Natural Environment Report Level 1 & 2

Category 9 and Category 11 Aggregate Permit

Part of Lot 11, Concession 2

McClintock Township

November 2016

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1.0 INTRODUCTION

FRi Ecological Services (FRi) was retained by Timbercraft Consultation Inc., to complete a Natural Environment Level 1 and 2 Report. This report is to support a new aggregate permit, which will involve a new quarry and the expansion of an existing sand pit. The new permit will consist of 21.85 hectares in McClintock Township, Part of Lot 11, Concession 2, County of Haliburton. This report was prepared as per the Aggregate Resources of Ontario Provincial Standards. Consistent with *Aggregate Permit Applications: Natural Environment Report Standards: A.R. 4.01.06*, five natural heritage components were considered for the proposed permit area. This report combines background information from agency sources and field work completed in 2016 to identify natural heritage values, assess potential impacts and suggest appropriate mitigation measures.

1.1 Study Objectives

This study was designed to determine if the following natural heritage features exist on or within 120 metres of the site and if so, provide appropriate mitigation for any negative impacts. The proposed permit area will be 21.85 hectares, with a total extractable area of 14.85 hectares. The following natural heritage features were considered, based on a desktop review of available information from various sources including correspondence with the Ontario Ministry of Natural Resources and Forestry (MNRF) and information collected during field investigations in 2016. The following natural heritage features were considered during site visits on May 24, June 2, June 7, June 9, June 13, June 27 and July 12 and November 17, 2016.

- Significant wetlands;
- Habitat of threatened and endangered species;
- Significant areas of natural and scientific interest (A.N.S.I.);
- Significant wildlife habitat; and
- Fish habitat.

1.2 Background Information

A request for information was sent to the Ministry of Natural Resources and Forestry (MNRF) – Parry Sound District on May 17, 2016 summarizing suspected species at risk, habitats and values to be considered. A reply was received June 1, 2016. See Appendix A for correspondence.

It is our understanding that the area of extraction will be limited to northeastern limits of the permit boundary.

1.3 Field Investigations

Several species-specific surveys were completed; those that are relevant to this application are outlined in the sections below.

2.0 STUDY AREA DESCRIPTION

2.1 Geographic Location

The proposed pit expansion and quarry is in part of Lot 11, Concession 2, in the geographic township of McClintock. The site is located at 1436 McClintock Road, off Highway 12 approximately 8 km north of the town of Dorset (Figure 1). The Crown Land Use Policy Atlas[1] was consulted and the proposed aggregate operation is located within the Bracebridge Area of Parry Sound District General Use Area G362; which permits aggregate extraction in this area.

2.2 Ecological Setting

The subject property and the surrounding landscape is situated in Ecodistrict 5E-9. This site consists of moderately rolling rock ridges that are shallow to moderately covered with stony silty sand. Trains of sand and gravel are present in depressions. The base content of the sand and silty sand is very low and granitic. The underlying bedrock is also granitic.[2]

Within this region, mixedwood forest with dominant vegetation such as; yellow birch, sugar maple, eastern hemlock, and eastern white pine with beech appearing on warmer sites are common. Red and eastern white pine, and red oak occupy dry sites. Wetter sites support red maple, black ash, white spruce, tamarack, and eastern white cedar.[3]

2.3 Bedrock

The bedrock of this area is composed mainly of Precambrian rocks within the central gneiss belt of the Grenville structural province; a subdivision of the Canadian shield. Rocks are metamorphic, heterogeneous and include banded quartzo-feldspatic gneiss, pelitic and semi-pelitic gneiss and calc-silicate gneiss.[4] Some hills of exposed bedrock were seen in portions of the maple hardwood forest community.

2.4 Local Drainage

The subject property has gentle to moderate slopes, especially surrounding the low-lying wetlands. A noticeable gradient is located where the conifer swamp transitions into the maple hardwood forest community at the southeastern section of the site. In general, surface water flows north-to-south.

There are two swamps (mineral conifer and maple hardwood) located within the proposed site, as well as a sparse treed bog and meadow marsh located within the 120 m adjacent lands. The nearest watercourse is an unnamed stream which flows underneath McClintock Road in a

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[1] Ontario Ministry of Natural Resources and Forestry. Policy Report. Ontario's Crown Land Use Policy Atlas. http://www.giscoeapp.lrc.gov.on.ca/services/MNR/NHLUPS/CLUPA/xmlReader.aspx?xsl=web-primary.xsl&type=primary&POLICY_IDENT=G362 (Bracebridge Area – Parry Sound District) Accessed July 22, 2016.

[2, 4] Ford, M.J., and Geddes, R.S. Quaternary Geology of the Algonquin Park Area; Ontario Geological Survey, Open Field Report 5600, 87p +. 1986. Ontario Geological Survey Open File Report 5600, Quaternary Geology of the Algonquin Park Area, (pp 7-14)

[3] Achuff, P., J et al., Ecological Framework of Canada, Ecoregions of Canada. Algonquin-Lake Nipissing http://ecozones.ca/english/region/98.html

southerly direction leading to Harvey Lake, east of the proposed site. The maple hardwood swamp located within the western limits of the site is isolated from any other watercourse and appeared to be connected by groundwater flows. The water within the conifer swamp, at the eastern limits flows east into the unnamed stream that flows south into Harvey Lake.

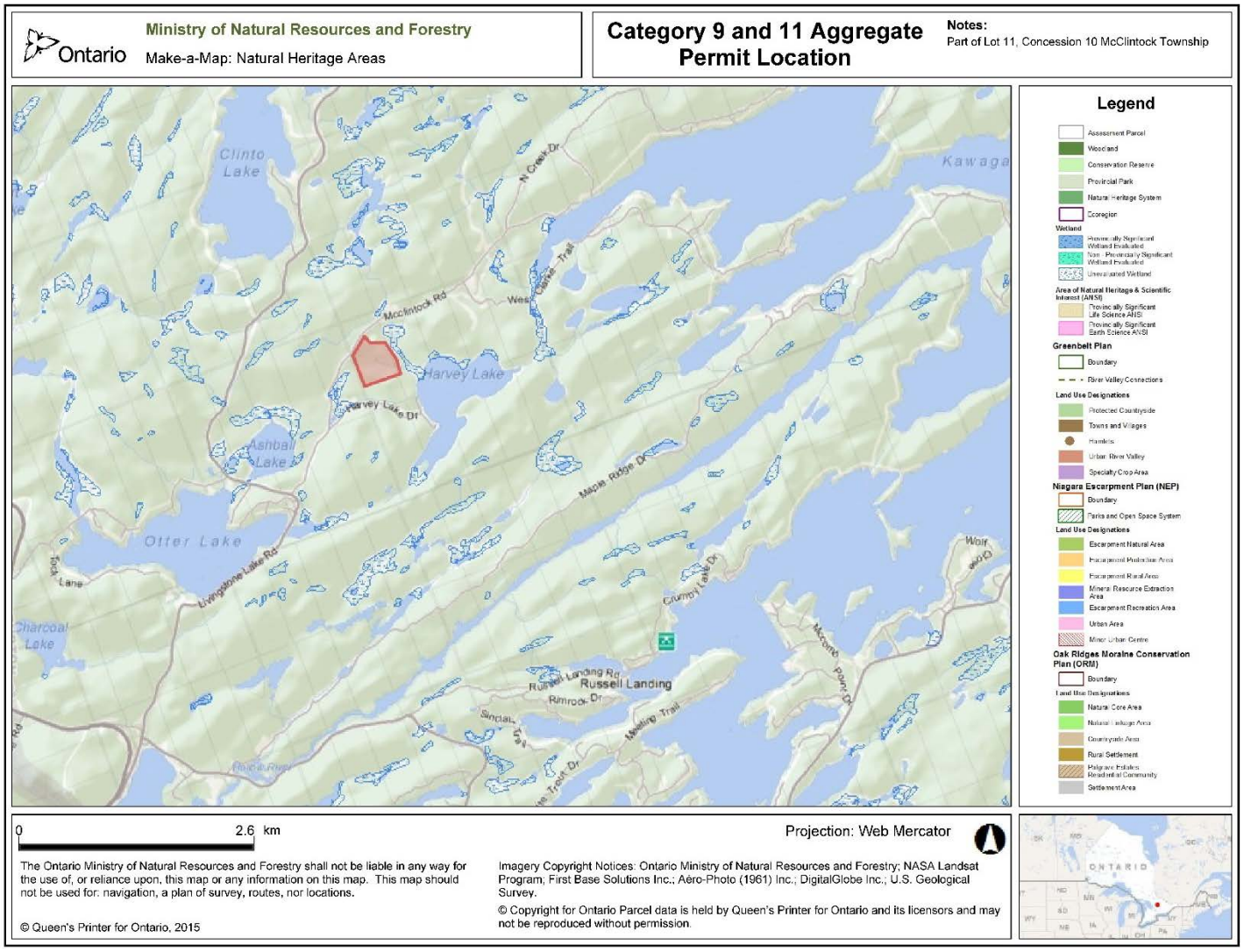

Figure 1: Location of proposed pit expansion and quarry in McClintock Township

3.0 ECOLOGICAL LAND CLASSIFICATION (ELC) - ECOSITES

The ecosites (soil type and vegetation communities) were assessed using the Ontario Ministry of Natural Resources (OMNR) *Ecosites of Ontario (April 2009 Operational draft*[5]*)*. A total of seven (7) ecosites represented the property and the surrounding 120 metre information area.

[5] Ecosites of Ontario. 2009. Operational Draft. Ontario Ministry of Natural Resources. 385+pp.

Table 1: ELC - Ecosite Designations within the 120 m Study Area

Ecosite	**Total Area (ha)**
G107Tt - Fresh, Silty to Fine Loamy: Maple Hardwood	7.7
G108Tt: Fresh, Silty to Fine Loamy: Mixedwood	36.2
G131Tt – Maple Hardwood Swamp	0.2
G137 - Sparse Treed Bog	0.06
G142N – Mineral Meadow Marsh	1.7
G223Tt – Mineral Intermediate Conifer Swamp	0.6
G001X – Excavated Bluff	1.4
TOTAL	47.9

The forest communities consisted predominately of ecosite G108Tt: Fresh, Silty to Fine Loamy: Mixedwood, covering approximately three quarters of the site (36.2 ha), and ecosite G107Tt - Fresh, Silty to Fine Loamy: Maple Hardwood (7.7 ha). Wetland communities included G142N – Mineral Meadow Marsh (1.7 ha), G223Tt – Mineral Intermediate Conifer Swamp (0.6 ha), G131Tt – Maple Hardwood Swamp (0.2ha) and G137: Sparse Treed Bog (0.06 ha). The existing sand pit is represented as an active mineral ecosite of G001X – Excavated Bluff, which includes 1.4 ha of the study area. Existing trails from heavy machinery and trees within the mixedwood forest appeared to be partially forested in some locations.

Photos 1 - 7 show the various ecosites located within the 120 m adjacent lands. Figure 2 shows a map outlining the ecosites located within the 120 m adjacent lands.

Photo 1: Ecosite G107Tt: Fresh, Silty to Fine Loamy: Maple Hardwood.

Photo 2: Ecosite G131Tt: Maple Hardwood Swamp.

Photo 3: The open water portion of ecosite G142N: Mineral Meadow Marsh.

Photo 4:: Ecosite G223Tt: Mineral Intermediate Conifer Swamp.

Photo 5 : Ecosite G137Tl: Sparse Treed Bog.

Photo 6: Ecosite G108Tt: Fresh, Silty to Fine Loamy: Mixedwood Forest.

Photo 7: Ecosite G001X: Excavated Bluff (active sand pit).

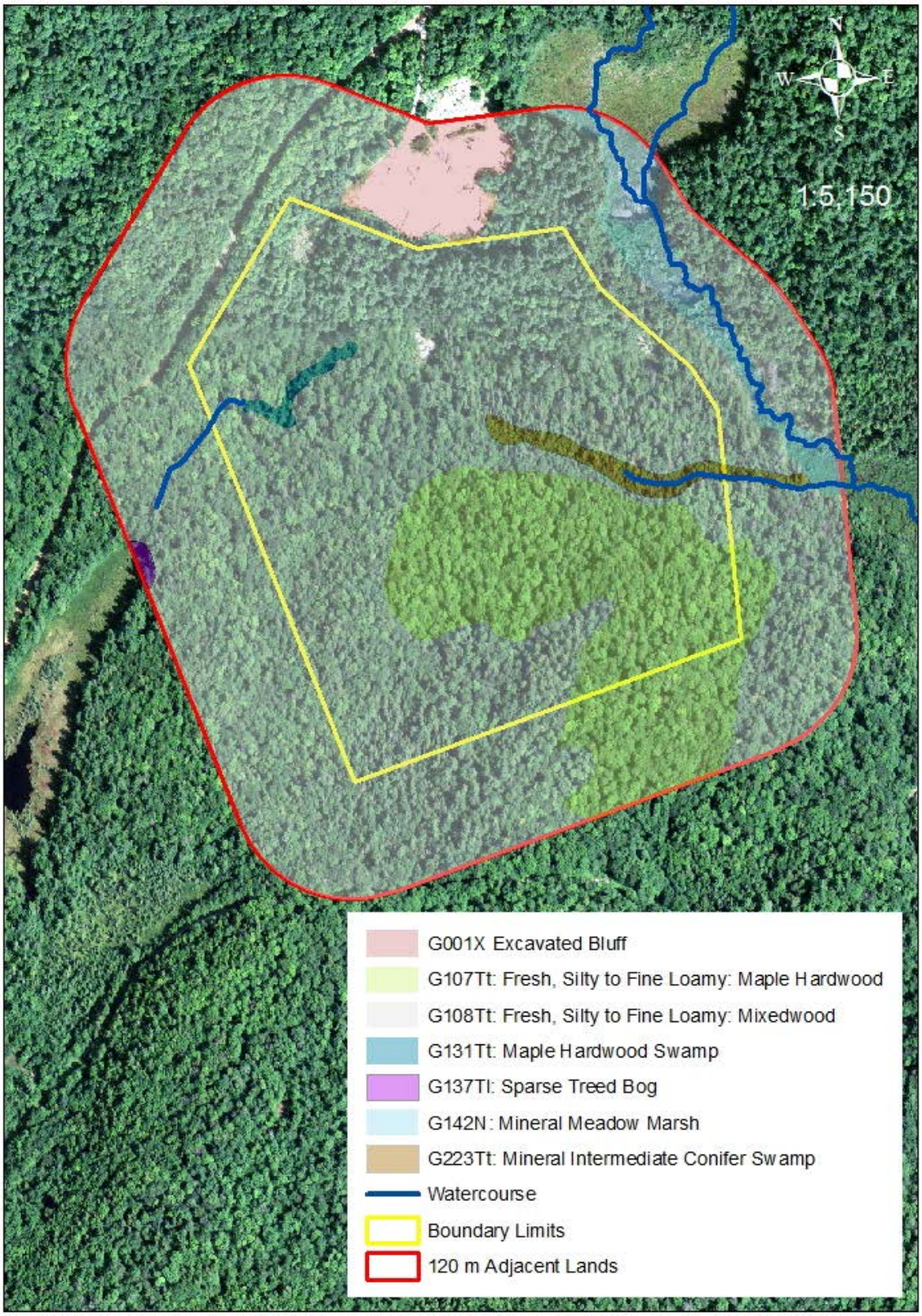

Figure 2: Ecosites observed within the boundary limits and 120m adjacent lands.

4.0 SIGNIFICANT WETLANDS

According to information provided by the MNRF Parry Sound District office and information obtained from Natural Heritage Information Database (NHIC) and Land Information Ontario (LIO), there are no significant wetlands on or within 120 metres of the proposed permit.

5.0 HABITAT OF THREATENED OR ENDANGERED SPECIES

A desktop review of available information was conducted in advance of field investigations. This included the NHIC, the Parry Sound District SAR tool and other publicly available species at risk databases (e.g. Ontario Breeding Bird Atlas, and the Ontario Nature's Reptile and Amphibian Atlas). Upon consultation with MNRF, no confirmed observations of threatened or endangered species were identified during the background review.

Species specific surveys for the following list of species whose ranges overlapped the study area and which potential habitat was present were considered during field investigations in 2016. This included Blanding's turtle (*Emydoidea blandingii*), Barn Swallow (*Hirundo rustica*), Bank Swallow (*Riparia riparia*), Chimney Swift (*Chaetura pelagica*), Eastern Hog-nosed Snake (*Heterodon platirhinos*) and Eastern Whip-poor-will (*Antrostomus vociferous*) as well as little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), Eastern small-footed myotis (*Myotis leibii*) and tri-colored bat (*Perimyotis subflavus*).

5.1 Blanding's Turtle

Blanding's turtles live in large wetlands and shallow lakes that contain many submergent and emergent aquatic plants. They are also associated with sphagnum wetlands and ponds. They are known to travel hundreds of meters looking for a mate or searching for a suitable nesting site. Hibernation takes place from October until the end of April within the mud of permanent water bodies [6].

Based on the presence of potentially suitable habitat for Blanding's turtles within 120 m of the proposed site, FRi completed basking surveys for Blanding's turtles on May 24, June 2, June 7, June 9, and June 13. One Blanding's turtle was observed basking in the sparse treed bog on June 9th, indicating that the sparse treed bog is likely a hibernaculum. The distance of the identified Blanding's turtle was 335 m from the proposed permit boundary. Buffers consisting of 30 m will be placed around any wetlands within the site to protect suitable Blanding's turtle habitat and potential travel corridors, see Figure 3.

[6]Government of Ontario. Ministry of Natural Resources and Forestry. Species at Risk Section. (www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BLNDNGS_TRTL_EN.html)

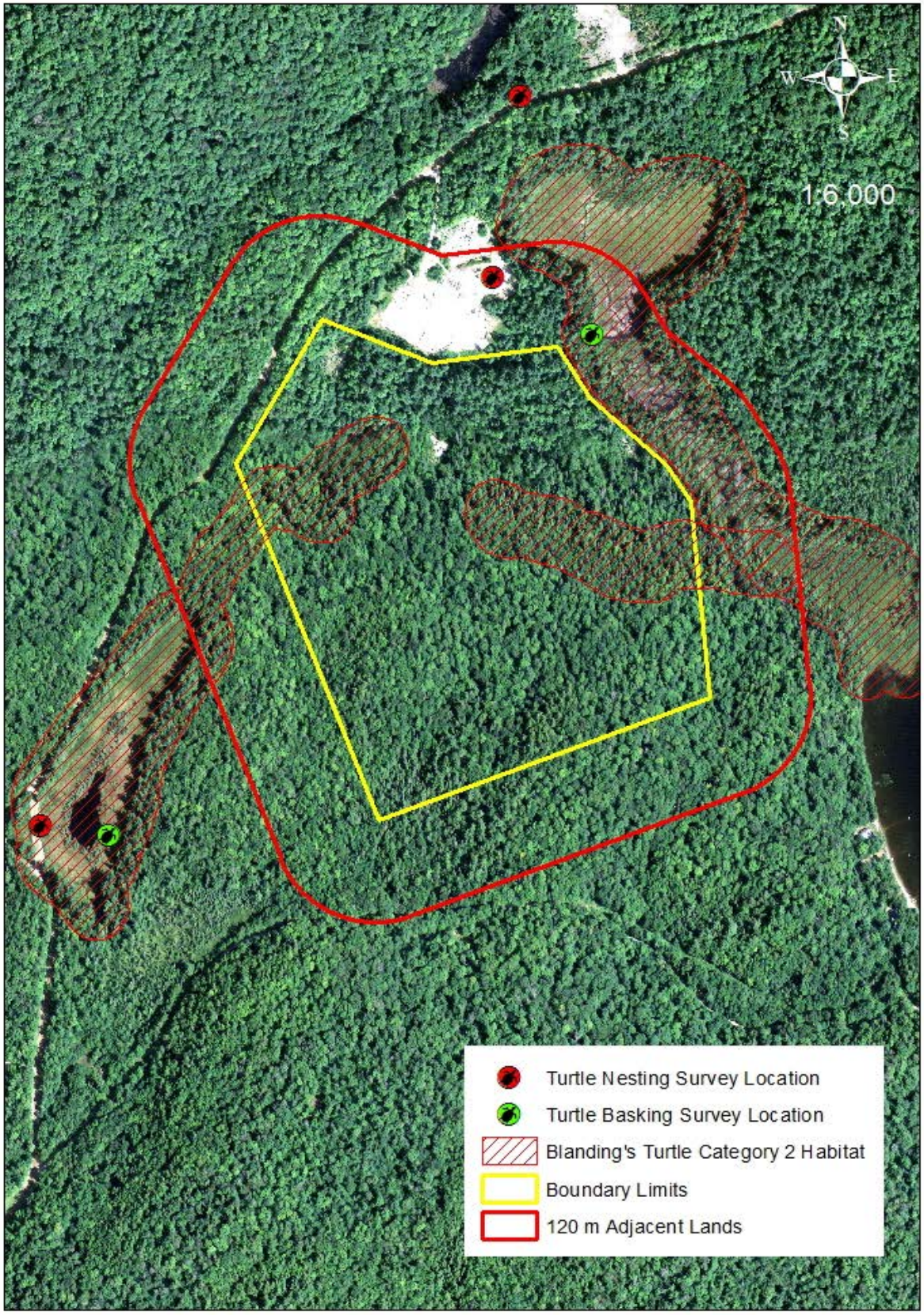

Figure 3: Blanding's turtle survey locations and Blanding's turtle Category 2 Habitat.

5.2 Barn Swallow

Barn swallows are an aerial insectivore, which are known to build their cup shaped nests under bridges, culverts and within open barns. They are attracted to open structures that contain ledges, which are often re-used every year.[7]

The existing sand pit, meadow marsh and cleared forested sections surrounding the sand pit may represent suitable foraging habitat for barn swallows; however, no suitable nesting habitat was observed within the study area. No Barn Swallows were observed during field investigations. It is expected that the open portions of existing habitat will remain and continue to provide a food source for swallows or other insectivores if they use the site in the future. No mitigation is recommended.

5.3 Bank Swallow

The Bank Swallow nests in burrows that include natural and man made settings which include vertical faces within active sand and gravel pits. The breeding colony is typically composed of multiple colonies that can consist of several individuals to a few thousand pairs.[8]

The existing sand pit (excavated bluff) does provide suitable nesting habitat for the bank swallow, however no bank swallows were observed and no colonies or nests were observed along the vertical cliffs of the sand pit during field investigations. The only nest that was present within the vertical cliff of the sand pit presumably belonged to a Belted Kingfisher. Although it was not observed entering or leaving the nest cavity, it was active in the area during all site visits.

5.4 Chimney Swift

Chimney swifts are an aerial insectivore; commonly seen foraging near waterbodies, and over open areas, and wetlands. They typically roost and nest in chimneys or similar structures, but there is evidence that suggests they may use large hollow cavity trees with a diameter breast height (DBH) greater that 50 cm. Surveys were completed during each site visit for the presence of swifts as well as for the presence of suitable nesting and roosting habitat.[9]

The study area offered open areas at the northern section of the meadow marsh and within the currently existing sand pit that Chimney Swift could potentially use for foraging, however no suitable nesting or roosting habitat was noted within the study area. Although there were a few white pines located within the mixedwood forest, none appeared to have cavities or be large enough to accommodate nesting or roosting swifts. Most the trees within both forest types had

[7]Government of Ontario. Ministry of Natural Resources and Forestry. Species at Risk Section. (http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BRN_SWLLW_EN.html)

[8] Government of Ontario. Ministry of Natural Resources and Forestry Species at Risk Section. (https://www.ontario.ca/page/bank-swallow)

[9]COSEWIC 2007. COSEWIC assessment and status report on the Chimney Swift *Chaetura pelagica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii +49pp.

trees with a diameter breast height (DBH) less than 50 cm. Suggested general mitigation for breeding birds is suggested below; recognizing the chance of encounter is low.

5.5 Eastern Hog-nosed Snake

Studies have shown that Eastern hog-nosed snakes prefer well-drained loose or sandy soil, open vegetative cover such as open woods, brush land or forest edge, proximity to water and climatic conditions typical of the eastern deciduous forest biome[10]. The proposed permit area contains some of the physical features that are considered preferred habitat e.g. sandy soils within the sand pit, forest edge and cleared forested areas.

Surveys were conducted in 2016 on warm sunny days when the air temperature was above 10°C but less than 30°C. Efforts were made to survey in the morning or later in the afternoon avoiding the hottest time of the day. Attention was paid to the cleared forested areas southwest of the current sand pit, forest edges adjacent to the shallow marsh and throughout the sand pit. No eastern hognose snakes were observed during field investigations, however four (4) eastern garter snakes were observed within the cleared forested areas and at the edge of the shallow marsh. The MNRF did not identify any occurrences of the eastern hog-nosed snake within or nearby the study area, however potential habitat is present within the study area. Suggested general mitigation for reptiles is included below.

5.6 Eastern Whip-poor-will

Suitable Whip-poor-will habitat includes a mix of open and forested areas with open woodlands or openings in mature, deciduous and coniferous and mixed forest types. Whip-poor-will have been documented in a variety of semi-open habitats, usually near wetlands. These open areas are used for foraging and forested areas are used for roosting and nesting. According to the Recovery Strategy for Eastern Whip-poor-will, nesting usually occurs in forest types in early stages of succession that contain rock or sand barrens with sparse shrub and herbaceous cover[11].

An assessment of the subject property was completed by using the song meter auditory survey method according to the MNRF Whip-poor-will and Common Nighthawk Survey Protocol (2015). No Whip-poor-wills were heard calling on the song meter.

Although suitable habitat was present for foraging, it is expected the forest type isn't suitable for nesting since most of the shrub and herbaceous cover was quite dense on several occasions, and most of the forest did not have sparse cover. General mitigation for breeding birds is suggested and is included below.

[10]Recovery Strategy for the Eastern Hog-nosed Snake (*Heterodon platirhinos*) in Canada. Species at Risk Act Recovery Strategy Series. Parks Canada Agency, Ottawa. vi + 24pp.

[11] Environment Canada. 2015. Recovery Strategy for the Eastern Whip-poor-will (*Antrostomus vociferus*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. v + 59 pp.

5.7 Bats

Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis & Tri-colored Bat

Little brown myotis use caves, quarries, tunnels, hollow trees or buildings for roosting. Maternity colonies are most often found in warm dark areas, like barns, attics and old buildings. They overwinter in caves or abandoned mines that are humid and remain above freezing. This species forages mainly over wetlands and near forest edges[12].

Northern myotis (previously referred to as Northern long-eared) prefers roosting in hollow trees or under loose bark, but they also roost in houses and other manmade structures. Males roost individually in the summer, while females are found in maternity colonies with up to 60 adults. They overwinter in mines and caves[13]. Northern myotis also prefers large sections of older forest cover for foraging and roosting in snags and trees[14].

Eastern small-footed myotis roost in caves, mine shafts, crevices or buildings that are in or near a forest. They hibernate in cold dry caves or mines; maternity colonies are in caves or buildings and hunt primarily in forests.

The tri-colored bat creates day roosts and maternity colonies in older forests and occasionally in barns and other structures. They are known to be present in open woods near water and will roost in trees, cliffs crevices, buildings or caves. They will hibernate preferably in draft-free and damp warm caves in mines or rock crevices[15].

According the SWH Ecoregion 5E Criterion, the following suitable ELC ecosites for little brown and northern myotis for roosting include G103-G108 and suitable hibernation ecosites include G158, G159, G164 and G180-181. Suitable roosting habitat was present within some areas (G107 and G108); however, no hibernation habitat was observed within the study area.

The Ministry of Natural Resources & Forestry's recent *Species at Risk (SAR) Technical Note* (2015)[16] lists several ecosites which have the potential to function as or contain bat habitat. None of the ecosites on or within 120 metres of the property qualify as 'candidate SAR bat habitat' according to the technical note.

Potential for Species at Risk Bats

There are no ecosites which qualify as candidate SAR bat habitat; therefore, according to MNRF's latest protocol and advice, no further surveys for species at risk bats were necessary.

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[12],[13] OMNR. 2000. Significant wildlife habitat technical guide. 151p.

[14] OMNR. 2012. Significant wildlife habitat Ecoregion 5E Criterion Schedule. 46p.

[15] OMNR. 2000. Significant wildlife habitat technical guide. Appendix G-Table G-4: Habitat descriptions for native Ontario mammals. p. 234.

16 Technical Note, Species at Risk (SAR) Bats, Little brown myotis and Northern myotis. Regional Operations Division, June 2015.

In consideration of significant wildlife habitat (non-species at risk bats), a passive acoustic recorder was deployed at the edge of the sand pit near the meadow marsh as this was considered potentially suitable bat habitat. The only species at risk bat that was recorded was the little brown bat, two passes were recorded during nine nights of recorder deployment. One pass was on May 24 and the other pass was noted on May 29. This extremely low number relative to the more than 500 passes overall indicates that these bats are flying by; the numbers do not support evidence of a maternity roost nearby.

The Wildlife Acoustics passive acoustic recorder was deployed for 9 consecutive nights; from May 24th through June 1st. The recorder was set to triggered recording from sunset to sunrise, the internal clock set with the GPS accessory to ensure absolute locational accuracy. The minimum trigger frequency (14kHz) was chosen to include the full echolocation range of the eight-species found in Ontario. The recordings were analyzed with Wildlife Acoustics Kaleidoscope Pro software and verified by an experienced biologist.[17]

6.0 Significant Areas of Natural and Scientific Interest (ANSI's)

There are no areas of natural and scientific interest on or within 120 metres of the proposed aggregate site. This was confirmed through consultation with MNRF and the Corporation of the Township of Algonquin Highlands official plan.

7.0 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) (MNR 2000)[18], the Significant Wildlife Habitat Ecoregion 5E Criterion Schedule (SWH Ecoregion 5E Criterion)[19] and the process outlined in the Ministry of Natural Resources Natural Heritage Reference Manual (2010) (NHRM)[20] were used to guide field investigations related to significant wildlife habitat.

A few potentially significant habitats were identified following the classification of the ecosites and cross-referencing the list of known species ranges that overlap the study area. According to the SWH Ecoregion 5E Criterion Schedule (2012), there are approximately forty-three different types of significant wildlife habitat that were considered; twenty-six had the potential to be present and are described further.

7.1 Seasonal Concentration Areas

Seasonal concentration areas are defined by the SWHTG as relatively small areas where species of wildlife are concentrated at certain times of the year.

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[17] *When the acoustic recorder is triggered by a sound with the appropriate frequency and duration, a recording is saved. Each recording is a series of pulses which represent the bat echolocating. The pulse series is called a bat pass. The bat passes provide valuable information with respect to which species are present, and the relative abundance over time or compared to other sites. It does not, however, give any indication of the actual number of individuals of a particular species.*

[18] OMNR. 2000. Significant wildlife habitat technical guide. 151p.

[19] OMNR. 2012. Significant wildlife habitat Ecoregion 5E Criterion Schedule. 46p.

[20] Ontario Ministry of Natural Resources. March 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second edition. Toronto: Queen's Printer for Ontario. 248pp.

7.1.1 Waterfowl Stopover and Staging Areas (Aquatic)

To be considered a waterfowl stopover and staging area, aggregations of 100 or more of the listed species in the SWH Ecoregion 5E Criterion must be found over 7 days to provide suitable stopover and staging habitat. Suitable field ecosites must also have annual spring flooding from melt water / runoff. None of the listed waterfowl species were identified and no substantial flooding was observed in the meadow marsh community to provide suitable stopover areas. The absence of species and substantial spring flooding precludes this as significant wildlife habitat.

7.1.2 Raptor Wintering Area

The property provides a combination of forested habitat which could be potential habitat for wintering raptors. The following forested ecosites are potential wintering habitat: G011 - G019, G023 - G028, G033 – G043, G048 – G059, G064 – G076, G081 - G092, G097 - G108 or G113 - G125 and must contain at least one or more Short-eared Owls, be used regularly by at least 10 individuals and two species of either Rough-legged hawk, Long-eared Owl, Boreal Owl and Northern Saw-whet Owl. A Wildlife Acoustics Song Meter was placed in suitable habitat where these owl species could be present. Ecosites G107 and G108 were forested types within the study are that have the potential to provide wintering habitat for raptors. None of the listed raptor species were heard in the song meter recordings or during the field investigations.

7.1.3 Bat Maternity Colonies

The SWHCS for Ecoregion 5E list G107 and G108 ecosites as those which could contain maternity roosts for big brown and silver-haired bats. A field investigation was conducted during leaf off conditions to determine if suitable roosting trees were present within forest communities G107 and G108. Trees were examined along the forest edges and wetlands according to presence of cavities, diameter breast height, tree height, presence of loose bark with early stages of decay. A total of nine trees were identified as potential bat roosts; six located to the east of the existing sand pit and three located south of the sand pit within the new boundary limits. These trees are identified in Figure 4 below with UTM coordinates provided in Table 2 below.

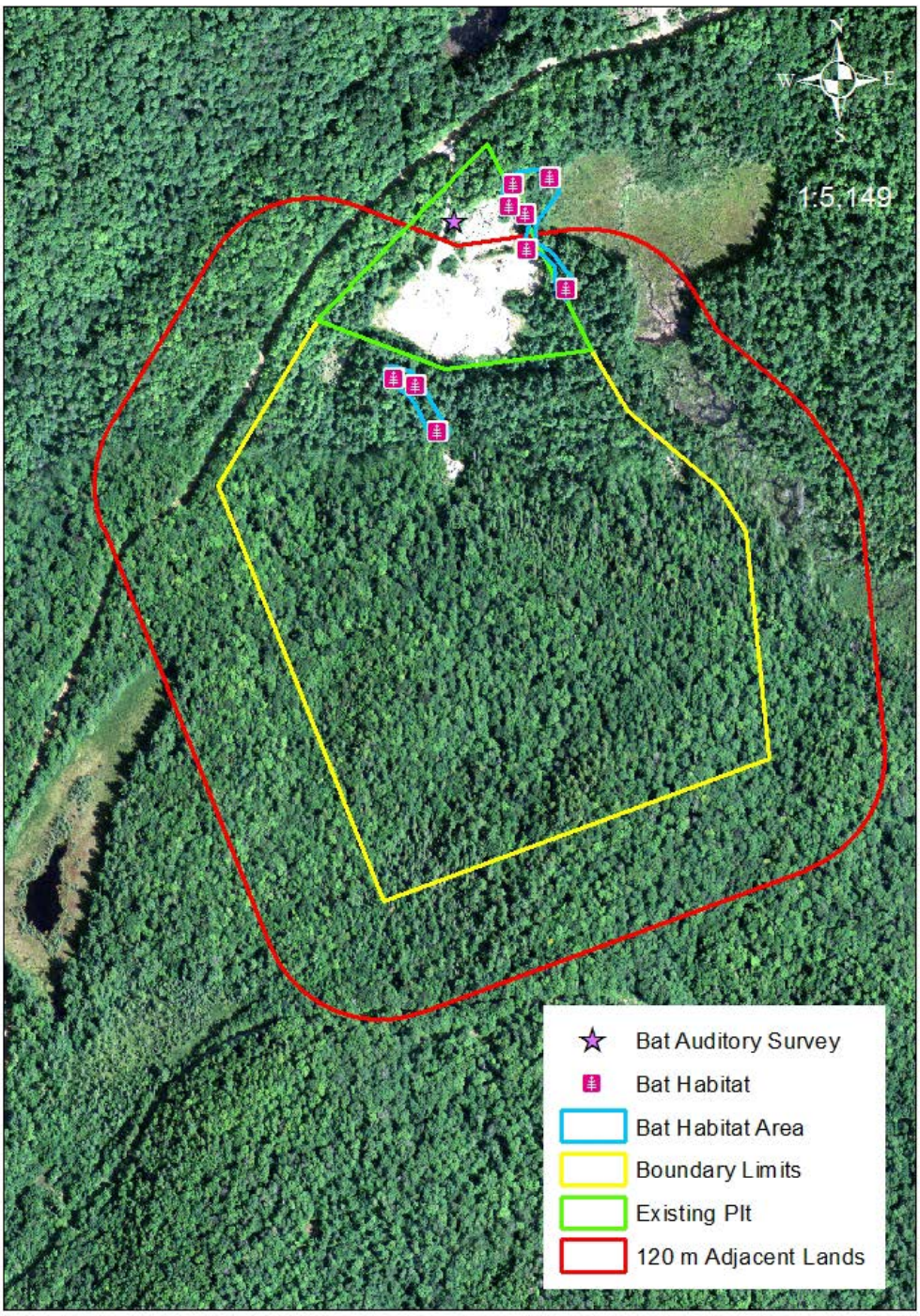

Figure 4: Location of potential bat habitat within the boundary limits and adjacent lands

Table 2: UTM Coordinates of potential bat trees (NAD83, 17T)

Easting, Northing
668632, 5018324
668599, 5018317
668595, 5018296
668611, 5018289
668615, 5018252
668649, 5018214
668478, 5018122
668498, 5018116
668521, 5018068

These trees were chosen as potential roosts as it has been indicated in past research that myotis species generally roost in tall, large diameter snags that are in early stages of decay and located in open areas within mature forest. They also are known to forage over water and natural roosts are located where bats can commute between roost and forage areas which are often along waterways, forest edges and above the canopy.[21] This area to the east of the sand pit is suitable since they are close to a forest edge and near a water source as well as being close to other nearby snags, which females can move their pups. It is recommended that those snags identified are retained.

7.1.4 Turtle Wintering Areas

During basking surveys that were completed according to the Draft MNRF Blanding's turtle survey protocol; a Blanding's turtle, painted turtle and snapping turtle were observed within the sparse treed bog during the basking survey timing window. To be considered significant habitat, there must be the presence of at least five Midland painted turtles or at least one or more northern map turtle or snapping turtle. In this case, the sparse treed bog would be considered significant due to the presence of the snapping turtle.

Within the meadow marsh, one snapping turtle was also observed. Since the water depth within the meadow marsh was quite shallow it is unlikely the snapping turtle would be using this area as wintering habitat and was likely travelling north from the more open water near Harvey Lake. Due to the presence of breeding spotted salamanders, the meadow marsh is already considered significant for amphibian breeding habitat. No impacts are expected, as no wetlands will be impacted during the aggregate operation and a 30 m buffer will be placed around each wetland.

7.1.5 Reptile Hibernaculum

According to the SWH Ecoregion 5E Criterion, snakes are known to hibernate in sites below frost lines in burrows, rock crevices and in areas of broken and fissured rock. Wetlands such as conifer

[21] COSEWIC. 2013. Assessment and Status Report on the Little Brown Myotis (Myotis lucifugus), Northern Myotis (Myotis *septentrionalis,* Tri-colored Bat *Perimyotis subflavus* in Canada

or shrub swamps, fens or depressions in bedrock with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover are also important over-wintering areas.

During the site investigations, no congregations of snakes were observed during the field surveys. Four eastern gartersnakes were observed in total which were spread out throughout the site, two (2) in the cleared forested areas to the west of the existing sand pit, one in the meadow marsh near open water and one at the edge of the hardwood swamp. The suitable habitat present in the study area for snake hibernation would include the conifer swamp, hardwood swamp and along the edges of the meadow marsh. A 30 m buffer will be placed around each wetland to protect any potential hibernating snake species.

7.1.6 Colonially Nesting Bird Breeding Habitat (Bank and Cliff)

Sites supporting colonially nesting bank and cliff swallows are described as areas with exposed soil banks, sandy hills, borrow pits, steep slopes and sand piles that are undisturbed or naturally eroding. According to the SWH Ecoregion 5E Criterion, this excludes permitted aggregate areas, human-created structures, recently disturbed (2 years) soil areas, berms, embankments, soil and aggregate stockpiles. Due to the fact this is a permitted aggregate area, this is not considered significant habitat. No impacts are expected as no bank or cliff swallows were observed. General protection for breeding birds is included at the end of this document.

If bank and/or cliff swallows are present in the future, this does not exclude protection of bank swallows under the ESA, or for the protection of bank and cliff swallows under the Migratory Bird Convention Act.

7.1.7 Colonially Nesting Bird Breeding Habitat (Ground)

Sites supporting colonially nesting ground birds are described as islands, peninsulas associated with open water, marshes and lakes. None of this habitat exists on or within 120 metres of the site.

7.1.8 Colonially Nesting Bird Breeding Habitat (Trees/Shrubs)

To be considered colonially nesting bird breeding habitat, SWH Ecoregion 5E Criterion states the presence of 10 or more active nests of Great Blue Heron or one or more active nests of Black-Crowned Night Heron must be present. The nests are present in live or dead standing trees in wetlands, lakes, islands and peninsulas. No colonial nests were present surrounding wetlands, and no Great Blue Heron or Black-crowned night herons were observed or heard either on the site visits or on the song meter recordings.

7.1.9 Deer Wintering Habitat

Deer yards or deer wintering areas are locations deer traditionally use in response to winter cold and snow conditions. The MNRF has stated that a Stratum 2 deer wintering yard is present nearby. The LIO mapping shows this is located approximately 170 m south west of the proposed permit boundary. Due to the distance of the wintering deer yard in relation to the proposed site; it is anticipated no significant impacts will occur to any wintering deer. There was no substantial deer browsing noted within the site.

7.2 Rare Vegetation Communities and Specialized Habitats for Wildlife

Rare vegetation communities and specialized habitats for wildlife are defined by the SWHTG as areas that contain a provincially rare vegetation community and areas that support wildlife species that have highly specific habitat requirements or habitat that greatly enhances a species' survival respectively.

7.2.1 Old Growth Forest

Old growth forest is absent on or within 120 metres of the proposed aggregate site. There is evidence of past harvest in the treed portion of the site.

7.2.2 Bog

Bogs are considered rare in Ecoregion 5E. The following Ecosite G137Tl – Sparse Treed Bog was present approximately 110 m west of the proposed site boundary. A 30 m buffer will be placed around this wetland, therefore no impacts are anticipated.

7.2.3 Waterfowl Nesting Area

According to the SWH Ecoregion 5E Criterion, to be considered significant habitat there must be the presence of 10 or more nesting pairs of various waterfowl species, including mallard. One pair of mallards, likely nesting nearby was observed in the mineral meadow marsh during field surveys.

7.2.4 Woodland Raptor Nesting Habitat

The SWH Ecoregion 5E Criterion states the presence of one or more active nests belonging to a Red-tailed Hawk, Great-Horned Owl, Broad-winged Hawk, Sharp-shinned Hawk, Merlin, Barred Owl, Red-Shouldered Hawk, Coopers Hawk or Northern Goshawk is considered significant habitat. One broad-winged hawk was heard during field investigations near the existing sand pit and meadow marsh, however no stick nests were identified.

7.2.5 Turtle and Lizard Nesting Areas

A complete search of the most suitable turtle nesting areas were examined, which included the existing sand pit as well as the roadside ditches adjacent to or close to any wetlands. Refer to Figure 4 for locations of turtle nesting survey locations. No evidence of turtle nesting was observed. For an area to function as a turtle nesting area according to the SWH Ecoregion 5E Criterion; turtles must be able to dig into sand and gravel that is provided in open, sunny areas. Nesting on the sides of road embankments and shoulders is not considered significant wildlife habitat.

7.2.6 Seeps and Springs

Evidence of groundwater was observed within sections of the maple hardwood swamp and within the watercourse west of hardwood swamp community. This watercourse was isolated from the sparse treed bog. No impacts are expected as the area of aggregate extraction will be above the groundwater table and a 30m buffer will be placed around the watercourse as well as the hardwood swamp. The aggregate of interest is also located further east of the site.

7.2.7 Amphibian Breeding Habitat (Woodland)

Significant amphibian breeding habitat (woodland) was not met by the SWH Ecoregion 5E Criterion, however many toadlets and young wood frogs were observed within the maple hardwood swamp, indicating it has the potential to be amphibian breeding habitat. No impacts are anticipated as a 30m buffer will be implemented around the wetland community.

7.2.8 Amphibian Breeding Habitat (Wetlands)

According to the SWH Ecoregion 5E Criterion, significant amphibian breeding habitat (wetlands) exists within the meadow marsh community and the sparse treed bog due to the presence of breeding spotted salamanders. Impacts aren't anticipated, due to 30 m buffers being implemented around each wetland community.

7.3 Habitat of Species of Conservation Concern

Habitat of species of conservation concern are those species listed as Special Concern on the Species at Risk List in Ontario, known to be experiencing declines, species known to be uncommon/rare in the planning area or species that are subjects of recovery programs. The following species whose ranges overlapped the study are and which potential habitat was present were considered during field investigations in 2016. This included Bald Eagle (*Haliaeetus leucocephalus*), Canada Warbler (*Cardellina canadensis*), Common Nighthawk (*Chordeiles minor*), Monarch (*Danaus plexippus*), Golden-winged Warbler (*Vermivora chrysoptera*), Olive-sided Flycatcher (*Contopus cooperi*), Eastern Wood-pewee (*Contopus virens*) and Snapping Turtle (*Chelydra serpentina*).

7.3.1 Marsh Bird Breeding Habitat

No marsh bird species of conservation concern were identified within 120 m of the proposed site boundary and none of the defining criteria for nesting was observed for any of the qualifying bird species listed in the SWH Ecoregion 5E Criterion.

7.3.2 Bald Eagle

The presence of Bald Eagles was investigated by searching for large stick nests in canopy trees, listening for their call and looking for them in flight during site visits. No eagles were seen or heard and no stick nests were found. General mitigation to avoid impacts to breeding birds is included below.

7.3.3 Canada Warbler

The Canada Warbler breeds within a range of wet deciduous and coniferous, forest types with a well-developed, dense shrub layer. Dense shrub and understory vegetation help in concealing nests located on or near the ground[22]. Suitable habitat was present within edges of the meadow marsh; however, no Canada Warbler was observed or heard calling during field surveys. A 30 m

[22] Government of Ontario. Ministry of Natural Resources and Forestry Species at Risk Section. (https://www.ontario.ca/page/canada-warbler)

buffer will be established around this wetland. General mitigation to avoid impacts to breeding birds is also included below.

7.3.4 Common Nighthawk

Common nighthawks are active at dusk and dawn and use semi-open habitats for breeding, similar to Whip-poor-will. They are easily seen and heard foraging over sites when present. A song meter was set near suitable foraging habitat to determine their presence. The song meter recorded calls during the early morning and late evening hours during the week of May 25 to June 2, 2016. Although, suitable foraging habitat is present over the existing sand pit and over the meadow marsh, no nighthawks were observed or heard during field investigations or by song meter recordings. General mitigation to avoid impacts to breeding birds is included below.

7.3.5 Monarch

Monarch butterflies depend upon common milkweed plants to lay their eggs, which the caterpillars also feed upon. Adults also require nectar from wildflowers, which are found in open sites such as meadows and roadsides[23]. There were no patches of milkweed, monarch butterflies or caterpillars identified on or within 120m of the site.

7.3.6 Golden-winged Warbler

The Golden-winged Warbler prefers to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-way's, or logged areas[24]. Suitable habitat was present within the meadow marsh community and within cleared portions to the west of the existing sand pit; however, no Golden-winged warblers were heard or observed during field surveys. No impacts are expected, general mitigation to avoid impacts to breeding birds is included below.

7.3.7 Olive-sided Flycatcher

The Olive-sided Flycatcher breeds along forest edges and openings that include recent burns, wetland edges and semi-open forest. Tall, prominent trees and snags as well as open areas are common features of all nesting habitats, as they serve as singing and foraging perches[25].

Although suitable habitat was present within previously cleared areas and the meadow marsh, no Olive-sided flycatchers were heard or seen during field surveys. No impacts are expected, general mitigation to avoid impacts to breeding birds is included below.

[23] Government of Ontario. Ministry of Natural Resources and Forestry Species at Risk Section. http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_MNRCH_BTTRFLY_EN.html
[24] Government of Ontario. Ministry of Natural Resources and Forestry Species at Risk Section. https://www.ontario.ca/page/golden-winged-warbler
[25] Altman, Bob and Rex Sallabanks. 2012. Olive-sided Flycatcher (Contopus cooperi), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/502

7.3.8 Eastern Wood-Pewee

Eastern Wood-Pewee prefer mature and intermediate aged deciduous and mixed forests. Often it is associated with forests dominated by sugar maple, elm and oak. It is also typically associated with forest clearings and edges within the vicinity of a nest[26]. Suitable habitat is present within the maple hardwood however; no Eastern Wood-pewees were observed or heard during field investigations. No impacts are expected, general mitigation to avoid impacts to breeding birds is included below.

7.3.9 Snapping Turtle

Snapping turtles are found in the shallow waters of lakes, rivers and ponds. They occasionally move over land usually in search of suitable nest sites. A snapping turtle was sighted twice within the meadow marsh, once on June 9 in the open water portion of the wetland and then on June 13, 2016. It is expected this is the same turtle travelling north along the edge of the stream bank, likely travelling to a suitable nesting site. Due to the low water levels in the meadow marsh, it is expected that is not suitable hibernation habitat within that area. It is expected that it was likely travelling from Harvey Lake, where more suitable hibernation habitat would be available.

A second snapping turtle was observed within the sparse treed bog on June 9th, which indicated this wetland could be used as wintering habitat. No work will occur in any wetlands, and a 30m buffer will be applied to all wetlands. As such, no impacts are anticipated.

No evidence of turtle nesting was observed within the sand pit or along roadside edges at nearby wetlands within the study area.

7.4 Animal Movement Corridors

Animal movement corridors are defined in the SWHTG as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. They can include a wide variety of landscape features including riparian zones and shorelines, wetland buffers, stream and river valleys, woodlands and anthropogenic features such as hydro corridors, abandoned roads and railways.

The SWH Ecoregion 5E Criterion requires that movement corridors be identified and protected where other significant wildlife habitat features exist including amphibian breeding, deer wintering, moose aquatic feeding area and mineral lick habitat, as well as denning sites for mink, otter, marten, fisher and eastern wolf. Amphibian breeding habitat was observed within the study area, and deer wintering habitat was present nearby, however was outside the 120 m adjacent land boundary.

[26] COSEWIC. 2012. COSEWIC assessment and status report on the Eastern Wood-pewee *Contopus virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x +39pp. (https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Eastern%20Wood-pewee_2013_e.pdf)

Significant amphibian breeding habitat (wetlands) exists within the meadow marsh community and the sparse treed bog due to the presence of breeding spotted salamanders. Impacts aren't anticipated, as a 30 m buffer will be implemented around each wetland community.

Although deer wintering habitat was located nearby, it is located outside the 120 m boundary. It is also anticipated that deer are not using this area as a corridor to reach their wintering areas as minimal browsing and deer tracks were observed throughout the study area.

8.0 Fish Habitat

One watercourse was located within 120 m of the proposed aggregate site. The unnamed stream to Harvey Lake flows south underneath McClintock Road (Photo 5) to the meadow marsh northeast of the proposed boundary limits, eventually leading into Harvey Lake. The following fish species are known to be present according to the Parry Sound MNRF in the stream segments on an adjacent property, which are likely present within the stream on the subject property as well. This includes brook stickleback (*Culaea inconstans*), creek chub (*Semotilus atromaculatus*), pumpkinseed (*Lepomis gibbosus*), blacknose shiner (*Notropis heterolepis*), fathead minnow (*Pimephales promelas*) and *Phoxinus* spp. During field surveys, northern pearl dace (*Margariscus nachtriebi)* and brook stickleback were captured within the stream located in the meadow marsh. It should be noted that the culvert outlet on the south side of McClintock Road is perched, which is preventing fish to swim upstream.

No impacts to fish habitat are expected, as a 30 m buffer will be implemented around the meadow marsh.

Photo 8 : Stream flowing south under McClintock Road to Harvey Lake.

9.0 Summary of Natural Heritage Features and Suggested Mitigation

The following table summarizes the natural heritage features found on or within 120 metres of the property and suggested mitigation. Additional information is included in the text below the table.

Table 3: Natural Heritage Features Summary

Natural Heritage Feature	On or within 120 metres?	Impacts Expected?	Suggested Mitigation	Authorization Required?
Significant wetlands	No	n/a	n/a	n/a
Habitat of THR/END species	Yes – Blanding's turtle Potential for roosting for little brown myotis and northern myotis	None with suggested mitigation	No work in wetlands 30m buffer surrounding all wetlands including potential corridors Retain potential bat roosting trees	Unknown
Significant Areas of Natural and Scientific Interest	No	n/a	n/a	n/a
Significant Wildlife Habitat	Yes: Turtle wintering Area (Snapping Turtle) Rare Vegetation Community (Bog)	None with suggested mitigation	No work occurring within any wetlands No in-water works Buffer of 30m implemented surrounding each wetland Aggregate extraction existing above the groundwater table	No

	Seeps and Springs Habitat of Species of Conservation Concern (Snapping Turtle) Amphibian Breeding Habitat (Wetlands)		Although not considered significant, all habitats provide nesting for a variety of breeding birds. Timing restrictions for site clearing/preparation activities; no work May 1 – August 31.	
Fish Habitat	Yes	None with suggested mitigation	No in-water works No work within 30m of a wetland	n/a

The following general mitigation is recommended to ensure compliance with the *Endangered Species Act (*2007*),* the *Fisheries Act* (1990), the *Migratory Birds Convention Act (1994)* and the *Fish and Wildlife Conservation Act* (1997). These recommendations have already been suggested in previous sections of the report. They are reiterated here to confirm their applicability to species groups and habitats which are found on the site.

- All aggregate extraction will occur above the water table
- No in-water works shall take place
- No work shall occur within any wetlands
- A 30 m buffer will be placed around each wetland located within the proposed site and 120 m adjacent lands
- Site clearing and preparation shall not occur during the breeding season for migratory birds; May 1 – August 31 of any given year
    - Exceptions to this may be permissible provided the area is swept by a qualified individual to ensure no nests or birds would be destroyed as a result of the activity
- No tree removal or vegetation clearing will occur outside of the proposed permit area
- Potential bat roosting trees should be retained
- Any staff operating in the quarry, should be familiar with any of the species at risk they may encounter and be knowledgeable about their responsibilities under the Endangered Species Act and any required actions.

10.0 Conclusions

Based on this understanding and our knowledge of the site from field investigations conducted and from background information, we feel that the aggregate permit can be issued subject to the suggested mitigation.

Respectfully submitted,

April McCrum
Biologist
November 2016

Appendix A: Correspondence

From: NHI ParrySound (MNRF) [mailto:NHI.ParrySound@ontario.ca]
Sent: Monday, May 30, 2016 3:36 PM
To: April McCrum <april.mccrum@fricorp.com>
Subject: RE: Information Request - McClintock Township

Dear Ms. McCrum,

Thank you for your inquiry regarding the presence of natural heritage features in the area of a proposed aggregate permit application within Lot 11, Concession 2, McClintock Township, Ontario.

The following fish species are resident in the stream segments on the adjacent property and likely inhabit the stream on the subject property as well: brook stickleback, stream chub, pumpkinseed, blacknose shiner fathead minnow, Phoxinus sp.. There is significant wildlife habitat - Stratum 2 winter deer habitat is mapped within 150 m of the subject property on the southwest side.

I can inform you that we have no confirmed observations of Species at Risk (SAR) within the above property. There is a recent confirmed record of an Eastern Wood-pewee in the immediate vicinity of this location. No other species occurrence records exist in the immediate area. In your request you outlined species that are known to occur in McClintock Township. Because the province has not been surveyed comprehensively for the presence of species at risk (SAR), the absence in the NHIC database of an EO in a particular geographic area does not indicate the absence of the species in that area. Consequently, the presence of an EO is useful to flag the presence of the species in the area, but is not an appropriate tool to determine whether a species is absent, or whether it should be surveyed for or not in a particular area.

Furthermore, the Species at Risk in Ontario list (SARO) is a living document and is amended periodically as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO list can be accessed on the webpage
http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_CSSR_SARO_LST_EN.html

The District is of the opinion that each potential SAR should be surveyed for (if possible; or their presence considered), regardless of whether or not the species has been previously recorded in the area, or whether previous records are historical in nature. Some SAR surveys require an authorization under the Endangered Species Act 2007 and/or a Scientific Collector's Permit; please contact the District if you require further direction regarding these.

Sincerely,

Ron Black

Wildlife Biologist

Parry Sound District

(705) 773-4225

ron.black@ontario.ca

From: April McCrum [mailto:april.mccrum@fricorp.com]
Sent: May-26-16 12:56 PM
To: NHI ParrySound (MNRF)
Cc: ESA Parry Sound (MNRF)
Subject: RE: Information Request - McClintock Township

Good afternoon,

I am looking for any additional species at risk or natural heritage information, as described in the original email dated May 17th below. A map of the location is attached (Lot 11, Concession 2 – McClintock Township).

Thank you for your help in this matter.

Kind regards,

April

From: April McCrum [mailto:april.mccrum@fricorp.com]
Sent: May-17-16 3:30 PM
To: ESA Parry Sound (MNRF)
Subject: Information Request - McClintock Township

Good afternoon,

We are currently working on a Natural Environment report in support of an aggregate permit application within McClintock Township. Attached is a map showing the location of interest. It is located within the General Use area G362. The following is a summary of the sources checked and information compiled to date.

Could you please provide any additional or updated information with respect to the above mentioned property?

Significant wetlands: There are none on or within 120 metres of the area of interest. (CLUPA, LIO data)

Habitat of Endangered and/ Threatened Species: None known; no NHIC records (MNRF LIO Make-a-Map data);

- Parry Sound District (Bracebridge Area) Species at Risk List indicates the following species are known for McClintock Township:

  - Bank Swallow, Barn Swallow, Bobolink, Chimney Swift, Eastern hog-nosed snake, Eastern Meadowlark, Eastern Whip-poor-will, Little Brown Myotis, Northern Long-eared Myotis and Eastern Small-footed Bat

Areas of Natural and Scientific Interest: No known or candidate ANSI's on or within 120 metres of the area of interest (MNRF LIO Make-a-map data)

Significant Wildlife Habitat: No known significant wildlife habitat

- Species of Conservation Concern (Special Concern species listed on ESA known/presumed to occur in McClintock Twp) include

  - Canada Warbler, Eastern Wood-Pewee, Olive-sided Flycatcher, Snapping Turtle and Wood Thrush
  - Other non-SAR bats will be considered

Fish Habitat: There are no known cold-water systems on or within 120 metres of the area of interest.

Could you please provide any additional natural heritage information or values related to this area of interest?

Thank you,

April

April McCrum

Biologist

FRi Ecological Services

1875A Seymour Street, North Bay, ON P1B 8G4

Phone: (705) 476-0085

Fax: (705) 476-5631

Cell: (705) 493-9794

Appendix B: Author's Qualifications

April E. McCrum Biologist, FRi Ecological Services

Professional Profile

April has over 10 years of experience in the environmental field which has involved working for various non-profit organizations and private environmental consulting companies. Her experience includes completing species at risk (SAR) surveys, vegetation, wetland, as well as reptile, amphibian, bat, fisheries and migratory bird surveys for MTO detail design projects, as well as for private companies and landowners. She also has over 5 years of experience working with Contractors and Contract Administrators on Ministry of Transportation Projects to ensure compliance with environmental regulations and contract documents. This has involved providing guidance and recommending mitigation measures for the protection of SAR, fish and fish habitat, migratory birds and other wildlife.

RELATED PROJECTS

Environmental Impact Studies (EIS):

Field investigations completed to assess significant habitat for species at risk, significant wildlife habitat, areas of natural and scientific Interest, fish habitat and significant wetlands in accordance with the Provincial Policy Statement (2014) and Endangered Species Act (2007). Field investigations included species at risk surveys for little brown myotis, northern myotis, eastern small footed-myotis, masassauga, eastern hognose snake, eastern foxsnake, Blanding's turtle, snapping turtle, Whip-poor-will and Common Nighthawk.

- Dalron Construction Limited, City of Greater Sudbury
- Diamond View Muskoka Inc.
- KGHM International, Sudbury Area
- Private landowners in the Parry Sound and Sudbury Area

Aggregate Licence and Permit Applications, Natural Environment Level 1 & 2:

Field investigations completed to assess significant habitat for species at risk, significant wildlife habitat, areas of natural and scientific Interest, fish habitat and significant wetlands in accordance with the Provincial Policy Statement (2014) and Endangered Species Act (2007). Field investigations included species at risk surveys for little brown myotis, northern myotis, eastern small footed-myotis, eastern hognose snake, Blanding's turtle, snapping turtle, ribbon snake and bank swallow.

MTO Class Environmental Assessments:

Background research and field work was completed during the Detail Design Phase for MTO projects. Environmental components included assessment of species at risk and associated habitat, fisheries and aquatic habitat, as well as field surveys completed for resident birds, mammals and other herpetofaunal species. Impacts were evaluated and mitigation measures were provided along with Natural Science Technical Reports, Fish and Fish Habitat Impact Assessment Reports, Environmental Screening Documents

and Existing Conditions Reports. Species of risk surveys focussed on Blanding's turtle, Barn Swallow, Whip-poor-will, Bobolink and Eastern Meadowlark.

- New Interchange and Extension of existing 4-laning, Highway 17 at the west junction of Sudbury Municipal Road 55, from 20.5 km west of Highway 144, easterly for 6.5 km, Sudbury Area (G.W.P. 156-98-00)
- Culvert replacements along Nepewassi Lake Road at Highway 69 and Onaping Lake Road, Sudbury Area (G.W.P. 5022-10-00 & 5023-10-00)
- Bridge replacements at Prune Creek and Obijou River, Hearst Area (G.W.P. 5033-07-00 & 5044-11-00)
- Rehabilitation of 5 structures on Highway 17 and Highway 6, Sudbury Area (G.W.P. 5561-04 & 5107-05-00)
- Rehabilitation of Highway 7 from Highway 115 north to Peterborough County Road 15/North Monaghan Parkway (G.W.P. 4053-06-00)

MTO – Construction Supervision and Inspection:

SAR Compliance and Effectiveness Monitoring:

- Highway 69 from 3.1 km North of Highway 64 northerly for 11.2 km, Species at Risk Qualified Member and Qualified Professional. Species of Interest included Masassauga, Blanding's turtle, spotted turtle, eastern hog-nosed snake, Whip-poor-will and Chimney Swift.
- Highway 17 Batchewana River Bridge, 4.7 km south of Highway 563 – Species at Risk Specialist. Species of Interest included Barn Swallow and wood turtle.
- Highway 17 Carp River Bridge, 0.2 km south of Highway 563 – Species at Risk Specialist. Species of interest included Barn Swallow.

Fisheries Inspections and Monitoring:

- Highway 17 from 0.3 km east of Highway 94 easterly for 12. 3 km – Environmental Specialist
- Highway 69 from 3.1 km North of Highway 64 northerly for 11.2 km – Environmental Specialist
- Highway 60, Oxtongue Narrows Bridge Replacement – Environmental Inspector
- Highway 144, Mollie River Culvert Replacement, 2.7 km North of Highway 560 – Environmental Specialist
- Highway 69 Expansion and 4-laning from 12.2 km North of Hwy 64 for 14.6 km to Estaire – Environmental Inspector

Additional Relevant Experience:

- CFB Petawawa – Species at Risk surveys completed for Blanding's turtle, map turtle, wood turtle, spiny softshell and Kirtland's Warbler.

- Ducks Unlimited Canada – Waterfowl and shorebird nesting surveys in Alberta and Saskatchewan to determine spatial and temporal nesting success in various habitats within the prairie pothole region of Canada.

- Canadore College, Part time Instructor (2013 and 2014) – Environmental Auditing, Impact and Risk Assessment Course

EDUCATION

Bachelor of Science Degree, Biology Major – Trent University (2010)

Terrain and Water Resources Technology Diploma – Sir Sandford Fleming College (2000)

Courses and Certificates

- Ontario Ecological Land Classification Certification
- Ontario Wetland Evaluation Certification
- MTO/MNR Highway 69 Species at Risk Training and Certificate
- Ontario Certified Inspector of Sediment and Erosion Control (CISEC) Course and Certification
- Fisheries Specialist Training and Certificate (MTO/MNR/DFO Protocol)
- Class 2 Backpack Crew Leader Electrofishing Course and Certificate
- Pleasure Craft Operators Card
- Ontario reptile handling training
- Standard First Aid with CPR
- Confined Space Entry Certification