Stantec

Memo

To:	Steve Brown	From:	Janice Ball Sean Geddes
	Waterloo		Waterloo
File:	Silver Lake Environmental Assessment Addendum 161413464	Date:	February 20, 2018

Reference: Silver Lake and Laurel Creek in Waterloo Park Natural Heritage Overview

INTRODUCTION

Stantec Consulting Ltd. (Stantec) has been retained by the City of Waterloo to complete a Class Environmental Assessment (Class EA) Addendum and Environmental Impact Study (EIS) for Silver Lake and Laurel Creek Rehabilitation in Waterloo Park (the Project). The primary objective of the project is to identify preferred rehabilitation options for Silver Lake and Laurel Creek. The Study Area includes all lands within the Waterloo Park Boundary (Figure 1). This memo provides an overview of natural heritage features within the Study Area and will be used to inform the Class EA study and eventual EIS report.

METHODS

BACKGROUND DATA COLLECTION

Background data applicable to the Study Area were obtained through review of existing documents and information available online. Background resources reviewed include, but are not limited to:

- City of Waterloo Official Plan (office consolidation 2016)
- Natural Heritage Information Centre (MNRF 2017)
- Ontario Breeding Bird Atlas (Cadman et al. 2007)
- Ontario Mammal Atlas (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2016)
- Fisheries and Oceans Canada Species at Risk Maps (DFO, 2015).
- Grand River Conservation Authority Regulation Mapping (GRCA 2017)
- Land Information Ontario Mapping (LIO 2017)

The Guelph District Ministry of Natural Resources and Forestry (MNRF) office was contacted on July 12, 2017 to inquire about potential species at risk and species of conservation concern known to occur in the vicinity of the Study Area. In addition, the MNRF Natural Heritage Information Centre (NHIC) database on the Land Information Ontario website was accessed on July 13, 2017, to document the presence/absence of known occurrences of rare floral or faunal species (i.e., nationally and/or provincially endangered, threatened or special concern species) within the vicinity of the Study Area. The presence or absence of known sensitive natural environment features was also checked, including areas of natural and

scientific interest (ANSIs), provincially significant wetlands (PSWs), environmentally significant areas (ESAs), provincial or national parks, or conservation areas.

FIELD INVESTIGATIONS

Field investigations in 2017 included the characterization and mapping of vegetation communities using the Ecological Land Classification system, a spring botanical inventory, breeding bird surveys, waterfowl nesting surveys, amphibian surveys, a wetland delineation, wildlife habitat assessment, incidental wildlife observations and an aquatic habitat assessment in the Study Area. A summary of all field work completed for this study is provided in Table 1. Field investigation methods are outlined in the sections below.

Table 1: Summary of Field Investigations

Type of Field Work	Date(s) of Field Work	Personnel
Vegetation Surveys		
Spring Botanical Inventory & ELC	May 24 and 26, 2017	J. Ball
Summer Botanical Inventory	July 26, 2017	J. Ball
Fall Botanical Inventory	September 11, 2017	J. Ball
Wetland Delineation	May 16, 2017	J. Ball R. Messier
Wildlife Surveys		
Amphibian Surveys	April 27, 2017	J. Ball S. Muscat
	May 16, 2017	J. Ball K. Easterling
	June 14, 2017	J. Ball B. Holden
Breeding Bird Surveys	June 14, 2017	J. Ball B. Holden
	June 27, 2017	J. Ball M. Faiella
Waterfowl Nesting Survey	April 28 and May 26, 2017	J. Ball
Wildlife Habitat Assessment	During the ELC Survey	J. Ball
Incidental Wildlife Observations	During All Surveys	J. Ball
Aquatic Surveys		
Aquatic Habitat Assessment	June 27 and October 17, 2017	M. Faiella

Reference: Silver Lake and Laurel Creek in Waterloo Park Natural Heritage Overview

Vegetation Survey

Vegetation community assessments were conducted by Stantec on May 24 and 26, 2017 using the protocols outlined in the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al.,1998). A detailed spring botanical inventory was conducted for each community during the vegetation community assessment. 2008 ELC code updates were used to classify vegetation communities that were not listed in the 1998 manual. Summer and fall botanical inventories were conducted on July 26 and September 11, respectively, during which time the vegetation community assessment was further refined, where required.

The ELC data cards were reviewed to determine whether any of the communities were rare in the province, contained any provincially significant plant species or had the potential to provide significant habitat for wildlife. Provincial significance of vegetation communities was based on the rankings assigned by the Natural Heritage Information Centre (MNRF, 2015).

Flora nomenclature was based primarily on the Database of Vascular Plants of Canada (VASCAN) (Brouillet et al. 2010+) with updates to genera, specific epithets and family names as necessary to reflect recent taxonomic revisions. The primary source of revised nomenclature was VASCAN (2016).

The provincial status of all plant species was based on the rankings provided in the Natural Heritage Information Centre database (MNRF, 2015). Identification of potentially sensitive native plant species was based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

Amphibian Surveys

Amphibian surveys were conducted by Stantec in the spring of 2017 using the protocols outlined in the Marsh Monitoring Program (MMP) Manual (Bird Studies Canada and Environment Canada, 2008).

In accordance with the MMP Protocol, three rounds of amphibian call count surveys were conducted; one in April, one in May and one in June. All surveys were conducted at least one half hour after sunset in conditions with calm winds (Beaufort scale of 0-3) and no precipitation (although light rain, fog or damp conditions provide suitable conditions for surveying). Surveys met the night-time temperature requirements as follows:

- April: > 5^{o}C
- May: > 10^{o}C
- June: > 17^{o}C

Three survey stations were established to target potential amphibian breeding habitat in the Study Area. Each survey station consisted of a 100 m radius semicircle. Survey locations are shown as Marsh Monitoring Stations D, E and F on Figure 3. The surveyor stood at the edge of the station and listened for three minutes for all calling toads and frogs within and outside of the survey station boundary. Call levels were described using values of 1, 2, or 3. As per the MMP Protocol, Level 1 indicates that individuals can be counted and calls are not simultaneous, Level 2 indicates that calls are distinguishable with some simultaneous calling and Level 3 indicates a full chorus where calls are continuous and overlapping. Call levels 1 and 2 are paired with an estimation of the number of individuals heard calling. For example, two individuals heard calling without any overlap would be represented as 1-1. Call level 3 is not paired with an estimate of the number of individuals, as overlapping calls make it impossible to determine the number of individuals calling.

Survey times, weather conditions, and observers are provided below in Table 2.

Table 2: Amphibian Survey Dates, Times, and Weather Conditions

Survey	Date/Time	Weather				Surveyors
		Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	
1	April 27, 2017	17	1-2	60	None/Rain	J. Ball S. Muscat
2	May 16, 2017	20	1	10	None/Rain	J. Ball K. Easterling
3	June 14, 2017	17	2	10	None/None	J. Ball B. Holden

Breeding Bird Surveys

Breeding bird surveys were conducted by Stantec on June 14 and 27, 2017. Breeding bird surveys were conducted by traversing the Study Area on foot, recording all species of birds that were heard or seen. A conservative approach to determining breeding status was taken; all birds seen or heard in appropriate habitat during the breeding season were assumed to be breeding.

Surveys were conducted between a half an hour before sunrise and 10:00 a.m. Weather conditions (i.e., precipitation and visibility) were within the parameters required by monitoring programs such as Environment Canada's Breeding Bird Survey (Environment Canada, 2016).

Survey times, weather conditions, and observers are provided below in Table 3.

Table 3: Breeding Bird Survey Dates, Times, and Weather Conditions

Survey	Date/Time	Weather				Surveyors
		Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	
1	June 14, 2017 06:00 – 08:00	20	0	10	None/None	J. Ball B. Holden
2	June 27, 2017 07:10 – 09:30	14	2	90	None/Rain	J. Ball M. Faiella

Species at Risk

Species at Risk and their habitat were assessed by compiling a list of species with the potential to be present in the Study Area based on the background review and then assessing the Study Area for habitat suitability based on ELC classification and an assessment of biophysical attributes.

Reference: Silver Lake and Laurel Creek in Waterloo Park Natural Heritage Overview

Waterfowl Nesting Survey

Two waterfowl nesting surveys were conducted in early spring to determine the location and species of nesting waterfowl associated with Silver Lake. This involved walking around the perimeter of the lake, searching adjacent upland habitat for nesting waterfowl, and recording the species and nest locations. Survey times, weather conditions, and surveyors are provided below in Table 4.

Table 4: Waterfowl Nesting Survey Dates, Times, and Weather Conditions

Survey	Date/Time	Weather				Surveyors
		Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	
1	April 28, 2017 12:00 – 12:30	15	2	40	None/Rain	J. Ball
2	May 26, 2017 09:30 – 10:30	14	2	100	None/Rain	J. Ball

Wildlife Habitat Assessment

A candidate significant wildlife habitat assessment of the Study Area was undertaken during the ELC and botanical survey. Criteria used to identify candidate significant wildlife habitat in the Study Area were derived from the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNRF 2015).

Incidental Wildlife Observations

Incidental wildlife observations were recorded during all 2017 field investigations. All wildlife species identified by sight, sound or distinctive signs during all surveys were recorded.

Aquatic Habitat Assessment

Surveys of aquatic habitat conditions in Silver Lake and Laurel Creek were completed on June 27 and October 17, 2017. Observations of feature dimensions (width, depth), flow morphology, in-water cover, substrates, bank stability and riparian zone character were recorded and reconnaissance was completed to confirm whether conditions are consistent with previous studies of the area. Fish observations were recorded opportunistically and no formal fish community surveys were completed.

RESULTS

BACKGROUND REVIEW

No Areas of Natural and Scientific Interest, Provincially Significant Wetlands, designated Significant Wildlife Habitat or other designated natural areas were identified in the Study Area. No Areas of Natural and Scientific Interest, Provincially Significant Wetlands, designated Significant Wildlife Habitat or other designated natural areas were identified in the Study Area on the LIO Natural Heritage Areas Mapping Website (LIO 2017). Unevaluated wetlands are identified on the LIO Website along Laurel Creek upstream from Silver Lake. The City of Waterloo Official Plan (2016) designates forested

areas surrounding Laurel Creek that are furthest from Silver Lake as Core Natural Features, and forested areas closer to Silver Lake as Supporting Natural Features. Designated natural heritage features are shown on Figure 2.

A complete list of terrestrial species at risk and provincially rare species that have the potential to occur in the Study Area is located in Appendix A, including a habitat assessment to determine the likelihood of the species occurring in the Study Area.

A recent record of Snapping Turtle was identified in the 1 km NHIC squares overlapping the Study Area boundary (MNRF 2017). No other recent records (1987+) of species at risk or provincially rare species were identified in the Study Area. Based on the known range and habitat features present on site, four (4) Endangered bat species are considered to be potentially present in the Study Area based on background review and field investigations: Little Brown Myotis *(Myotis lucifugus)*, Eastern Small-footed Myotis *(Myotis leibii)*, Northern Myotis *(Myotis septentrionalis)* and Tri-coloured Bat *(Perimyotis subflavus)*. Additionally, habitat for nesting Barn Swallow may be associated with bridges and other man-made structures in the Study Area.

Based on a review of Fisheries and Ocean Canada's (DFO's) aquatic Species at Risk mapping (DFO 2015) and the Natural Heritage Information Centre (NHIC) database (MNRF 2017), there are no aquatic Species at Risk present.

An Information Request letter was submitted to MNRF on July 12, 2017. This letter outlined the Project and requested relevant information and advice on known records of species at risk, provincially rare species and designated natural heritage features. A response was received from the MNRF on August 11, 2017, confirming that Snapping Turtle has been recorded in the vicinity of the Study Area. In addition, the MNRF indicated that there are two records of Rusty-patched Bumblebee from the Study Area and a Bank Swallow colony has been recorded in the vicinity of the Study Area.

FIELD INVESTIGATIONS

Vegetation Communities

The vegetation communities identified in the Study Area are illustrated on Figure 3 and described in Table 5 below.

Table 5: Ecological Land Classification (ELC) Vegetation Types

ELC Type	Community Description
Forest (FO)	
Deciduous Forest (FOD)	
FOD6-2 Dry-Fresh Sugar Maple-Black Maple Deciduous Forest	The FOD6-2 community was a small, disturbed deciduous forest in the middle of the parklands. This mature community was dominated by sugar maple and black maple in the canopy. Common buckthorn dominated the understory and shrub layers.
FOD7 Fresh-Moist Lowland Deciduous Forest	The FOD7 community was a variable lowland deciduous forest community that occurred throughout Waterloo Park along the Laurel Creek corridor. Species in the FOD7 community closest to Silver Lake were mainly poplars and willows.
FOD7-3 Fresh-Moist Willow Lowland Deciduous Forest	An FOD7-3 community was located on the sloped banks that surrounded Silver Lake. The community was fragmented and varied in width from approximately 5 m to 15 m. Dominant canopy species were black and crack willow. The shrub layer was dominated by willows, red-osier dogwood and common buckthorn. Ground vegetation was dominated by yellow avens, garlic mustard and grasses.

Reference: Silver Lake and Laurel Creek in Waterloo Park Natural Heritage Overview

Table 5: Ecological Land Classification (ELC) Vegetation Types

ELC Type	Community Description
FOD9-3 Fresh-Moist Bur Oak Deciduous Forest	The FOD9-3 community was located in the northern section of the continuous woodland along the Laurel Creek corridor. The canopy was dominated by bur oak, with an abundance of green ash heavily impacted by the emerald ash borer. Shrub and ground vegetation was dominated by common buckthorn. There was an extensive area of vernal pooling observed in the spring at the southeast corner of this community.
Woodland (WO)	
Deciduous Woodland (WOD)	
WODM5-3 Fresh-Moist Manitoba Maple Deciduous Woodland	The WODM5-3 community was a small, disturbed woodland located in the northeast corner of the Study Area. The canopy was dominated by Manitoba Maple with Black Walnut. The ground layer was dominated by garlic mustard and yellow avens.
Cultural (CU)	
Cultural Thicket (CUT)	
CUT1 Mineral Cultural Thicket	The CUT1 community was a culturally influenced feature located at the southeast edge of the Study Area along the embankment adjacent to Father David Bauer Drive. The vegetation varied in dominance between common buckthorn, staghorn sumac and Tartarian honeysuckle.
Swamp (SW)	
Thicket Swamp (SWT)	
SWT2-2 Willow Mineral Thicket Swamp	The SWT2-2 community was part of the MAS2-1/SWT2-2 wetland complex (Subject Wetland) located directly adjacent to the proposed boardwalk. The deciduous swamp thicket was dominated by willow and red-osier dogwood.
Marsh (MA)	
Shallow Marsh (MAS)	
MAS2-1 Cattail Mineral Shallow Marsh	The MAS2-1 communities were all located along the Laurel Creek corridor. These features were dominated by cattails with purple loosestrife, spotted jewelweed, stinging nettle and swamp thistle. The MAS2-1/SWT2-2 feature contained standing water during the spring amphibian surveys.

Vascular Plants

A complete list of all vascular plant species recorded during field investigations is included in Appendix B. A total of 169 species of vascular plants were recorded from the Study Area, of which 59% were native. Eighty-five percent (85%) of the native species identified have a rank of S5, indicating they are common and secure within Ontario. Seven percent (7%) of the native species have a rank of S4, indicating that they are apparently secure. There were three provincially rare plant species observed (ranked S1-S3):

- Large yellow pond-lily (*Nuphar advena advena*)
- Bristly Buttercup (*Ranunculus hispidus hispidus*)
- Cup Plant (*Silphium perfoliatum perfoliatum*)

Reference: Silver Lake and Laurel Creek in Waterloo Park Natural Heritage Overview

Amphibians

During the amphibian call count surveys conducted by Stantec in 2017, three species of amphibians were observed in the Study Area in low abundance (American Toad, Northern Leopard Frog and Green Frog). Results are presented below in Table 6.

Table 6: Amphibian Survey Results

Station ID	Round	Date Surveyed	Species Present (Highest Call Code)
A	1	April 27, 2017	American Toad (1-2)
	2	May 16, 2017	American Toad (1-2)
	3	June 14, 2017	No calling amphibians observed
B	1	April 27, 2017	No calling amphibians observed
	2	May 16, 2017	No calling amphibians observed
	3	June 14, 2017	No calling amphibians observed
C	1	April 27, 2017	American Toad (1-3)
	2	May 16, 2017	American Toad (2-5)
	3	June 14, 2017	No calling amphibians observed
D	1	April 27, 2017	American Toad (1-3)
	2	May 16, 2017	Green Frog (1-3) heard calling and one Northern Leopard Frog observed in feature earlier in day during the wetland delineation
	3	June 14, 2017	No calling amphibians observed
E	1	April 27, 2017	No calling amphibians observed
	2	May 16, 2017	No calling amphibians observed
	3	June 14, 2017	No calling amphibians observed
F	1	April 27, 2017	American Toad (1-4) Northern Leopard Frog (1-1)
	2	May 16, 2017	Northern Leopard Frog (1-1) American Toad (1-2) heard calling after the survey
	3	June 14, 2017	Green Frog (1-1)

Breeding Birds

A total of 40 bird species were observed during the breeding bird surveys conducted by Stantec in 2017 (Appendix C), or as incidental observations during other surveys. Thirty-three (33) out of the 40 bird species observed are assumed to be breeding in the Study Area, since they were observed in suitable habitat during the breeding season. Suitable breeding habitat was not observed in the Study Area for Ring-billed Gull, Caspian Tern, Great Blue Heron, Black-crowned Night Heron, Osprey, Chimney Swift and Barn Swallow. Barn Swallow and Chimney Swift are both provincially and federally threatened birds. Eastern Wood-Pewee, a provincially and federally designated special concern species, was observed in the southwest corner of the FOD7 community during the breeding bird survey.

Area-sensitive birds are defined as those species that prefer to breed in habitat patches greater than 20 ha in size. American Restart, an area sensitive species, was observed during the breeding bird surveys in the center of the FOD7 community.

Great Blue Heron, Black-crowned Night Heron, Osprey, Hairy Woodpecker, Warbling Vireo and American Redstart are all considered uncommon breeders in the Region of Waterloo, however breeding habitat for Great Blue Heron, Black-crowned Night Heron and Osprey was not available on site.

Waterfowl Nesting Survey

Three Canada Goose nests were observed on April 28, 2017 on the islands at the west end of Silver Lake, adjacent to where the twinned pedestrian bridge is proposed. No nesting waterfowl were observed during the May 26, 2017 survey.

Incidental Wildlife

Incidental wildlife (or evidence of) noted during the 2017 field investigations included Caspian Tern, Osprey, Hairy Woodpecker, Snapping Turtle, Red-eared Slider, Eastern Cottontail, Eastern Chipmunk, Woodchuck, Eastern Grey Squirrel, Beaver and White-tailed Deer. All wildlife species encountered are ranked S5 (common) provincially with the exception of Osprey and Black-crowned Night Heron, which and both ranked S3B (vulnerable breeders), and Snapping Turtle, which is a provincial and federal special concern species. Snapping turtle was noted as nesting on the southeast slope of the Light Rail Transit (LRT) track embankment adjacent to Laurel Creek (Figure 3). A habitat suitability assessment for Snapping Turtle is detailed below.

Aquatic Resources

Laurel Creek enters the west side of Waterloo Park at University Avenue West and is largely contained within a wooded corridor. Wetted widths range from 5 to 8 metres throughout much of its length prior to entering Silver Lake, while depths averaged between 30 cm and 65 cm during October 17, 2007 survey work. In the vicinity of the existing soccer fields, band shell and westerly pedestrian bridge, the wooded corridor subsides, particularly along the south edge of the creek, and canopy cover lessens considerably. Riparian vegetation consisted of larger tree species such as willow, black maple, oak and ash, while ground cover is characterized by old field vegetation. Through this section, substrates consisted primarily of sand, some gravels and silt, with sparse patches of cobble and boulder. Instream cover was provided by undercut banks, pools, and large woody debris. Areas of bank slumping and scour were common throughout this open section, and exposed tree roots and bank materials suggest that scour actively occurs during high flows. Gabion baskets line the stream banks in the area of the west bridge. The west bridge sits on concrete piers that may be prone to trapping woody debris during high flows. A small patch of watercress was noted at the west bridge, suggesting some expression of groundwater is likely occurring.

A second, free-span pedestrian bridge (middle bridge) is present approximately 150 m downstream of the west bridge. The riparian zone transitions back to more of a wooded corridor lining both sides of the creek. Downstream of the middle pedestrian bridge, the channel appears more stable as it enters a wider wooded corridor and riparian wetland zone.

Laurel Creek widens out as it transitions from a creek feature to a lake environment at the existing pedestrian bridge (east bridge) near the LRT tracks. The creek ranged from 25 to 27 metres in wetted width on June 27, 2017, with an estimated bankfull width ranging from 40 to 45 metres. Substrates were variable, but generally consisted of soft silts and mucks with occasional patches of coarser substrates such as cobble, gravel and boulder, which provide some minimal instream cover. Sparse large woody debris also provides instream cover, but is generally transient and prone to moving under higher flows.

Flow morphology ranged from slow moving run habitat to slow flat with the transition to lentic environment at the east bridge crossing location, and flow depth was estimated at 60 cm. The riparian zone had a predominantly open canopy characterized by black and crack willow. Dominating the shrub layer were willow, red-osier dogwood and common buckthorn. The ground layer was dominated by species of avens, garlic mustard and reed canary grass.

Silver Lake is a shallow open water feature with a primarily silt substrate created by sediment deposition from upstream sources. The north and northwest shoreline is marked by a wooden boardwalk and riparian cover is lacking, with areas of manicured turf predominating. The northeast and southern sides of the lake exhibit more riparian cover provided by willow and dogwood shrubs. No formal fish community surveys were completed; however Common Carp and cyprinids were observed opportunistically during the habitat surveys. Brown bullhead, carp, pumpkinseed, yellow perch and white sucker have been recorded from the lake previously. All species previously recorded and observed during 2017 are common and generally tolerant of degraded habitat conditions.

SIGNIFICANT NATURAL HERITAGE FEATURES

LOCALLY SIGNIFICANT WETLANDS

The province determines significance of wetlands according to standardized evaluation procedures. Additionally, the planning authority may designate other wetlands significant if they have limited representation within the planning area or are of high quality within the context of the municipality.

Unevaluated wetlands were identified along Laurel Creek on the LIO mapping website. Unevaluated wetlands greater than 0.5 ha are designated as locally significant wetlands in the City of Waterloo OP. The unevaluated wetlands are approximately 1.9 ha in size and therefore qualify as locally significant wetlands according to the City of Waterloo OP Policies and are considered as Supporting Natural Features in the OP.

HABITAT FOR ENDANGERED AND THREATENED SPECIES

The protection of endangered and threatened species and their habitats is necessary to aid in the recovery of species that are at risk in Ontario. The following species and/or potential species habitat were noted within the Study Area:

Endangered Bats

Potential candidate bat maternity colony habitat for endangered bat species occurs in the Study Area within the FOD7, FOD7-3 and FOD9-3 communities. This habitat is discussed in further detail below under “Significant Wildlife Habitat”.

Rusty-patched Bumblebee

Potential foraging habitat for Rusty-patched Bumblebee occurs in small patches of naturalized open areas within the Study Area. These patches were too small to map as separate ELC units, but generally consisted of areas that are undergoing restoration/naturalization that are located next to larger mapped features.

Barn Swallow

One Barn Swallow, a provincially and federally threatened species, was observed during field investigations foraging over the parkland east of the Study Area.

Barn Swallows nest on walls or ledges of barns as well as on other human-made structures such as bridges, culverts or other buildings (Cadman et al., 2007). There were no Barn Swallow nests or activity observed under the pedestrian bridge

or in the LRT culvert over Laurel Creek. Gazebos and picnic shelters were also checked for the presence of Barn Swallow nests and activity, with none observed.

Chimney Swift

Chimney Swift, a provincially and federally threatened species, was observed during field investigations foraging over Silver Lake.

Chimney Swift use chimneys for roosting and breeding, as well as walls, rafters, or gables of buildings and, less frequently, natural structures such as hollow trees, tree cavities and cracks in cliffs (Cadman et al., 2007). No chimneys or other suitable structures were observed in the Study Area during field investigations. Chimney Swifts are most likely to nest in the chimneys associated with buildings in the surrounding urban areas of Waterloo.

SIGNIFICANT WILDLIFE HABITAT

There are four general types of significant wildlife habitat including seasonal concentration areas, rare or specialized habitat, habitat for species of conservation concern, and wildlife movement corridors. Field documentation of wildlife habitat was completed during ELC surveys and other field investigations. MNRF's Significant Wildlife Habitat Technical Guide (MNRF, 2000) and SWH Criteria Schedules for Ecoregion 6E (MNRF 2015) were applied to identify candidate and confirmed significant wildlife habitat supported by ELC, habitat and wildlife observations. A summary of the significant wildlife habitat features identified within the Study Area based on the above guidelines is provided below.

Turtle Wintering Areas

Suitable habitat for turtle wintering areas occurs in Silver Lake, since there is an abundance of soft substrate for burrowing, and the water is deep enough to remain unfrozen throughout the winter. According to the SWH Criteria Schedule, the presence of one or more overwintering Snapping Turtle qualifies a feature as significant. One Snapping Turtle was observed in Silver Lake during the June 27 breeding bird survey, and two Snapping Turtles were observed nesting on the southeast embankment of the LRT tracks during the June 16 breeding bird survey. Based on these observations, significant wildlife habitat for turtle wintering areas is present in Silver Lake.

Bat Maternity Colonies

According to the SWH Criteria Schedule, significant bat maternity colonies can be found in FOD, FOM, SWD and SWM ELC communities. Potential candidate bat maternity colony habitat therefore occurs in the Study Area within the FOD7, FOD7-3 and FOD9-3 communities.

Turtle Nesting Areas

According to the SWH Criteria Schedule, the presence of one or more nesting Snapping Turtle qualifies a feature as significant. Two Snapping Turtles were observed nesting on the southeast embankment of the LRT tracks (close to Laurel Creek) during the June 16 breeding bird survey (Figure 3), qualifying this area as significant.

Special Concern and Rare Wildlife Species

Confirmed habitat for two special concern species was observed during field investigations. This included habitat for Eastern Wood-Pewee in the FOD7-3 community in the southwest corner of the Study Area, and turtle overwintering habitat for Snapping Turtle in Silver Lake and Laurel Creek, and Snapping Turtle nesting habitat along the LRT track embankment.

Reference: Silver Lake and Laurel Creek in Waterloo Park Natural Heritage Overview

FISH HABITAT

Fish habitat is present in the Study Area in Silver Lake and Laurel Creek.

SUMMARY OF SIGNIFICANT NATURAL HERITAGE FEATURES

In summary, the following significant natural heritage features were identified in the Study Area:

- Locally significant wetlands/Supporting Natural Feature (unevaluated wetlands)
- Significant wildlife habitat including:
    - Bat Maternity Colonies in the FOD7, FOD7-3 and FOD9-3 communities
    - Turtle Wintering Areas in Silver Lake and Laurel Creek
    - Turtle Nesting Areas on the southeast slope of the LRT Tracks
    - Snapping Turtle Habitat (overlaps with Turtle Wintering and Nesting Areas)
    - Habitat for Eastern Wood-Pewee in the FOD7-3 community in the southwest corner of the Study Area
- Fish Habitat in Laurel Creek and Silver Lake
- Core and Supporting Natural Features within the Study Area as identified in the City of Waterloo OP.

STANTEC CONSULTING LTD.

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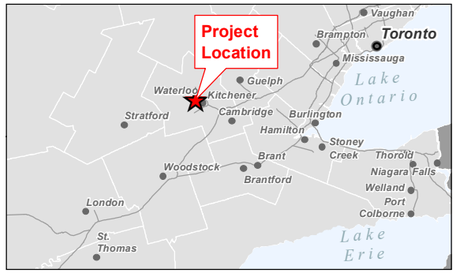
Attachment: Figure 1: Study Area
Figure 2: Designated Natural Heritage Features
Figure 3: Ecological Land Classification
Appendix A: Species at Risk Habitat Assessment
Appendix B: Plant Species List
Appendix C: Wildlife Species List

Stantec

Legend
- Study Area
- Watercourse
- Waterbody

0 100 200 m
1:5,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2014. Image Date 2014.



Project Location
Waterloo,
Ontario

161413464 REVA
Prepared by CMC on 2017-10-13
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
CITY OF WATERLOO
SILVER LAKE EA ADDENDUM
ENVIRONMENTAL IMPACT STUDY

Figure No.
1

DRAFT

Title
Study Area

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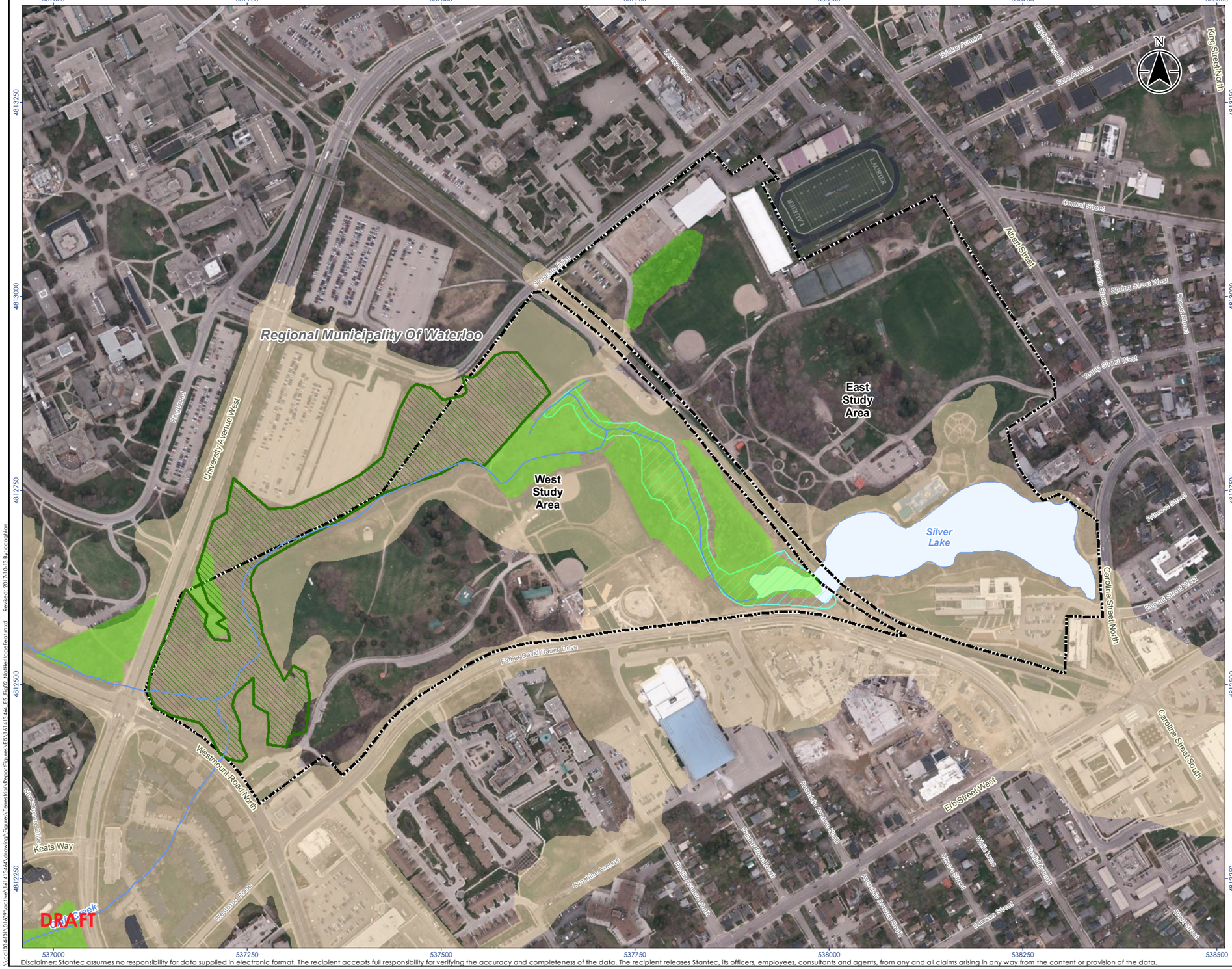

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Legend

- Study Area
- Watercourse
- Municipal Boundary - Upper Tier
- Regulation Limit (GRCA)
- Waterbody
- Wetland - Not evaluated per Ontario Wetland Evaluation System

Official Plan (City of Waterloo)

- Core Natural Feature
- Supporting Natural Feature

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
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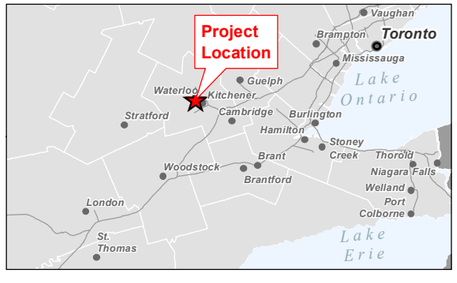

Project Location Waterloo, Ontario	161413464 REVA Prepared by CMC on 2017-10-13 Technical Review by ABC on yyyy-mm-dd Independent Review by ABC on yyyy-mm-dd

Client/Project

CITY OF WATERLOO

SILVER LAKE EA ADDENDUM

ENVIRONMENTAL IMPACT STUDY

Figure No.

2

DRAFT

Title

Designated Natural Heritage Features

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Stantec

Legend

- Study Area
- Amphibian Station
- Snapping Turtle Nesting Location
- ELC Boundary
- Watercourse
- Waterbody

CUT1:	Mineral Cultural Thicket
FOD6-2:	Fresh-Moist Sugar Maple-Black Maple Deciduous Forest
FOD7:	Fresh-Moist Lowland Deciduous Forest
FOD7-3:	Fresh-Moist Willow Lowland Deciduous Forest
FOD9-3:	Fresh – Moist Bur Oak Deciduous Forest Type
STW2-2:	Willow Mineral Swamp Thicket
MAS2-1:	Cattail Mineral Shallow Marsh
WODM5-3:	Fresh - Moist Manitoba Maple Deciduous Woodland Type

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

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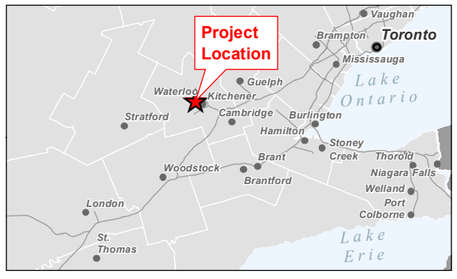
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2014. Image Date 2014.
4. Official plan data © Region of Waterloo Official Plan 2015 and City of Waterloo Official Plan 2016.



Project Location
Waterloo,
Ontario

161413464 REVA
Prepared by CMC on 2017-10-13
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
CITY OF WATERLOO
SILVER LAKE EA ADDENDUM
ENVIRONMENTAL IMPACT STUDY

Figure No.
3

DRAFT

Title
Ecological Land Classification

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Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Amphibians	Jefferson Salamander	Ambystoma jeffersonianum	END	END-END	S2	MNRF 2016	Adult Jefferson Salamanders are found underground in rodent burrows or under rocks and logs in moist deciduous forest (MNRF 2016). Eggs are laid on the underside of vegetation in woodland ponds, where larvae spend the first few months after hatching (MNRF 2016).	No nearby recent records. Vernal pools in the FOD7 woodland were dry by mid-June and unlikely to support breeding Jefferson Salamanders.	Low
Amphibians	Western Chorus Frog (GLSL Pop.)	Pseudacris triseriata	NAR	THR-THR	S3	Ontario Nature 2017	The Western Chorus Frog prefers small, ephemeral wetlands disconnected from other water sources for breeding (Environment Canada 2015; COSEWIC 2008d). The temporary nature of these wetlands leads to a reduction in predation pressure, but also makes entire populations susceptible to seasonal events such as premature drying due to climate conditions (Environment Canada 2015). The vegetation composition in breeding ponds is typically herbaceous with the presence of occasional shrubs or partially submerged trees forming a discontinuous or open canopy (Environment Canada 2015). Some populations may breed at the edges of closed-canopy habitats (Environment Canada 2015).	Recent Ontario Nature records exist. Suitable habitat was present in the MAS2-1 habitats adjacent to woodlands (FOD). Targeted amphibian surveys failed to detect this species.	Low
Birds	Acadian Flycatcher	Empidonax virescens	END	END-END	S2S3B	MNRF 2016, OBBA 2017	The Acadian Flycatcher typically breeds in mature deciduos forest with a dense canopy closure and ravines, or in forested swamps with maple and beech trees (MNRF 2016). This species is sensitive to disturbance and is generally found in large, undisturbed forest tracts (COSEWIC 2010a).	OBBA records exist for the Waterloo area. Forested communities (FOD) were in discontinuous tracts with limited interior habitat. Targeted surveys failed to detect this species.	Low
Birds	Bank Swallow	Riparia riparia	THR	THR-NS	S4B	OBBA 2017	The Bank Swallow breeds on a variety of sites with vertical banks, including riverbanks, bluffs, aggregate pits and stock piles of sand and soil (COSEWIC 2013a). Sand-silt substrates are preferred (COSEWIC 2013a). Nesting sites are often near open habitats used for aerial foraging (COSEWIC 2013a). Large wetlands are used as communal roosts during post-breeding, migration, and wintering periods (COSEWIC 2013a).	OBBA records exist for the Waterloo area. No stable banks of exposed substrate were observed on site, and targeted surveys failed to detect this species.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Barn Swallow	Hirundo rustica	THR	THR-NS	S4B	OBBA 2017	The Barn Swallow commonly nests on walls or ledges of barns, bridges, culverts or other man-made structures (Cadman et al. 2007). Where suitable nesting structures occur, Barn Swallow often form small colonies, sometimes mixed with other swallow species (COSEWIC 2011a). The Barn Swallow feeds on aerial insects while foraging over a variety of open habitats such as pastures, lawns, meadows and fields (COSEWIC 2011a). It will also frequently forage in woodland clearings, over wetland habitats or open water where insect prey are abundant (Cadman et al. 2007).	OBBA records exist for the Waterloo area. Barn swallows were observed foraging over the site, but nests or candidate breeding structures were not identified.	Confirmed, however no breeding habitat present in the Study Area.
Birds	Black Tern	Chlidonias niger	SC	NAR-NAR	S3B	MNRF 2016, OBBA 2017	The Black Tern prefers cattail marshes for breeding, where it builds its floating nests in loose colonies (MNRF 2016). It is primarily an aerial insectivore, but will dive to feed on fish (Cornell Lab of Ornithology 2015).	OBBA records exist for the Waterloo area, however this species prefers large areas of emergent aquatic vegetation adjacent to large bodies of water which are not present in the Study Area. Targeted surveys failed to detect this species.	Low
Birds	Bobolink	Dolichonyx oryzivorus	THR	THR-NS	S4B	MNRF 2016, OBBA 2017	The Bobolink is generally referred to as a “grassland species”. It nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures. Preferred ground cover species include grasses such as Timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC 2010b). Bobolink is an area-sensitive species, with reported lower reproductive success in small habitat fragments (COSEWIC 2010b).	OBBA records exist for the Waterloo area. No suitable tallgrass fields or grasslands were present during the field investigation. Targeted breeding bird surveys failed to detect this species.	Low
Birds	Canada Warbler	Cardellina canadensis	SC	THR-THR	S4B	OBBA 2017	The Canada Warbler is found in wet deciduous, coniferous and mixed forests with a dense shrub layer and complex forest floor (MNRF 2016; COSEWIC 2008a), in riparian shrub forests, regenerating stands and in old-growth forest (COSEWIC 2008a). It nests on the ground or on mossy logs or roots near stream banks or on hummocks (MNRF 2016).	OBBA records exist for the Waterloo area. The FOD7 and FOD7-3 communities were not likely suitable for this species since the forest floor of these communities are dominated by invasive species and lack complexity. Targeted surveys failed to detect this species.	Low
Birds	Cerulean Warbler	Dendroica cerulea	THR	END-SC	S3B	MNRF 2016, OBBA 2017	The Cerulean Warbler is found in mature deciduous forest with large trees and an open understory (MNRF 2016; COSEWIC 2010c). They can be found in moist lowland forest or drier upland forest (COSEWIC 2010c).	OBBA records exist for the Waterloo area. This species prefers large tracks of undisturbed deciduous forest which is not available in the Study Area. Targeted surveys failed to detect this species.	Low
Birds	Chimney Swift	Chaetura pelagica	THR	THR-THR	S4B, S4N	OBBA 2017	Chimney Swift uses chimneys for roosting and breeding, and less commonly, nest in large hollow trees (Cadman et al. 2007). Nesting sites typically have a constant ambient temperature (COSEWIC 2007). It is an aerial insectivore, and often forages near water (COSEWIC 2007).	OBBA records exist for the Waterloo area. Chimney Swifts were observed foraging over the site. However, no suitable nesting structures were observed and breeding habitat was not present.	Confirmed, however no breeding habitat present in the Study Area.

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Common Nighthawk	Chordeiles minor	SC	THR-THR	S4B	OBBA 2017	The Common Nighthawk is an aerial insectivore and forages at dawn and dusk. This species nests on the ground in open habitats with rocky or graveled substrate, and will even nest on gravel roofs in the city (Cadman et al. 2007). The regeneration or succession of forest clearings and the destruction of grassland habitats appear to play a major role in this species' decline along with the non-selective spraying for mosquitoes (Cadman et al. 2007).	OBBA records exist for the Waterloo area. No suitable undisturbed, open habitat or rooftop habitat was present for nesting.	Low
Birds	Eastern Meadowlark	Sturnella magna	THR	THR-NS	S4B	MNRF 2016, OBBA 2017	The Eastern Meadowlark is typically found in fields, meadows, golf courses, pastures, alfalfa fields, roadsides and other open areas (MNRF 2016). Older sites with moderately tall grass, a substantial litter layer, low forb and shrub cover and dense grass are preferred (COSEWIC 2011b). Larger patch sizes (>5 ha) are also generally preferred (COSEWIC 2011b).	OBBA records exist for the Waterloo area. Potentially suitable habitat was present in the parkland communities on site. Targeted surveys failed to detect this species.	Low
Birds	Eastern Whip-poor-will	Antrostomus vociferus	THR	THR-THR	S4B	MNRF 2016	The Eastern Whip-poor-will is typically found in areas with a mixture of open and forested habitats such as savannahs, open woodlands or openings in mature forests (MNRF 2016). Common tree associations are pine and oak (COSEWIC 2009a). Semi-open and patchy forests are preferred, as are areas with little ground cover such as rock barrens (COSEWIC 2009a). Nests are usually found on the ground in forested areas (MNRF 2016).	No nearby recent records. Although forest communities were discontinuous, large-treed, patchy pine-oak forest with undeveloped understory was absent.	Low
Birds	Eastern Wood-Pewee	Contopus virens	SC	SC-NS	S4B	OBBA 2017	The Eastern Wood-Peewee is found in the mid-canopy layer of deciduous and mixedwood forests with open understories, and is commonly associated with edges and clearings (MNRF 2016).	This species was confirmed on site, and suitable breeding habitat was present throughout the forested (FOD) communities on site.	Confirmed in the southwest corner of the FOD7 community.
Birds	Golden-winged Warbler	Vermivora chrysoptera	SC	THR-THR	S4B	OBBA 2017	The Golden-winged Warbler is found in early-successional shrubby areas surrounded by mature forest, including field edges, hydro or utility Right-of-Ways or logged areas (MNRF 2016; COSEWIC 2006a). It can also be found in dry uplands, swamp forests and marshes (COSEWIC 2006a).	OBBA records exist for the Waterloo area. No early successional habitats were present on site. Targeted surveys failed to detect this species.	Low
Birds	Grasshopper Sparrow	Ammodramus savannarum	SC	SC-NS	S4B	OBBA 2017	The Grasshopper Sparrow is found in large (>5 ha) sparsely vegetated grasslands, hay fields, pastures, prairies and alvars with well-drained, sandy soil (MNRF 2016; COSEWIC 2013b). The nests are typically well hidden in grasses (MNRF 2016).	OBBA records exist for the Waterloo area. No tallgrass communities such as pastures, grasslands or prairies were present on site. Targeted surveys failed to detect this species.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Least Bittern	Ixobrychus exilis	THR	THR-THR	S4B	MNRF 2016, OBBA 2017	The Least Bittern prefers cattail marshes, but may be found in a variety of wetland habitats with stable water levels and dense vegetation interspersed with open water areas (MNRF 2016; COSEWIC 2009b). Nests are built in dense vegetation near open water for foraging (MNRF 2016).	OBBA records exist for the Waterloo area. The MAS2-1 communities identified on site were potentially suitable for this species, however this species prefers larger, undisturbed cattail marshes for breeding.	Low
Birds	Loggerhead Shrike	Lanius ludovicianus	END	NS-END (migrans spp.)/END-NS (ssp.)	S2B	MNRF 2016	Loggerhead Shrike prefers open fields, pastures, prairies, savannahs, alvars and grasslands with an abundance of low trees and shrubs for perching (COSEWIC 2014; MNRF 2016). Nests are typically built in low trees and shrubs with dense branches (COSEWIC 2014).	No nearby recent records. No open fields with an abundance of low trees and shrubs were present on site. Targeted surveys failed to detect this species.	Low
Birds	Louisiana Waterthrush	Seiurus motacilla	SC	THR-SC	S3B	MNRF 2016	The Louisiana Waterthrush prefers headwater streams and wetlands in large tracts of mature forest (COSEWIC 2015), but but may also be found in deciduous swamps with open water (MNRF 2016). It nests under fallen logs, in root masses or in niches in stream banks (MNRF 2016; COSEWIC 2015).	No nearby recent records. No headwater streams or large continuous tracts of mature forest were present on site. Targeted surveys failed to detect this species.	Low
Birds	Northern Bobwhite	Colinus virginianus	END	END-END	S1	OBBA 2017	The Northern Bobwhite breeds in a variety of habitat early successional habitat types, including grasslands, croplands and brushy areas (COSEWIC 2003). Nesting occurs in grasslands in the summer (COSEWIC 2003). Croplands are required in summer and fall for feeding, dusting, loafing and roosting, and brushy habitat is required for roosting, feeding and escape during the fall and winter (COSEWIC 2003).	OBBA records exist for the Waterloo area. No early successional habitats were present on site. Targeted surveys failed to detect this species.	Low
Birds	Peregrine Falcon	Falco peregrinus	SC	SC-SC	S3B	MNRF 2016, OBBA 2017	The Peregrine Falcon traditionally prefers rock cliffs, particularly those adjacent to water (MNRF 2016). More recently, this species has been released in various urban centres in Ontario where it successfully nests on tall buildings (Cadman et al. 2007; MNRF 2016).	OBBA records exist for the Waterloo area. No cliffs or tall structures to support nesting were present on site.	Low
Birds	Red-headed Woodpecker	Melanerpes erythrocephalus	SC	THR-THR	S4B	OBBA 2017	The Red-headed Woodpecker prefers open woodlands and forest edges, and is often found in disturbed areas such as cemeteries, parks and golf courses (MNRF 2016). This species shows a preference for dead or dying trees and at least a few snags or large dead limbs are necessary for its presence in more open habitats (Cadman et al. 2007).	OBBA records exist for the Waterloo area. Suitable habitat was present in the parklands and disturbed areas on site. Targeted surveys failed to detect this species.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Birds	Short-eared Owl	Asio flammeus	SC	SC-SC	S2N, S4B	OBBA 2017	The Short-eared Owl is typically found in a variety of unforested habitats such as grasslands, fallow pastures, marshes and tundra where it nests on the ground (MNRF 2016; COSEWIC 2008c). The primary factor influencing habitat selection appears to be abundance of small mammals, especially voles (MNRF 2016; COSEWIC 2008c).	OBBA records exist for the Waterloo area. The MAS2-1 communities on site were not large enough to support an abundance of prey species. No other open habitats expected to support prey species were present on site.	Low
Birds	Wood Thrush	Hylocichla mustelina	SC	THR-NS	S4B	OBBA 2017	The Wood Thrush is found in deciduous and mixed forests with a developed understory and tall trees (MNRF 2016). While it prefers large forest tracts, it will utilize smaller forest fragments (MNRF 2016). Nests are constructed in shrubs or saplings, typically Sugar Maple or American Beech (MNRF 2016).	OBBA records exist for the Waterloo area. Potentially suitable habitat was present in the forested (FOD) communities on site, although they were too fragmented to be preferred by this species. Targeted surveys failed to detect this species.	Low
Birds	Yellow-breasted Chat	Icteria virens	END	END-END	S2B	MNRF 2016	The Yellow-breasted Chat requires dense, low shrubby vegetation and is usually associated with early successional shrub thickets (MNRF 2016; COSEWIC 2011d). It is typically found in abandoned agricultural fields, hydro lines, Right-of-ways, wetlands and pond edges (COSEWIC 2011d).	No nearby recent records. No early successional habitats were present on site. Targeted surveys failed to detect this species.	Low
Invertebrates	Rusty-patched Bumble Bee	Bombus affinis	END	END-END	S1	MNRF 2016	The Rusty-patched Bumble Bee is found in a variety of open habitats with flowers from which pollen and nectar can be collected (MNRF 2016; COSEWIC 2010e). Most recently, observations of this species have been made in oak savannah (MNRF 2016). Nests are made in underground rodent burrows (COSEWIC 2010e).	No nearby recent records. No open habitats supporting a large number of flowering species were present on site.	Low
Mammals	American Badger	Taxidea taxus jacksoni	END	END-END	S2	MNRF 2016	American Badger prefers non-forested grasslands and shrublands with coherent soils that can be easily burrowed into (COSEWIC 2012). They are found in wetlands, alpine areas, and in agircultural areas where there is sufficient hedgerows, fencerows and edges to support prey species (COSEWIC 2012). Preferred prey are fossorial rodents, but its diet can be highly varied (COSEWIC 2012).	No nearby recent records. This species utilizes large territories with a variety of habitat types. Waterloo Park is an isolated park surrounded by an urban landscape, and habitat for this species is not likely to be present.	Low
Mammals	Eastern Small-footed Myotis	Myotis leibii	END	Not listed	S2S3	Dobbyn 1994	The Eastern Small-footed Myotis roosts in a variety of habitats, including hollow trees, under rocks or in rock outcrops, in buildings, caves, mines and under bridges (MNRF 2016). Different roosting sites may be selected each day (MNRF 2016). Hibernation occurs in abandoned mines and caves (MNRF 2016).	No nearby recent records. Suitable maternity roost habitat was present in the forested (FOD) communities on site.	Moderate

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Mammals	Little Brown Myotis	Myotis lucifugus	END	END-END	S4	Dobbyn 1994	The Little Brown Myotis roosts in tree cavities and abandoned buildings, and often forms roosting colonies in barns, attics and abandoned buildings (MNRF 2016; COSEWIC 2013c). They have been found in a wide variety of deciduous and coniferous tree stands (COSEWIC 2013c). Hibernation typically occurs in caves and mines (MNRF 2016).	No nearby recent records. Suitable maternity roost habitat was present in the forested (FOD) communities on site.	Moderate
Mammals	Northern Myotis	Myotis septentrionalis	END	END-END	S3?	Dobbyn 1994	The Northern Myotis roosts in colonies in tree cavities (COSEWIC 2013c) in a wide variety of deciduous and coniferous forest stands. Little is known about the effect of tree density on maternity roost selection for this species, but bats tend to avoid large open areas (COSEWIC 2013c). Small forest gaps, such as over streams or ponds, are used for foraging (COSEWIC 2013c).	No nearby recent records. Suitable maternity roost habitat was present in the forested (FOD) communities on site.	Moderate
Mammals	Tri-colored Bat	Perimyotis subflavus	END	END-END	S3?	Dobbyn 1994	The Tri-coloured Bat roosts in colonies in tree cavities (COSEWIC 2013c) in a wide variety of deciduous and coniferous forest stands. Little is known about the effect of stand composition on maternity roost selection for this species, but it is strongly associated with forest watercourses and streamside vegetation (COSEWIC 2013c).	No nearby recent records. Suitable maternity roost habitat was present in the forested (FOD) communities on site.	Moderate
Plants	American Chestnut	Castanea dentata	END	END-END	S2	MNRF 2016	The American Chestnut prefers dry upland deciduous forest with sandy, acidic to neutral soils and is often associated with Red Oak, Black Cherry, Sugar Maple and American Beech (MNRF 2016). It is only found in the Carolinian zone within Ontario (MNRF 2016).	No nearby recent records. One forested community (FOD6-2) contained some associate tree species. Targeted surveys failed to detect this species.	Low
Plants	American Columbo	Frasera caroliniensis	END	END-END	S2	MNRF 2016	The American Columbo is primarily found on dry, upland, open deciduous forest slopes, but may also be found in thickets, forest edges, pine and cedar forest, grasslands, moist woods and swamps (MNRF 2016; COSEWIC 2006b). Although it will grow on a variety of soils, it is found on rocky slopes throughout its range (COSEWIC 2006b).	No nearby recent records. Potentially suitable habitat was present in the forested (FOD) and wetland (MAS and SWT) communities on site. Targeted surveys failed to detect this species.	Low
Plants	False Hop Sedge	Carex lupuliformis	END	END-END	S1	MNRF 2016	False Hop Sedge grows around temporary forest ponds or near riverine swamps and marshes in Ontario (MNRF 2016; COSEWIC 2011c). It prefers to grow under canopy openings with lots of sunlight (MNRF 2016).	No nearby recent records. No temporary forest ponds or riverine swamps and marshes were present on site. Targeted surveys failed to detect this species.	Low
Plants	Green Dragon	Arisaema dracontium	SC	SC-SC	S3	MNRF 2016	Green Dragon grows along streams in moist to wet forests dominated by maple, Green Ash and White Elm (MNRF 2016).	No nearby recent records. No forests dominated by associate species were present on site. Targeted surveys failed to detect this species.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Plants	Pygmy Pocket Moss	Fissidens exilis	NAR	NAR-SC	S2	MNRF 2016	The Pygmy Pocket Moss is typically found on bare, moist clay-based soil or loam in partial or full shade (COSEWIC 2016). While habitat patches are transient and unpredictable, it has been collected on forested banks of streams and rivers, floodplains, bluffs, beaches, roadsides and trails (COSEWIC 2016).	No nearby recent records. Due to the transient nature of this species' habitat, suitable habitat may be present in shaded areas of the site. Targeted surveys failed to detect this species.	Low
Reptiles	Blanding's Turtle	Emydoidea blandingi	THR	THR-THR	S3	MNRF 2016, Ontario Nature 2017	The Blanding's Turtle prefers shallow water in heavily vegetated, large wetlands and lakes (MNRF 2016). However, in Ontario it also commonly uses clear watered habitats such as streams, rivers and ponds (COSEWIC 2005). Nests occur in a variety of loose substrates such as sand, gravel and cobblestone (COSEWIC 2005). Blanding's Turtles can often be found hundreds of metres from the nearest aquatic habitat during the active season, as they search for mates or nest sites (MNRF 2016). Overwintering sites are permanent pools approximately 1 m in depth (COSEWIC 2005).	Recent Ontario Nature records exist. Blanding's Turtle has been confirmed approximately 5km upstream from the Study Area in the Laurel Creek Reservoir. Although the features are connected via Laurel Creek, it is unlikely that Blanding's Turtle would navigate over the Laurel Creek Dam, through several culverts, and Columbia Lake to reach the Study Area.	Low
Reptiles	Eastern Ribbonsnake	Thamnophis sauritus	SC	SC-SC	S3	MNRF 2016, Ontario Nature 2017	The Eastern Ribbonsnake is usually found close to water and is particularly characteristic of wetlands that have an abundance of small fish and frogs (MNRF 2016). It hibernates in communal underground burrows over winter (MNRF 2016).	No nearby recent records. Wetlands on site did not have an abundance of small fish and frogs required for this species.	Low
Reptiles	Northern Map Turtle	Graptemys geographica	SC	SC-SC	S3	MNRF 2016, Ontario Nature 2017	The Northern Map Turtle inhabits rivers and lakes with suitable basking sites such as deadheads, rocks and emergent vegetation (MNRF 2016; COSEWIC 2002). It requires high-quality water with abundant mollusc populations, which are the preferred prey source (MNRF 2016). The map turtle overwinters in slow-moving, deep sections of river (COSEWIC 2002).	Recent Ontario Nature records exist for the area, likely for the Grand River which provides suitable water quality requirements and an abundance of prey.	Low
Reptiles	Queensnake	Regina septemvittata	END	END-END	S2	MNRF 2016, Ontario Nature 2017	The Queensnake is an aquatic snake that is seldom found more than 3 m from streams, rivers and lakes with gravelly/rocky bottoms and an abundance of crayfish (COSEWIC 2010d; MNRF 2016). Hibernacula are generally found in bridge abutments and bedrock crevices (MNRF 2016).	No nearby recent records. Queensnake presence in the Waterloo Region is likely for the Grand River, according to Ontario Species at Risk Mapping.	Low

Group	Common Name	Scientific Name	COSSARO	COSEWIC	S-Rank	Source(s)	Habitat Description	Habitat Assessment	Potential Presence
Reptiles	Snapping Turtle	Chelydra serpentina	SC	SC-SC	S3	MNRF 2016, Ontario Nature 2017, MNRF 2017	The Snapping Turtle inhabits ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms (COSEWIC 2008b). It prefers to stay in shallow water, where it buries itself into mud and leaf litter and has easy access to the surface for air (MNRF 2016). Females nest in sand or gravel, frequently using manmade surfaces such as road shoulders and aggregate pits, in May and early June (MNRF 2016; COSEWIC 2008b).	Recent Ontario Nature records exist, and nests were confirmed on site. Overwintering habiat was probable in Silver Lake.	Confirmed

Species at Risk and Species of Conservation Concern Assessment

SAR and SOCC were assigned a category (low, moderate, high or confirmed) based on their potential to occur in the Study Area. The criteria for each category are outlined below:

Confirmed – The species was identified in the Study Area during the 2017 assessment.

High – Suitable habitat is present in the Study Area, there are known nearby recent (1997+) records and no targeted surveys were performed to confirm presence.

Moderate – Suitable habitat is present, the species is listed as present in Waterloo Region by MNRF (2016), there are no known nearby recent records and targeted surveys were not performed to confirm presence.

Low – No suitable habitat or known nearby recent records were identified but the species is listed as present in Waterloo Region by MNRF (2016) or targeted surveys failed to detect species presence.

Family[1]	Scientific Name[1]	Common Name[1]	Species Code[3,4]	Establishment Means[1]	Coefficient of Conservatism[3]	Wetness Index[3]	Wetland Plant Species[3]	Weediness Index[3]	Provincial Status[2,4]	SARO Status[2]	COSEWIC Status[3]	LOCAL STATUS WATERLOO[3]
Equisetaceae	*Equisetum arvense*	field horsetail	EQUARVE	native	0	0	T		S5			X
Onocleaceae	*Matteuccia struthiopteris pensylvanica*	ostrich fern	MATSTRU	native	5	-3	T		S5			X
Onocleaceae	*Onoclea sensibilis*	sensitive fern	ONOSENS	native	4	-3	I		S5			
Cupressaceae	*Thuja occidentalis*	eastern white cedar	THUOCCI	native	4	-3	T		S5			X
Pinaceae	*Pinus sylvestris sylvestris*	Scotch pine	PINSYLV	introduced		5		-3	SE5			I
Adoxaceae	*Sambucus racemosa pubens*	red elderberry	SAMRACE	native	5	2			S5			X
Adoxaceae	*Viburnum opulus opulus*	cranberry viburnum	VIBOPUL	introduced		0		-1	-?	-?		I
Amaranthaceae	*Amaranthus sp.*											
Anacardiaceae	*Rhus typhina*	staghorn sumac	RHUTYPH	native	1	5			S5			X
Anacardiaceae	*Toxicodendron radicans rydbergii*	western poison ivy	RHUBORE	native	5	-1	T		S5			
Apiaceae	*Daucus carota*	wild carrot	DAUCARO	introduced		5		-2	SE5			I
Apiaceae	*Osmorhiza sp.*											
Apocynaceae	*Apocynum cannabinum cannabinum*	-?	APOCACA	native		1			S5			X
Apocynaceae	*Asclepias incarnata incarnata*	swamp milkweed	ASCINCA	native	6	-5	I		S5			X
Apocynaceae	*Asclepias syriaca*	common milkweed	ASCSYRI	native	0	5			S5			X
Asteraceae	*Ambrosia artemisiifolia*	common ragweed	AMBARTE	native	0	3			S5			X
Asteraceae	*Arctium minus*	common burdock	ARCMINU	introduced		5		-2	SE5			I
Asteraceae	*Bidens cernua*	nodding beggarticks	BIDCERN	native	2	-5	I		S5			X
Asteraceae	*Bidens frondosa*	devil's beggarticks	BIDFRON	native	3	-3	I		S5			X
Asteraceae	*Centaurea stoebe micranthos*	spotted knapweed	CENBIEB	introduced		5		-3	SE5			I
Asteraceae	*Cichorium intybus*	wild chicory	CICINTY	introduced		5		-1	SE5			I
Asteraceae	*Cirsium arvense*	Canada thistle	CIRARVE	introduced		3		-1	SE5			I
Asteraceae	*Cirsium palustre*	marsh thistle	CIRPALU	introduced		-?	T		SE1			
Asteraceae	*Cirsium vulgare*	bull thistle	CIRVULG	introduced		4		-1	SE5			I
Asteraceae	*Erigeron annuus*	annual fleabane	ERIANNU	native	0	1			S5			
Asteraceae	*Erigeron philadelphicus philadelphicus*	Philadelphia fleabane	ERIPHIL	native	1	-3	T		S5			X
Asteraceae	*Eupatorium perfoliatum*	common boneset	EUPPERF	native	2	-4	I		S5			X
Asteraceae	*Euthamia graminifolia*	grass-leaved goldenrod	EUTGRAM	native	2	-2			S5			X
Asteraceae	*Eutrochium maculatum maculatum*	spotted Joe Pye weed	EUTMAMA	native	3	-5	I		S5	-?		X
Asteraceae	*Helenium autumnale*	common sneezeweed	HELAUTU	native	7	-4	T		S5			
Asteraceae	*Lapsana communis*	common nipplewort	LAPCOMM	introduced		5		-2	SE5			I
Asteraceae	*Rudbeckia hirta pulcherrima*	black-eyed Susan	RUDHIRT	native	0	3			S5	-?		X
Asteraceae	*Silphium perfoliatum perfoliatum*	cup plant	SILPERF	native	9	-2			S2			
Asteraceae	*Solidago canadensis canadensis*	Canada goldenrod	SOLCANA	native	1	3			S5	-?		X
Asteraceae	*Solidago gigantea*	giant goldenrod	SOLGIGA	native	4	-3	T		S5			X
Asteraceae	*Sonchus sp.*											
Asteraceae	*Symphyotrichum lanceolatum lanceolatum*	white panicled aster	SYMLANC	native	3	-3	I		S5	-?		
Asteraceae	*Symphyotrichum lateriflorum lateriflorum*	calico aster	SYMLATE	native	3	-2	T		S5			X
Asteraceae	*Symphyotrichum novae-angliae*	New England aster	SYMNOVA	native	2	-3			S5			X
Asteraceae	*Symphyotrichum puniceum puniceum*	purple-stemmed aster	SYMPUNI	native	6	-5	I		S5			X
Asteraceae	*Tanacetum vulgare*	common tansy	TANVULG	introduced		5		-1	SE5			I
Asteraceae	*Taraxacum officinale*	common dandelion	TAROFFI	introduced		3		-2	SE5			I
Asteraceae	*Tussilago farfara*	coltsfoot	TUSFARF	introduced		3	T	-2	SE5			I
Balsaminaceae	*Impatiens capensis*	spotted jewelweed	IMPCAPE	native	4	-3	I		S5			X
Berberidaceae	*Podophyllum peltatum*	May-apple	PODPELT	native	5	3			S5			
Betulaceae	*Ostrya virginiana*	ironwood	OSTVIRG	native	4	4			S5			X
Boraginaceae	*Echium vulgare*	common viper's bugloss	ECHVULG	introduced		5		-2	SE5			I
Boraginaceae	*Myosotis sp.*											
Brassicaceae	*Alliaria petiolata*	garlic mustard	ALLPETI	introduced		0		-3	SE5			I
Brassicaceae	*Capsella bursa-pastoris*	common shepherd's purse	CAPBURS	introduced		1		-1	SE5			I
Brassicaceae	*Hesperis matronalis*	dame's rocket	HESMATR	introduced		5		-3	SE5			I
Brassicaceae	*Thlaspi arvense*	field pennycress	THLARVE	introduced		5		-1	SE5			I
Campanulaceae	*Campanula rapunculoides*	creeping bellflower	CAMRAPU	introduced		5		-2	SE5			
Caprifoliaceae	*Dipsacus fullonum*	common teasel	DIPFULL	introduced		5		-1	SE5			I
Caprifoliaceae	*Lonicera tatarica*	Tartarian honeysuckle	LONTATA	introduced		3		-3	SE5			I
Caryophyllaceae	*Saponaria officinalis*	bouncing-bet	SAPOFFI	introduced		3		-3	SE5			I
Caryophyllaceae	*Silene vulgaris*	bladder campion	SILLATI	introduced		-?			SE5			
Celastraceae	*Euonymus obovatus*	running strawberry bush	-?	native	-?	-?	-?	-?	S5		?	-?
Celastraceae	*Euonymus sp.*											
Convolvulaceae	*Convolvulus arvensis*	field bindweed	CONARVE	introduced		5		-1	SE5			I
Cornaceae	*Cornus racemosa*	grey dogwood	CORNFOR	native	-?	-?	-?	-?	S5		?	-?
Cornaceae	*Cornus stolonifera*	red-osier dogwood	CORSERI	native	2	-3	I*		S5			X
Cucurbitaceae	*Echinocystis lobata*	wild cucumber	ECHLOBA	native	3	-2	T		S5			X
Elaeagnaceae	*Elaeagnus angustifolia*	Russian olive	ELAANGU	introduced		4		-1	SE3			
Fabaceae	*Lotus corniculatus*	garden bird's-foot trefoil	LOTCORN	introduced		1		-2	SE5			I
Fabaceae	*Melilotus albus*	white sweet-clover	MELALBA	introduced		3		-3	SE5			I
Fabaceae	*Securigera varia*	purple crown-vetch	COROVAR	introduced	-?	-?	-?	-?	SE5		?	-?
Fabaceae	*Trifolium hybridum*	alsike clover	TRIHYBR	introduced		1		-1	SE5			I
Fagaceae	*Fagus grandifolia*	American beech	FAGGRAN	native	6	3			S4			X
Fagaceae	*Quercus macrocarpa*	bur oak	QUEMACR	native	5	1	T		S5			
Geraniaceae	*Geranium robertianum*	herb-Robert	GERROBE	native		5		-2	S5			I
Grossulariaceae	*Ribes americanum*	wild black currant	RIBAMER	native	4	-3	T		S5			X
Grossulariaceae	*Ribes hirtellum*	swamp gooseberry	RIBHIRT	native	6	-3	I		S5			X
Grossulariaceae	*Ribes sp.*											
Hypericaceae	*Hypericum perforatum perforatum*	common St. John's-wort	HYPPERF	introduced		5		-3	SE5			I
Juglandaceae	*Juglans nigra*	black walnut	JUGNIGR	native	5	3			S4			X
Lamiaceae	*Glechoma hederacea*	ground-ivy	GALSPEC	introduced		5		-2	SE5			I
Lamiaceae	*Leonurus cardiaca cardiaca*	common motherwort	LEOCARD	introduced		5		-2	SE5			I
Lamiaceae	*Lycopus uniflorus*	northern water-horehound	LYCUNIF	native	5	-5	I		S5			X
Lamiaceae	*Mentha canadensis*	Canada mint	MENCANI	native	3	-3	I		S5	-?		X
Lamiaceae	*Monarda fistulosa fistulosa*	wild bergamot	MONFIST	native	6	3			SU	-?		X
Lamiaceae	*Nepeta cataria*	catnip	NEPCATA	introduced		1		-2	SE5			I
Lamiaceae	*Prunella vulgaris vulgaris*	common self-heal	PRUVUVU	introduced		0		-1	-?	-?		I
Lamiaceae	*Teucrium canadense canadense*	Canada germander	TEUCACA	native	6	-2	T		SU	-?		
Lythraceae	*Lythrum salicaria*	purple loosestrife	LYTSALI	introduced		-5	I	-3	SE5			X
Malvaceae	*Abutilon theophrasti*	velvetleaf	ABUTHEO	introduced		4		-1	SE5			
Malvaceae	*Tilia americana*	basswood	TILAMER	native	4	3			S5			X
Nymphaeaceae	*Nuphar advena advena*	large yellow pond-lily	NUPADVE	native	7	-5	I		S3			
Nymphaeaceae	*Nymphaea odorata odorata*	fragrant water-lily	NYMODOR	native		-?	I		SU	-?		
Oleaceae	*Fraxinus americana*	white ash	FRAAMER	native	4	3			S4			X
Oleaceae	*Fraxinus pennsylvanica*	red ash	FRAPENN	native	3	-3	T		S4			X
Oleaceae	*Ligustrum vulgare*	European privet	LIGVULG	introduced		1		-2	SE5			
Onagraceae	*Circaea canadensis canadensis*	Canada enchanter's nightshade	CIRCANA	native	3	3			S5			X
Onagraceae	*Epilobium sp.*											
Onagraceae	*Oenothera biennis*	common evening primrose	OENBIEN	native	0	3			S5			X
Oxalidaceae	*Oxalis stricta*	European wood-sorrel	OXASTRI	introduced	0	3			S5			
Papaveraceae	*Chelidonium majus*	greater celandine	CHEMAJU	introduced		5		-3	SE5			I
Papaveraceae	*Sanguinaria canadensis*	bloodroot	SANCANA	native	5	4			S5			X
Phrymaceae	*Mimulus ringens ringens*	square-stemmed monkeyflower	MIMRING	native	6	-5	I		S5			X
Polygonaceae	*Persicaria maculosa*	spotted lady's-thumb	PERMACU	introduced		-3	T	-1	SE5			I
Polygonaceae	*Persicaria pensylvanica*	Pennsylvania smartweed	PERPENS	native	3	-4	I		S5			
Polygonaceae	*Rumex crispus*	curled dock	RUMECRI	introduced	-?	-?	-?	-?	SE5		?	-?
Primulaceae	*Lysimachia ciliata*	fringed yellow loosestrife	LYSCILI	native	4	-3	T		S5			X
Ranunculaceae	*Anemone canadensis*	Canada anemone	ANECANA	native	3	-3	T		S5			X
Ranunculaceae	*Ranunculus acris*	common buttercup	RANACRI	introduced		-?	T	-2	SE5			I
Ranunculaceae	*Ranunculus hispidus caricetorum*	northern swamp buttercup	RANHICA	native	5	-5	I		S5	-?		X
Ranunculaceae	*Ranunculus hispidus hispidus*	bristly buttercup	RANPENS	native	3	-5	I		S3	-?		X
Ranunculaceae	*Thalictrum dioicum*	early meadow-rue	THADIOI	native	5	2			S5			X
Ranunculaceae	*Thalictrum pubescens*	tall meadow-rue	THAPUBE	native	5	-2	T		S5			X
Rhamnaceae	*Frangula alnus*	glossy buckthorn	RHAFRAN	introduced		-1	T	-3	SE5			
Rhamnaceae	*Rhamnus cathartica*	European buckthorn	RHACATH	introduced		3	T	-3	SE5			I
Rosaceae	*Geum aleppicum*	yellow avens	GEUALEP	native	2	-1	T		S5			X
Rosaceae	*Malus pumila*	common apple	MALPUMI	introduced		5		-1	SE4			I
Rosaceae	*Physocarpus opulifolius*	eastern ninebark	PHYOPUL	native	5	-2	T		S5	-?		
Rosaceae	*Potentilla recta*	sulphur cinquefoil	POTRECT	introduced		5		-2	SE5			I

Rosaceae	*Prunus cerasifera*	cherry plum	PRUCERF	introduced		5		-1	SE1			
Rosaceae	*Prunus virginiana virginiana*	chokecherry	PRUVIRG	native	2	1			S5			X
Rosaceae	*Rubus idaeus strigosus*	American red raspberry	RUBUIDI	native	-?	-?	-?	-?	SNA	-?	-?	-?
Rosaceae	*Rubus odoratus*	purple-flowering raspberry	RUBODOR	native	3	5			S5			X
Rubiaceae	*Galium mollugo*	smooth bedstraw	GALMOLL	introduced		5		-2	SE5			I
Rubiaceae	*Galium palustre*	common marsh bedstraw	GALPALU	native	5	-5	I		S5			X
Rubiaceae	*Galium sp.*											
Salicaceae	*Populus balsamifera*	balsam poplar	POPBALS	native	4	-3	T		S5			X
Salicaceae	*Populus grandidentata*	large-toothed aspen	POPGRAN	native	5	3			S5			X
Salicaceae	*Populus tremuloides*	trembling aspen	POPTREM	native		0	T		S5			X
Salicaceae	*Salix ×fragilis*	hybrid white willow	-?	introduced	-?	-?	-?	-?	-?	-?	-?	-?
Salicaceae	*Salix alba*	white willow	SALALBA	introduced		-?	T	-2	SE4			X
Salicaceae	*Salix amygdaloides*	peach-leaved willow	SALAMYG	native	6	-3	T		S5			X
Salicaceae	*Salix babylonica*	weeping willow	-?	-?	-?	-?	-?	-?	-?	-?	-?	-?
Salicaceae	*Salix eriocephala*	cottony willow	SALIERI	native	-?	-?	-?	-?	S5		-?	-?
Salicaceae	*Salix interior*	sandbar willow	SALINTE	native	3	-5	T		S5			X
Salicaceae	*Salix nigra*	black willow	SALNIGR	native	6	-5	T		S4?			
Sapindaceae	*Acer ×freemanii*	Freeman maple	-?	native	-?	-?	-?	-?	SNA	-?	-?	-?
Sapindaceae	*Acer negundo*	Manitoba maple	ACENEGU	native	0	-2	T		S5			X
Sapindaceae	*Acer nigrum*	black maple	ACENIGR	native	7	3			S4?			
Sapindaceae	*Acer platanoides*	Norway maple	ACEPLAT	introduced		5		-3	SE5			I
Sapindaceae	*Acer rubrum*	red maple	ACERUBR	native	4	0	T		S5			X
Sapindaceae	*Acer saccharum*	sugar maple	ACESACC	native	4	3			S5			X
Scrophulariaceae	*Verbascum thapsus thapsus*	-?	VERTHAP	introduced		5		-2	SE5			I
Solanaceae	*Solanum dulcamara*	bittersweet nightshade	SOLDULC	introduced		0	T	-2	SE5			I
Ulmaceae	*Ulmus americana*	white elm	ULMAMER	native	3	-2	T		S5			X
Ulmaceae	*Ulmus pumila*	Siberian elm	ULMPUMI	introduced		5		-1	SE3			I
Urticaceae	*Urtica dioica dioica*	European stinging nettle	URTDIDI	introduced		-1		-1	-?	-?		
Urticaceae	*Urtica dioica gracilis*	slender stinging nettle	URTDIGR	native	2	-1	T		S5	-?		X
Verbenaceae	*Verbena hastata*	blue vervain	VERHAST	native	4	-4	I		S5			X
Verbenaceae	*Verbena urticifolia*	white vervain	VERURTI	native	4	-1	T		S5			X
Violaceae	*Viola sp.*											
Vitaceae	*Parthenocissus quinquefolia*	Virginia creeper	PARQUIN	native	6	1			S4?			
Vitaceae	*Vitis riparia*	riverbank grape	VITRIPA	native	0	-2			S5			X
Amaryllidaceae	*Allium oleraceum*	field garlic	ALLVINE	introduced		3		-1	SE1			
Araceae	*Arisaema triphyllum pusillum*	small Jack-in-the-pulpit	ARITRIP	native	5	-2	T		S5			X
Asparagaceae	*Convallaria majalis majalis*	European lily-of-the-valley	CONMAJA	introduced		5		-2	SE5			I
Asparagaceae	*Maianthemum stellatum*	star-flowered false Solomon's seal	MAISTEL	native	6	1			S5			X
Cyperaceae	*Carex arctata*	drooping woodland sedge	CAREART	native	-?	-?	-?	-?	S5		-?	-?
Cyperaceae	*Carex lacustris*	lake sedge	CARELAC	native	-?	-?	-?	-?	S5		-?	-?
Cyperaceae	*Carex retrorsa*	retrorse sedge	CARRETR	native	5	-5	I		S5			X
Cyperaceae	*Carex vulpinoidea*	fox sedge	CARVULP	native	3	-5	I		S5			X
Cyperaceae	*Schoenoplectus tabernaemontani*	soft-stemmed bulrush	SCHTABE	native	5	-5	I		S5			X
Liliaceae	*Erythronium americanum americanum*	yellow trout lily	ERYAMER	native	5	5			S5			X
Melanthiaceae	*Trillium grandiflorum*	white trillium	TRIGRAN	native	5	5			S5			X
Orchidaceae	*Epipactis helleborine*	broad-leaved helleborine	EPIHELL	introduced		5		-2	SE5			I
Poaceae	*Dactylis glomerata*	orchard grass	DACGLOM	introduced		3		-1	SE5			I
Poaceae	*Echinochloa crus-galli*	large barnyard grass	ECHCRUS	introduced		-3	T	-1	SE5			I
Poaceae	*Phalaris arundinacea arundinacea*	reed canarygrass	PHAARUN	native	0	-4	T		S5			X
Poaceae	*Phragmites australis australis*	European reed	PHRAUAU	introduced	0	0	T	0	-?	-?		
Poaceae	*Poa pratensis pratensis*	Kentucky bluegrass	POAPRPR	introduced	0	1			-?	-?		X
Typhaceae	*Typha angustifolia*	narrow-leaved cattail	TYPANGU	introduced	3	-5	I		SE5			X
Typhaceae	Monocots	Typha	latifolia	native	TYPLATI	native	3	-5	S5		S5	
Xanthorrhoeaceae	*Hemerocallis fulva*	orange daylily	HEMFULV	introduced		5		-3	SE5			I

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)	Region of Waterloo Regionally Significant
ODONATA						
Ebony Jewelwing	*Calopteryx maculata*	S5				
BUTTERFLIES						
Cabbage White	*Pieris rapae*	SNA				
Monarch	*Danaus plexippus*	S4B, S2N	SC	SC		
AMPHIBIANS						
American Toad	*Anaxyrus americanus*	S5				
Northern Green Frog	*Lithobates clamitans*	S5				
Northern Leopard Frog	*Lithobates pipiens*	S5	NAR	NAR		
REPTILES						
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC		
Slider	*Trachemys scripta*	SNA				
BIRDS						
Canada Goose	*Branta canadensis*	S5				
Mallard	*Anas platyrhynchos*	S5				
Rock Pigeon	*Columba livia*	SNA				
Mourning Dove	*Zenaida macroura*	S5				
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR		
Killdeer	*Charadrius vociferus*	S5B, S5N				
Spotted Sandpiper	*Actitis macularia*	S5				
Ring-billed Gull	*Larus delawarensis*	S5B,S4N				
Caspian Tern	*Hydroprogne caspia*	S3B	NAR	NAR		
Great Blue Heron	*Ardea herodias*	S5				X
Black-crowned Night-Heron	*Nycticorax nycticorax*	S3B,S3N				X
Osprey	*Pandion haliaetus*	S5B				X
Downy Woodpecker	*Picoides pubescens*	S5				
Hairy Woodpecker	*Picoides villosus*	S5			10	X
Northern Flicker	*Colaptes auratus*	S4B				
Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC-NS		
Eastern Phoebe	*Sayornis phoebe*	S5B				
Warbling Vireo	*Vireo gilvus*	S5B				X
Red-eyed Vireo	*Vireo olivaceus*	S5B				
Blue Jay	*Cyanocitta cristata*	S5				
American Crow	*Corvus brachyrhynchos*	S5B				
Barn Swallow	*Hirundo rustica*	S4B	THR	THR-NS		
Black-capped Chickadee	*Poecile atricapillus*	S5				
White-breasted Nuthatch	*Sitta carolinensis*	S5			10	
House Wren	*Troglodytes aedon*	S5B				
American Robin	*Turdus migratorius*	S5B				
Gray Catbird	*Dumetella carolinensis*	S4B				
European Starling	*Sturnus vulgaris*	SNA				
Cedar Waxwing	*Bombycilla cedrorum*	S5B				
House Sparrow	*Passer domesticus*	SNA				
House Finch	*Haemorhous mexicanus*	SNA				

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	COSSARO	COSEWIC	AREA SENSITIVITY (ha)	Region of Waterloo Regionally Significant
American Goldfinch	*Spinus tristis*	S5B				
American Redstart	*Setophaga ruticilla*	S5B			20-30	X
Yellow Warbler	*Setophaga petechia*	S5B				
Song Sparrow	*Melospiza melodia*	S5B				
Northern Cardinal	*Cardinalis cardinalis*	S5				
Red-winged Blackbird	*Agelaius phoeniceus*	S4				
Common Grackle	*Quiscalus quiscula*	S5B				
Brown-headed Cowbird	*Molothrus ater*	S4B				
Baltimore Oriole	*Icterus galbula*	S4B				
MAMMALS						
Eastern Cottontail	*Sylvilagus floridanus*	S5				
Eastern Chipmunk	*Tamias striatus*	S5				
Woodchuck	*Marmota monax*	S5				
Grey Squirrel	*Sciurus carolinensis*	S5				
Red Squirrel	*Tamiasciurus hudsonicus*	S5				
Beaver	*Castor canadensis*	S5				
White-tailed Deer	*Odocoileus virginianus*	S5				

SUMMARY

Total Odonata: 1

Total Butterflies: 2

Total Amphibians: 3

Total Reptiles: 2

Total Birds: 40

Total Breeding Birds: 33

Total Mammals: 7

SIGNIFICANT SPECIES

National: 4

Provincial: 4

Regional: 6

LATEST STATUS UPDATE

Odonata: Nov 2016

Amphibans: Nov 2016

Reptiles: Nov 2016

Birds: February 2017

Mammals: June 2016

S and G ranks and explanations: December 2011

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

REGION: Rare in a Site Region

S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)

S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S5: Secure—Common, widespread, and abundant in the province

SX: Presumed extirpated

SH: Possibly Extirpated (Historical)

SNR: Unranked

SU: Unrankable—Currently unrankable due to lack of information
conservation status rank is not

S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species

S#B- Breeding status rank

S#N- Non Breeding status rank

?: Indicates uncertainty in the assigned rank

T: Denotes that the rank applies to a subspecies or variety

Q: Denotes that the taxonomic status of the species, subspecies, or variety is **questionable**.

END: Endangered

THR: Threatened

SC: Special Concern

2, 3 or NS after a COSEWIC ranking indicates the species is either on Schedule 2, Schedule 3 or No Schedule of the Species At Risk Act (SARA)

NAR: Not At Risk

Area: Minimum patch size for area-sensitive species (ha)