territorial bird sighting. Based on this classification there was no Category 1 habitat (nest sites) however the entire licensed area is considered Category 2 and 3. Figure 3 shows the extent of each category.

The MNRF classification identifies and defines the following three categories:

Category 1
Whip-poor-will nests and the area immediately around the nest (i.e. 20 m) are highly sensitive features supporting the species' reproduction life cycle and have the lowest tolerance to alteration. These are areas the species depends on for egg laying, incubation, feeding, resting and rearing of young. Whip-poor-wills do not construct a traditional nest as eggs are laid directly on leaf litter (Peck and James 1983). Nests require tree cover, shade, sparse ground cover, and proximity to open areas for foraging on flying insects (Eastman 1991, Reese 1996, Wilson and Watts 2008). These features are important to nesting site suitability. A 20 m distance from the nest is important to maintain the microclimate and vegetation features around the nest. Whip-poor-wills exhibit nest site fidelity (Cink, 2002). However, if a nest is identified, it and the area within 20 m shall be categorized as Category 1.

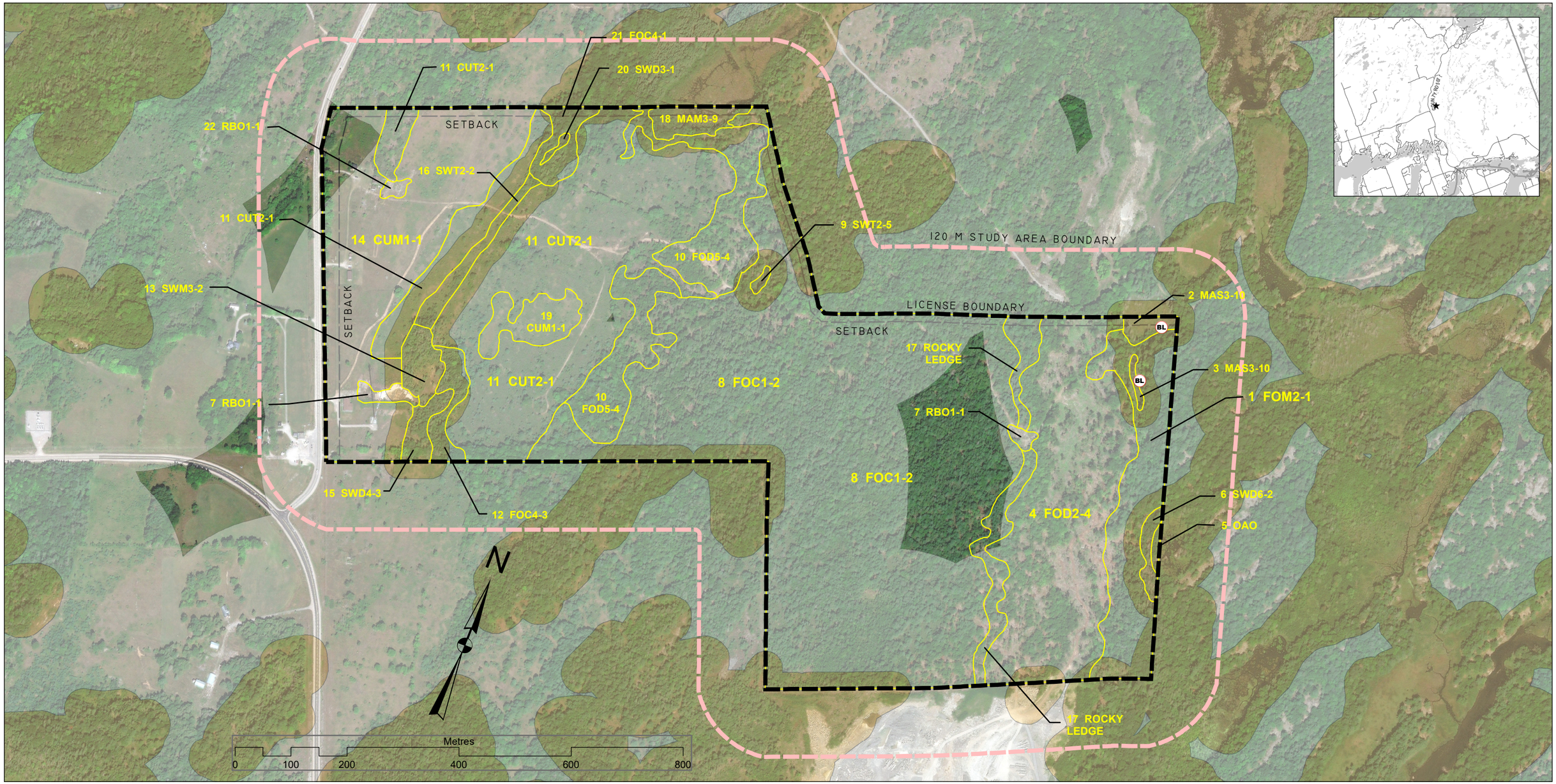
Category 2
The area between 20 m and 170 m of the nest or centre of approximated defended territory is included in Category 2 and is considered to have a moderate level of tolerance to alteration. This area includes the species' defended territory and is depended upon for nesting, rearing young, feeding, and resting. Territories have been found to range between 3 and 11 ha, averaging 4 – 5 ha (Fitch 1958, Hunt 2009). However, recent research in Ontario has shown that defended whip-poor-will territories are approximately 9 ha in size, (i.e. approximately 170 m from the nest or centre of approximated defended territory) (English, pers. comm. 2011). Suitable breeding habitats generally include open and half treed areas and often exhibit a scattered distribution of treed and open space. Structure is known to be an important factor in habitat selection (Garlapow 2007, Wilson and Watt 2008, Hunt 2009). Perching and roosting sites are important features found within this area. During the day, adults will lay motionless on a roost site (or nest) and become active only at dusk (Cink 2002). Perches have been reported to be used repeatedly, night after night (Cink 2002). Roosts are typically located in forest habitat on a low branch or directly on the ground (Mills 2007).

Category 3
The area of suitable habitat between 170 m and 500 m of the nest site or centre of approximated defended territory is included in Category 3 and is considered to have a high level of tolerance to alteration. This area supports various life processes, primarily feeding. Whip-poor-wills forage only at dawn or dusk but can forage all night during moonlit nights. Whip-poor-wills are seldom found greater than 500 m from nest sites based on unpublished field data collected in Kansas over 10 summers, from a study of 20 pairs (Cink pers. comm. 2012). Whip-poor-wills that range greater than 500 m from nest sites are likely females that have abandoned the territory due to loss of a mate (Cink, pers. comm. 2012). The area between 170 m and 500 m from a nest site may incorporate larger forest tracts that support additional foraging opportunities.

The impact assessment was based on this mapping of the territories and an overlay of the proposed aggregate operation. The impacts on whip-poor-will habitat, proposed mitigation measures and compensation measures are presented in the Section 5.0 of this report.

The extraction of limestone resources will temporarily remove the habitat as excavation proceeds. The aggregate quarry will be excavated down to an elevation of 293m Above Sea Level (ASL), approximately 2m above the water table. Rehabilitation of this area post construction is recommended to be re-creation of the same habitat. This will create a habitat very similar to existing areas on the property. This will also provide ideal whip-poor-will habitat.

Currently disturbance on the property has resulted in exposed open forests with scattered low and small copses of trees and a more exposed face on the limestone ridge. Other areas that have been disturbed include portions of the common juniper thicket in the western portion of the property. The creation of the open forest through clearing in the east has actually promoted the development of suitable whip-poor-will habitat. By replanting and reseeding the rehab areas in native species specifically chosen to create forest, copses and open meadow with low grasses, it is possible to create habitat that would be suitable for whip-poor-wills, versus allowing natural succession and pioneer species to establish. The Endangered Species Act requires an Overall Benefit Permit for activities that destroy or eliminate habitat. We will be in contact with MNRF and follow the standard steps under the ESA that may lead to an Overall Benefit Permit. A rehabilitation plan has been prepared for the license application.



LEGEND

- BT — Blanding's Turtle Station
- License Line
- 120m Study Area
- License Setback
- Category 2
- Category 3

Extrapolated from 1601-1 & 1601-2.dwg, 2016.
Composite satellite imagery acquired in tje spring of 2013. SCOOP.

ELC TYPES (1ST APPROXIMATION)

CODE	TYPE DESCRIPTION
CUM1-1	Dry-moist old field meadow
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SWD3-1	Red maple mineral deciduous swamp
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SWD6-2	Silver maple organic deciduous swamp
SWM3-2	Poplar-conifer mineral mixed swamp
SWT2-5	Red-osier mineral thicket swamp
SWT3-2	Willow organic thicket swamp

FIGURE 3: BLANDING'S TURTLE HABITAT

Lot 21, Con 8, Township of Trent Lakes
County of Peterborough
Peterborough District

UTM Zone 17
WKID: 26917 Authority: EPSG
Transverse Mercator
GCS North American 1983, ESRI ArcGIS 10.1

REVISIONS

NO	BY	DATE	DESCRIPTION
1	W.P.	06/06/2017	Initial map creation.

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PROJECT NO: PN12-030
REVISION NO.: RV-01
PROJECT: Stonescape III
CLIENT: N/A

SCALE: 1:6,800 CENTIMETERS

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4.3.14 Common Nighthawk

Nighthawks require open field habitats for foraging and will nest on natural open habitats, such as sand dunes, beaches, recently burned-over areas, pastures, exposed rocky outcrops, rock barrens, and rooftops for nesting. Like many aerial insect-eating birds this species has declined across its range. Habitat degradation through changes in land use and forest practices re forest fires, as well as global declines in insect populations, the main prey for nighthawks, are the suspected cause (MNRF fact sheet).

Targeted surveys for this species and for possible nest sites were part of our field program and were conducted simultaneously with the Whip-poor-will surveys. Suitable habitat exists within the woodland clearings, limestone ridge and logged forests. No nighthawks were observed during surveys conducted on May 24th, 30th and June 14th, 2016. However, while conducting evening amphibian surveys on June 14th, 2016, four (4) common nighthawk were heard calling in the eastern portion of the property. There is potential nesting habitat on the rock outcrops/barrens, however most are very small and do not offer protection from ground predators. The rock outcrops/barrens were checked for nighthawks either roosting or nesting. No birds were flushed off nests or roost sites during any of our other field surveys. Habitat in the western portion of the subject lands consists of more open juniper thickets with rock barrens and fields however no birds were heard or observed during other field investigations.

Habitat for this species may be created through the rehabilitation of the pit. The rehab plan includes creating open field/grassland and forest habitats with stepped slopes and exposing rock outcrops. This species may find suitable foraging habitat and/or nesting habitat on various portions of the property at different times, as the rehabilitation plans implemented. In particular, additional rock barrens/outcrops will be exposed, enlarging the area currently present.

4.3.15 Eastern Meadowlark

During breeding bird surveys conducted in June, eastern meadowlark were observed in the open fields located in the western portion of the property. NEA staff conducted targeted surveys for bobolink/eastern meadowlark using the MNRF Eastern Meadowlark Survey protocol (August 2.13). Site visits were completed on June 3rd, 16th and 30th, 2016.

A total of two pairs of meadowlark were found with young observed using the habitat as well. The presence of a threatened species, also requires the completion of an ESA process. As the field area is less than 30 ha, the provisions under Regulation 242/08 of the ESA apply. The options are to re-instate the habitat post extraction as part of the rehabilitation

plan or find a secondary site (off-site compensation location) nearby. As the quarry will be rehabilitated in phases, with this field area being part of the last phase, the field habitat will be recreated as per the criteria in the regulation. The process for registering the activity will be conducted with MNRF and the rehabilitation plan provides details on the seeding required and the monitoring requirements.

4.3.16 Sensitive Species

Discussions with MNRF Species at Risk staff have concluded that given the footprint of the site and the habitat, it is unlikely that the two (2) sensitive species identified, but not specifically named on the NHIC database for the 5km radius of the study area, is present on or in proximity to the site. Due to the sensitive nature of the species and the lack of suitable habitat on the site, these sensitive species are protected by the MNRF, therefore the species names will not be disclosed in this document.

4.4 Habitat for Area-sensitive Bird Species

The Significant Wildlife Habitat Technical Guide (MNR, 2000) identifies habitat for area sensitive species as a priority for preservation. It specifically discusses forest fragmentation, edge effects and grassland habitat.

The bird surveys for this project recorded twelve (12) area sensitive species (Appendix II-Level 1 report). Areas Sensitive (AS) species are those that require a minimum hectarage of contiguous suitable habitat to successfully breed (OMNRF, 2000). The species recorded included broad-winged hawk (*Buteo platypterus*), red and white-breasted nuthatch (*Sitta canadensis and S. carolinensis*), pileated woodpecker (*Dryocopus pileatus*), hairy woodpecker (*Picoides villosus*), least flycatcher (*Empidonax minimus*), winter wren (*Troglodytes troglodytes*), veery (*Catharus fuscescens*), hermit thrush (*Catharus guttatus*), magnolia warbler (*Dendroica magnolia*), black-throated blue warbler (*Dendroica caerulescens*), black-throated green warbler (*Dendroica virens*), blackburnian warbler (*Dendroica fusca*), pine warbler (*Dendroica pinus*), black-and-white warbler (*Mniotilta varia*), American redstart (*Setophaga ruticilla*), ovenbird (*Siurus aurocapillus*), scarlet tanager (*Piranga olivacea*) and the eastern whip-poor-will (*Antrostomus vociferous*).

The presence of area sensitive species is due to the large contiguous forest and wetland areas in this part of the Township where few roads are present. The proposed extraction area would remove forest cover and areas adjacent to the rock barren areas on the property during the phasing and operational life of the pit. The progressive rehabilitation plan and phasing of the cuts would limit the amount of mature forest cut at any one time. The impact on the area sensitive species would be a direct loss of habitat. The habitat is

presently disturbed through recent selective logging by the landowner. The southern limits of the eastern portion of the property is a disturbed area which consists of an active quarry. These activities contribute a certain level of disturbance to the property. This however has not prevented the above species from breeding on the site.

The rehabilitation plan includes the reinstatement of forest and field areas, on the licensed area, with a diversity of tree species and forest types, as well as old field habitat and rock barrens. This will provide a diversity of habitat suitable for the area sensitive species. As well the extraction will be phased from east to west, with the existing vegetation cover retained until that phase is to be cleared. The progressive rehabilitation will create field, forest and wetland as per the rehabilitation plan. Mitigation measures include no clearing of any vegetation within the peak breeding bird timing window of April 15th to August 15th.

4.5 Rare Vegetation Species and Rare Vegetation Communities

Three (3) regionally rare species were found within the study area (Appendix I-B Level 1). These included walking fern (*Asplenium rhizophyllum*), Japanese barberry (*Berberis thunbergii*) and rock elm (*Ulmus thomasii*). (Oldham, M.J., 1999).

The walking fern was observed growing along the top ledge of the limestone ridge, north of the existing access road (Community 17). This fern species is unique in that new plants grow wherever the arching leaves of the parent plant touch the ground.

Photo 1: View of walking fern growing on limestone ridge. (Photo date: Oct. 29, 2014)

Japanese barberry was found growing in two locations on the subject lands. This plant was observed in the oak-hardwood deciduous forest community (Community 4) below the limestone ridge, prior to this area having been logged and cleared. It was also noted in the juniper thicket (Community 11) in the western portion of the property. This plant is considered an invasive shrub native to Japan. Japanese barberry is covered in thorns and spreads easily by birds that have consumed the seeds of this plant.

The rock elm was found growing in the juniper thicket (Community 11), in the western portion of the subject lands. This tree species is not uncommon in this region and prefers to grow in moist but well-drained sandy loam, loam or silt loam soils but can also grow on dry uplands as in this case.

All of the species were located within either the property licensed area or the proposed extraction area. For the protection of these species re-location or transplanting would usually occur but is not recommended.

Since the forest community below the limestone ridge was cleared, the walking fern was not found during the 2016 field surveys. This plant may have disappeared due to being exposed to harsher, drier conditions by the lack of a forest canopy to provide shade. The Japanese barberry is an invasive species and therefore removal of this plant during extraction phases is considered a benefit to prevent further spread of this thorny shrub. The rock elm specimen was small, approximately XX m tall …. (The need for a salvage plan to confirm the continued presence of these species and transplant the specimens will be discussed with MNRF.

One rare vegetation community was observed on site, the rock barrens (Communities 7 and 22). These communities existed mainly in the western portion of the property with a smaller community located along the existing access route where the roadway descends the limestone ridge in the east (Figure 1). The proposed quarry will include the rock barren communities which will be re-established as part of the comprehensive and progressive rehabilitation plan.

5.0 Potential Impacts on Key Natural Heritage Features and Functions from Specific Activities

The key activities on the property that have the potential to impact on the natural features noted above include:

- Clearing of forest cover
- Road construction
- Berming
- Excavation; noise, dust and heavy equipment
- Sediment and construction runoff
- Change of grading and landform
- Blasting
- Dewatering
- Road or accidental mortality
- Habitat of Species at Risk

5.1 Clearing of Vegetation

There will be a loss of woodland habitat due to clearing within the extraction area. As this is a relatively large operation, approximately 84.2 hectares, extractions will occur in five phases. The logging of the forest communities will occur prior to overburden stripping in the extraction area. The progressive rehabilitation plan will be implemented in each phase prior and during extraction of subsequent phases of the operation. The forest clearing will remove habitat for breeding birds protected under the Migratory Birds Convention Act. It is recommended that clearing in each phase occur outside of the peak breeding bird season, as per Environment Canada to be from April 15th to August 15th.

Clearing should occur in phases and only as necessary for the active extraction operations. In this way, the amount of habitat loss and vegetation clearing will be limited at any one time. This will minimize the area of cleared forest and maintain potential habitat for birds, deer and other wildlife. Soil and organics should be salvaged from areas within the proposed extraction and set aside for future use in the rehabilitation of the site.

The recommended rehabilitation of the quarry after extraction involves creation reforestation, rock barren and establishing meadow and wetland habitats. As well, a series of forested areas will be created through the property. The open field/meadow will be seeded with native grasses between forested areas but also be allowed to re-establish naturally in the intervening areas. This will reinstate most of the natural pre-construction forest cover and connectivity/linkages in the area while maintaining the existing

biodiversity provided by the other habitat types.

5.2 Road Construction

As previously noted, the primary access shall be via an entrance off County Road 36 and will utilize a service road through Quarry Licence No. 127479 as per an agreement with the adjacent licensee. A secondary entrance off County Road 507 will be used if the County Road 36 entrance is no longer available. This entrance will be used for maintenance, delivery and logging access in the meantime and will be maintained and gated. Detailed information pertaining to access and haul routes can be found in the Traffic Impact Study, prepared by Tranplan Associates.

This places all truck traffic well away from any neighbouring residences. Furthermore, the existing road network in this area provides for a number of haul route options including north, south and west. The likely route will be to the south, thru Buckhorn and points south.

There is currently an existing roughed out access route through the western portion of the property. This route will not be used as the primary access to the extraction area however may be used for maintenance, delivery and logging activities. Surface upgrading may be required to accommodate the larger vehicles.

The internal haulage roads will be constructed as the quarry expands north and west. A number of recommendations for mitigation during construction are included below, as well as recommendations to protect wildlife.

5.3 Berming

Berms are used to store topsoil and overburden material for rehabilitation as the phasing progresses. Berms are constructed within the portion where a 30m excavation setback from the licensed area boundary is required (Figure 1).

Berming is required within the 30m setback from County Road 507 along the western boundary of the property. The berm will be created along the western license boundary separating the excavation limit from County Road 507 and provide an effective visual and/or acoustical barrier Berms will be graded and seeded with native grasses after construction and reseeded as needed to control erosion. The construction of this berm will not have any additional impacts on the vegetation or wildlife present in those areas. This berm will be temporary and the stored topsoil reused for the rehabilitation of the site.

5.4 Excavation

The excavation method for a limestone quarry will utilize the following equipment including compressors, conveyors, rock drills, excavators, backhoes, bulldozers, scrapers, front-end loaders and dump trucks. Portable crushing and screening plants will be used to process the material. Processing equipment will be located within the extraction area, on the quarry floor. Other pit operations may include activities such as sorting, crushing, screening and washing of materials. Heavy equipment and vehicles are used to transport materials around the site and from the pit to off-site construction sites.

No sensitive bird species or colonies (great blue heron) or wildlife areas are present in this area that would be directly or indirectly impacted by extraction activities and the noise generated.

The noise from quarries and generation of dust can also impact on wildlife populations. The significant or sensitive wildlife species found within 1 km of the licensed area that would be impacted by noise or dust include the eastern meadowlark and barn swallow. Whip-poor-will will not be impacted as they are a nocturnal bird and therefore active during evening hours. Quarry operations hours to be determined. Mitigating measures to benefit these species and reduce these impacts include training of operations staff on identifying these species and what to do if a significant or sensitive species (including species at risk) is observed during operations and the timing of operations occur outside of the peak breeding bird season, acknowledged by Environment Canada to be from April 15th to August 15th.

5.5 Sediment/Construction Runoff

The Class “A” Licence Category 4 license is for extraction above the water table therefore no dewatering activities will be required as part of the operation.

If dewatering post spring melt or heavy rains is required, the water should not discharge directly to watercourses or wetland pockets but be treated via vegetated swales or other measures.

5.6 Loss of Catchment Area for Wetlands

The study area contains several wetlands, particularly in the north and eastern portions. The wetlands will not be removed by the extraction and are mostly located off of the licensed area. The northern wetland is a headwater wetland with a catchment area upstream of the licensed area. The extraction to the anticipated depth will not reduce the catchment area or affect the input of water.

The eastern wetlands are located to the east of the property and are buffered by a 50 m setback from the extraction limit. The watershed divide is a rock ridge/limestone ledge that is at the eastern limit of the extraction area with rolling topography below the ridge. The wetlands are associated with a watercourse and beaver activity with the catchment area north and east of the extraction area. As such no impacts on the wetland water levels or catchment area are expected from the extraction.

5.7 Change of Grading and Landforms

The change of grading and landforms to the property may temporarily lead to a loss of wildlife habitat and vegetation cover within that particular phase extraction area. However, the excavation areas have been designed to avoid the larger wetlands and watercourses. The rehabilitation plan has been designed to replace the habitat that previously existed and enhance what existed prior to the extraction (forest area, rock barrens, field and wetland habitat). The progressive phasing rehabilitation plan will allow for species to find suitable habitat on other sections of the property throughout the extraction processes while it is occurring on one.

As the horizontal limit of extraction is reached, the operator will create an average slope no steeper than 3:1. Top soil/overburden and organic material will be spread at variable depths on the 3:1 slope. Habitat will be enhanced and will create variable topography which will promote and contribute to micro habitat development, topsoil development and moisture retention.

5.8 Blasting

As this is a surface operation, pop-ups and minor blasting will occur on the site as the quarry stone is loosened/extracted. Impacts on wildlife and sensitive receptors can occur from blasting activities. As there are several species at risk on the property, disturbance to nesting and behaviour patterns can occur. Generally blasting should be limited to a minimum during the bird nesting season (April 15th – August 15th). Blasts do tend to be very short events with disturbance from the noise predominantly. Although birds such as

herons are more sensitive to these sudden sharp noises, most birds are adaptable and are more prone to abandon from repeatedly being disturbed by sharp and random noises. There are no specific sensitive receptors, such as great-blue heron colonies within 500 m of the study area.

When possible, other measures to control blast size and vibrations should be used within or adjacent (up to 250m) to snake habitat (OMNR, 2011). All blasting activities will follow the project blasting plan.

5.9 De-watering

As the proposed quarry will be operating above the water table, de-watering needs are to be determined. The dewatering will be conducted under a Permit to take water or Environmental Compliance Certificate. No off-site diversion or discharge of surface water is expected as drainage in the extraction site will continue to be predominately subsurface through the underlying soils.

5.10 Road or Accidental Mortality

The quarry staff will be trained by a qualified biologist in the identification and proper handling for the relocation of turtles (snapping turtle) or snakes (eastern hog-nosed snake, eastern ribbon snake, eastern milksnake), out of harm's way if they are found within the quarry operating area or roads.

Exclusion fencing is one practice often used to prevent species at risk from accessing a site, however this can become very costly in terms of materials used and labour to install. In order to effectively restrict a species such as snakes and/or turtles, the entire perimeter of the active extraction area and access roads would require a heavy-duty geotextile fencing at least 1-2m in height.

In lieu of fencing, , the installation of silt fencing (restrictive fencing) on the eastern portion and at specific locations adjacent to wetland buffers, around the active extraction phases will limit access to active excavation areas. If exclusion fencing is to be used, it should be installed prior to extraction operations, during a period of inactivity, typically November through April for reptiles and amphibians. Fencing should be maintained throughout the active season for snake species (late April to late October).

The possible installation of eco-passages under the haul routes would prove to provide a significant reduction in road mortality of many reptile species at risk, including the eastern hog-nosed snake and Blanding's turtles.

Other more cost effective mitigation techniques such as education of the operation staff, signage along all access roads, including speed reductions can more effectively reduce the chances of snakes or other species at risk being killed.

Signs will be posted and information provided to individuals entering the quarry site to identify the presence of any SAR on site. A speed limit of 30 kph on the access road from County Road 36 and training of staff in identification and to avoid snakes will limit accidental mortality.

If exclusion fencing is required, delineation of the exclusion fencing on site plans will be recommended to the proponent for placement on engineered drawings.

5.11 Removal of Habitat for Species at Risk

5.11.1 Whip-poor-will

The main impact from the proposed Rockridge quarry operation will be the temporary loss of habitat for approximately four (4) territories for those pairs of birds identified during field surveys. The operating life of the pit is estimated at 50+ years, as the limestone deposits are fairly extensive and the tonnage could be up to 1,500,000 tonnes annually, under a Class A license. As such the loss of habitat will be phased with a plan to rehabilitate to pre-disturbance conditions in terms of the habitat type.

Most of the territories of the birds identified were within the licensed area with the exception of the two pair in the northern areas of the property. The Category 2 and 3 whip-poor-will habitat however, does overlap the properties to the north and south. Although this aggregate license will include rehabilitation measures, it is unclear if the licensed quarry to the south has any measures in place to recreate whip-poor-will habitat.

The rehabilitation proposed on the Rockridge quarry may not be as effective if the adjacent quarry to the south is cleared and the end uses are counterproductive in terms of an overall increase or benefit to the local whip-poor-will population. There will be cumulative impacts from the adjacent licensed quarries however these will be significantly minimized by the proposed rehabilitation and enhancement measures for recreating forest and field habitat on both the Stonescape I and II quarries and the proposed Rockridge quarry. Regardless, the rehabilitation measures undertaken on the Rockridge Quarry property are designed to maximize the habitat for whip-poor-wills and the forest to the north of the licensed area will be maintained. The property on its own could still support several pairs of whip-poor-wills post-rehabilitation.

The rehabilitation plan's key objective will be to recreate whip-poor-will habitat. Although other measures and features are included in the rehabilitation, the reforestation and open spacing is designed specifically for whip-poor-will habitat. The forest and meadows will attract other species and provide habitat for many of the wildlife species currently found on the property.

An analysis of the current vegetation community types in the licensed area found that the site is mostly forested with open meadow and juniper thickets in the western portion of the property as well as a few small rock barren communities (Table 3).

Table 3. Existing vegetation types within extraction area

Vegetation Type	Existing (ha)	% of Extraction Area	Vegetation Community
Rock barren			7, 22
Limestone ridge			17
Field/meadow			14, 19
Wetlands – marsh			2, 3, 18
Wetlands - swamp			6, 13, 15, 20
Wetlands - thicket			9, 16
Wetlands – pond			5
Forest - deciduous			4, 10
Forest - mixed			1
Forest - coniferous			8, 12, 21
Juniper thicket			11
TOTAL	84.2		

Whip-poor-will habitat in general is a combination of forest for nesting, roosting and some foraging and openings (rock, field, pasture, wetlands) for foraging. The rehabilitation plan was designed to maintain a similar percentage of forest vs. openings and within the habitat description criteria found in the literature. Recreating the conditions for whip-poor-wills is possible based on the habitat requirements. Wilson and Watts (2008) found birds used clear-cut areas in timber harvesting sites to a certain distance and recommended smaller tracts be cut to maximize the ratio of forest edge and regenerating cutover areas.

To ensure all key aspects of the territory requirements are recreated, the following is a list of the criteria applied.

- Maximize forest area (min. 60% forest cover post-rehab)
- Maximize length of forest edge perimeter for nesting, cover and roosting
- New forest blocks with different forest types, similar to current species

composition and diversity (pure conifer stands, mixed stands and deciduous) with 2-3 yr. old stock
- Align forest blocks to keep mix of open foraging and woodland nesting habitat
- 100m distances created of open meadow for foraging
- All forest outside of licensed area will remain on property, currently used as part of territories of known pairs in the larger area.
- Plant meadow habitat with a native meadow mix with species pollinated by moths and maximize all life stages of moths.
- Woody debris/leaf litter accumulation and regeneration between forest blocks over time.
- Woody debris placed in forests, to be used as roost sites.
- Plant juniper in some of open space to add to diversity.
- 3-9 acre territories overlapping licensed area to be recreated by adding habitat elements removed due to extraction activities.
- Forest blocks oriented to allow penetration of moonlight for better foraging.
- Invasive species monitoring and occasional brushing of undesired species such as sumac, weeds.

5.11.2 Notes To Be Added To Site Plans

Three key Species at Risk were found within the licensed area, therefore appropriate operational measures and pro-active mitigation measures are included here to provide the operator with protocols to prevent accidental mortality or injury to any animal that may wander through the quarry during the operational phase.

Whip-poor-will

- Clearing of vegetation in each phase occur outside the peak breeding bird season (April 15th to August 15th) as per Environment Canada guidelines
- Discussions with MNRF Bancroft District regarding Endangered Species Act section 17 permit
- Rehabilitation plan includes meadow and forest blocks/nodes that will recreate suitable habitat
- Survey of woodlots identified, by a qualified biologist and at the appropriate time of year (weather, moon phase) be completed to determine if habitat is still being used by birds for nesting, roosting or foraging
- If whip-poor-will are encountered in the operating phase, the bird(s) be left to leave on its own and MNRF contacted regarding location

Eastern Meadowlark

- Clearing of vegetation in each phase occur outside the peak breeding bird season (April 15th to August 15th) as per Environment Canada guidelines.
- As the phasing occurs, retain some suitable field habitat on site at all times.
- Conduct monitoring of site to determine presence of eastern meadowlarks in next phase by completing sufficient level of effort (multiple visits, time of day, weather protocols and time of year for best detecting breeding)
- Rehabilitation plan include creation of grassland habitat in progressive rehabilitation phases (Phase 6 is the meadows in western edge of property).
- Discussions with MNRF Bancroft District regarding Endangered Species Act section 17 permit or Notice of Activity (<30 ha meadowlark habitat).

Barn Swallow

- Clearing of vegetation in each phase occur outside the peak breeding bird season (April 15th to August 15th) as per Environment Canada guidelines.
- Discussions with MNRF Bancroft District regarding Endangered Species Act section 17 permit/or Notice of Activity
- Existing dwellings/buildings being retained until last phase of quarry
- Compensation habitat (i.e. nesting structures) will be created within 1km of the site, outside the extraction area
- Re-creation of grassland foraging habitat is part of operational plan
- Monitoring will be completed in accordance with O. Reg. 242/08.

To protect any SAR that may enter the extraction area, the following mitigation and avoidance measures are made:

- A biologist check the initial excavation area to be stripped and excavated prior to the overburden removal and provide Species at Risk training to quarry staff
- No stripping and excavation on the ledge be conducted during the season when snake(s) are in the hibernaculum (October – April), tree clearing can be conducted.
- Quarry staff to be briefed on the Species at Risk that may be found in the area and contingency/response protocols established and reviewed (during initial inspection).
- Regular checks of rock stockpiles and quarry floor be conducted during the snake's active period (April – October) by trained site staff
- Regular checks of equipment, quarry area and adjacent lands be conducted during the nesting season (early to mid-summer) by trained site staff.

- If a turtle/snake or whip-poor-will is found, the species is to be confirmed and the animal avoided temporarily until it leaves on its own or if necessary, the animal be relocated outside the active quarry area. MNRF will be contacted regarding observations of these species.
- All persons who enter the site be provided Information on Species at Risk, this includes all employees or contractors on site
- The licensee shall install signs on site in suitable locations (i.e. in the scale house) to identify the possible presence of these species. The licensee shall keep records of the search dates, personnel and times and action taken regarding encounters with Species at Risk
- If a snake is accidentally killed or harmed during operations, the licensee shall investigate and propose additional mitigation measures to prevent similar events
- If a nest site (e.g. eggs, young of snakes or turtles) are exposed accidently, work in that area should cease immediately and MNRF be contacted in regard to appropriate measures
- Speed limit on access road from County Road 36 to scales be limited to 30 km/hr.
- Operators and haulers be aware of snakes crossing area roadways.
- Exterior lighting in quarry area use diffuse or motion activated lights to reduce light pollution or if not needed, no lighting of the quarry area, accept around the plant.
- Implementation of dust control measures and monitored on an on-going basis to ensure effective dust control

The contingency plan can include the need for additional visual searches of the quarry during particular seasons: hibernaculum emergence (April/May) or entrance (Sept./Oct.) and hatching season for snakes (late August/Sept.). If there are multiple sightings of snakes, the need for restrictive fencing can be discussed with MNRF.

6.0 Rehabilitation Plan

The final rehabilitation plan prepared for this operation includes reforestation creation of small wetlands, maintenance of rock barrens and meadow end use. This will reinstate the existing vegetation cover and roughly equal percentage of each habitat. The diversity of open rock barren, meadow, wetlands and mixed forest will reinstate the variety of plants and wildlife habitat currently present. Increasing the amount of edge habitat is part of the measures to enhance the area for whip-poor-will. Due to the amount of rock that will be exposed post extraction, creating the exact same ratio of forest to field is not feasible. To maintain a diversity of forest types, the forest blocks will be planted with different compositions of trees. This will provide the best attempt at re-establishing the vegetation community types currently present.

Table 4. Vegetation community areas-existing vs. post rehabilitation of pit

Vegetation Type	Existing (ha)	% of Extraction Area	Vegetation Community	Post-rehab (ha)	% of Extraction Area
Rock barren			7, 22	25.5	
Wetlands/pond			2, 3, 5, 6, 9, 13 15, 16, 18, 20	0.18	
Meadow/ field			14, 19	29.5	
Juniper thicket			11	0	
Forest			1, 4, 8, 10, 12, 21	19.5	
Total forest					
Total Area	84.2			79.0	

The rehabilitation will include use of stockpiled topsoil and overburden to create stable slopes on the excavation limits to stabilize the quarry walls. There should be sufficient topsoil material to cover a majority of the entire excavation area as part of the rehabilitation. It is recommended that blocks of forest be recreated with intervening patches of open field habitat and several rock outcrops or rock barrens. The forest blocks will be planted with native tree and shrub species. This will create corridors to reconnect the forest to the north and east across the site as the progressive rehabilitation occurs. Over time, these dense bands will fill in some of the gaps. The intervening areas should be levelled with sand overburden to create an uneven surface and the topsoil applied. Seeding with a native seed mixture tailored for the Buckhorn area and for the habitat preferences will also be conducted as shown on the rehabilitation plan. This will mimic rock barrens found elsewhere in this area. The blocks of forest were specifically designed to reconnect the woodlands to the north and south, to include east-west and north-south connectivity to adjacent forested areas and to create an interconnected network of cover to act as wildlife

corridors and linkages between natural areas. The diversity of woodland, rock barren and meadows will create a wide variety of habitats post-rehabilitation. The key criteria is the creation of whip-poor-will nesting, roosting and foraging habitat.

The details of the final rehabilitation plan are shown on the large scale submitted drawings. It was discussed between NEA and the licensee that the detailed notes on that plan include native tree and shrub species indigenous to the Buckhorn area and the habitats on site.

The forest blocks will include species already found on the property such as sugar maple, white ash, American beech, white spruce, eastern white pine, eastern hemlock, white birch, red and bur oak, ironwood, large-toothed aspen, trembling aspen and red maple. Tree planting arrangement should be variable and not in rows, to mimic a natural forest. Shrub plantings should be arranged in random clumps.

Final quarry faces and limits of extraction will be progressively sloped (infilling and cut/fill). Overburden and topsoil applied, graded, seeded with grass seed conducive to tree planting and planted with clumps of trees, sloping of final excavation faces will be at 2:1 or 3:1. Overburden and topsoil removed for extractive purposes will be spread over the final extractive floor, graded, seeded with grass seed conducive to pasturing and planting of trees and planted with clumps of trees. Importation of material may be required for rehabilitation if insufficient topsoil is present. Only clean, inert fill will be imported for rehabilitation purposes.

This rehabilitation plan will reinstate the natural wildlife corridors, wildlife habitat and native forest on the site post-extraction.

Habitat for species at risk (snakes, turtles and whip-poor-will) will be enhanced. Two (2) trial snake hibernacula will be constructed within the re-forested areas close to the edge.

As the rock barrens with forested edges are key habitats for whip-poor-will and potentially common nighthawk in the post-construction scenario, the extraction phase of the operation is to be conducted carefully to ensure no vegetation removal over the phased extraction area is conducted unnecessarily. This will allow habitat to remain as long as possible prior to extraction activities removing this habitat while allowing rehabilitation to begin in areas post extraction almost immediately.

7.0 Conclusions

This Natural Environment Level 2 Technical Report has examined, in detail, the potential for negative effects on the natural features and functions within the proposed licence area and to some degree within the broader surrounding landscape. NEA has recommended the avoidance of sensitive features, mitigation measures of setbacks and buffers from the wetlands, pond and other features/communities and Monitoring activity through an Adaptive management approach so that no negative impacts are predicted to occur on the identified natural heritage features or ecological functions provided the recommendations in this report are implemented.

The operational plan and the extraction area limit have been defined by the environmental constraints. Rehabilitation efforts proposed will replace the existing habitats post-extraction on the Rockridge property prior to and/or during extraction activities taking place.

Finally, notes on the operational plan will be included regarding contingency measures for possible presence of Species at Risk on site during the operation.

The MNRF process regarding the Endangered Species Act compliance and possible C-permit will be completed as part of the licensing of this project. NEA will prepare the necessary documentation such as the Information Gathering Form, Alternative Avoidance form and the Overall Benefit Permit application as required and work with MNRF to provide any other information that leads ultimately to the issuance of an Overall Benefit Permit.

8.0 Recommendations

1) Clearing of vegetation occur outside the peak breeding bird season (April 15th to August 15th) as per Environment Canada guidelines.

2) Clearing occurs in phases whenever possible, with minimal clearing done in stages prior to the need for additional aggregate.

3) The progressive rehabilitation plan end use is reforestation and reinstatement of the natural tree cover, north to south connectivity/linkages through the centre of the extraction area, as well as establishing wetlands, field and meadow habitats.

   The reforestation plan should include only native tree and shrub species indigenous to the Buckhorn area and be derived from stock from local nurseries.

   Topsoil/overburden and organic material will be spread at variable depths across the site are to be seeded with native meadow mix including low growing native grasses.

   Trees should be planted in mixed groupings that include appropriate native species currently found on site such as sugar maple, red maple, white ash, eastern white pine, eastern hemlock, white spruce, eastern hemlock, white birch, bur oak, red oak, American beech, large-toothed aspen, trembling aspen and ironwood. Trees should be planted in each block of forest as per the rehabilitation plan and in the percentage of conifer/deciduous prescribed.

   Tree planting arrangement should be variable and not in rows, to mimic a natural forest. Shrub plantings should be arranged in random clumps. Plant material can be bare root if planted in early spring and fall however, during leaf-out season (mid-May to September) plants should be potted or B&B (ball and burlap).

   Plants should be watered immediately after planting and monthly during the first growing season. Tree guards should be placed on stems to reduce browsing by mice and rabbits. Plants should be monitored annually for two years following planting to ensure survival. Plants will be replaced if there is less than 70% survival.

   Butternut compensation plantings to occur within the 50m setback in the eastern portion of the property and within the 30m setback along the north boundaries.

4) Quarry operational phasing and progressive rehabilitation schedules be coordinated to limit the area of disturbed tree cover at any one time.

5) Monitoring:

a) Mortality surveys conducted for snakes and turtles from traffic for quarry operation.
b) Five (5) year monitoring plan as per the Endangered Species Act Overall Benefit Permit be implemented to ensure habitat created is being utilized by whip-poor-wills, eastern meadowlark and barn swallows.
c) Vegetation monitoring – survival rates on rehabilitation efforts; survival rates on butternut compensation plantings

6) Habitat to enhance habitat for Species at Risk (snakes, turtles, whip-poor-will, eastern meadowlark, barn swallow) will be created.

a) If exposed fissures are encountered upon extraction completion, they will not be filled but rather left as part of the rehabilitation

b) Two trial snake hibernacula will be constructed in a suitable location (with MNRF approval) in the licensed area of the Rockridge Quarry. They will consist of excavations and piles of limestone rock and woody debris randomly piled to maximize spaces and cover.

c) Barn swallow compensation habitat (nesting structures) will be created within 1km of the site, outside the extraction area and monitored in accordance with O. Reg 242/08.

7. Species at Risk

a) A qualified professional biologist check the initial excavation area to be stripped and excavated prior to the overburden removal and provide Species at Risk training to quarry staff.

b) Stripping and excavation on the limestone ridge be conducted carefully during the season when snakes could be in the hibernaculum (October – April), tree clearing can be conducted. If snakes are uncovered, a biologist needs to be contacted to address the issue.

c) Quarry staff to be briefed on the Species at Risk that may be found in the area and contingency/response protocols established and reviewed (during initial inspection).

d) During the active period for snakes, (June-August), workers should be aware of snakes in and around the quarrying area. If found, the snake should be left to leave its own or if in active work area, encouraged to leave the site. If necessary a biologist at MNRF is to be contacted for advice.

e) During the turtle nesting season (June), workers should be aware of turtles nesting in storage piles or walking through the quarry site. If found, the turtle should be left to leave its own or if eggs are laid a biologist contact on how to isolate that area. .

f) If a turtle/snake or whip-poor-will is found, the species is to be confirmed and the animal be avoided temporarily until it leaves on its own or if necessary, the animal be relocated outside the active pit area. MNRF will be contacted regarding observations of these species.

g) All persons working on the site, shall be provided with written information on Species At Risk, and be made aware of the possible presence of SAR within the site, including recommendations i, j and k below who enter the site be provided Information on Species at Risk or be made aware of the possible presence of SAR, this includes all employees or contractors on site.

h) The licensee shall install signs on site in suitable locations (i.e. in the scale house) to identify the possible presence of these species.

i) The licensee shall keep records of the search dates, personnel and times and action taken regarding encounters with Species at Risk.

j) If a snake is accidentally killed or harmed during operations, the licensee shall investigate and with advice of a qualified biologist, implement additional mitigation measures to prevent similar events.

k) If a nest site (e.g. eggs, young of snakes or turtles) are exposed accidently, work in that area should cease immediately and MNRF be contacted in regard to appropriate measures.

l) Speed limit on access road from County Road 36 to excavation area and within the quarry be limited at 30 km/hr or less.

m) Exterior lighting in quarry area use diffuse or motion activated lights to reduce light pollution or if not needed, no lighting of the quarry area.

9.0 References

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Appendix I-A

Plant Species by Community

APPENDIX I - A Plant Species by Community

Families and genera for the plant species found in this appendix are listed in taxonomic order. The species are listed alphabetically by its scientific name within each genus.

Three standard reference works were used for the botanical nomenclature and taxonomy (Newmaster et. al., 1998; Gleason and Cronquist 1991; Voss 1980; 1985). Other published works for botanical names included; ferns (Cody and Britton 1989); grasses (Dore and McNeill 1980); orchids (Whiting and Catling 1986); shrubs (Soper and Heimburger 1982) and trees (Farrar 1995).

Total: Number of communities where plant species was recorded
X : Plant species recorded

			COMMUNITY NUMBER														
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
CLADONIA FAMILY	*CLADONIACEAE*																
reindeer-moss	*Cladina rangiferina*	2	X						X								
STONEWORT FAMILY	*CHARACEAE*																
stonewort	*Chara spp.*	1															
PEAT MOSS FAMILY	*SPHAGNACEAE*																
sphagnum moss species	*Sphagnum spp.*	5		X	X		X										X
CLUBMOSS FAMILY	*LYCOPODIACEAE*																
shining clubmoss	*Huperzia lucidula*	1	X														
ground-pine	*Lycopodium obscurum*	2	X			X											

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
HORSETAIL FAMILY	*EQUISETACEAE*																	
field horsetail	*Equisetum arvense*	3	X			X								X			
water horsetail	*Equisetum fluviatile*	3		X			X	X									
meadow horsetail	*Equisetum pratense*	4									X				X		X
ROYAL FERN FAMILY	*OSMUNDACEAE*																	
cinnamon fern	*Osmunda cinnamonea*	1	X															
interrupted fern	*Osmunda claytoniana*	1						X										
royal fern	*Osmunda regalis var.spectabilis*	2	X					X										
MAIDENHAIR FERN FAMIL	*PTERIDACEAE*																	
northern maidenhair fern	*Adiantum pedatum*	2				X												
BRACKEN FERN FAMILY	*DENNSTAEDTIACEAE*																	
eastern bracken fern	*Pteridium aquilinum*	3	X			X				X								
BEECH FERN FAMILY	*THELYPTERIDAE*																	
New York fern	*Thelypteris noveboracensis*	1												X				
marsh fern	*Thelypteris palustris*	6		X	X		X	X			X							
SPLEENWORT FAMILY	*ASPLENIACEAE*																	
walking fern	*Asplenium rhizophyllum*	1																
maidenhair spleenwort	*Asplenium trichomanes ssp.quadrivalen*	1				X												
WOOD FERN FAMILY	*DRYOPTERIDACEAE*																	
northern lady fern	*Athyrium filix-femina*	1													X			
bulbet bladder fern	*Cystopteris bulbifera*	3									X							X
spinulose wood-fern	*Dryopteris carthusiana*	4	X			X												
evergreen wood-fern	*Dryopteris intermedia*	1																
marginal wood-fern	*Dryopteris marginalis*	6	X			X				X		X			X			
oak fern	*Gymnocarpium dryopteris*	1	X															
ostrich fern	*Matteuccia struthiopteris*	2	X								X							
sensitive fern	*Onoclea sensibilis*	10	X	X	X			X			X			X	X			X
POLYPODY FAMILY	*POLYPODIACEAE*																	
rock polypody fern	*Polypodium virginianum*	4	X			X				X								

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
PINE FAMILY	*PINACEAE*																	
balsam fir	*Abies balsamea*	8	X		X	X		X		X				X	X		X
white spruce	*Picea glauca*	8	X					X		X			X	X	X		
eastern white pine	*Pinus strobus*	11	X			X		X	X	X			X	X	X	X	
eastern hemlock	*Tsuga canadensis*	3	X			X								X			
CYPRESS FAMILY	*CUPRESSACEAE*																	
common juniper	*Juniperus communis var. depressa*	9	X						X	X		X	X			X	
eastern red cedar	*Juniperus virginiana*	1															
eastern white cedar	*Thuja occidentalis*	15	X	X		X		X	X	X	X		X	X	X		X
WATER-LILY FAMILY	*NYMPHACEAE*																	
bullhead pond-lily	*Nuphar variegata*	3			X		X										
fragrant water-lily	*Nymphaea odorata spp. Odorata*	1					X										
WATER-SHIELD FAMILY	*CABOMBACEAE*																	
water-shield	*Brasenia schreberi*	1															
BUTTERCUP FAMILY	*RANUNCULACEAE*																	
white baneberry	*Actaea pachypoda*	3				X									X		
thimbleweed	*Anemone virginiana*	4										X				X	
wild columbine	*Aquilegia canadensis*	3				X											
goldthread	*Coptis trifolia*	2				X				X							
sharp-lobed hepatica	*Hepatica acutiloba*	1															
round-lobed hepatica	*Hepatica americana*	3				X						X					
tall buttercup	*Ranunculus acris*	7				X								X	X	X	X
early meadow rue	*Thalictrum dioicum*	1				X											
BARBERRY FAMILY	*BERBERIDACEAE*																	
Japanese barberry	*Berberis thunbergii*	2				X							X				
blue cohosh	*Caulophyllum giganteum*	2				X											

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
FUMITORY FAMILY	*FUMARIACEAE*																	
yellow corydalis	*Corydalis flavula*	2				X												
pink corydalis	*Corydalis sempevirens*	1																
squirrel-corn	*Dicentra canadensis*	1				X												
ELM FAMILY	*ULMACEAE*																	
American elm	*Ulmus americana*	7				X						X	X		X		X	
rock elm	*Ulmus thomasii*	1											X					
NETTLE FAMILY	*URTICACEAE*																	
American stinging nettle	*Urtica dioica ssp. Gracilis*	3			X						X							
WALNUT FAMILY	*JUGLANDACEAE*																	
bitternut hickory	*Carya cordiformis*	2	X			X												
butternut	*Juglans cinerea*	1								X								
WAX-MYRTLE FAMILY	*MYRICACEAE*																	
sweet-fern	*Comptonia peregrina*	2	X										X					
BEECH FAMILY	*FAGACEAE*																	
American beech	*Fagus grandifolia*	2	X			X												
bur oak	*Quercus macrocarpa*	4	X							X						X		
red oak	*Quercus rubra*	7	X			X				X		X		X				
BIRCH FAMILY	*BETULACEAE*																	
speckled alder	*Alnus rugosa*	2						X										
yellow birch	*Betula alleghaniensis Britt.*	1						X										
white birch	*Betula papyrifera*	7	X			X		X	X	X								
ironwood	*Ostrya virginiana*	6				X						X		X				
GOOSEFOOT FAMILY	*CHENOPODIACEAE*																	
lamb's-quarters	*Chenopodium album*	1				X												
PINK FAMILY	*CARYOPHYLLACEAE*																	
bladder campion	*Silene vulgaris*	1																

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
BUCKWHEAT FAMILY	*POLYGONACEAE*																	
water smartweed	*Polygonum amphibium*	1					X											
black bindweed	*Polygonum convolvulus*	1				X												
sheep sorrel	*Rumex acetosella*	3				X										X		
ST. JOHN'S-WORT FAMILY	*GUTTIFERAE*																	
common St. John's-wort	*Hypericum perforatum*	4										X			X		X	
marsh St. John's-wort	*Triadenum fraseri*	1																
LINDEN FAMILY	*TILIACEAE*																	
American basswood	*Tilia americana*	8				X				X		X		X	X			
VIOLET FAMILY	*VIOLACEAE*																	
downy yellow violet	*Viola pubescens*	2				X												
kidney-leaved violet	*Viola renifolia*	3				X		X										
WILLOW FAMILY	*SALICACEAE*																	
balsam poplar	*Populus balsamifera*	5							X		X				X		X	
large-toothed aspen	*Populus grandidentata*	3	X			X		X										
trembling aspen	*Populus tremuloides*	7	X						X	X			X		X		X	
Bebb's willow	*Salix bebbiana*	1							X									
pussy willow	*Salix discolor*	7		X	X						X				X		X	
crack willow	*Salix fragilis*	4		X				X	X								X	
slender willow	*Salix petiolaris*	7		X	X						X			X			X	
MUSTARD FAMILY	*BRASSICACEAE*																	
toothwort	*Cardamine diphylla*	1				X												
wild mustard	*Sinapsis arvensis*	1														X		
HEATH FAMILY	*ERICACEAE*																	
wintergreen	*Gaultheria procumbens*	3	X			X				X								
highbush blueberry	*Vaccinium corymbosum*	1	X															
WINTERGREEN FAMILY	*PYROLACEAE*																	
shinleaf	*Pyrola elliptica*	1				X												

			COMMUNITY NUMBER														
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
INDIAN PIPE FAMILY	*MONOTROPACEAE*																
indian pipe	*Monotropa uniflora*	1				X											
PRIMROSE FAMILY	*PRIMULACEAE*																
fringed loosestrife	*Lysimachia ciliata*	1													X		
starflower	*Trientalis borealis*	1	X														
GOOSEBERRY FAMILY	*GROSSULARIACEAE*																
prickly gooseberry	*Ribes cynosbati*	5	X			X											
red currant	*Ribes rubrum*	1															
ORPINE FAMILY	*CRASSULACEAE*																
mossy stonecrop	*Sedum acre*	3											X			X	
SAXIFRAGE FAMILY	*SAXIFRAGACEAE*																
bishop's-cap	*Mitella diphylla*	1				X											
foam flower	*Tiarella cordifolia*	2	X														

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
ROSE FAMILY	*ROSACEAE*																	
agrimony	*Agrimonia gryposepela*	1	X															
hawthorn species	*Crataegus spp.*	2														X		
common strawberry	*Fragaria virginiana*	9			X								X			X	X	
yellow avens	*Geum aleppicum*	3				X						X						
apple	*Malus domestica*	2											X			X		
marsh cinquefoil	*Potentilla palustris*	1																
sulfur cinquefoil	*Potentilla recta*	4	X													X		
creeping cinquefoil	*Potentilla reptans*	1							X									
pin cherry	*Prunus pensylvanica*	1																
black cherry	*Prunus serotina*	1	X															
choke cherry	*Prunus virginiana*	7						X					X			X		
prickly rose	*Rosa acicularis*	1																
Alleghany blackberry	*Rubus allegheniensis*	4	X			X			X				X					
wild red raspberry	*Rubus idaeus*	8	X	X		X					X		X			X		
purple-flowering raspberry	*Rubus odoratus*	1				X												
dwarf raspberry	*Rubus pubescens*	1															X	
narrow-leaved meadowsweet	*Spiraea alba*	9		X			X	X			X		X		X		X	
barren strawberry	*Waldsteinia fragarioides*	6	X			X			X	X		X						
PEA FAMILY	*FABACEAE*																	
black medick	*Medicago lupulina*	1														X		
white sweet-clover	*Melilotus alba*	5							X				X			X		
low hop clover	*Trifolium agrarium*	3														X		
red clover	*Trifolium pratense*	4											X			X		
white clover	*Trifolium repens*	3				X							X					
cow vetch	*Vicia cracca*	2														X		
LOOSESTRIFE FAMILY	*LYTHRACEAE*																	
water willow-herb	*Decodon verticillatus*	1		X														
purple loosestrife	*Lythrum salicaria*	1		X														

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
MEZEREUM FAMILY	*THYMELAECEAE*																	
leatherwood	*Dirca palustris*	3	X			X												
EVENING PRIMROSE FAMIL	*ONAGRACEAE*																	
dwarf enchanter's nightshade	*Circaea alpina*	1																
common evening primrose	*Oenothera biennis*	2											X					
DOGWOOD FAMILY	*CORNACEAE*																	
alternate-leaf dogwood	*Cornus alternifolia*	1																
bunchberry	*Cornus canadensis*	2	X							X								
red panicled dogwood	*Cornus foemina Miller ssp.racemosa*	1	X															
round-leaved dogwood	*Cornus rugosa*	1																
red-osier dogwood	*Cornus stolonifera*	6		X	X						X						X	
BUCKTHORN FAMILY	*RHAMNACEAE*																	
European buckthorn	*Rhamnus cathartica*	8										X	X	X	X	X	X	
GRAPE FAMILY	*VITACEAE*																	
Virginia creeper	*Parthenocissus inserta*	1																
wild grape	*Vitis riparia*	6				X			X		X				X	X	X	
MAPLE FAMILY	*ACERACEAE*																	
striped maple	*Acer pensylvanicum*	1	X															
red maple	*Acer rubrum*	8	X		X			X			X						X	
silver maple	*Acer saccharinum*	2						X										
sugar maple	*Acer saccharum ssp.saccharum*	7	X			X						X				X		
CASHEW FAMILY	*ANACARDIACEAE*																	
western poison-ivy	*Rhus rydbergii*	9		X							X			X	X		X	
staghorn sumac	*Rhus typhina*	7	X						X	X			X			X		
GERANIUM FAMILY	*GERANIACEAE*																	
wild geranium	*Geranium maculatum*	1				X												
herb Robert	*Geranium robertianum*	2				X												
TOUCH-ME-NOT FAMILY	*BALSAMINACEAE*																	
spotted jewelweed	*Impatiens capensis*	1			X													

			COMMUNITY NUMBER														
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
GINSENG FAMILY	*ARALIACEAE*																
wild sarsaparilla	*Aralia nudicaulis*	4	X			X								X			
CARROT FAMILY	*APIACEAE*																
bulbous water-hemlock	*Cicuta bulbifera*	2															
Queen-Anne's lace	*Daucus carota*	4							X			X	X			X	
woolly sweet cicely	*Osmorhiza claytonii*	1				X											
black snakeroot	*Sanicula marilandica*	2				X											
hemlock water parsnip	*Sium suave*	2					X	X									
DOGBANE FAMILY	*APOCYNACEAE*																
spreading dogbane	*Apocynum androsaemifolium*	1															X
MILKWEED FAMILY	*ASCLEPIADACEAE*																
swamp milkweed	*Asclepias incarnata*	4						X			X				X		
common milkweed	*Asclepias syriaca*	5				X							X			X	
NIGHTSHADE FAMILY	*SOLANACEAE*																
clammy ground-cherry	*Physalis heterophylla*	1															
bitter nightshade	*Solanum dulcamara*	7			X	X								X	X		
MORNING-GLORY FAMILY	*CONVOLVULACEAE*																
field bindweed	*Convolvulus arvensis*	1														X	
WATERLEAF FAMILY	*HYDROPHYLLACEAE*																
Virginia waterleaf	*Hydrophyllum virginianum*	1													X		
BORAGE FAMILY	*BORAGINACEAE*																
Viper's bugloss	*Echium vulgare*	4							X							X	
common gromwell	*Lithospermum officinale*	2												X	X		
MINT FAMILY	*LAMIACEAE*																
wild basil	*Clinopodium vulgare*	4										X					X
American water-horehound	*Lycopus americanus*	6		X	X			X			X				X		
wild mint	*Mentha arvensis*	2				X											
heal-all	*Prunella vulgaris ssp. Lanceolata*	4				X						X	X				

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
PLANTAIN FAMILY	*PLANTAGINACEAE*																
narrow-leaved plantain	*Plantago lanceolata*	4											X			X	
broad-leaved plantain	*Plantago major*	1				X											
OLIVE FAMILY	*OLEACEAE*																
white ash	*Fraxinus americana*	8				X				X		X	X	X		X	
black ash	*Fraxinus nigra*	1															X
green ash	*Fraxinus pennsylvanica var. subintegerr*	3												X	X		X
FIGWORT FAMILY	*SCROPHULARIACEAE*																
butter-and-eggs	*Linaria vulgaris*	1														X	
common mullein	*Verbascum thapsus*	6				X						X	X			X	
MADDER FAMILY	*RUBIACEAE*																
cleavers	*Galium aparine*	1															
rough bedstraw	*Galium asprellum*	4			X			X			X						
white bedstraw	*Galium mollugo*	1															
small bedstraw	*Galium trifidum*	1							X								
creeping partridge-berry	*Mitchella repens*	3	X			X				X							
HONEYSUCKLE FAMILY	*CAPRIFOLIACEAE*																
fly honeysuckle	*Lonicera canadensis*	1															
tartarian honeysuckle	*Lonicera tatarica*	2															
red-berried elderberry	*Sambucus racemosa*	2				X											
downy arrow-wood	*Viburnum rafinesquianum*	1				X											

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
ASTER FAMILY	*ASTERACEAE*																
common yarrow	*Achillea millefolium*	5							X				X			X	
field pussytoes	*Antennaria neglecta*	2														X	
common burdock	*Arctium minus*	1															
nodding beggarticks	*Bidens cernua*	1			X												
ox-eye daisy	*Chrysanthemum leucanthemum*	5		X					X							X	
bull thistle	*Cirsium vulgare*	1				X											
Philadelphia fleabane	*Erigeron philadelphicus ssp. philadelphi*	2														X	
spotted joe-pyeweed	*Eupatorium maculatum*	5		X							X						
boneset	*Eupatorium perfoliatum*	5		X	X			X									X
large-leaved aster	*Eurybia macrophylla*	9	X			X			X	X		X	X		X		
grass-leaved goldenrod	*Euthamia graminifolia*	2									X						X
orange hawkweed	*Hieracium aurantiacum*	4							X				X			X	
king devil hawkweed	*Hieracium x florbundum*	6				X								X	X	X	
black-eyed Susan	*Rudbeckia hirta*	1															
tall goldenrod	*Solidago altissima*	7	X			X			X				X			X	
Canada goldenrod	*Solidago canadensis*	2							X							X	
zig-zag goldenrod	*Solidago flexicaulis*	2				X											
gray goldenrod	*Solidago nemoralis ssp. Nemoralis*	5							X				X			X	
field sow thistle	*Sonchus arvensis ssp.arvensis*	1														X	
spiny-leaved sow thistle	*Sonchus asper*	1														X	
heart-leaved aster	*Symphyotrichum cordifolium*	1	X														
panicled aster	*Symphyotrichum lanceolatum ssp.hesper*	1	X														
calico aster	*Symphyotrichum lateriflorum var.laterifl*	5	X		X							X	X				
New England aster	*Symphyotrichum novae- angliae*	3		X												X	
white heath aster	*Symphyotrichum pilosum var.pilosum*	1														X	
purple-stemmed aster	*Symphyotrichum puniceum*	3			X											X	
common dandelion	*Taraxacum officinale*	4				X		X								X	
goat's-beard	*Tragopogon dubius*	3														X	

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
coltsfoot	*Tussilago farfara*	2	X			X											
ARUM FAMILY	*ARACEAE*																
Jack-in-the-pulpit	*Arisaema triphyllum*	1	X														
DUCKWEED FAMILY	*LEMNACEAE*																
common duckweed	*Lemna minor*	1			X												
RUSH FAMILY	*JUNCACEAE*																
Canadian rush	*Juncus canadensis*	4		X													X
path rush	*Juncus tenuis*	4		X										X	X		X
SEDGE FAMILY	*CYPERACEAE*																
drooping wood sedge	*Carex arctata Boott*	2				X									X		
golden-fruited sedge	*Carex aurea*	1				X											
Bebb's sedge	*Carex bebbii*	6		X	X						X						X
fringed sedge	*Carex crinita*	1															X
bladder sedge	*Carex intumescens*	4			X						X						X
common lake sedge	*Carex lacustris*	5					X	X			X						X
livid sedge	*Carex livida*	2													X		X
few-fruited sedge	*Carex oligocarpa*	5		X	X						X				X		
Pennsylvania sedge	*Carex pensylvanica*	7	X			X				X		X		X	X		
cypress-like sedge	*Carex pseudo-cyperus*	4		X	X		X	X									
awl-fruited sedge	*Carex stipata*	6		X	X										X		X
tussock sedge	*Carex stricta*	4		X	X		X	X									
greenish sedge	*Carex viridula*	3		X	X												X
three-way sedge	*Dulichium arundinaceum*	3		X			X										
needle spike-rush	*Eleocharis acicularis*	2		X													
wool-grass	*Scirpus cyperinus*	7		X	X		X				X						X
common three-square	*Scirpus pungens*	1					X										
softstem bulrush	*Scirpus validus*	2									X						

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
GRASS FAMILY	*POACEAE*																	
redtop	*Agrostis gigantea*	1																
bearded shorthusk	*Brachyelytrum erectum*	2				X												
field brome	*Bromus arvensis*	1																
fringed brome grass	*Bromus ciliatus*	1							X									
awnless brome grass	*Bromus inermis ssp.inermis*	3											X			X		
Kalm's brome	*Bromus kalmii*	1																
Canada bluejoint grass	*Calamagrostis canadensis*	1																
orchard grass	*Dactylis glomerata*	2														X		
poverty oatgrass	*Danthonia spicata*	4							X				X			X		
bottle-brush grass	*Elymus hystrix*	3	X			X						X						
quack grass	*Elymus repens*	1														X		
fowl manna grass	*Glyceria striata*	6			X		X				X						X	
white-grained mountain rice	*Oryzopsis asperifolia*	1				X												
acuminate panic grass	*Panicum acuminatum var.acuminatum*	3							X							X		
reed canary grass	*Phalaris arundinacea*	2															X	
timothy	*Phleum pratense*	6											X			X	X	
fowl meadow grass	*Poa palustris*	5					X				X	X				X		
false melic grass	*Schizachne purpurascens (Torr.) Swalle*	1				X												
CATTAIL FAMILY	*TYPHACEAE*																	
common cattail	*Typha latifolia*	1		X														
LILY FAMILY	*LILIACEAE*																	
bluebead lily	*Clintonia borealis*	1	X															
Canada mayflower	*Maianthemum canadense*	4	X			X												
Indian cucumber-root	*Medeola virginiana*	2	X			X												
false Solomon's seal	*Smilacina racemosa*	1																
rose-twisted stalk	*Streptopus roseus*	4				X									X			
white trillium	*Trillium grandiflorum*	2										X						

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
IRIS FAMILY	*IRIDACEAE*																	
wild blue flag	*Iris versicolor*	1					X											
CATBRIER FAMILY	*SMILACACEAE*																	
carrionflower	*Smilax herbacea*	1																
ORCHID FAMILY	*ORCHIDACEAE*																	
helleborine	*Epipactis helleborine*	7	X			X				X				X	X			
Total Number of Plant Species	252		60	31	29	83	17	28	28	24	29	24	37	24	37	54	41	

Number of Plant Species Per Community

APPENDIX I - A Communities 16-22

			COMMUNITY NUMBER						
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
CLADONIA FAMILY	*CLADONIACEAE*								
reindeer-moss	*Cladina rangiferina*	2							
STONEWORT FAMILY	*CHARACEAE*								
stonewort	*Chara spp.*	1			X				
PEAT MOSS FAMILY	*SPHAGNACEAE*								
sphagnum moss species	*Sphagnum spp.*	5					X		
CLUBMOSS FAMILY	*LYCOPODIACEAE*								
shining clubmoss	*Huperzia lucidula*	1							
ground-pine	*Lycopodium obscurum*	2							
HORSETAIL FAMILY	*EQUISETACEAE*								
field horsetail	*Equisetum arvense*	3							
water horsetail	*Equisetum fluviatile*	3							
meadow horsetail	*Equisetum pratense*	4					X		
ROYAL FERN FAMILY	*OSMUNDACEAE*								
cinnamon fern	*Osmunda cinnamonea*	1							
interrupted fern	*Osmunda claytoniana*	1							
royal fern	*Osmunda regalis var.spectabilis*	2							
MAIDENHAIR FERN FAMIL	*PTERIDACEAE*								
northern maidenhair fern	*Adiantum pedatum*	2		X					
BRACKEN FERN FAMILY	*DENNSTAEDTIACEAE*								
eastern bracken fern	*Pteridium aquilinum*	3							
BEECH FERN FAMILY	*THELYPTERIDAE*								
New York fern	*Thelypteris noveboracensis*	1							

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
marsh fern	*Thelypteris palustris*	6			X				
SPLEENWORT FAMILY	*ASPLENIACEAE*								
walking fern	*Asplenium rhizophyllum*	1		X					
maidenhair spleenwort	*Asplenium trichomanes ssp.quadrival*	1							
WOOD FERN FAMILY	*DRYOPTERIDACEAE*								
northern lady fern	*Athyrium filix-femina*	1							
bulbet bladder fern	*Cystopteris bulbifera*	3			X				
spinulose wood-fern	*Dryopteris carthusiana*	4		X				X	
evergreen wood-fern	*Dryopteris intermedia*	1						X	
marginal wood-fern	*Dryopteris marginalis*	6		X					
oak fern	*Gymnocarpium dryopteris*	1							
ostrich fern	*Matteuccia struthiopteris*	2							
sensitive fern	*Onoclea sensibilis*	10			X		X		
POLYPODY FAMILY	*POLYPODIACEAE*								
rock polypody fern	*Polypodium virginianum*	4		X					
PINE FAMILY	*PINACEAE*								
balsam fir	*Abies balsamea*	8							
white spruce	*Picea glauca*	8		X		X			
eastern white pine	*Pinus strobus*	11				X		X	
eastern hemlock	*Tsuga canadensis*	3							
CYPRESS FAMILY	*CUPRESSACEAE*								
common juniper	*Juniperus communis var. depressa*	9		X		X			X
eastern red cedar	*Juniperus virginiana*	1							X
eastern white cedar	*Thuja occidentalis*	15			X	X	X	X	
WATER-LILY FAMILY	*NYMPHACEAE*								
bullhead pond-lily	*Nuphar variegata*	3			X				
fragrant water-lily	*Nymphaea odorata spp. Odorata*	1							
WATER-SHIELD FAMILY	*CABOMBACEAE*								
water-shield	*Brasenia schreberi*	1			X				

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
BUTTERCUP FAMILY	*RANUNCULACEAE*								
white baneberry	*Actaea pachypoda*	3		X					
thimbleweed	*Anemone virginiana*	4	X			X			
wild columbine	*Aquilegia canadensis*	3		X				X	
goldthread	*Coptis trifolia*	2							
sharp-lobed hepatica	*Hepatica acutiloba*	1		X					
round-lobed hepatica	*Hepatica americana*	3		X					
tall buttercup	*Ranunculus acris*	7				X			X
early meadow rue	*Thalictrum dioicum*	1							
BARBERRY FAMILY	*BERBERIDACEAE*								
Japanese barberry	*Berberis thunbergii*	2							
blue cohosh	*Caulophyllum giganteum*	2		X					
FUMITORY FAMILY	*FUMARIACEAE*								
yellow corydalis	*Corydalis flavula*	2		X					
pink corydalis	*Corydalis sempevirens*	1		X					
squirrel-corn	*Dicentra canadensis*	1							
ELM FAMILY	*ULMACEAE*								
American elm	*Ulmus americana*	7					X	X	
rock elm	*Ulmus thomasii*	1							
NETTLE FAMILY	*URTICACEAE*								
American stinging nettle	*Urtica dioica ssp. Gracilis*	3			X				
WALNUT FAMILY	*JUGLANDACEAE*								
bitternut hickory	*Carya cordiformis*	2							
butternut	*Juglans cinerea*	1							
WAX-MYRTLE FAMILY	*MYRICACEAE*								
sweet-fern	*Comptonia peregrina*	2							
BEECH FAMILY	*FAGACEAE*								
American beech	*Fagus grandifolia*	2							
bur oak	*Quercus macrocarpa*	4							X

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
red oak	*Quercus rubra*	7		X				X	
BIRCH FAMILY	*BETULACEAE*								
speckled alder	*Alnus rugosa*	2			X				
yellow birch	*Betula alleghaniensis Britt.*	1							
white birch	*Betula papyrifera*	7		X				X	
ironwood	*Ostrya virginiana*	6		X			X	X	
GOOSEFOOT FAMILY	*CHENOPODIACEAE*								
lamb's-quarters	*Chenopodium album*	1							
PINK FAMILY	*CARYOPHYLLACEAE*								
bladder campion	*Silene vulgaris*	1							X
BUCKWHEAT FAMILY	*POLYGONACEAE*								
water smartweed	*Polygonum amphibium*	1							
black bindweed	*Polygonum convolvulus*	1							
sheep sorrel	*Rumex acetosella*	3		X					
ST. JOHN'S-WORT FAMILY	*GUTTIFERAE*								
common St. John's-wort	*Hypericum perforatum*	4				X			
marsh St. John's-wort	*Triadenum fraseri*	1			X				
LINDEN FAMILY	*TILIACEAE*								
American basswood	*Tilia americana*	8		X				X	X
VIOLET FAMILY	*VIOLACEAE*								
downy yellow violet	*Viola pubescens*	2		X					
kidney-leaved violet	*Viola renifolia*	3						X	
WILLOW FAMILY	*SALICACEAE*								
balsam poplar	*Populus balsamifera*	5			X				
large-toothed aspen	*Populus grandidentata*	3							
trembling aspen	*Populus tremuloides*	7	X						
Bebb's willow	*Salix bebbiana*	1							
pussy willow	*Salix discolor*	7	X		X				
crack willow	*Salix fragilis*	4							

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
slender willow	*Salix petiolaris*	7	X		X				
MUSTARD FAMILY	*BRASSICACEAE*								
toothwort	*Cardamine diphylla*	1							
wild mustard	*Sinapsis arvensis*	1							
HEATH FAMILY	*ERICACEAE*								
wintergreen	*Gaultheria procumbens*	3							
highbush blueberry	*Vaccinium corymbosum*	1							
WINTERGREEN FAMILY	*PYROLACEAE*								
shinleaf	*Pyrola elliptica*	1							
INDIAN PIPE FAMILY	*MONOTROPACEAE*								
indian pipe	*Monotropa uniflora*	1							
PRIMROSE FAMILY	*PRIMULACEAE*								
fringed loosestrife	*Lysimachia ciliata*	1							
starflower	*Trientalis borealis*	1							
GOOSEBERRY FAMILY	*GROSSULARIACEAE*								
prickly gooseberry	*Ribes cynosbati*	5		X				X	X
red currant	*Ribes rubrum*	1		X					
ORPINE FAMILY	*CRASSULACEAE*								
mossy stonecrop	*Sedum acre*	3							X
SAXIFRAGE FAMILY	*SAXIFRAGACEAE*								
bishop's-cap	*Mitella diphylla*	1							
foam flower	*Tiarella cordifolia*	2		X					
ROSE FAMILY	*ROSACEAE*								
agrimony	*Agrimonia gryposepela*	1							
hawthorn species	*Crataegus spp.*	2						X	
common strawberry	*Fragaria virginiana*	9	X	X		X		X	X
yellow avens	*Geum aleppicum*	3		X					
apple	*Malus domestica*	2							
marsh cinquefoil	*Potentilla palustris*	1			X				

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
sulfur cinquefoil	*Potentilla recta*	4				X			X
creeping cinquefoil	*Potentilla reptans*	1							
pin cherry	*Prunus pensylvanica*	1							X
black cherry	*Prunus serotina*	1							
choke cherry	*Prunus virginiana*	7		X		X		X	X
prickly rose	*Rosa acicularis*	1				X			
Alleghany blackberry	*Rubus allegheniensis*	4							
wild red raspberry	*Rubus idaeus*	8		X					X
purple-flowering raspberry	*Rubus odoratus*	1							
dwarf raspberry	*Rubus pubescens*	1							
narrow-leaved meadowsweet	*Spiraea alba*	9	X		X				
barren strawberry	*Waldsteinia fragarioides*	6		X					
PEA FAMILY	*FABACEAE*								
black medick	*Medicago lupulina*	1							
white sweet-clover	*Melilotus alba*	5				X			X
low hop clover	*Trifolium agrarium*	3				X			X
red clover	*Trifolium pratense*	4				X			X
white clover	*Trifolium repens*	3				X			
cow vetch	*Vicia cracca*	2				X			
LOOSESTRIFE FAMILY	*LYTHRACEAE*								
water willow-herb	*Decodon verticillatus*	1							
purple loosestrife	*Lythrum salicaria*	1							
MEZEREUM FAMILY	*THYMELAECEAE*								
leatherwood	*Dirca palustris*	3		X					
EVENING PRIMROSE FAMIL	*ONAGRACEAE*								
dwarf enchanter's nightshade	*Circaea alpina*	1						X	
common evening primrose	*Oenothera biennis*	2							X
DOGWOOD FAMILY	*CORNACEAE*								
alternate-leaf dogwood	*Cornus alternifolia*	1		X					

			COMMUNITY NUMBER						
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
bunchberry	*Cornus canadensis*	2							
red panicled dogwood	*Cornus foemina Miller ssp.racemosa*	1							
round-leaved dogwood	*Cornus rugosa*	1		X					
red-osier dogwood	*Cornus stolonifera*	6			X		X		
BUCKTHORN FAMILY	*RHAMNACEAE*								
European buckthorn	*Rhamnus cathartica*	8			X				X
GRAPE FAMILY	*VITACEAE*								
Virginia creeper	*Parthenocissus inserta*	1		X					
wild grape	*Vitis riparia*	6							
MAPLE FAMILY	*ACERACEAE*								
striped maple	*Acer pensylvanicum*	1							
red maple	*Acer rubrum*	8		X	X		X		
silver maple	*Acer saccharinum*	2					X		
sugar maple	*Acer saccharum ssp.saccharum*	7		X		X		X	
CASHEW FAMILY	*ANACARDIACEAE*								
western poison-ivy	*Rhus rydbergii*	9		X		X	X	X	
staghorn sumac	*Rhus typhina*	7						X	X
GERANIUM FAMILY	*GERANIACEAE*								
wild geranium	*Geranium maculatum*	1							
herb Robert	*Geranium robertianum*	2						X	
TOUCH-ME-NOT FAMILY	*BALSAMINACEAE*								
spotted jewelweed	*Impatiens capensis*	1							
GINSENG FAMILY	*ARALIACEAE*								
wild sarsaparilla	*Aralia nudicaulis*	4		X					
CARROT FAMILY	*APIACEAE*								
bulbous water-hemlock	*Cicuta bulbifera*	2			X		X		
Queen-Anne's lace	*Daucus carota*	4							
woolly sweet cicely	*Osmorhiza claytonii*	1							
black snakeroot	*Sanicula marilandica*	2		X					

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
hemlock water parsnip	*Sium suave*	2							
DOGBANE FAMILY	*APOCYNACEAE*								
spreading dogbane	*Apocynum androsaemifolium*	1							
MILKWEED FAMILY	*ASCLEPIADACEAE*								
swamp milkweed	*Asclepias incarnata*	4			X				
common milkweed	*Asclepias syriaca*	5				X			X
NIGHTSHADE FAMILY	*SOLANACEAE*								
clammy ground-cherry	*Physalis heterophylla*	1				X			
bitter nightshade	*Solanum dulcamara*	7	X		X		X		
MORNING-GLORY FAMILY	*CONVOLVULACEAE*								
field bindweed	*Convolvulus arvensis*	1							
WATERLEAF FAMILY	*HYDROPHYLLACEAE*								
Virginia waterleaf	*Hydrophyllum virginianum*	1							
BORAGE FAMILY	*BORAGINACEAE*								
Viper's bugloss	*Echium vulgare*	4				X			X
common gromwell	*Lithospermum officinale*	2							
MINT FAMILY	*LAMIACEAE*								
wild basil	*Clinopodium vulgare*	4				X		X	
American water-horehound	*Lycopus americanus*	6					X		
wild mint	*Mentha arvensis*	2			X				
heal-all	*Prunella vulgaris ssp. Lanceolata*	4					X		
PLANTAIN FAMILY	*PLANTAGINACEAE*								
narrow-leaved plantain	*Plantago lanceolata*	4				X			X
broad-leaved plantain	*Plantago major*	1							
OLIVE FAMILY	*OLEACEAE*								
white ash	*Fraxinus americana*	8		X				X	
black ash	*Fraxinus nigra*	1							
green ash	*Fraxinus pennsylvanica var. subinteg*	3							

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
FIGWORT FAMILY	*SCROPHULARIACEAE*								
butter-and-eggs	*Linaria vulgaris*	1							
common mullein	*Verbascum thapsus*	6		X					X
MADDER FAMILY	*RUBIACEAE*								
cleavers	*Galium aparine*	1		X					
rough bedstraw	*Galium asprellum*	4			X				
white bedstraw	*Galium mollugo*	1		X					
small bedstraw	*Galium trifidum*	1							
creeping partridge-berry	*Mitchella repens*	3							
HONEYSUCKLE FAMILY	*CAPRIFOLIACEAE*								
fly honeysuckle	*Lonicera canadensis*	1		X					
tartarian honeysuckle	*Lonicera tatarica*	2		X					X
red-berried elderberry	*Sambucus racemosa*	2		X					
downy arrow-wood	*Viburnum rafinesquianum*	1							
ASTER FAMILY	*ASTERACEAE*								
common yarrow	*Achillea millefolium*	5				X			X
field pussytoes	*Antennaria neglecta*	2							X
common burdock	*Arctium minus*	1							X
nodding beggarticks	*Bidens cernua*	1							
ox-eye daisy	*Chrysanthemum leucanthemum*	5				X			X
bull thistle	*Cirsium vulgare*	1							
Philadelphia fleabane	*Erigeron philadelphicus ssp. philadel*	2				X			
spotted joe-pyeweed	*Eupatorium maculatum*	5	X		X		X		
boneset	*Eupatorium perfoliatum*	5			X				
large-leaved aster	*Eurybia macrophylla*	9		X		X			
grass-leaved goldenrod	*Euthamia graminifolia*	2							
orange hawkweed	*Hieracium aurantiacum*	4				X			
king devil hawkweed	*Hieracium x florbundum*	6				X			X
black-eyed Susan	*Rudbeckia hirta*	1				X			

			COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
tall goldenrod	*Solidago altissima*	7				X			X
Canada goldenrod	*Solidago canadensis*	2							
zig-zag goldenrod	*Solidago flexicaulis*	2		X					
gray goldenrod	*Solidago nemoralis ssp. Nemoralis*	5				X			X
field sow thistle	*Sonchus arvensis ssp.arvensis*	1							
spiny-leaved sow thistle	*Sonchus asper*	1							
heart-leaved aster	*Symphyotrichum cordifolium*	1							
panicled aster	*Symphyotrichum lanceolatum ssp.hes*	1							
calico aster	*Symphyotrichum lateriflorum var.late*	5	X						
New England aster	*Symphyotrichum novae- angliae*	3				X			
white heath aster	*Symphyotrichum pilosum var.pilosum*	1							
purple-stemmed aster	*Symphyotrichum puniceum*	3				X			
common dandelion	*Taraxacum officinale*	4	X						
goat's-beard	*Tragopogon dubius*	3				X			X
coltsfoot	*Tussilago farfara*	2							
ARUM FAMILY	*ARACEAE*								
Jack-in-the-pulpit	*Arisaema triphyllum*	1							
DUCKWEED FAMILY	*LEMNACEAE*								
common duckweed	*Lemna minor*	1							
RUSH FAMILY	*JUNCACEAE*								
Canadian rush	*Juncus canadensis*	4	X				X		
path rush	*Juncus tenuis*	4							
SEDGE FAMILY	*CYPERACEAE*								
drooping wood sedge	*Carex arctata Boott*	2							
golden-fruited sedge	*Carex aurea*	1							
Bebb's sedge	*Carex bebbii*	6	X				X		
fringed sedge	*Carex crinita*	1							
bladder sedge	*Carex intumescens*	4					X		
common lake sedge	*Carex lacustris*	5			X				

		COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
livid sedge	*Carex livida*	2							
few-fruited sedge	*Carex oligocarpa*	5					X		
Pennsylvania sedge	*Carex pensylvanica*	7						X	
cypress-like sedge	*Carex pseudo-cyperus*	4							
awl-fruited sedge	*Carex stipata*	6	X		X				
tussock sedge	*Carex stricta*	4							
greenish sedge	*Carex viridula*	3							
three-way sedge	*Dulichium arundinaceum*	3			X				
needle spike-rush	*Eleocharis acicularis*	2			X				
wool-grass	*Scirpus cyperinus*	7	X				X		
common three-square	*Scirpus pungens*	1							
softstem bulrush	*Scirpus validus*	2			X				
GRASS FAMILY	*POACEAE*								
redtop	*Agrostis gigantea*	1				X			
bearded shorthusk	*Brachyelytrum erectum*	2		X					
field brome	*Bromus arvensis*	1							X
fringed brome grass	*Bromus ciliatus*	1							
awnless brome grass	*Bromus inermis ssp.inermis*	3							X
Kalm's brome	*Bromus kalmii*	1				X			
Canada bluejoint grass	*Calamagrostis canadensis*	1					X		
orchard grass	*Dactylis glomerata*	2							X
poverty oatgrass	*Danthonia spicata*	4				X			
bottle-brush grass	*Elymus hystrix*	3							
quack grass	*Elymus repens*	1							
fowl manna grass	*Glyceria striata*	6			X		X		
white-grained mountain rice	*Oryzopsis asperifolia*	1							
acuminate panic grass	*Panicum acuminatum var.acuminatu*	3							X
reed canary grass	*Phalaris arundinacea*	2	X						
timothy	*Phleum pratense*	6	X			X			X

			COMMUNITY NUMBER							
Common Name	***Scientific Name***	**Total**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
fowl meadow grass	*Poa palustris*	5							X
false melic grass	*Schizachne purpurascens (Torr.) Swal*	1							
CATTAIL FAMILY	*TYPHACEAE*								
common cattail	*Typha latifolia*	1							
LILY FAMILY	*LILIACEAE*								
bluebead lily	*Clintonia borealis*	1							
Canada mayflower	*Maianthemum canadense*	4		X				X	
Indian cucumber-root	*Medeola virginiana*	2							
false Solomon's seal	*Smilacina racemosa*	1		X					
rose-twisted stalk	*Streptopus roseus*	4		X				X	
white trillium	*Trillium grandiflorum*	2		X					
IRIS FAMILY	*IRIDACEAE*								
wild blue flag	*Iris versicolor*	1							
CATBRIER FAMILY	*SMILACACEAE*								
carrionflower	*Smilax herbacea*	1		X					
ORCHID FAMILY	*ORCHIDACEAE*								
helleborine	*Epipactis helleborine*	7		X				X	
Total Number of Plant Species	252		16	53	31	39	22	26	38
			Number of Plant Species Per Community							

Appendix I-B

List of Significant Plant Species

APPENDIX I - B List of Significant Plant Species

Plant species observed by NEA with significant status on national, provincial and relevant regional lists are listed with status codes and where applicable the most current year of publication. Three standard reference works were used for the botanical nomenclature and taxonomy (Newmaster et. al., 1998; Gleason and Cronquist 1991; Voss 1980; 1985). Other published works for botanical names included; ferns (Cody and Britton 1989); grasses (Dore and McNeill 1980); orchids (Whiting and Catling 1986); shrubs (Soper and Heimburger 1982) and trees (Farrar 1995).

NATIONAL RANKING **Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Government of Canada**
Species at Risk Act (SARA), SCHEDULE 1 (Subsections 2(1), 42(2) and 68(2)), Government of Canada

PROVINCIAL RANKING **Species at Risk in Ontario (COSSARO), Government of Ontario**
Provincial Rank (SRANK), Natural Heritage Information Center, Government of Ontario

REGIONAL RANKING **Oldham PTO** Oldham, M.J. 1999

STATUS CODES

COSEWIC	**END ***	- Endangered Species	***Year of Status Publication included in Code**
COSSARO	**THR ***	- Threatened Species	
SARA	**SC ***	- Species of Concern	
SRANK	**S1**	- Extremely Rare	**Other national or provincial codes not listed**
	S2	- Very Rare	
	S3	- Rare to Uncommon	
Regional Lists	**R**	- Rare native species	**Other Regional codes not listed**
	EXP	- Extirpated native species	

		NATIONAL RANKINGS		PROVINCIAL RANKINGS		REGIONAL RANKINGS				
Common Name	**Scientific Name**	**COSEWIC**	**SARA**	**COSSARO**	**SRank**	**Oldham PTO**				
walking fern	Asplenium rhizophyllum					R				
Japanese barberry	Berberis thunbergii					R				
rock elm	Ulmus thomasii				S4?	R				
butternut	Juglans cinerea	END Apr/14	END Mar/13	END Jun/14	S3?					
Plants with Ranking	**Total:** 4 **Status List Totals:**	1	1	1		3	0	0	0	0

Appendix II

Project Bird Status Report

APPENDIX II Bird Status Report

Bird species observed by NEA are listed in the order followed the American Ornithologists' Union (AOU) Check-list of North American birds (7th edition, 1999, 47th Supplement). Common and scientific nomenclature are based on those used by AOU. Any significant status for a species on national and provincial lists is displayed as well as those from relevant regional lists.

List Status :

END - endangered	A wildlife species facing imminent extirpation or extinction.
END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:

COSEWIC	The Committee on the Status of Endangered Wildlife in Canada, May 2016.
COSSARO	The Committee on the Status of Species at Risk in Ontario, June 2016.
SARA	Species At Risk Act, Schedule 1, Government of Canada, 2016.
Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000
Region 6	Southern Ontario Wetland Evaluation Appendix 11B, Version 3.2, March 2013

Breeding Status: (Observed By NEA)

B -species observed in breeding season in suitable habitat with some evidence of breeding (confirmed, probable or possible as per Ontario Breeding Bird Atlas, 2002).

F -species observed in breeding season but no evidence of breeding or suitable nest sites available on the study site (includes flyovers, migrants and foraging colonial breeders).

M -species observed outside of breeding season for that species and in area outside of the known

AOU Code	Common Name	Scientific Name				Area Sensitive	Region 6		
RUGR	Ruffed Grouse	*Bonasa umbellus*				No			
WITU	Wild Turkey	*Meleagris gallopavo*				No			
COLO	Common Loon	*Gavia immer*				No			
BWHA	Broad-winged Hawk	*Buteo platypterus*				Yes			
RTHA	Red-tailed Hawk	*Buteo jamaicensis*				No			
AMKE	American Kestrel	*Falco sparverius*				No			
KILL	Killdeer	*Charadrius vociferus*				No			
AMWO	American Woodcock	*Scolopax minor*				No			
MODO	Mourning Dove	*Zenaida macroura*				No			
CONI	Common Nighthawk	*Chordeiles minor*	THR	SC	THR	No			
WPWI	Eastern whip-poor-will	*Antrostomus vociferus*	THR	THR	THR	Yes			
YBSS	Yellow-bellied Sapsucker	*Sphyrapicus varius*				No			
DOWO	Downy Woodpecker	*Picoides pubescens*				No			
HAWO	Hairy Woodpecker	*Picoides villosus*				Yes			
NOFL	Northern Flicker	*Colaptes auratus*				No			
PIWO	Pileated Woodpecker	*Dryocopus pileatus*				Yes			
EWPE	Eastern Wood-Pewee	*Contopus virens*	SC	SC		No			
ALFL	Alder Flycatcher	*Empidonax alnorum*				No			
LEFL	Least Flycatcher	*Empidonax minimus*				Yes			
EAPH	Eastern Phoebe	*Sayornis phoebe*				No			
GCFL	Great Crested Flycatcher	*Myiarchus crinitus*				No			
EAKI	Eastern Kingbird	*Tyrannus tyrannus*				No			
REVI	Red-eyed Vireo	*Vireo olivaceus*				No			
BLJY	Blue Jay	*Cyanocitta cristata*				No			
AMCR	American Crow	*Corvus brachyrhynchos*				No			
BARS	Barn Swallow	*Hirundo rustica*	THR	THR		No			
BCCH	Black-capped Chickadee	*Poecile atricapillus*				No			

RBNU	Red-breasted Nuthatch	*Sitta canadensis*				Yes		
WBNU	White-breasted Nuthatch	*Sitta carolinensis*				Yes		
WIWR	Winter Wren	*Troglodytes troglodytes*				Yes		
VEER	Veery	*Catharus fuscescens*				Yes		
HETH	Hermit Thrush	*Catharus guttatus*				Yes		
WOTH	Wood Thrush	*Hylocichla mustelina*	THR	SC		No		
AMRO	American Robin	*Turdus migratorius*				No		
GRCA	Gray Catbird	*Dumetella carolinensis*				No		
BRTH	Brown Thrasher	*Toxostoma rufum*				No		
EUST	European Starling	*Sturnus vulgaris*				No		
CEWX	Cedar Waxwing	*Bombycilla cedrorum*				No		
NAWA	Nashville Warbler	*Vermivora ruficapilla*				No		
YEWA	Yellow Warbler	*Dendroica petechia*				No		
CSWA	Chestnut-sided Warbler	*Dendroica pensylvanica*				No		
MAWA	Magnolia Warbler	*Dendroica magnolia*				Yes		
BTBW	Black-throated Blue Warb	*Dendroica caerulescens*				Yes		
YRWA	Yellow-rumped Warbler	*Dendroica coronata*				No		
BTGW	Black-throated Green War	*Dendroica virens*				Yes		
BLWA	Blackburnian Warbler	*Dendroica fusca*				Yes		
PIWA	Pine Warbler	*Dendroica pinus*				Yes		
PRWA	Prairie Warbler	*Dendroica discolor*				No		
BWWA	Black-and-white Warbler	*Mniotilta varia*				Yes		
AMRE	American Redstart	*Setophaga ruticilla*				Yes		
OVEN	Ovenbird	*Seiurus aurocapillus*				Yes		
NOWA	Northern Waterthrush	*Seiurus noveboracensis*				No		
COYE	Common Yellowthroat	*Geothlypis trichas*				No		
SCTA	Scarlet Tanager	*Piranga olivacea*				Yes		
EATO	Eastern Towhee	*Pipilo erythrophthalmus*				No		
CHSP	Chipping Sparrow	*Spizella passerina*				No		
CCSP	Clay-colored Sparrow	*Spizella pallida*				No		

FISP	Field Sparrow	*Spizella pusilla*				No			
SOSP	Song Sparrow	*Melospiza melodia*				No			
WTSP	White-throated Sparrow	*Zonotrichia albicollis*				No			
RBGR	Rose-breasted Grosbeak	*Pheucticus ludovicianus*				No			
INBU	Indigo Bunting	*Passerina cyanea*				No			
RWBL	Red-winged Blackbird	*Agelaius phoeniceus*				No			
EAME	Eastern Meadowlark	*Sturnella magna*	THR	THR		No			
COGR	Common Grackle	*Quiscalus quiscula*				No			
BHCO	Brown-headed Cowbird	*Molothrus ater*				No			
AMGO	American Goldfinch	*Carduelis tristis*				No			
TOTAL SPECIES OBSERVED:	**67**					**19**	**0**	**0**	**0**

Appendix III

Mammals

APPENDIX III Mammal Status Report

Project ID: 12-030

Mammal species observed by NEA are listed. These species are identified by the common and scientific name used by the Natural heritage information Centre (NHIC). Any significant status for a species on national and provincial lists is displayed as well as those from relevant regional lists.

List Status :

END - endangered	A wildlife species facing imminent extirpation or extinction.
END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:

COSEWIC	The Committee on the Status of Endangered Wildlife in Canada, Apr. 2013.
COSSARO	The Committee on the Status of Species at Risk in Ontario, May 2013.
SARA	Species At Risk Act, Schedule 1, Government of Canada, 2013.
Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000

Common Name	Scientific Name	COSEWIC	COSSARO	SARA	Area Sensitive
Ermine	*Mustela erminea*				No
Black Bear	*Ursus americanus*				No
Common Porcupine	*Erethizon dorsatum*				No
Coyote	*Canis latrans*				No
Eastern Chipmunk	*Tamias striatus*				No
Eastern Cottontail	*Sylvilagus floridanus*				No
American Beaver	*Castor canadensis*				No
Eastern Gray Squirrel (Gray Phase)	*Sciurus carolinensis*				No
White-tailed Deer	*Odocoileus virginianus*				No
Long-tailed Weasel	*Mustela frenata*				No
Meadow Jumping Mouse	*Zapus hudsonius*				No
Moose	*Alces alces*				Yes
Red Fox	*Vulpes vulpes*				No
Red Squirrel	*Tamiasciurus hudsonicus*				No
Snowshoe Hare	*Lepus americanus*				No
Eastern Gray Squirrel (Black Phase	*Sciurus carolinensis*				No
No. of Species Observed in Project 16		0	0	0	1

Appendix IV

Herpetezoa

APPENDIX IV Herpetozoa Status Report

Project ID: 12-030

Herpetozoa (amphibian and reptile) species observed by NEA are listed by class then by family taxonomic grouping. These species are identified by the common and scientific name used by the Natural heritage information Centre (NHIC). Any significant status for a species on national and provincial lists is displayed as well as those from relevant regional lists.

List Status :

END - endangered	A wildlife species facing imminent extirpation or extinction.
END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:

COSEWIC	The Committee on the Status of Endangered Wildlife in Canada, Apr. 2013.
COSSARO	The Committee on the Status of Species at Risk in Ontario, May 2013.
SARA	Species At Risk Act, Schedule 1, Government of Canada, 2013.
Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000

Amphibian

Common Name	Scientific Name	COSEWIC	COSSARO	SARA	Area Sensitive
Lungless Salamanders	*Plethodontidae*				
Eastern Red-backed Salamander	*Plethodon cinereus*				No
Treefrogs	*Hylidae*				
Western Chorus Frog	*Pseudacris triseriata*	THR		THR	No
Spring Peeper	*Pseudacris crucifer*				No
Gray Treefrog	*Hyla versicolor*				No
True Frogs	*Ranidae*				
Northern Leopard Frog	*Rana pipiens*				No
Green Frog	*Rana clamitans*				No
American Bullfrog	*Rana catesbeiana*				Yes
No. of Species Observed: 7		**1**	**0**	**1**	**1**

Reptiles

Common Name	Scientific Name	COSEWIC	COSSARO	SARA	Area Sensitive
Typical Snakes	*Colubridae*				
Common Gartersnake	*Thamnophis sirtalis*				No
No. of Species Observed: 1		**0**	**0**	**0**	**0**

No. of Species Observed in Project 8