



*Treasury Metals
Revised EIS Report
Goliath Gold Project
April 2018*



APPENDIX R

TERRESTRIAL

NOTE TO READER APPENDIX R

In April 2015, Treasury Metals submitted an Environmental Impact Statement (EIS) for the proposed Goliath Gold Project (the Project) to the Canadian Environmental Assessment Agency (the Agency) for consideration under the Canadian Environmental Assessment Act (CEAA), 2012. The Agency reviewed the submission and informed Treasury Metals that the requirements of the EIS Guidelines for the Project were met and that the Agency would begin its technical review of the submission. In June 2015, the Agency issued a series of information requests to Treasury Metals regarding the EIS and supporting appendices (referred to herein as the Round 1 information requests). The Round 1 information requests included questions from the Agency, other federal and provincial reviewers, and members of Indigenous communities, as well as interested stakeholders. As part of the Round 1 information request process, the Agency requested that Treasury Metals consolidate the responses to the information requests into a revised EIS for the Project.

Appendix R to the original EIS (Terrestrial) presented baseline wildlife data from field investigations conducted by DST in 2012 and 2013. Baseline wildlife data were also collected by Klohn Crippen Berger in 2010 and 2011, and the results presented in Appendix G to the original EIS. Since submission of the original EIS, Treasury Metals has been refining their understanding of wildlife and wildlife habitat in the area surrounding the Project, as well as collecting specific additional baseline field data. As part of the work to respond to the Round 1 information requests, Treasury Metals has consolidated the available wildlife baseline information that have been relied on in assessing the effects of the Project on wildlife and wildlife habitat (Section 6.12 of the revised EIS) into a single document entitled Summary Wildlife Baseline Report (2011–2016), which has been included as Appendix R to the revised EIS. Appendix R (Summary Wildlife Fisheries Baseline Report (2011–2016)) to the revised EIS replaces Appendix R to the original EIS, and incorporates all of the relevant baseline information from Appendix G to the original EIS. The information presented in this appendix was used to describe baseline wildlife conditions (Section 5.9 of the revised EIS) and in the assessment of effects of the Project on wildlife and wildlife habitat (Section 6.14 of the revised EIS).

As part of the process to revise the EIS, Treasury Metals has undertaken a review of the status for the various appendices. The status of each appendix to the revised EIS has been classified as one of the following:

- **Unchanged:** The appendix remains unchanged from the original EIS, and has been re-issued as part revised EIS.
- **Minor Changes:** The appendix remains relatively unchanged from the original EIS, and has been re-issued with relevant clarification.
- **Major Revisions:** The appendix has been substantially changed from the original EIS. A re-written appendix has been issued as part of the revised EIS.

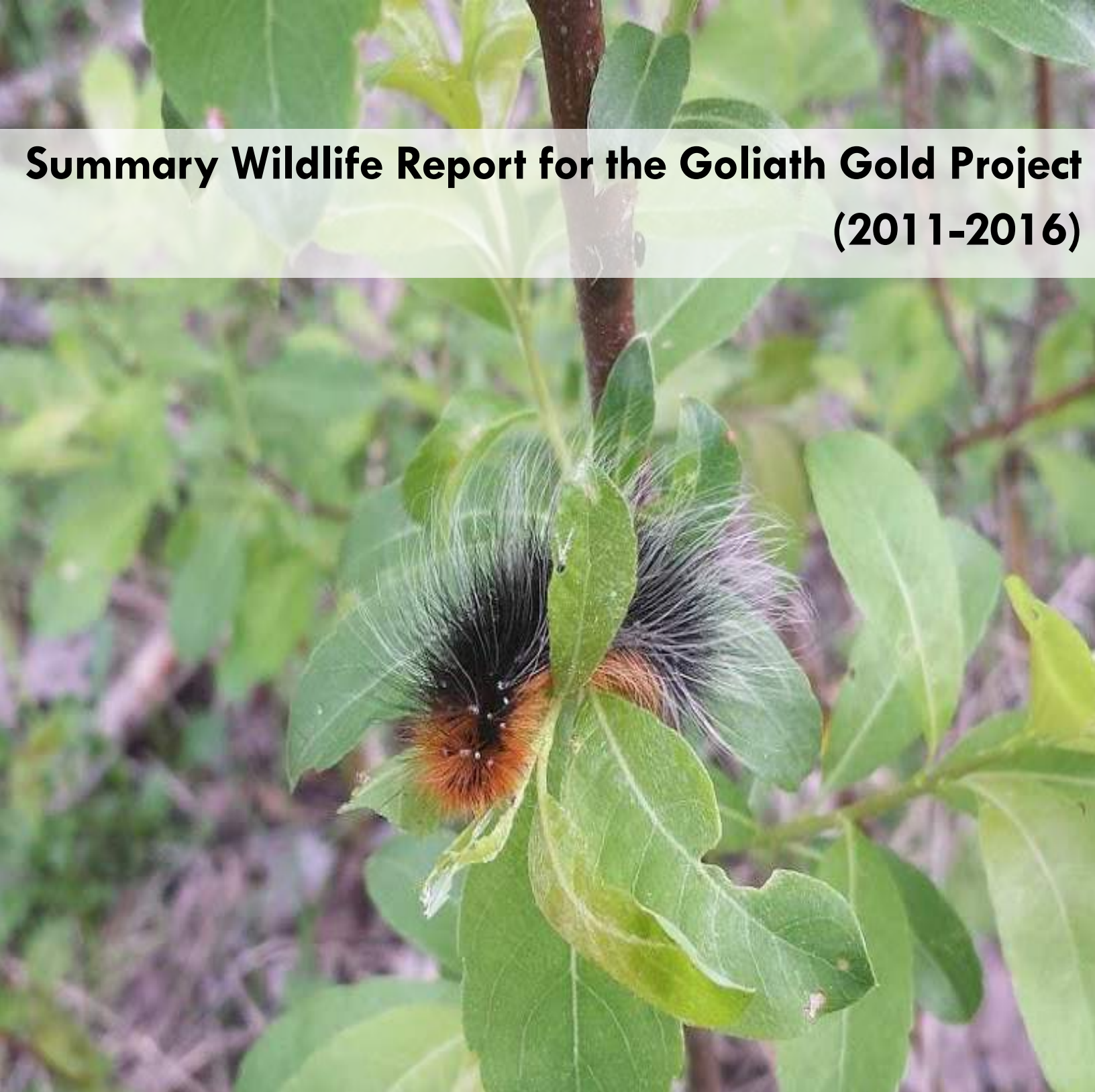
- **Superseded:** The appendix is no longer required to support the EIS. The information in the original appendix has been replaced by information provided in a new appendix prepared to support the revised EIS.
- **New:** This is a new appendix prepared to support the revised EIS.

The following table provides a listing of the appendices to the revised EIS, along with a listing of the status of each appendix and their description.

List of Appendices to the Revised EIS		
Appendix	Status	Description
Appendix A	Major Revisions	Table of Concordance
Appendix B	Unchanged	Optimization Study
Appendix C	Unchanged	Mining Study
Appendix D	Major Revisions	Tailings Storage Facility
Appendix E	Minor Changes	Traffic Study
Appendix F	Major Revisions	Water Management Plan
Appendix G	Superseded	Environmental Baseline
Appendix H	Minor Changes	Acoustic Environment Study
Appendix I	Unchanged	Light Environment Study
Appendix J	Minor Changes	Air Quality Study
Appendix K	Minor Changes	Geochemistry
Appendix L	Superseded	Geochemical Modelling
Appendix M	Minor Changes	Hydrogeology
Appendix N	Unchanged	Surface Hydrology
Appendix O	Superseded	Hydrologic Modeling
Appendix P	Unchanged	Aquatics DST
Appendix Q	Major Revisions	Fisheries and Habitat
Appendix R	Major Revisions	Terrestrial
Appendix S	Major Revisions	Wetlands
Appendix T	Unchanged	Socio-Economic
Appendix U	Minor Changes	Heritage Resources
Appendix V	Major Revisions	Public Engagement
Appendix W	Unchanged	Screening Level Risk Assessment
Appendix X	Major Revisions	Alternatives Assessment Matrix
Appendix Y	Unchanged	EIS Guidelines
Appendix Z	Unchanged	TML Corporate Policies
Appendix AA	Major Revisions	List of Mineral Claims
Appendix BB	Unchanged	Preliminary Economic Assessment
Appendix CC	Unchanged	Mining, Dynamic And Dependable For Ontario's Future
Appendix DD	Major Revisions	Indigenous Engagement Report

List of Appendices to the Revised EIS		
Appendix	Status	Description
Appendix EE	Unchanged	Country Foods Assessment
Appendix FF	Unchanged	Photo Record Of The Goliath Gold Project
Appendix GG	Minor Changes	TSF Failure Modelling
Appendix HH	Unchanged	Failure Modes And Effects Analysis
Appendix II	Major Revisions	Draft Fisheries Compensation Strategy and Plans
Appendix JJ	New	Water Report
Appendix KK	New	Conceptual Closure Plan
Appendix LL	New	Impact Footprints and Effects

Summary Wildlife Report for the Goliath Gold Project (2011-2016)



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EXECUTIVE SUMMARY

Treasury Metals Inc. (TMI) is a Canadian gold exploration and development company focused on its 100% owned high-grade Goliath Gold Project (the Project), situated in the Kenora/Dryden Mining District of northwestern Ontario. The Project is located adjacent to the village of Wabigoon, Ontario, approximately 20 km east of the city center of Dryden or 330 km west of the city of Thunder Bay. The Project has been required to complete a federal environmental assessment, as well as a provincial environmental assessment and permits prior to development. To support ongoing drilling activities and project permitting, TMI retained Klohn Crippen Berger (KCB), DST Consulting Engineers Inc. (DST), and KBM Resources Group (KBM) in 2011, 2012, and 2015-2016 respectively, to gather baseline data and to submit environmental reports summarizing data collection efforts. Terrestrial baseline data collection involved surveys for breeding birds, Whip-poor-wills (WPW), waterfowl, marsh birds, amphibians, reptiles, and small mammals. This report summarizes all terrestrial wildlife data collection efforts from 2011 to 2016.

In general, bird densities and species richness observed during the field surveys were typical of the boreal forest. A total of 121 avian species were observed. Of the 121 avian species, 101 species were noted as probable breeders based on the surveys and historical database records. Species richness was the highest in point count stations that were in deciduous habitats. Avian species at risk (SAR) detected at the Project Site included, Common Nighthawk, Barn Swallow, Canada Warbler and Olive-sided Flycatcher. No WPW were detected during surveys.

All animals captured during the small mammal trapping program are common throughout northwestern Ontario and their capture rates and relative abundance in 2016 were comparable with those found in similar habitats in 2012, but abundance was lower during the 2016 trapping program. All species captured are habitat generalists, with the exception of southern red-backed voles and red squirrels, which tend to prefer mature wooded areas as opposed to disturbed or regenerating sites.

Ultrasonic recorders were set up throughout the LSA in 2011, 2012, and 2016, with bats being recorded at most of the locations. Although exact population numbers are not determinable based on recorder information, there was a clear indication that bats are present within the Project study area. In January 2013, three species of bats were officially added to the Ontario SAR list (Tri-coloured, Little Brown Myotis, and Northern Myotis). Two of the three species detected at the site were provincially listed. The detected species included Little Brown Myotis, Northern Myotis and Big Brown bats .

In 2011 and in 2012, 21 sites were surveyed for amphibians in conjunction with the WPW studies. These sites were visited on three separate occasions in 2011 (May, June and July) and two occasions in 2012 (June and July). Species encountered included Spring Peepers, Grey Treefrogs, Wood Frogs and Boreal Chorus Frog. No reptile species were observed during any surveys. A Blue Spotted Salamander was captured in a minnow trap in 2011 and also in a pitfall trap in 2012.

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1 INTRODUCTION

Treasury Metals Inc. (TMI) is a Canadian gold exploration and development company focused on its 100% owned high-grade Goliath Gold Project (the Project), situated in the Kenora/Dryden Mining District of northwestern Ontario. The Project is located adjacent to the village of Wabigoon, Ontario, approximately 20 km east of the city center of Dryden or 330 km west of the city of Thunder Bay (refer to Figure 1.1).

The Project Area consists largely of two historic properties, the “Thunder Lake Property”, previously owned by Teck-Corona and the “Laramide Property”, located partially within both the Hartman and Zealand townships. The properties have a total area of approximately 4,881 hectares, comprised of 4,064 hectares of 137 unpatented land claims and 19 patented land claims for the remainder. Treasury holds the entire project subject to specific royalties on 13 of the patented land parcels. The site can be readily accessed year-round from Highway 17 and from multiple public secondary roads that extend north from the highway, including Anderson Road, Maggrah Road, and Tree Nursery Road.

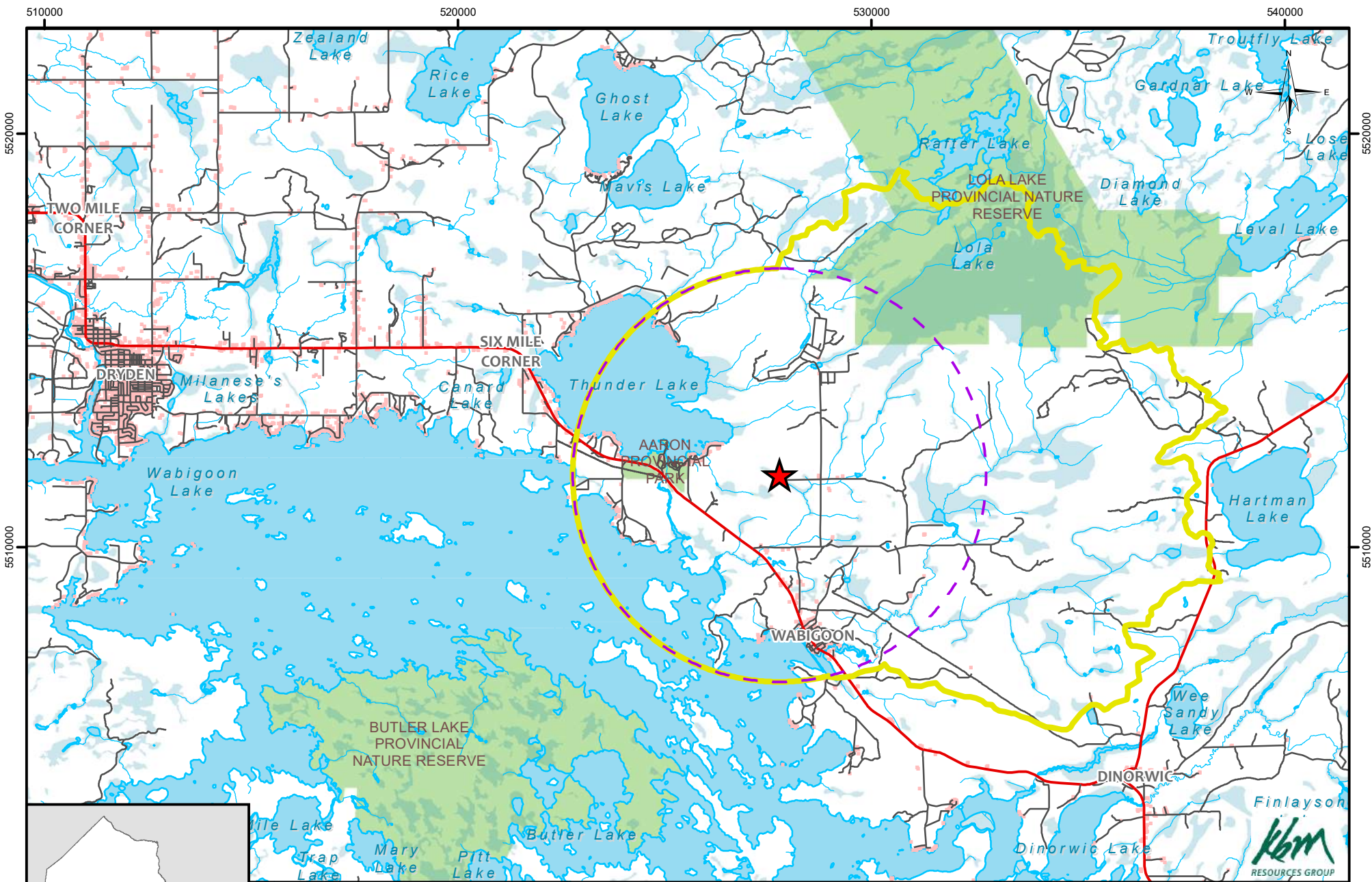
This report presents a summary of the findings of the wildlife baseline studies. Studies were completed in 2010/2011 by Klohn Crippen Berger (KCB), in 2012/2013 by DST Consulting Engineers (DST), and in 2015/2016 by KBM Resources Group (KBM). The objectives of these studies were to:

- describe the wildlife community of the LSA and RSA;
- identify rare and species at risk (SAR) known or potentially occurring in the LSA and RSA; and
- identify important wildlife habitat as defined by the Ontario Ministry of Natural Resources and Forestry (OMNRF) (2000).

1.1 Study Area

Two sets of study areas have been used for the wildlife baseline data collection efforts. From 2010-2013, the LSA selected for terrestrial data collection was a 5-km radius circle centered on the main ore deposit (Figure 1.1). This study area was refined for the wildlife data collection efforts in 2015/2016, as a better understanding of the proposed project footprint was determined. The most recent LSA was based on the boundaries of the watersheds within which the project footprint will be located (Figure 1.2). LSA boundaries were selected to focus field study efforts on identifying and assessing the wildlife community, important wildlife habitat and SAR located within, and near, the area in which most Project facilities were anticipated to be located based on the information provided by TMI at the time the studies were being completed. The wildlife RSA is defined by the Wabigoon Ecoregion (Figure 1.3). Ontario Ecoregions are defined as “A unique area of land and water nested within an ecozone that is defined by a characteristic range and pattern in climatic variables, including temperature, precipitation, and humidity. The climate within an ecoregion has a profound influence on the vegetation types, substrate formation, and other ecosystem processes, and associated biota that live there.” (Crins 2009).

The review of existing data focused on the LSA and RSA while field studies focused survey effort on the LSA.



Legend

-  Project Site
-  Road
-  Local Study Area
-  Wetlands
-  Highway
-  Regional Study Area
-  Park/Nature Reserve
-  Building As Symbol
-  Streams and Rivers
-  Lakes

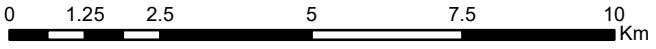
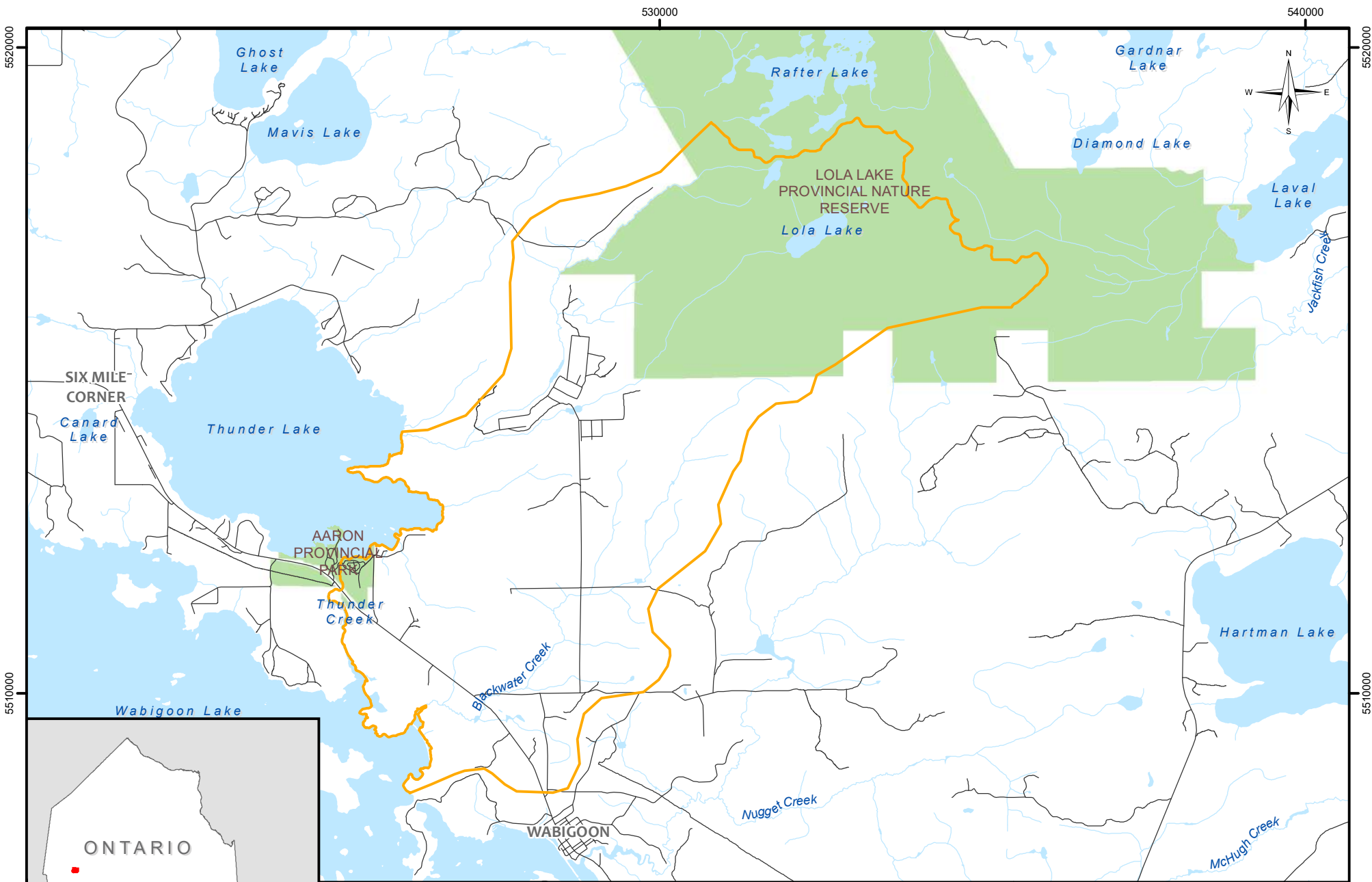


Figure 1.1
Local Study Area for 2011
data collection efforts

1:125,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-03-24

KRM
 RESOURCES GROUP



Legend

- Road
- Stream
- Local Study Area
- Waterbody
- Park/Nature Reserve

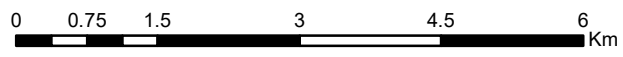
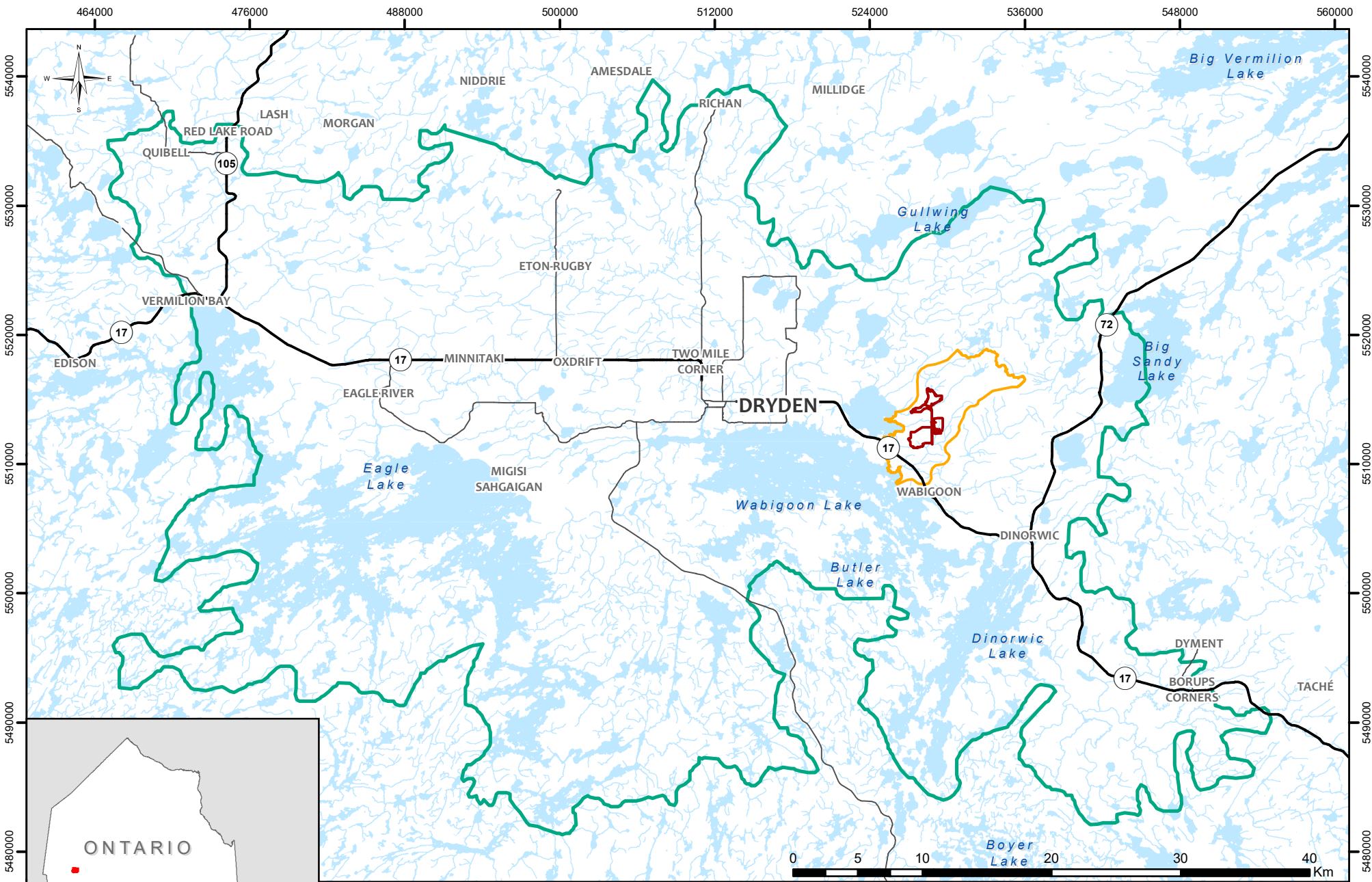


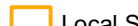




Figure 1.2
Local Study Area for 2012-2016
data collection efforts

1:80,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-03-24



Legend

-  Stream
-  Development Footprint
-  Local Study Area
-  Regional Study Area
-  Waterbody



**Figure 1.3
Regional Study Area (RSA)**

1:400,000
Projection: NAD 1983 UTM Zone 15N
Date created: 2017-04-03

2 METHODS

The following methods of data collection were used to compile the wildlife baseline study:

- Pre-field review of existing wildlife, SAR, and important habitat records related to the LSA and RSA; and
- Wildlife field surveys in the LSA.

The specific methodologies employed for the pre-field and field studies are described in the following sub-sections.

2.1 Pre-field Review of Existing Data

The objective of the pre-field review was to collect available local and regional data on wildlife communities, species, habitat and known significant habitat features, and rare and SAR wildlife known to occur, or potentially occur within the LSA and RSA. Data were obtained from the following literature and web-based sources:

- Species At Risk in Ontario List;
- Dryden Forest Management Company Forest Management Plan (2011-2021);
- Ontario Breeding Bird Atlas;
- Natural Heritage Information Centre;
- Ontario Odonata Atlas; and
- Ontario Reptile and Amphibian Atlas;

2.2 Field Surveys

Field surveys were undertaken to gather site-specific data on the wildlife, rare species, SAR, and significant habitats within the LSA. Targeted searches for rare and at-risk species known to occur, or potentially occur in the LSA were also completed.

In addition to the survey methodologies described below, encounter surveys (i.e., meandering transects followed through defined habitat noting wildlife species, and/or their field signs) for bird, mammal, amphibian, and reptile taxa were also conducted during each field visit. Incidental wildlife and habitat observations were also recorded during fisheries and vegetation fieldwork.

To supplement the survey techniques described below and, thereby, increase survey effort and study area coverage, seven programmable remote sound recording units with an inbuilt broadband detector, sound recorder, and stereo microphones (Wildlife Acoustics SM2) were used at 33 stations across the LSA during the 2011 field program. Four additional sound recorders were deployed at 10 locations during the 2013 field program. The sound recorders were used to record calls from songbirds, nocturnal bird species, frogs, and bats. Details on sound recorder deployment are provided in Table 2.1. The sound recorder methodology applied to survey the taxa listed in the table is provided in the respective sub-sections below.

Table 2.1 Sound recorder deployment in the LSA, 2011

STATION	DATE	EASTING	NORTHING	TAXA*
SR1	June 13	528330	5514462	S,F,N
SR2	June 13	527726	5514287	S,F,N
SR3	June 13	528034	5514254	S,F,N
SR4	June 14	528587	5516004	S
SR5	June 14	528596	5515168	S,F
SR6	June 14	528762	5514828	S,F,N
SR7	June 15	528789	5512415	S,F,N
SR8	June 14	528733	5515605	S,F,N
SR9	June 15	527783	5511812	S,F,N
SR10	June 15	527162	5511656	S,F,N
SR11	June 15	527010	5511599	S,F,N
SR12	June 16	529969	5510018	S,F,N
SR13	June 16	527783	5511812	S,F,N
SR14	June 16	527162	5511656	S,F,N
SR15	June 16	527010	5511599	S
SR16	June 12	528330	5514462	F, N
SR17	June 12	527726	5514287	F, N
SR18	June 12	528034	5514254	F, N
SR19	June 12	528722	5514350	F,N
SR20	June 13	528762	5514828	F, N
SR21	June 13	528327	5514803	B,F,N
SR22	June 14 and June 15	528697	5514344	B,F,N
SR23	June 16 to June 18	526280	5511527	B,N
SR24	July 11 to July 13	525506	5515654	S,N
SR25	July 11 to July 13	526204	5515882	S,N
SR26	July 11 and July 12	523835	5510525	S,N
SR27	July 11 and July 12	532552	5512878	S,N
SR28	July 12 and July 13	525568	5511381	S,N
SR29	July 12 to July 14	531289	5510042	S,N
SR30	July 13 to July 15	528779	5513144	S,N
SR31	July 13 to July 15	528783	5511038	S,N
SR32	July 13 to July 15	528648	5513918	S,N
SR33	July 14 and July 15	532233	5510045	S,N

*F = frogs, S = songbirds, N = Whip-poor-will, nighthawks and other nocturnal species, B = bats

2.2.1 Birds

2.2.1.1 *Forest Bird Survey (2011)*

The location of all point count surveys can be found in Figure 2.1. The 2011 forest bird surveys were conducted following an adapted version of the Forest Bird Monitoring Program (FBMP) protocol (Konze and McLaren 1997) and using forms from the Inventory Methods for Forest and Grassland Songbirds (BCRISC 1999).

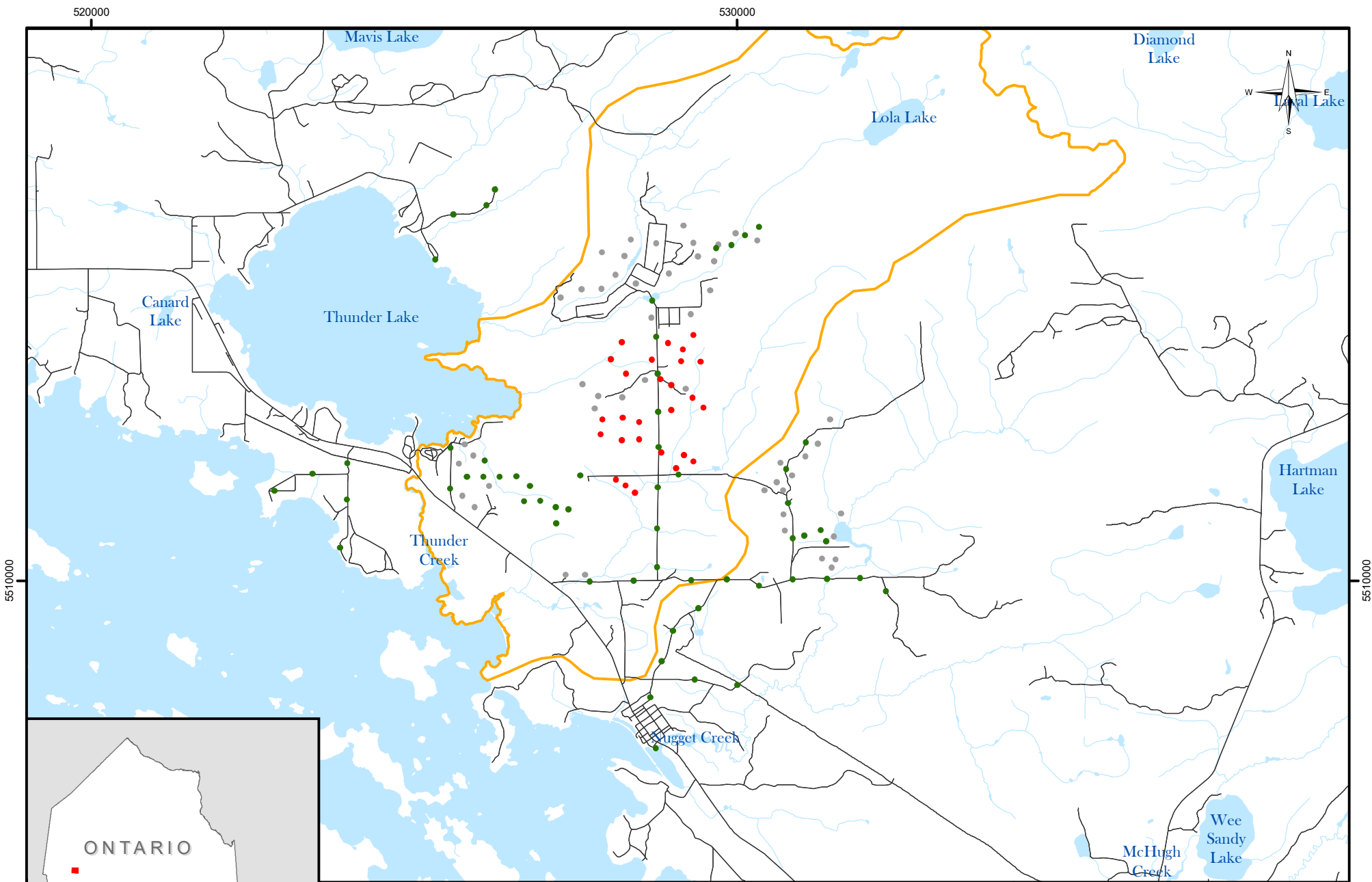
The songbird surveys were conducted using the point count survey technique. Surveyors recorded birds observed by call and/or sight for a period of 10 minutes at each survey station. All birds detected during the survey were mapped on the field data cards with the location of the bird, the species, number of individuals, and the breeding status (assigned using the OBBA breeding evidence codes (Cadman et al. 2008)).

Fifty-nine stations located at least 250 m apart were selected to sample the full range of habitats present in the LSA. Surveys began 30 minutes before sunrise and were completed by 11:00 a.m. Each station was surveyed once by one chief observer (who conducted the point count at each station), and one field assistant (the note taker), between June 12, 2011 and June 16, 2011. The surveys were undertaken during favourable weather conditions (clear, calm, slightly damp and with a wind speed less than 15 km/h) (Konze and McLaren, 1997). Weather conditions, ecosite information, and habitat information were also recorded at each station.

In addition to the point count surveys, calling and singing birds were recorded using the remote sound recording system (Wildlife Acoustics SM2) to record songbirds at 25 stations across the LSA between June 12, 2011 and June 18, 2011 and between July 11, 2011 and July 15, 2011. Recorders were programmed to record for one hour at dawn (at sunrise). Bird recorder data from the morning sound recordings were transcribed for the first 10-minute interval to remain consistent with the FBMP protocol. The data was pooled with the forest bird survey data to provide additional survey effort.

2.2.1.2 *Forest Bird Survey (2012)*

In 2012, 54 breeding bird surveys occurred throughout the Project study area, with a focus on the areas potentially impacted by development. The surveys followed the protocol described earlier for the Ontario Breeding Bird Atlas (Cadman et al. 2007) (Figure 2.1). This protocol uses a point count method and requires two visits between the dates of May 24th, and June 17th. Ideally sites are visited under clear, calm, and slightly damp conditions with winds under 15 km/h. All birds seen or heard were counted during a 10-minute period at each station. Bird plots were stratified by habitat categories throughout the study area with multiple plots in all habitat types.



Legend

- 2011
- 2016
- 2012
- Stream
- Waterbody
- Road
- Local Study Area

KRM
RESOURCES GROUP

0 0.75 1.5 3 4.5 6 Km

Figure 2.1
Locations of all point count surveys (2011-2016)

1:80,000
Projection: NAD 1983 UTM Zone 15N
Date created: 2017-02-24

2.2.1.3 Forest Bird Survey (2016)

In 2016, 27 additional breeding bird surveys occurred throughout the Project study area, with a focus on habitat categories that had been under sampled in previous surveys and to increase the spatial extent of surveyed areas (Figure 2.1). These point-counts also followed the protocol described for the Ontario Breeding Bird Atlas (Cadman et al. 2007). This protocol uses a point count method and requires two visits between the dates of May 24, and June 17. Ideally sites are visited under clear, calm and slightly damp conditions with winds under 15 km/h. All birds seen or heard were counted during a ten-minute period at each station. Bird plots were stratified by habitat categories throughout the study area with multiple plots in all habitat types.

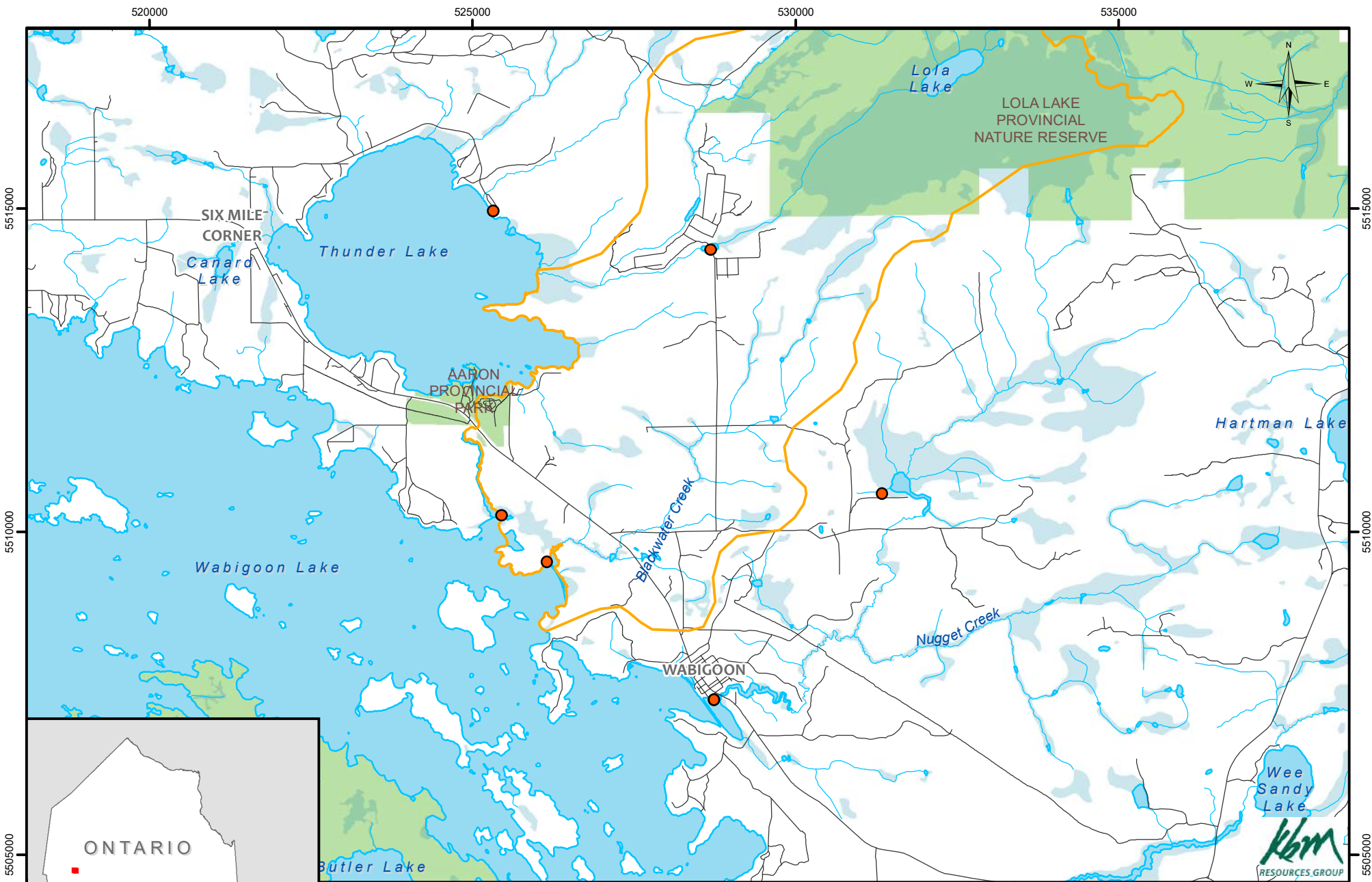
Avian data collected during all survey years, were pooled, tabulated and analyzed per Environment Canada guidelines. Specifically, species were ranked with respect to abundance, distribution, richness, and habitat abundance. According to Environment Canada, the study area lies in Bird Conservation Region 8 and as such, priority species associated with this conservation region will also be ranked according to abundance, distribution and abundance by habitat.

2.2.1.4 Bird Migration Survey (2011)

The bird migration survey followed the Hawk Migration Association of North America protocol (HMANA 2011). Six stations, focusing on shoreline and wetland habitat, were chosen as representative stopover habitats. These stations offered an unimpeded view for at least several hundred meters to the north, east, and/or west to observe birds migrating south (Figure 2.2).

Migration surveys were conducted between October 13, 2011 and October 15, 2011, for a period of six hours each morning, beginning 30 minutes before sunrise. Surveyors surveyed from a suitable vantage point, and recorded the numbers and species of migrating raptors, waterfowl, and other migrating bird species. Surveyors recorded migrating birds only. Migrating birds were defined as bird species known to migrate and which, at the time of the survey, were purposively flying south or southwest, in a direct line, and/or, depending on the species, were flying high and in groups. Bird observations were summarized into height zones and flight direction. Wind direction, temperature, and other weather parameters, were also recorded, along with habitat features and ecosite information.

The purpose of the bird migration survey was to complete a general assessment of the LSA, to identify the potential for migratory route and/or stopover habitat based on known regional bird migration patterns. The survey was not intended to be a comprehensive assessment of bird migration, which is dependent on weather and other factors and is highly variable between years.



Legend

- Bird Migration Survey Station
- Local Study Area
- Park/Nature Reserve
- Road
- Lakes
- Streams
- Wetlands

0 0.75 1.5 3 4.5 6 Km

Figure 2.2
Locations of migratory bird surveys (2011)

1:80,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-03-24



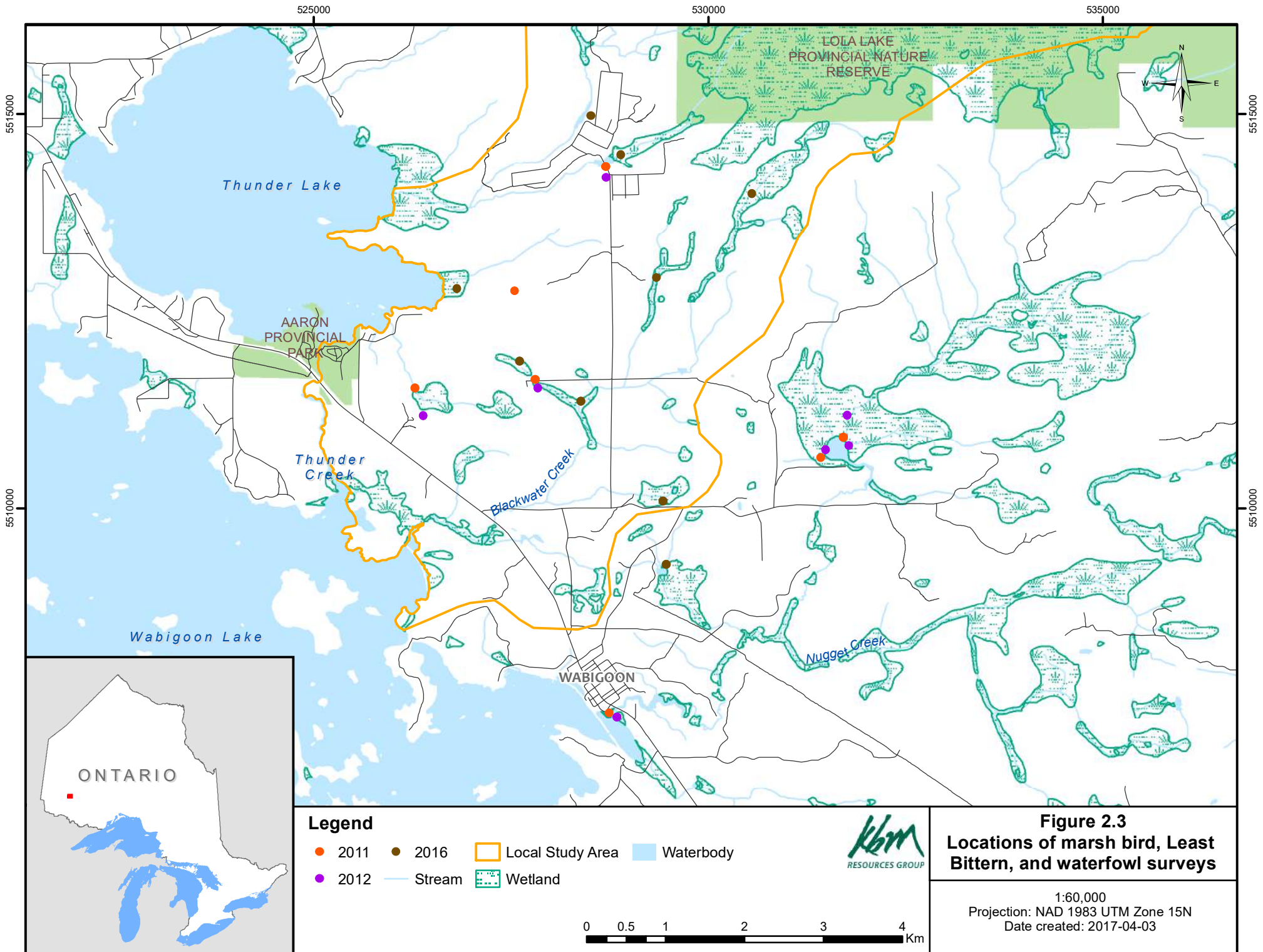
2.2.1.5 Marsh Bird and Waterfowl Survey (2011)

In 2011, the marsh bird and waterfowl survey methods followed a combined version of the Marsh Monitoring Program (MMP) protocol (Konze and McLaren, 1997) and the Inventory Methods for Waterfowl and Allied Species (RISC 1999) protocol. All waterfowl and marsh birds observed (seen and heard) in and/or adjacent to a 100-m radius circle were recorded by one chief observer and one note taker over a period of 11 minutes (six minutes of call playback, followed by five minutes of point count) for each of the six survey stations. The marsh bird stations were established in key habitat areas, located along the edges of open water marsh wetlands within the LSA (Figure 2.3).

Marsh bird and waterfowl surveys were conducted at dusk, beginning at 6:00 p.m. and completed before sunset. Each station was surveyed twice, with at least 10 days between visits (May 12, 2011 and June 16, 2011). Standardized field forms (RISC, 1999) were used to record observed species, wetland habitat features, and weather conditions. Each bird observed was classified into one of three groups ((1) not using study area (e.g. flying over); (2) aerial forager over study area; and (3) directly using the study area).

A call playback tape was played at each survey station. At each survey station a playback tape of Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), yellow rail (*Coturnicops noveboracensis*), least bittern (*Ixobrychus exilis*), pied-billed grebe (*Podilymbus podiceps*) and short-eared owl (*Asio flammeus*) calls were played for a six-minute period (30 seconds per species, followed by 30 seconds of silent point count). Following the call playback, a five-minute point count was conducted. Responses to the call playback surveys were also recorded on the standardized marsh bird and waterfowl survey field forms (RISC, 1999).

The marsh bird and waterfowl survey was undertaken during favourable weather conditions (allowing good visibility, with little or no precipitation or wind) (Konze and McLaren, 1997).



2.2.1.6 Marsh Bird and Waterfowl Survey (2012)

In 2012, waterfowl surveys were conducted at six locations within the study area (Figure 2.3). Any waterfowl, nests and/or incidental species observed were recorded, as well as species number and social structure. A second visit to each waterfowl survey site was performed in July in an attempt to confirm if breeding and note broods were present. Incidental species were also noted during these surveys.

Marsh bird monitoring followed the Bird Studies Canada (BSC) protocol (Bird Studies Canada 2000). The protocol requires that surveys occur between May 20 and July 5 (although it is generally accepted that these dates can be pushed back in northern Ontario depending on the arrival of spring conditions). Marsh monitoring points were visited on two occasions; once in June, and again in July to target the more secretive species associated with wetland habitats. Marsh monitoring points were selected in key habitat areas, located along edges of open water marsh wetlands in the study area. Marsh Bird Monitoring sites were the same as the Waterfowl Survey locations because there are few suitable wetlands within the study area. Surveys were conducted after 18:00 and completed before sunset as stated in the protocol. The call playback method was used for the marsh bird surveys, which followed the BSC protocol of five minutes of silent listening upon arriving at the marsh site followed by five minutes of playing the territorial broadcast tape. Marsh birds on the broadcast tape were Least Bittern (*Ixobrychus exilis*), Sora (*Porzana carolina*), Virginia Rail (*Rallus limicola*), American Coot (*Fulica americana*) and Pied-billed Grebe (*Podilymbus podiceps*). After the calls were played, a second five-minute period of silent listening was employed. Standardized field data sheets were used to record observed species, wetland features, and weather conditions. Individual birds heard or seen within the semi-circle sample area were counted and their locations mapped on field data cards. Birds observed actively foraging above the station area (to a height of 100 metres) were counted and recorded separately. Birds detected from outside the station area were recorded as being present and were also tallied separately. Marsh bird survey stations were located at least 250 metres (275 yards) apart to help avoid double counting.

2.2.1.7 Marsh Bird and Waterfowl Survey (2016)

In 2016, marsh bird monitoring again followed the BSC protocol (described in section 2.2.1.6) (Bird Studies Canada 2000). Least Bittern surveys were also completed immediately after the marsh bird surveys at each location. Least Bittern surveys followed the National Least Bittern Survey Protocol (Jobin et al. 2011). Protocol requires surveys to take place between late May to mid July in northern Ontario, with three visits to each site once every 10 days. Point counts are 13 minutes in length and consist of 5 minutes of passive listening, 5 minutes of call broadcasts (each minute is 30 seconds of the Least Bittern “coo-coo-coo” call followed by 30 seconds of silence), then 3 minutes of passive listening. For all survey stations the speaker was held approximately 1 m above the water level. The volume of the broadcast equipment was set in the 80-90 dB range at 1 m in front of the speaker. All other species of birds heard or seen during the Least Bittern Surveys were documented. The location of surveys can be found in Figure 2.3.

2.2.1.8 Bird Species at Risk-Targeted Surveys

Whip-poor-will and Common Nighthawk (2011)

Eastern whip-poor-will (*Caprimulgus vociferus*) (WPW) is listed as threatened provincially and designated as threatened federally. Common nighthawk (*Chordeiles minor*) is listed as special concern provincially and is designated as threatened federally. Surveys for WPW and common nighthawk were conducted in the LSA using the Whip-poor-will Roadside Survey Protocol (Bird Studies Canada 2011) on June 14, 2011 and July 12, 2011. Both surveys were conducted during periods of 50 % moon exceedance (full moon dates were June 15, 2011 and July 15, 2011). Surveys began 30 minutes after sunset and were completed before midnight. Point counts were conducted every one kilometre along a pre-determined road route for a total of 19 stations (Figure 2.4).

A six-minute point count was completed at each station and all WPW, common nighthawk, and other nocturnal species observed were recorded. Standardized survey field forms (Bird Studies Canada 2011) were used to record the species observed, general habitat, and weather conditions (wind scale, noise level, and traffic volumes).

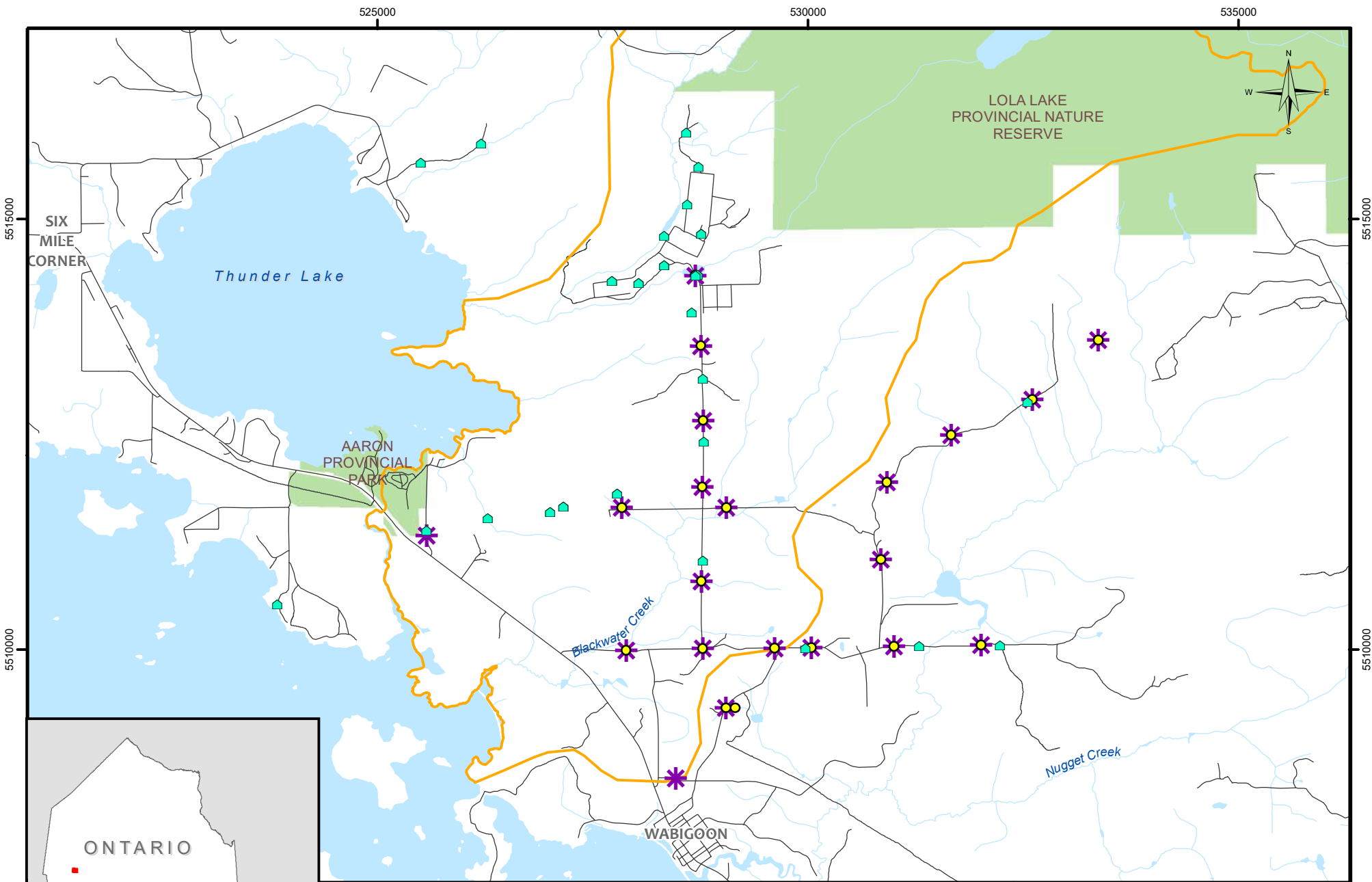
To increase survey effort and LSA coverage, and to target remote areas (unsafe to visit at night), 31 sound recorders were placed in suitable habitat (e.g. forests, grasslands, marshes and clear-cuts) and programmed to record 30 minutes after sunset for a period of 1 hour at 30 stations from June 12, 2011 to June 18, 2011 and from July 11, 2011 to July 15, 2011 (Figure 2.4). Due to the listed status of whip-poor-will and common nighthawk, the entire one hour nocturnal recordings sonograms were scanned for whip-poor-wills, common nighthawks, owls, and any other nocturnal bird species.

Whip-poor-will and Common Nighthawk (2012)

In 2012, WPW triangulation surveys were conducted in the study area on the night of June 4 to the 6^h and July 4 and 5 and followed the Audubon Society Protocol (Hunt 2011). WPW are known to call more frequently in relation to a full moon, therefore, surveys were conducted after sunset and within 10 days of a full moon. This period is when birds are setting up territories and nesting, resulting in the highest rates of calls. A total of 21 stations were established, each being located at least 250 m apart, along roads traversing WPW habitat (Figure 2.4). Preferred habitats for the WPW include rock or sand barrens with scattered trees, savannahs, old burns in a state of early forest succession, and open conifer plantations (Cadman et al 2007). A crew of two qualified biologists conducted WPW surveys by listening at separate adjacent stations for 10 minutes. If a WPW or Common Nighthawk call was heard, each crew member would take a compass bearing, resulting in an approximate location of the calling bird's location.

Bobolink

Bobolink (*Dolichonyx oryzivorus*) is listed as threatened provincially and is not at risk (NAR) nationally. FBMP surveys and sound recordings were conducted in suitable Bobolink habitat (e.g. pastures and open grasslands) in the LSA. Encounter surveys were also conducted for Bobolink in suitable habitat (agricultural fields and grasslands) during the 2011 June and July breeding season at both dawn and dusk.



Legend

- 2011
- ▲ 2011 Sound Recording Stations
- ✱ 2012
- Road
- Stream
- ▭ Local Study Area
- ▭ Waterbody
- ▭ Park/Nature Reserve



 KRM
 RESOURCES GROUP

Figure 2.4
Locations of Whip-poor-will survey (2011-2012)

1:60,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-04-03

Songbirds

At-risk songbirds include Barn Swallow (*Hirundo rustica*), Chimney Swift (*Chaetura pelagica*), Olive-sided Flycatcher (*Contopus cooperi*), Golden-winged Warbler (*Vermivora chrysoptera*), Canada Warbler (*Wilsonia canadensis*), and Rusty Blackbird (*Euphagus carolinus*) (Table 2.2). These species were surveyed during forest bird monitoring surveys in suitable habitat, through the use of sound recorders at 25 stations from June 13, 2011 to June 16, 2011 and from July 1, 2011 to July 15, 2011 and through encounter surveys conducted in suitable habitat in during the June and July breeding season. In 2016, all structures within the LSA were inspected for nesting barn swallows.

Marsh Birds

At-risk marsh birds include, American White Pelican (*Pelecanus erythrorhynchos*), Black Tern (*Chlidonias niger*), Short-eared Owl (*Asio flammeus*), Yellow Rail, and Least Bittern (Table 2.2). These species were targeted during FBMP and MMP surveys. Targeted tape playback surveys were undertaken for the latter three species during the MMP surveys on May 12, 2011 and June 16, 2011. Tape playback surveys were not undertaken for American white pelican or black tern as these species do not respond to tapes.

Bald Eagles

Bald eagles (*Haliaeetus leucocephalus*) are listed as special concern provincially and Not at Risk (NAR) nationally (Table 2.2). Stick nest surveys for bald eagles were conducted incidentally with other fieldwork, particularly during the fall and winter season when the leaves were off the trees (November 2010, October 2011, and October 2015).

Table 2.2 Provincial and Federal at risk status for Avian Species.

Common Name	Provincial Status	Federal Status
Barn Swallow	Threatened	NAR
Chimney Swift	Threatened	Threatened
Olive-sided Fly Catcher	Special Concern	Threatened
Golden-winged Warbler	Special Concern	NAR
Rusty Blackbird	NAR	Special Concern
American White Pelican	Threatened	NAR
Black Tern	Special Concern	NAR
Short-eared Owl	Special Concern	NAR
Yellow Rail	Special Concern	NAR
Least Bittern	Threatened	Threatened
Bald Eagle	Special Concern	NAR

2.2.2 Amphibians

Amphibians and reptiles represent a significant component of both terrestrial and freshwater ecosystems. Amphibians are also considered important indicators of environmental health due to their complex ecological requirements. This component of the terrestrial survey was comprised of a number of surveying techniques due to the secretive nature of amphibians and reptiles as well as their strong responses to weather variations. Survey techniques included visual encounter surveys, where all individuals seen while conducting other survey work were documented; and call monitoring, which followed the Amphibian Road Call Count protocol (Konze and McLaren 1997).

2.2.2.1 Visual Encounter Surveys

Habitat investigations and visual encounter surveys for amphibians were carried out during the 2011 spring and summer field work. Typical habitat including rocks, logs, leaf litter and other forms of cover were searched for amphibian presences or evidence. All logs, rocks and leaf litter turned over were replaced. Vernal pools used for frog and salamander eggs and larvae were also examined. All observations were recorded in field notebooks.

2.2.2.2 Road Call Counts (2011)

Amphibian counts were conducted following the Amphibian Road Call Count protocol (Konze and McLaren, 1997) which is based on road transects with unlimited distance point counts at regular intervals. In northern Ontario, the suggested dates for the first survey is between May 1 and May 15, for the second survey between June 1 and June 15, and for the third survey between July 1 and July 15 (Konze and McLaren 1997). These counts were conducted on May 11, 2011, June 14, 2011, and July 12, 2011 (the latter two were completed in conjunction with the whip-poor-will and common nighthawk surveys) at 21 locations (Figure 2.5). Surveys were conducted at night, beginning 30 minutes after sunset and completed by midnight.

Surveys were conducted three times during the breeding season following suggested dates for northern Ontario Surveys (Konze and McLaren 1997) to enable the detection of early and late season breeders. Counts were run along routes of eleven stations situated 0.8 km apart (Figure 2.5). At each station a chief observer and one note taker recorded the level of calling frogs and/or toads during a three-minute period. The species observed and the call level was documented (Table 2.3). Standardized field forms were used to record species and general habitat features (Konze and McLaren 1997). The road call counts were undertaken during favourable weather conditions (damp night with light rain or fog and winds less than level three on the Beaufort Wind Scale with a minimum recommended night-time air temperature of 8°C for the first survey, 13°C for the second survey, and 21°C for the third survey (Konze and McLaren, 1997).

Calling amphibians were also recorded on sound recorders deployed at 17 locations (Figure 2.5) across suitable habitat in the LSA between June 12, 2011 and June 16, 2011 (Table 2.3). Recorders were programmed to record for one hour at dawn (at approximately sunrise) and one hour in the evening (beginning at about 30 minutes after sunset). Recordings were transcribed for a three-minute interval (to remain consistent with the road call count protocol). The data were pooled with the road call data to provide additional survey effort. The entire one-hour recording was also scanned for additional frog species.

Table 2.3 Amphibian Survey Stations in the LSA, 2011

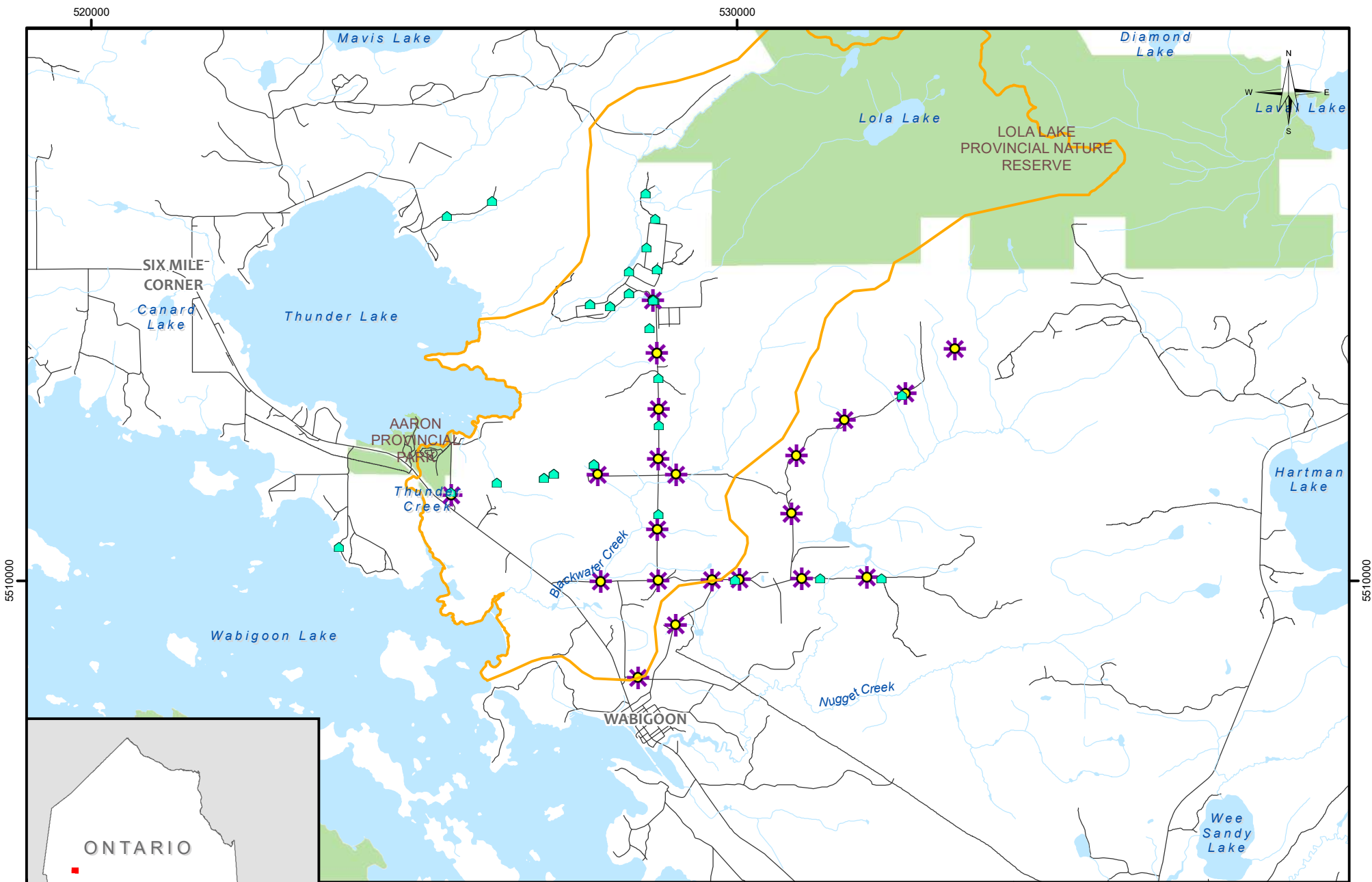
Amphibian Call Level Codes

CALL LEVEL CODE	DESCRIPTION
0	None heard
1	Individuals can be counted, calls not overlapping
2	Numbers of some individuals can be estimated or counted
3	Full chorus, calls continuous and overlapping, individuals not distinguishable

Source: Konze and McLaren 1997

Table 2.3 Amphibian Survey Stations in the LSA, 2011

AMPHIBIAN STATION NUMBER	EASTING	NORTHING	LAND USE CODE
AM1	528697	5514344	-
AM2	528759	5513529	90% Woodlot / Forest, 10% Old Field
AM3	528786	5512658	70% Woodlot / Forest, 30% Cut Over
AM4	528778	5511887	100% Woodlot / Forest
AM5	527843	5511647	Pond, Large Wetland, Disturbed
AM6	529057	5511649	100% Large Wetland
AM7	528766	5510795	100% Woodlot / Forest
AM8	528779	5510013	100% Woodlot / Forest
AM9	529614	5510018	80% Woodlot/Forest, 20% Small Wetland
AM10	527890	5509989	100% Woodlot/Forest
AM11	525575	5511329	100% Woodlot/Forest
AM12	530043	5510021	90% Woodlot/Forest, 10% Small Wetland
AM13	531003	5510039	100% Woodlot/Forest
AM14	532015	5510054	100% Woodlot/Forest
AM15	530850	5511044	100% Woodlot / Forest
AM16	530922	5511941	100% Woodlot / Forest
AM17	531668	5512491	100% Woodlot / Forest
AM18	532609	5512904	80% Cut Over, 20% Woodlot / Forest
AM19	533377	5513595	100% Woodlot / Forest
AM20	529052	5509322	100% Woodlot / Forest
AM21	528467	5508505	100% Woodlot / Forest



5510000

5510000

520000

530000



Legend		
<ul style="list-style-type: none"> ● 2011 ▲ 2011 Sound Recording Stations ✱ 2012 	<ul style="list-style-type: none"> Road Stream Local Study Area Waterbody Park/Nature Reserve 	

Figure 2.5
Locations of Amphibian call stations (2011-2012)

1:80,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-03-24

2.2.2.3 Road Call Counts (2012)

Amphibian road call counts completed in 2012 also followed the Amphibian Road Call Count protocol as presented above in section 2.2.2.2 (Konze and McLaren 1997) (Figure 2.5). Surveys were completed at 21 locations throughout the LSA. In 2012, sites were only visited twice during the breeding season due to an unusually cold spell during the May survey window.

2.2.3 Reptiles

2.2.3.1 Visual Encounter Surveys (2011)

Habitat investigations and visual encounter surveys for reptiles were carried out in suitable habitat during the spring and summer of 2011. Typical habitat including rocks, logs, leaf litter and other forms of cover were turned over and replaced. Basking logs and soil banks used by turtles were also examined. Species and habitat features were recorded in field notebooks.

2.2.3.2 Species at Risk-specific Surveys

Snapping Turtle

Snapping turtle (*Chelydra serpentina*) is listed as special concern provincially and special concern federally. No targeted surveys were completed for Snapping turtles, however, Snapping turtles were a consideration during the encounter surveys in June 2011 when the females are laying their eggs, and when adults may be seen basking out in the open in suitable wetland habitats in northwestern Ontario. Observations for Snapping turtles were made in all wetlands throughout the summer field season, as well as evidence of nesting along access roads.

2.2.4 Mammals

2.2.4.1 Encounter Surveys (2011)

Evidence of mammal presence in the LSA was collected during encounter surveys (i.e., meandering transects followed through suitable habitat) with the presence of mammalian species being recorded based on direct observation or field signs (e.g., tracks, scats, feeding remains, beaver lodges, denning sites, and scratching posts). These transects targeted habitat particularly suitable for moose (*Alces alces*) aquatic feeding areas, winter deer yards, ungulate wintering areas, ungulate calving/fawning sites, and key SAR habitat such as grasslands and open areas for the American badger (*Taxidea taxus*) and open areas, forests, and woodlands for the grey fox (*Urocyon cinereoargenteus*). Mammalian field signs were recorded during site visits throughout the duration of the wildlife field program.

2.2.4.2 Small Mammal Trapping (2012)

No small mammal surveys (i.e., trapping) were conducted in 2011.

Small mammal trapping was conducted between October 1 and 4, 2012, within areas of potential disturbance, to determine general abundance and species composition of small mammal populations (Figure 2.6). Trapping followed the protocol found in Wildlife Monitoring Programs and Inventory Techniques for Ontario (Konze and McLaren 1997). A total of 50 Sherman live traps (H. B. Sherman Traps, Inc. model LNATDG 235x80x90 mm) were placed throughout the study area. Traps were baited with a peanut butter/oatmeal mixture and provisioned with cotton to provide nesting and insulative value to captured animals. Where possible, traps were covered with moss to prevent rainwater from entering the

trap and cooling trapped mammals. No pre-baiting occurred and each trap was set for either 24 or 48 hours. Sex and reproductive condition were recorded (when possible) for each captured animal.

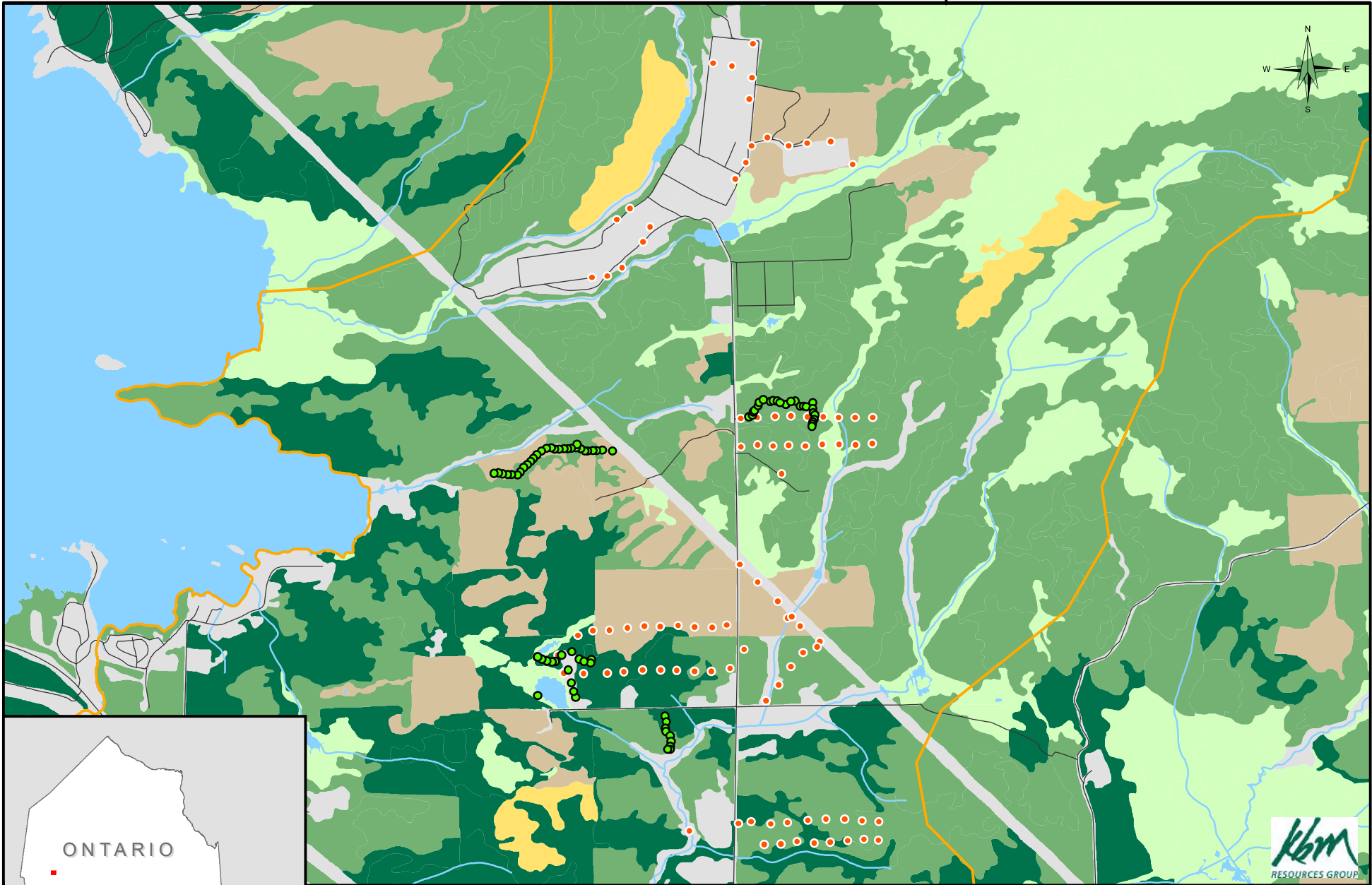
The catch-per-unit-effort (CPUE) is a measure of the individual animals captured per trap night and is typically used as an index of relative abundance. CPUE is determined by the calculation:

$$\frac{\text{number of individuals captured}}{\text{total number of trap nights}}$$

2.2.4.3 Small Mammal Trapping (2016)

Small mammal trapping was conducted on two occasions; July 6, 7, and 8, and July 26, 27, and 28, 2016. A total of 86 live traps (H. B. Sherman Traps, Inc. model LNATDG 235x80x90 mm) were set for 72 hours. Traps were baited with a peanut butter/oatmeal mixture and provisioned with cotton to provide nesting and insulative value to captured animals. A slice of carrot was also placed in each trap to provide water for trapped individuals. Where possible, traps were covered with moss to prevent rainwater from entering the trap and cooling trapped mammals. No pre-baiting occurred. Sex and reproductive condition were recorded (when possible) for each captured animal.

530000



Legend

- 2012
- 2016
- Road
- Stream
- Local Study Area
- Habitat Class**
- Coniferous
- Deciduous
- Developed
- Successional
- Upland
- Water
- Wetland

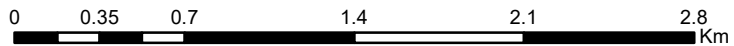


Figure 2.6
Locations of small mammal traps (2012 and 2016)

1:31,153
Projection: NAD 1983 UTM Zone 15N
Date created: 2017-03-24

2.2.4.4 Species at Risk-specific Surveys

On February 3, 2012, an emergency assessment subcommittee of COSEWIC (Committee on the Status of Endangered Wildlife in Canada) assessed the status of three Canadian bat species; tri-colored bat (*Perimyotis subflavus*), little brown myotis (*Myotis lucifugus*), and Northern myotis (*Myotis septentrionalis*). All three species were assessed as Endangered owing to the rapid declines of their population from the *Geomyces destructans* fungal pathogen responsible for White-nose Syndrome. A recommendation has been made to the Minister of the Environment that an Emergency Order be issued placing these bats on Schedule 1 of the Species at Risk Act (SARA). At the time of the 2011 field program there were no at – risk bats known to occur in or near the LSA and, as such, a presence/absence survey was undertaken, rather than a more in depth SAR-specific survey.

Bats (2011)

Presence/Likely Absence Survey

The presence/likely absence of foraging/commuting bats in the LSA was determined by deploying one sound recorder to record their echolocation calls in flight at each of three locations (Figure 2.7):

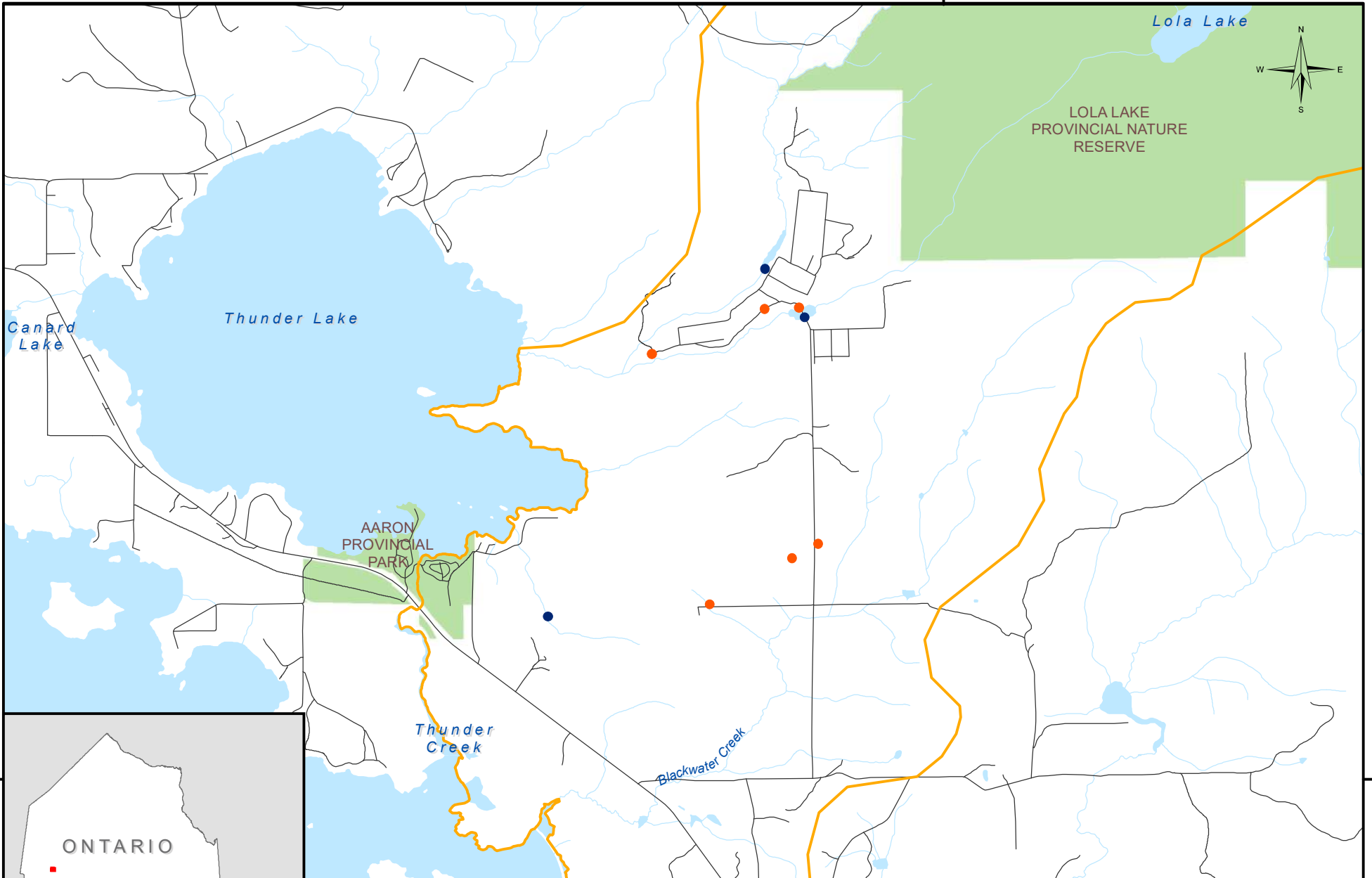
- SR21 (north pond at Tree Nursery);
- SR22 (south pond at Tree Nursery); and
- SR23 (Beaver Pond at Project site).

These locations were chosen because they represent the variety of habitat types suitable for bat foraging and commuting corridors. This includes open water, forests, tree-lines, scrub and grasslands with an abundant supply and diversity of invertebrate prey.

In order to record the high-frequency bat echolocation calls, the sound recorders used were set to the ultrasonic range (above 20 kHz). The recorders were programmed to record for one hour, beginning at 30 minutes after sunset (MoELP 1998). The recorders were set at approximately 1 m above the ground in both open and wooded habitats in order to detect species that fly high over open areas and those that use cluttered habitats. For example, silver-haired bats (*Lasionycteris noctivagans*) forage over woodland ponds and streams at heights up to 7 m to 8 m (Harvey et al. 2011).

The recordings were undertaken during June, the optimal season being between May through August (MoELP 1998). SR21 and SR22 were surveyed for two nights (June 12, 2011 and June 13, 2011 and June 14, 2011 and June 15, 2011 respectively), while SR23 was surveyed over three nights (June 16, 2011 to June 18, 2011). Analysis of sonograms from these recordings, using Songscape 4.0.2 software, was conducted, and where possible, bat species were identified and transcribed.

530000



5510000

5510000

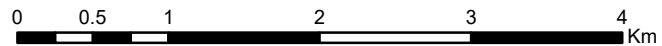


Legend

- 2011
- 2012
- Road
- Stream
- Local Study Area
- Park/Nature Reserve
- Waterbody



Figure 2.7
Locations of bat ultrasonic recording stations (2011 and 2012)



1:50,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-03-24

Bats (2012)

In 2012, there was no bat monitoring protocol for mineral exploration baseline data collection programs, however, the OMNRF had advised that a modified version of the bat monitoring protocol from the Guidelines for Wind Power Projects (OMNRF 2011) could be used to conduct surveys. The presence/likely absence of foraging/commuting bats in the study area was determined by deploying a sound recorder to record bat echolocation calls in flight during June and July 2012. Six locations within areas of potential disturbance were chosen based on the variety of habitat types suitable for bat foraging and commuting corridors (Figure 2.7). This included open water, forests, tree-lines, scrub and grasslands with an abundant supply and diversity of invertebrate prey. In order to record the high frequency bat echolocation calls, the sound recorders used were set to the ultrasonic range (above 20kHz). The recorders were set to record at dusk for 5 hours and programmed to record in trigger mode, meaning they would begin recording any time a signal was detected above 18 kHz. The recorders were set approximately 2 m above the ground in both open and wooded habitats in order to detect species that fly high over open areas and those that use cluttered habitats. Species identification was conducted through an analysis of sonograms from recordings using Song Scope and Kaleidoscope software (Wildlife Acoustics), where possible.

Bats (2015/2016)

A much more comprehensive bat monitoring program was implemented in 2015/2016. Direction for conducting bat maternity roost surveys was provided by the Dryden District OMNRF. The methodology, which is required prior to any development in order to verify occupancy of bat maternity roosts within woodlands, followed a three-step process:

- a) the identification of forest stands with the potential to contain maternity roost habitat;
- b) snag density calculations for these stands, and;
- c) detailed mapping of sang/cavity trees within the stands.

The identification of potential maternity roost habitat involved the Ecological Land Classification (ELC) of key areas potentially impacted by development. A map of the proposed project footprint for the mine infrastructure was overlaid with Forest Resource Inventory (FRI) data to search for the following ELC communities and ELC codes:

ELC communities:

- Deciduous Forests (FOD);
- Mixedwood Forests (FOM);
- Coniferous Forests (FOC);
- Deciduous Swamp (SWD);
- Mixedwood Swamps(SWM); and
- Coniferous Swamps (SWC).

ELC Codes:

- G/B015-019 Very Shallow: Dry to Fresh: Mixedwood/hardwood;
- G/B023-028 Very Shallow: Humid: Conifer/Mixedwood;

- G/B039-043 Dry, Sandy: Hardwood/Mixedwood;
- G/B054-059 Dry to Fresh: Coarse: Mixedwood/Hardwood;
- G/B069-076 Moist, coarse: Mixedwood/Hardwood;
- G/B087-092 Fresh, Clayey: Mixedwood/hardwood;
- B103-108 Fresh, Silty to Fine Loamy: Mixedwood/Hardwood;
- B118-125 Moist. Fine: Mixedwood/Hardwood; and
- B130-133: Swamps.

Forest stands possessing this ELC information were highlighted by the OMNRF as having potential for bat maternity roost habitat. The FRI data (Wabigoon (2010) and Dryden (2015) Forest Resource Inventory) were searched using ArcMap (v.10.3.1) to determine the locations of the afore mentioned ELC communities and codes, which led to the identification of three stands as having the potential for maternity roost habitat.

Once these stands were identified, a certified photo interpreter reviewed high resolution imagery (10 cm) of the stands to determine snag densities, snag species (hardwood or conifer) and crown closure estimates. The photo interpretation exercise was completed in a similar fashion to the proposed snag density calculation methodology presented by the OMNRF; Random plots were selected throughout each stand with a fixed radius of 12.6 m (0.05 ha). Within each plot the snag density for snags assumed to be >25 cm in diameter was determined. Snag densities per hectare for each of the four areas were determined by averaging the total number of snags observed over the total area covered by the plots within each area. Each plot represented 0.05 ha, therefore the density of snags per hectare was determined by the formula:

$$\frac{\text{(number of snags observed in each area)}}{\text{(0.05 X the number of plots in each area)}} = \text{Density of snags per hectare}$$

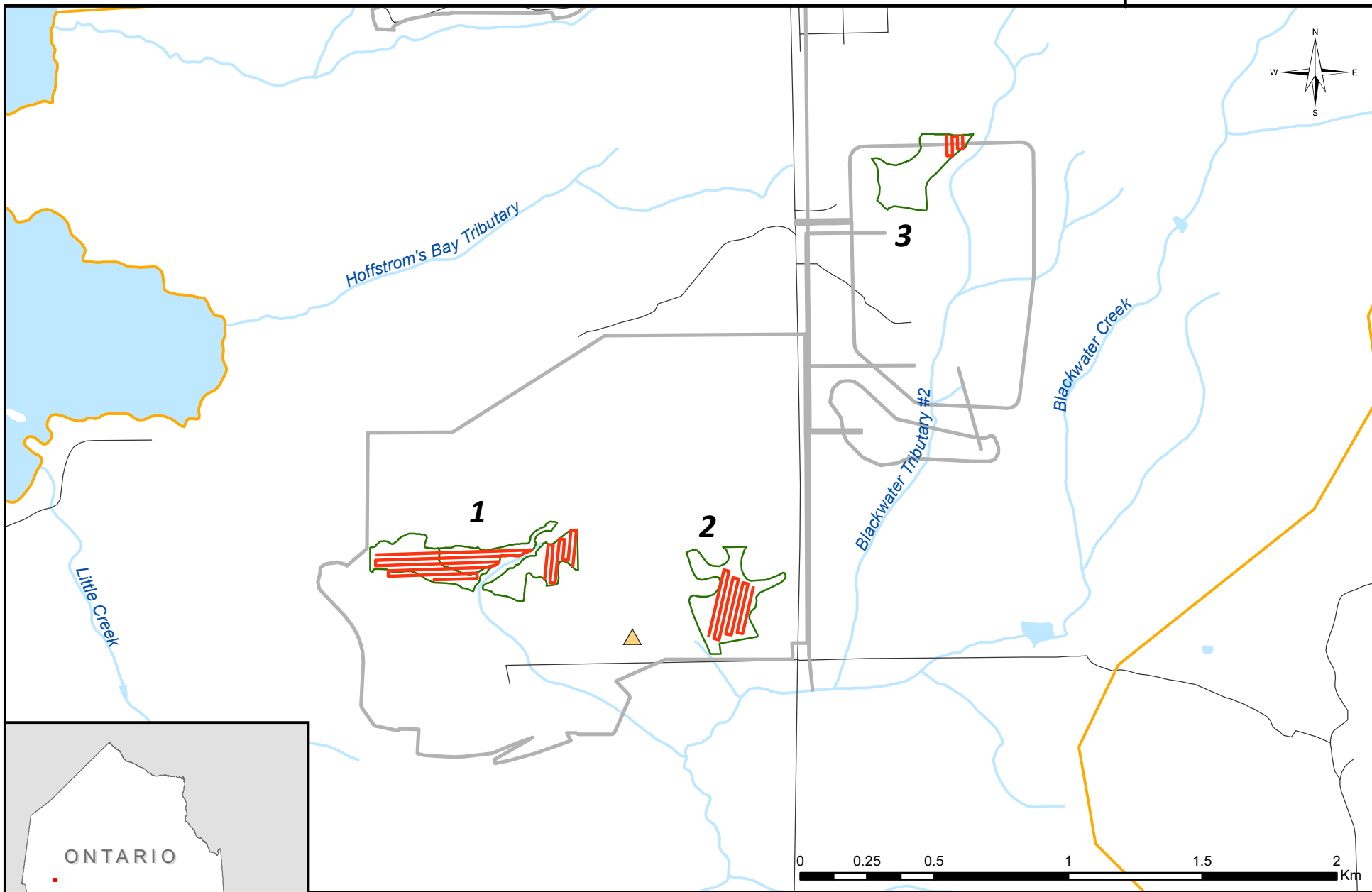
Field mapping of maternity roost habitat was completed on October 22, 2015 by conducting transects within the three areas previously identified (Figure 2.8). Transects were created for each area following the OMNRF procedure, which recommended that transects be completed during leaf off. Transects were created in ArcMap, and were oriented within each area to minimize the walking distance, while allowing for transects to be as long as possible. Transects were spaced at 20 m intervals. Information collected for all snags observed during field investigations included species, the presence of cavities/cracks, diameter at breast height (dbh), presence of loose/peeling bark, decay class (as per Watt and Caceres 1999), and position within the surrounding canopy. Once this information was collected, snags and cavity trees were plotted using their GPS coordinates, and the best candidate trees were determined through a ranking system. An overall ranking (High, Medium, or Low) of the potential for roosting use was determined once all the information was considered together. The OMNRF provided criteria to determine the best candidate roosting trees (in order of importance), which were used to determine the overall rank:

- Tallest snag/cavity tree;
- Exhibits cavities or crevices most often originating as cracks, scars, knot holes or woodpecker cavities;
- Has the largest diameter breast height (>25cm diameter at breast height);

- Is within the highest density of snags/cavity trees (e.g. cluster of snags);
- Has a large amount of loose, peeling bark;
- Cavity or crevice is high in snag/cavity tree (>10m);
- Tree species that provide good cavity habitat (e.g. white pine, maple, aspen, ash, oak);
- Canopy is more open (to determine canopy cover, determine the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of trees); and
- Exhibits early stages of decay (decay Class 1-3; refer to Watt and Caceres 1999).

For a snag or cavity tree to be ranked as “High”, it needed to exhibit the following characteristics; be as tall, or taller than the canopy, have a crack and/or crevice, and have loose peeling bark. For a snag or cavity tree to be ranked as “Medium”, it needed to exhibit the following characteristics; be as tall, or taller than the canopy, have a crack or crevice, and/or one or more of the additional criteria provided by the OMNRF. All other trees were ranked as “Low”.

An exit survey was also completed by Treasury in conjunction with the Dryden OMNRF on June 11th, 2015. This exit survey was completed at the abandoned residence on the Treasury property (Figure 2.8).



Legend

Unoccupied House	Road	Local Study Area
Transect	Stream	Waterbody
Proposed Project Footprint	Candidate Bat Roosting Stand	

Figure 2.8
Locations of snag surveys
bat maternity roosting sites

1:20,000
 Projection: NAD 1983 UTM Zone 15N
 Date created: 2017-04-11

2.2.5 Invertebrates

Observations of dragonflies and damselflies (*Odonates*) and butterflies were compiled opportunistically during summer fieldwork. Some *odonate exuviae* (shed larval skins) were collected and identified. No concerted invertebrate sampling effort was undertaken. Only one invertebrate SAR (monarch (*Danaus plexippus*)) is known to occur in the RSA. Monarchs are large, conspicuous, and readily detected through incidental observations. Incidental observations were recorded throughout the field program.

2.2.6 Incidental Observations

Incidental observations of wildlife species were recorded throughout the field program, for example, songbirds were recorded during wetland bird surveys and vice versa.

2.2.7 Significant Wildlife Habitat

An inventory of significant wildlife habitat, as described in OMNRF (2000), was conducted in 2010, 2011, and 2015, across the LSA. Specifically, this habitat included colonial and raptor nest sites, bird migratory staging and stopover areas, ungulate wintering areas, ungulate calving and fawning sites, winter deer yards, moose aquatic feeding areas (MAFAs), mineral licks and winter habitat, and reptile and bat hibernacula. Moose aquatic feeding areas, calving sites, mineral licks, and animal denning sites were mapped from OMNRF data. In 2016, 11 wetlands in the LSA were surveyed for potential MAFAs. Ranking of potential MAFAs followed the direction provided in Selected Wildlife and Habitat Features: Inventory Manual (Ranta 1998). This protocol ranks wetlands based on the presence of certain aquatic vegetation, accessibility by moose, and wetland/waterbody type.

3 RESULTS

3.1 Pre-field Review of Existing Data Results

3.1.1 Wildlife Habitat

The following habitat information was collected during the pre-field review of existing data.

3.1.1.1 Colonial and Raptor Nest Sites

There are no documented colonial nest sites for birds (including heron) or raptor nesting sites areas (including Osprey (*Pandion haliaetus*) and Bald Eagle) in the LSA (DFMC 2010).

3.1.1.2 Bird Migratory Staging and Stopover Areas

According to the desktop research conducted in 2011 and 2012, there are no documented migratory bird staging and stopover areas in the RSA or LSA. Traditional Ecological Knowledge has indicated that there may be migratory staging areas in Lola Lake provincial park.

3.1.1.3 Ungulate Wintering Areas and Calving / Fawning sites

There are no known wintering areas or calving/fawning sites for caribou (*Rangifer tarandus*), moose (*Alces alces*), or deer in the LSA (DFMC 2010). Moose wintering areas, as well as calving sites are present in the RSA.

3.1.1.4 Winter Deer Yards

No winter deer yards are known to occur in the LSA or RSA, however review of the Forest Resources Inventory (FRI) data indicates that potential deer yards habitat (dense cedar swamps; Ecosite 37) make up approximately 460 ha of the LSA.

3.1.1.5 Moose Aquatic Feeding Areas and Mineral Licks

According to the values map for the Dryden Forest Management Plan, the closest MAFA was located approximately 3 km NW of the LSA (DFMC 2010). MAFA assessments were completed in 11 wetlands throughout the LSA during the wetland evaluations (Figure 3.1). The results of these assessments can be found in Table 4.1. There are no known moose mineral licks in the LSA or RSA (DFMC 2010).

Table 3.1 Results of moose aquatic feeding area assessments for 11 wetlands within the LSA.

Wetland ID	MAFA Ranking
WLD 1	2
WLD 2	3
WLD 3	3
WLD 4	3
WLD 5	2
WLD 6	3
WLD 7	3
WLD 8	3
WLD 9	4
WLD 10	3
WLD 11	3

3.1.1.6 Hibernacula

No bat hibernacula are documented for the RSA or LSA (DFMC 2010) and no abandoned mines or caves are known to occur. No reptile hibernacula have been documented in the RSA or LSA (DFMC 2010).

3.1.2 Rare and at Risk Species

Information on provincially rare species, SAR and their habitat is described in the following sub-sections. “Species at risk” are those species under threat of becoming extinct or of being extirpated from the province. Federally and provincially listed at-risk species that are known to occur, or may potentially occur within the RSA, owing to the presence of suitable habitat, were identified.

Federally listed at-risk species include those listed as endangered, threatened or of special concern on Schedule 1 of SARA. These species are protected under the Species at Risk Act (SARA). Provincially listed species include those listed as endangered, threatened or of special concern on the Species at Risk in Ontario (SARO) list developed by the Committee on the Status of Species at Risk in Ontario (COSSARO). Listed species and their habitat are offered protection under the *Endangered Species Act* (2007).

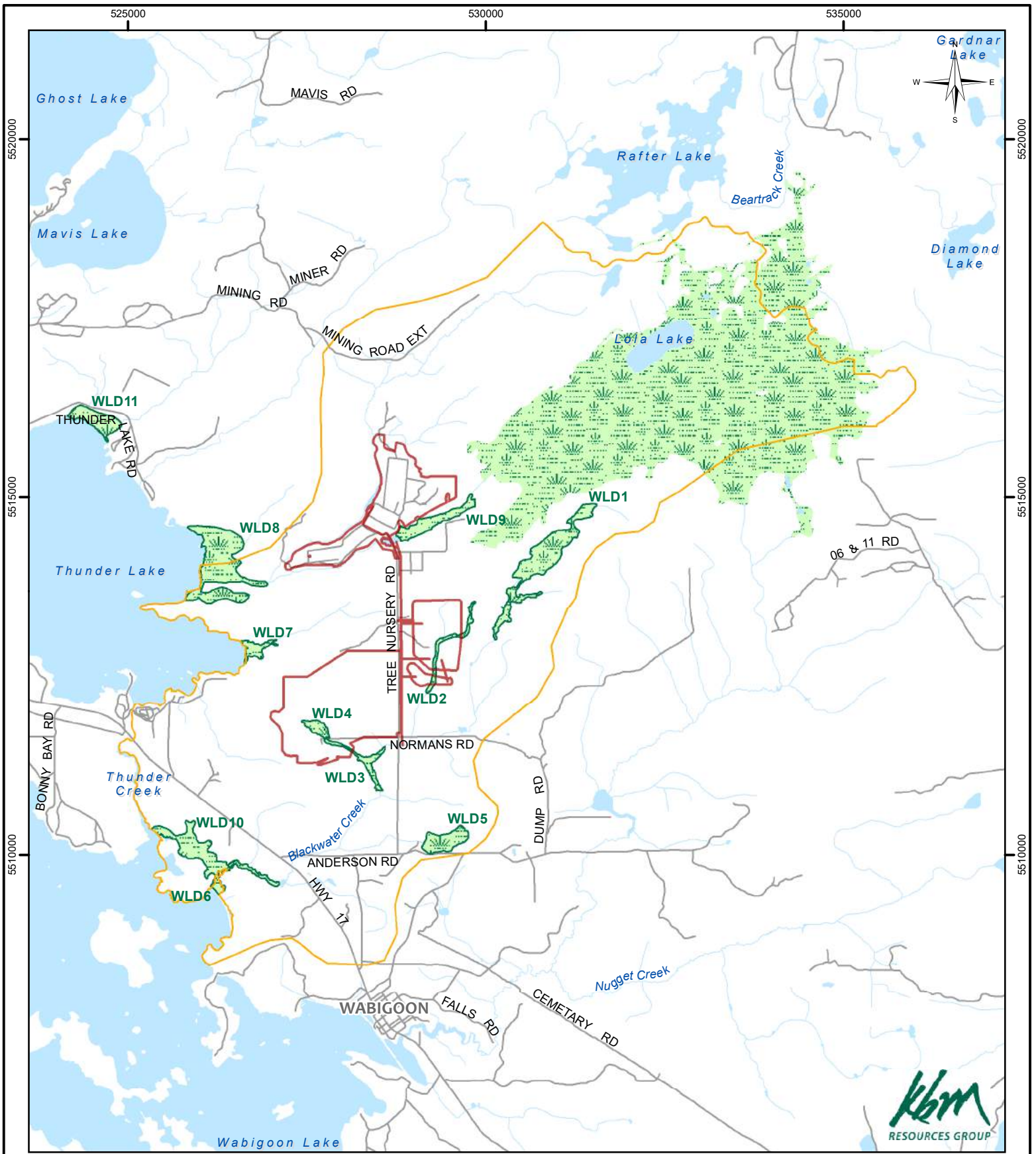


Figure 3.1
Moose aquatic feeding area
survey locations

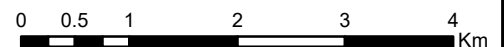
Legend

- Development Footprint
- Local Study Area
- Wetlands
- Stream
- Surveyed Wetlands
- Waterbody

Projection: NAD 1983 UTM Zone 15N

Date created: 2017-03-24

SCALE: 1:70,000



3.1.2.1 *Species at Risk*

The review of existing data identified fifteen avian, one reptilian, four mammalian, and one invertebrate SAR that may potentially occur, or are known to occur within the RSA and LSA (Table 3.2). Woodland caribou (*Rangifer tarandus*) are a SAR that no longer occur in Dryden Forest, although they were known to inhabit the area in the late 1950s (DFMC 2010).

A search of the NHIC database indicated that there have been no historic observations of any SAR for the study site. One OBBA point count square overlaps the TML study area (15WR21). Species observed and their breeding status are listed in Appendix A. Several species at risk were listed in the OBBA observations for the study area including Bald Eagle, Barn Swallow, Canada Warbler (*Wilsonia canadensis* – Special Concern), and Olive-sided Flycatcher (*Contopus cooperi* – Special Concern).

Table 3.2 Species at Risk Potentially Occurring or Known to Occur within the RSA and LSA

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Woodland caribou (Boreal pop)	Rangifer tarandus caribou (Boreal pop.)	Large unfragmented patches of mature conifer dominated forests. Winter, refuge and calving habitat.	TH	TH-2002	N5	TH		S4
Cougar (Mountain Lion)	Puma (Felis) concolor	A variety of structures may be used as dens; such as, caves & nooks in rock cliffs, boulder piles, excavated burrows, uprooted trees, fallen logs, tree cavities, and dense brush piles.	NR	DD - 1998	N4N5	EN		SU
Little Brown Bat (Little Brown Myotis)	Myotis lucifugus	Summer roosts & maternity colonies are located under exfoliating bark and cavities of dead & dying trees. Hibernates in caves & mines, Sept. to May, when they are sensitive to disturbance.	EN	EN-2013	N3	EN	EN-2012	S4

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Nothern Long-eared Bat (Northern Myotis)	Myotis septentrionalis	Summer roosts & maternity colonies are located under exfoliating bark and cavities of dead & dying trees. Hibernates in caves & mines, Sept. to May, when they are sensitive to disturbance.	EN	EN-2013	N2N3	EN	EN-2012	S3
Wolverine (western pop.1)	Gulo Gulo (western pop.1)	Dens consist of snow tunnels developed amongst boulders, rocky slopes, & large deadfall where deep snow can accumulate.	NR	SC-2014	N3N4	TH	TH	S2S3
American White Pelican	Pelecanus erythrorhynchos	Nests in colonies on islands in freshwater lakes.	NR	NAR-1987	N3N4B	TH	TH-2008	S2B
Bald Eagle (N.Ont)	Haliaeetus leucocephalus	Form huge stick nests high in trees (Pw, Pr, Po), near water.	NR	NAR-1984	N5B, N5N	SC	SC-2009	S2N
Barn Swallow	Hirundo rustica	Open areas near buildings for nesting. Nests on vertical surfaces of buildings close to ceiling Nests are often re-used year after year.	NR	TH-2011	N4N5B	TH	TH-2011	S4B

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Black Tern	<i>Chlidonias niger</i>	Floating nests found in loose colonies in shallow cattail marshes.	NR	NAR-1996	N4N5B	SC		S3B
Bobolink	<i>Dolichonyx oryzivorus</i>	Inhabits grassy farmlands & beaver meadows where it nests on the ground.	NR	TH-2010	N4N5B	TH	TH-2010	S4B
Canada Warbler	<i>Wilsonia canadensis</i> (<i>Cardellina canadensis</i> , <i>Cardellina pusilla</i>)	Nests on or near the ground on mossy logs & hummocks along shrubby stream banks & swamps.	TH	TH-2008	N5B	SC	SC-2009	S4B
Chimney Swift	<i>Chaetura pelagica</i>	Nests in chimneys, silos, barns and hollow trees.	TH	TH-2007	N4B	TH	TH-2009	S4B
Common Nighthawk	<i>Chordeiles minor</i>	Prefers open woodlands with rock outcrops, clearcuts, burns, gravel pits and minimal vegetation.	TH	TH-2007	N4B	SC	SC-2009	S4B
Eastern Loggerhead Shrike (migratory population)	<i>Lanius ludovicianus (migrans)</i>	Inhabits pastures & grasslands with scattered low trees and shrubs where it builds its nest	EN	EN-2000		EN		S2B

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Eastern Whip-poor-will	Anstrostomus vociferus (Caprimulgus vociferus)	Nests on the ground in dead leaves under semi-open forests. Inhabits the edges of openings in mature coniferous, deciduous, & mixedwood forests where they forage for insects in the openings & roost in the nearby trees.	TH	TH-2009	N4B	TH	TH-2009	S4B
Eastern Wood-pewee	Contopus virens	Nests is a shallow, woven grass cup placed on a horizontal tree branch. Although found in all woodland types, they prefer Intermediate-aged forests with a relatively sparse midstory where they can feed on flying insects.	NR	SC-2012	N4N5B	SC	SC-2013	S4B
Golden Eagle	Aquila chrysaetos	Form large stick nests, usually on a cliff ledge, occasionally in trees.	NR	NAR-1996	N4N5	EN	EN-2004	S2B
Olive Sided Flycatcher	Contopus cooperi	Nests next to wetlands & rivers and inhabits forest edges & openings including logged & burned areas of coniferous and mixed forests. Twig nests may be found near the tip of horizontal branches, high up in conifers.	TH	TH-2007	N4B	SC	SC-2009	S4B

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Peregrine Falcon	<i>Falco peregrinus anatum/tundrius</i>	Nests on cliff ledges & tall building ledges.	SC	SC-2007	N3N4B, N3N	SC	SC-2013	S3B
Red-necked Grebe	<i>Podiceps grisegena</i>	Nests in marshy areas of shallow lakes and ponds.	NR	NAR-1982	N5B, N5N	NR		S3B
Rusty Blackbird	<i>Euphagus carolinus</i>	Found in wetlands of conifer forests & muskeg. Nests are built in shrubs near or over water.	SC	SC-2006	N4B	NR		S4B
Short-eared Owl	<i>Asio flammeus</i>	Lives in open grasslands & marshes where it nests on the ground.	SC	SC-2008	N4B, N3N	SC	SC-2009	S2NS4B

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Yellow Rail	<i>Coturnicops noveboracensis</i>	Lives in reedbeds of marshy wetlands.	SC	SC-2009	N4B	SC	SC-2009	S4B
Wood Thrush	<i>Hylocichla mustelina</i>	The wood thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches.	TH	TH-2012	N4B	SC	SC-2014	S4B
Large Marble Butterfly	<i>Euchloe ausonides</i>	Meadows within sandy pine forests.		PS: ssp. Insulanus EXT	N5			S3
Monarch Butterfly	<i>Danaus plexippus</i>	The larvae feed solely on milkweed which is found around old fields & roadsides. Adult butterflies feed on nectar from a wide variety of wildflowers in non-forested, riparian, and forest edge habitats.	SC	SC-2010	N5B	SC	SC-2009	S2NS4B

Species	Scientific name	Habitat requirements	Federal			Ontario		
			SARA	COSEWIC	Nature Serve N-rank	SARO	COSSARO	Nature Serve S-rank (NHIC)
Skillet Clubtail Dragonfly	Gomphus ventricosus	Found around medium to large, turbid rivers with sand to mud bottoms & good water quality.		EN-2010	N1		DD-2011	SH
Snapping Turtle	Chelydra serpentina	Inhabits shallow slow-moving waters with a muddy, leafy bottom. Lays eggs late May to early July, in sandy/gravelly areas along streams, roadbeds & gravel pits.	SC	SC-2008	N5	SC	SC-2009	S3

SC – Special Concern, TH – Threatened, EN - Endangered and NR-

Source: NHIC 2012; OBBA 2006; COSEWIC, COSSARO, OMNRF

3.1.2.2 Featured Species and Provincially Rare Wildlife Species

Table 3.3 provides a summary of featured species and provincially rare species occurring or potentially occurring in the RSA and LSA. Featured species are species with economic or conservation significance or indicators of functioning boreal ecosystems as designated in the Dryden Forest Management Plan (DFMC 2010). Provincially rare (NHIC 2012; OMNRF 2012) wildlife species are known to be, or potentially, using the RSA and LSA. These species provide an important ecological role, and in some cases, a cultural role in their ecosystem (DFMC 2010) e.g. moose (*Alces alces*) and American marten, for subsistence and the fur trade, respectively.

Table 3.3 Featured Wildlife Species and Provincially Rare Species Known to occur or May Potentially Occur within the RSA and LSA

SPECIES		LOCATION OF CLOSEST RECORD	RELEVANT HABITAT USE	STATUS
Common Name	Scientific Name			
Birds				
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Dryden Forest	Mixed forests and woodlands	Featured species
Black-backed Woodpecker	<i>Picoides arcticus</i>	Dryden Forest	Mature to old-growth coniferous	Featured species
Red-necked Grebe	<i>Podiceps grisegena</i>	Provincially rare ¹³ nesting species but widely distributed in the NW part of Ontario	Wetlands	Provincially rare (S3B)
Black-billed Magpie	<i>Pica hudsonia</i>	Provincially rare but common nesting species in agricultural land around Dryden	Field edges and structures	Provincially rare (S3)
Mammals				
American marten	<i>Martes americana</i>	Dryden Forest	Mature coniferous	Featured species
Moose	<i>Alces alces</i>	Dryden Forest	Coniferous forests, streams and brushy	Featured species
White-tailed deer	<i>Odocoileus virginianus</i>	Dryden Forest	Rolling country, open areas near cover, valleys, streams, woodlands and	Featured species
Black bear	<i>Ursus americanus</i>	Dryden Forest	Forests	Featured species
Invertebrates				
Laurentian tiger beetle	<i>Cicindela deniki</i>	Historical record of this rare species in Dryden Forest	Coniferous or mixed forests	Provincially rare (S3)
Horned clubtail	<i>Arigomphus cornutus</i>	Provincially rare but widespread in NW Ontario; distribution unknown	Ponds and muddy streams	Provincially rare (S3)
Pronghorn clubtail	<i>Gomphus graslinellus</i>	Provincially rare; distribution	Slow moving streams and medium to large lakes	Provincially rare (S3)

Source: DFMC 2010/2011; NHIC 2012; ABBO 2006; Eder and Pattie 2001; Paulson 2009; Oldham and Weller 2000; Campbell and Kennedy 2009; RRGp Ap. VI-1 2011; RRGp Ap. VII-13 2011; and RRGp Ap. VI-14 2011

4 FIELD SURVEY RESULTS

4.1 Bird Survey Results

4.1.1 Point Count Results

The following section provides a summary of the bird observations recorded during the 2010, 2011, 2012, and 2016 surveys.

Breeding bird surveys were carried out in Jun and July of 2011, 2012, and 2016. A total of 140 point count stations were surveyed in June and repeated in July. A total of 1655 individual birds from 100 species were encountered during point count surveys.

Avian species richness was the highest in point count stations that were in developed areas (76 species) compared to deciduous habitats (65 species), coniferous (63 species), wetland (37 species), successional (35 species), and upland (28 species). The 10 species encountered most frequently during point count surveys in descending order were; White-throated Sparrow (177), Red-eyed Vireo (104), Nashville Warbler (*Oreothlypis ruficapilla*) (97), American Robin (*Turdus migratorius*) (85), Swanson's Thrush (*Catharus ustulatus*) (75), Ruby-crowned Kinglet (*Regulus calendula*) (72), Ovenbird (*Seiurus aurocapilla*) (67), Hermit Thrush (*Catharus guttatus*) (57), Red-breasted Nuthatch (50), and Magnolia Warbler (*Dendroica magnolia*) (49). The most common birds, representing 80 % of the total birds counted, are presented below (Table 4.1 and Table 4.2).

Owl species recorded during nocturnal surveys included Northern Saw-whet (*Aegolius acadicus*), Long-eared (*Asio otus*), Barred (*Strix varia*) and Great Horned Owl (*Bubo virginianus*). In addition, Great Grey (*Strix nebulosa*) and Boreal Owl were reported in Breeding Bird Atlas grid squares overlapping the LSA. All of these species are likely to nest in the LSA. An adult Great Horned Owl was observed with a juvenile offspring in the LSA.

Table 4.1 Most common bird species from point counts (representing 80% of total birds counted)

Common Name	Scientific Name	Abundance	Rank
White-throated Sparrow	<i>Zonotrichia albicollis</i>	177	1
Red-eyed Vireo	<i>Vireo olivaceus</i>	104	2
Nashville Warbler	<i>Vermivora ruficapilla</i>	97	3
American Robin	<i>Turdus migratorius</i>	85	4
Swainson's Thrush	<i>Catharus ustulatus</i>	75	5
Ruby-crowned Kinglet	<i>Regulus calendula</i>	72	6
Ovenbird	<i>Seiurus aurocapilla</i>	67	7
Hermit Thrush	<i>Catharus guttatus</i>	57	8
Red-breasted Nuthatch	<i>Sitta canadensis</i>	50	9
Magnolia Warbler	<i>Dendroica magnolia</i>	49	10
Common Raven	<i>Corvus corax</i>	38	11
Least Flycatcher	<i>Empidonax minimus</i>	38	12
Yellow-rumped Warbler	<i>Dendroica petechia</i>	37	13
Chipping Sparrow	<i>Spizella passerina</i>	36	14
Chestnut Sided Warbler	<i>Setophaga pensylvanica</i>	34	15
Mourning Warbler	<i>Geothlypis philadelphia</i>	33	16
American crow	<i>Corvus brachyrhynchos</i>	32	17
Winter Wren	<i>Troglodytes troglodytes</i>	32	18
Blue Jay	<i>Cyanocitta cristata</i>	31	19
Alder Flycatcher	<i>Empidonax alnorum</i>	30	20
Black-capped Chickadee	<i>Poecile atricapilla</i>	28	21
Song sparrow	<i>Melospiza melodia</i>	27	22
Tennessee Warbler	<i>Oreothlypis peregrina</i>	26	23
Northern Flicker	<i>Colaptes auratus</i>	25	24
Golden-crowned Kinglet	<i>Regulus satrapa</i>	23	25
Gray Jay	<i>Perisoreus canadensis</i>	23	26
Swamp Sparrow	<i>Melospiza georgiana</i>	23	27
Lincoln's Sparrow	<i>Melospiza lincolni</i>	21	28
Common Yellowthroat	<i>Geothlypis trichas</i>	20	29
Dark-eyed Junco	<i>Junco hyemalis</i>	19	30

Table 4.2 Bird species ranked according to distribution across point counts

Common Name	Scientific Name	Abundance	# of Points	% of Points	Density
White-throated Sparrow	<i>Zonotrichia albicollis</i>	177	118	0.81	0.39
Red-eyed Vireo	<i>Vireo olivaceus</i>	104	90	0.62	0.23
Nashville Warbler	<i>Vermivora ruficapilla</i>	97	77	0.53	0.21
American Robin	<i>Turdus migratorius</i>	85	74	0.51	0.19
Swainson's Thrush	<i>Catharus ustulatus</i>	75	66	0.45	0.16
Ruby-crowned Kinglet	<i>Regulus calendula</i>	72	67	0.46	0.16
Ovenbird	<i>Seiurus aurocapilla</i>	67	54	0.37	0.15
Hermit Thrush	<i>Catharus guttatus</i>	57	48	0.33	0.12
Red-breasted Nuthatch	<i>Sitta canadensis</i>	50	46	0.32	0.11
Magnolia Warbler	<i>Dendroica magnolia</i>	49	42	0.29	0.11
Common Raven	<i>Corvus corax</i>	38	37	0.25	0.08
Least Flycatcher	<i>Empidonax minimus</i>	38	34	0.23	0.08
Yellow-rumped Warbler	<i>Dendroica petechia</i>	37	32	0.22	0.08
Chipping Sparrow	<i>Spizella passerina</i>	36	28	0.19	0.08
Chestnut Sided Warbler	<i>Setophaga pensylvanica</i>	34	32	0.22	0.07
Mourning Warbler	<i>Geothlypis philadelphia</i>	33	33	0.23	0.07
American crow	<i>Corvus brachyrhynchos</i>	32	30	0.21	0.07
Winter Wren	<i>Troglodytes troglodytes</i>	32	30	0.21	0.07
Blue Jay	<i>Cyanocitta cristata</i>	31	27	0.18	0.07
Alder Flycatcher	<i>Empidonax alnorum</i>	30	28	0.19	0.07
Black-capped Chickadee	<i>Poecile atricapilla</i>	28	19	0.13	0.06
Song sparrow	<i>Melospiza melodia</i>	27	25	0.17	0.06
Tennessee Warbler	<i>Oreothlypis peregrina</i>	26	20	0.14	0.06
Northern Flicker	<i>Colaptes auratus</i>	25	25	0.17	0.05
Golden-crowned Kinglet	<i>Regulus satrapa</i>	23	20	0.14	0.05
Gray Jay	<i>Perisoreus canadensis</i>	23	20	0.14	0.05
Swamp Sparrow	<i>Melospiza georgiana</i>	23	25	0.17	0.05
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	21	16	0.11	0.05
Common Yellowthroat	<i>Geothlypis trichas</i>	20	20	0.14	0.04
Dark-eyed Junco	<i>Junco hyemalis</i>	19	12	0.08	0.04

The type and structure of vegetation is important in determining the make-up of the avian community. Different vegetation communities provide nest sites, roost locations for refuge from predators, food for herbivorous birds, a prey base for carnivorous birds and structurally, the vegetative habitat enables or constrains foraging. Different bird species require different habitat types as their preferred territories. Bird species richness and abundance by habitat type based on point count results is provided below (Table 4.3 and

Table 4.4).

Table 4.3 Breeding bird species richness by habitat category

Habitat Category	# of Points	# of Species
Conifer	37	63
Deciduous	34	65
Successional	9	35
Upland	5	28
Wetland	12	37
Developed	44	76

Table 4.4 Species ranked according to abundance in each habitat category

Coniferous	#	Deciduous	#	Developed	#
White-throated Sparrow	56	White-throated Sparrow	38	White-throated Sparrow	50
Nashville Warbler	29	Red-eyed Vireo	27	Red-eyed Vireo	42
Swainson's Thrush	25	Ovenbird	24	American Robin	38
Red-eyed Vireo	24	Nashville Warbler	19	Nashville Warbler	26
Ruby-crowned Kinglet	24	Swainson's Thrush	19	American crow	24
Ovenbird	20	American Robin	17	Ovenbird	22
Hermit Thrush	19	Magnolia Warbler	17	Mourning Warbler	18
American Robin	18	Red-breasted Nuthatch	16	Common Raven	16
Tennessee Warbler	15	Ruby-crowned Kinglet	16	Magnolia Warbler	15
Golden-crowned Kinglet	14	Song sparrow	15	Chestnut Sided Warbler	14
Red-breasted Nuthatch	14	Black-capped Chickadee	14	Red-breasted Nuthatch	14
Magnolia Warbler	13	Chestnut Sided Warbler	13	Ruby-crowned Kinglet	14
Winter Wren	13	Least Flycatcher	12	Swainson's Thrush	14
Kentucky Warbler	11	Common Raven	11	Blue Jay	13
Yellow-rumped Warbler	11	Alder Flycatcher	9	Least Flycatcher	12
Chipping Sparrow	8	Blue Jay	9	Black-capped Chickadee	11
Dark-eyed Junco	7	Chipping Sparrow	9	Alder Flycatcher	10
Ruffed Grouse	7	Hermit Thrush	9	Hermit Thrush	10
Brown Creeper	6	Mourning Warbler	9	Northern Flicker	10
Least Flycatcher	6	Common Yellowthroat	7	Chipping Sparrow	9
Northern Parula	6	Tennessee Warbler	7	Winter Wren	9
Redbreasted Nuthatch	6	Yellow-rumped Warbler	7	Swamp Sparrow	8

Coniferous	#	Deciduous	#	Developed	#
		Black-and-white			
Blue Jay	5	Warbler	6	Veery	8
Chestnut Sided Warbler	5	Dark-eyed Junco	6	American Goldfinch	7
Common Raven	5	Northern Flicker	6	Common Yellowthroat	7
Gray Jay	5	Northern Parula	6	Song sparrow	7
Northern Flicker	5	Blackburnian Warbler	5	Yellow-rumped Warbler	7
Swamp Sparrow	5	Gray Jay	5	Common Grackle	6
American Goldfinch	4	Lincoln's Sparrow	5	Ruffed Grouse	6
Boreal Chickadee	4	Veery	5	Common Goldeneye	5
Cedar Waxwing	4	Golden-crowned Kinglet	3	Gray Jay	5
Downy Woodpecker	4	Ruffed Grouse	3	Savannah Sparrow	5
Mourning Warbler	4	Swamp Sparrow	3	Wilson's Snipe	5
Song sparrow	4	Wilson's Snipe	3	Barn Swallow	3
Bay-breasted Warbler	3	Winter Wren	3	Bay-breasted Warbler	3
Blackburnian Warbler	3	Yellow-bellied Sapsucker	3	Black-and-white Warbler	3
Blue-headed Vireo	3	American crow	2	Clay-coloured Sparrow	3
Lincoln's Sparrow	3	Blue-headed Vireo	2	Common Yellowthroat	3
Red-winged Blackbird	3	Kentucky Warbler	2	Common Loon	3
Wilson's Snipe	3	Red-winged Blackbird	2	Common Merganser	3
Alder Flycatcher	2	Rose-breasted Grosbeak	2	Dark-eyed Junco	3
American crow	2	American Goldfinch	1	Kentucky Warbler	3
Black-and-white Warbler	2	American Redstart	1	Ring-billed Gull	3
Common Yellowthroat	2	Brown Creeper	1	Tennessee Warbler	3
Eastern Phoebe	2	Cedar Waxwing	1	Tree Swallow	3
Hairy Woodpecker	2	Downy Woodpecker	1	Blackburnian Warbler	2
Pileated Woodpecker	2	Eastern Phoebe	1	Cedar Waxwing	2
Yellow-bellied Sapsucker	2	Great Blue Heron	1	European Starling	2
American Redstart	1	Hairy Woodpecker	1	Golden-crowned Kinglet	2
Blackbacked					
woodpecker	1	Northern Waterthrush	1	Lincoln's Sparrow	2
Black-billed Cuckoo	1	Palm Warbler	1	Northern Parula	2
Black-capped Chickadee	1	Pileated Woodpecker	1	Palm Warbler	2
Cape May Warbler	1			Philadelphia Vireo	2
Common Yellowthroat	1			Red-winged Blackbird	2
Great Blue Heron	1			Yellow-bellied Sapsucker	2
LeConte's Sparrow	1			American Bittern	1
Mourning Dove	1			American Kestrel	1
Northern Waterthrush	1			American Redstart	1
Palm Warbler	1			Bald Eagle	1
Pine siskin	1			Barred Owl	1
Rose-breasted Grosbeak	1			Cape May Warbler	1
Veery	1			Downy Woodpecker	1
Wood Thrush	1			Eastern Phoebe	1
				Gray Catbird	1
				Great Blue Heron	1
				Great Horned Owl	1
				Hairy Woodpecker	1
				Herring Gull	1

Coniferous	#	Deciduous	#	Developed	#
				Killdeer	1
				Mallard	1
				Pileated Woodpecker	1
				Purple Finch	1
				Redbreasted Nuthatch	1
				Ruby-throated	
				Hummingbird	1
				Spotted Sandpiper	1
				Yellow-bellied Flycatcher	1
Wetland	#	Upland	#	Successional	#
Ruby-crowned Kinglet	10	Nashville Warbler	8	Hermit Thrush	7
Swainson's Thrush	9	Yellow-rumped Warbler	6	Chipping Sparrow	6
White-throated Sparrow	9	Hermit Thrush	5	Alder Flycatcher	4
Lincoln's Sparrow	8	Swainson's Thrush	5	Clay-coloured Sparrow	4
Hermit Thrush	7	White-throated Sparrow	5	American crow	3
Nashville Warbler	7	Gray Jay	4	Blue Jay	3
Swamp Sparrow	7	Ruby-crowned Kinglet	4	Common Yellowthroat	3
Wilson's Snipe	5	Least Flycatcher	3	Lincoln's Sparrow	3
Yellow-bellied Flycatcher	5	Red-breasted Nuthatch	3	Magnolia Warbler	3
Common Yellowthroat	4	White-winged Crossbill	3	American Goldfinch	2
Gray Jay	4	Winter Wren	3	Black-billed Cuckoo	2
Red-winged Blackbird	4	Alder Flycatcher	2	Cedar Waxwing	2
Winter Wren	4	Black-capped Chickadee	2	Least Flycatcher	2
Alder Flycatcher	3	Chipping Sparrow	2	Northern Flicker	2
Common Raven	3	Common Raven	2	Black-and-white Warbler	1
Least Flycatcher	3	Dark-eyed Junco	2	Chestnut Sided Warbler	1
Palm Warbler	3	Golden-crowned Kinglet	2	Common Raven	1
Yellow-rumped Warbler	3	Northern Flicker	2	Dark-eyed Junco	1
American Robin	2	American Robin	1	Evening Grosbeak	1
Boreal Chickadee	2	Boreal Chickadee	1	Golden-crowned Kinglet	1
Chipping Sparrow	2	Brown Creeper	1		
Great Blue Heron	2	Common Yellowthroat	1		
Red-breasted Nuthatch	2	Magnolia Warbler	1		
Red-eyed Vireo	2	Mourning Warbler	1		
Sandhill Crane	2	Ovenbird	1		
American crow	1	Red-eyed Vireo	1		
Blue Jay	1	Veery	1		
Chestnut Sided Warbler	1	Woodpecker sp.	1		
Conneticut Warbler	1				
Golden-crowned Kinglet	1				
Greater Yellowlegs	1				
LeConte's Sparrow	1				
Mourning Warbler	1				
Northern Harrier	1				
Red-necked Grebe	1				

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Coniferous	#	Deciduous	#	Developed	#
Song sparrow	1				
Tennessee Warbler	1				

4.1.2 Waterfowl and Marsh Bird Survey Results (2011-2016)

The wetland communities associated with beaver ponds, the large wetland complex on Hughes Creek and Wabigoon Lake, contribute to the diverse mix of marsh bird and waterfowl species found in the LSA. Among the more common species encountered in 2011 were Red-winged Blackbird (*Agelaius phoeniceus*), Canada Goose (*Branta canadensis*) and Ring-necked Duck. In 2012 and 2016, the most common species were Red-winged Blackbird and Swamp Sparrow (*Melospiza Georgiana*). The breeding density of ducks appeared to be modest given the relatively small number of potential nesting ponds. However, marshes at the mouth of Blackwater Creek, Hughes Creek (above the confluence with Nugget Creek), Nugget Creek (below the confluence with Hughes Creek) at the mouth of Wabigoon Lake, and Thunder Creek have fairly extensive wild rice stands that appear to support significant numbers of migrating ducks and probably represent locally important waterfowl staging areas. Other wetland species encountered during Marsh Monitoring in 2012 and in 2016 were Common Yellowthroat (*Geothlypis trichas*), Northern Waterthrush (*Parkesia noveboracensis*), Sora (*Porzana carolina*), and Swamp Sparrow. No SAR were observed during the marsh monitoring surveys. Sora was the only marsh bird target species that was encountered in any of the survey locations. Probable breeders, based on their observance at the same location on both dates includes American Bittern, Sora, and Red-necked Grebe. Canada Goose was also a probable breeder due to the presence of a mated pair with three goslings. A summary of dates, species and locations of sightings are listed below (Table 4.5).

Table 4.5 Species observed or heard during waterfowl and Marsh bird surveys

Species	#	Year Observed
Red-winged Blackbird	14	2011
Canada Goose	12	2011
Ring-necked Duck	10	2011
Tree Swallow	10	2011
Mallard	5	2011
Barn Swallow	4	2011
Common Grackle	4	2011
Eastern Kingbird	4	2011
Belted Kingfisher	3	2011
American Robin	2	2011
Common Raven	2	2011
Swamp Sparrow	11	2012
Red-winged Blackbird	8	2012
Common Yellowthroat	7	2012
Bank Swallow	4	2012
Canada Goose	4	2012
Ring-necked Duck	4	2012
American Bittern	3	2012
American Robin	3	2012

Species	#	Year Observed
Common Raven	3	2012
Great Blue Heron	3	2012
Mallard	3	2012
Spotted Sandpiper	3	2012
Eastern Kingbird	2	2012
Hermit Thrush	2	2012
Herring Gull	2	2012
LeConte's Sparrow	2	2012
Northern Flicker	2	2012
Redbreasted Nutchatch	2	2012
Redeyed Vireo	2	2012
Red-necked Grebe	2	2012
Ruby Crowned Kinglet	2	2012
Sora	2	2012
Swainsons Thrush	2	2012
Whitethroated Sparrow	2	2012
American Crow	1	2012
Bald Eagle	1	2012
Blackcapped Chickadee	1	2012
Bonaparte's Gull	1	2012
Cerulean Warbler	1	2012
Common Goldeneye	1	2012
Common Merganser	1	2012
Hooded Merganser	1	2012
Killdeer	1	2012
Nashville Warbler	1	2012
Northern Shrike	1	2012
Northern Waterthrush	1	2012
Red-tailed Hawk	1	2012
Ruffed Grouse	1	2012
Song Sparrow	1	2012
Tree Swallow	1	2012
Red-winged Blackbird	8	2016
Swamp Sparrow	6	2016
Common Raven	4	2016
Whitethroated Sparrow	2	2016
Mallard	1	2016
Ruffed Grouse	1	2016
Common Merganser	1	2016
Canada Goose	1	2016

Species	#	Year Observed
American Robin	1	2016
Common Goldeneye	1	2016

4.1.3 Eastern Whip-poor-will Survey Results

The Goliath Project study area was found to have little suitable Whip-poor-will (WPW) habitat. Preferred habitats for the WPW include rock or sand barrens with scattered trees, savannahs, old burns in a state of early forest succession, and open conifer plantations. Eggs are laid directly on leaf litter.

WPW was not detected in the LSA in 2011 despite nocturnal surveys in June and July, and about 30 hours of nocturnal sound recordings. Although potential habitat is present at scattered open rock outcrops and open sandy habitat at the former tree nursery grounds in the LSA, the lack of records for whip-poor-will suggest it does not inhabit the LSA.

A total of 21 WPW survey plots were conducted along the roads throughout the study area in 2012. No WPW were heard or seen during the surveys in 2012, however, one Common Nighthawk was heard. Other crepuscular avian species encountered during the survey include American Woodcock (*Scolopax minor*) (7) and Common Snipe (*Gallinago gallinago*) (6). In 2012 all sites were located along the road network throughout the LSA. These 21 sites were surveyed on June 4 and 5, and July 4 and 5 for WPW presence. These dates coincided with nights around the full moon, which are the optimal times for WPW surveys. Conditions encountered during the surveys were favorable.

4.1.4 Boreal Conservation Region Priority Species

EC has requested a priority species summary list based on the Ontario landbird conservation plan showing total abundance, frequency, abundance by habitat, and density by habitat (Table 4.6 and Table 4.7). The LSA and the RSA are found in Boreal Conservation Region 8. Most of the priority species are common boreal forest landbirds for which this region has a particularly high conservation responsibility. Some priority species are of high conservation concern due to a combination of population declines, high vulnerability, and high regional responsibility.

Table 4.6 Boreal Conservation Region 8 species total abundance, frequency, and abundance by habitat

Priority Species BCR8	Total Abundance	% of Points	Coniferous	Deciduous	Successional	Wetland	Upland	Developed
Alder Flycatcher	30	20.0	2	9	4	3	2	10
Bald Eagle	1	0.7	0	0	0	0	0	1
Bay-breasted Warbler	6	4.3	3	0	0	0	0	3
Belted Kingfisher	0	0.0	0	0	0	0	0	0
Black-and-White Warbler	12	8.6	2	6	1	0	0	3
Blackburnian Warbler	10	7.1	3	5	0	0	0	2
Black-throated Green Warbler	1	0.7	0	1	0	0	0	0
Blue-headed Vireo	8	4.3	3	2	3	0	0	0
Canada Warbler	1	0.7	0	1	0	0	0	0
Chestnut-sided Warbler	34	22.9	5	13	1	1	0	14
Evening Grosbeak	1	0.7	0	0	1	0	0	0
Magnolia Warbler	49	30.0	13	17	3	0	1	15
Mourning Warbler	33	23.6	4	9	0	1	1	18
Nashville Warbler	97	55.0	29	19	8	7	8	26
Northern Flicker	25	17.9	5	6	2	0	2	10
Olive-Sided Flycatcher	0	0.0	0	0	0	0	0	0
Ovenbird	67	38.6	20	24	0	0	1	22
Philadelphia Warbler	0	0.0	0	0	0	0	0	0
Ruby-crowned Kinglet	72	47.1	24	16	4	10	4	14
Ruffed Grouse	18	12.1	7	3	2	0	0	6
Swamp Sparrow	23	12.1	5	3	0	7	0	8
Tennessee Warbler	26	13.6	15	7	0	1	0	3
White-throated Sparrow	177	84.3	56	38	19	9	5	50
Winter Wren	32	21.4	13	3	0	4	3	9
Yellow-bellied Flycatcher	7	5.0	0	1	0	5	0	1
Yellow-bellied Sapsucker	7	5.0	2	3	0	0	0	2

Table 4.7 Boreal Conservation Region 8 species density by habitat

Priority Species BCR8	Coniferous	Deciduous	Successional	Wetland	Upland	Developed
Alder Flycatcher	0.004	0.020	0.009	0.007	0.004	0.022
Bald Eagle	0.000	0.000	0.000	0.000	0.000	0.002
Bay-breasted Warbler	0.007	0.000	0.000	0.000	0.000	0.007
Belted Kingfisher	0.000	0.000	0.000	0.000	0.000	0.000
Black-and-White Warbler	0.004	0.013	0.002	0.000	0.000	0.007
Blackburnian Warbler	0.007	0.011	0.000	0.000	0.000	0.004
Black-throated Green Warbler	0.000	0.002	0.000	0.000	0.000	0.000
Blue-headed Vireo	0.007	0.004	0.007	0.000	0.000	0.000
Canada Warbler	0.000	0.002	0.000	0.000	0.000	0.000
Chestnut-sided Warbler	0.011	0.028	0.002	0.002	0.000	0.031
Evening Grosbeak	0.000	0.000	0.002	0.000	0.000	0.000
Magnolia Warbler	0.028	0.037	0.007	0.000	0.002	0.033
Mourning Warbler	0.009	0.020	0.000	0.002	0.002	0.039
Nashville Warbler	0.063	0.041	0.017	0.015	0.017	0.057
Northern Flicker	0.011	0.013	0.004	0.000	0.004	0.022
Olive-Sided Flycatcher	0.000	0.000	0.000	0.000	0.000	0.000
Ovenbird	0.044	0.052	0.000	0.000	0.002	0.048
Philadelphia Warbler	0.000	0.000	0.000	0.000	0.000	0.000
Ruby-crowned Kinglet	0.052	0.035	0.009	0.022	0.009	0.031
Ruffed Grouse	0.015	0.007	0.004	0.000	0.000	0.013
Swamp Sparrow	0.011	0.007	0.000	0.015	0.000	0.017
Tennessee Warbler	0.033	0.015	0.000	0.002	0.000	0.007
White-throated Sparrow	0.122	0.083	0.041	0.020	0.011	0.109
Winter Wren	0.028	0.007	0.000	0.009	0.007	0.020
Yellow-bellied Flycatcher	0.000	0.002	0.000	0.011	0.000	0.002
Yellow-bellied Sapsucker	0.004	0.007	0.000	0.000	0.000	0.004

4.1.5 Avian Species at Risk in the LSA

4.1.5.1 *Rusty Blackbird*

A flock of three migrating Rusty Blackbirds was observed in October 2011. No evidence of nesting was observed.

4.1.5.2 *Common Nighthawk*

Common Nighthawk was detected on nocturnal sound recordings at two locations on the former tree nursery ground in June 2011. Given the close proximity of the records, they probably represent a single individual or a pair. Although further evidence of nesting was not observed in the LSA, suitable nesting habitat occurs in the sandy openings in the tree nursery grounds as well as the cutover immediately to the north. The species likely nests in the LSA. A single Common Nighthawk was heard during a WPW survey in 2012.

4.1.5.3 *Olive-sided Flycatcher*

A singing male Olive-sided Flycatcher was heard in suitable nesting habitat on the shore of Thunder Lake in July 2011, and another in the TSF area in 2012. The habitat was a shoreline peatland with tall standing

snags. The presence of a singing male during the nesting season suggests that Olive-sided Flycatcher probably nests in the LSA.

4.1.5.4 *Barn Swallow*

Barn Swallows were observed foraging over ponds, lakes, fields and other open habitat in the LSA and were commonly observed along roads. Active nests were observed on buildings on the former tree nursery grounds in June 2011 and in 2012. No active nests were observed in 2016, as Treasury personnel had made concerted efforts to restrict access to many of the outbuildings on the property.

4.1.5.5 *Bald Eagle*

Bald eagles were frequently seen in the LSA, but no stick nests were observed. Potential nesting habitat occurs in mature trees along Wabigoon Lake and Thunder Lake.

4.1.5.6 *Peregrine Falcon*

A Peregrine Falcon was observed at the mouth of Nugget Creek in October 2011. Given the time of year, this was likely a migrating bird, rather than from a local nest. There is no suitable nesting habitat (i.e., cliffs, tall buildings, or large bridges) in the LSA and the nearest known occupied nesting habitat is several hundred kilometres east of the LSA (Brian Ratcliff, pers. comm.).

4.1.5.7 *Black Tern*

A single Black Tern was observed flying over forest habitat near Wabigoon Lake in June 2011. No nesting habitat (e.g., large marshes) was nearby. Surveys of the marshes at the mouths of Blackwater Creek, Thunder Creek, and Nugget Creek in July 2011 did not find any nesting evidence, suggesting the species did not nest at these locations in 2011 given their colonial nesting habits and aggressive defence against human intruders. The species probably nests on Wabigoon Lake and may use the marshes at the Blackwater Creek, Thunder Creek, and Nugget Creek mouths in some years.

4.1.6 Bird Species at Risk not recorded in the LSA

4.1.6.1 *American White Pelican*

American White Pelican is a conspicuously large bird. There were no observations of this bird in the LSA during the fieldwork.

4.1.6.2 *Short-eared Owl*

Short-eared Owl was not observed in the LSA during the fieldwork. Suitable habitat (marshes and agricultural land) is relatively common in the LSA and given its secretive nature, the species may occur in low numbers in the LSA.

4.1.6.3 *Whip-poor-will*

Whip-poor-will was not detected in the LSA in 2011 despite nocturnal surveys in June and July, and about 30 hours of nocturnal sound

4.1.6.4 *Canada Warbler*

Canada Warbler was not observed in the LSA in 2011, however a single individual was observed in 2012 on the shore of Thunder Lake. Given the abundance of suitable habitat, and its occurrence elsewhere in the Dryden area, Canada Warbler may be a nesting species in the LSA.

4.1.6.5 Bobolink

Bobolink were not detected in the LSA despite significant survey effort in suitable habitat. Potential habitat in the LSA was covered at least once by point counts, sound recorders, and encounter surveys in 2011 and 2012.

4.1.6.6 Yellow Rail

Yellow Rail was not observed in the LSA despite a significant amount of effort conducting marsh bird surveys during multiple years. Suitable habitat (sedge marshes; ES45 and ES46) is relatively common.

4.1.6.7 Least Bittern

Least Bittern was not observed in the LSA. It is known to nest in cattail marshes near Dryden (Woodliffe 2007) and may inhabit similar habitat in the marshes on Wabigoon Lake at the mouths of Blackwater, Nugget, and Thunder creeks.

4.1.6.8 Chimney Swift

No Chimney Swifts were observed in the LSA in 2011. Given the scarcity of suitable nesting habitat (chimneys and old buildings), the species probably does not breed in the LSA.

4.1.7 Provincially Rare Bird Species recorded in the LSA

The Red-necked Grebe (*Podiceps grisegena*) and Black-billed Magpie (*Pica hudsonia*) are two provincially rare species recorded in the LSA during the field surveys. A pair of Red-necked Grebes was seen regularly throughout the summer of 2011 (May 12, June 1, June 14, June 15, June 16, and July 14) on a pond on Hughes Creek where they likely nested. The pond is shallow and densely vegetated with pondweeds (ES49) and surrounded by shore fen (ES45). Black-billed Magpies (*Pica hudsonia*) were frequently observed throughout the LSA in 2011 and were probably nesting there, however, none were seen in 2012 or 2016.

4.2 Amphibian Survey Results (2011)

A total of six amphibian species were observed in the LSA in 2011 (Table 4.8). None of the amphibian species observed are SAR.

Five species of frogs were observed in the LSA in 2011; Northern Spring Peepers (*Pseudacris crucifer*), Eastern American Toad (*Bufo americanus*), Chorus Frog (*Pseudacris maculata*), and Wood Frog (*Rana sylvatica*) were observed during the May, early spring surveys. Northern Spring Peepers were observed as most abundant during the May surveys, and were observed calling in chorus at each of the stations surveyed. Tetraploid Grey Tree Frog (*Hyla versicolor*), Eastern American Toad, Chorus Frog, and Northern Spring Peeper were observed during the late spring surveys conducted in June. Tetraploid Grey Treefrog was the most abundant species observed during the late spring surveys (in June) and was the most abundant amphibian species observed in the LSA in 2011.

In addition to the species observed during the roadside and sound recorder surveys, a Blue-spotted Salamander (*Ambystoma jeffersonianum-laterale* "complex") was captured in a minnow trap in May 2011. Leopard Frogs (*Rana pipiens*), Green Frogs (*Rana clamitans*), Central Newt (*Notophthalmus viridescens louisianensis*) were not observed during the 2011 surveys but are known to occur in the Dryden area (Oldham and Weller 2000).

Frog egg masses (probably Wood Frog and Boreal Chorus Frog) were observed in vernal pools in roadside ditches at several locations. Woodland breeding ponds are common in the LSA, given the flat, poorly drained terrain and clay soils. These fish-free habitats are used particularly by Wood Frog, Boreal Chorus Frog, and Tetraploid Gray Treefrog (MacCulloch 2002). The other frog species also use wetlands, and stagnant ponds, for breeding. During the marsh bird and waterfowl survey in June 2011, there were incidental sightings of a Mink Frog and a Tetraploid Gray Treefrog.

4.3 Amphibian Survey Results (2012)

A total of 21 sites were monitored for amphibian call counts in 2012 (Figure 2.5). The first amphibian survey was conducted on June 4th and 5th, 2012, while the second amphibian survey was conducted on July 4 and 5, 2012. Nighttime temperatures ranged from 16 to 25 °C for survey one, and 20 to 25 °C for survey two. Species encountered included Spring Peepers (*Pseudacris crucifer*), Grey Treefrogs (*Hyla versicolor*), Wood Frogs (*Rana sylvatica*) and Boreal Chorus Frog (*Pseudacris maculate*) (Table 4.8). A Blue Spotted Salamander was captured in a small mammal pitfall trap in October as well.

Table 4.8 Abundance Rank of Amphibian Species from the Roadside and Sound Recorder (SR) Surveying Stations in the LSA, 2011 and 2012

Species	Abundance Rank (2011)	Abundance Rank (2012)
Tetraploid gray treefrog	1	3
Northern spring peeper	2	2
Wood frog	3	1
Eastern American toad	4	N/A
Boreal chorus frog	5	4
Mink Frog	Incidental obs	N/A
Blue-spotted Salamander	Incidental obs	Incidental obs.

4.4 Reptile Survey Results

Two reptile species, the Western Painted Turtle (*Chrysemys picta belli*) and the Eastern Garter Snake (*Thamnophis sirtalis sirtalis*) were observed during the 2011, 2012, and 2016 field program, neither of which are SAR. These two reptile species were frequently seen in the LSA.

4.5 Non-Species at Risk Mammals

The more conspicuous mammals recorded in, and around, the LSA were the larger species, namely moose, white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), grey wolf and, to a lesser extent, small mammal furbearers. Further details of these species are provided in the following paragraphs.

4.5.1 Moose

Moose (including calves) and their field signs (tracks and pellets) were observed at several locations in the LSA during 2011, at one location in 2012, and nowhere in 2016. The species appeared to be uncommon, as there is little suitable habitat (winter or summer) within the targeted areas of the LSA (Plate 4 in Appendix VI-16). The LSA is within Cervid Ecological Zone C1 (OMNRF 2009) where the objective is to maintain moderate to high moose density and low density of white-tailed deer, however, high deer density in the LSA may limit moose numbers due to potentially high incidence of brainworm (*Parelaphostrongylus tenuis*) (Boer 1997). Potential late winter habitat for moose (dense, mature conifer forest; OMNRF 2000) in the area consists mainly of black spruce swamp (i.e., Ecosite 35 and Ecosite 36). This habitat is common in the LSA (over 2500 ha), but the significance of these stands for moose is unknown. Potential moose aquatic feeding areas occur in beaver ponds and small lakes throughout the LSA, but no evidence of use by moose was observed, and all observed MAFAs were ranked 2 or lower.

4.5.2 White-tailed Deer

White-tailed deer and their signs were observed almost daily during all fieldwork in all habitats in the LSA, most frequently on the edges of fields near hardwood forest. The regional landscape supports high deer densities due to the interspersion of forest and agricultural land; however, deer are near the northern edge of their range at the LSA and are probably limited by severe winters (DFMC 2010). No evidence of winter deer yards was observed in the field.

4.5.3 Black Bear

Black bears were observed on several occasions in May 2011, specifically one approximately three-year-old male was observed frequently at the Tree Nursery (Plate 3 in Appendix VI-16) during the site visit in May. One other black bear was observed during small mammal trapping in 2016. TEK indicates there was a den located off tree nursery road, however, the den was not observed during any fieldwork.

4.5.4 Grey Wolf

Grey wolf scat and tracks was observed daily throughout the LSA between May 10, 2011 and May 12, 2011. Occasional sign was observed in 2016.

4.5.5 Furbearers

Many furbearers are common throughout the LSA and the RSA, with beaver being the most common within the LSA. Beaver dams and lodges are frequent on Blackwater Creek and Hughes Creek as well as their tributaries.

Other furbearers observed in the LSA included mink (*Mustela vison*), river otter (*Lontra canadensis*) (observed on October 13, 2011), red fox (*Vulpes vulpes*) (observed on May 12, 2012), muskrat (*Ondatra zibethicus*) (observed on October 13, 2011), woodchuck (*Marmota monax*) and snowshoe hare (*Lepus americanus*).

Although American marten is a common furbearer in the Dryden area, and in the RSA, a lack of suitable habitat in the LSA (large blocks of mature conifer forest) may limit their numbers. The forest industry has put considerable time and effort into planning for the maintenance of marten habitat throughout the surrounding managed forests.

4.6 Reptile Species at Risk not recorded in the LSA

4.6.1 Snapping Turtle

Snapping turtle (*Chelydra serpentina*) is a SAR that is known to exist in the Dryden area (Oldham and Weller 2000). This species was not observed despite survey effort during the nesting season for this species.

4.7 Mammal Survey Results

Twenty mammal species were observed in the LSA during fieldwork. These sightings (except for small mammal trapping and nocturnal bat sound recordings) were incidental observations rather than targeted mammal surveys. Following is a discussion of the mammal species of economic or recreational interest and SAR occurring in the LSA or surrounding area.

4.7.1 Small Mammal Survey Results (2012)

Small mammal trapping occurred over a three-night period during October of 2012. An effort of 119 trapping nights occurred between October 1 and 4, 2012. However, when revisiting the traps, 10 were found with their doors closed and were likely inactive overnight. Therefore, a more accurate trap night count would be 109. A total of 32 small mammals were captured, including 18 southern red-backed voles (*Clethrionomys gapperi*), 12 deer mice (*Peromyscus maniculatus*), one northern short-tailed shrew (*Blarina brevicauda*), and one red squirrel (*Tamiasciurus hudsonicus*). All traps were left out for only a single night, with the exception of the 32 set out in on October 1, 2012, which, because of extremely low capture success after the first night, were left out for a second night. CPUE for this survey was 0.29 individuals per trap per night. This catch rate is comparable to the catch rates in other studies (personal observation).

Two pit fall arrays were installed for both nights. No small mammals were captured in any of the pitfall arrays. However, a blue-spotted salamander was captured the night of October 3, 2012. It is likely that capture success of pitfall traps would improve if left for longer periods of time.

4.7.2 Small Mammal Survey Results (2016)

Small mammal trapping occurred again over a four-night period during July of 2016. An effort of 172 trapping nights occurred between July 7 and July 29, 2016. Nineteen traps were found with their doors closed, and were assumed to be inactive overnight. The revised trapping effort would be 160 trap nights. A total of 11 small mammals were captured, including seven southern red-back voles, two least chipmunks (*Tamias minimus*), and one meadow jumping mouse (*Zapus hudsonius*). All traps were left in place for two successive nights. CPUE for this survey was 0.07. This catch rate is slightly lower than other studies in the same area, and significantly lower than the catch rate observed in 2012.

4.7.3 Mammal Species at Risk recorded in the LSA

4.7.3.1 Bats (2011)

Bat recordings detected at least three bat species in the LSA: hoary bat (*Lasiurus cinereus*) (at SR19, SR21 and SR22), little brown myotis (*Myotis lucifugus*) (at SR21, SR22 and SR23) and big brown bat (*Eptesicus fuscus*) and/or silver-haired bat (at SR19, SR22 and SR23).

Although quantitative data was not obtained, the big brown bat and the silver-haired bat were the most commonly detected species. They were recorded over a variety of habitats including ponds, roads, and other clearings. The hoary bat is the most widespread bat in the Americas, occurring in most of southern Canada. The big brown bat is common throughout most of its range, while the silver-haired bat is relatively uncommon throughout much of their range (Harvey et al 2011).

4.7.3.2 Bats (2012)

Five out of six monitoring locations where the ultrasonic recorders were deployed recorded Little Brown Myotis (*Myotis lucifugus*), one location detected Northern Myotis (*Myotis septentrionalis*) and one location detected the Big Brown Bat (*Eptesicus fuscus*). Both of the myotis species recorded are listed under COSEWIC and the Committee on the Status of Species at Risk in Ontario (COSSARO) as endangered. Ultrasonic recorders only indicate presence/absence as opposed to quantity (Table 4.9).

Table 4.9 Results of ultrasonic monitoring stations (2012)

Date	Location ID	Common Name	Scientific Name	Habitat
6/26/2012	BAT1	Little Brown Myotis	<i>Myotis lucifugus</i>	Developed
6/26/2012	BAT2	Little Brown Myotis	<i>Myotis lucifugus</i>	Developed
6/27/2012	BAT3	Little Brown Myotis	<i>Myotis lucifugus</i>	Successional
6/27/2012	BAT3	Northern Myotis	<i>Myotis septentrionalis</i>	Successional
6/27/2012	BAT4	Big Brown Myotis	<i>Eptesicus fuscus</i>	Successional
7/5/2012	BAT2	Little Brown Myotis	<i>Myotis lucifugus</i>	Wetland
7/5/2012	BAT1	Little Brown Myotis	<i>Myotis lucifugus</i>	Developed

4.7.3.3 Bats – Maternity Roost Survey (2015)

Ecological Land Classification

A total of 5 forest stands were determined to have ELC classifications suitable for supporting roosting habitat. Table 4.10 presents the ELC classification and the total area for each stand. After this initial stage, stands 1A and 1B were grouped together due to their close proximity to each other and the fact that they had the same ELC classification.

Table 4.10 Stand identification, ELC classification and area of forest stands found to have suitable ELC classifications to support bat roosting habitat.

Stand ID	ELC Classification	Area (ha)
1A	G/B087-092 Fresh, Clayey: Mixedwood/hardwood	4.07
1B	G/B087-092 Fresh, Clayey: Mixedwood/hardwood	2.49
2	G/B087-092 Fresh, Clayey: Mixedwood/hardwood	3.68
3	G/B087-092 Fresh, Clayey: Mixedwood/hardwood	6.78
4	G/B087-092 Fresh, Clayey: Mixedwood/hardwood	5.03

Snag density

Once the potential stands were identified and delineated, a certified aerial photo interpreter conducted a snag density exercise to determine the number of snags per plot, the crown closure per plot, snag type (hardwood vs. conifer), and the density of snags per hectare. The results of the interpretation exercise can be found in Table 4.11

Mapping Potential Snag/Cavity Trees

After the stand identification and the snag density stages were completed, a field investigation was conducted in order to map individual snags/cavity trees within the four areas. A total of 41 snags/cavity trees were observed in the field ranging from live trees with some dead branches (decay class 1) to snags with no branches and missing tops (decay class 5) (Watt and Caceres 1999). Information pertaining to the OMNRF criteria were recorded in the field in order to establish an overall ranking for each tree. Of the 41 snags/cavity trees observed and measured in the field, only four resulted in a ranking of High (Table 4.12).

Table 4.11 Results of aerial photo interpretation for snag density and crown closure of stands found to have suitable ELC classifications to support bat roosting habitat.

Area ID	Plot ID	Crown Closure (%)	Snags (hardwood)	Snags (conifer)	Total No. Snags	Snag Density (per ha)
1	7	70	2	0	2	50
	8	60	5	1	6	
	14	70	1	0	1	
	16	40	1	2	3	
	18	40	1	1	2	
	24	65	1	1	2	
	31	80	0	0	0	
	34	80	3	0	3	
	35	30	4	0	4	
	37	0	2	0	2	
2	6	50	2	1	3	40
	21	75	1	0	1	
	23	80	1	0	1	
	25	30	3	0	3	
3	1	40	0	1	1	48
	2	60	2	1	3	
	3	60	1	0	1	
	4	50	6	0	6	
	5	70	3	0	3	
	28	0	0	0	0	
	32	35	3	0	3	
	33	50	2	0	2	
4	9	70	3	2	5	42
	10	75	1	2	3	
	11	70	1	4	5	
	39	60	0	2	2	
	40	70	0	0	0	
	41	80	0	1	1	
	42	60	0	2	2	
	43	85	0	1	1	
	44	90	0	1	1	
	45	50	0	1	1	

Table 4.12 Potential bat roosting snag/cavity tree rankings as a result of field investigations (trees in bold are considered to have high potential).

Waypoint	Species	dbh (cm)	Height (m)	Cavity/C racks	Loose Peeling Bark	Decay Class	Ranking (H/M/L)	Position in Canopy
46	Trembling aspen	26.4	16.5	N	Y	4	L	Below main canopy
48	Trembling aspen	30.4	23.0	N	N	1	M	Below main canopy
49	Trembling aspen	39.0	25.0	N	N	2	M	Below main canopy
51	Trembling aspen	54.0	18.0	Y	N	4	L	Below main canopy
52	Trembling aspen	29.2	21.0	N	Y	2	M	Below main canopy
53	White Birch	25.6	10.0	Y	N	5	L	Below main canopy
54	Trembling aspen	25.8	10.0	N	N	5	L	Below main canopy
55	Trembling aspen	44.0	27.0	Y	Y	3	H	Above main canopy
56	Trembling aspen	27.0	13.0	Y	N	5	L	Below main canopy
57	Cedar	44.8	10.0	Y	N	3	L	Below main canopy
58	Trembling aspen	45.9	27.0	Y	N	3	M	Above main canopy
59	Trembling aspen	33.5	24.0	N	Y	2	M	Above main canopy
60	Trembling aspen	33.1	22.0	N	N	1	M	Below main canopy
61	Trembling aspen	33.3	21.0	N	N	4	L	Below main canopy
62	Trembling aspen	26.3	17.0	N	N	2	M	Below main canopy
63	Trembling aspen	37.5	11.0	N	N	4	L	Open area next to pond
64	Trembling aspen	42.5	10.0	N	N	5	L	Open area next to pond
65	Trembling aspen	30.5	18.0	N	Y	4	L	Below main canopy
66	Trembling aspen	26.3	18.0	N	N	2	M	Below main canopy
67	Trembling aspen	26.0	11.0	N	N	4	L	Below main canopy
68	Trembling aspen	35.5	10.0	N	N	5	L	Below main canopy
69	Trembling aspen	35.8	10.0	Y	N	4	L	Below main canopy
70	Trembling aspen	31.0	16.0	N	N	4	L	Below main canopy
72	White Spruce	42.4	10.0	N	N	4	L	Below main canopy
73	Trembling aspen	28.3	17.0	N	N	5	L	Below main canopy
74	Trembling aspen	33.0	12.0	N	N	4	L	Below main canopy
75	Trembling aspen	54.9	15.0	N	Y	5	L	Below main canopy
76	Trembling aspen	29.3	16.0	Y	Y	5	M	Below main canopy
77	Balsam poplar	49.5	18.0	Y	Y	2	H	At main canopy
78	Balsam poplar	59.2	23.0	Y	Y	2	H	At main canopy
79	Balsam poplar	38.9	18.0	Y	Y	2	H	At main canopy
80	Balsam poplar	49.9	22.0	N	N	5	L	Below main canopy
81	Balsam poplar	62.4	28.0	N	N	5	L	Below main canopy
82	Trembling aspen	49.6	18.0	Y	Y	4	M	Below main canopy
83	Balsam poplar	62.0	26.0	N	Y	3	M	Above main canopy (group of 3)
83	Balsam poplar	31.4	19.0	N	N	3	M	Below main canopy (group of 3)
83	Balsam poplar	54.0	12.0	N	Y	5	L	Below main canopy (group of 3)
84	Balsam poplar	33.2	18.0	N	N	5	L	Below main canopy
85	Balsam poplar	48.4	20.0	N	Y	5	L	Below main canopy
86	Trembling aspen	44.4	16.0	Y	Y	5	L	Below main canopy
WP01	Trembling aspen	31.8	20.0	N	Y	3	M	Next to opening

A total of five potential snags were found to have high potential for bat roosting. Four of these sites was investigated through an exit survey on July 20 2016, while the fifth site was investigated on July 26th, 2016. On July 20th, no bats were observed leaving each of the snags, and no bats were recorded on an ultrasonic recording device during the observations of each snag. Two bats were observed on July 26th at waypoint 55 (species unknown).

4.7.4 Mammal Species at Risk not recorded in the LSA

4.7.4.1 *American Badger, Grey Fox, Cougar, Eastern Timber Wolf*

No observations or field signs of the four mammalian SAR (American badger, grey fox, cougar, and eastern timber wolf) that could be potentially using the LSA were recorded in the LSA during any fieldwork.

4.8 Invertebrate Incidental Results

4.8.1 General Overview

A total of four butterflies, two damselflies and 16 dragonflies, were observed in the LSA, of which two are provincially rare:

- Tiger Swallowtail (*Papilio glaucus canadensis*)
- Orange Sulphur *Colias eurytheme* Coppers
- Spring Azure *Celastrina ladon*
- Mourning Cloak *Nymphalis antiopa*
- Canada Darner *Aeshna canadensis*
- Variable Darner *Aeshna interrupta*
- Ocellated Darner *Boyeria grafiana*
- Racket-tailed Emerald *Dorocordulia libera*
- Common Baskettail *Epiptera cynosura*
- Horned Clubtail *Arigomphus cornutus*
- Black-shouldered Spinyleg *Dromogomphus spinosus*
- Pronghorn Clubtail *Gomphus graslinellus*
- Ashy Clubtail *Gomphus lividus*
- Dragonhunter *Hagenius brevistylus*
- Hudsonian Whiteface *Leucorrhinia hudsonica*
- Common Whitetail *Libellula lydia*
- Twelve-spotted Skimmer *Libellula pulchella*
- Four-spotted Skimmer *Libellula quadrimaculata*
- Black Meadowfly *Sympetrum danae*
- Swift River Cruiser *Macromia illinoensis*
- River Jewelwing *Calopteryx aequabilis*
- Sedge Sprite *Nehalennia irene*

4.8.2 Invertebrate Species at Risk recorded in the LSA

No invertebrate SAR were observed during the fieldwork in the LSA.

4.8.3 Invertebrate Species at Risk not recorded in the LSA

No monarch butterflies, or the larval food plant of this species (milkweed (*Asclepias spp.*)), were observed in the LSA during incidental surveys.

4.8.4 Provincially Rare Invertebrate Species recorded in the LSA

Two provincially rare invertebrate species were recorded in the LSA: horned clubtail and pronghorn clubtail.

Horned clubtail exuvia (larval skin) was collected on Hughes Creek on June 16, 2011. Suitable larval habitat is found in the creek and the presence of an exuvia indicates that the species successfully reproduces here. Horned clubtail is ranked as S3 (Vulnerable; often 80 or fewer populations) in Ontario but is locally common in the Rainy Lake to Lake of the Woods area (Ontario Odonata Atlas 2005).

An adult pronghorn clubtail was collected on the east side of Thunder Lake on July 13 2011. Suitable larval habitat is present in Thunder Lake. Pronghorn clubtail is ranked as S3 in Ontario but is locally common in the Rainy Lake to Lake of the Woods area (Ontario Odonata Atlas 2005).

4.8.5 Significant Wildlife Habitat

Assessments of Seasonal Concentrations of Wildlife, or Specialized Habitat for Wildlife and Habitat of Species of Conservation Concern are found in Table 4.13.

Table 4.13 Assessment of Seasonal Concentrations Locations of Wildlife in the LSA (from Table Q-1 in OMNRF 2000)

TYPE OF SEASONAL CONCENTRATION	PRESENT IN THE LSA	NOTES RELATING TO THE 2010 AND 2011 WILDLIFE FIELD PROGRAM
White-tailed deer winter yard	Possible	Not documented or observed in field investigation. Potential habitat present.
Moose late winter habitat	Possible	Not documented or observed in field investigation. Potential habitat present.
Waterfowl stopover and staging areas	Yes	Marshes at Blackwater, Nugget, and Thunder Creek supported significant numbers of migrating waterfowl in October 2011. There are fairly extensive areas of wild rice (important duck food) at these sites.
Waterfowl nesting areas	Yes	Eight waterfowl species observed during the nesting season. Marshes at Blackwater, Nugget, and Thunder Creek may be significant nesting habitat.
Colonial bird nesting sites	Possible	No evidence of heronries or nesting of other colonial species documented or observed in site investigation. Potential habitat present for Great Blue Heron.
Shorebird migratory stopover areas	Possible	No significant numbers of shorebirds observed during site investigation. Stopover of some species may occur in fields and marshes in some years.
Landbird migratory stopover area	No	Not documented. Stopover of some species may occur, but unlikely to be significant at more than the local scale given the absence of large lakes, ravines, and other landforms likely to concentrate migrants.
Raptor wintering areas	Possible	None documented or observed in site investigation. Some potential habitat is present but wintering raptors are generally uncommon in northwestern Ontario.
Bald Eagle winter feeding and roosting areas	Possible	Bald Eagles observed in May to October 2011. Wintering not documented. No open water present in most winters, but the dump is a potential source of food.
Wild turkey winter range	No	Wild Turkeys do not occur in the area.
Turkey vulture summer roost	No	None documented or observed in site investigation.
Reptile hibernacula	Possible	None documented or observed in site investigation. Potential habitat present.
Bat hibernacula	No	None documented. No suitable habitat present.
Butterfly migratory stopover areas	No	None documented or observed in site investigation. Suitable habitat present on Wabigoon Lake shoreline, but significant butterfly migration has apparently not been documented in northwestern Ontario.
Bullfrog concentration areas	No	Bullfrogs do not occur in the area.

5 SUMMARY

The wildlife of the LSA is typical of the southern boreal forest in northwestern Ontario but also includes some species associated with agricultural areas. A total 1655 individuals from 100 bird species were observed during point counts and a total of 121 bird species were observed collectively through all surveys and incidental observations, of which 102 are known or suspected to nest in the LSA. Significant waterfowl staging habitat is associated with wild rice marshes where Blackwater, Nugget and Thunder creeks enter Wabigoon Lake.

White-tailed deer are the most common ungulate species. Moose are present, but their numbers may be suppressed by high deer density. No significant moose or white-tailed deer habitat has been documented in the LSA.

Ten species at risk were observed throughout the LSA. Barn swallow, common nighthawk, Canada warbler, and olive-sided flycatcher were confirmed as probable nesters in the LSA. Bald eagle and black tern were observed foraging in the LSA, but no nesting evidence was discovered. Peregrine falcon and rusty blackbird were observed as migrants, but no evidence of nesting was observed. Little brown myotis and Northern myotis were captured on ultrasonic recording devices in 2011 and in 2012. Although not observed during any field surveys, habitat for three other bird species (yellow rail, short-eared owl, least bittern) and one reptile (snapping turtle) occurs in the LSA and these species may breed here. Whip-poor-will and bobolink were not detected despite intensive surveys for the species and probably do not occur in the LSA. In addition to the species at risk, four provincially rare animal species (red-necked grebe, black-billed magpie, pronghorn clubtail and horned clubtail) were also observed in 2011.

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