Appendix Q

Species At Risk Information

1. Species At Risk Screening Report: New East-West Road Corridor, Waterdown Road Corridor Class Environmental Assessment, Dillon Consulting Limited, May 2012
2. Phase 1 Species at Risk, Sampling Results Brief, New East-West Road Corridor and Waterdown Road Corridor, GENIVAR Inc., May 2011
3. New East-West Road Corridor and Waterdown Road Corridor, Class Environmental Assessment, Phase 2/3 SAR Survey, GENIVAR Inc., May 2012
4. Owl Species at Risk, Winter 2012 Survey Results, GENIVAR Inc., May 2012
5. Jefferson Salamander Sampling, GENIVAR Inc., April 2012

Species at Risk Screening Report

New East-West Road Corridor
Waterdown Road Corridor
Class Environmental Assessment

City of Hamilton
City of Burlington
Halton Region

Project No.: 08-9020

May 2012

Introduction

At a meeting with the Ministry of Natural Resources (Guelph District) on July 27th, 2010 regarding the Class Environmental Assessments for the New East-West Road and Waterdown Road corridor, a request was made to complete additional screening for the list of Species at Risk (SAR) that could potentially be found within the Hamilton area. Subsequent to that meeting, Karolyne Pickett (MNR Species at Risk Biologist) provided the list of species shown in ***Table 1***. A comprehensive screening was completed for the East-West Alignment and the Waterdown Road corridor according to the methodology discussed with the MNR. This report is a summary of the methodology used, and results of the comprehensive screening.

Methodology

I. Habitat Inventory

A comprehensive botanical inventory of the entire corridor that may be subject to direct and indirect impacts from the proposed activity was undertaken as part of Phase 3 of the Class EA that is being completed. The vegetation communities were classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. With respect to aquatic habitats in the study area, data was collected on the physical characteristics of the watercourses, as well as an inventory of the riparian zone vegetation, in order to classify these habitats.

The habitat inventory was completed during the summer and fall of 2007 and the summer and fall of 2008.

II. Potential SAR on the property

A list of species at risk that have the potential to occur in the area was produced by cross-referencing the Vegetation Types described during the botanical inventory with the habitat descriptions of Species at Risk known to occur in the Hamilton area.

The Ministry of Natural Resources provided the list of Species at Risk known to occur in the Hamilton area in an email of July 28th, 2010 (see ***Table 1***). The list of potential Species at Risk on the site includes 36 species, of which 9 are plants and 27 are animals. Of the 27 animals, 14 are birds, 8 are reptiles, 2 are mammals, and there is 1 each of fish, amphibians and insects.

The process of determining the potential for these species to exist on the property was based on the following methodology:

- Determine the type of habitat each of the above species requires.

- Determine if life cycle migrations are required for the species to survive.
- Determine if suitable habitat for each species is present.
- Determine if the road intersects areas required for life cycle migration.
- Determine if full field studies have been completed for that species (e.g. plants, birds). If so, cross reference the list to see if species were found during those surveys.
- If the road intersects areas of life cycle migration or interferes with suitable habitat, determine what surveys would be required to see if the species was present.

In the case of species where Recovery Plans have been created and regulated habitat exists, the habitat was defined according to the Recovery Plans. Otherwise, general literature on the habitat was used to define the habitat.

Table 1 –List of Species-at-Risk Known in the Hamilton Area

Endangered Species
Acadian Flycatcher (Historical – no recent records)
American Badger *
American Chestnut
American Columbo
American Ginseng
Barn Owl *
Butternut
Few-flowered Club-rush **
Hoary Mountain-mint **
Prothonotary Warbler **
Red Mulberry **
Redside Dace
Threatened Species
Blanding's Turtle
Chimney Swift**
Jefferson Salamander *
Least Bittern
Peregrine Falcon *
Spiny Softshell
Stinkpot
Whip-poor-will**
White Wood Aster
Special Concern Species
Black Tern
Cerulean Warbler
Common Nighthawk
Eastern Ribbonsnake
Green Dragon
Hooded Warbler
Louisiana Waterthrush
Milksnake
Monarch
Northern Map Turtle
Red-headed Woodpecker
Short-eared Owl
Snapping Turtle
Woodland Vole (Historical – no recent records)
Extirpated Species [1]
Timber Rattlesnake

* Species' habitat is protected by regulation
** Species' habitat is protected as of listing

The detailed results of the screening are provided in the species summary sheets as well as the potential habitat location map for each species. These are provided in ***Appendix A*** of this report.

Conclusion

SAR screenings were conducted in 2010 by Dillon Consulting Limited. Further correspondence between the Ministry of Natural Resources and the City of Hamilton resulted in additional surveys being conducted for SAR in 2011. The results of the screening and additional surveys are included in this report. The results for each SAR species along with maps showing potential habitat for the species in the study area are shown on ***Appendix A***.

APPENDIX A

Species Screening Sheet and Maps

Species Summary Sheet - Acadian Flycatcher

Empidonax virescens

Status: Endangered

Habitat

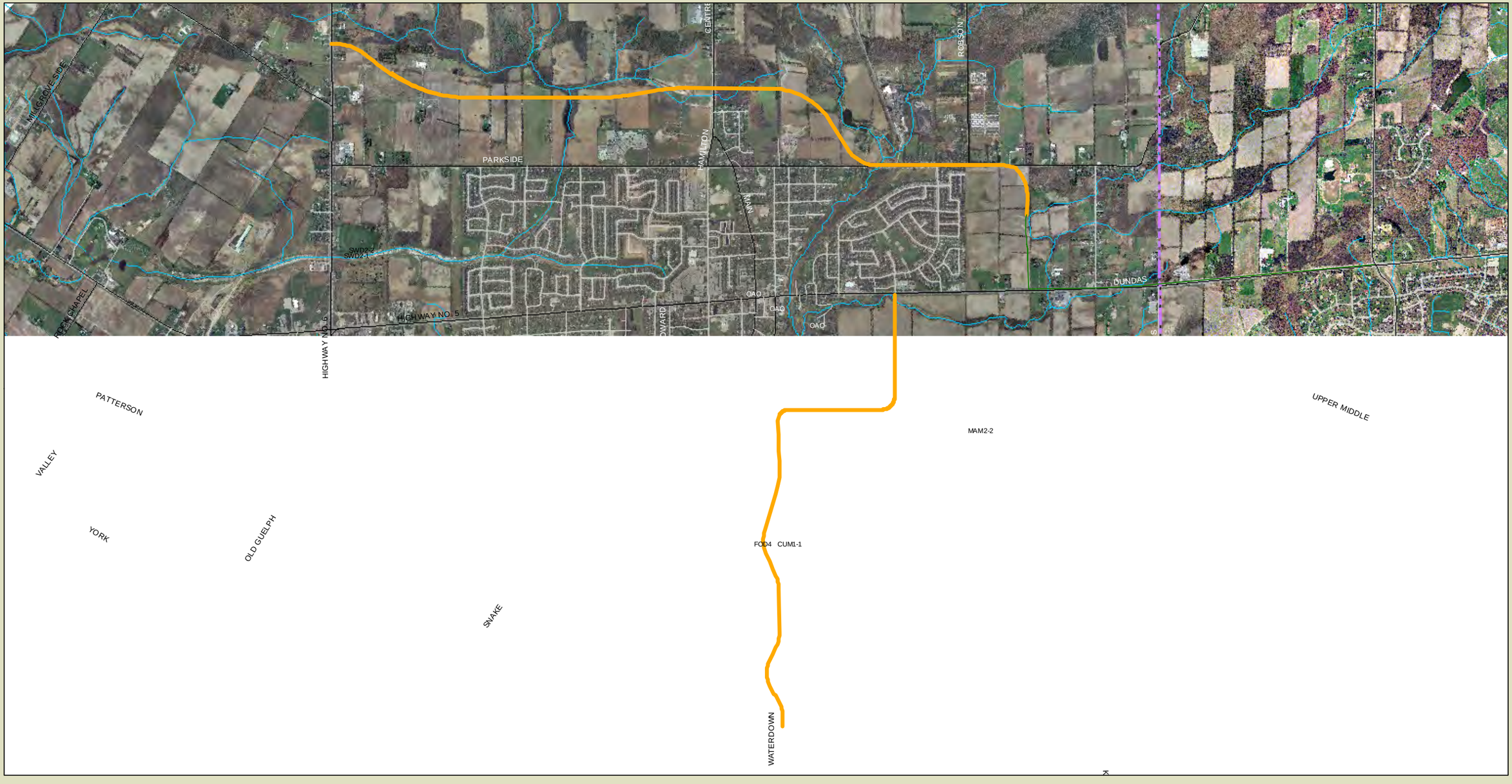
This small insect eating bird is found within the Carolinian Forest Zone. Acadian Flycatchers prefers large, mature deciduous forests for nesting. Areas near a stream such as shaded ravines, riparian woodlands, and wooded swamps are also preferred. This species requires a high dense canopy and an open understory and tends to be scarce or absent in small forest tracts, unless the tract is near a larger forested area. Acadian Flycatcher requires relatively undisturbed mature forest and floodplain forests that must be more than 400-500 feet wide before they become suitable. Minimum forest area needed to sustain a viable breeding population is 80-125 acres.

Possible Presence in the Road Corridor

All mature deciduous forests throughout the study area are not large enough to sustain a population. Additionally, Breeding Bird surveys found no Acadian Flycatchers in the area.

Follow Up

Detailed surveys were completed by Dillon and the species was not found in the study area. Additional surveys were completed in 2011 and Acadian Flycatchers were not observed (Phase 2/3 SAR Survey – Genivar, 2011).



Species at Risk: Acadian Flycatcher

- Preferred Route
- Watercourses
- Acadian Flycatcher Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
Map Checked By: IR
Date Created: September 1, 2010
Date Modified: August 4, 2009
File Path: I:\GIS\089020 - Waterdown\Natural Environment Figures April 2009\Mapping\Species at Risk Figures
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

OVE SIDE

ROCK CHAPEL

PATTERSON

LLEY

YORK

OLD GUELPH

SMAKE

SWD2-2
SWD2-1

HIGHWAY NO. 5

HIGHWAY NO. 6

MAM2-2

UPPER MIDDLE

TERDOWN

Species At Risk: American Columbo

- Preferred Route
- Watercourses
- American Columbo Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
Map Checked By: IR
Date Created: September 1, 2010
Date Modified: August 4, 2009
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Natural Environment Figures April 2009\
Mapping\Species at Risk Figures
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Species Summary Sheet - American Ginseng

Panax quinquefolius

Status: Endangered

Habitat

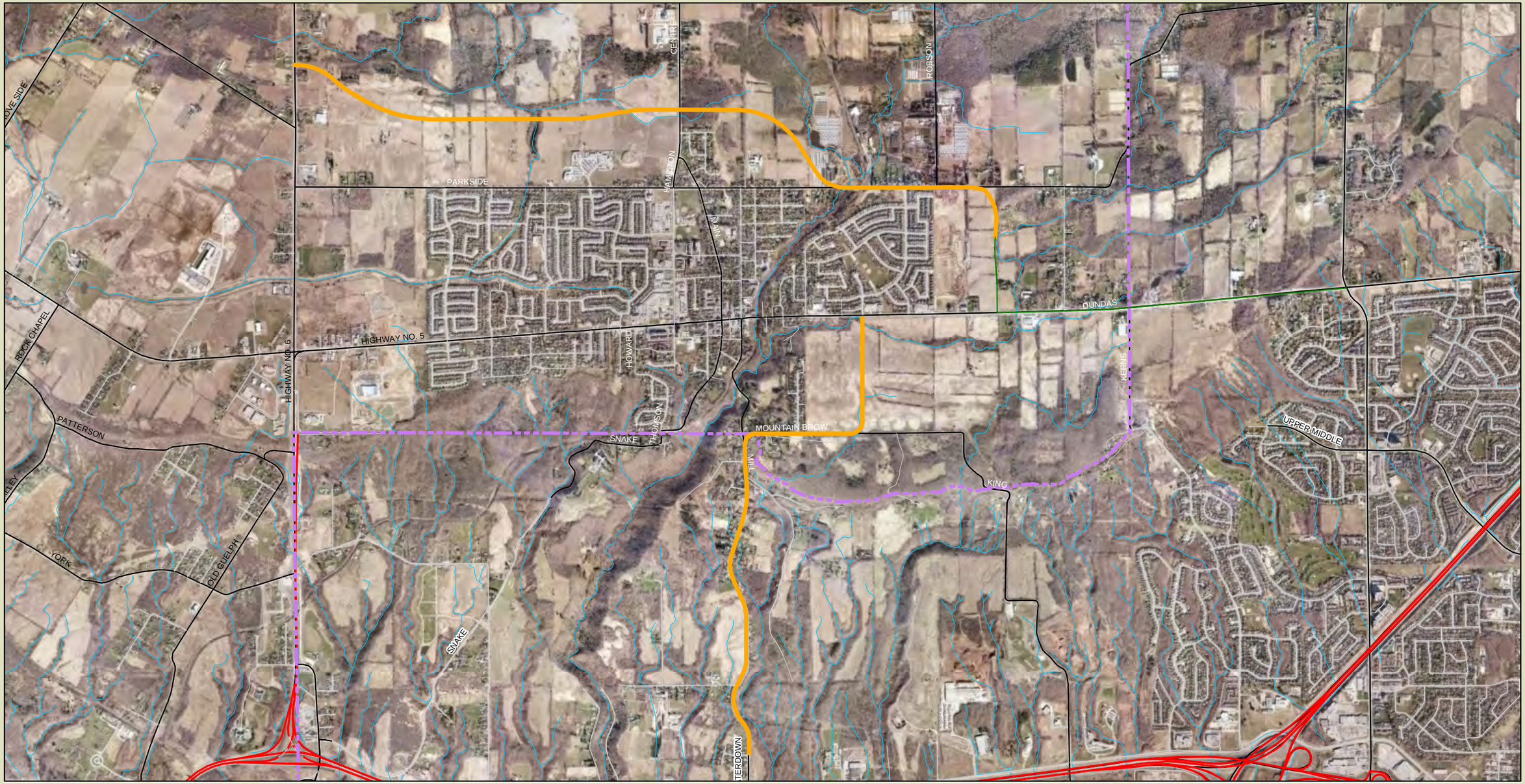
This long-lived, slow growing perennial herb inhabits deciduous forests on moist, rich soils especially on rocky, shaded cool slopes. Populations can also be found on south-west facing slopes; in soil where sand or clay is characteristic. This species is predominantly found in forests with conifers and softwood.

Possible Presence in the Road Corridor

There are rocky cool slopes in the Sassafrass Woods area adjacent to the Waterdown Road Alignment. The vegetation in this area has been surveyed in great detail in the area of disturbance and American Ginseng was not found.

Follow Up

Surveys were completed in 2011 and American Ginseng was not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: American Ginseng

Preferred Route

Watercourses

*American Ginseng is a sensitive species and the potential locations are intentionally withheld

1:28,000

0 0.25 0.5 1 km

DILLON CONSULTING

Map Notes

Map Created By: SR
Map Checked By: IR
Date Created: September 1, 2010
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File Path: I:\GIS\089020 - Waterdown\Natural Environment Figures April 2009\Mapping\Species at Risk Figures
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Species Summary Sheet - Barn Owl

Panax quinquefolius

Status: Endangered

Habitat

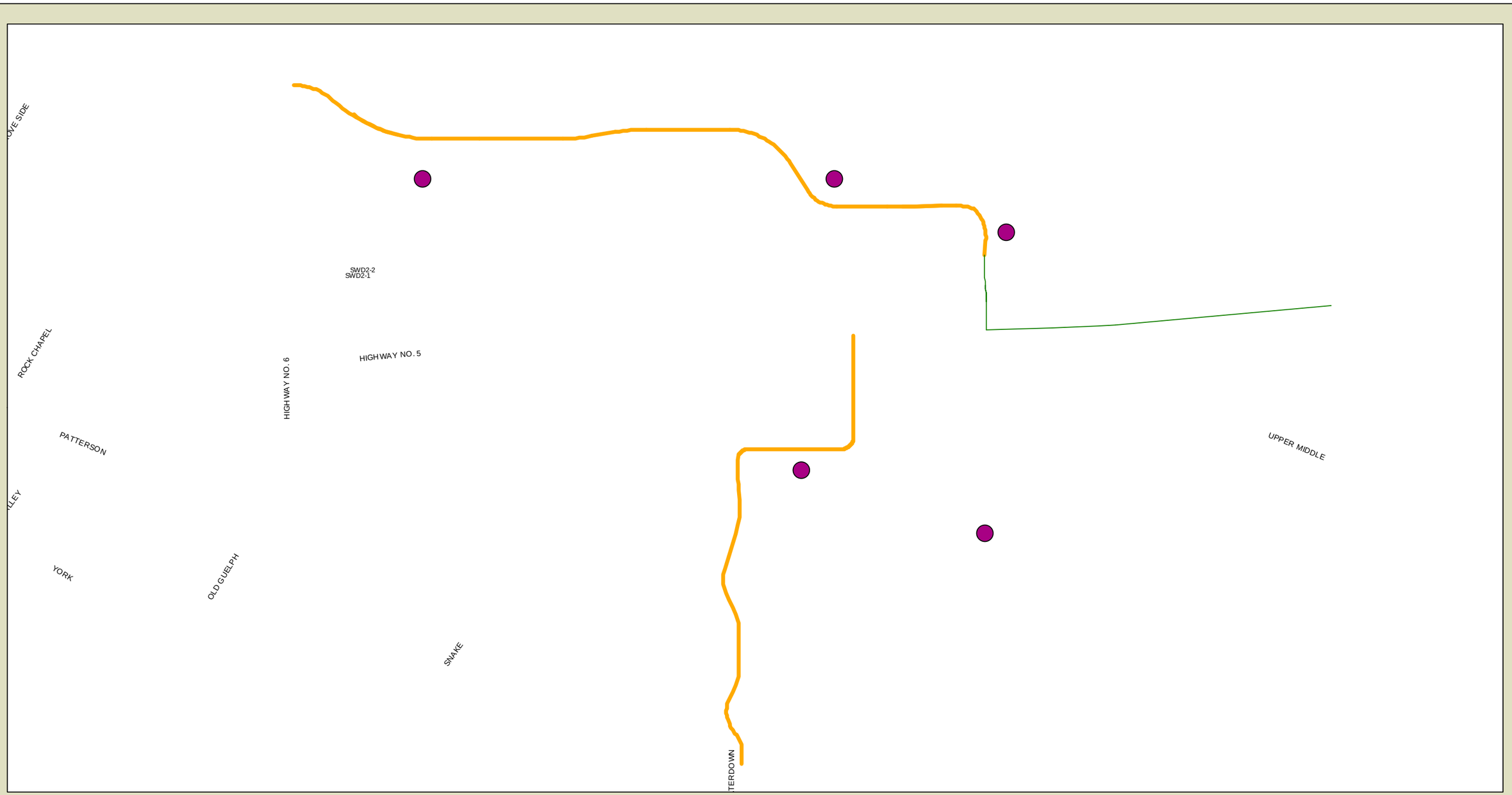
This widely distributed species is predominantly found in open country, favoring native grasslands, pastures, hayfields, shallow marshes, wetland edges and other open grassy habitats that support adequate populations of mice and voles. Nesting sites are commonly situated in naturally formed cavities in large hollow trees and in the faces of cliffs or riverbanks. Recorded nesting sites include: farm buildings, water towers, old flour mills, bridges, tree hollow, barn lofts and silos. This species can also be seen occupying residential and even industrial areas.

Possible Presence in the Road Corridor

The study area consists of a number of preferred habitats for the Barn Owl including open country and grasslands. No old barns/structures were identified which limits the possibility of potential breeding sites. Barn Owls were not found during the bird surveys or incidentally during other field work.

Follow Up

Surveys were completed in 2011 and Barn Owls were not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: Barn Owl

- Preferred Route
- Watercourses
- Barn Owl Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
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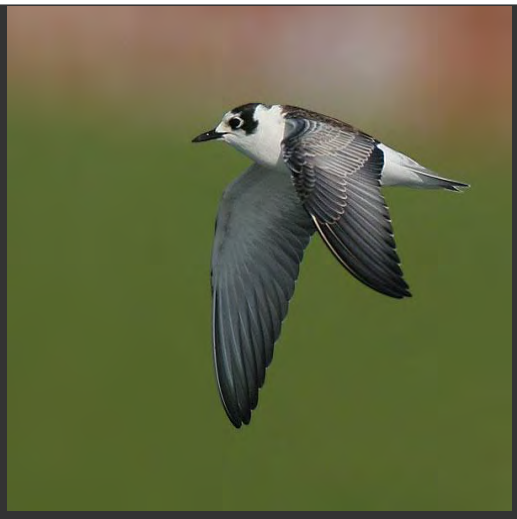


Species Summary Sheet - Black Tern

Chlidonias niger

Status: Special Concern

Habitat

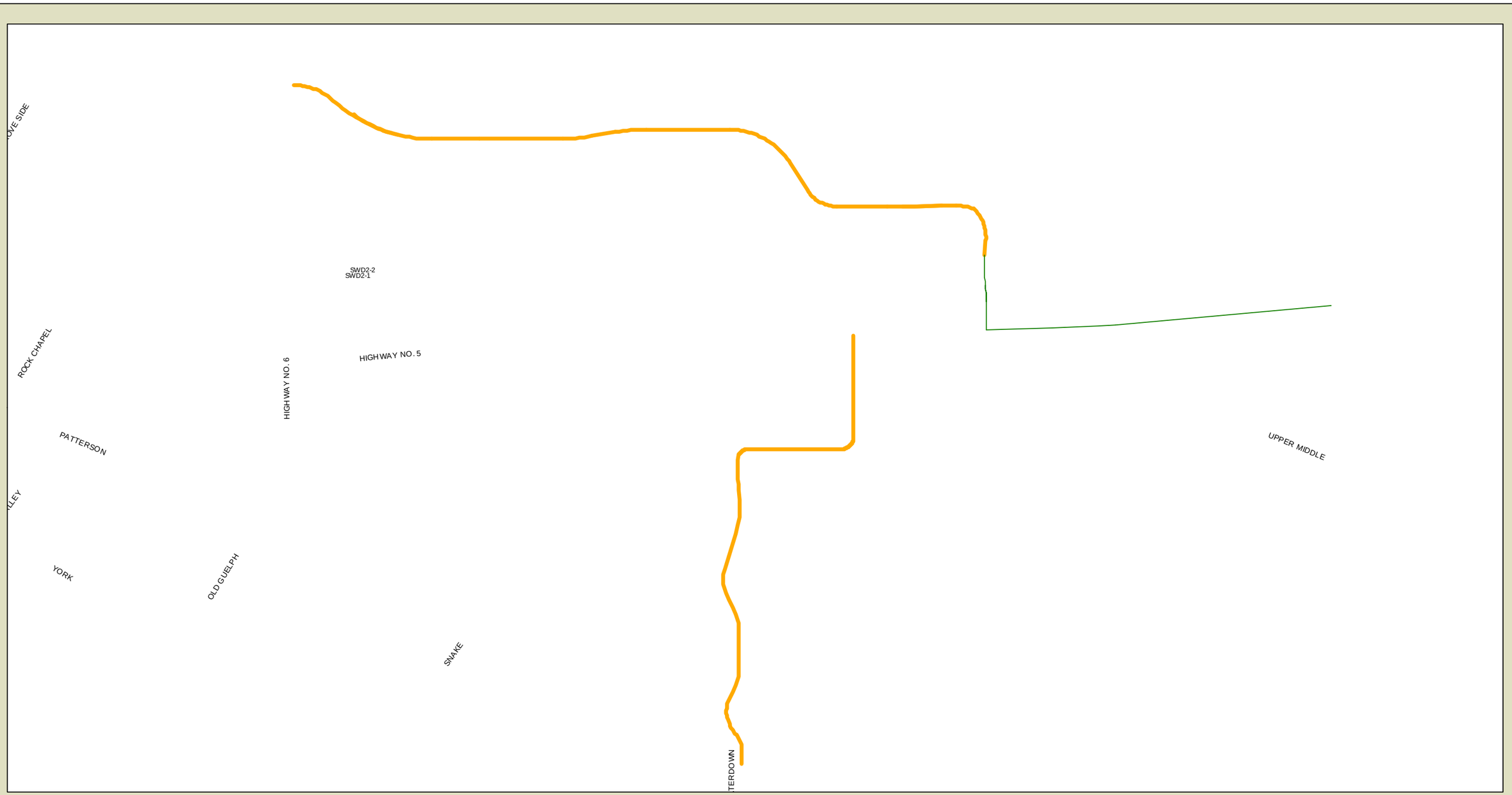
The small bird is found predominantly in reedy ponds, cattail or other emergent vegetation in marshes, sloughs or lake edges. Nests are on constructed on floating mats of vegetation or on marshy hummocks

Possible Presence in the Road Corridor

There is very limited marsh habitat within the study area and this is focused in the Borer's Creek area of the East-West alignment. Detailed Breeding Bird surveys have been completed in this area and Black Terns were not found.

Follow Up

Detailed surveys were completed by Dillon and the species was not found in the study area. Additional surveys were completed in 2011 and Black Terns were not observed (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: Black Tern

- Preferred Route
- Watercourses
- Black Tern Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
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Species Summary Sheet - Blanding's Turtle

Emydoidea blandingii

Status: Threatened

Habitat

This semi-aquatic turtle inhabits a network of lakes, streams and wetlands, preferring shallow wetland areas with abundant vegetation. Suitable habitat includes calm, wet areas dotted with duckweed and bogs of lakes, where they can be seen basking on moss and grass hummocks.

Presence in the Road Corridor

Preferred habitat can be found throughout the study area. A number of swamps and marshes have been identified as having shallow water with an abundance of vegetation. These communities also contain dry areas for basking in the form of surrounding hummocks or are woodland areas. Communities that area possible Blanding's Turtle habitat include: White Birch Poplar Mineral Deciduous Swamp, Yellow Birch Organic Deciduous Swamps, Red Ash Mineral Deciduous Swamps, Ash Organic Deciduous Swamps, and Cattail Mineral Shallow Marshes.

Follow Up

Additional herptofauna surveys are recommended. Based on surveys completed in 2011, Blanding's Turtles were not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).

MILLGROVE SIDE

SWD2-2
SWD2-1

ROCK CHAPEL

HIGHWAY NO. 5

HIGHWAY NO. 6

PATTERSON

UPPER MIDDLE

VALLEY

YORK

OLD GUELPH

SNAKE

WATERDOWN

Species At Risk: Blanding's Turtle

- Preferred Route
- Watercourses
- Blanding's Turtle Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
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Species Summary Sheet - Least Bittern

Lzobrychus exilis

Status: Threatened

Habitat

This small wading bird, the smallest heron found in Canada, prefers freshwater marshes, reedy ponds, swamps, bogs and nests on ground in emergent aquatic vegetation or in low shrubs. (They can be found in relatively stable water levels and intersperse areas of open water). Water clarity is important for hunting prey. Nests are underlain by platforms on stiff vegetation they need dense robust stands of taller emergent species and are usually found within 10m of open water.

Possible Presence in the Road Corridor

Preferred habitat of the Least Bittern is large open marshes. These areas were not found within the study area. Additionally, Breeding Bird field work reported no Least Bittern in the study area.

Follow Up

Based on surveys completed in 2011, Least Bitterns were not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).

Species Summary Sheet - Monarch

Danaus plesippus

Status: Special Concern

Habitat

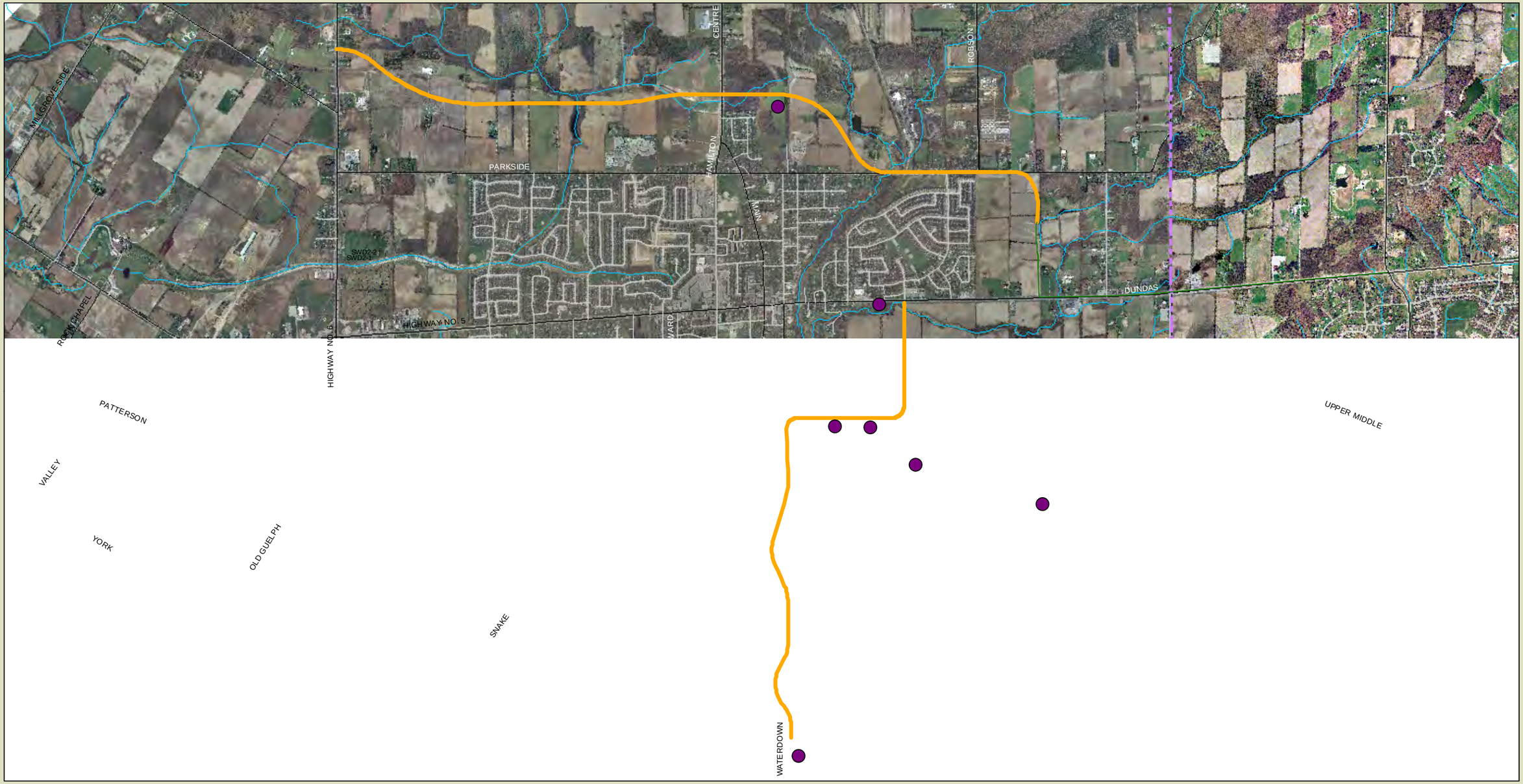
This butterfly species inhabits open fields where there is an abundance of milkweed. It is widely found in abandoned farmlands, along roadsides and in other open areas.

Possible Presence in the Road Corridor

Milkweed can be found in one community type throughout the study area, Dry-Moist Old Field Meadows (CUM 1-1). Incidental Wildlife surveys reported Monarchs passing through the study area.

Follow Up

Based on surveys completed in 2011, Monarchs were found in various locations across the Site. "Adult monarchs and larvae were observed in various locations across the Site, with the largest concentrations in the north end of the Site in the Waterdown North Development area. Abandoned fields in this area have been colonized by a variety of grasses, clovers, goldenrods, Wild Carrot and Milkweed. The northern end of the agricultural fields, along the woodland margin and roadsides are host to a large number of milkweed plants. Several larvae were observed on Milkweed plants in this area during the August site visits." (Phase 2/3 SAR Survey – Genivar, 2011)



Species At Risk: Monarch

- Preferred Route
- Watercourses
- Monarch Potential Habitat

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Map Notes

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OVE SIDE

SWD2-2
SWD2-1

ROCK CHAPEL

HIGHWAY NO. 5

HIGHWAY NO. 6

PATTERSON

UPPER MIDDLE

LLEY

YORK

OLD GUELPH

SMAKE

TERDOWN

Species At Risk: Red Mulberry

- Preferred Route
- Watercourses
- Red Mulberry Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
Map Checked By: IR
Date Created: September 1, 2010
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Species Summary Sheet - Redside Dace

Clinostomus elongatus

Status: Endangered

Habitat

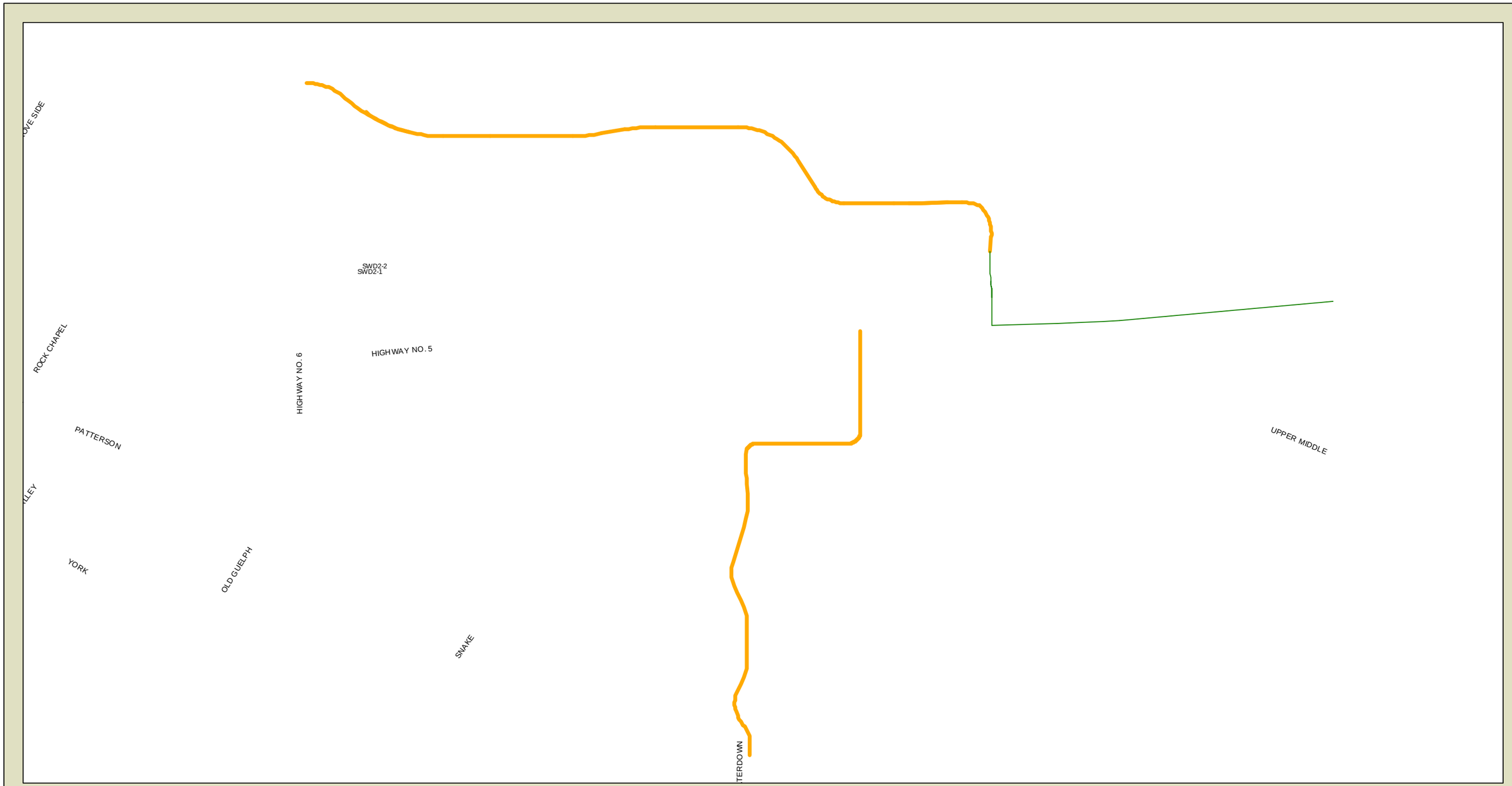
This minnow species require cool, clear flowing water with riffle-pool sequences and overhanging streamside vegetation. Suitable streams often flow through open habitats (meadows, pastures and shrubs) with overhanging vegetation, undercut banks and submerged branches and logs. Bottom substrate includes boulders, rocks, gravel or sand, often with a shallow surface covering of detritus or silt. These species are very sensitive to turbidity and prefer temperatures less than 24 degrees.

Possible Presence in the Road Corridor

Aquatic habitat in the study area is cool to warm water with poor to moderate turbidity levels. These conditions are not preferred habitats for the Redside Dace. A background review of Aquatic Species at Risk mapping for 2010 does not report any Redside Dace in the study area (see attached map).

Follow Up

No follow up surveys for Redside Dace are recommended based on the absence of habitat.



Species At Risk: Redside Dace

- Preferred Route
- Watercourses
- Redside Dace Potential Habitat

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0 0.25 0.5 1 km

Map Notes

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Species Summary Sheet - Short-eared Owl

Asio flammeus

Status: Special Concern

Habitat

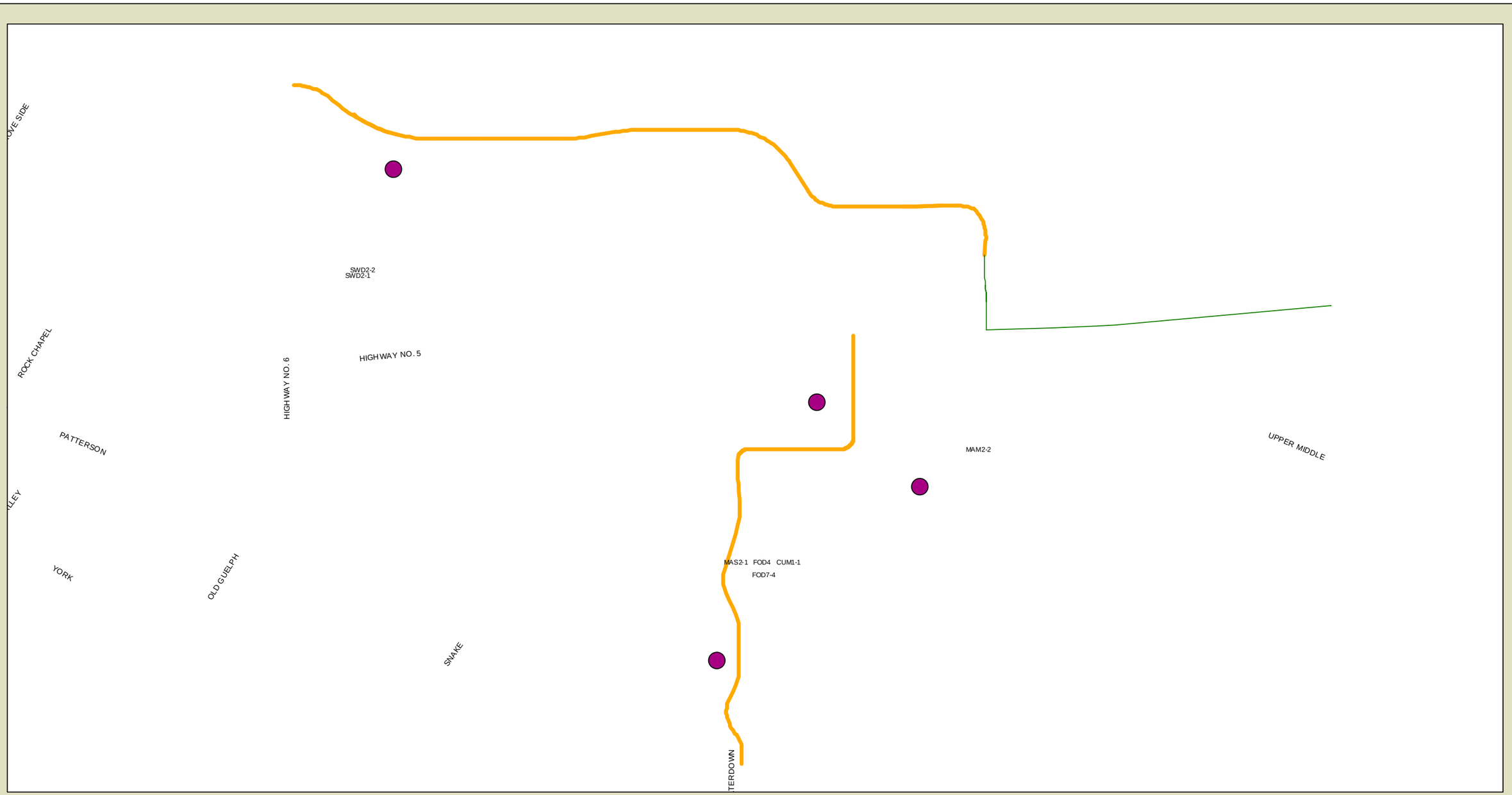
This species can be found in open grasslands, prairies, and tundra. Hunts in open country, abandoned pastures, fields, hay meadows, and marshes during winter and requires large ranges.

Possible Presence in the Road Corridor

The open areas within the study area are typically agricultural. These lands do provide possible habitat for the Short-eared Owl when they are low intensity agriculture such as hay fields. More intensive agriculture is unsuitable for the species. Despite the presence of possible habitat, no Short-eared Owls were identified during the field studies or other surveys.

Follow Up

Based on surveys completed in 2011, Short-eared Owls were not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: Short-eared Owl

- Preferred Route
- Watercourses
- Short-eared Owl Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
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Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Species Summary Sheet - Snapping Turtle

Chelydra serpentina

Status: Special Concern

Habitat

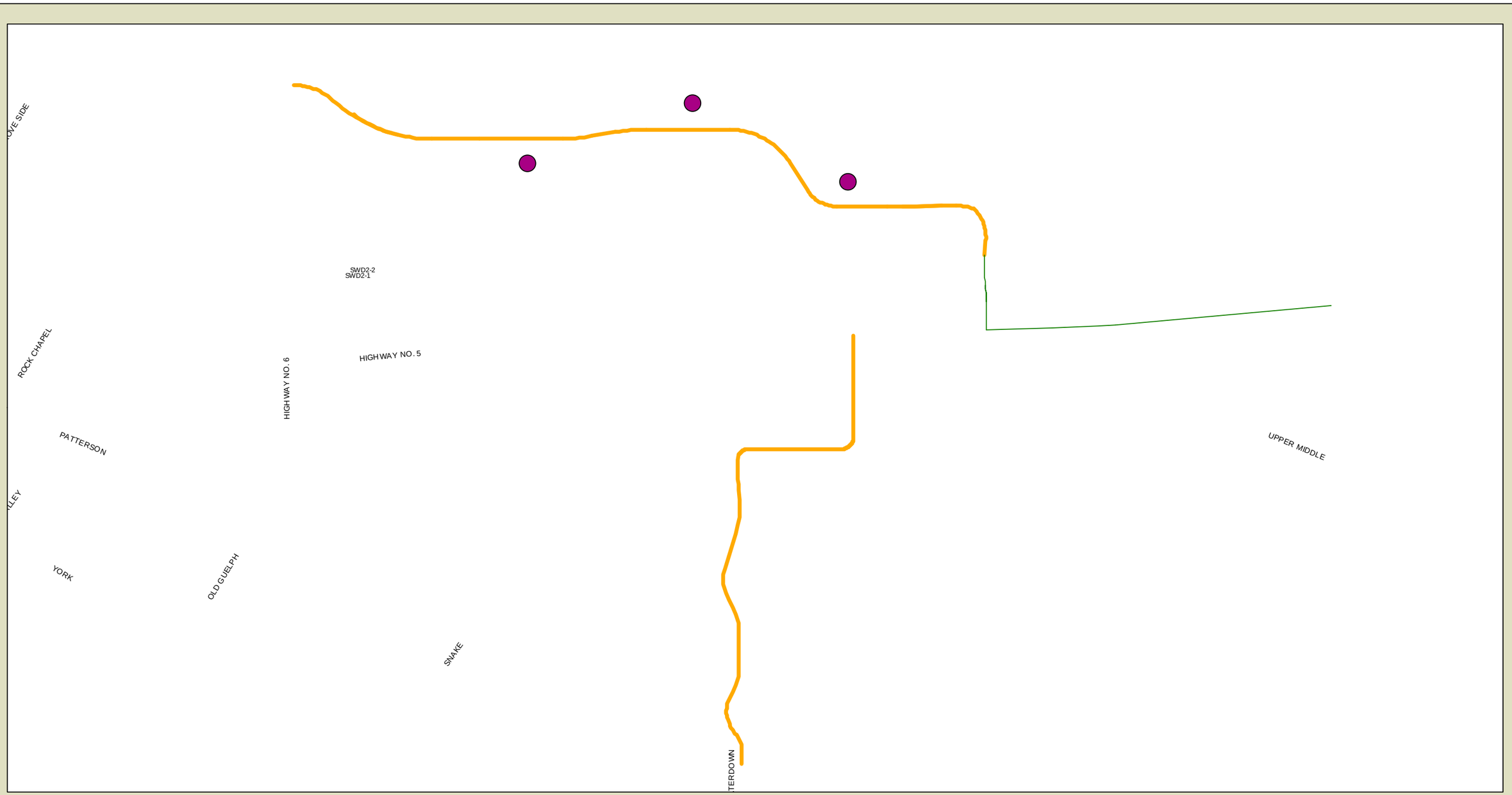
This large freshwater species inhabits shallow lakes, permanent ponds and streams with lots of plants and a muddy bottom.

Possible Presence in the Road Corridor

Black's Pond, which is a permanent pond located near the E-W alignment, is considered possible habitat. In addition, Grindstone Creek which transects the E-W alignment is a permanent watercourse with a well vegetated area which is suitable habitat. The third area of possible habitat is the Borer's Creek Main Branch which is a well vegetated permanent watercourse.

Follow Up

Additional herptofauna surveys are recommended. Based on surveys completed in 2011, Snapping Turtles were observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: Snapping Turtle

- Preferred Route
- Watercourses
- Snapping Turtle Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
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Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Species Summary Sheet - Spiny Softshell

Apalone spinifera

Status: Threatened

Habitat

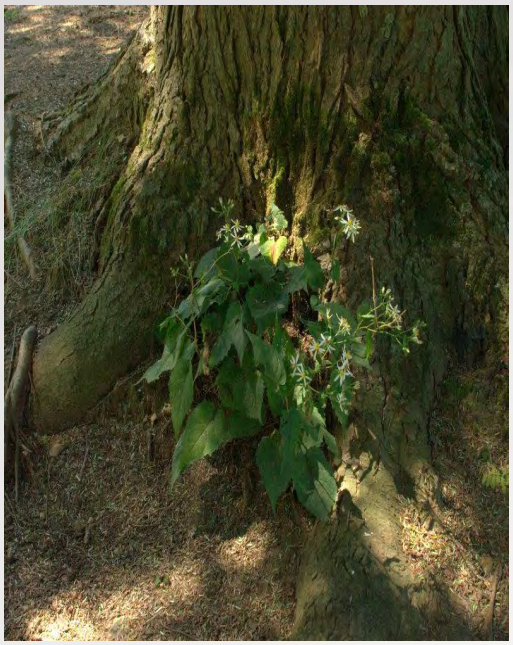
This largest of the freshwater turtles prefers rivers, lakes, impoundments with sand or mud bottoms with little vegetation. Common features include a soft bottom with some aquatic vegetation as well as sandbars or mudflats. Sandy or gravelly nesting areas close to water and relatively clear of vegetation are essential components of their preferred habitat. Shallow muddy or sandy areas to bury in, deep pools for hibernation, basking areas, and suitable habitat for crayfish and other softshell food sources are important. These species are intolerant of pollution.

Possible Presence in the Road Corridor

The possible habitat is limited in the study area to the Borer's Creek and Blacks Pond. A background review of the Herpetofauna Atlas reports no Spiny Softshell in the study area.

Follow Up

Additional herptofauna surveys are recommended. Based on surveys were completed in 2011, Spiny Softshell Turtles were not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species Summary Sheet - White Wood Aster

Eurybia divaricata

Status: Threatened

Habitat

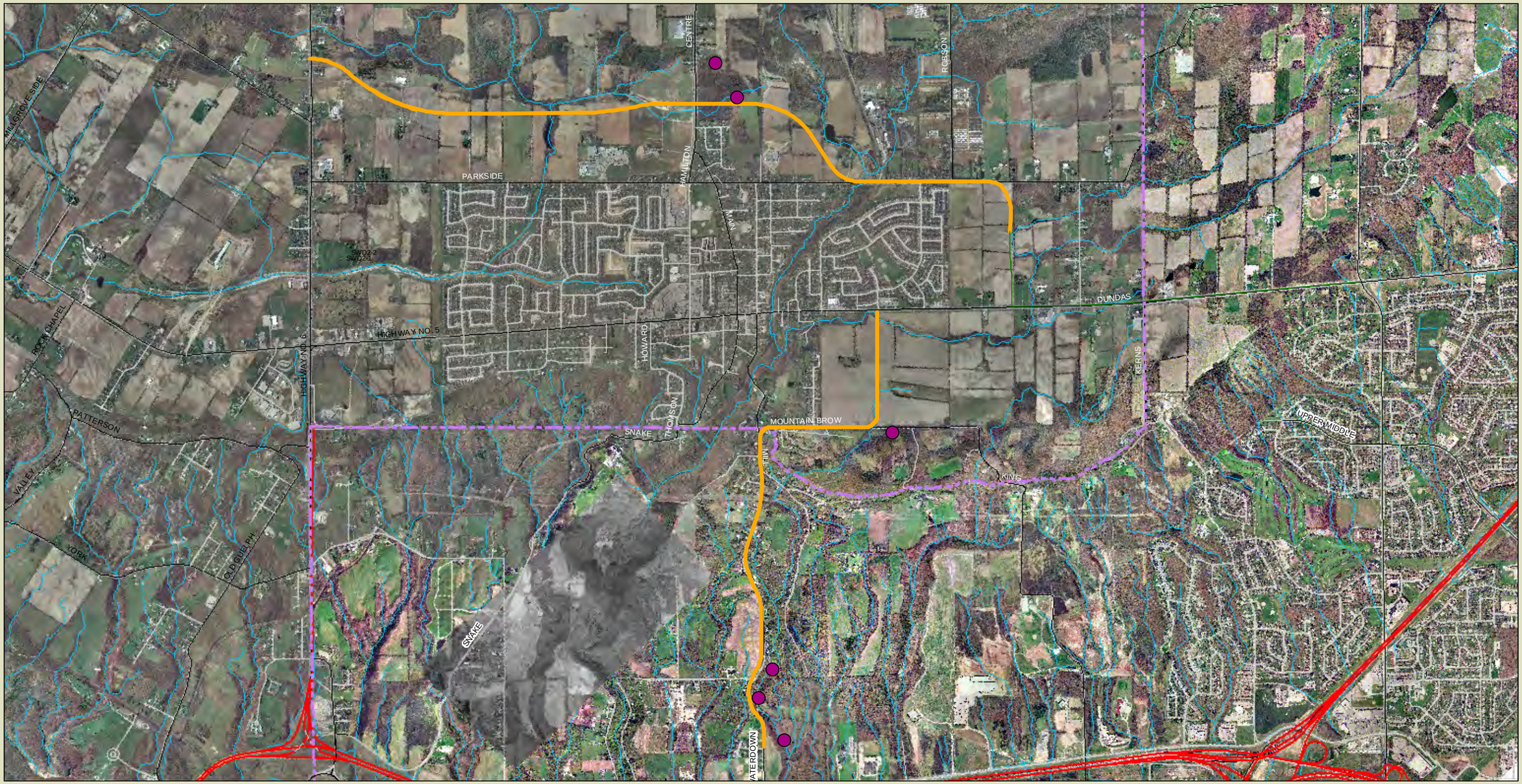
This species inhabits dry to moist deciduous woodlands with well-drained soils and relatively open canopies. Can be found within forests dominated by sugar maple and American beech, but also contains red, white and black oaks, shagbark hickory, basswood and Carolinian affiliates. This species may like some disturbances, as it grows along trails.

Possible Presence in the Road Corridor

A number of deciduous woodlands have been identified as habitat for the White Wood Aster. One in particular (FOD 4-2) has a higher probability of the species occurring due to its drier soil and trail system. Detailed vegetation surveys found no White Wood Aster in the study area.

Follow Up

Based on surveys completed in 2011, White Wood Aster was not observed in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: White Wood Aster

- Preferred Route
- Watercourses
- White Wood Aster Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
Map Checked By: IR
Date Created: September 1, 2010
Date Modified: August 4, 2009
File Path: I:\GIS\089020 - Waterdown\Natural Environment Figures April 2009\Mapping\Species at Risk Figures

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Species Summary Sheet - Woodland Vole

Microtis pinetorum

Status: Special Concern

Habitat

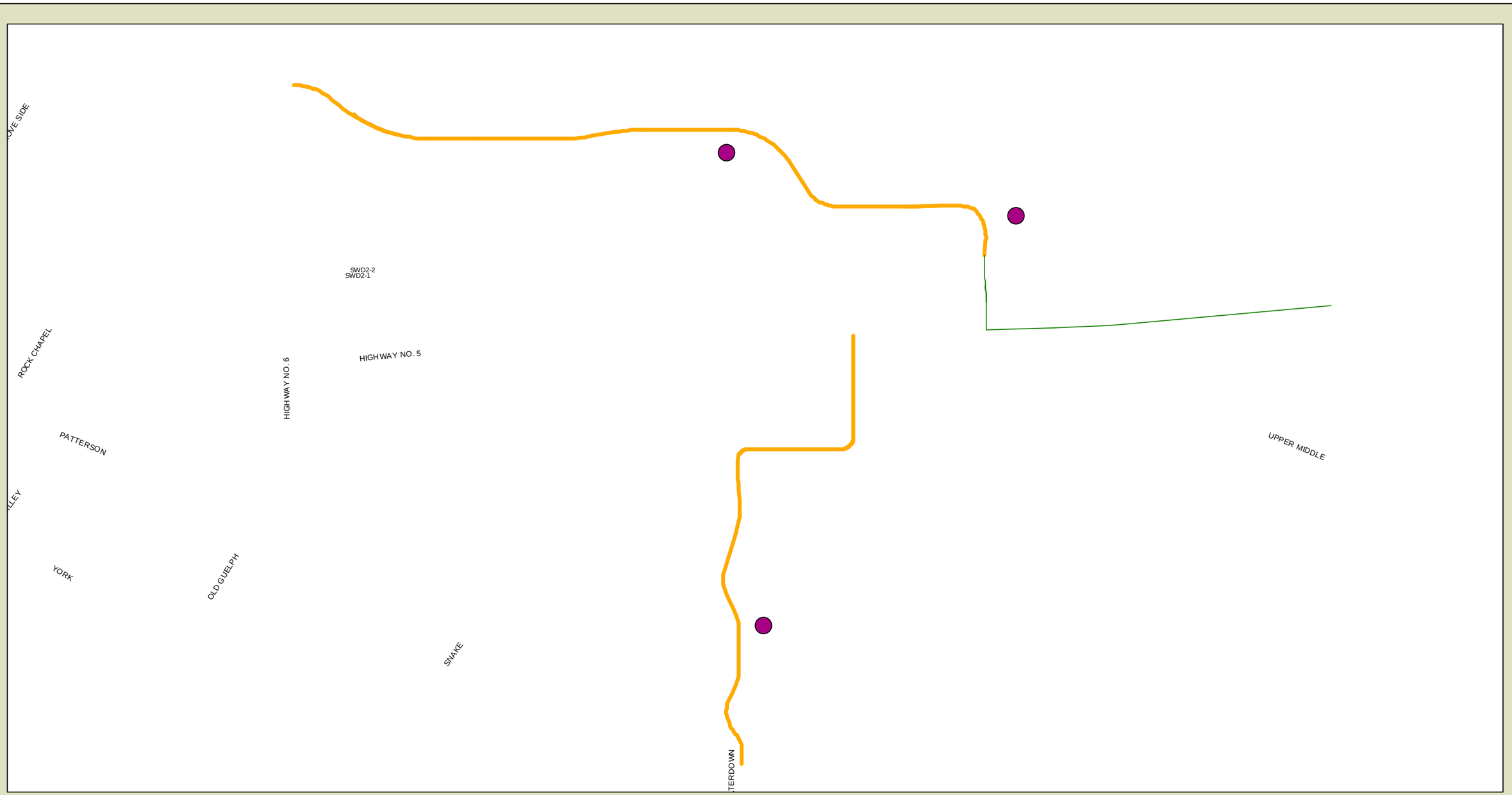
Woodland Voles live in mature deciduous forests where there is a deep litter layer to allow for burrowing.

Possible Presence in the Road Corridor

There are a number of deciduous forests within the study area that could be possible Woodland Vole habitat. The proposed road avoids all of these except for the crossing at the Centre Road Woodlot. This area has been surveyed extensively and Woodland Voles were never identified incidentally during any of this field wok.

Follow Up

Based on surveys completed in 2011, Woodland Vole was not observed or trapped in the study area (Phase 2/3 SAR Survey – Genivar, 2011).



Species At Risk: Woodland Vole

- Preferred Route
- Watercourses
- Woodland Vole Potential Habitat

1:28,000

0 0.25 0.5 1 km

Map Notes

Map Created By: SR
Map Checked By: IR
Date Created: September 1, 2010
Date Modified: August 4, 2009
File Path: I:\GIS\089020 - Waterdown\Natural Environment Figures April 2009\Mapping\Species at Risk Figures

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Phase 1 Species at Risk Sampling Results Brief New East-West Road Corridor And Waterdown Road Corridor City of Hamilton Halton Region

May 2011

Prepared for:
City of Hamilton
c/o Melanie Jajko
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario
L8P 4Y5

Prepared by:
GENIVAR Inc.
1091 Gorham Street, Suite 301
Newmarket, Ontario L3Y 8X7

Project No. 111-16104-00

Distribution:
12 c Client
1 c Electronic
1 c File

GENIVAR

Project No. 111-1604-00

May 5, 2011

City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, ON L8P 4Y5

Re: Phase 1 Species at Risk (SAR) Sampling Results
New East-West, and Waterdown Road Corridor Class Environmental Assessment
City of Hamilton, City of Burlington, Halton Region, Ontario

Introduction

GENIVAR Inc. was retained by the City of Hamilton to complete a Species at Risk Survey for the new East-West and Waterdown Road Corridors. Through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it has been noted that there is potential for several SAR species to exist on or within the area of influence of the proposed works.

The Phase 1 work plan was created to ensure the site and surrounding areas will be surveyed using the accepted field protocols with the highest degree of probability of encountering the selected species and/or protecting their habitat. The Phase 1 work plan included surveys for the species outlined in Table 1.

Table 1: Phase 1 Species at Risk surveyed within the Study Area

Phase 1	**Early Spring**	
Common Name	**Species**	**Optimal Observation Period**
Blanding's Turtle	*Emydoidea blandingii*	Phase 1
Jefferson Salamander	*Ambystoma jeffersonianum*	Phase 1
Spiny Softshell	*Apalone spinifera spinifera*	Phase 1
Map Turtle	*Graptemys geographica*	Phase 1
Snapping Turtle	*Chelydra serpentina*	Phase 1
West Virginia White	*Pieris virginiensis*	Phase 1
Barn Owl	*Tyto alba*	Phase 1
Short-eared Owl	*Asio flammeus*	Phase 1

1091 Gorham Street, Suite 301, Newmarket, Ontario L3Y 8X7
Telephone: 905.853.3303 • Fax: 905.853.1759• www.genivar.com

Phase 1 Study Results

Jefferson Salamander Sampling

Special concern is needed when dealing with the Jefferson Salamander, as tail-tipping is required to correctly identify the species or their unisexuals based on genetic markers. All permits and licensing surrounding the survey and tail-tipping of this species were approved and in place before sampling began. Wildlife Scientific Collectors Permitting (#1062333) was obtained on April 8, 2011, Permit for Species Protection or Recovery (#GY-B-015-11) was issued April 06, 2011, and Wildlife Animal Care Committee Approval (#11-247) was obtained April 06, 2011. A total of nine (9) ponds / wetland locations were screened as potential locations to be surveyed for Jefferson Salamanders; however, land owner consent was only obtained to survey seven (7) locations. Landowner permission was not granted for ponds 8 and 9 and subsequently these ponds were not sampled. Survey methodology outlined within our work plan was followed, and will be detailed within the final project report. Traps were set in the afternoon / evening and checked the following morning on: April 14, 2011, April 16, 2011, April 19, 2011, April 21, 2011, and April 28, 2011. Traps nights were numbered 1 – 5 sequentially based on date. Sampling results are summarized in Table 2.

Table 2: Jefferson Salamander Sampling Results

Pond	Survey nights	Species Present
Pond 1	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Pumpkinseed (*Lepomis gibbosus*)
		Central Mud Minnow (*Umbra limi*)
		Creek Chub (*Semolitus atromaculatus*)
		Giant Water Bug (*Lethorcerus americanus*)
Pond 2	1 - 5	Brook Stickleback (*Culaea inconstans*)
		American Toad (*Bufo americanus*)
Pond 3	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Pumpkinseed (*Lepomis gibbosus*)
		Central Mud Minnow (*Umbra limi*)
		Creek Chub (*Semolitus atromaculatus*)
		American Toad (*Bufo americanus*)
		Leopard Frog (*Rana pipiens*)
Pond 4	4 - 5	Brook Stickleback (*Culaea inconstans*)
		American Toad (*Bufo americanus*)
		Tadpoles (Green) (*Rana clamitans*)
Pond 5	4 - 5	Coleopetera – Great Diving Beatle (*Dytiscus marginalis*)
		Audible - Wood Frog (*Rana sylvatica*)

Pond 6	1 – 5	Brook Stickleback (*Culaea inconstans*)
Pond 7	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Leopard Frog (*Rana pipiens*)
		Tadpoles (Green) (*Rana clamitans*)
Pond 8	Not Surveyed	n/a
Pond 9	Not Surveyed	n/a

In general, most ponds had fish species present during one or all of the sampling events, and most ponds that were sampled had at least one fish species, with Brook Stickleback being the most prevalent fish species. Most ponds also had some evidence of supporting in some capacity amphibian populations, as Green Frog tadpoles were a common sighting, and while not observed, Spring Peepers (*Pseudacris cruficer*) were heard calling during the evenings. A list of incidental wildlife observations and full analysis of each pond's potential to be considered a Jefferson Salamander breeding aggregation site will be included within the final report.

Nocturnal Owl Surveys

Nocturnal Owl surveys for the Barn Owl and the Short-eared Owl were conducted along suitable habitat areas within the study area. The methodology outlined within the Ontario Nocturnal Owl Survey (Nocturnal Owl Surveys in Central Ontario: a Citizen Scientist's Guide: Bird Studies Canada) was followed. A total of thirteen (13) locations were surveyed over four evenings (April 18, 20, 25, and 27) for Barn and Short-eared Owls focusing on locations near or adjacent to potential habitat. Fields were visually surveyed at dusk to ensure any owls present were sighted. Specific location details and methodology will be included within the final report.

No Owl species were visually sighted or were heard calling back from the audio recordings during any of the owl surveys at any location. Details on incidental observations will be provided within the final report.

Turtle Surveys

Several turtle species (Blanding's Turtle, Spiny Softshell, Map Turtle and Snapping Turtle) were identified by the regulating agencies as having potential to be present during field sampling. Ponds and wetlands that were being visited to conduct Jefferson Salamander surveys were visited a total of 10 times (with the exception of Ponds 4, 5, which were visited 4 times, and ponds 8 and 9 in which landowner consent was not obtained). Care was taken when approaching the ponds as to not disturb any basking turtles so visual observation could be made. Trap installation also required the 'muddling' of sediment around the trap location which increases the chances of stirring up submerged turtles. No turtle species were observed during any of the field exercises.

Additional Species and Incidental Observations

The field program included ten days / evenings of field sampling. While the focus during the Phase 1 sampling surrounded major search species, every effort was taken to search and record any additional species found on and surrounding the project site. While no species at risk were noted during the field program, a large number of additional species were noted and will be included within an addendum of the final report.

We trust that this evaluation is satisfactory for your current needs. Please contact us if you have any questions.

Yours truly,
GENIVAR Inc.

Prepared by:

Dan Reeves, M.Sc.
Project Biologist

Muin Husain, PhD, P. Geo
Director Environment

DJR:lnc

New East-West Road Corridor
Waterdown Road Corridor
Class Environmental Assessment
Phase 2/3 SAR Survey

May 2012

Prepared for:
City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, ON L8P 4Y5

Prepared by:
GENIVAR Inc.
1091 Gorham Street, Suite 301
Newmarket, Ontario L3Y 8X7

Project No. 111-19698-00

Distribution:
6 c Client
1 c File

GENIVAR

Project No. 111-19698-00

May 18, 2012

City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, ON L8P 4Y5

Re: New East-West, and Waterdown Road Corridor Class EA
Phase 2/3 Species at Risk Surveys
City of Hamilton, City of Burlington, Halton Region, Ontario
FINAL Report

Dear Ms Jajko:

GENIVAR Inc. is pleased to provide you with this FINAL report documenting the Species at Risk Surveys conducted as part of the New East-West, and Waterdown Road Corridor Class Environmental Assessment. We have provided six (6) hard copies and one (1) digital copy as requested.

GENIVAR Inc. was retained by the City of Hamilton to complete a Species at Risk (SAR) Survey for the above project. Through ongoing discussion with the Conservation Authorities and the Ontario Ministry of Natural Resources, it was noted that there was potential for numerous SAR species to exist on or within the area of influence of the proposed works. GENIVAR, in consultation with the appropriate regulatory agencies, created a work plan to survey the site and surrounding areas using accepted field protocols and timing to provide the highest degree of probability of encountering the targeted species.

The study findings confirm the presence of eight (8) of the thirty-five (35) Species at Risk that have the potential to use the Study Area for their life cycle processes (breeding, nesting, foraging, etc.) Mitigative measures have also been provided to help ensure that the proposed development activities will have no negative impacts on the form and function of identified SARs on the site.

Thank you for the opportunity to complete this assessment. Please contact the undersigned if you have any questions.

Yours truly,
GENIVAR Inc.

Ann Rocchi, M.Sc.
Senior Biologist
EAC:nah

294 Rink Street, Suite 103, Peterborough, Ontario K9J 2K2
Telephone: 705-743-6850 • Fax: 705-743-6854 • www.genivar.com

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1. Introduction

GENIVAR Inc. (GENIVAR) was retained by the City of Hamilton to complete a Species at Risk (SAR) Survey for the new East-West and Waterdown Road Corridors. During the initial project meetings, and through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it was noted that there was potential for several SAR species to exist on or within the area of influence of the proposed works. The project was broken into three distinct phases (Phases 1-3) based on the specific timing windows for optimal observation of the identified SAR. Field phases and protocols were developed and approved by appropriate regulating agencies using the accepted field protocols with the highest degree of probability of encountering the selected species and/or protecting their habitat.

1.1 Regional Ecosystem Context

1.1.1 Mixedwood Plains Ecozone

Ecozones are areas of the earth's surface which are representative of large generalized ecological units and are characterized by interactive abiotic and biotic factors.

The project area is located within the greater Mixedwood Plains Ecozone (Ecological Framework of Canada, 2011), which encompasses the general area of the lower Great Lakes and the St. Lawrence River Valley, extending along the shoreline of the St. Lawrence River to Quebec. The area is approximately 175,000 square kilometers. The Ecozone is typified by cool winters and warm summers, and is prone to highly changeable weather, as the Ecozone is in one of the major storm tracks of North America.

1.1.2 Lake Erie Lowlands Ecoregion

Ecoregions are parts of an Ecozone, characterized by distinctive regional ecological factors including climate, flora, fauna, physiography, soil, water, and land usage.

Within the Mixedwood Plains Ecozone, the site lies within the Lake Erie Lowlands Ecoregion (Ecological Framework of Canada, 2011). The Ecoregion covers the extreme southwestern portion of Ontario, bordering the Great Lakes. The Ecoregion is very heavily populated, with very few large blocks of natural habitat remaining. Most of the Lake Erie Lowlands are gently rolling, and show strong annual temperature cycles typified by humid, warm to hot summers, and mild, snowy winters. The mean annual temperature is 8°C, with a mean summer temperature of 18°C, and a mean winter temperature of -2.5°C. Annual precipitation ranges from 750-900 mm and is distributed evenly throughout the year.

1.1.3 Dominant Vegetation of the Ecoregion

The Ecoregion is dominated by deciduous forests, distinct from the mixed forests in other areas to the north and contain lower species diversity than Ecoregions to the east and south. Historically, the Ecoregion consisted of Sugar Maple (*Acer saccharum*) and American Beech (*Fagus grandifolia*) forest habitats, which comprised 80 percent of the canopy in the region. Other forest types, dominated by Oak (*Quercus spp*.) and Hickory (*Carya spp*.) occur on drier sites, whereas mixed swamp forests, particularly Elm (*Ulmus spp*.), Ash (*Fraxinus spp*.), and Red Maple (*Acer rubrum*) occupy the wettest soils. A tightly

closed canopy and a thick layer of humus and organics characterize these forests, encouraging a diverse herbaceous community, while limiting bryophytic communities. Fire and water table depth are important ecological processes in maintaining relict prairie grasslands and oak savannahs, habitat types that have disappeared significantly in the Ecoregion.

1.1.4 Dominant Wildlife of the Ecoregion

The Ecoregion is the most northward distribution of many Carolinian species in North America. Characteristic mammals include White-tailed Deer (*Odocoileus virginianus*), Red Fox (*Vulpes vulpes*), Eastern Chipmunk (*Tamias striatus*), Red Squirrel (*Tamiasciurus hudsonicus*) and Grey Squirrel (*Sciurus carolinensis*). Typical breeding birds include Northern Cardinal (*Cardinalis cardinalis*), Wood Thrush (*Hylocichla mustelina*), Screech Owl (*Megascops asio*), Mourning Dove (*Zenaida macroura*), Green Heron (*Butorides virescens*), Wild Turkey (*Meleagris gallopavo*), and Pileated (*Dryocopus pileatus*) and Red-bellied Woodpeckers (*Melanerpes carolinus*).

1.2 Site Description

The study area is located in the Town of Waterdown which is approximately 7.5 km due north of Hamilton, Ontario. The study area is bounded by Highway 6 to the west, Concession 5 Road East to the north, Cedar Springs Road to the east and Highway 403 to the south. The preferred east-west and north-south corridors, as well as the lands within the 1 km and 120 m zones of influence around the preferred routes, are identified in Figure 1.

The study area crosses several jurisdictional boundaries, lying in the Hamilton Conservation Authority and Conservation Halton areas, as well as the Aurora and Guelph Ministry of Natural Resources Districts. Although much of the study area falls within the amalgamated City of Hamilton, the southern portion of the study area, along the southern section of Waterdown Road lies within the City of Burlington's jurisdiction.

The Halton Region (2005) identifies four Environmentally Significant Areas (ESAs) within the vicinity of the study area. The Waterdown Escarpment Woods, Sassafras Woods, Grindstone Creek Escarpment Valley and the Clappison Escarpment Woods make up much of the natural areas that remain in the southern part of the study area (refer to Figure 1). These four ESAs have been designated as Areas of Natural and Scientific Interest (ANSIs) by the Ministry of Natural Resources due to their unique physical and biological features. A number of locally, provincially and nationally rare species are known to exist within these ESAs. Though not identified as an ESA the Waterdown North woodlands have been included in the Hamilton Natural Areas Inventory as a large tract of natural cover.

2. Environmental Policy Context

2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) (Ontario Ministry of Municipal Affairs and Housing (OMMAH), 2005) is a planning document that provides a framework for and governs development within the Province of Ontario. In order to preserve various ecological resources deemed significant in the Province, development lands must be assessed for the presence of natural heritage features prior to construction.

These natural heritage features (listed below) are both defined and afforded protections under the PPS. Linkages between natural heritage features, surface water and groundwater features are also recognized and afforded similar protections under the policy. Section 2.1 of the PPS also requires that the diversity and connectivity of all natural heritage features and the long-term ecological function of natural heritage systems be maintained, restored or improved where possible.

Under the PPS (OMMAH, 2005), development or site alteration is prohibited within the significant habitat of endangered or threatened species, significant wetlands in Ecoregions 5E, 6E and 7E and in significant coastal wetlands, but may be allowed adjacent to these features provided the adjacent lands have been evaluated and it has been demonstrated that there will be no negative impacts to these features or their ecological functions. Development may be permitted in or adjacent to significant wetlands north of Ecoregions 5E, 6E and 7E, areas of natural and scientific interest (ANSI), significant woodlands and significant valleylands south and east of the Canadian Shield, and significant wildlife habitat provided there will be no negative impacts to these features or their ecological function due to the proposed undertaking. In addition, development and site alteration is not permitted in fish habitat unless in accordance with provincial and federal legislation.

Natural heritage features as defined by the PPS (OMMAH, 2005) include:

A) *Fish Habitat;*
B) *Significant Areas of Natural and Scientific Interest (ANSI);*
C) *Significant Habitat of Endangered and Threatened Species ;*
D) *Significant Wetlands;*
E) *Significant Wildlife habitat;*
F) *Significant Woodlands* south and east of the Canadian Shield*; and*
G) *Significant Valleylands* south and east of the Canadian Shield*.*

2.2 Species at Risk Act (SARA)

The purpose of the Species at Risk Act (SARA; Government of Canada, 2011) (current to 2012) is to 'prevent all wildlife species from being, extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened' (Government of Canada, 2011). The Act provides protection for individuals of listed threatened, endangered or extirpated species and their residences on federal lands in the provinces, on lands under the authority of the Minister of the Environment and for migratory game birds covered under the Migratory Birds Convention Act, 1994 wherever they occur. It also provides protection to aquatic species and their habitat which is defined as 'the spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly to carry out their life processes' (Government of Canada, 2009).

2.3 Endangered Species Act (ESA), 2007

The Endangered Species Act (ESA) (Government of Ontario, 2007) is a legislative document that strives to: identify species at risk by using the best available information; protect species at risk and their critical habitat needs, promote their recovery; and support stewardship activities that assist in the protection and recovery of species at risk. The ESA provides protection to extirpated, threatened and endangered species listed on the Species at Risk in Ontario (SARO) List. Section 9 and 10 of the Act state that no person shall:

- kill, harm, harass, capture or take a living member of an extirpated, endangered or threatened species listed on the SARO List;
- possess, transport, collect, buy, sell, lease, trade or offer to do any of the aforementioned actions, for any part or derivation of any living or dead member of a species listed as extirpated, endangered or threatened on the SARO List;
- damage or destroy the habitat of a species listed as endangered or threatened on the SARO List.

2.4 Environmental Assessment Act

The purpose of the Environmental Assessment Act (1990) is 'the betterment of the people of the whole or any part of Ontario by providing protection, conservation and wise management in Ontario of the Environment' (Section 2, Environmental Assessment Act, 1990). It is understood that in order to complete works proposed by the City of Hamilton, the Environmental Assessment Act needs to be satisfied, including the quantification of Species at Risk and their habitats within the project area contained within this report.

3. Desktop Review

A thorough desktop review of available information resources was conducted to better understand the nature of the site with respect to existing and future land use, topography, terrestrial and aquatic habitats, and records of species at risk.

As part of this review, a search of the OMNR Natural Heritage Information Centre (NHIC) database was conducted to determine the existence and approximate location of recorded occurrences of species at risk in the study area. Thirty-two (32) one square kilometer (1 km^2) quadrats surrounding the site were checked to ensure potential species at risk were accounted for in the search. Known element occurrences included 29 species with subnational (SRANKS) assigned by the NHIC, and ten (10) species that are identified as species at risk within Ontario (SARO). Refer to Table 1 for a list of the SARO-listed species and their provincial (SARO) and national (COSEWIC) at-risk designations.

Table 1: NHIC Element Occurrences within the Study Area

Common Name	Species	COSEWIC Rank[1]	SARO Rank[2]
American Chestnut	*Castanea dentata*	END	END
Spotted Wintergreen*	*Chimaphila maculate*	END	END
Northern Bobwhite*	*Colinus virginianus*	END	END
Eastern Flowering Dogwood*	*Cornus florida*	END	END
American Columbo	*Frasera caroliniensis*	END	END
Red Mulberry	*Morus rubra*	END	END
Timber Rattlesnake*	*Crotalus horridus*	EXP	EXP
Cerulean Warbler	*Dendroica cerulean*	END	SC
Milksnake	*Lampropeltis triangulum*	SC	SC
Jefferson Salamander	*Ambystoma jeffersonianum*	END	THR

[1] Committee on the Status of Endangered Wildlife in Canada; [2] Species at Risk in Ontario Status; END – Endangered, THR – Threatened, SC – Special concern, NAR – Not at Risk, and '-' – Not Listed.

Of these ten species, four (marked in Table 1 with an asterisk *) were not targeted for species-specific searches as part of this study based on discussions with the OMNR and Conservation Authorities during the pre-consultation meeting on March 10, 2011. In addition to the other 6 species with known element occurrences in the area, the OMNR and Conservation Authorities identified 29 additional species at risk that have the potential to occur in the study area. The consultation process and resulting study focus are described in more detail below.

3.1 Information resources

A list of all information resources consulted over the course of this study and final report preparation are provided below. References for specific documents used in this report are provided in Section 8.0.

- Ontario Ministry of Natural Resources (OMNR), Aurora District Office;
- Ontario Ministry of Natural Resources (OMNR), Guelph District Office;
- Conservation Halton (CH);
- Hamilton Conservation Authority (HCA);
- Borer's Creek Natural Heritage Assessment, Parkside Drive to Highway 6 (Dillon Consulting, 2010);
- Borer's Creek Subwatershed Stewardship Action Plan (Hamilton Conservation Authority, 2009);
- Species at Risk Screening Report (Savanta Inc., 2006);
- Cootes to Escarpment Park System: Conservation and Land Management Strategy (2009);
- Halton Region Environmentally Sensitive Areas Consolidation Report (2005);
- Natural Heritage Information Centre (NHIC) Mapping and Databases (2010);
- Aerial Photographs;
- Ontario Ministry of Northern Development and Mines Ontario Base Mapping resources (CLAIMaps);
- Ontario Ministry of Natural Resources Biodiversity Explorer (2010);
- Ontario Ministry of Natural Resources Significant Wildlife Habitat: Technical Guide (2000);
- Ontario Herpetofaunal Atlas (Oldham and Weller, 2000);
- Atlas of the Breeding Birds of Ontario (2009);
- Atlas of the Mammals of Ontario (1994);

- Species at Risk in Ontario (SARO) List;
- Species at Risk Public Registry (SARA) (2009);
- Endangered Species Act (ESA) (2007);
- Ontario Regulation 242/08 made under the Endangered Species Act (2007);
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, and
- Species at Risk Recovery Strategies and Reports (OMNR).

3.2 Agency Consultation

The Aurora and Guelph District offices of the Ontario Ministry of Natural Resources (OMNR), and Halton and Hamilton Conservation Authorities were consulted during the early planning stages which included a meeting on March 10, 2011 to determine target species and the scope of work required for the species at risk surveys.

Species at risk biologists with the OMNR were consulted during the preparation of animal care protocols for the collection of Jefferson Salamander (*Ambystoma jeffersonianum*) and Woodland Vole (*Microtis pinetorum*). Permits were issued by the OMNR and Conservation Halton (CH) to complete this work (refer to Appendix B).

Requests for information were submitted to the OMNR and Conservation Authorities at the end of the field season to ensure that the most up-to-date SAR information was available. This information was considered during the preparation of this report, including recommendations for mitigation. A record of correspondence with the participating agencies is provided in Appendix A.

3.3 Survey Focus

A pre-consultation meeting with appropriate Conservation Authorities, OMNR staff, and relevant planning staff was completed on March 10, 2011. During the meeting, the various regulating agencies identified thirty-five (35) species at risk which may occur on or in the vicinity of the project site. Four species identified in the NHIC background search were not identified by regulating agencies as target species for this survey (refer to Table 2). The 35 species at risk targeted in this survey and their current national (COSEWIC) and provincial (SARO) ranks are provided in Table 2.

Table 2: Identified Potential Species at Risk in the Study Area

Common Name	Species	COSEWIC Rank[1]	SARO Rank[2]
Amphibians and Reptiles			
Blanding's Turtle	*Emydoidea blandingii*	THR	THR
Eastern Ribbon Snake	*Thamnophis sauritis septentrionalis*	SC	SC
Jefferson Salamander	*Ambystoma jeffersonianum*	END	END
Milksnake	*Lampropeltis triangulum*	SC	SC
Northern Map Turtle	*Graptemys geographica*	SC	SC
Snapping Turtle	*Chelydra serpentina*	SC	SC
Spiny Softshell	*Apalone spinifera spinifera*	THR	THR

Common Name	Species	COSEWIC Rank[1]	SARO Rank[2]
Birds			
Acadian Flycatcher	*Empidonax alnorum*	END	END
Barn Owl	*Tyto alba*	END	END
Barn Swallow	*Hirundo rustica*	THR	THR*
Black Tern	*Chlidonias niger*	NAR	SC
Bobolink	*Dolichonyx oryzivorus*	THR	THR
Cerulian Warbler	*Dendroica cerulea*	END	THR
Chimney Swift	*Chaetura pelagica*	THR	THR
Common Nighthawk	*Chordeiles minor*	THR	SC
Eastern Meadowlark	*Sturnella magna*	THR	THR*
Hooded Warbler	*Wilsonia citrina*	THR	SC
Least Bittern	*Ixobrychus exilis*	THR	THR
Louisiana Waterthrush	*Seiurus motacilla*	SC	SC
Peregrine Falcon	*Falco peregrinus*	SC	THR
Red-headed Woodpecker	*Melanerpes erythrocephalus*	THR	SC
Short-eared Owl	*Asio flammeus*	SC	SC
Whip-poor-will	*Caprimulgus vociferus*	THR	THR
Mammals			
American Badger	*Taxidea taxus*	END	END
Woodland Vole	*Microtis pinetorum*	SC	SC
Plants			
American Chestnut	*Castanea dentata*	END	END
American Columbo	*Frasera caroliniensis*	END	END
American Ginseng	*Panax quinquefolius*	END	END
Butternut	*Juglans cinerea*	END	END
Green Dragon	*Arisaema dracontium*	SC	SC
Red Mulberry	*Morus rubra*	END	END
White Wood Aster	*Eurybia divaricata*	THR	THR
Invertebrates			
Monarch	*Danaus plexippus*	SC	SC
Rusty Patched Bumble Bee	*Bombus affinis*	END	END
West Virginia White	*Pieris virginiensis*	NAR	SC

[1] Committee on the Status of Endangered Wildlife in Canada; [2] Species at Risk in Ontario Status; END – Endangered, THR – Threatened, SC – Special concern, NAR – Not at Risk.

* These species were not listed at the time of the 2011 survey but were uplisted to Threatened on the SARO list as part of the amendment to O.Reg. 230/08 on January 13, 2012.

4. Field Program

The field program was divided into three phases to ensure surveys for particular taxonomic groups and species occurred during optimal timing windows. Phase 1 commenced in early spring, Phase 2 in late spring to early summer, and Phase 3 in summer. A representative sample of the photographs taken during field activities is provided in Appendix C.

Table 3: Summary of Field Program Effort and Timing

Activity	Individuals Involved	Dates
Reptile and Amphibian Surveys		**Phase 1 and 3**
Jefferson Salamander	Dan Reeves, Eric Taylor, Brian Cooper	April 13 – 16, April 18 – 21, and April 27 - 28, 2011
	Dan Reeves, Erin Corstorphine, James Dennis	March 14 – 16, March 20 and March 26, 2012
Turtles	Dan Reeves, Erin Corstorphine. Mike King (sub-consultant)	April – August 2011
	Dan Reeves, Erin Corstorphine, James Dennis	March – April 2012
Snakes	All surveyors	April – August 2011
Bird Surveys		**Phase 1 and 2**
Barn and Short-eared Owl	Ann Rocchi	April 14 – June 26, 2011
	Rachel Bryan, James Dennis	February 15, February 23 and February 28, 2012
Breeding Bird Point Counts	Mike King	May 22 – July 3, 2011
Whip-poor-will	Mike King	May 22 – July 3, 2011
Chimney Swift	Ann Rocchi	May 16 – May 23, 2011
Common Nighthawk	Ann Rocchi	May 16 – May 23, 2011
Least Bittern	Ann Rocchi	June 19 – June 26, 2011
Tree and Herbaceous Plant Surveys		**Phase 2 and 3**
Vegetation	Erin Corstorphine, Eric Taylor	August 8 – 12, 2011
Mammal Surveys		**Phase 1 to 3**
Woodland Vole	Erin Corstorphine, James Dennis, Dan Reeves, Eric Taylor	Set-up: August 30 and 31, 2011 Survey: August 31, September 1 - 3, 2011
American Badger	All surveyors	April – September 2011
Invertebrate Surveys		**Phase 1 to 3**
Monarch West Virginia White Rusty-patched Bumble Bee	All surveyors	April – September 2011

4.1 Herptiles

4.1.1 Jefferson Salamander

Through ongoing discussion with the appropriate Conservation Authorities and OMNR, it was noted that there is potential for populations of Jefferson Salamanders (*Ambystoma jeffersonianum*) or unisexuals (*Abystoma* (2) *laterale* – *jeffersonianum* (LLJ) or *Ambystoma laterale* – (2) *jeffesonianum* (LJJ)) within the study area. Accepted field sampling protocols require the capture and collection of tissue (tail tipping) which requires the need for an ESA (Endangered Species Act) permit, an Scientific Collectors permit, and an approved Animal Care Protocol from the OMNR Wildlife Animal Care Committee. All permits and licensing surrounding the survey and tail-tipping of this species were approved and in place before sampling began. Wildlife Scientific Collectors Permitting (#1062333) was obtained on April 8, 2011, Permit for Species Protection or Recovery (#GY-B-015-11) was issued April 6, 2011, and Wildlife Animal Care Committee Approval (#11-247) was obtained April 6, 2011 (refer to Appendix B).

4.1.1.1 Species Background

Upon discussion with the local OMNR Species at Risk Biologist, a draft copy of the Sampling Protocol for Determining the Presence / Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011) was obtained. Within the document, they describe the species as:

"The Jefferson Salamander is a relatively large (15 to 18 cm) mole salamander (family Ambystomatidae). It is a dark, brownish-gray salamander with small, pale blue flecks on the limbs and lower sides. It has relatively long toes and the adpressed limbs of males (front limb folded towards the tail and back limb folded towards the head) overlap by more than one and a half costal folds. Jefferson Salamanders also have a relatively wide head. *A. jeffersonianum* was first described by Green in 1827 (as *Salamandra jeffersonianum*) from an area near Jefferson College, Canonburg, Pennsylvania. *A. jeffersonianum* populations within Ontario seem to be more closely associated with Carolinian type forests than with other deciduous forest types. This may reflect climatic factors that similarly limit the northern distribution of Carolinian forest and Jefferson Salamander. Jefferson Salamander breed in the very early spring (late March or early April). Salamanders emerge from over wintering sites and migrate during rain or on very humid nights to the breeding ponds with males usually preceding females to the ponds. Once in the ponds, males will court females then deposit a spermatophore on the bottom of the pond. The female will pick up the spermatophore with her cloaca and will then lay ten or more clutches of approximately 30 eggs usually on the stem of submerged vegetation, such as willow (*Salix*) branches, near the periphery of the pond. In Ontario larvae hatch from egg masses about mid-April at a length of 8.9 to 15.2 mm. Larvae remain in the pond for 61-110 days, over which time they develop limbs and grow 3 to 8 times their hatching size. Individuals metamorphose at 28 to 44 mm SVL (the length from the snout to the posterior portion of the vent) and leave the pond for the surrounding forested areas, where they usually enter burrows or rock crevices and forage for the remainder of the summer and fall. They overwinter below the frost line.

The identification of the Jefferson Salamander is complicated by the fact that all of the Ontario populations of this species exist with female, mostly polyploid, nuclear hybrids. Although these females, called unisexuals, have one or more sets of Blue-spotted Salamander (*Ambystoma laterale*) chromosomes and one or more sets of Jefferson Salamander chromosomes, they are not, as is generally believed, hybrids that have resulted from the crossing of these two species. The Blue-spotted and Jefferson Salamanders are rarely, if ever, found in the same ponds so hybridization would be unlikely.

But, the critical evidence that rejects normal hybridization events is based on the examination of mitochondrial DNA (*mt*DNA) that is only inherited from females. Wherever they occur, all the unisexual individuals have a similar *mt*DNA that is very different from the *mt*DNA of either *A. jeffersonianum* or *A. laterale*. The unisexual individuals apparently exist and perpetuate themselves by swapping chromosomes from a sperm donor who breeds at the same time in the same pond. Because the unisexuals are more common than the Jefferson Salamander and, those that live with *A. jeffersonianum*, use and require Jefferson's sperm, viable unisexual eggs or larvae signify the presence of Jefferson Salamander males in a breeding pond. Additionally, because most unisexuals are triploid and carry two sets of the sperm donor's chromosomes, it is possible to distinguish Blue-spotted from Jefferson Salamander breeding ponds. The unisexuals would be, respectively, *Ambystoma* (2) *laterale* – *jeffersonianum* (LLJ) or *Ambystoma laterale* – (2) *jeffersonianum* (LJJ) in ponds with *A. laterale* or *A jeffersonianum*. Microsatellite loci are used to distinguish the unisexuals from the Blue-spotted and Jefferson salamanders and can also be used to distinguish different nuclear combinations in the hybrids."

Jefferson Salamanders are known to occur in the study area within the Grindstone Creek Valley Environmentally Sensitive Area (ESA) (Conservation Halton, pers. comm. September 16, 2011; Halton Region, 2005), Waterdown Escarpment Woods and Sassafras Woods ESAs (Halton Region, 2005).

4.1.1.2 Sampling Methodology

Preferred methodology for presence / absence studies for this species are outlined within the Sampling Protocol for Determining the Presence / Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011). This document, along with continued discussion with appropriate regulating agencies was the basis for methodology creation. Detailed methodology is outlined below.

Site Selection

The larger project area (Figure 1) was surveyed early in the study to determine candidate Jefferson Salamander survey locations based on the four main habitat criteria that the OMNR uses to determine pond suitability for breeding by Jefferson Salamanders (Karolyne Pickett pers. comm., 2011):

1. Documented breeding of other amphibians in the pond (e.g. documented frog calls, documented presence of tadpoles);
2. Presence of egg attachment sites in the pond, such as the presence of low shrubs, twigs, fallen tree branches, submerged riparian vegetation or emergent vegetation to which salamander egg masses can attach to (e.g. presence of Red-Osier Dogwood along the margins of the pond);
3. Pond is free of predatory fish species; and
4. Pond has suitable hydro-period: water must remain present in the pond depression long enough for eggs to develop into juvenile salamanders, typically until mid to late summer. However some types of wetlands which may be used for breeding may have permanent or semi-permanent water. Hydro-period is typically a function of pond size, depth, volume (influenced by snow melt), flow rate, detritus, forest crown cover and ambient temperature. A ponds hydro-period may vary from year to year. For example, a shallow pond may not provide a suitable hydro-period in a dry year.

Candidate sites were selected based on background and field surveys, and approved by the OMNR before sampling began. Prior to the site visit, satellite images of the property, land use, and topographical maps were reviewed to identify potential locations. Pond locations are outlined in Figure 2.

Animal Collection

A suitable number (as approved by OMNR) of un-baited minnow traps (five (5) for Ponds 1, 2, 4, 5, 6, and 7, fifteen for Pond 3) were placed in potential breeding locations within the study area and their location recorded with a handheld GPS. Traps were checked the morning after they were set, and any species captured were photographed and documented. Five trap nights, on non-consecutive days during the season were conducted, as outlined within the OMNR protocol. The start and end of monitoring was confirmed based on discussions with OMNR staff as well as Dr. James Bogart at the University of Guelph.

The following methods were utilized during the surveys:

1. Trap Setting
    a. A long rope was attached to each minnow trap before it was submerged into the water. The rope was secured to a nearby tree or shrub and placement of each trap was recorded with a handheld GPS.
    b. Placement of traps was evenly distributed throughout the pond / wetland to ensure good overall coverage and a range of microhabitat types were covered.
    c. Each trap was marked with appropriate flagging tape / signage stating the UTM co-ordinate, trapper name, contact number, and dates.
    d. Surrounding habitat information was noted, as well as weather conditions and time of trap setting.
    e. Traps were placed in the evening and checked the following morning, approximately 12-14 hours after setting.

2. Trap Checking
    a. The trap was removed from water.
    b. The following was recorded for each trap (where applicable):
        i. Trap #
        ii. All species caught in the trap and quantity.
        iii. Photograph number, measurements and sex (if possible) for all salamander species observed.
        iv. Sample number of any suspect Jefferson salamanders obtained.
        v. Note indicating if captured salamanders were recaptured, and their general condition.
        vi. Note indicating if trap was re-set in same location.

Additional observations were collected surrounding each pond and trap location. These observations generally included: additional species present, egg masses for salamander or other species, and vegetation characteristics of immediate area or vicinity. Traps were only used within one pond to minimize the risk of cross-contamination.

Tail Clipping

As different unisex combinations of Jefferson salamanders are virtually impossible to identify visually, small tail clippings (less than 5 mm) of all suspect Jefferson salamanders encountered during trap surveys were to be collected and preserved in 70% ethanol for subsequent DNA extractions and microsatellite examination. The salamanders would then have been released at the location they were

captured. In the unlikely event that injuries or death were to occur, the OMNR would have been notified by way of the weekly updates and summary report at the end of the survey season. DNA extraction and analysis would have been performed at the University of Guelph by Dr. James Bogart. Tail clipping would have involved the following steps:

1. Clean, un-used nitrile gloves would be used for handing of each salamander and would be changed at each trap.
2. One researcher would gently hold the suspect individual on a sterile, flat, clean background medium, while another researcher used a sterile single edge razor to snip off the tail tip (less than 5 mm).
3. The tail clipping would be immersed in 70% ethanol within a sample tube, and labeled appropriately for transport to the lab.
4. The subject salamander would then be returned to the edge of the water and observed to ensure that it was uninjured. Any injuries or fatalities would be documented and reported to the OMNR.
5. All sampling equipment would be sterilized between uses using alcohol.

Laboratory Analysis

Tail tips require microsatellite analysis for DNA extraction and arrangements for this procedure were made with Dr. James Bogart at the University of Guelph. Dr. Bogart was contacted prior to the field program and was anticipating any samples. Laboratory analysis was not required as no salamanders were captured.

Egg Mass Surveys

In addition to the methodology described above, the Sampling Protocol for Determining the Presence / Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011) suggests a visual inspection for egg masses in sample locations. Throughout the duration of the sampling season, visual egg mass surveys were conducted from the water's edge. Any egg masses observed were described, photographed and reported to the OMNR.

4.1.1.3 Results and Discussion

A total of nine (9) ponds / wetland locations were screened as potential locations to be surveyed for Jefferson Salamanders; however, land owner consent was only obtained to survey seven (7) locations. Refer to Figure 2 for details. Landowner permission was not granted for Ponds 8 and 9 and subsequently these ponds were not sampled. Traps were set in the afternoon / evening and checked the following morning on: April 14, 2011, April 16, 2011, April 19, 2011, April 21, 2011, and April 28, 2011. Traps nights were numbered 1 – 5 sequentially based on date. Sampling results are summarized in Table 4.

Table 4: Jefferson Salamander Sampling Results

Pond	Survey nights	Species Present
Pond 1	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Pumpkinseed (*Lepomis gibbosus*)
		Central Mud Minnow (*Umbra limi*)
		Creek Chub (*Semolitus atromaculatus*)
		Giant Water Bug (*Lethorcerus americanus*)
Pond 2	1 - 5	Brook Stickleback (*Culaea inconstans*)
		American Toad (*Bufo americanus*)
Pond 3	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Pumpkinseed (*Lepomis gibbosus*)
		Central Mud Minnow (*Umbra limi*)
		Creek Chub (*Semolitus atromaculatus*)
		American Toad (*Bufo americanus*)
		Leopard Frog (*Rana pipiens*)
Pond 4	4 - 5	Brook Stickleback (*Culaea inconstans*)
		American Toad (*Bufo americanus*)
		Tadpoles (Green) (*Rana clamitans*)
Pond 5	4 - 5	Great Diving Beetle (*Dytiscus marginalis*)
		Audible - Wood Frog (*Rana sylvatica*)
Pond 6	1 – 5	Brook Stickleback (*Culaea inconstans*)
Pond 7	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Leopard Frog (*Rana pipiens*)
		Tadpoles (Green) (*Rana clamitans*)
Pond 8	Not Surveyed	n/a
Pond 9	Not Surveyed	n/a

Most ponds had fish species present during one or all of the sampling events, and most ponds that were sampled had at least one fish species, with Brook Stickleback being the most prevalent fish species. Most ponds also had some evidence of supporting, in some capacity, amphibian populations, as Green Frog tadpoles were a common sighting, and while not observed, Spring Peepers (*Pseudacris cruficer*) were heard calling during the evenings. Field notes are provided in Appendix D.1 and a list of incidental wildlife observations is included in Appendix K.

It is understood that due to the relatively late start of the study (first set night April 13), there is the potential that the majority of Jefferson Salamander activity may have been missed (Jim Bogart pers. comm. 2011). It was noted that in previously studied Jefferson Salamander breeding aggregation locations that were observed in 2011, peak activity occurred approximately April 4 to April 7, 2011 (Jim Bogart pers. comm. 2011). In addition to the five (5) trapping nights (two (2) for Ponds 4 and 5) that occurred, visual inspection for salamander egg masses at each pond locations were conducted throughout the survey period. It is unlikely that our relatively long trapping season (ending April 28, 2011) would have entirely missed the breeding season. It is also unlikely that Jefferson Salamanders were successfully breeding within the ponds surveyed, as no adults or egg masses were observed during a relatively intensive field program. Further, the presence of predatory fish species found in most of the

ponds (ponds 1, 2, 3, 4, 6, 7) suggests that they are unlikely to be selected as breeding aggregation ponds for this species.

Based on the timing of the 2011 survey OMNR recommended that additional studies be carried out during the 2012 breeding season to determine whether the absence of salamanders in 2011 was due to the elapse of the timing window (after the breeding season), or because Jefferson Salamanders were absent in the areas surveyed. The 2012 sampling program focused on four (4) ponds (Pond 2, 4, 5 and 6) and was conducted during peak breeding season for Jefferson Salamanders based on breeding activity in surrounding areas (J. Bogart pers. comm., March 16, 2012). It is unlikely that our trapping season (March 14 to March 26, 2012) would have missed the breeding season. There were no individuals or egg masses observed in any of the ponds. Further, the presence of predatory fish species found in Ponds 2, 4 and 6 for the second year in a row suggests that they are unlikely to be selected as breeding aggregation ponds for this species. Details of the 2012 survey are provided in Appendix D.2.

It is our opinion that due to the relatively intensive field program yielding no individuals of this species, no visual observation of egg masses, and the presence of predatory fish species within most of the ponds, it is unlikely that the ponds surveyed are used as breeding aggregations for Jefferson Salamanders.

4.1.2 Turtle Surveys

Several turtle species (Blanding's Turtle, Spiny Softshell, Map Turtle and Snapping Turtle) were identified by the regulating agencies as having potential to be present during field sampling.

Blanding's Turtle

Blanding's Turtle is a medium-sized fresh water turtle that inhabits lakes, temporary ponds, streams and wetlands in the Great Lakes Basin. They are typically found in wetland areas with a high density of aquatic vegetation and suitable basking and nesting sites. This species has a greyish-black, domed carapace with yellow flecks or spots, and is most often distinguished from other turtles by its bright yellow lower jaw and throat. Approximately 20% of the Blanding's Turtle's global range occurs in Southern Ontario and southwestern Quebec. Recent estimates suggest there are approximately 10, 000 Blanding's Turtles left in Ontario, though specific population data is unavailable (COSEWIC, 2005). Primary threats to Blanding's Turtle in Ontario arise from low reproductive success due to nest depredation by skunks, raccoons and other predators, and a reduction in suitable nesting habitat associated with habitat destruction and increased development within the Great Lakes Basin. The Ontario population of Blanding's Turtle is listed as Threatened (COSEWIC, 2005).

Spiny Softshell

The Spiny Softshell Turtle is a medium to large-sized freshwater turtle that inhabits a variety of aquatic habitats, but are most commonly found in rivers and lakes with soft-bottoms and an abundance of prey sources and nesting sites. Spiny Softshell Turtles are olive to tan in colour and have a flat, leathery shell with small spiny projections along the anterior edge. This species' long neck and tubular snout allow it to lie almost completely submerged and virtually unseen while waiting to ambush prey.

Spiny Softshell Turtles were once found throughout the lower Great Lakes-St. Lawrence watershed, but are now restricted to several isolated populations within its historic range. At present the largest concentrations of Spiny Softshell Turtles are found in eastern Ontario along the Ottawa River, St.

Lawrence River and Richelieu River-Lake Champlain system and in southwestern Ontario in Lake St. Clair, Lake Erie and within its major tributaries (Thames and Syndenham Rivers). The decline of Spiny Softshell Turtle populations in Ontario is largely attributed to habitat loss and degradation due to increased development along shorelines, and to a lesser extent, predation of eggs and young, environmental contamination and nest parasitism by sarcophagid fly larvae. This species is listed as Threatened in Canada (COSEWIC, 2002d).

Northern Map Turtle

The Northern Map Turtle is generally associated with lakes, rivers and ponds with fallen trees and debris for basking, though is most often found in rivers. Their diet consists mainly of mollusks, but they also eat insects and crayfish. The Northern Map Turtle's carapace is distinctive, with fine light lines resembling contour lines on a map. The Northern Map Turtle's Canadian range corresponds to the most densely populated area of the country, extending east along the entire north shores of Lake Erie and Lake Ontario (and into the St. Lawrence River) and north to Grand Bend and Ottawa. A smaller pocket also exists on the southeast shore of Georgian Bay, from approximately Midland to Parry Sound. The most significant threats to existing populations are therefore human-made structures, including dams and roadways along suitable shorelines, but international wildlife trading also threatens the Northern Map Turtle's survival (COSEWIC, 2002c). This species is listed as Special Concern in Canada.

Snapping Turtle

Snapping Turtles are generally associated with shallow ponds, shallow lakes and streams. As omnivores, their diet consists of plant and animal matter, including carrion. The Snapping Turtle is large and robust, with a ridged carapace and long tail with three rows of triangular tubercles. The Snapping Turtle's Canadian range includes the southern portions of Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick and Nova Scotia. The success of Snapping Turtle breeding is the most significant factor in its survival. Events such as harvesting, persecution and road mortality increase adult mortality and limit breeding success and are therefore significant threats to the Snapping Turtle's survival (COSEWIC, 2008b). The Snapping Turtle is a species of Special Concern in Canada.

4.1.2.2 Sampling Methodology

Ponds and wetlands that were being visited to conduct Jefferson Salamander surveys were visited a total of 10 times (with the exception of Ponds 4, 5, which were visited 4 times, and Ponds 8 and 9 in which landowner consent was not obtained). Care was taken when approaching the ponds as to not disturb any basking turtles so visual observation could be made. Salamander trap installation also required 'muddling' (stirring up of sediment) around the trap location, which also increased the chances of disturbing submerged turtles and thereby the chances of incidental encounters. The 2012 Jefferson Salamander survey provided additional opportunities to observe early emergence of turtles within the four (4) ponds surveyed.

Additional turtle basking surveys were carried out during the vegetation survey. These basking surveys were limited to permanent ponds within 120 m of the preferred route though observation of Pond 7 was inhibited by a chain-link fence surrounding the pond. Basking surveys were conducted during the early afternoon on clear, sunny days with temperatures between 20 and 25°C and consisted of visual observations of likely basking locations. Ponds were approached with care to avoid disturbing turtles and were monitored for at least 10 minutes. Due to the ephemeral nature of several of the ponds in the study

area (e.g. Ponds 2 and 6) no standing water was observed at the time of the vegetation survey, thus, it was assumed that no turtles were present within these ponds at those times.

4.1.2.3 Results and Discussion

Snapping Turtle was the only SAR turtle species documented within the Study Area, in and near Borer's Creek (refer to Figure 6). The species was observed on three separate occasions during the breeding bird and point count surveys and a single snapping turtle was observed in Pond 5 on several dates during the 2012 Jefferson Salamander survey (refer to Appendix D.2). Given the date and presence of ice on the pond it is likely that the turtle had over-wintered in the pond. Over 20 Painted Turtles (*Chrysemys picta*) were observed basking in Pond 3 (refer to Figure 2). Painted Turtle is not at risk provincially or nationally. There were no other turtles observed.

4.1.3 Snake Surveys

4.1.3.1 Species Background

Milksnake and Eastern Ribbon Snake were identified by the regulating agencies as having potential to occur within the study area.

Milk Snake

Milksnakes inhabit a range of habitat types including hay fields, pastures, swamps and woodlands, particularly those that are in close proximity to water. In Ontario, this species is more commonly found in heavily forested areas, than those with low forest cover (COSEWIC, 2002b). Main threats to Milksnake populations include habitat loss, road kill and persecution. Milksnakes do not openly bask as often as other snakes, but thermoregulate by obtaining heat indirectly and are often found underneath objects that are in direct sunlight. The Milksnake is listed as Special Concern in Canada (COSEWIC, 2002b).

Eastern Ribbon Snake

Eastern Ribbon Snakes are generally associated with wetland and pond edge habitats as their diet includes frogs, tadpoles, salamanders, small fish and aquatic insects. Similar in appearance to the Eastern Garter Snake, the Ribbon Snake can be distinguished from its close relative by close examination of the dorsal stripes; those of the Ribbon Snake fall on scale rows 3 and 4, while those of the Garter Snake fall on rows 2 and 3. Though likely never common in Ontario, Ribbon Snake populations are threatened by habitat loss, collecting, road kill and predation by domestic animals (COSEWIC, 2002a). The Eastern Ribbon Snake is listed as Special Concern in Canada.

4.1.3.2 Sampling Methodology

Surveys for the Milk and Ribbon Snakes were conducted along suitable habitat areas and under suitable weather conditions (warm sunny days for basking observations) to maximize sightings of adult and young snakes, clutches of eggs and/or active hibernacula sites. Forested and open habitats, as well as habitats close to water, were surveyed visually by all surveyors throughout the 2011 field season. Potential cover objects were flipped by all surveyors and any snake observations were recorded.

4.1.3.3 Results and Discussion

Neither SAR snake species was encountered on the site; however, sightings of Eastern Garter Snake (*Thamnophis sirtalis sirtalis*) and DeKay's Brown Snake (*Storeria dekayi*) were noted (see Appendix K).

4.2 Birds

4.2.1 Owl Surveys

4.2.1.1 Species Background

Barn Owl

The Barn Owl is a medium-sized, buff-coloured owl with a distinctive heart-shaped facial disk. The head is rather large and lacks ear tufts. The upperparts are mainly buffy; the underparts are tawny to white, with fine black spots or speckles. Barn Owls prefer low-elevation, open country, where their small rodent prey are more abundant. In Canada, they are often associated with agricultural lands, especially pasture, and most nests are found on man-made structures, especially those which are abandoned or unused.

Eastern Canada supports a tiny fraction of the global population. Owing to its intolerance of cold climates and deep snow cover, populations in Canada are restricted to parts of southern British Columbia and southwestern Ontario, where the species is now close to being extirpated. The species is declining and is threatened by ongoing loss and degradation of grassland and old field habitat and by the conversion of old wooden barns and other rural buildings to more modern structures. This owl is also exposed to increasing levels of road-kill mortality owing to expansion of the road network and increases in traffic volume. The Eastern Population of Barn Owl in Canada is listed as Endangered (COSEWIC, 2010a).

Short-eared Owl

The Short-eared Owl has a large, round head, with small tufts of feathers that look like ears. This medium-sized owl measures approximately 34 to 42 cm in length. It has fairly long wings and a short tail. Adults have a brown back and creamy-buff chest with brown streaks. Sexes are similar in appearance, but females are slightly larger and tend to be darker. Juveniles resemble adults, but their plumage is somewhat more buff in colour. The Short-eared Owl is conspicuous only when it flies, often at dawn and dusk. It can easily be identified by its irregular flight, which resembles that of a foraging moth. It is characterized by deep wingbeats, occasional hovering, and a habit of skimming patches of grassland or marsh.

Possible factors for population decline include habitat loss and alteration, especially of coastal marshes and grasslands that were formerly heavily used by wintering owls, but also grasslands on the Canadian prairies and in southern Ontario, increased nest depredation (as a result of habitat fragmentation); declines in prey abundance as a result of habitat changes; and collisions with vehicles, utility lines, and barbed wire fences. The Short-eared Owl is listed as Special Concern in Canada (COSEWIC, 2008a).

4.2.1.2 Sampling Methodology

Nocturnal Owl surveys for the Barn Owl and the Short-eared Owl were conducted in 2011 along suitable habitat areas within the study area. The methodology outlined within the Ontario Nocturnal Owl Survey (Nocturnal Owl Surveys in Central Ontario: a Citizen Scientist's Guide: Bird Studies Canada, 2003) was followed. Surveys took place over four (4) evenings (April 14, April 18, June 18 and June 25, 2011) for Barn and Short-eared Owls, focusing on locations near or adjacent to potential habitat. Fields were visually surveyed at dusk throughout the field season (April to August) as well to monitor any dusk activity. Owl survey routes are shown in Figure 3.

Based on the timing and nature of the owl surveys, OMNR requested that further nocturnal owl surveys be conducted in February 2012 to maximize opportunities for encounters. Given that Short-eared Owls and Barn Owls do not typically respond to playbacks, as used in the 2011 survey, it was recommended that a vehicle roadside survey be conducted in 2012. The 2012 survey was conducted along the 2011 routes during the optimal timing window for owl surveys (February to March) and included an additional survey route as suggested by OMNR staff. No owl species were heard or detected visually.

4.2.1.3 Results and Discussion

No owl species were visually sighted or heard calling back from the audio recordings during any of the owl surveys at any location. No owls of any species were observed by any of the surveyors from April to August 2011 and February 2012, including intensive point count surveys in Spring 2011 (refer to Appendix E.1).

Owls in general are typically more active and visible in the winter (November through March), and particularly vocal during mating season (usually February). No Barn Owl sightings occurred in Hamilton or Halton Region in 2011. Short-eared Owls were not observed in Halton in 2011 and only a single Short-eared Owl has been documented in Hamilton on January 9, 2011 for the year to date, according to eBird, the Cornell Lab of Ornithology's interactive birding database (http://ebird.org/content/ebird, accessed October 5th, 2011).

Based on the results of this multiple method and seasonal survey, it is GENIVAR's opinion that the study area is not being used by the two targeted owl species. Details pertaining to the 2012 owl survey are provided in Appendix E.2.

4.2.2 Breeding Bird Surveys

Breeding bird surveys were completed by Michael King, Ornithology, over a period covering the entire breeding season (May 15 to June 30) and included a total of eighteen (18) site visits. Birding involved visual and auditory observation while walking the length of the site during optimal observation timing windows, as well as point counts at eleven (11) established birding stations using the Ontario Breeding Bird Atlas (OBBA) Guide for Participants protocol (2001). Stations were established based on initial field observations and included the areas in which identification of the maximum number of species was likely. Refer to Table 5 and Figure 6 for point count location details. Each point count station was visited three (3) times during the survey. The first visits occurred between May 22 and May 29; the second between June 11 and June 18; and the third between June 25 and July 3, with at least thirteen days between visits.

Table 5: Birding Station Locations (UTM, NAD 83, Zone 17T)

Station #	Easting	Northing
A	0586894	4797672
B	0587318	4798136
C	0587739	4798542
D	0588202	4799047
E	0588588	4799416
F	0590761	4800200
G	0592373	4801182
H	0592396	4801671
I	0590973	4798435
J	0591416	4797211
K	0591906	4796734

A total of 85 bird species were observed over the course of the study. Fifty-six (56) bird species were documented during the Point Count portion of the survey, including one avian SAR (Bobolink) and another of the sixteen targeted bird species (Barn Swallow). During the SAR focussed surveys, four (4) of the 16 targeted bird species were documented, namely, Bobolink, Eastern Meadowlark, Chimney Swift, and Barn Swallow. Snapping Turtles were also observed in three separate locations during the SAR surveys. Complete results of the Breeding Bird Surveys are included in Appendix F. Locations of SAR observations are shown on Figure 6.

Whip-poor-will

Whip-poor-wills generally prefer rock or sand barrens with scattered trees, savannahs, old burns or disturbed sites in early to mid-successional stages (COSEWIC, 2009b). The preferred habitat for this species is not prevalent on the project site and this species has not existed in large numbers within the site vicinity in the past.

Concurrently with the early-morning surveys for other bird species taking place at the eleven (11) monitoring stations, pre-dawn surveys were conducted in accordance with the Central Ontario Whip-poor-will Survey Participants Guide (BSC, 2010), with minor modifications. Focus was on areas of open habitat, such as plantation forests, within the study area. No Whip-poor-wills were seen or heard during the field season.

4.2.3 Chimney Swift and Common Nighthawk Dusk Surveys

4.2.3.1 Species Background

Chimney Swift

The Chimney Swift is readily distinguished by its cigar-shaped body; long, narrow, pointed wings; unique call; short tail; and quick, jerky flight, similar to that of a bat. Its folded wings project considerably beyond the spiny-looking tail. It is a small bird with dark brown, slightly iridescent plumage. The throat is brownish grey. There are no significant differences between the male and the female, and juveniles and adults have similar plumage. Chimney Swifts are found in and around urban settlements where they nest and

roost in uncapped chimneys and other human-made structures. They also tend to stay close to water as this is where the flying insects they eat congregate.

Many aerial insectivores, including this species, swallows and nighthawks, have suffered population declines throughout the Americas over the past 30 years. The Canadian population of this species has declined by almost 30% over the last three generations (13.5 years) and the area it occupies has declined by a third over the same time period. The estimated Canadian population is about 12,000 individuals.

The causes for these widespread declines are unknown but likely involve impacts to insect populations through pesticide use and habitat loss. Of this species group, the current species has had the most serious known decline, probably because of the steadily decreasing number of suitable chimneys that the swifts use for nesting and roosting. Very few natural sites (large hollow trees) exist and current forest management regimes make it unlikely that many more will be available in the future. The Chimney Swift in Canada is listed as Threatened (COSEWIC, 2007a).

Common Nighthawk

Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores and mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways, they tend to occupy natural sites.

In Canada, this species has shown both long and short-term declines in population. A 49% decline was determined for areas surveyed over the last three generations. Reduction of food sources has apparently contributed to the decline of this species, as with several other aerial insectivores. Reductions in habitat availability, caused by fire suppression, intensive agriculture, and declines in the number of gravel rooftops in urban areas, may also be factors in some regions. The Common Nighthawk is listed as Threatened in Canada and as Special Concern in Ontario (COSEWIC, 2007b).

4.2.3.2 Sampling Methodology

The Chimney Swift Monitoring Protocol was followed (Bird Studies Canada (BSC), April 2010), with minor modifications, and surveys were conducted by a trained individual. As Chimney Swifts and Common Nighthawk are often seen and heard together over downtown areas, surveys for both species were conducted using the same methodology. Steps of the Swift Monitoring Protocol (Ontario Swift Watch) are as follows:

1) Chimney Inventory - The chimney inventory is a systematic assessment of potential swift nest and roost chimneys, and their related physical characteristics. It is performed once at the beginning of the first season of Ontario Swift Watch. GENIVAR completed this task on May 16th and 17th, 2001.

2) Presence/Absence Surveys - Presence/Absence surveys are conducted to identify the total number of active chimneys within a community. They are performed during the first season of Ontario SwiftWatch. Surveys are to take place on the same day each week during breeding season (May 15th to July 15th) and roosting season (August 1st to September 15th). GENIVAR conducted this task from May 16 to June 7th, 2011 twice a week on Sunday and Monday evenings during the breeding period.

3) Evening Monitoring - Evening Monitoring involves counting the total number of birds seen entering a chimney. Evening monitoring can be performed at active chimneys located within the assigned survey squares during the first season of SwiftWatch.

4) Daytime Monitoring (Optional) - The number of entrances and exits by swifts observed at active chimneys are recorded at active chimneys located anywhere within the community (BSC, 2010).

Steps 3 and 4 were not conducted for this survey as no active chimneys were observed.

Daytime surveys during May concentrated on assessing suitable nesting sites (open, uncapped chimneys, and other natural or human-made hollow areas) using BSC Chimney Assessment forms. Newer buildings generally do not have chimney types conducive for nesting; as such, newer subdivisions were not included in the survey, and older town and farmhouses with uncapped chimneys were the focus for potential nesting sites. Chimney type observations were non-intrusive, using binoculars and from public sidewalks or roadsides.
The Chimney Swift Monitoring Protocol recommends survey squares of 500 square metres. Due to the size of the Waterdown study area, larger areas were monitored. Initial field reconnaissance identified four (4) main areas within the study site of potential chimney swift habitat:

- Chimney Swift 1 or CS1: Parkside Road E, west to Highway 6, north to Concession 5 East (silos and open chimneys present);
- CS2: Dundas Street East to Hamilton Street North to John Street West to Main Street West (rooftops and open chimneys present);
- CS3: Mill Street South to Union Street to Main Street South to Flamboro Street to Dundas Street East (rooftops and open chimneys present), and
- CS4: Evans Road to Dundas Street East to Kerns Road south (small ponds, open chimneys and an abandoned quarry present).

Concurrently and following the Chimney Inventory, eight (8) Presence/Absence evening surveys were conducted for a minimum 30 minutes in duration, commencing 15 minutes before sunset at potential nesting sites to document any activity. For safety reasons, surveys were performed by slow-moving car (windows rolled down) until swifts were seen and/or heard, at which point the survey would continue on foot. Chimney Swifts were identified by their calls and by visual sightings. The single Common Nighthawk identification was by call on the evening of Monday May 23rd, 2011. In addition, surveyors watched for visual identification of Common Nighthawks in all woodland clearings and other open areas while traversing the study area.

Chimney Assessment forms are provided in Appendix G. Locations of Chimney Swift and Common Nighthawk locations are shown in Figure 3.

4.2.3.3 Results and Discussion

Chimney Swifts were observed on five (5) of the eight (8) Presence/Absence evening surveys and Common Nighthawk was heard on one of the eight evening surveys. All observations were in CS2 and CS3, representing the downtown core (Dundas Street and Mill Street vicinity). Swifts were commonly seen in small groups of 2 or 3 individuals, which is typical for swift courtship displays. Two swifts flying together often represent a pair, begins early after the swifts' return to Ontario and continues through the breeding cycle. Another common flight pattern is three swifts together, termed a "trio glide", in which two birds flying close together follow a leader bird (usually two males following a female). This behaviour is

exhibited just prior to breeding (Stokes, 1979). No active chimneys were documented, and interest in any particular chimney or potential roost location was not observed during the eight surveys. Presence/Absence Observations for Chimney Swift and Common Nighthawk are provided in Table 6. Refer to Figure 6 for locations.

Table 6: Chimney Swift and Common Nighthawk Observations

Date	Survey Square	# of Birds	General Location	General Observations
May 22, 2011	CS2	2 Chimney Swifts	Mill St North and Dundas St East above Village Theatre/Library parking lot	Most frequent location for swift observations throughout the field season. Two open chimneys present, no interest in any particular chimney.
May 23, 2011	CS2	3 Chimney Swifts	Mill St North and Dundas St East above Village Theatre/Library parking lot	Two open chimneys present, no interest in any particular chimney.
May 23, 2011	West of CS2	1 Common Nighthawk	Exact location unknown, mostly likely foraging over downtown residential area or open ballfield.	Auditory only.
May 30, 2011	CS3, flew west outside of monitoring square, then north into CS2	3 to 4 Chimney Swifts	Mill St North and Dundas St East above Village Theatre/Library parking lot Dundas Street East	Several open chimneys present, no interest in any particular chimney.
June 6, 2011	CS2 and north of monitoring square	3 Chimney Swifts	Mill St North and Dundas St East above Village Theatre/Library parking lot Dundas Street East	Two open chimneys present, no interest in any particular chimney.
		5 Chimney Swifts	Mills and Elgin Street above school yard	No open chimneys observed, although bell tower in adjacent church may be a potential roosting site.
		2 Chimney Swifts	Main and Church Streets	No open chimneys observed.
June 7, 2011	CS2 and north of monitoring square	2 Chimney Swifts	Mill St North and Dundas St East above Village Theatre/Library parking lot Dundas Street East	Daytime incidental observations, 12 and 4 pm.
		3 Chimney Swifts	Mills and Elgin Street above school yard	No open chimneys observed, although bell tower in adjacent church may be a potential roosting site.

Least Bittern

Least Bittern prefer freshwater marshes with tall stands of cattails or other emergent vegetation, relatively stable water levels, and interspersed with small open water pockets. Larger wetland areas (> 5 to 10 ha) have the highest likelihood of housing this species, and are generally preferred; however, they have been known to use suitable habitat under 0.5 ha if habitat is limited (COSEWIC, 2009a). The species is a small wader, very cryptic and seldom flies, and therefore must be monitored primarily by auditory methods.

Initial desktop review and field surveys of the project site and associated areas of influence did not have record of large, appropriate habitat types for this species, but several small isolated ponds were identified. The Marsh Monitoring Protocol (produced by Bird Studies Canada in partnership with the Canadian Wildlife Service and the U.S. Environmental Protection Agency, Bird studies Canada, 2011). Dawn surveys were conducted in June using playback tapes. No least bitterns or any other wading bird responded to the tapes on any of the survey mornings.

Overall, five (5) of sixteen (16) potential SAR species were found in the Study Area during field activities from April to August, 2011. A summary of first date of arrival and known departure dates for these sixteen species, for the Hamilton and Halton Regions, as well as GENIVAR's survey dates and sightings, is given in Table 7.

4.3 Mammals

Through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it has been noted that there is potential for populations of Woodland Vole and American Badger in the study area.

The Woodland Vole has been identified as a species of Special Concern by the OMNR and COSEWIC, while the American Badger is listed as Endangered by both agencies. Accepted field sampling protocols for Woodland Vole involve live-capture trapping and require a Scientific Collectors permit, and an approved Animal Care Protocol from the OMNR Wildlife Animal Care Committee. A permit was also required from Conservation Halton (CH) to survey on conservation land in the Waterdown Escarpment Woods Environmentally Sensitive Area south of Mountain Brow Road. Permits were issued on July 18 and August 29, 2011 by the OMNR and CH, respectively, for work up to September 16, 2011. Copies of these permits are provided in Appendix B. Surveys for American Badger do not involve trapping, and instead typically rely on incidental observations of tracks, scat and badger dens in targeted preferred habitat areas.

The following sections describe the methods used to survey for these species, the results of the surveys, implications and any applicable mitigation measures. Incidental observations of other mammal species noted during field surveys were also documented (refer to Appendix K).

Table 7: Regional Arrival and Departure Dates for Targeted Avian Species At Risk and Dates of 2011 Surveys and Sightings in the Waterdown Study Area

Avian SAR Species	Arrival Date		Departure Date		GENIVAR Avian Survey Dates	Documented? (Y/N)	GENIVAR Survey Dates Encapsulate Local Sightings in 2011? (Y/N)
	Hamilton	Halton	Hamilton	Halton			
Acadian Flycatcher	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	May 21 - July 3, 2011	N	Not recorded in 2011 (as of October 1, 2011)
Barn Owl	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	April 14 - June 26, 2011	N	Not recorded in 2011 (as of October 1, 2011)
Barn Swallow	9-Apr-11	9-Apr-11	10-Sep-11	9-Sep-11	May 16 - June 7, 2011	**Y**	Shorter than season, but species observed May 22 June 12, July 3,
Black Tern	24-Jul-11	25-Sep-11	25-Sep-11	25-Sep-11	May 21 - July 3, 2011	N	No
Bobolink	16-May-11	9-May-11	16-Aug-11	7-Aug-11	May 21 - July 3, 2011	**Y**	Shorter than season, but species observed on May 21, 22 and June 12
Cerulean Warbler	Not recorded for 2011	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	May 21 - July 3, 2011	N	Not recorded in 2011 (as of October 1, 2011)
Chimney Swift	6-May-11	11-May-11	28-Aug-11	30-Jul-11	May 16 - June 7, 2011	**Y**	Shorter than season, but species observed on May 22, 23, 30 , June 6 and 7, 2011
Common Nighthawk	30-May-11	27-May-11	25-Aug-11	27-May-11	May 16 - June 7, 2011	**Y**	Shorter than season, but species documented on May 23, 2011
Eastern Meadowlark	18-May-11	19-May-11	15-Aug-11	24-Sep-11	May 21 - July 3, 2011	**Y**	Shorter than season, but species observed June 18, 2001
Hooded Warbler	21-May-11	21-May-11	21-May-11	18-Jun-11	May 21 - July 3, 2011	N	Yes
Least Bittern	26-Apr-11	Not recorded in 2011	7-Jun-11	Not recorded in 2011	May 21 - July 3, 2011	N	No
Louisiana Waterthrush	8-May-11	21-May-11	21-May-11	25-Jun-11	May 21 - July 3, 2011	N	Yes
Peregrine Falcon	4-Jan-11	21-Feb-11	4-Jan-11	21-Feb-11	May 21 - July 3, 2011	N	No, only observed in winter in 2011
Red-headed Woodpecker	13-May-11	19-May-11	21-May-11	25-Jun-11	May 21 - July 3, 2011	N	Yes
Short-eared Owl	9-Jan-11	Not recorded in 2011	9-Jan-11	Not recorded in 2011	April 14 - June 26, 2011	N	No, only observed in winter in 2011
Whippoorwill	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	Not recorded in 2011	May 21 - July 3, 2011	N	No, last observed in winter in 20009

*Arrival/departure dates as per ebird, Cornell Ornithology Lab (http://ebird.org/content/ebird, accessed October 5th, 2011)

* Not recorded in 2011 as of date of Draft Report Submission

* Bird species presented in alphabetical order for ease of reference

4 of 16 species not recorded in Hamilton in 2011 to date - Acadian Flycatcher, Barn Owl, Cerulean Warbler and Whip-poor-will

6 of 16 species not recorded in Halton in 2011 to date - Acadian Flycatcher, Barn Owl, Cerulean Warbler, Least Bittern, Short-eared Owl and Whip-poor-will

4.3.1 Woodland Vole

4.3.1.1 Background Information

The Woodland Vole (M*icrotus pinetorum*) is a small rodent with chestnut brown dorsal fur and greyish fur on its ventral side. Rarely active above ground, *M. pinetorum* spends most of its time in subterranean tunnels, burrows and nests making survey difficult, particularly in Ontario where population densities are low. *M. pinetorum* has a stocky body with a relatively large, flattened head and small eyes and ears. Its short tail, which is approximately twenty percent the length of its body, distinguishes it from other vole species in southern Ontario (COSEWIC, 1998).

M. pinetorum is active year-round and although daily patterns have not been observed, it is thought to be most active between dusk and dawn. It spends most of its time in surface runways just beneath the leaf litter and in complex tunnel systems roughly 10 cm beneath the ground (COSEWIC, 1998). *M. pinetorum* feeds on a variety of plant material including roots, stems, tubers, seeds, fruits, nuts, bark and leaves, and occasionally on animal matter.

The Woodland Vole can be found across most of eastern North America and is at the northern extent of its range in southern Ontario and Quebec. In Ontario, *M. pinetorum* has been found in mature deciduous forests where a deep humus layer and soft, friable soil allows for easy burrowing; however, they have also been found in edge habitats along forest and field edges, and near roads, paths, and railroad tracks.

4.3.1.2 Methodology

The methodology used for the presence / not detected study for the Woodland Vole was based on previous similar studies in Ontario (Karolyne Pickett pers. comm., 2011) and available protocols from the Alberta Wildlife Animal Care Committee (2005) and the British Columbia Ministry of the Environment (1998). Detailed methodology for this study is outlined below.

The study area (outlined in Figure 1) was surveyed to determine candidate *Microtus pinetorum* survey locations based on the descriptions of preferred habitat provided in the COSEWIC Status Report (COSEWIC, 1998). Woodland voles have been found in habitats with the following characteristics:

1. Mature deciduous forests dominated by maples (*Acer* spp.), oaks (*Quercus* spp.), ashes (*Fraxinus* spp.), American Beech (*Fagus grandifolia*), etc. and characterized by substantial ground cover (herbaceous plants and/or shrubs) or woodland edges with dense, low herbaceous vegetation, bordering fields or pastureland, and;
2. Light, sandy, loamy, friable soil with moisture content ranging from 0-75% with a deep humus layer.

Based on a review of satellite images, land use, topographical maps of the property and preliminary site work, three forested areas were chosen for the survey, one in the Waterdown North Development area, one along Mountain Brow Road (Waterdown Escarpment Woods), and the other east of Waterdown Road (Sassafras Woods) in the southern portion of the study area. Sixty pitfall traps were deployed in three transects within suitable habitat in each of the three survey areas (refer to Figure 4). Seven of the nine transects had 20 traps deployed; Transects 2 and 3 in the Waterdown Escarpment Woods had 15 and 25 traps respectively.

The traps consisted of unused 1 gallon paint cans counter-sunk approximately 5 cm below the ground surface to accommodate the fossorial nature of this species. Traps were set every evening and were stocked with a variety of food sources including nuts, pieces of potato, peanut butter and oats. As traps were likely to capture other small insectivorous mammals, such as shrews, mealworms were provided to reduce mortality rates. Natural fiber bedding was provided as insulation and holes were punched in the base of all traps to ensure proper drainage. Each trap was numbered and marked with flagging tape. UTM co-ordinates and general habitat characteristics, including dominant tree, shrub and herbaceous plant species, were recorded for each trap (refer to field notes in Appendix H).

The survey was conducted for three consecutive nights including August 31, September 1 and September 2, 2011. Traps were opened every evening between 6:00 pm and 8:00 pm and checked the following morning between 6:30 am and 10:00 am. Any small mammals caught in the traps were identified, photographed, weighed and measured before being released. Once all animals and debris had been removed, traps were restocked and lids were put in place to prevent animals from falling into the traps during the day.

On the evening of August 31, 2011, traps 16 through 25 were not set for Transect 3 in the Waterdown Escarpment Woods survey area. The traps were set more than 5 m apart, and with a thick understory, visibility was hampered as sunset approached. Additional flagging of this transect the following day, and earlier trap setting allowed for deployment of these traps on the remaining two nights of the survey.

4.3.1.3 Results and Discussion

There were no Woodland Voles caught during the survey. The only small mammals trapped were caught on the first night of the survey. On September 1, 2011 four small mammals, three Northern Short-tailed Shrews (*Blarina brevicauda*) and one Masked Shrew (*Sorex cinereus*), were captured. Trap locations, measurements and general condition of the animals are summarized in the table below. Live animals were released in the vicinity of the trap.

Table 8: Results of Woodland Vole Survey

Trap Location	Species	General Condition	Measurements
Waterdown Road South Transect 3, Trap 1 UTM: 17T 0591723 E 4796778 N	Northern Short-tailed Shrew	Dead and wet	Weight (wet): 19.5 g Total length: 10.5 cm Tail length: 2.7 cm
Waterdown Woods Transect 1, Trap 4 UTM: 17T 0591068 E 4798418 N	Northern Short-tailed Shrew	Good condition; alive, energetic and dry	Weight (dry): 12.5 g Total length: 10.5 cm Tail length: 2.0 cm
Waterdown Woods Transect 2, Trap 15 UTM: 17T 0591411 E 4798592 N	Northern Short-tailed Shrew	Poor condition; alive, sluggish and wet	Weight (wet): 15.5 g Total length: 9.5 cm Tail length: 2.2 cm
Waterdown North Transect 3, Trap 19 UTM: 17T 0586850 E 4798036 N	Masked Shrew	Dead and wet	Weight (wet): 3.2 g Total length: 8 cm Tail length: 4.0 cm

Toads and a variety of insects and slugs were also caught in the traps. On the first night, 33 toads were caught in the Waterdown North area, two (2) were caught in the Waterdown Road South traps, and none were caught in the Waterdown Escarpment Woods survey area. These numbers decreased substantially over the following two nights of trapping; only two toads were caught on each night, both in the

Waterdown North area. Toads often forage at night when temperatures are lower and humidity levels tend to be higher. Late night storms on the first night of the survey created favourable conditions for amphibians and increased activity in these damp conditions likely resulted in the higher number of toad captures that night.

Weather conditions during the survey were relatively consistent with overnight lows of approximately 17 °C and daytime highs between 23 and 29 °C. Following the first night of trapping the traps were wet due to the overnight storms. The second and third nights were dry, with no record of precipitation in the area.

In addition to differences in weather conditions, the lower numbers of captures on the second and third nights of the survey may also be due to increased rates of predation on animals caught in the traps. This was particularly true of the traps in the Waterdown North area, where several of the traps had been disturbed, with obvious signs of digging in the area immediately surrounding the mouth of the trap. Tracks in the area suggested that skunks and/or raccoons were likely culprits; however, it is possible that other species were involved and went undetected. In the Waterdown Escarpment Woods survey area, squirrels were abundant and may have removed nuts or peanut butter mixtures from the traps.

4.3.2 American Badger

4.3.2.1 Background Information

The American Badger is a medium-sized carnivore in the Family Mustelidae (weasels). Badgers are slightly larger than raccoons and are grey in colour with black and white stripes on the face and head. With long claws on their front feet and a flattened body, they are well-adapted to digging and life underground. Badgers are a fossorial species and require soils that are suitable for digging and of sufficient depth to allow for the creation of their burrows. Historically badgers likely inhabited tall-grass prairies and oak savannahs, but now can be found in natural and disturbed grasslands, pastureland, old fields, edges of agricultural fields and orchards, scrubland and wooded areas (Ontario American Badger Recovery Team, 2009). In Ontario, their diet consists primarily of Groundhogs (*Marmota monax*), Eastern Cottontails (*Sylvilagnus floridanus*), mice and voles (Dobbyn, 1994) and as such, badgers are typically found in areas with relatively large areas of grassland and/or scrubland habitat which support prey populations.

Key threats to badgers are loss of habitat and road fatalities. It is estimated that only 5% of Ontario's tall-grass prairies and savannah remain (Ontario American Badger Recovery Team, 2009). There are four subspecies of American Badger in North America; the Ontario population is the *jacksoni* subspecies and is at the northern end of its range in southern Ontario. Populations in this area are isolated from neighbouring populations due to habitat fragmentation, the barriers posed by the Great Lakes and extensive development along potential corridors.

The Draft Recovery Strategy for the American Badger in Ontario (Ontario American Badger Recovery Team, 2009) does not list any known sightings in the Halton Region. Based on sightings between 2000 and 2008, badger populations appear to be concentrated in Lambton, Middlesex and Norfolk counties with current population estimates of less than 200 in the province. In 2007, a roadkill two-year old male badger was found at the end of Centre Road where it meets the Flamborough Centre Wetland Complex Provincially Significant Wetland. The OMNR conducted surveys for badger and prey burrows in the area, but none were identified (Savanta, 2011).

4.3.2.2 Methodology

Survey efforts for the American Badger were based upon track and scat identification and burrow surveys. Any visible track or scat seen throughout the study area was examined to determine the presence of this species during all phases of the project. Burrow surveys included searching locations with high potential for use as burrow sites, including field and road edges, and edge of forested habitats with access to food sources. Edges of fields, and roadsides in agricultural areas and meadows were surveyed for the presence of burrows or evidence of badger activity. Emphasis was given to those areas within 120 m of the preferred route.

4.3.2.3 Results and Discussion

There were no sightings of badgers, potential badger dens, or scat evidence in the study area however there was one set of unidentified tracks observed in the Waterdown North area. The poor quality of the track made it difficult to assess and photograph (see below) and a definite identification was not possible. The distinct claw marks and placement of front and hind paw associated with the print are suggestive of American Badger, but are not conclusive. This observation was made at Trap 15, Transect 2 in the Waterdown North area on September 2, 2011. The approximate UTM co-ordinates are 17T 0586740 E 4797977 N (NAD 83). Refer to Image 7 in Appendix C-3.

Immediate habitat around the trap consisted of mixed forest dominated by White Spruce, Green Ash, Trembling Aspen, Red Pine and Black Walnut. Soils in the area were sandy and moist. Agricultural fields to the north and south of the woodland could provide suitable foraging habitat for American Badger.

The results of our small mammal trapping survey cannot rule out the presence of Woodland Voles in the area. Pitfall traps are an open trap system which allow for undetected access by predators. The potential for tampering with the traps and predation on trapped animals reduces the effectiveness of the survey, and the likelihood that results truly represent small mammal populations in the area. The degree of disturbance surrounding several traps suggests that predation may have been an issue and that trapping success in the area could be underestimated. Beyond the removal of trapped animals by other wildlife, the open nature of the traps also allowed for the pilfering of traps by squirrels which reduced the food sources available for trapped animals.

4.4 Vegetation

This section provides background information on the seven floral species at risk surveyed, outlines the methodology and results of the survey and explores implications and potential mitigative measures. A general survey of vegetation present on the site was conducted, with emphasis directed towards areas that may provide suitable habitat for the species of concern.

Several Environmentally Sensitive Areas (ESAs) exist in the study area (refer to Figure 1; Halton Region, 2005). The Sassafras Woods is a 136 hectare secondary growth hardwood forest located in the southern portion of the site and is home to a number of provincially rare plants and animals. The Grindstone Creek Valley is the major basin for the extreme southwest part of Halton Region and has been identified as one of the top botanical sites in Halton Region and is home to a variety of provincially and nationally rare plant and animal species. The Waterdown and Clappison Escarpment Woods are designated biosphere reserves due to the presence of vertical bedrock exposures of the Niagara Escarpment in the area. These woodlands are also reported to support a highly diverse community of vascular plants including several

species that are considered provincially rare. All four areas have been designated as Provincially Significant Life Science Areas of Natural and Scientific Interest (ANSI) by the OMNR. The Sassafras Woods was searched as part of the vegetation survey, while observations of the Waterdown Escarpment Woods were made during the Woodland Vole survey.

The study area exists within the northern reach of the Carolinian (or Deciduous) forest region, a narrow band extending between the northwest shore of Lake Ontario down to Windsor. This forest region reaches from southern Ontario down to Georgia. Although many of the plant and animal species characteristic of the Carolinian forest are common in the United States, they are considered rare in Ontario.

4.4.1 Background Information

Species descriptions, habitat requirements and potential threats to the seven species at risk (refer to Table 2) with the potential to be in the Study Area are outlined below.

American Chestnut

American Chestnut (*Castanea dentata*), a member of the beech family, is typically associated with dry upland deciduous forests with sandy, acidic soils. It is a shade-tolerant tree that is commonly associated with Red Oak (*Quercus rubra*), Black Cherry (*Prunus serotina*), Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*), White Ash (*Fraxinus americana*), White Oak (*Quercus alba*), Red Maple (*Acer rubrum*) and Sassafras (*Sassafras albidum*). Chestnuts are at the northern extent of their range in Ontario and are restricted to the Carolinian Zone in southwestern Ontario. Once common in dry deciduous forests of North America, chestnut numbers have been drastically reduced by the introduction of Chestnut Blight approximately a century ago. It is estimated that only 120 – 150 mature trees remain in Canada with remnant populations existing as either single trees or small groups (COSEWIC, 2004). An additional 1000 individuals are thought to persist as stump sprouts in rich, upland deciduous forests.

According to the OMNR's NHIC database American Chestnut has been recorded throughout the study area. It has also been identified as one of the few rare floral species found in the Sassafras Woods. According to the Hamilton Naturalists Club, it has been found in Clappison Escarpment Woods (Savanta, 2011). American Chestnut is Endangered in Ontario.

American Columbo

American Columbo (*Frasera caroliniensis*) is a perennial herb that is found within the Carolinian forest region of Canada, in southwestern Ontario. It is most common in dry upland deciduous forests, but has also been found along forest edges, in dense thickets, open meadows and grasslands. It is at the northern extent of its range in Canada and was likely never common in the province. Threats to American Columbo include competition from invasive plants and development. Plants are typically observed in their vegetative form as a basal rosette of 3-25 deciduous leaves. Individual plants flower only once, after 7-15 years of growth, producing a single flowering stem approximately 2-3 metres tall. Limited information is available regarding the timing of flowering and senescence of this plant, however it is likely that flowering occurs sometime during early summer (likely June) and senescence may be complete by mid-August (COSEWIC, 2006).

American Columbo has been recorded in the general area, along Borer's Creek, within Clappison Escarprment Woods, Sassafras Woods and along King Road. The population in Sassafras Woods was estimated at 100s of vegetative plants in 2005, while over 500 were recorded in 2004 (COSEWIC, 2006). Previous studies (Savanta, 2011) which surveyed several properties in the Waterdown North area did not detect American Columbo in the immediate area. American Columbo is Endangered in Ontario.

American Ginseng

American Ginseng (*Panax quinquefolius*) is a long-lived perennial herb often found at the base of gentle south-facing slopes in rich, moist undisturbed deciduous forests dominated by Sugar Maple, White Ash, Bitternut Hickory (*Carya cordiformis*) and Basswood (*Tilia americana*). Reproductive plants flower in the summer, with fruits appearing in late summer and ripening in August to September. In Ontario, concentrations of American Ginseng are located along the Niagara Escarpment and the eastern edge of the Precambrian Shield. Major threats to American Ginseng are small population size, harvesting and habitat loss due to forest clearing and logging.

An estimated seven viable populations (approximately 8600 individual plants) are thought to remain in Ontario (COSEWIC, 2000). A small population of less than 170 plants was thought to exist in the general study area based on a 1996-1998 survey (COSEWIC, 2000). American Ginseng is listed as Endangered in Ontario.

Butternut

Butternut (*Juglans cinerea*) is a small to medium-sized deciduous tree in the Walnut family that is typically found as scattered individuals or in small groups in mixed hardwood stands. It is at the northern extent of its range within Canada and is found in southern Ontario, Quebec and New Brunswick. As a shade intolerant species Butternut does not reproduce or grow well under a forest canopy and as a result is more commonly found along fence lines, in open fields and at forest edges. Although once widespread within its range, Butternut numbers are declining due to the spread of Butternut Canker, an introduced fungus that attacks and eventually kills most infected trees. The fungus often appears as a sooty patch on the trunk or branches of the tree, and as the infection worsens the bark splits and falls away creating an open canker.

Butternut grows best in rich, moist soils along watercourses but may also be found on well-drained gravelly soils of limestone origin. It is commonly associated with other hardwoods such as Basswood, Black Cherry, American Beech, Black Walnut (*Juglans nigra*), White Elm (*Ulmus americana*), Red Maple, Sugar Maple, Oak, Hickory, Eastern Hemlock (*Tsuga canadensis*), White Ash and Yellow Birch (*Betula alleghaniensis*) (COSEWIC, 2003).

Suitable habitat for Butternut exists throughout the study area. Available information sources indicate that Butternut exists within the Halton Region and north of the City of Hamilton (COSEWIC, 2003), although there are currently no NHIC records for Butternut in the study area. A single Butternut was recorded along Borer's Creek south of Parkside Drive in a Natural Heritage Assessment performed by Dillon Consulting Limited (2010). Butternut is Endangered in Ontario.

As an endangered species, Butternut is protected under Section 9 of the Endangered Species Act (ESA). This section prohibits against killing, harming, taking, possessing, buying or selling species listed as endangered or threatened. Two exceptions to these prohibitions, with respect to Butternut, are outlined in

Ontario Regulation 242/08. The first exception applies to Butternut trees that are not naturally occurring and were not planted to satisfy the requirements of a permit issued under Section 17 of the ESA. The second exception applies to Butternut trees that are severely affected by Butternut Canker and have been deemed non-retainable by an approved Butternut Health Assessor. Any Butternut trees that are likely to be impacted by the proposed development must be assessed by a Butternut Health Assessor using the criteria outlined in the OMNR's Butternut Assessment Guidelines (2007).

Green Dragon

The Green Dragon (*Arisaema dracontium*) is a perennial wildflower that is found in riparian areas and wet forests, particularly those dominated by maples, Green Ash (*Fraxinus pennsylvanica*) or White Elm. It flowers in the early spring and the green berries ripen in late summer becoming bright orange-red. Its fruiting bodies are very similar to those of Small Jack in the Pulpit (*Arisaema triphyllum*), to which it is closely related. At the northern end of its range in Ontario, Green Dragon was likely never common in the province. Historical records indicate that the plant was likely more widespread in Ontario, but increased development and clearing of forests have likely contributed to its decline.

Suitable habitat for the Green Dragon exists in several areas within the study area. In particular, riparian habitat associated with Borer's Creek and its tributaries in the Waterdown North area may provide suitable habitat, along with the valleylands within the Sassafras Woods in the Waterdown Road area. There are no NHIC records for Green Dragon in the study area. Green Dragon is of Special Concern in Ontario.

Red Mulberry

Red Mulberry (*Morus rubra*) is a small understory tree found in moist forests, ravines and talus slopes within the Carolinian Zone. Threats to Red Mulberry include hybridization with the introduced White Mulberry (*Morus alba*), disease, habitat destruction and fragmentation. The species is known to occur in 21 sites within southern Ontario and only ten sites have more than five individuals (Parks Canada, 2011). The NHIC database indicates that historical records for Red Mulberry exist in the Sassafras Woods and Waterdown Escarpment Woods in the southern end of the study area. Red Mulberry is listed as an Endangered species in Ontario.

White Wood Aster

White Wood Aster (*Eurybia divaricata*) is a fall-flowering perennial herb that is commonly found in moist deciduous woodlands with well-drained soils and relatively open canopies. Flowering occurs in early September. In Ontario, it is found in forests dominated by Sugar Maple or American Beech, but is also associated with Oak, Shagbark Hickory (*Carya ovata*) and Basswood. Historically, White Wood Aster occurred in 16 locations within Ontario, but current estimates suggest only 8 populations remain, all of which are in the Niagara region (COSEWIC, 2002e). The cause of this decline is not well understood, but may be attributed to competition with invasive Garlic Mustard (*Alliaria petiolata*), habitat destruction, trampling and small population size. White Wood Aster is a Threatened species in Ontario. A search of available information sources did not reveal any records of White Wood Aster in the study area.

4.4.2 Vegetation Survey Methodology

Vegetation surveys consisted of wandering transects within wooded areas, along valleys, field edges, hedgerows and in other available habitats to determine the presence of species at risk within the study area. Emphasis was placed on preferred habitat within the 120 m buffer zone surrounding the proposed route.

Site visits were conducted on June 6 and August 8 to 12, 2011. Site visits were timed to account for the varying life cycles of the plants involved in the survey. Most herbaceous plants would have been in fruit at the time of the August visits, with the exception of American Columbo which may have begun to senesce in late July-early August, and White Wood Aster, which does not flower until late September. However, survey timing for the trees species was not sensitive as all can be easily identified based on bark, twig and/or leaf characteristics.

4.4.3 Results and Discussion

Only one of the seven identified species at risk was observed throughout the course of the vegetation survey. While every attempt was made to thoroughly search all lands within 120 m of the preferred route, it is possible that individual plants may have been missed. Five (5) Butternut trees were found within 200 m of the preferred route. All were located on the east-west corridor, with three (3) in the Grindstone Creek-Parkside Drive area, and two (2) in the wooded area south of Dundas Street, west of Cedar Springs Road. Four (4) of these trees are within 60 m of the paved edge of the existing roadway. General health assessments and measurements of the Butternut trees observed on the site were not performed. UTM co-ordinates and approximate distances to the closest roadway for each tree are provided in Table 9. Refer to Figure 6 for approximate locations.

Table 9: Butternut Locations and General Characteristics

Butternut[1]	Easting[2]	Northing[2]	General Location	Approximate Distance to Roadway (m)[3]	General Observations
A	0589768	4799736	Grindstone Creek	60	Large tree, canker on trunk
B	0589770	4799785	Grindstone Creek	28	Small tree, some dead branches
C	0589748	4799850	Grindstone Creek	25	Medium-sized tree
D	0592360	4801106	Dundas Street East	171	Large tree, some damage to crown
E	0592336	4801296	Dundas Street East	36	Some damage to crown

[1] Butternut identifiers correspond to those on Figure 6; [2] All UTM co-ordinates are in zone 17T (NAD 83) and [3] Distance estimates were derived from Google Earth and have not been verified in the field.

In addition, several cultivated Blue Ash (*Fraxinus quadrangulata*), a species ranked as 'Special Concern' on the SARO list, were planted as landscape trees on a residential property on the north side of Dundas Street, east of Spring Creek Drive. Approximate UTM co-ordinates for their location are as follows: 17T 590950 E 4799775 N (NAD 83). Native populations of Blue Ash are only found in a few isolated locations in extreme southwestern Ontario. There were no other observations of floral species at risk in the area.

Descriptions of dominant species within woodlands in each vegetation survey zone are outlined below. Refer to Figure 5 for approximate vegetation zone boundaries. Typical roadside and open meadow vegetation across the study area was dominated by Goldenrod (*Solidago* sp.), Common Milkweed (*Asclepias syriaca*), White Sweet Clover (*Melilotus alba*), Wild Carrot (*Daucus carota*), grasses and to a

lesser extent Chicory (*Cichiorium intybus*), Thistles (*Cirsium* sp.), Burdock (*Arctium sp.*), Common St. John's Wort (*Hypericum perforatum*), Fleabane (*Erigeron sp.*), Teasel (*Dipsacus sylvestris*), and Ragweed (*Ambrosia* sp.). Residential areas consisted of manicured lawns and a variety of native and exotic landscape trees. Conifers such as Blue Spruce (*Picea pungens*), White Spruce (*Picea glauca*) and Norway Spruce (*Picea abies*) were common, while lower numbers of White Pine (*Pinus strobus*) and Red Pine (*Pinus resinosa*) were also present. Maples, Black Walnut, Willows (*Salix* sp.) and Ash were common deciduous trees present along roadsides, while Horsechestnut (*Aesculus hippocastanum*), Hickories, Elm and Poplars (*Populus* sp.) were less common. A complete list of the 171 plant species encountered on the site is provided in Appendix J. Species names are consistent with accepted nomenclatures outlined in the Southern Ontario Vascular Plant Species List (OMNR, 2010c). Field notes are provided in Appendix I.

4.4.3.1 Vegetation Zone 1: Waterdown North Area

Land use in Vegetation Zone 1 is predominantly agricultural with some existing residential areas along Parkside Drive, as well as some recent and ongoing development north of Parkside Drive. Remaining agricultural fields are actively farmed for soybean and hay though some abandoned farmland exists in the western portion of this zone. Moist deciduous woodlands mark the northern boundary of this section, in an area interrupted by numerous permanent and intermittent tributaries of Borer's Creek. Low-lying areas along watercourses are dominated by Green Ash, Silver Maple (*Acer saccharinum*), Trembling Aspen (*Populus tremuloides*) and to a lesser extent White Elm. Moving further from the watercourses, Sugar Maple, White Ash and Black Walnut contribute more to the woodland canopy, with the occasional Black Cherry, Red Oak and White Pine also present. Small conifer stands, including a Blue and White Spruce plantation, exist along the southern boundary of the westernmost woodland. Black's Pond exists to the southeast corner of this zone, just north of Parkside Drive. The shallow pond is surrounded by a vegetated buffer of Hawthorn (*Crataegus* sp.) and Common Buckthorn (*Rhamnus cathartica*), and to a lesser extent Red Oak, Basswood, White Ash, White Elm and Black Cherry.

4.4.3.2 Vegetation Zone 2: Centre Road to Parkside Drive at Grindstone Creek

Centre Road bisects Vegetation Zone 2. To the west of Centre Road, abandoned agricultural fields exist along the preferred route, with a residential development to the south, and a deciduous woodland to the north. On the east side of Centre Road, the preferred route and 120m zone of influence run through a woodland and then bend south through several soybean fields to meet Parkside Road near Grindstone Creek. A wetland area dominated by Cattails (*Typha* sp.) exists along the western margin of the woodland, but gives way to moist deciduous woodlands dominated by Green Ash and Silver Maple and to a lesser extent, Red Oak, Eastern Hemlock, Eastern White Cedar (*Thuja occidentalis*) and Basswood. Ground cover was relatively thick within the woodland with a variety of ferns, grasses, shrubs and herbaceous plants. Drier areas within the woodland consisted of Maples, White Ash, Yellow Birch and White Birch (*Betula papyrifera*), Poplars and occasional Black Cherry. Several patches of low-lying areas were observed, suggesting that sections of the woodland experience seasonal flooding. One such area towards the southeast margin of the woodland was blanketed by Scouring Rush (*Equisetum hyemale*) and ferns. Trembling Aspen, White Ash, Silver Maple and Willows were more common towards the eastern edge of the woodland. White Pine, Blue Beech (*Carpinus caroliniana*) and Manitoba Maple (*Acer negundo*) were also observed infrequently in the northeast corner of the woodland. Red Raspberry (*Rubus pubescens*), Common Blackberry (*Rubus allegheniensis*), Wild Rose (*Rosa* sp.) and Staghorn Sumac (*Rhus typhina*) created dense thickets along the woodland margin and within the hydro corridor along the northeast corner. The watercourse that winds through the south end of the woodland was dry at

the time of the site visit. The creek bed was surrounded by Sensitive Fern (*Onoclea sensibilis*), Spotted Water Hemlock (*Cicuta maculata*), Jewelweed (*Impatiens capensis*) and various grasses and sedges.

The open meadow east of the woodland consisted of Goldenrod, Wild Carrot, Common Milkweed, White Sweet Clover and St. John's Wort, with the occasional Willow, Choke Cherry (*Prunus virginiana*), Manitoba Maple and Trembling Aspen. This area was cross-crossed by several ATV trails and the hydro corridor.

Norway Maple (*Acer platanoides*), Common Buckthorn, Black Walnut and White Oak dominated the hedgerows along the soybean fields. The woodland to the east of the soy fields is a moist deciduous forest dominated by Ashes, with the occasional Black Cherry and Black Walnut along the woodland margin. Ground plants and shrubs were well established and similar to those observed in the woodland to the west.

4.4.3.3 Vegetation Zone 3: Grindstone Creek to Dundas Street west of Evans Road

Land use in Vegetation Zone 3 is mostly residential with a few residual agricultural fields. A large nursery occupies a large parcel of land to the north of Parkside Drive adjacent to the preferred road corridor. Little natural vegetation remains in this section and is restricted to the Grindstone Creek valley and the hedgerows and small woodland patches adjacent to the agricultural fields between Parkside Drive and Dundas Street.

A small wetland area dominated by Cattails, Spotted Joe-Pye Weed (*Eupatorium maculatum*) and small Willows, lies just south of Parkside Drive west of the railway line. Eastern White Cedar, Green Ash, Basswood, European Black Alder (*Alnus glutinosa*), Manitoba Maple, White Elm and Black Walnut were common tree species along the banks of Grindstone Creek. The occasional White Pine, Butternut, Black Cherry, and White Willow (*Salix alba*) were also found in the area particularly in the southern section along the railway line. A single White Mulberry exists between the wetland area and Parkside Drive.

Agricultural fields east of Spring Creek Drive supported hay and wheat crops. Mixed deciduous woodlands dominated by Silver Maple and Green Ash exist on the eastern border of the fields. Bur Oak (*Quercus macrocarpa*), Basswood, White Elm and White Ash were also present in lower numbers. The hedgerows along the fields consisted primarily of Oaks, Ashes, Maples and Black Walnut with the occasional Basswood, Shagbark Hickory, Apple (*Malus* sp.) and White Elm.

4.4.3.4 Vegetation Zone 4: Dundas Street

Land use in Vegetation Zone 4 is primarily agricultural although some residential and commercial properties also exist. Hay, soybean and corn were the primary crops in the area, however, several fields had been abandoned or left fallow, creating open meadows with tall grasses and wildflowers. Towards Cedar Springs Road, there are several woodlands adjacent to Dundas Street. Segments of the Bruce Trail run through the narrow strip of woodland to the south, and well into the woodland on the north side of Dundas Street. The southern woodland was dominated by Basswood, Hickory, Hawthorn and to a lesser extent Maple, Ash, Red Oak, Black Cherry, White Pine and Dogwood (*Cornus* sp.). Two Butternut trees were found in this woodland.

The northern woodland consisted of dry upland deciduous forests. In the western section of the woodland, common canopy species were Shagbark Hickory, Sugar Maple, Black Walnut, White Ash and

Basswood with an increasing number of White Oak towards the woodland interior. Moving east through the woodland, Sugar Maple became increasingly common, forming pure stands in areas of higher elevation. Lower-lying areas were a mix of White Elm, Basswood, White Ash, White Oak, Black Walnut and Black Cherry.

4.4.3.5 Vegetation Zone 5: Dundas Street to Waterdown Road

Land use in Vegetation Zone 5 is primarily residential and is characterized by manicured lawns with landscape trees and ornamentals. Between Dundas Street and Mountain Brow Road the agricultural fields are currently under development. What little natural cover remains in this area is restricted to hedgerows and small woodland patches. Sections of the Bruce Trail follow the western boundary of the agricultural land, and extend into the wooded areas south of Mountain Brow Road. The dry deciduous woodland to the south of Mountain Brow Road is dominated by Shagbark Hickory, Red Oak and Sugar Maple with the occasional Basswood. A dense understory of Common Buckthorn, Hawthorn, Honeysuckle (*Lonicera* sp.) and Dogwood was present.

4.4.3.6 Vegetation Zone 6: Waterdown Escarpment Woods

Vegetation Zone 6 is dominated by patches of the Waterdown Escarpment Woods Environmentally Sensitive Area (ESA) and open meadows. To the west, several small creeks and low-lying areas exist within the woodland. Creek beds were dry at the time of the site visits, but soils were relatively moist in the area. Common canopy species in this area were Green Ash, Silver Maple, Red Oak and to a lesser extent Bur Oak, Sugar Maple and Shagbark Hickory. Common Buckthorn and Hawthorn were common along woodland edges, occasionally forming dense thickets with Red Raspberry and Wild Rose.

The woodland to the east had drier soils and was dominated by Sugar Maple and White Ash, with occasional Black Cherry, Ironwood (*Ostrya virginiana*), Red Oak and Shagbark Hickory. In some areas where exposed limestone formations restricted the growth of larger trees, Hawthorn, Buckthorn and Shagbark Hickory were more common. Meadows consisted of a variety of grasses, Goldenrods, Milkweed, wild flowers and the occasional Willow and Dogwood shrubs.

4.4.3.7 Vegetation Zone 7: Waterdown Road South

Vegetation Zone 7 is dominated by the Sassafras Woods ESA to the east of Waterdown Road, and agricultural fields (hay) to the west. The Sassafras Woods extends across relatively undulating terrain marked by a series of steep ridges and valleys which follow a course roughly parallel to the roadway. The well-drained slopes and ridges were dominated by Red Oak, Sugar Maple, American Beech, Shagbark Hickory, White Ash with the occasional Black Cherry, Basswood, Blue Beech and White Pine. Witch-Hazel (*Hamamelis virginiana*), Ironwood, Hawthorn and Common Buckthorn were common understory species. The moist valleys had higher concentrations of Green Ash, Silver Maple, European Black Alder and Basswood. Herbaceous plants, ferns, and a variety of graminoids provided a dense layer of ground cover along the banks of the watercourses and within the floodplain. Sassafras was observed in several areas, as individual plants and in small stands. A single Tulip Tree (*Liriodendron tulipifera*), another Carolinian forest species, was also observed in this woodland. A hydro corridor cuts through the woodland and across Waterdown Road south of the agricultural fields. The hydro corridor was choked by dense thickets of Staghorn Sumac, Black Locust (*Robinia pseudoacacia*), Hawthorn, Wild Rose, and Raspberry. Black Walnut, Willows and Dogwoods were also present, but more common along the hydro

corridor on the west side of Waterdown Road. Wild grape (*Vitis sp*.) and Virginia Creeper (*Parthenocissus quinquefolia*) were common in moist areas as well as exposed areas along the hydro corridor.

4.5 Invertebrates

The following section outlines the habitat requirements of three invertebrate species that may exist within the study area. Observations of Rusty Patched Bumble Bee, West Virginia White and Monarch were noted as well as the presence of larval host plants, in the case of the Lepidoptera.

4.5.1 Rusty Patched Bumble Bee

The Rusty-patched Bumble Bee is a medium to large-sized bumble bee that can be distinguished from other similar species by a reddish-brown spot on its abdomen. They have been recorded in a variety of habitats including farmland, sand dunes, marshes, urban and lightly wooded areas where they nest in abandoned rodent burrows. Records of this species from 1899 to 2000 suggest that historically, this species was relatively common in the study area. More recent surveys in 2005 suggest the species may be restricted to a small area within Pinery Provincial Park, however, subsequent surveys in 2006-2008 failed to detect any individuals (COSEWIC, 2010b). Survey methods for this species relied on incidental sightings of bumble bees within the survey area; none were detected.

4.5.2 West Virginia White

The West Virginia White is a white butterfly in the Family Pieridae that flies in the early spring and can be found in moist deciduous or mixedwood forests. Toothwort (*Dentaria diphylla*), a spring-flowering plant of the forest floor, acts as the primary host plant for the larvae of this species. Although likely never common in Canada, threats to the West Virginia White have been attributed to loss of habitat due to increasing development and the spread of Garlic Mustard. Rather than survey for the species directly, surveys for the larval host plant were conducted as a measure of habitat suitability for West Virginia White in the area. As Toothwort flowers in early spring and senesces in late June (Chambers, Legasy and Bentley, 1996), several areas with moist deciduous woodlands were surveyed in June. Toothwort was not observed on the June 6, 2011 site visit to the Waterdown Road woodland, Grindstone Creek or Kearns Quarry areas. Based on available habitat, there is potential for Toothwort in hardwood stands within Vegetation Zone 1, 2, 4 and 6; however, the timing of the 2011 site visits to these areas was outside the Toothwort season. Garlic mustard was observed throughout the site. Refer to Appendix K for more specific locations.

The Centre Road woodlot (Vegetation Zone 2) was surveyed in May 2012 for Toothwort. There were no Toothwort plants observed within this woodland.

4.5.3 Monarch

The larval stage of the Monarch Butterfly feeds exclusively on Milkweed (*Asclepias spp*.), generally Common Milkweed (*Asclepias syriaca*), in Ontario. Because their life cycle is largely dependent on the availability of healthy Milkweed populations, the habitat suitability for this species in a particular area can be determined by surveying for Milkweed. The presence of Milkweed was noted as part of the vegetation survey and can be found in Appendix J. Adult monarchs and larvae were observed in various locations across the Site, with the largest concentrations in the north end of the Site in the

Waterdown North development area. Abandoned fields in this area have been colonized by a variety of grasses, clovers, goldenrods, Wild Carrot and Milkweed. The northern end of the agricultural fields, along the woodland margin and roadsides are host to a large number of milkweed plants. Several larvae were observed on Milkweed plants in this area during the August site visits.

5. Summary of Results

Table 10 lists the eight (8) species at risk, of the 35 targeted species, which were documented in the Waterdown Study Area during the 2011 and 2012 field season. Five of the eight species confirmed were avian, and one turtle, tree and butterfly species were also noted.

Table 10: Species at Risk Observed in the Waterdown Study Area

Common Name	Species Name	Within or on the 120 m delineation	Within 1 km buffer
Barn Swallow	*Hirundo rustica*	Yes	Yes
Bobolink	*Dolichonyx oryzivorus*	Yes	Yes
Chimney Swift	*Chaetura pelagica*	Yes	Yes
Common Nighthawk	*Chordeiles minor*	No	Yes
Eastern Meadowlark	*Sturnella magna*	Yes	Yes
Snapping Turtle	*Cheyldra serpentina*	Yes	Yes
Monarch Butterfly	*Danaus plexippus*	Yes	Yes
Butternut	*Juglans cinerea*	Yes	Yes

6. Recommendations

For overall protection and mitigation of the existing habitat, resident wildlife and present and potential SARs, the following measures are recommended.

- Mitigation for the marsh, field and woodland bird species that may be encountered would include adherence to the Breeding Bird window of May 15 to August 1. If the scheduled construction falls within this window, a breeding bird survey conducted by a qualified biologist would be necessary to document and flag active nests in the proposed work zone. Buffer zones (5-60 m) would be established and respected until the young have fledged or until August 1. Nest sweeps would be conducted every three days during construction to ensure that new nests are not established. Also, significant snags that provide holes for cavity nesting species and food sources for woodpeckers should be preserved if possible.

- The above timing window would also protect sensitive herptile species during their breeding and/or nesting period. Caution should be exercised when working close to Borer's or Grindstone Creeks, as this is the habitat where snakes, turtles and frogs will most likely be encountered. Snakes may also be encountered in the drier upland areas near open fields and within the forest edge areas. Any turtles or snakes observed during construction activities should be gently removed from the site. Photos or identification by a qualified biologist should be obtained prior to the release of the animal if possible.

- Although there were no confirmed sightings of Woodland Voles or American Badgers, we cannot conclude that they are not present within the Study Area. Potential habitat for Woodland Vole exists in the woodlands in the Waterdown North development area and Waterdown Escarpment Woods but is beyond the 120 m buffer surrounding the preferred route. The Sassafras Woods along Waterdown Road fall within the 120 m buffer and may be impacted by the proposed development. In order to minimize the impacts of the development on undetected populations of Woodland Vole and/or their habitat it is recommended that physical barriers, such as tree protection fencing or siltation fencing, be employed between areas of proposed development and natural areas to prevent movement of small mammals into the development zone. Fencing should be installed prior to the commencement of any construction activities and should be removed when activities have ceased.

- Four (4) of the five (5) butternut trees observed within the study area are located within the 120 m zone of influence surrounding the preferred route. Upon review of detailed design plans any butternut trees within 25 m of the preferred route (refer to Table 9) should be assessed by a Butternut Health Assessor to determine if they are considered retainable. In the event they are deemed retainable, and avoidance of these trees is not possible, a permit for their removal may be required if approved mitigative measures are not adopted. An amendment to Section 5(5) of Ontario Regulation 242/08 (April 5, 2011) for Butternut includes a new provision that would allow the removal of up to 10 retainable Butternut, provided a planting plan specifying the replacement of removed trees is drafted in accordance with the new regulation.

To minimize the effect of the proposed development on woodlands and woodland edges within or adjacent to the preferred route, the following mitigative measures are proposed:

- Tree removal should take place at minimum one season prior to the commencement of construction activities to ensure that vegetation along the new woodland edges have been 'pre-stressed' prior to intense construction activity.

- Tree protection fencing should be employed between areas of proposed development and woodland boundaries to reduce the potential for physical damage to trees and root systems. Tree protection fencing should be installed prior to the commencement of any construction activities.

- Every effort should be made to minimize the removal of trees and natural vegetation during construction. In the event tree removal is necessary, a replanting schedule should be developed to compensate for the removal of existing trees.

- Milkweed is a plant species that thrives in disturbed areas and as such, will not be negatively impacted by the disturbance to the existing easement. Replanting with a native seed mix in some disturbed areas post-construction is recommended. A native butterfly mix may encourage other butterflies and invertebrates as well.

Results to date are based on fieldwork conducted from early April to August 2011 and late February to early April 2012. Surveys were conducted in 2012 for owls and salamanders to address concerns with the timing and methodology (owls) of the 2011 surveys. There were no owl or salamander species observed during the 2012 surveys which were conducted during optimal timing windows, using OMNR approved methodology.

7. Closure

This Report has been prepared by GENIVAR Inc. The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in the Report. The conclusions presented herein respecting current conditions represent the best judgment of the assessors based on current environmental standards. GENIVAR Inc. attests that to the best of our knowledge, the information presented in this Report is accurate. The use of this Report for other projects without written permission of City of Hamilton and GENIVAR Inc. is solely at the user's own risk.

Thank you for the opportunity to complete this report. We trust that this information is satisfactory for your current requirements. Please contact us if we can be of further assistance.

Report prepared by:
GENIVAR Inc.

Dan Reeves, M.Sc.
Project Biologist

Reviewed by:

Ann Rocchi, M.Sc.
Senior Biologist

Erin Corstorphine, M.Sc.
Biologist

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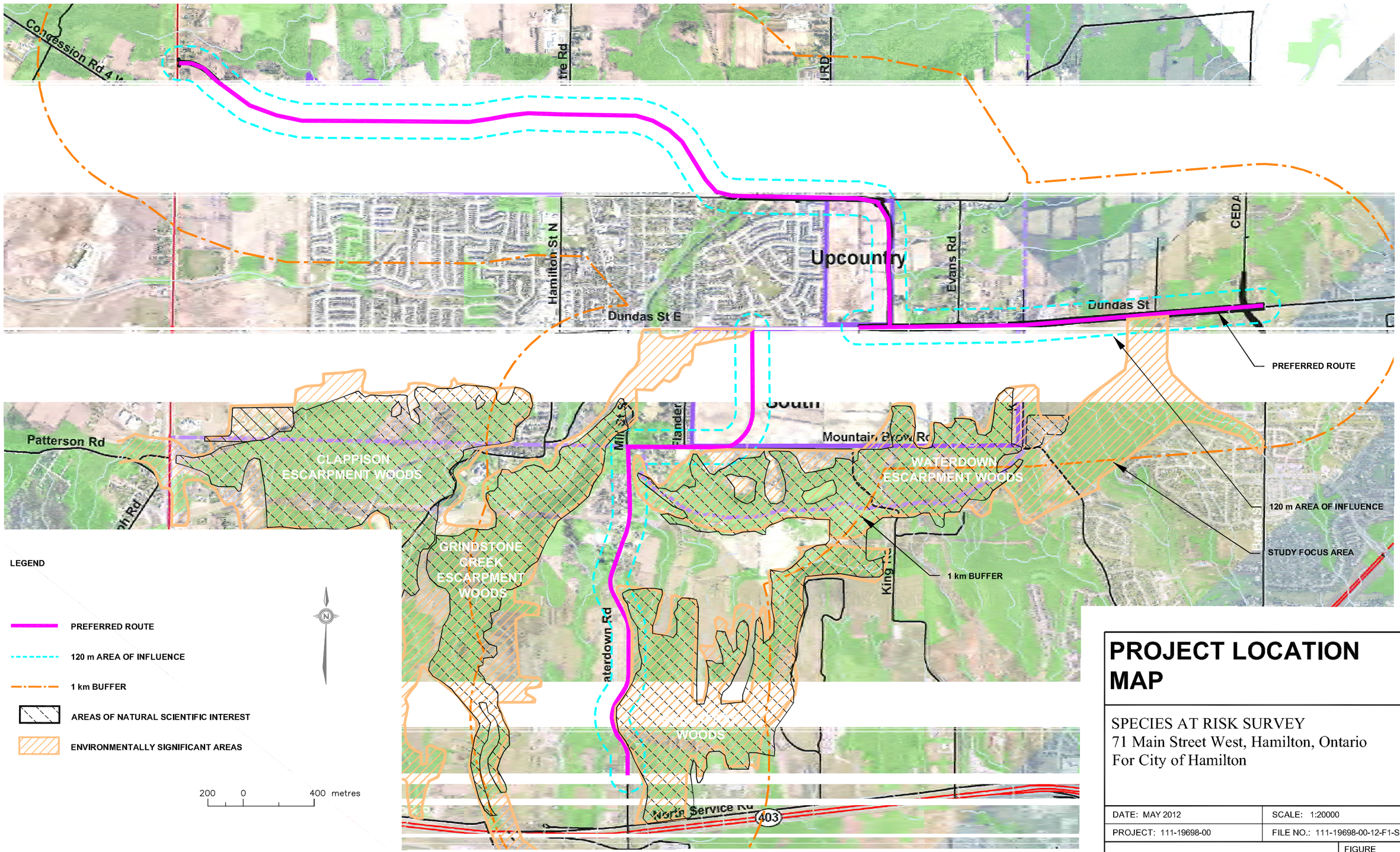
Figures



LEGEND

- PREFERRED ROUTE
- 120 m AREA OF INFLUENCE
- 1 km BUFFER
- AREAS OF NATURAL SCIENTIFIC INTEREST
- ENVIRONMENTALLY SIGNIFICANT AREAS

200 0 400 metres

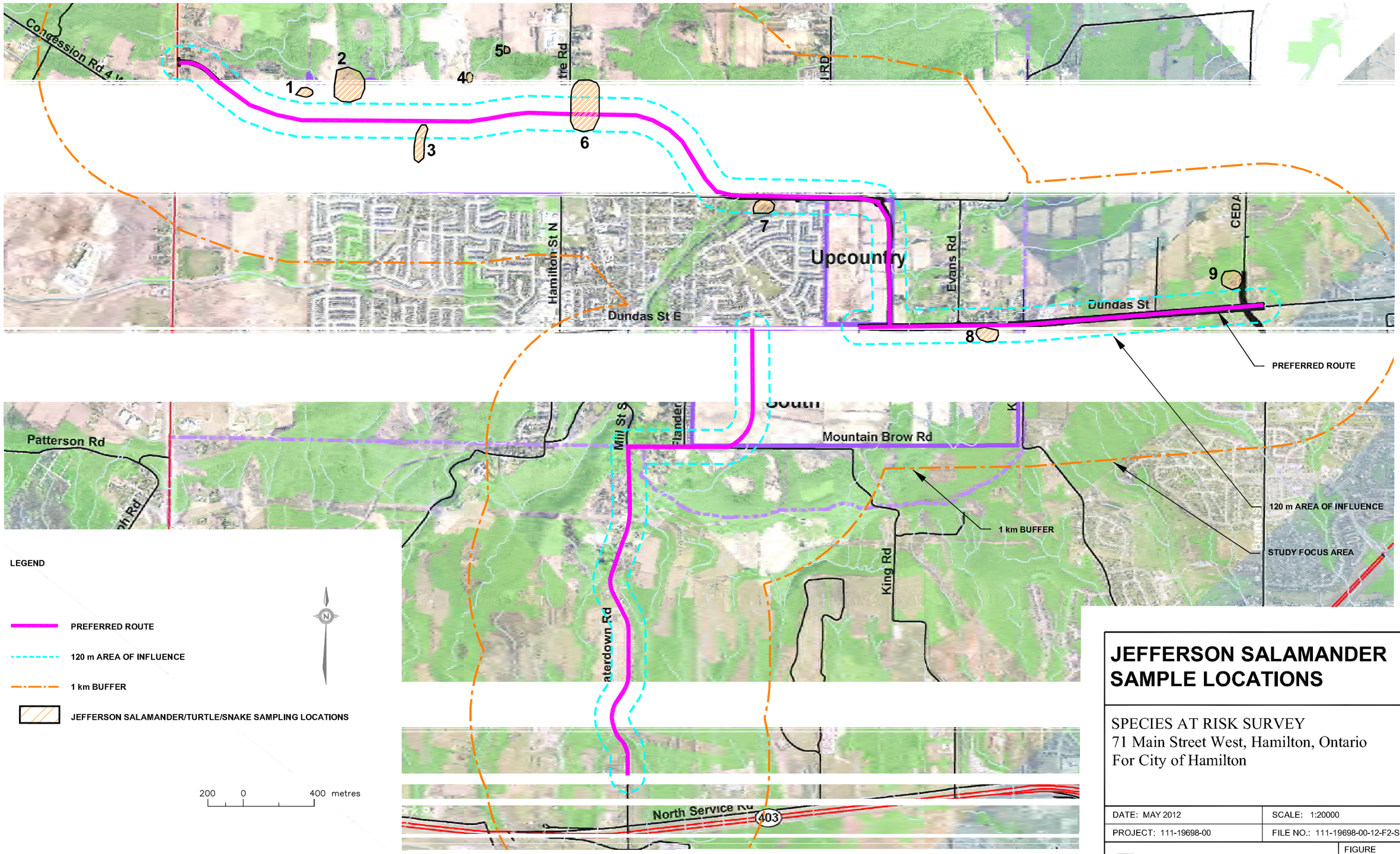
PROJECT LOCATION MAP

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: MAY 2012	SCALE: 1:20000
PROJECT: 111-19698-00	FILE NO.: 111-19698-00-12-F1-SP

GENIVAR

FIGURE 1



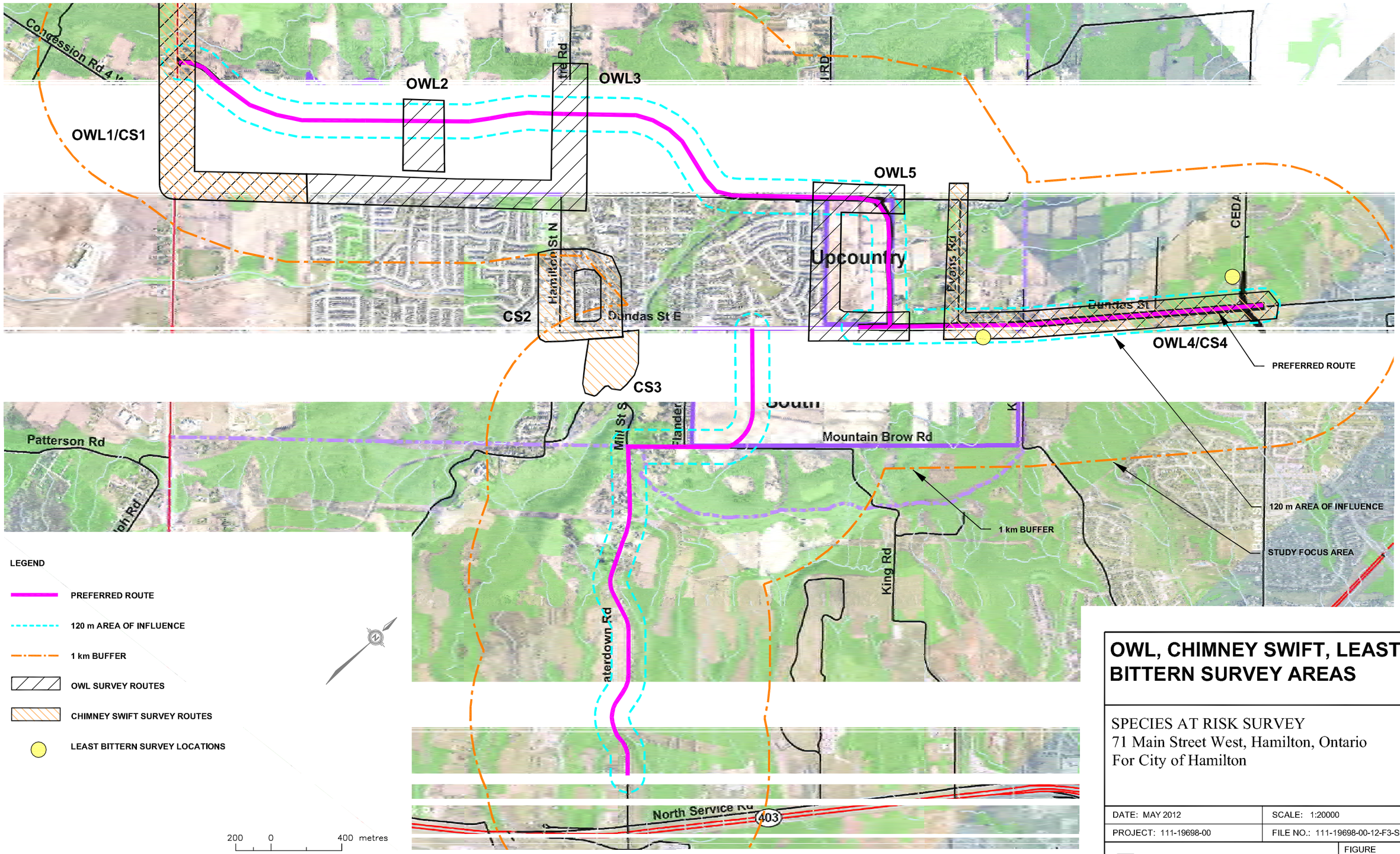
JEFFERSON SALAMANDER SAMPLE LOCATIONS

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: MAY 2012	SCALE: 1:20000
PROJECT: 111-19698-00	FILE NO.: 111-19698-00-12-F2-SP

GENIVAR

FIGURE 2



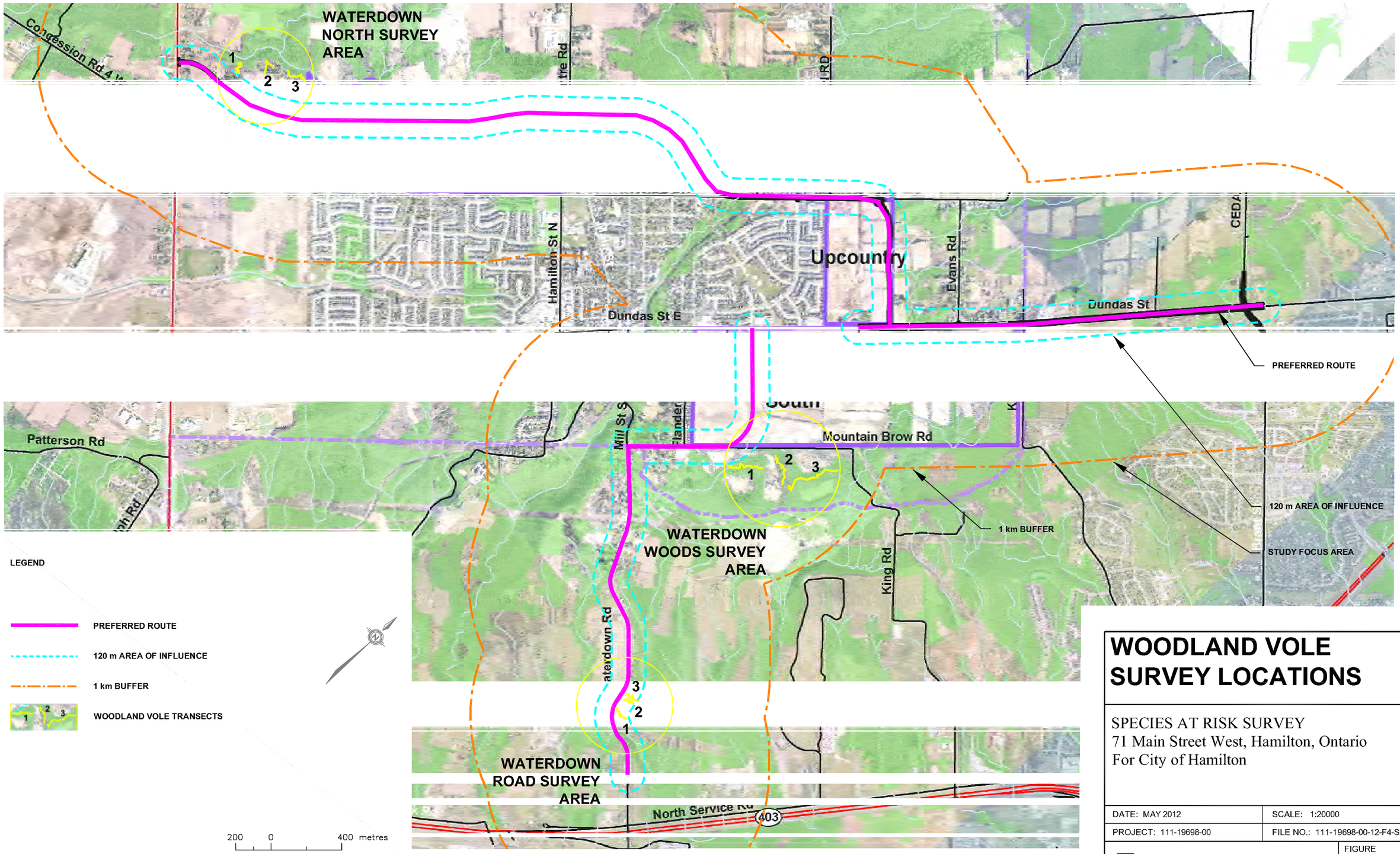
OWL, CHIMNEY SWIFT, LEAST BITTERN SURVEY AREAS

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: MAY 2012	SCALE: 1:20000
PROJECT: 111-19698-00	FILE NO.: 111-19698-00-12-F3-SP

GENIVAR

FIGURE 3



LEGEND

- PREFERRED ROUTE
- 120 m AREA OF INFLUENCE
- 1 km BUFFER
- WOODLAND VOLE TRANSECTS (1, 2, 3)

200 0 400 metres

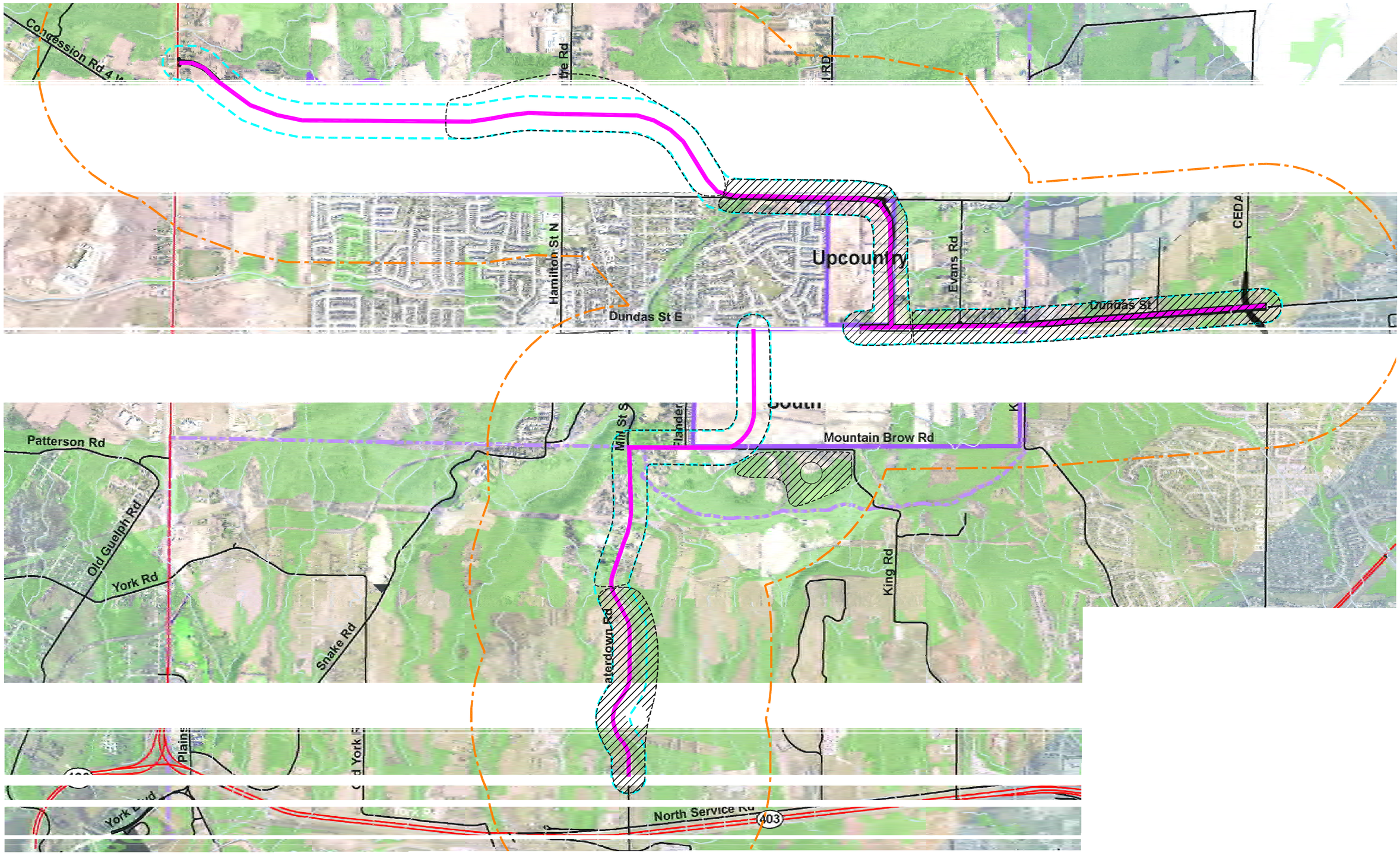
WOODLAND VOLE SURVEY LOCATIONS

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: MAY 2012	SCALE: 1:20000
PROJECT: 111-19698-00	FILE NO.: 111-19698-00-12-F4-SP

GENIVAR

FIGURE 4


Congession Rd 4
Ire Rd
IRD
Upcountry
Hamilton St N
Dundas St E
Evans Rd
Dundas St
CEDA
Patterson Rd
Old Guelph Rd
York Rd
Snake Rd
Mountain Brow Rd
King Rd
North Service Rd
403

Hey Erin,

I'm working on pulling together any SAR sightings we have for the study area, am just waiting on our SAR tech to check his most recent data. We were wondering if you have contacted the local MNR district office (Aurora and Guelph districts, mostly Guelph) as they should have most of our sightings up to last fall so that will cover most of our sightings (our SAR tech dose not think any new records were made in your study area in 2011).

I've created a Data Licensing Agreement, attached, if you can sign on the second page and fax back, or scan and email back to me that would be great, I will then send you what data we have.

Thanks,
Brenda

_____

Brenda Van Ryswyk
Natural Heritage Ecologist
Conservation Halton
2596 Britannia Road West
Burlington, ON L7P 0G3
Phone:905.336.1158 ext. 282
Fax:905.336.6684
brendav@hrca.on.ca
www.conservationhalton.on.ca

Erin Corstorphine

From: Pickett, Karolyne (MNR) [Karolyne.Pickett@ontario.ca]
Sent: Tuesday, September 20, 2011 12:23 PM
To: Erin Corstorphine
Subject: RE: RE:

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Erin,
For East Flamborough, the only restricted record I can guess is that your search picked up Timber rattlesnake, because the only other SARO records we have are JESA, chestnut, columbo, red mulberry, and milksnake.

Halton is in Aurora D.

Karolyne
519-826-4961

From: Erin Corstorphine [mailto:Erin.Corstorphine@genivar.com]
Sent: September 13, 2011 2:42 PM
To: Pickett, Karolyne (MNR)
Subject: RE: RE:

Hi Karolyne,

We ran another check of the NHIC database for the Waterdown area and found that there were a handful of restricted records. Our best estimates for the locations, using lot and concession info are as follows:

Lot 1-5, Concession 2 and Lot 1-5, Concession 3, East Flamborough

Lot 21-24, Concession 1 South, Municipality of Halton

I am wondering if these latter records may reside with Aurora District? Please advise if this is the case.

Thank you!
Erin

GENIVAR
Erin Corstorphine, BSc, MSc
Biologist
GENIVAR | *Constructive people*
1091 Gorham Street, Suite 301, Newmarket, ON L3Y 8X7
Direct: (905) 853-3303 ext. 232 | Cell: (905) 967-3330 |
www.genivar.com

From: Pickett, Karolyne (MNR) [mailto:Karolyne.Pickett@ontario.ca]
Sent: Tuesday, September 13, 2011 9:20 AM

To: Erin Corstorphine; Buck, Graham (MNR)
Subject: RE:

Good morning Erin,
Sorry for the delay in replying, I have been on sick leave. Does your NHIC search of Waterdown turn up any restricted records? I didn't have the chance to check the identity of the restricted records you sent me for the other project site but will do so later today.

Karolyne
519-826-4961

From: Erin Corstorphine [mailto:Erin.Corstorphine@genivar.com]
Sent: September 8, 2011 3:14 PM
To: Buck, Graham (MNR)
Cc: Pickett, Karolyne (MNR)
Subject:

Hi Graham,

I left a message with you earlier today regarding the City of Hamilton Waterdown project, and more specifically the Species at Risk Survey that we have been engaged in over the past several months. From what I understand most of the contact we have had with the Guelph District has been with Karolyne Pickett, but I have had a hard time getting in touch with her over the past couple of weeks. I am hoping that you may be able to assist us in her stead.

As mentioned on the phone, we would like to ensure that we have the most current species at risk occurrence data for the project site, prior to writing our final report. We are expecting a summary of field data from Halton Region Conservation Authority sometime early next week. The Hamilton CA was also contacted but we were advised that they have no additional data to add. I will conduct another search of the NHIC database, but am aware that in the case of particularly sensitive species records are often restricted. Please let me know if you would like me to forward the results of my search so that you can verify the completion of the NHIC records.

I have attached a copy of a general site map – please let me know if you require further information. If you feel that a more formal avenue should be taken for this information request, please let me know.

Thank you,
Erin

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www.genivar.com

Please consider the environment before printing!

Erin Corstorphine

From: Weisz, Erika (MNR) [Erika.Weisz@ontario.ca]
Sent: Friday, September 30, 2011 9:14 AM
To: Erin Corstorphine
Cc: Thompson-Black, Melinda (MNR)
Subject: RE: SAR request for information

Hi Erin,

Thank you for sending me the information about your project again – Melinda informed me that as your project is quite involved and crosses over two jurisdictions, she will be handling your request herself. She has been cc'd along the way and therefore has your information, and will be looking at it as soon as time permits.

Thanks for your patience,

Erika Weisz
Aurora District
Ministry of Natural Resources
50 Bloomington Rd.
Aurora, ON L4G 0L8

Tel: 905-713-7707
Email: erika.weisz@ontario.ca

From: Erin Corstorphine [mailto:Erin.Corstorphine@genivar.com]
Sent: September 22, 2011 4:28 PM
To: Weisz, Erika (MNR)
Cc: Thompson-Black, Melinda (MNR)
Subject: SAR request for information

Hi Erika,

Thank you very much for contacting me today – I really appreciate it. I went back and found my initial email to Melinda requesting information on species at risk records in the Waterdown area and rather than rewrite everything, I have forwarded it instead – the original message is below.

We are conducting this work on behalf of the City of Hamilton. A map of the site is attached. If anything about the info we are requesting is unclear, please let me know.

Thank you and kind regards,
Erin

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www.genivar.com

From: Erin Corstorphine
Sent: Friday, September 16, 2011 3:15 PM
To: 'melinda.thompson-black@ontario.ca'
Subject: Waterdown SAR Surveys

Hello Melinda,

I am involved in the species at risk survey being conducted by GENIVAR for the proposed East-West and Waterdown Road Corridors . Prior to the completion of our report, we are checking with regulating agencies to ensure that we have the most up-to-date species at risk sighting and habitat information available. I have been in contact with Karolyne Pickett at the Guelph District Office, and received recent data and mapping from the Halton Region Conservation Authority earlier today. In fact, I just noticed that you were also cc'd on the message, so you are likely well aware of our efforts to acquire this information! I had called you about this last Thursday, September 6th, and thought I better follow up with an email.

We are aware that Jefferson salamanders are in the area, and I understand that some regulated habitat areas have been mapped by Aurora District. I am wondering if it would be possible to have access to this information, as well as any other information that may relate to recent sightings of species at risk (not in NHIC), or regulated SAR habitat areas that fall within the immediate study area.

I have attached a map depicting the general site location. Please let me know if additional information is required to complete this request. We are busily preparing our final report and I am happy to do whatever I can to expedite this process.

Thank you,
Erin

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Appendix B

Wildlife Collection Permits

Ministry of Natural Resources

Ministère des Richesses naturelles

Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Telephone: (519) 826-4955
Facsimile: (519) 826-4929

April 8, 2011

Mr. Dan Reeves
Genivar Inc.
1091 Gorham Street, Suite #301
Newmarket, ON L3Y 8X7

RE: Wildlife Scientific Collectors Authorization #1062333

Dear Mr. Reeves,

I am sending along the above Wildlife Scientific Collectors Authorization as well as ESA permit #GU-B-015-11. Please sign and return a signed copy of the WSC authorization as well as the schedule A to this office prior to commencement of any work either by mail or by fax 519 826-4929.

> This Wildlife Scientific Collectors Authorization is valid from April 8th to May 15th of 2011. Please note that you and your assistants are expected to adhere to all conditions on the authorization as well as those on the schedule A, the approved Animal Care Protocol and the ESA permit. Please also note that you are expected to have these documents with you while you are collecting.

The assistants that are permitted to collect and the gear permitted for use under this authorization are listed on the Schedule A which is attached.

If you are dealing with Endangered Species special conditions apply so it is important that you read and understand all terms and conditions of your authorization as well as any extra conditions that may be included.

If you have any questions please don't hesitate to contact me at the number below or Art Timmerman at 519 826-4935.

Sincerely,

Michele Bonaldo
Ministry of Natural Resources
Business Services Clerk
519 826-4909

Ontario

Ministry of Natural Resources

Ministère des Richesses naturelles

Wildlife Scientific Collector's Authorization

Autorisation pour faire la collecte scientifique d'animaux sauvages

AuthoriationNo.. N° d'autorisation	Local Reference No. N° de référence local	Issuer Account No. N° de compte du delivreur de permis.
1062333	7200	10001664

This authorization is issued under Section 39 of the Fish and Wildlife Conservation Act, 1997 to:
Cette autorisation est délivrée en vertu de l'article 39 de la Loi sur la protection du poisson et de la faune de 1997 à:

Name of Authorization holder / *Nom du titulaire de l'autorisation*

Last Name / Nom de famille	First Name / Prénom	Middle Name / Second Prénom
Mr. Reeves	Dan	J.

Name of Business/Organization/Affiliation (if applicable)
Nom de l'entreprise/de l'organisme/de l'affiliation (le cas échéant)

Genivar Inc.

Mailing address of Authorization holder / *Adresse postale du titulaire de l'autorisation*

Street Name & No./PO Box/RR#/Gen. Del./ N° rue/C.P./R.R./poste restante

1091 Gordon Street, Suite 301

City/Town/Municipality / Ville/village/municipalité	Province/State Province/Etat	Postal Code/Zip Code Code Postal/Zip
Newmarket	ON	L3Y 8X7

This authorization permits the above-named person to:
Cette autorisation permet à la personne nommée ci-haut de:

☒ **Capture wildlife of the species and sex, in the numbers, and in the area set out be below.**
Capturer les espèces d'animaux sauvages selon le nombre et le sexe indiqués ci-dessous dans les lieux indiqués ci-dessous

and/or / et/ou

☐ Keep game wildlife or specially protected wildlife in captivity for the purposes of education or science.
Garder des animaux sauvages spécialement protégés et du gibier sauvage en captivité à des fins éducatives et scientifiques

☒ Release the captured wildlife in the area of capture, if the captured wildlife is not to be removed from that area
Remettre en liberté les animaux sauvages capturés dans la zone de capture si les animaux captures ne doivent pas être enlevés de cette zone

OR / OU

☐ **Capture and kill wildlife of the species and sex, in the numbers, and in the area set out be below.**
Capturer et tuer les espèces d'animaux sauvages selon le nombre et le sexe indiqués ci-dessous dans les lieux indiqués ci-dessous

Species / Especés	Sex Sexe	Numbers Nombre	Location / Endroit
Jefferson Salamanders		350	Lots 7-12, Conc. 4, East Flamborough, City of Hamilton
Jefferson Salamanders		50	Lot 1, Conc. 3, East Flamborough, City of Hamilton
Jefferson Salamanders		50	Lot 21, Conc. 1 North, Nelson Twp., City of Burlington

Yes/Oui

☐ Additional list attached / Liste additionnelle ci-jointe

Authorization Dates / *Dates d'autorisation*

Effective Date / Date d'entrée en vigueur (YYYY-MM-DD)	Expiry Date / Date d'expiration (YYYY-MM-DD)
2011-04-08	2011-05-15

Authorization conditions / **Conditions de l'autorisation**

This authorization is subject to the conditions contained in Schedule A if included./Cette autorisation doit respecter les conditions de l'annexe A si celle-ci est jointe.

Yes/Oui	No/Non	
☒	☐	Schedule A included. / Annexe A ci-jointe

Authorized by (please print) Autorisé par (veuillez écrire en caractères d'imprimerie)	Signature of Authorizer / Signature de la personne chargée d'autoiser	Date of Issue/Date de délivrance (YYYY-MM-DD)
Al Murray, Guelph Area Supervisor		2011-04-08

Signature of Authorization holder / Signature du titulaire de l'autorisation	Date (YYYY-MM-DD)
	2011-04-08

Personal information contained on this form is collected under the authority of the Fish and Wiildlife Conservation Act, 1997 and will be used for the purpose of licencing, identification, enforcement, resource management and customer service surveys. Please direct further inquiries to the District Manager of the MNR issuing district.

Les renseignements personnels dans ce formulaire sont recueillis conformément à la Loi sur la protection du poisson de la faune, 1997 , et ils seront utilisés aux fins de délivrance de permis, d'identification, d'application des règlements, de gestion des ressources et de sondage sur les services a la clientèle. Veuillez communiquer avec le chef du district du MRN qui délivré le permis si vous avez des questions.

FW2018 (04/00)

Wildlife Scientific Collector's Authorization
Autorisation pour faire la collecte scientifique d'animaux sauvages
Schedule A – Authorization conditions
Annexe A - Conditions de l'autorisation

Authorization No. 1062333
No d'autorisation. _____

This authorization is subject to the conditions listed below.

1. This authorization is valid only for the persons, species, numbers, areas and calendar year indicated. A written report covering the operation of the preceding year must be submitted to the authorization issuer within 30 days of the termination date, but in no case later than January 31 next following the year of issue. The report shall contain a statement outlining the objectives of the operations, the methods used, the number and species of wildlife caught and their fate as well as a map indicating where the collections took place. An analysis is not required. The submission of a satisfactory report is a prerequisite to any subsequent renewals.
2. Before carrying out any operation under the authorization in any area the authorized person shall inform the Area Supervisor of his or her intentions at least a week before commencing work and include information as to the type of operation, location, duration, and the name or names of personnel involved. The forgoing does not apply to the collection of road killed specimens of a type indicated on the authorization.
3. When possible, all wildlife captured under this authorization shall be released alive in the area of capture. When further examination of the animal is necessary in the laboratory permission must be obtained as part of this authorization under section 40(2)(c) of the Fish and Wildlife Conservation Act. Where furbearing mammals are collected the authorized person must contact the issuing office and make arrangements to pay the royalty. Dead animals which are no longer required must be cremated or buried. The authorized person will inform the issuer of any burial site. Any animal suspected of being infected with a communicable disease shall be incinerated in a facility approved under the Environmental Protection Act for that purpose.
4. A copy of the original authorization must be carried by the authorized person when working at the designated sites. An assistant of the authorized person who is carrying out activities under this authorization during the absence of the authorized person shall carry a copy of the authorization on his or her person.
5. All collection gear shall be clearly marked with names of the organization and people authorized to collect.
5b) Gear permitted: minnow traps and related materials, sterile single edge razor, 70% ethanol, sterile gloves and transportation viles.
6. This authorization is not valid in Provincial Parks, park reserves, National Parks, Conservation Areas, Crown game preserves or sanctuaries established under the Migratory Birds Convention Act without written permission from the authorized person in charge of the area concerned.
7. Capture gear shall be inspected regularly and live holding traps must be inspected at least once daily.
8. This authorization does not allow access to any property without permission of the landowner.
9. Sections 5 and 6 of the Fish and Wildlife Conservation Act 1997, and the provisions of the regulations relating to open seasons and bag limits do not apply to persons capturing or killing wildlife under this authorization.
10. MNR Vineland biologist is to receive a copy of the data and all traps must be clean before using them in a new pond or site.
11. Assistants: Ann Rocchi.

Cette autorisation doit se conformer aux conditions ci-dessous.

1. Cette autorisation n'est valide que pour les personnes, espèces, nombres, zones et année civile indiqués. Un rapport écrit portant sur les activités de l'année précédente doit être soumis au délivreur de l'autorisation dans les 30 jours suivant la date d'expiration et jamais plus tard que le 31 janvier qui suit la date de délivrance. Le rapport devra comprendre une déclaration décrivant les objectifs des activités, les méthodes utilisées, le nombre et les espèces d'animaux sauvages capturés et leur destination finale ainsi qu'une carte montrant l'emplacement des collectes. Une analyse n'est pas requise. La présentation d'un rapport satisfaisant est une condition préalable pour obtenir un renouvellement de l'autorisation.
2. Avant de réaliser toute activité visée par l'autorisation dans toute zone, la personne autorisée doit aviser le superviseur de la zone de ses intentions au moins une semaine avant de commencer ses activités et il doit fournir des renseignements sur le type d'activité, l'emplacement, la durée et le nom de toutes les personnes impliquées. Cette condition ne s'applique pas à la collecte de spécimens tués sur la route s'il s'agit d'une espèce mentionnée dans l'autorisation.
3. Lorsque cela est possible, tous les animaux sauvages capturés en vertu de cette autorisation doivent être remis en liberté dans la zone de capture. Lorsqu'un examen ultérieur d'un animal dans un laboratoire est nécessaire, il faut obtenir une permission à cet effet dans le cadre de cette autorisation, conformément à l'alinéa 40(2)(c) de la Loi sur la protection du poisson et de la faune. Lorsque des mammifères à fourrure sont récoltés, la personne autorisée doit communiquer avec le bureau qui délivre l'autorisation et prendre des dispositions pour payer les redevances afférentes. Les animaux morts qui ne sont plus utiles doivent être incinérés ou enterrés. La personne autorisée avisera le délivreur de l'autorisation de tout lieu d'enterrement. Tout animal qui pourrait avoir été infecté d'une maladie transmissible devra être incinéré dans une installation approuvée à cette fin, conformément à la Loi sur la protection de 'environnement.
4. Le titulaire de l'autorisation doit avoir en sa possession un exemplaire de l'autorisation originale lorsqu'il travaille dans les endroits désignés. Si un adjoint du titulaire de l'autorisation réalise des activités visées par l'autorisation en l'absence du titulaire de l'autorisation, il devra avoir un exemplaire de l'autorisation en sa possession.
5. Tout le matériel de collecte doit indiquer bien clairement le nom du titulaire de l'autorisation et de son organisme.
6. Cette autorisation n'est pas valide dans les parcs provinciaux, les réserves de parcs, les parcs nationaux, les zones de protection de la nature, les réserves de chasse de la Couronne et les réserves naturelles établies en vertu de la Loi sur la Convention concernant les oiseaux migrateurs sans la permission écrite de la personne autorisée qui est responsable de la zone en question.
7. Tout le matériel de collecte doit être inspecté régulièrement et les viviers doivent être inspectés au moins une fois par jour.
8. Cette autorisation ne permet pas au titulaire d'avoir accès à une propriété privée sans la permission du propriétaire foncier.
9. Les articles 5 et 6 de la Loi sur la protection du poisson et de la faune de 1997 et les dispositions des règlements se rapportant aux saisons de chasse et aux limites de prise ne s'appliquent pas à la personne qui capture ou tue des animaux sauvages en vertu de cette autorisation.

Signature of authorization holder / Signature du titulaire de l'autorisation **Date**

_____ _____

PERMIT for SPECIES PROTECTION or RECOVERY

Issued under the authority of clause 17(2)(b), of the *Endangered Species Act, 2007*, S.O. 2007, c. 6

Issued to: Dan Reeves
Genivar Inc.
1091 Gorham Street, Suite 301
Newmarket, ON

Permit No: GU-B-015-11

Assistants:
Ann Rocchi

Effective Date: Date of Issuance

Expiry Date: 26 August 2011

Project Title: New East-West and Waterdown Road Corridor Class Environmental Assessment Species at Risk Survey – Jefferson Salamander

Project Description: The project will assist in the protection and recovery of Jefferson Salamander and involves inventory work to identify its breeding ponds. Continued protection of potentially viable breeding habitats and adjacent forests is critical to the survival of the Jefferson salamander. Recovery objectives include the identification and monitoring of populations and habitat. Because genetically 'pure' Jefferson's Salamander's are virtually impossible to identify visually small tail clippings (approximately 5mm) of all suspected Jefferson's Salamanders are to be collected for subsequent DNA extraction and microsatellite examination. DNA extraction and analysis will be performed at the University of Guelph by Dr. Jim Bogart.

Authorization: This permit authorizes Dan Reeves and Assistants to engage in the activities as specified and described in Schedule A attached to the permit that would otherwise be prohibited by s. 9(1) of the Endangered Species Act, 2007 in relation to Jefferson Salamander (*Ambystoma jeffersonianum*).

The authorizations provided by this permit do not apply unless the holder complies with Schedules A and B which are attached to and form part of this permit.

Project Location: The study site is located near the community of Waterdown, with portions within the City of Hamilton and City of Burlington, Ontario (Schedule C).

Issued by:

Ian Hagman
Guelph District Manager
Ministry of Natural Resources

Date of Issuance: 06/04/11
(dd/mm/yy)

Schedule B: Conditions **Permit No:** GU-B-015-11

1. Any changes to named Assistants shall be identified in writing to Karolyne Pickett, Species at Risk biologist, Guelph District, Ministry of Natural Resources, 1 Stone Road West Guelph ON N1H 4Y2, karolyne.pickett@ontario.ca) within 24 hours of the change.

2. The permit holder shall carry a copy of this permit at all times when conducting activities under the authority of the permit. If the permit holder is not present when authorized activities are being conducted, the permit holder shall ensure that a copy of the permit is maintained at the location activities are being conducted.

3. The permit holder shall comply with the Animal Care Protocol for Jefferson Salamander that has been approved by the Ministry of Natural Resources Animal Care Committee as specified in Schedule D to this permit.

4. All equipment used to conduct activities under the authority of this permit shall be labelled with the Permit Number for this permit.

5. If an individual Jefferson Salamander becomes accidentally injured and there is no possibility of the individual surviving:
   (a) the individual shall be immediately humanely euthanized on site; and
   (b) the incident shall be reported to the MNR Guelph District office (address as above) within 24 hours or the next working day.

6. Submerged minnow traps must be checked every 12-18 hours. If the traps will remain in the pond for longer an air space of at least 2 centimetres must be left.

7. All individuals shall be released at the point of capture.

8. Only the ponds identified under Schedule C may be sampled and any changes to the ponds being sampled must be identified in writing to the MNR Guelph District office Species at Risk Biologist identified above.

9. Visual egg mass surveys from the shore are permitted. This permit does not allow you to enter the ponds to search for egg masses. You may only handle egg masses for the purpose of documentation and the egg mass must be put back where it was found. This permit does not allow you to collect a sample from the egg mass.

10. Prior to August 26, 2011, the following information on all amphibians located while conducting the activities authorized by this permit shall be submitted to the Species at Risk biologist of the MNR Guelph District office (address a above), in the format specified:

    i) Species name;
    ii) Date;
    iii) Name of Observer;
    iv) Contact Information for Observer;
    v) Accurate Location (GPS point or detailed description and directions);
    vi) Observation Details (e.g., the number of individuals observed); and
    vii) List of any injuries, deaths, or complications that occurred during this project.

Schedule D: Animal Care Protocol **Permit No:** GU-B-015-11

The MNR Wildlife Animal Care Committee has approved your protocol: " New East-West, and Waterdown Road Corridor Class Environmental Assessment Jefferson Salamander Animal Care Protocol". Your protocol number for 2011 is 11-247.

Ministry of Natural Resources

Ministère des Richesses naturelles

Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Telephone: (519) 826-4955
Facsimile: (519) 826-4929

Ontario

July 18, 2011

Dan Reeves
Genivar Inc.
1091 Gorham Street
Suite 301
Newmarket, ON L3Y 8X7

RE: Wildlife Scientific Collectors Authorization #1063849

Dear Dan,

I am sending along the above Wildlife Scientific Collectors Authorization. Please sign and return a signed copy of the WSC permit as well as the schedule A to this office prior to commencement of any work either by mail, email or by fax 519 826-4929.

> This Wildlife Scientific Collectors Authorization is valid from June 13th, 2011 to December 31st of 2011. Please note that you and your assistants are expected to adhere to all conditions on the authorization as well as those on the schedule A. Please also note that you are expected to have these documents with you while you are collecting.

The assistants that are permitted to collect and the gear permitted for use under this authorization are listed on the Schedule A which is attached.

If you are dealing with Endangered Species special conditions apply so it is important that you read and understand all terms and conditions of your authorization as well as any extra conditions that may be included.

If you have any questions please don't hesitate to contact me at the number below or Art Timmerman at 519 826-4935.

Sincerely,

Michele Bonaldo
Ministry of Natural Resources
Business Services Clerk
519 826-4909
Email; michelle.bonaldo@ontario.ca

Ontario

Ministry of Natural Resources

Ministère des Richesses naturelles

Wildlife Scientific Collector's Authorization

Autorisation pour faire la collecte scientifique d'animaux sauvages

AuthorizationNo.. / N° d'autorisation	1063849
Local Reference No. / N° de référence local	7200
Issuer Account No. / N° de compte du delivreur de permis.	10001664

This authorization is issued under Section 39 of the Fish and Wildlife Conservation Act, 1997 to:
Cette autorisation est délivrée en vertu de l'article 39 de la Loi sur la protection du poisson et de la faune de 1997 à:

Name of Authorization holder / *Nom du titulaire de l'autorisation*

Last Name / Nom de famille	First Name / Prénom	Middle Name / Second Prénom
Mr. Reeves	Dan	Jeffrey

Name of Business/Organization/Affiliation (if applicable)
Nom de l'entreprise/de l'organisme/de l'affiliation (le cas échéant)

Genivar Inc.

Mailing address of Authorization holder / *Adresse postale du titulaire de l'autorisation*

Street Name & No./PO Box/RR#/Gen. Del./ N° rue/C.P./R.R./poste restante: 1091 Gorham Street, Suite 301

City/Town/Municipality / Ville/village/municipalité	Province/State Province/Etat	Postal Code/Zip Code Code Postal/Zip
Newmarket	ON	L3Y 8X7

This authorization permits the above-named person to:
Cette autorisation permet à la personne nommée ci-haut de:

☒ **Capture wildlife of the species and sex, in the numbers, and in the area set out be below.**
Capturer les espèces d'animaux sauvages selon le nombre et le sexe indiqués ci-dessous dans les lieux indiqués ci-dessous

and/or / et/ou

☐ Keep game wildlife or specially protected wildlife in captivity for the purposes of education or science.
Garder des animaux sauvages spécialement protégés et du gibier sauvage en captivité à des fins éducatives et scientifiques

☒ Release the captured wildlife in the area of capture, if the captured wildlife is not to be removed from that area
.Remettre en liberté les animaux sauvages capturés dans la zone de capture si les animaux captures ne doivent pas être enlevés de cette zone

OR / OU

☐ **Capture and kill wildlife of the species and sex, in the numbers, and in the area set out be below.**
Capturer et tuer les espèces d'animaux sauvages selon le nombre et le sexe indiqués ci-dessous dans les lieux indiqués ci-dessous

Species / Especés	Sex Sexe	Numbers Nombre	Location / Endroit
Woodland Vole		50	Waterdown, Ontario

Yes/Oui ☐ Additional list attached / Liste additionnelle ci-jointe

Authorization Dates / *Dates d'autorisation*

Effective Date / Date d'entrée en vigueur (YYYY-MM-DD)	Expiry Date / Date d'expiration (YYYY-MM-DD)
2011-07-18	2011-09-15

Authorization conditions / **Conditions de l'autorisation**

This authorization is subject to the conditions contained in Schedule A if included./Cette autorisation doit respecter les conditions de l'annexe A si celle-ci est jointe.

Yes/Oui ☒ No/Non ☐ Schedule A included. / Annexe A ci-jointe

Authorized by (please print) / Autorisé par (veuillez écrire en caractères d'imprimerie)	Signature of Authorizer / Signature de la personne chargée d'autoiser	Date of Issue/Date de délivrance (YYYY-MM-DD)
Al Murray, Guelph Area Supervisor		2011-07-18

Signature of Authorization holder / Signature du titulaire de l'autorisation	Date (YYYY-MM-DD)
	2011-07-18

Personal information contained on this form is collected under the authority of the Fish and Wildlife Conservation Act, 1997 and will be used for the purpose of licencing, identification, enforcement, resource management and customer service surveys. Please direct further inquiries to the District Manager of the MNR issuing district.

Les renseignements personnels dans ce formulaire sont recueillis conformément à la Loi sur la protection du poisson de la faune, 1997 , et ils seront utilisés aux fins de délivrance de permis, d'identification, d'application des règlements, de gestion des ressources et de sondage sur les services à la clientèle. Veuillez communiquer avec le chef du district du MRN qui délivré le permis si vous avez des questions.

Wildlife Scientific Collector's Authorization
Autorisation pour faire la collecte scientifique d'animaux sauvages
Schedule A – Authorization conditions
Annexe A - Conditions de l'autorisation

Authorization No 1063849
N° d'autorisation. _____

This authorization is subject to the conditions listed below.

1. This authorization is valid only for the persons, species, numbers, areas and calendar year indicated. A written report covering the operation of the preceding year must be submitted to the authorization issuer within 30 days of the termination date, but in no case later than January 31 next following the year of issue. The report shall contain a statement outlining the objectives of the operations, the methods used, the number and species of wildlife caught and their fate as well as a map indicating where the collections took place. An analysis is not required. The submission of a satisfactory report is a prerequisite to any subsequent renewals.
2. Before carrying out any operation under the authorization in any area the authorized person shall inform the Area Supervisor of his or her intentions at least a week before commencing work and include information as to the type of operation, location, duration, and the name or names of personnel involved. The forgoing does not apply to the collection of road killed specimens of a type indicated on the authorization.
3. When possible, all wildlife captured under this authorization shall be released alive in the area of capture. When further examination of the animal is necessary in the laboratory permission must be obtained as part of this authorization under section 40(2)(c) of the Fish and Wildlife Conservation Act. Where furbearing mammals are collected the authorized person must contact the issuing office and make arrangements to pay the royalty. Dead animals which are no longer required must be cremated or buried. The authorized person will inform the issuer of any burial site. Any animal suspected of being infected with a communicable disease shall be incinerated in a facility approved under the Environmental Protection Act for that purpose.
4. A copy of the original authorization must be carried by the authorized person when working at the designated sites. An assistant of the authorized person who is carrying out activities under this authorization during the absence of the authorized person shall carry a copy of the authorization on his or her person.
5. All collection gear shall be clearly marked with the authorized person's name and the organization's name.
6. This authorization is not valid in Provincial Parks, park reserves, National Parks, Conservation Areas, Crown game preserves or sanctuaries established under the Migratory Birds Convention Act without written permission from the authorized person in charge of the area concerned.
7. Capture gear shall be inspected regularly and live holding traps must be inspected at least once daily.
7b) **Gear to be used:** live capture pit fall traps consistinf of 1.36 litre cans counter-sunk to 5cm below the ground surface.
8. This authorization does not allow access to any property without permission of the landowner.
9. Sections 5 and 6 of the Fish and Wildlife Conservation Act 1997, and the provisions of the regulations relating to open seasons and bag limits do not apply to a person capturing or killing wildlife under this authorization.
10. Assistants: Erin Corstorphine, Ann Rocchi and Eric Taylor
11. Non-native reptiles and amphibians that are collected must not be released.
12. The capture of any threatened or endangered species must be reported immediately to the Ministry of Natural Resources (Graham Buck at 519 826-4505, Karolyne Pickett at 519 826-4961 or Art Timmerman at 519 826-4935)

1. Cette autorisation n'est valide que pour les personnes, espèces, nombres, zones et année civile indiqués. Un rapport écrit portant sur les activités de l'année précédente doit être soumis au délivreur de l'autorisation dans les 30 jours suivant la date d'expiration et jamais plus tard que le 31 janvier qui suit la date de délivrance. Le rapport devra comprendre une déclaration décrivant les objectifs des activités, les méthodes utilisées, le nombre et les espèces d'animaux sauvages capturés et leur destination finale ainsi qu'une carte montrant l'emplacement des collectes. Une analyse n'est pas requise. La présentation d'un rapport satisfaisant est une condition préalable pour obtenir un renouvellement de l'autorisation.
2. Avant de réaliser toute activité visée par l'autorisation dans toute zone, la personne autorisée doit aviser le superviseur de la zone de ses intentions au moins une semaine avant de commencer ses activités et il doit fournir des renseignements sur le type d'activité, l'emplacement, la durée et le nom de toutes les personnes impliquées. Cette condition ne s'applique pas à la collecte de spécimens tués sur la route s'il s'agit d'une espèce mentionnée dans l'autorisation.
3. Lorsque cela est possible, tous les animaux sauvages capturés en vertu de cette autorisation doivent être remis en liberté dans la zone de capture. Lorsqu'un examen ultérieur d'un animal dans un laboratoire est nécessaire, il faut obtenir une permission à cet effet dans le cadre de cette autorisation, conformément à l'alinéa 40(2)(c) de la Loi sur la protection du poisson et de la faune. Lorsque des mammifères à fourrure sont récoltés, la personne autorisée doit communiquer avec le bureau qui délivre l'autorisation et prendre des dispositions pour payer les redevances afférentes. Les animaux morts qui ne sont plus utiles doivent être incinérés ou enterrés. La personne autorisée avisera le délivreur de l'autorisation de tout lieu d'enterrement. Tout animal qui pourrait avoir été infecté d'une maladie transmissible devra être incinéré dans une installation approuvée à cette fin, conformément à la Loi sur la protection de 'environnement.
4. Le titulaire de l'autorisation doit avoir en sa possession un exemplaire de l'autorisation originale lorsqu'il travaille dans les endroits désignés. Si un adjoint du titulaire de l'autorisation réalise des activités visées par l'autorisation en l'absence du titulaire de l'autorisation, il devra avoir un exemplaire de l'autorisation en sa possession.
5. Tout le matériel de collecte doit indiquer bien clairement le nom du titulaire de l'autorisation et de son organisme.
6. Cette autorisation n'est pas valide dans les parcs provinciaux, les réserves de parcs, les parcs nationaux, les zones de protection de la nature, les réserves de chasse de la Couronne et les réserves naturelles établies en vertu de la Loi sur la Convention concernant les oiseaux migrateurs sans la permission écrite de la personne autorisée qui est responsable de la zone en question.
7. Tout le matériel de collecte doit être inspecté régulièrement et les viviers doivent être inspectés au moins une fois par jour.
8. Cette autorisation ne permet pas au titulaire d'avoir accès à une propriété privée sans la permission du propriétaire foncier.
9. Les articles 5 et 6 de la Loi sur la protection du poisson et de la faune de 1997 et les dispositions des règlements se rapportant aux saisons de chasse et aux limites de prise ne s'appliquent pas à la personne qui capture ou tue des animaux sauvages en vertu de cette autorisation.

Cette autorisation doit se conformer aux conditions ci-dessous.

Signature of authorization holder / Signature du titulaire de l'autorisation **Date**

Aug 2, 2011

ONTARIO MINISTRY OF NATURAL RESOURCES

WILDLIFE ANIMAL CARE COMMITTEE
RESEARCH PROTOCOL APPLICATION

START DATE 1-Aug-11 **COMPLETION DATE** 15-Sep-11
Submit TWO MONTHS before start date

Protocol Number 11-266 ☑ New ☐ Amendment

This project has been submitted to:
☑ MNR District Office
☐ Ontario Parks
☐ Species at Risk

Category	
C	**A:** Experiments on most invertebrates or on live isolates (ie Observational Studies)
	B: Experiments which cause little or no discomfort (ie *No* Capture or Handling)
	C: Experiments which cause minor stress or pain levels (ie Capture/ PIT tagging/Notching/Tissue Samples)
	D: Experiments which cause moderate to severe distress or discomfort (ie Surgery/Pursuit)
	E: Procedures which cause severe pain, at, or above pain threshold of unanesthetized conscious animals (ie Toxicity Studies)

Project Title: Hamilton Class EA - New East-West Road Corridor and Waterdown Road Corridor

Objective
Max Char 420
Count 342

As part of the Class EA process, a species at risk assessment is required to determine the presence of listed species or their habitat, and determine potential negative effects of the proposed development. It has been noted that there is potential for populations of Woodland Vole (Microtus pinetorum) on or within the vicinity of the sites.

Principal Investigator: Dan Reeves
Company Affiliation: Genivar Inc.

Branch: Environment
Section: Natural Sciences
Address: 1091 Gorham Road West, Suite 301, Newmarket, Ontario, L3Y 8X7
Telephone: 905-853-3303 x 249
Email: dan.reeves@genivar.com

Secondary Investigator(s): Ann Rocchi (Peterborough), Erin Corstorphine and Eric Taylor (Newmarket, address as above)
Company Affiliation: Genivar Inc.

Branch: Environment
Section: Natural Sciences
Address: 294 Rink Street, Suite 103, Peterborough, Ontario, K9J 2K2
Telephone: 705-743-6850 x 232
Email: ann.rocchi@genivar.com

Target Species

Woodland Vole (Microtus pinetorum)	Number(s) to be handled	<50
	Number(s) to be handled	
	Number(s) to be handled	

Location(s) of Projects (Municipality/MNR District)
City of Hamilton, Halton Region - Aurora MNR District
City of Burlington, Halton Region - Aurora MNR District

☑ Research ☐ Management ☐ Teaching

Type of Research: ☑ Non-Invasive ☐ Invasive ☐ Surgery

Stress Level: ☐ Nil ☐ Low ☑ Moderate ☐ High

Pain Level: ☐ Nil ☑ Low ☐ Moderate ☐ High

Drugs: ☐ Anaesthetic ☐ Analgesic ☐ Other

Samples: ☐ Blood ☐ Tooth ☐ Hair / Feather ☐ Tissue ☐ Other

Capture and Handling

Chase Method: ☐ Aircraft/Helicopter ☐ Snowmobile ☐ Powerboat ☑ Other

Animals to Be: ☑ Released at capture site ☐ Transported & Released ☐ Long Term Captive ☐ Terminated

Traps: ☐ Lethal ☐ Leg Snare ☐ Mist Net ☑ Live Trap Pitfall Trap ☐ Net Gun ☐ Other

Marking Method: ☐ PIT Tag ☐ Fur/Feather Clip ☐ Dye ☐ Tattoo ☑ Other permanent marker

Device fixed to Animal: ☐ Radio Collar ☐ Leg Band ☐ Implanted Tag ☐ Other

Lay Summary:

Max Char 840

Count 581

GENIVAR Inc. was retained by the City of Hamilton to complete a Species at Risk Survey for the new East-West and Waterdown Road Corridors. Through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it has been noted that there is potential for populations of Woodland Vole (Microtus pinetorum). Accepted field sampling protocols for M. pinetorum involve live-capture trapping. Accepted field protocols will be used, and the highest importance will be placed on ensuring the health and well-being of test subjects.

Declaration:

All animals used in this research will be cared for in accordance with the recommendations of the Canadian Council on Animal Care and the requirements under the Animals for Research Act, (Ont. 1980).

By submitting this form I hereby indicate my agreement not to make major changes to the research procedures without obtaining approval of a new Animal Use Protocol from the MNR WACC. I also affirm that I understand that no work may be performed prior to approval of this protocol by the MNR WACC.

NOTE: I understand that portions of this protocol may be used to develop a **"Standard Species Protocol"** to be used by other researchers.

For electronic submissions please sign below and scan, or check box:

☑ I, as principal investigator, am responsible for the information submitted.

Dan Reeves	July 5,2011
Signature (Principal Investigator)	Date Submitted

The project described in this protocol is approved under the terms of the Animals for Research Act, (Ont. 1980)

Sarah Crosgrey	July 14, 2011
Approved by	Date Approved

PERMIT NUMBER: 11-008

APPLICATION DATE:

THE HALTON REGION CONSERVATION AUTHORITY	CONSERVATION AREA(S)			
CONSERVATION HALTON Administration Office 2596 Britannia Road Burlington ON L7P 0G3 (905) 336-1158 Fax (905) 336-6684 www.conservationhalton.ca	X	**Waterdown Woods RMA**		

NAME OF GROUP	Genivar Inc.		
PERMIT APPLICANT NAME (please print)	Dan Reeves	BUSINESS PHONE	(905) 853-3303 X249
HOME/CELL PHONE		FAX	
ADDRESS	1091 Gorham Street, Suite 301, Newmarket, ON L3Y 8X7		
DATE(S) OF EVENT	August 22-September 16, 2011	START TIME DEPARTURE TIME	Daytime trap installation; 3 consecutive evenings and mornings
DETAILS OF EVENT/ACTIVITY (Brief description of activity; equipment; duration; exact location; number of participants; etc.)	1. Conduct trapping for woodland vole in accordance with attached protocol and MNR authorizations. 2. Researcher to carry a ***signed copy*** of this permit while on Conservation Halton property and leave a copy on dash of vehicle. 3. Results of the study to be reported to Conservation Halton within 30 days of completion.		
APPLICABLE CHARGES/FEES HST Registration Number R107462483	No charge for this permit		

PAYMENT DUE		ON ARRIVAL			DEPOSIT REC'D		PREPAID
INSURANCE REQUIRED FOR EVENT ACTIVITY		YES		NO	IF YES, AMOUNT OF INSURANCE REQUIRED	Minimum $2,000,000	
IS HRCA REQUIRED TO BE A NAMED INSURED FOR THIS EVENT/ACTIVITY		YES	✓	NO	IF YES, AMOUNT OF INSURANCE REQUIRED	$0.00	
PROOF OF INSURANCE RECEIVED (copy attached)		YES		NO	NAME OF INSURER		

FYI – All of our Conservation Areas have an AED on-site and Lands & Parks Security has a mobile unit in each vehicle.

DATE OF PERMIT APPLICATION	August 18, 2011	SIGNATURE OF PERMIT HOLDER	

...../2

Emergency contact number for Conservation Halton Security staff is (905) 854-6163

GENERAL PERMIT CONDITIONS

1. All participants under this Permit may be subject to coverage under one of the following: Workplace Safety & Insurance Board; Comprehensive General Liability Insurance; Homeowners Liability Insurance or University/School Board insurance coverage (i.e. OSBIE), and a certificate indicating proof of coverage may be required prior to access to Conservation Area lands under this Permit.
2. Participants covered under this Permit must check-in at the Gatehouse or Customer Service area upon arrival.
3. This permit is only valid for the date(s) and times specified and activities/purpose(s) indicated above. Conservation Halton Parks open at 8:30am and close at dusk (i.e. 8:30pm during summer months; 4:30 pm during winter months)
4. The Permit Holder agrees to be responsible for the conduct, behavior and discipline of persons in attendance on Conservation Authority lands at the designated permit location(s), including abiding by all Federal, Provincial, Municipal and Regional laws, bylaws policies, regulations and any other conditions which may be set out by The Halton Region Conservation Authority. Unacceptable behavior by permit holder and participants may result in removal from the Conservation Area and permit being revoked.
5. The Permit Holder agrees to be responsible for any clean-up and/or clean-up costs associated with the event activity as listed on this form. The Permit Holder also agrees to be responsible for property damage caused by all participants under this permit.
6. The Permit Holder agrees to be responsible for any costs involved with third-party rescue and use of third-party rescue equipment that may be involved in the event of an emergency (fire, ambulance, etc.).

THE PERMIT HOLDER AGREES TO ADHERE TO THE FOLLOWING ADDITIONAL PERMIT PROCEDURES AND SAFETY PRECAUTIONS

Extra conditions may be included here once the permit application is received and reviewed by the Area Manager and/or Health & Safety Manager.

n/a

I AGREE TO THE ABOVE *GENERAL AND ADDITIONAL* PERMIT CONDITIONS AND REQUIREMENTS AS INDICATED ON THIS PAGE AND ON THE AFOREMENTIONED PAGE. IF AT ANY TIME I AM UNABLE TO COMPLY WITH ANY OF THESE CONDITIONS, I WILL INFORM PARK OPERATIONS STAFF IMMEDIATELY AND ALTERNATE ARRANGEMENTS WILL BE MADE.

DATE OF APPLICATION	August 18, 2011	SIGNATURE OF PERMIT HOLDER	

The information on this permit is collected by authority of The Conservation Authorities Act (R.S.O. 1990, C.27) for the purposes of booking your activity or event and will not be used for any other purpose.

THE HALTON REGION CONSERVATION AUTHORITY OFFICE USE ONLY:

DATE OF APPROVAL	APPROVED BY	AUTHORIZED SIGNATURE	CC: GATEHOUSE PARK MANAGER SECURITY
August 29, 2011	KIM BARRETT		

Emergency contact number for Conservation Halton Security staff is (905) 854-6163

Appendix C

Site Photos

Appendix C-1: Salamander Survey – Field Pictures

Image 1: Looking North from the Southern edge of Jefferson Salamander Sampling Pond 3.

Image 2: Typical Jefferson Salamander Sampling trap set-up on edge of Pond 3.

Image 3: Jefferson Salamander sampling trap, and anchoring system.

Image 4: *In situ* Jefferson salamander sampling trap, and anchoring system. Traps were spaced around each pond, as seen in the fore and background at Pond 1.

Appendix C-2: Bird Surveys Survey – Field Pictures

Image 1: Representative open field habitat for nocturnal owl surveys. View looking north from Parkside Road East. Photo taken June 7th, 2011

Image 2: Representative cattail/pond habitat (potential for Least Bittern).

Image 3: Example of altered (left) and unaltered (right) chimneys on historical home in survey square CS2. Photographed during Chimney Inventory, May 17th, 2011

Image 4: Representative t habitat, showing open clearing (potential for Common Nighthawk and Whip-poor-Will) and mixed forest habitat for passerine SARs. (May 24th, 2011 towards Borer's Creek.)

Appendix C-3: Woodland Vole Survey – Field Pictures

Image 1: Typical habitat in Waterdown Escarpment Woods (August 30, 2011).

Image 2: Typical habitat in Waterdown North survey area (August 31, 2011).

Image 3: Typical habitat in Waterdown Road South survey area (September 1, 2011).

Image 4: Example of trap set-up in Waterdown North survey area (September 2, 2011).

Image 5: Northern Short-tailed Shrew in Waterdown Escarpment Woods, Transect 1, Trap 4 (September 1, 2011).

Image 6: Typical signs of digging around the mouth of the trap (September 2, 2011).

Image 7: Unidentified tracks in Waterdown North, Transect 2, Trap 15 (September 2, 2011)

Appendix C-4: Vegetation Survey - Field Pictures

Image 1: Young Butternut tree in Vegetation Zone 3, south of Grindstone Creek at Parkside Drive (Figure 6: Butternut 'B', August 11, 2011).

Appendix D

Salamander Survey Field Notes

Appendix D.1

2011 Salamander Survey Field Notes

Appendix D.1: 2011 Salamander Survey Field Notes

* Pond numbers correspond to those on Figure 2.

Pond 1

Trap #	Sampling Date				
	14-Apr	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	1 stickleback 1 pumpkinseed	1 stickleback	nil	nil	6 creek chub 1 giant water assassin
2	nil	nil	nil	nil	nil
3	1 central mud minnow	6 creek chub	nil	nil	12 creek chub 6 stickleback
4	2 creek chub	nil	nil	nil	nil
5	nil	nil	nil	nil	3 creek chub

Pond 2

Trap #	Sampling Date				
	14-Apr	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	nil	nil	nil	nil	nil
2	nil	nil	nil	nil	nil
3	nil	1 stickleback	nil	nil	nil
4	nil	nil	nil	nil	2 stickleback
5	nil	nil	nil	nil	1 adult toad

Pond 3

Trap #	Sampling Date				
	14-Apr	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	1 stickleback	nil	nil	nil	Leopard frog
2	nil	1 stickleback	nil	nil	nil
3	1 stickleback	nil	nil	1 central mud minnow	nil
4	1 stickleback	nil	nil	nil	1 pumpkinseed
5	nil	nil	nil	nil	nil
6	nil	nil	nil	nil	nil
7	nil	nil	nil	nil	nil
8	nil	nil	nil	nil	nil
9	1 stickleback	nil	nil	1 central mud minnow 1 crayfish	Mayfly larvae
10	2 pumpkinseed 1 creek chub	nil	nil	nil	nil

11	nil	1 pumpkinseed	nil	nil	2 stick insects
12	nil	nil	nil	nil	1 adult toad
13	1 stickleback	nil	nil	nil	1 stick insect
14	nil	nil	nil	nil	nil
15	1 stickleback	nil	nil	nil	

Pond 4

	Sampling Date				
Trap #	**14-Apr**	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	not surveyed	not surveyed	not surveyed	1 stickleback	1 adult toad 14 stickleback 8 tadpoles
2	not surveyed	not surveyed	not surveyed	nil	55 tadpoles
3	not surveyed	not surveyed	not surveyed	nil	1 tadpole
4	not surveyed	not surveyed	not surveyed	nil	1 tadpole
5	not surveyed	not surveyed	not surveyed	nil	8 stickleback 1 adult toad 12 tadpoles

Pond 5

	Sampling Date				
Trap #	**14-Apr**	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	not surveyed	not surveyed	not surveyed	nil	nil
2	not surveyed	not surveyed	not surveyed	nil	nil
3	not surveyed	not surveyed	not surveyed	nil	nil
4	not surveyed	not surveyed	not surveyed	nil	1 large beetle
5	not surveyed	not surveyed	not surveyed	nil	nil

Pond 6

	Sampling Date				
Trap #	**14-Apr**	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	nil	nil	1 stickleback	nil	nil
2	nil	nil	nil	nil	nil
3	nil	nil	nil	nil	nil
4	1 stickleback	3 stickleback	nil	nil	nil
5	nil	nil	nil	nil	1 adult toad

Pond 7

Trap #	Sampling Data				
	14-Apr	**16-Apr**	**19-Apr**	**21-Apr**	**28-Apr**
1	1 tadpole (Green frog)	1 stickleback	nil	2 stickleback	6 stickleback 1 tadpole
2	Leopard frog	1 stickleback	nil	nil	1 tadpole
3	dragonfly larvae	4 stickleback	3 Stickleback	1 stickleback 2 tadpoles	7 tadpole
4	1 tadpole (Green frog)	20 tadpoles (green frog)	nil	1 tadpole	1 tadpole
5	1 stickleback, dragonfly larvae	nil	nil	1 tadpole	16 tadpole

Pond 8 – not surveyed

Pond 9 – not surveyed

Appendix D.2

2012 Salamander Survey Report and Field Notes

New East-West Road Corridor
Waterdown Road Corridor
Class Environmental Assessment
2012 Jefferson Salamander Sampling

April 2012

Prepared for:
City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, ON L8P 4Y5

Prepared by:
GENIVAR Inc.
1091 Gorham Street, Suite 301
Newmarket, Ontario L3Y 8X7

Project No. 111-19698-01

Distribution:
6 c Client
1 c File

GENIVAR

Project No. 111-19698-01

April 30, 2012

City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario
L8P 4Y5

Re: New East-West and Waterdown Road Corridor Class EA
2012 Jefferson Salamander Sampling Report
City of Hamilton, City of Burlington, Halton Region, Ontario

Dear Ms Jajko:

GENIVAR Inc. is pleased to provide you with this report documenting the results of the 2012 Jefferson Salamander sampling conducted as a continuation of the New East-West and Waterdown Road Corridor Class Environmental Assessment. We have provided six (6) hard copies and one (1) digital copy as requested.

GENIVAR Inc. was retained in 2011 by the City of Hamilton to complete a Species at Risk (SAR) Survey for the above project. Through ongoing discussion with the Hamilton and Halton Conservation Authorities and the Ontario Ministry of Natural Resources (OMNR), it was noted that the there was potential for numerous SAR species to exist on or within the area of influence of the proposed works. The study findings outlined within our Draft report (October, 2011) confirmed the presence of eight (8) of the thirty-five (35) Species at Risk that had previously been identified as potentially present in the Study Area. Comments from OMNR suggested additional sampling for Jefferson Salamanders would be needed early in the spring of 2012 (OMNR, 2012). GENIVAR, in consultation with the appropriate regulatory agencies, created a work plan to survey the site and surrounding areas using accepted field protocols, known habitat requirements and timing of aggregations to provide the highest degree of probability of encountering Jefferson Salamanders. The results of the 2012 sampling events are recorded within this report.

1091 Gorham Street, Suite 301, Newmarket, Ontario L3Y 8X7
Telephone: 905-853-3303 • Fax: 905-853-1759 • www.genivar.com

Thank you for the opportunity to complete this assessment. Please contact the undersigned if you have any questions.

Yours truly,
GENIVAR Inc.

Dan Reeves, M.Sc.
Project Biologist

EAC:nah

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Appendices

1. Introduction

GENIVAR Inc. was retained by the City of Hamilton to complete a Species at Risk (SAR) Survey for the new East-West and Waterdown Road Corridors. During the initial project meetings, and through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it was noted that there was potential for numerous SAR species to exist on or within the area of influence of the proposed works. The project was broken into three distinct phases (Phases 1-3) based on the specific timing windows for optimal observation of the identified SAR. Field surveys for 35 species were conducted during spring and summer of 2011. Field phases and protocols were developed and approved by appropriate regulating agencies using the accepted field protocols with the highest degree of probability of encountering the selected species and/or protecting their habitat.

Jefferson Salamander (*Ambystoma jeffersonianum*) was included in Phase 1 of the 2011 SAR surveys. A species-specific survey was conducted during April 2011 in seven (7) ponds within the study area. Nine ponds were originally targeted for the surveys following discussion with the OMNR; however, two of these ponds were not surveyed due to landowner permission issues. Although there were no salamanders observed during the 2011 field season, additional surveys were recommended by the OMNR determine whether the absence of salamanders was due to study timing (after the breeding season) or the absence of Jefferson Salamanders in the areas surveyed. Four (4) ponds were chosen through consultation with the OMNR for the 2012 field survey. Refer to Figures 1 and 2.

2. Species Background

Upon discussion with the local OMNR Species at Risk Biologist, a draft copy of the Sampling Protocol for Determining the Presence/Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011) was obtained. Within the document, the species is described as:

“The Jefferson Salamander is a relatively large (15 to 18 cm) mole salamander (family Ambystomatidae). It is a dark, brownish-gray salamander with small, pale blue flecks on the limbs and lower sides. It has relatively long toes and the adpressed limbs of males (front limb folded towards the tail and back limb folded towards the head) overlap by more than one and a half costal folds. Jefferson Salamanders also have a relatively wide head. *A. jeffersonianum* was first described by Green in 1827 (as *Salamandra jeffersonianum*) from an area near Jefferson College, Canonburg, Pennsylvania. *A. jeffersonianum* populations within Ontario seem to be more closely associated with Carolinian type forests than with other deciduous forest types. This may reflect climatic factors that similarly limit the northern distribution of Carolinian forest and Jefferson Salamander. Jefferson Salamander breed in the very early spring (late March or early April). Salamanders emerge from over wintering sites and migrate during rain or on very humid nights to the breeding ponds with males usually preceding females to the ponds. Once in the ponds, males will court females then deposit a spermatophore on the bottom of the pond. The female will pick up the spermatophore with her cloaca and will then lay ten or more clutches of approximately 30 eggs usually on the stem of submerged vegetation, such as willow (*Salix*) branches, near the periphery of the pond. In Ontario larvae hatch from egg masses about mid-April at a length of 8.9 to 15.2 mm. Larvae remain in the pond for 61-110 days, over which time they develop limbs and grow 3 to 8 times their hatching size. Individuals metamorphose at 28 to 44 mm SVL (the length from the snout to the posterior portion of the vent) and leave the pond for the surrounding forested areas, where they usually enter

burrows or rock crevices and forage for the remainder of the summer and fall. They overwinter below the frost line.

The identification of the Jefferson Salamander is complicated by the fact that all of the Ontario populations of this species exist with female, mostly polyploid, nuclear hybrids. Although these females, called unisexuals, have one or more sets of Blue-spotted Salamander (*Ambystoma laterale*) chromosomes and one or more sets of Jefferson Salamander chromosomes, they are not, as is generally believed, hybrids that have resulted from the crossing of these two species. The Blue-spotted and Jefferson Salamanders are rarely, if ever, found in the same ponds so hybridization would be unlikely. But, the critical evidence that rejects normal hybridization events is based on the examination of mitochondrial DNA (*mt*DNA) that is only inherited from females. Wherever they occur, all the unisexual individuals have a similar *mt*DNA that is very different from the *mt*DNA of either *A. jeffersonianum* or *A. laterale*. The unisexual individuals apparently exist and perpetuate themselves by swapping chromosomes from a sperm donor who breeds at the same time in the same pond. Because the unisexuals are more common than the Jefferson Salamander and, those that live with *A. jeffersonianum*, use and require Jefferson's sperm, viable unisexual eggs or larvae signify the presence of Jefferson Salamander males in a breeding pond. Additionally, because most unisexuals are triploid and carry two sets of the sperm donor's chromosomes, it is possible to distinguish Blue-spotted from Jefferson Salamander breeding ponds. The unisexuals would be, respectively, *Ambystoma* (2) *laterale* – *jeffersonianum* (LLJ) or *Ambystoma laterale* – (2) *jeffersonianum* (LJJ) in ponds with *A. laterale* or *A jeffersonianum*. Microsatellite loci are used to distinguish the unisexuals from the Blue-spotted and Jefferson salamanders and can also be used to distinguish different nuclear combinations in the hybrids."

3. Field Program

Through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it was noted that there is potential for populations of Jefferson Salamanders (*Ambystoma jeffersonianum*) or unisexuals (*Abystoma* (2) *laterale – jeffersonianum* (LLJ) or *Ambystoma laterale* – (2) *jeffesonianum* (LJJ)) within the study area. Accepted field sampling protocols require the capture and collection of tissue (tail tipping) which requires the need for an ESA (Endangered Species Act) permit, a Scientific Collectors permit, and an approved Animal Care Protocol from the OMNR Wildlife Animal Care Committee. All permits and licensing surrounding the survey and tail-tipping of this species were approved and in place before sampling began. Wildlife Scientific Collectors Permitting (#1067380) was obtained on March 12, 2012, the Permit for Species Protection or Recovery (#GU-B-011-12) was issued March 9, 2012, and the Wildlife Animal Care Committee Approval (#12-247) was obtained March 9, 2012 (Appendix A).

3.1 Sampling Methodology

Preferred methodology for presence/absence studies for this species are outlined within the Sampling Protocol for Determining the Presence/Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011). This document, along with continued discussion with appropriate regulating agencies was the basis for methodology creation. The same methodology was used for both the 2011 and 2012 surveys. Details of this methodology are outlined below.

3.1.1 Site Selection

The larger project area (outlined within Figure 1) was surveyed in 2011 and 2012 to determine candidate Jefferson Salamander survey locations based on the four main habitat criteria that the OMNR uses to determine pond suitability for breeding Jefferson Salamanders (Karolyne Pickett, OMNR Guelph District, Species at Risk Biologist, pers. comm., 2011):

1. Documented breeding of other amphibians in the pond (e.g. documented frog calls, documented presence of tadpoles);
2. Presence of egg attachment sites in the pond, such as the presence of low shrubs, twigs, fallen tree branches, submerged riparian vegetation or emergent vegetation to which salamander egg masses can attach to (e.g. presence of Red-Osier Dogwood along the margins of the pond);
3. Pond is free of predatory fish species; and
4. Pond has suitable hydro-period: water must remain present in the pond depression long enough for eggs to develop into juvenile salamanders, typically until mid to late summer. However some types of wetlands which may be used for breeding may have permanent or semi-permanent water. Hydro-period is typically a function of pond size, depth, volume (influenced by snow melt), flow rate, detritus, forest crown cover and ambient temperature. A pond's hydro-period may vary from year to year. For example, a shallow pond may not provide a suitable hydro-period in a dry year.

Candidate sites were selected based on results from the 2011 Jefferson Salamander survey (Genivar, 2011), background and field surveys, and approved by the OMNR prior to sampling. Prior to the site visit, satellite images of the property, land use, and topographical maps were reviewed to identify potential locations.

Of the nine (9) ponds surveyed in 2011, only four (4) of the ponds were deemed suitable for further investigation, based on the criteria outlined above. Refer to Figures 1 and 2.

3.1.2 Animal Collection

A suitable number (as approved by OMNR) of un-baited minnow traps (five (5) for Pond 4 and ten (10) for Ponds 2, 5 and 6) were placed in potential breeding locations within the study area and their locations were recorded with a handheld GPS. Traps were checked the morning after they were set, and any species captured were photographed and documented. The survey was conducted over five (5) non-consecutive days during the breeding season, as outlined within the OMNR protocol. The start and end of monitoring was confirmed based on discussions with OMNR staff as well as Dr. James Bogart at the University of Guelph.

The following methods were utilized during the surveys:

1. Trap Setting
    a. A long rope was attached to each minnow trap before it was submerged into the water. The rope was secured to a nearby tree or shrub and placement of each trap was recorded with a handheld GPS.
    b. Placement of traps was evenly distributed throughout the pond/wetland to ensure good overall coverage and a range of microhabitat types were covered.

c. Each trap was marked with appropriate flagging tape/signage stating the UTM co-ordinate, trapper name, contact number, and dates.
d. Surrounding habitat information was noted, as well as weather conditions and time of trap setting.
e. Traps were placed in the evening and checked the following morning, approximately 12-14 hours after setting.

2. Trap Checking
    a. The trap was removed from water.
    b. The following was recorded for each trap (where applicable):
        i. Trap #
        ii. All species caught in the trap and quantity.
        iii. Photograph number, measurements and sex (if possible) for all salamander species observed.
        iv. Sample number of any suspect Jefferson salamanders obtained.
        v. Note indicating if captured salamanders were recaptured, and their general condition.
        vi. Note indicating if trap was re-set in same location.

Additional observations were collected surrounding each pond and trap location. These observations generally included: additional species present, egg masses for salamander or other species, and vegetation characteristics of immediate area or vicinity. Traps were only used within one pond to minimize the risk of cross-contamination.

3.1.3 Tail Clipping

As different unisex combinations of Jefferson salamanders are virtually impossible to identify visually, small tail clippings (less than 5 mm) of all suspect Jefferson salamanders encountered during trap surveys were to be collected and preserved in 70% ethanol for subsequent DNA extractions and microsatellite examination. The salamanders would then have been released at the location they were captured. In the unlikely event that injuries or death were to occur, the OMNR would have been notified by way of the weekly updates and summary report at the end of the survey season. DNA extraction and analysis would have been performed at the University of Guelph by Dr. James Bogart. Tail clipping protocol is outlined below:

1. Clean, un-used nitrile gloves would be used for handing of each salamander and would be changed at each trap.
2. One researcher would gently hold the suspect individual on a sterile, flat, clean background medium, while another researcher used a sterile single edge razor to snip off the tail tip (less than 5 mm).
3. The tail clipping would be immersed in 70% ethanol within a sample tube, and labeled appropriately for transport to the lab.
4. The subject salamander would then be returned to the edge of the water and observed to ensure that it was uninjured. Any injuries or fatalities would be documented and reported to the OMNR.
5. All sampling equipment would be sterilized between uses using alcohol.

3.1.4 Laboratory Analysis

Tail tips require microsatellite analysis for DNA extraction and arrangements for this procedure were made with Dr. James Bogart at the University of Guelph. Dr. Bogart was contacted prior to the field program and was anticipating any samples. Laboratory analysis was not required in 2012 as no salamanders were captured.

3.1.5 Egg Mass Surveys

In addition to the methodology described above, the Sampling Protocol for Determining the Presence/ Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011) suggests a visual inspection for egg masses in sample locations. Throughout the duration of the sampling season (March 14 to March 26, 2012), visual egg mass surveys were conducted from the water's edge. Any egg masses observed were described, photographed and reported to the OMNR. There were no salamander egg masses observed during the survey; however, Wood Frog (*Rana sylvatica*) egg masses were observed within Pond 5 on March 19, 2012.

3.2 Results and Discussion

Of the nine (9) ponds surveyed in 2011, only four (4) of the ponds were deemed suitable for further investigation. Refer to Figure 2 for details. Traps were set in the afternoon/evening and checked the following morning on: March 14, 2012, March 15, 2012, March 16, 2012, March 20, 2012, and March 26, 2012. Landowner permission was not granted for Pond 2 until March 16, 2012; as a result only two trap nights were recorded for this pond. Traps nights were numbered 1 – 5 sequentially based on date. Sampling results are summarized in Table 1.

Table 1: Jefferson Salamander Sampling Results

Pond	Survey nights	Species Present
Pond 2	4 - 5	Brook Stickleback (*Culaea inconstans*)
		Creek Chub (*Semolitus atromaculatus*)
		Finescale Dace (*Phoxinus neogaeus*)
		Wood Frog (*Rana sylvatica*)
		Great Diving Beetle (*Dytiscus marginalis*)
		Gastropoda – unidentified snail
Pond 4	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Creek Chub (*Semolitus atromaculatus*)
		Green Frog (*Rana clamitans*)
		Green Frog Tadpoles (*Rana clamitans*)
		Crayfish
		unidentified Belastomatidae
		Damselfly Nymph

Pond	Survey nights	Species Present
Pond 5	1 - 5	Green Frog Tadpoles (*Rana clamitans*)
		Wood Frog (*Rana sylvatica*)
		Wood Frog Tadpole (*Rana sylvatica*)
		Great Diving Beetle (*Dytiscus marginalis*)
		Giant Water Bug (*Lethocerus americanus*)
		Dragonfly Nymph
		Water Scorpion
Pond 6	1 – 5	Brook Stickleback (*Culaea inconstans*)
		Great Diving Beetle (*Dytiscus marginalis*)

All ponds, with the exception of Pond 5, had fish species present during one or all of the sampling events, and most ponds that were sampled had at least one fish species, with Brook Stickleback being the most prevalent. Most ponds also had some evidence of supporting, in some capacity, amphibian populations, as Green Frog or Wood Frog adults and/or tadpoles were observed in three out of four ponds. Pond 5 exhibited the greatest diversity of reptile and amphibian species. A mature Snapping Turtle (*Chelydra serpentina*) overwintering in the pond, was first observed on March 13, 2012 when there was still ice covering the pond. The turtle was observed on subsequent visits on March 14 and 15, 2012. An aggregation of approximately 20 to 30 breeding Wood Frogs were observed in Pond 5, between Traps 4 and 5, on the evening of March 19, 2012. Egg masses were evident at that time, and tadpoles were present in Trap 5 on March 26, 2012. Green Frog tadpoles were also recorded in Pond 5 on the last two trap nights (March 20 and 26, 2012). Field notes are provided in Appendix D.

The 2012 sampling program was conducted during a period of peak Jefferson Salamander activity based on reports of breeding activity in surrounding areas (J. Bogart pers. comm. March 16, 2012). In addition to the five (5) trapping nights (two (2) for Pond 2) that occurred, visual inspection for salamander egg masses was conducted at each pond throughout the survey period. It is unlikely that our trapping season (March 14 to March 26, 2012) would have missed the breeding season. It is also unlikely that Jefferson Salamanders were successfully breeding within the ponds surveyed, as no adults or egg masses were observed during a relatively intensive field program. Further, given the presence of predatory fish species in Ponds 2, 4 and 6 for the second year in a row, these ponds are considered unsuitable as breeding aggregation ponds for Jefferson Salamanders.

It is our opinion that based on our intensive field program yielding no individuals of this species, the lack of visual observation of egg masses in either year of survey, and the presence of predatory species within most of the ponds, the survey ponds are not currently used as breeding aggregations for Jefferson Salamanders.

4. Conclusions and Recommendations

Based on the results of the 2012 Jefferson Salamander sampling program, it is our opinion that the ponds surveyed do not support breeding habitat for Jefferson Salamanders. There were no individuals or egg masses observed, and the presence of predatory fish species within most of the ponds make it unlikely that the ponds are being used as breeding aggregations.

Pond 5 should be considered Significant Wildlife Habitat (SWH) as a seasonal concentration area for woodland amphibian breeding habitat. Seasonal concentration areas are areas where animals occur in relatively high densities at specific periods in their life cycle and/or particular seasons. Pond 5 meets the criteria for significance outlined within the Significant Wildlife Habitat Ecoregion Criteria (OMNR, 2009), as it located adjacent to a woodland and supports a breeding population of more than 20 individuals of a recognized species (Wood Frog). While turtle over-wintering areas are considered candidate SWH as specialized habitat for wildlife, a single over-wintering individual does not satisfy the criteria for significance. To be considered SWH, a water body must support a minimum of five (5) over-wintering individuals from one or more of the listed species (Midland Painted Turtle (*Chrysemys picta marginata*) and Snapping Turtle), or a single Northern Map Turtle (*Graptemys geographica*).

Pond 5 is approximately 500 m from the proposed road corridor between Highway 6 and Centre Road. The potential for negative impacts associated with the development is not considered significant given the distance between the breeding pond and the proposed road corridor. No further mitigative measures are proposed.

5. Closure

This report has been prepared by GENIVAR Inc. The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in this report. The conclusions presented herein respecting current conditions represent the best judgment of the assessors based on current environmental standards. GENIVAR Inc. attests that to the best of our knowledge, the information presented in this report is accurate. The use of this report for other projects without written permission of the City of Hamilton and GENIVAR Inc. is solely at the user's own risk.
Thank you for the opportunity to complete this report. We trust that this information is satisfactory for your current requirements. Please contact us if we can be of further assistance.

Report prepared by:
GENIVAR Inc.

Erin Corstorphine, M.Sc.
Biologist

Dan Reeves, M.Sc.
Project Biologist

Reviewed by:

Ann Rocchi, M.Sc.
Senior Biologist

6. Literature Cited

GENIVAR Inc. 2011. Draft New East-West Road Corridor Waterdown Road Corridor Class Environmental Assessment: Phases 2/3 SAR Survey. 270 pp.

Ontario Ministry of Natural Resources (OMNR). 2009. DRAFT Significant Wildlife Habitat Ecoregion Criteria Schedules: Addendum to Significant Wildlife Habitat Technical Guide. 73 pp.

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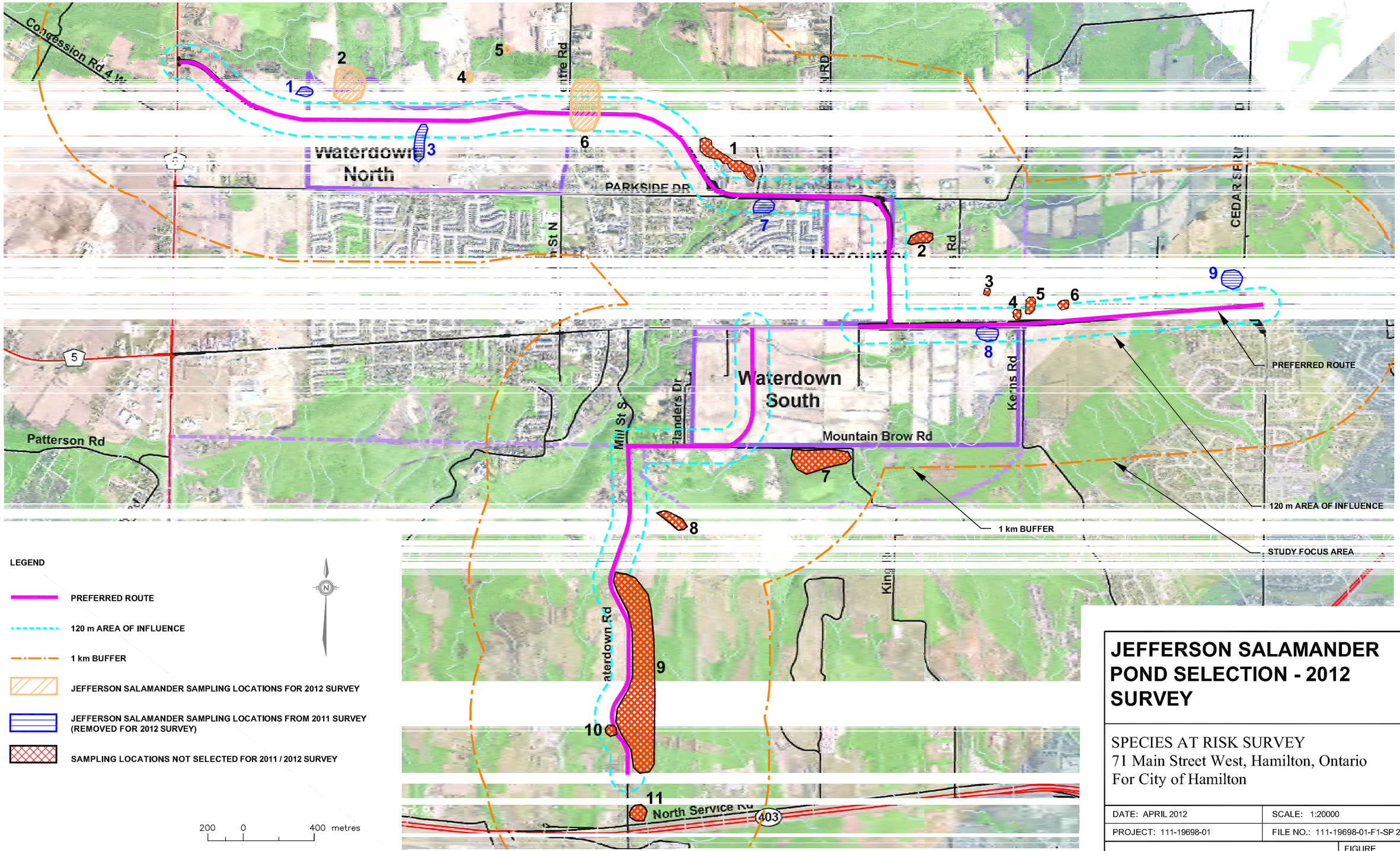
Figures



LEGEND

- PREFERRED ROUTE
- 120 m AREA OF INFLUENCE
- 1 km BUFFER
- JEFFERSON SALAMANDER SAMPLING LOCATIONS FOR 2012 SURVEY
- JEFFERSON SALAMANDER SAMPLING LOCATIONS FROM 2011 SURVEY (REMOVED FOR 2012 SURVEY)
- SAMPLING LOCATIONS NOT SELECTED FOR 2011 / 2012 SURVEY

200 0 400 metres

JEFFERSON SALAMANDER POND SELECTION - 2012 SURVEY

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: APRIL 2012	SCALE: 1:20000
PROJECT: 111-19698-01	FILE NO.: 111-19698-01-F1-SP 2012

GENIVAR

FIGURE 1

Date: _____ Mar 25 & Mar 26

Pond #	Trap #	UTM Co-ordinates	Time Set	Time Checked	Observations
2	1		5:45	9:14	- 5 sm gastropods
2	2		5:47	9:15	- 1 gastropod
2	3		5:48	9:16	- 2 gastropods
2	4		5:50	9:18	6 gastropods
2	5		5:52	9:18	- nothing
2	6		5:55	9:20	- nothing
2	7		5:50	9:20	- 4 gastropods
2	8		5:58	9:21	- 3 gastropods
2	9		6:04	9:23	- nothing
2	10		6:07	9:23	- 2 sm. debris - 1 gastropod

5 of 5

GENIVAR **Field Survey Form**	Property: Waterdown	
	Project Number:	
	Surveyor Name: Dan Reeves	
	Assistant Name: ~~Erin Corstorphine~~ Jenn Davis	
Date:	Survey Start Time:	Survey End Time:

ESA Permit #: GU-B-011-12
WSCA #107380
WACC #12-247
Permits received March 12, 2012 and effective until August 31, 2012

Weather Conditions:

Temperature	_____ °C check one: ☐ measured OR ☐ estimated
Wind	**0** Calm (0-2 km/h) **1** Light air (2-6 km/h) **2** Gentle breeze (12-19 km/h) **4** Moderate breeze (20-30 km/h) **5** Fresh breeze (31-39 km/h) **6** Very windy (40+ km/h)
Precipitation	**0** None **1** Trace **2** Rain
Sky (% cloud cover)	**0** Clear (0-25%) **1** Mostly clear (25-50%) **2** Mostly cloudy (50-75%) **3** Cloudy (75-100%)

Pond #	Trap #	UTM Co-ordinates	Time Set (Mar 25)	Time Checked (Mar 26)	Observations
4	1		6:04	8:49	1 trap, L - 4 shrimp
4	2		6:05	8:51	- 2 tad poles - 19 shrimp
4	3		6:06	8:47	- 26 shrimp - 1 tad pole
4	4		6:07	8:48	- 1 tadpole - 1 shrimp
4	5		6:08	8:47	- 1 tad pole - 11 shrimp
4A					

Appendix E

Owl Survey Field Notes

Appendix E.1

2011 Owl Survey Field Notes

ONTARIO NOCTURNAL OWL SURVEY – CENTRAL ONTARIO SURVEY FORM

Please return completed data forms with a map showing stop locations in the envelope provided by **20 May 2011**

ROUTE NAME: N/A - Hamilton

Closest Town: Waterdown, ON

Route Status (check one):
Established _____ Modified X New _____

(Circle one)
Route Map attached: Yes (No)
Do you wish to participate next year? Yes No

COMMENTS:
- East-West / Waterdown Road Corridor.

SURVEYOR: Dan Reeves
Address: 1090 Gorham Geniver Newmarket
Postal Code: _____

Telephone 905-853-3303 home
Telephone _____ work
E-mail: Dan.Reeves@genivar.com

ASSISTANT: Ana Rocchi
Address: _____
Postal Code: _____

Telephone _____ home
Telephone _____ work
E-mail: _____

BROADCAST EQUIPMENT

GENERAL TYPE:
___ Portable, single speaker
X Luggable, dual speakers
___ Other

MAKE/MODEL (speaker wattage if known):
RCA Compact CD Player.

RESULTS OF PRE-SURVEY EQUIPMENT TEST

When you tested your tape player, could you hear the ~~BOOW~~ BNow broadcast call (when playing the broadcast tape at maximum volume without distortion) at:
a) 100 metres distance? (Yes) No
b) 250 metres distance? (Yes) No
c) 500 metres distance? Yes (No)

When you tested your tape player, could you hear the ~~BARR~~ SEOW broadcast call (when playing the broadcast tape at maximum volume without distortion) at:
a) 100 metres distance? (Yes) No
b) 250 metres distance? (Yes) No
c) 500 metres distance? Yes (No)

From time to time, BSC may send you information regarding our programs, special issues, membership, and other correspondence. If you would prefer not to receive this information, please contact us by mail or e-mail rkirton@bsc-eoc.org. Thank you.

-Note: Accompanied by "Doug" from Savanta Group.

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon Day: 04 18 (2011)

Weather Conditions: Snow Cover (%): 0.0 | Max Depth (cm): N/A | Min Depth (cm): N/A

(Please circle one)

	Wind	Cloud Cover		Precipitation			Temperature
Start of Survey:	(0) 1 2 3 4 5	1 2 (3) 4 5	None	Trace	Rain	Snow	+/- (+) 4 °C
End of Survey:	(0) 1 2 3 4 5	1 2 (3) 4 5	None	Trace	Rain	Snow	+/- (+) 2 °C

BNOW BNOW SEOW SEOW

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	~~BNOW~~ After BOOW	After 1st ~~BARR~~	After 2nd ~~BARR~~	After 3rd ~~BARR~~	After 4th ~~BARR~~	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	20:05															N/A	2	—	—	—
																Comments – watched fields at dusk for short-eared owls. No sightings.				
~~1~~	20:11																			
																Comments – 0687772 4798422 17T, NAD83 EPE (5m)				
~~1~~	20:15																			
																Comments				
~~2~~	20:22															N/A	2	—	—	—
																Comments – 0587915 4798275 17T NAD83 EPE (5m)				
~~2~~	20:26																			
																Comments Note: Repeated 3 more times at station 2 at 9:01 p.m, 9:04 p.m, and 9:07 p.m. → No call backs/Observations				

Same location

9181465048

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Woodcock	Ruffed Grouse	Snipe
2 ~~6~~	20:31																			
3 ~~7~~	20:37															N/A	2	—	—	—
3 ~~8~~	20:42																			
3 ~~9~~	20:47																			
3 ~~10~~	20:5$																			

Column groups: "Mark "X" if heard; "S" if owl seen; "XS" if both" (1st Min to After 4th BARR); "Distance to each owl (m)" (<200 to 1000+); "Other Species (# heard)" (Amer. Woodcock, Ruffed Grouse, Snipe).

Comments (stop 2 ~~6~~):

Comments (stop 3 ~~7~~): 058 7860 479 8476
17T NAD 83 EPE (5m)

Comments (stop 3 ~~8~~): -No sightings/recordings.

Comments (stop 3 ~~9~~):

Comments (stop 3 ~~10~~): Repeat at 20:55

Stop

Stop	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+

Use these lines for additional owls. Please note the stop numbers.

For Office Use Only *ID #*

4642465045

2011 Central Ontario Nocturnal Owl Survey **STOP DESCRIPTION FORM**

PREPARED BY:	DATE: MM / DD / YY 04 /___ / 20__	ROUTE NAME:	ROUTE #:
_____		_____	_____

STOP #	Longitude (Easting)	Latitude (Northing)	NAD (83 or 27)	DESCRIPTION (location, habitat, etc.)
1	058 7772	4798422	83	
2	058 7915	479 8275	83	
3	058 7860	4798476	83	
4				
5				
6				
7				
8				
9				
10				

COMMENTS: _____

ONTARIO NOCTURNAL OWL SURVEY – CENTRAL ONTARIO SURVEY FORM

Please return completed data forms with a map showing stop locations in the envelope provided by **20 May 2011**

ONTARIO NOCTURNAL OWL SURVEY

ROUTE NAME: Hamilton

Closest Town: Waterdown

Route Status (check one):
Established _____ Modified X New _____

(Circle one)
Route Map attached: Yes (No)
Do you wish to participate next year? Yes No

COMMENTS:

Hamilton SAR

SURVEYOR: Dan Lees
Address: _____
_____
Postal Code: _____

Telephone _____ home
Telephone _____ work
E-mail: _____

ASSISTANT: Eric Taylor
Address: _____
_____
Postal Code: _____

Telephone _____ home
Telephone _____ work
E-mail: _____

BROADCAST EQUIPMENT

GENERAL TYPE:

___ Portable, single speaker
X Luggable, dual speakers
___ Other

MAKE/MODEL (speaker wattage if known):
RCA Compact CD Player

RESULTS OF PRE-SURVEY EQUIPMENT TEST

When you tested your tape player, could you hear the **BOOW** broadcast call (when playing the broadcast tape at maximum volume without distortion) at:

a) 100 metres distance? (Yes) No
b) 250 metres distance? (Yes) No
c) 500 metres distance? Yes (No)

When you tested your tape player, could you hear the **BARR** broadcast call (when playing the broadcast tape at maximum volume without distortion) at:

a) 100 metres distance? (Yes) No
b) 250 metres distance? (Yes) No
c) 500 metres distance? Yes (No)

From time to time, BSC may send you information regarding our programs, special issues, membership, and other correspondence. If you would prefer not to receive this information, please contact us by mail or e-mail rkirton@bsc-eoc.org. Thank you.

INSTRUCTIONS AND CODING INFORMATION

SURVEY WINDOW: Any evening in April, preferably in the first two weeks.

TIMING: Please begin your survey one half hour after sunset. Surveys should be completed by midnight and take about 3 hours to complete.

WEATHER: If possible, the survey should be conducted on a calm night with little wind (Beaufort force 3 or less, see below) and no precipitation (see coding below).

SNOW: In the space provided, estimate the percent snow cover on survey route (e.g. 33, if lower two-thirds of route is snow-free). Snow depth is estimated to the nearest cm, for both maximum and minimum depths.

ROUTE: Route selection and configuration should be confirmed with the Owl Survey Coordinator prior to the survey. It is recommended that surveyors scout their route in daylight prior to the first nocturnal survey.

STOPS: Each route consists of 10 stops. Stops should be located every 2.0 km along the survey route as much as possible. However, if a stop is unsafe or too noisy, move to the next suitable location.

MAP: Please provide a photocopy of a topographic map showing your route location with **each stop** clearly marked.

WEATHER CODES

WIND (Beaufort Scale)

0. Calm, smoke rises vertically.
1. Light air movement, smoke drifts.
2. Slight breeze, wind felt on face.
3. Gentle breeze, small twigs move.
4. Moderate breeze, small branches move.
5. Fresh breeze, small trees sway.

CLOUD COVER:

1. 0-25%
2. 25-50%
3. 50-75%
4. 75-100%
5. Fog

NOISE LEVEL CODES (Choose only one!)

1. None or slight, relatively quiet, little interference.
2. Moderate, some interference with broadcast and/or listening.
3. High, substantial interference with broadcast and/or listening.
4. Excessive noise, extreme interference with broadcast and/or listening.

TRAFFIC

Record number of vehicles which pass by during broadcast period.

OWL SPECIES CODES

BARR - Barred Owl
BOOW - Boreal Owl
GGOW - Great Gray Owl
GHOW - Great Horned Owl
EASO - Eastern Screech-Owl
NSWO - Northern Saw-whet Owl
LEOW - Long-eared Owl
SEOW - Short-eared Owl
UNOW - Unknown Owl
NOHO - Northern Hawk Owl

If more than four owls are heard on a single stop, use the additional lines found at the end of the data sheets, and mark the stop number accordingly.

REPEAT?: Mark 'Y' in this column when the same individual owl is heard callimg at multiple stops. If owl is a different individual, please leave blank.

DIRECTION TO OWL: Determine the direction that the owl **began calling from**. Mark **one** of the following directions in the space provided (N, NE, E, SE, S, SW, W, NW).

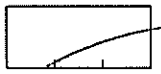
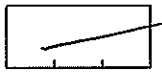
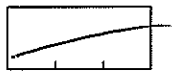
DISTANCE TO OWL: Place an **"X"** in the box that best describes the distance to the owl from your car **when the owl first began to call.**

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon Day

04	20
2011	

Weather Conditions: Snow Cover (%)  Max Depth (cm)  Min Depth (cm) 

(Please circle one)

	Wind	Cloud Cover	Precipitation	Temperature
Start of Survey:	0 1 **2** 3 4 5	1 2 **3** 4 5	None	Trace Rain Snow	+/- **+** 5 °C
End of Survey:	0 1 **2** 3 4 5	1 2 3 **4** 5	None	Trace Rain Snow	+/- **+** 4 °C

Mark "X" if heard; "S" if owl seen; "XS" if both

Distance to each owl (m)

Other Species (# heard)

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Woodcock	Ruffed Grouse	Snipe
1	20:32															>10	2			

Comments
- Killdeer
0591254 4797144 (5m)

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Woodcock	Ruffed Grouse	Snipe
1	2 20:34																			

Comments

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Woodcock	Ruffed Grouse	Snipe
1	3 20:36																			

Comments

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Woodcock	Ruffed Grouse	Snipe
1	4 20:38																			

Comments

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Woodcock	Ruffed Grouse	Snipe
1	5 20:40																			

Comments

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ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1 6	20:43 .																			
2 7	20:53 .															210	2			
2 8	20:55 .																			
2 9	20:57 .																			
2 10	20:59 .																			

Stop 6 Comments

Stop 7 Comments
0591734 479665-7
5r

Stop 8 Comments

Stop 9 Comments

Stop 10 Comments

Stop	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+

Use these lines for additional owls. Please note the stop numbers.

For Office Use Only *ID #*

4642465045

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe	Comments
2 6	21 : 0.2																				
2 7	21 : 04																				
3 8	21 : 23																				591198 4798752 BPB 9m
3 9	21 : 25																				
3 10	21 : 27																				
Stop																					

Use these lines for additional owls. Please note the stop numbers.

For Office Use Only ID #

4642465045

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon Day: 04 / 2017

Weather Conditions: Snow Cover (%) | Max Depth (cm) | Min Depth (cm)

(Please circle one)

	Wind	Cloud Cover	Precipitation	Temperature
Start of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- °C
End of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- °C

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	21:30	3																		
																Comments				
2	21:32	3																		
																Comments				
3	21:34	3																		
																Comments				
4	:																			
																Comments				
5	:																			
																Comments				

9181465048

2011 Central Ontario Nocturnal Owl Survey **STOP DESCRIPTION FORM**

PREPARED BY:	DATE: MM / DD / YY 04 /___ / 20__	ROUTE NAME:	ROUTE #:

STOP #	Longitude (Easting)	Latitude (Northing)	NAD (83 or 27)	DESCRIPTION (location, habitat, etc.)
1	0591257	4797149	83	
2	0591734	4796657	11	
3	591198	4798752	11	
4				
5				
6				
7				
8				
9				
10				

COMMENTS: _____

ONTARIO NOCTURNAL OWL SURVEY – CENTRAL ONTARIO SURVEY FORM

Please return completed data forms with a map showing stop locations in the envelope provided by **20 May 2011**

ONTARIO NOCTURNAL OWL SURVEY

ROUTE NAME: N/A Hamilton

Closest Town: Waterdown

Route Status (check one):
Established _____ Modified X New _____

(Circle one)
Route Map attached: Yes (No)
Do you wish to participate next year? Yes No

COMMENTS:
- East - West / Waterdown Road London

SURVEYOR: Dan Leeson
Address: Ignivor
1091 Gorham, Woodstock
Postal Code: _____

Telephone 905-953-3307 home
Telephone _____ work
E-mail: _____

ASSISTANT: Brian Cooper
Address: _____
_____
Postal Code: _____

Telephone _____ home
Telephone _____ work
E-mail: _____

BROADCAST EQUIPMENT

GENERAL TYPE:

___ Portable, single speaker
_X_ Luggable, dual speakers
___ Other

MAKE/MODEL (speaker wattage if known):
RCA Compact CD Player

RESULTS OF PRE-SURVEY EQUIPMENT TEST

When you tested your tape player, could you hear the **BOOW** broadcast call (when playing the broadcast tape at maximum volume without distortion) at:

a) 100 metres distance? (Yes) No
b) 250 metres distance? (Yes) No
c) 500 metres distance? Yes (No)

When you tested your tape player, could you hear the **BARR** broadcast call (when playing the broadcast tape at maximum volume without distortion) at:

a) 100 metres distance? (Yes) No
b) 250 metres distance? (Yes) No
c) 500 metres distance? Yes (No)

From time to time, BSC may send you information regarding our programs, special issues, membership, and other correspondence. If you would prefer not to receive this information, please contact us by mail or e-mail rkirton@bsc-eoc.org. Thank you.

INSTRUCTIONS AND CODING INFORMATION

SURVEY WINDOW: Any evening in April, preferably in the first two weeks.

TIMING: Please begin your survey one half hour after sunset. Surveys should be completed by midnight and take about 3 hours to complete.

WEATHER: If possible, the survey should be conducted on a calm night with little wind (Beaufort force 3 or less, see below) and no precipitation (see coding below).

SNOW: In the space provided, estimate the percent snow cover on survey route (e.g. 33, if lower two-thirds of route is snow-free). Snow depth is estimated to the nearest cm, for both maximum and minimum depths.

ROUTE: Route selection and configuration should be confirmed with the Owl Survey Coordinator prior to the survey. It is recommended that surveyors scout their route in daylight prior to the first nocturnal survey.

STOPS: Each route consists of 10 stops. Stops should be located every 2.0 km along the survey route as much as possible. However, if a stop is unsafe or too noisy, move to the next suitable location.

MAP: Please provide a photocopy of a topographic map showing your route location with **each stop** clearly marked.

WEATHER CODES

WIND (Beaufort Scale)

0. Calm, smoke rises vertically.
1. Light air movement, smoke drifts.
2. Slight breeze, wind felt on face.
3. Gentle breeze, small twigs move.
4. Moderate breeze, small branches move.
5. Fresh breeze, small trees sway.

CLOUD COVER:

1. 0-25%
2. 25-50%
3. 50-75%
4. 75-100%
5. Fog

NOISE LEVEL CODES (Choose only one!)

1. None or slight, relatively quiet, little interference.
2. Moderate, some interference with broadcast and/or listening.
3. High, substantial interference with broadcast and/or listening.
4. Excessive noise, extreme interference with broadcast and/or listening.

TRAFFIC

Record number of vehicles which pass by during broadcast period.

OWL SPECIES CODES

BARR - Barred Owl
BOOW - Boreal Owl
GGOW - Great Gray Owl
GHOW - Great Horned Owl
EASO - Eastern Screech-Owl
NSWO - Northern Saw-whet Owl
LEOW - Long-eared Owl
SEOW - Short-eared Owl
UNOW - Unknown Owl
NOHO - Northern Hawk Owl

If more than four owls are heard on a single stop, use the additional lines found at the end of the data sheets, and mark the stop number accordingly.

REPEAT?: Mark 'Y' in this column when the same individual owl is heard calling at multiple stops. If owl is a different individual, please leave blank.

DIRECTION TO OWL: Determine the direction that the owl **began calling from**. Mark **one** of the following directions in the space provided (N, NE, E, SE, S, SW, W, NW).

DISTANCE TO OWL: Place an "**X**" in the box that best describes the distance to the owl from your car **when the owl first began to call.**

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon Day: 04 25 / 2011

Weather Conditions: Snow Cover (%): 0.0 | Max Depth (cm): N/A | Min Depth (cm): N/A

(Please circle one)

	Wind	Cloud Cover	Precipitation			Temperature
Start of Survey:	0 1 2 3 **(4)** 5	1 2 **(3)** 4 5	None	**(Trace)**	Rain	Snow	+/- **(+)** .6 °C
End of Survey:	0 1 2 3 **(4)** 5	1 2 3 4 **(5)**	None	**(Trace)**	Rain	Snow	+/- **(+)** .4 °C

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	20:47															710	2	—	—	—
																Comments: 058 4825 4795-347 NAD 83 (10)				
1	~~2~~ 20:49															>10	2	—	—	—
																Comments: - Viewed adjacent fields as dusk / dark set in				
1	~~3~~ 20:51															>10	2	—	—	—
																Comments				
1	~~4~~ 20:54															>10	2	—	—	—
																Comments				
1	~~5~~ 20:57															>10	2	—	—	—
																Comments				

9181465048

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1 6	20:59															710	2	—	—	Yes
																Comments				
2 7	21:16															>				
																Comments: 0590831 479 9844 NAD83 17T (9n)				
2 8	21:18																			
																Comments: peepers calling, Canada geese heard				
2 9	21:21																			
																Comments				
2 10	21:24																			
																Comments				
Stop																				
																Use these lines for additional owls. Please note the stop numbers.				

For Office Use Only ID #

4642465045

Contd

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon Day 04 / 201

Weather Conditions: Snow Cover (%) | Max Depth (cm) | Min Depth (cm)

(Please circle one)

	Wind	Cloud Cover	Precipitation	Temperature
Start of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- °C
End of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- °C

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
2	1 21:26																			
																Comments				
2	~~2~~ 21:29																			
																Comments				
3	21:40															N/A	2			
																Comments: 592387 4801206 17T NAD 83 (BREEDING)				
3	~~4~~ 21:42																			
																Comments: - peepers in chorus				
3	~~5~~ 21:45																			
																Comments				

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ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
3	~~6~~ 2,1 : 4,8																			
																Comments				
3	~~8~~ 2,1 : 5,0																			
																Comments				
3	~~8~~ 2,1 : 5,3																			
																Comments				
4	~~9~~ 2,2 : 0,0															>25	3-4			
																Comments 17T 592638 4901778 EPE 9m				
4	~~10~~ 2,2 : 0,2																			
																Comments -a little bit much traffic hwy				
Stop																				
																Use these lines for additional owls. Please note the stop numbers.				

For Office Use Only ID # | | | | | | |

4642465045

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # O,N

Mon Day 04 / 201

Weather Conditions: Snow Cover (%) | Max Depth (cm) | Min Depth (cm)

(Please circle one)

	Wind	Cloud Cover	Precipitation	Temperature
Start of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- °C
End of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- °C

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	22:05																			
																Comments				
2	22:07																			
																Comments				
3	22:09																			
																Comments				
4	22:11																			
																Comments				
5	:																			
																Comments				

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2011 Central Ontario Nocturnal Owl Survey **STOP DESCRIPTION FORM**

PREPARED BY: DSM DATE: MM / DD / YY 04 / 25 / 20 11 ROUTE NAME: _____ ROUTE #: _____

STOP #	Longitude (Easting)	Latitude (Northing)	NAD (83 or 27)	DESCRIPTION (location, habitat, etc.)
1	0584825	4795347	83	
2	0590831	4799844	"	
3	592387	4801206	"	
4	592638	4801778	"	
5				
6				
7				
8				
9				
10				

COMMENTS: _____

ONTARIO NOCTURNAL OWL SURVEY – CENTRAL ONTARIO SURVEY FORM

Please return completed data forms with a map showing stop locations in the envelope provided by **20 May 2011**

ONTARIO NOCTURNAL OWL SURVEY

ROUTE NAME: Hamilton Closest Town: Waterdown Route Status (check one): Established _____ Modified X New _____ ***(Circle one)*** Route Map attached: Yes (No) Do you wish to participate next year? Yes No	**COMMENTS:** Hamilton SAR

SURVEYOR: Dan Keeres Address: _____ Postal Code: _____ Telephone _____ home Telephone _____ work E-mail: _____	**ASSISTANT:** _____ Address: _____ Postal Code: _____ Telephone _____ home Telephone _____ work E-mail: _____

BROADCAST EQUIPMENT

GENERAL TYPE: ___ Portable, single speaker X Luggable, dual speakers ___ Other	MAKE/MODEL (speaker wattage if known): RCA Compact CD Player

RESULTS OF PRE-SURVEY EQUIPMENT TEST

When you tested your tape player, could you hear the **BOOW** broadcast call (when playing the broadcast tape at maximum volume without distortion) at: **a)** 100 metres distance? (Yes) No **b)** 250 metres distance? (Yes) No **c)** 500 metres distance? Yes (No)	When you tested your tape player, could you hear the **BARR** broadcast call (when playing the broadcast tape at maximum volume without distortion) at: **a)** 100 metres distance? (Yes) No **b)** 250 metres distance? (Yes) No **c)** 500 metres distance? Yes (No)

From time to time, BSC may send you information regarding our programs, special issues, membership, and other correspondence. If you would prefer not to receive this information, please contact us by mail or e-mail rkirton@bsc-eoc.org. Thank you.

INSTRUCTIONS AND CODING INFORMATION

SURVEY WINDOW: Any evening in April, preferably in the first two weeks.

TIMING: Please begin your survey one half hour after sunset. Surveys should be completed by midnight and take about 3 hours to complete.

WEATHER: If possible, the survey should be conducted on a calm night with little wind (Beaufort force 3 or less, see below) and no precipitation (see coding below).

SNOW: In the space provided, estimate the percent snow cover on survey route (e.g. 33, if lower two-thirds of route is snow-free). Snow depth is estimated to the nearest cm, for both maximum and minimum depths.

ROUTE: Route selection and configuration should be confirmed with the Owl Survey Coordinator prior to the survey. It is recommended that surveyors scout their route in daylight prior to the first nocturnal survey.

STOPS: Each route consists of 10 stops. Stops should be located every 2.0 km along the survey route as much as possible. However, if a stop is unsafe or too noisy, move to the next suitable location.

MAP: Please provide a photocopy of a topographic map showing your route location with **each stop** clearly marked.

WEATHER CODES

WIND (Beaufort Scale)

0. Calm, smoke rises vertically.
1. Light air movement, smoke drifts.
2. Slight breeze, wind felt on face.
3. Gentle breeze, small twigs move.
4. Moderate breeze, small branches move.
5. Fresh breeze, small trees sway.

CLOUD COVER:

1. 0-25%
2. 25-50%
3. 50-75%
4. 75-100%
5. Fog

NOISE LEVEL CODES (Choose only one!)

1. None or slight, relatively quiet, little interference.
2. Moderate, some interference with broadcast and/or listening.
3. High, substantial interference with broadcast and/or listening.
4. Excessive noise, extreme interference with broadcast and/or listening.

TRAFFIC

Record number of vehicles which pass by during broadcast period.

OWL SPECIES CODES

BARR - Barred Owl
BOOW - Boreal Owl
GGOW - Great Gray Owl
GHOW - Great Horned Owl
EASO - Eastern Screech-Owl
NSWO - Northern Saw-whet Owl
LEOW - Long-eared Owl
SEOW - Short-eared Owl
UNOW - Unknown Owl
NOHO - Northern Hawk Owl

If more than four owls are heard on a single stop, use the additional lines found at the end of the data sheets, and mark the stop number accordingly.

REPEAT?: Mark 'Y' in this column when the same individual owl is heard calling at multiple stops. If owl is a different individual, please leave blank.

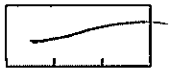
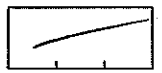
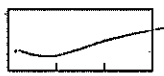
DIRECTION TO OWL: Determine the direction that the owl **began calling from**. Mark **one** of the following directions in the space provided (N, NE, E, SE, S, SW, W, NW).

DISTANCE TO OWL: Place an **"X"** in the box that best describes the distance to the owl from your car **when the owl first began to call.**

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon 04 **Day** 20 1

Weather Conditions: Snow Cover (%)  Max Depth (cm)  Min Depth (cm) 

(Please circle one)

	Wind	Cloud Cover	Precipitation			Temperature
Start of Survey:	0 1 2 (3) 4 5	1 2 (3) 4 5	None	Trace	Rain	Snow	+/- + 1,2 °C
End of Survey:	0 1 (2) 3 4 5	1 (2) 3 4 5	None	Trace	Rain	Snow	+/- + 1,2 °C

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	20:30															NA	1			
																Comments: 586279 4797849 EFF 9m				
2	20:32																			
																Comments				
3	20:34																			
																Comments				
4	20:36																			
																Comments				
5	20:39																			
																Comments				

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ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	~~8~~ 20:41																			
																Comments				
2	~~7~~ 21:07															725	3			
																Comments				
																- busy road				
																- peepers very active				
2	~~8~~ 21:09																			
																Comments				
																17T 586595				
																~~EPB~~ 9m				
																4797233				
2	~~9~~ 21:13																			
																Comments				
2	~~10~~ 21:15																			
																Comments				
Stop																				

Use these lines for additional owls. Please note the stop numbers.

For Office Use Only *ID #*

4642465045

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Stop	Time (24hr) and Odometer(km)	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Amer. Wood-cock	Ruffed Grouse	Snipe	Comments
2 ~~6~~	21:17																				
3 ~~7~~	:															5	2	—	—	—	0587492 4797468 BPE 9m
3 ~~8~~	:																				
3 ~~9~~	:																				
3 ~~10~~	:																				

Mark "X" if heard; "S" if owl seen; "XS" if both. Distance to each owl (m). Other Species (# heard).

Stop	Species Code	1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	<200	200-500	500-1000	1000+

Use these lines for additional owls. Please note the stop numbers.

For Office Use Only *ID #*

4642465045

ONTARIO NOCTURNAL OWL SURVEY - Central Ontario

Route # ON

Mon Day 04 / 2 0 1

Weather Conditions: Snow Cover (%) ____ Max Depth (cm) ____ Min Depth (cm) ____

(Please circle one)

	Wind	Cloud Cover	Precipitation	Temperature
Start of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- ____ °C
End of Survey:	0 1 2 3 4 5	1 2 3 4 5	None Trace Rain Snow	+/- ____ °C

Stop	Time (24hr) and Odometer(km)	Species Code	Mark "X" if heard; "S" if owl seen; "XS" if both: 1st Min	2nd Min	After BOOW	After 1st BARR	After 2nd BARR	After 3rd BARR	After 4th BARR	Repeat?	Direction to Owl	Distance to each owl (m): <200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)	Other Species (# heard): Amer. Woodcock	Ruffed Grouse	Snipe
1	: .																			
																Comments				
2	: .																			
																Comments				
3	: .																			
																Comments				
4	: .																			
																Comments				
5	: .																			
																Comments				

9181465048

2011 Central Ontario Nocturnal Owl Survey **STOP DESCRIPTION FORM**

PREPARED BY:	DATE: MM / DD / YY	ROUTE NAME:	ROUTE #:
DM	04 / 27 / 2011		

STOP #	Longitude (Easting)	Latitude (Northing)	NAD (83 or 27)	DESCRIPTION (location, habitat, etc.)
1	586874	4797849	83	
2	586595	4797233	11	
3	587492	4797468	11	
4			1	
5				
6				
7				
8				
9				
10				

COMMENTS: _____

Appendix E.2

20112 Winter Owl Survey Report

Owl Species at Risk
Winter 2012 Survey Results
New East-West Road Corridor
And Waterdown Road Corridor
City of Hamilton
Halton Region

May 2012

Prepared for:
City of Hamilton
c/o Melanie Jajko
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario L8P 4Y5

Prepared by:
GENIVAR Inc.
294 Rink Street
Peterborough, Ontario K9J 2K2

Project No. 121-14156-00

Distribution:
6 c Client
1 c Electronic Client
1 c File

GENIVAR

Project No. 121-14156-00

May 2, 2012

City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario
L8P 4Y5

Re: New East-West and Waterdown Road Corridor Class EA
Owl Species At Risk (SAR) Winter 2012 Survey Results
City of Hamilton, City of Burlington, Halton Region, Ontario

1. Introduction

GENIVAR was retained by the City of Hamilton in 2011 to complete a Species at Risk Survey for the new East-West and Waterdown Road Corridors. A Draft Phase 2/3 SAR Survey report was submitted to the City of Hamilton on October 11, 2011. In response to Ministry of Natural Resources (MNR) comments dated February 3, 2012, additional surveys for owl SAR species were required.

GENIVAR Inc. was retained by the City of Hamilton in February of 2012 to complete additional surveys for Owl Species at Risk (SAR) for the new East-West and Waterdown Road Corridors. Through ongoing discussion with the Ontario Ministry of Natural Resources (OMNR), a survey protocol was provided by the OMNR for the purpose of this study and is described in greater detail below.

The Owl SAR surveys were conducted in February 2012 along the 2011 routes during the optimal timing window for owl surveys (February to March) and included an additional survey route as suggested by MNR staff. This report outlines the results of these Owl SAR surveys.

2. Owl Species at Risk Survey

2.1 Methodology

GENIVAR conducted nocturnal owl surveys for Barn Owl (*Tyto alba*) and Short-eared Owl (*Asio flammeus*) from April to July 2011 following methodology outlined within the Ontario Nocturnal Owl Survey recommended by Bird Studies Canada. Any owl observations were also to be noted during intensive spring breeding birds surveys conducted during the same time period of the overall SAR

294 Rink Street, Suite 103, Peterborough, Ontario K9J 2K2
Telephone: 705.743.6850 • Fax: 705.743.8366• www.genivar.com

study. This methodology incorporated the use of pre-recorded call playbacks followed by a timed listening period. No owl species were visually observed or heard calling back in response to audio recordings during any of the owl surveys. Furthermore, no owls of any species were observed within the study area by any of the surveyors from April to August.

Although survey methodology including playbacks is one of the most widely used techniques for locating and surveying owls, OMNR staff noted that Barn Owl and Short-eared Owl do not typically respond to playbacks, and as such, an alternate survey methodology was recommended. In addition, optimal timing windows for owl surveys fall within winter months (November through March) when owls are generally more active and visible. Recommendations for the field program as per Guelph District MNR staff (Mike Stone, pers. comm., February 3, 2012) were followed and are described in detail below.

Rather than employ the use of playbacks, the recommended methodology involved a roadside survey conducted from a moving vehicle, with one person driving and the other scanning the horizon for owls within suitable habitat areas. In addition to the locations surveyed in the 2011 owl surveys, the field(s) east of the Centre Road woodland were included in the 2012 survey route. Three (3) sampling sessions were to be conducted for each location and began approximately two (2) hours before dusk. Qualified biologists among GENIVAR field staff were selected for this survey based upon background experience, subject knowledge and familiarity with the Study Area.

These sampling sessions will be conducted on three (3) separate occasions approximately five (5) days apart under weather conditions allowing for good visibility and hearing conditions. To allow for temporal variation in survey time, different locations will be surveyed at different times on each of the three survey dates. Surveyors scanned the horizon for birds flying low over the area, approximately 1-3 m above the ground. Foraging owls generally fly close to the ground and may hover before dropping down onto their prey.

The surveys were conducted along five routes, four of which had been used for the owl SAR surveys conducted in 2011. The four routes used previously were Owl 1, Owl 3, Owl 4 and Owl 5. Owl 2 was not included in the 2012 winter surveys due to access restrictions. A new route, Owl 6, was added based on MNR recommendations. Each route was travelled twice in its entirety during each survey date. The order of the routes changed between dates, but not always within dates due to time constraints. Scans lasted between 1 to 2 minutes per point, with approximately 18 points between all six routes.

All routes are presented in Figure 1. See field notes for route orders (Appendix).

GENIVAR staff conducted the prescribed surveys on February 15, 23 and 28 (at the required intervals of a minimum of five (5) days apart). Details regarding survey conditions are summarized in Table 1.

Table 1: Owl SAR Survey Conditions

Date	Official Sunset*	Survey Start/End	Environmental Conditions
February 15	17:44	16:30/18:30	Cloudy (75-100%), gentle breeze (12-19 km/h), no precipitation, 2°C low
February 23	17:58	16:40/18:40	Mostly cloudy (50-75%), gentle breeze, no precipitation, 2°C low
February 28	18:04	16:55/18:55	Mostly clear (25-50%), gentle breeze, no precipitation, 1°C low

*Environment Canada http://weatheroffice.gc.ca/canada_e.html

Scans lasted between 1 to 2 minutes per point, with approximately 18 points between all six routes.

2.2 Results

No owl species were visually sighted or heard. Other raptors sighted and recorded during the winter owl surveys included Red-tailed Hawk *(Buteo jamaicensis)* (six sightings over the three survey dates), Rough-Legged Hawk *(Buteo Lagopus)* (one sighting during the February 15th survey) and Northern Shrike *(Lanius excubitor)* (one sighting during the February 15th survey). These raptors are not listed on the provincial SAR list. All field observations are included in the Appendix.

Although Barn Owls and Short-eared Owls were not observed in Waterdown during the winter 2012 survey, the sampling program was conducted during a period of peak Short-eared Owl activity in the Hamilton area. Short-eared Owls were first listed in the Hamilton Naturalist Club's weekly summary on Saturday February 11th at 10th Road and 11th Road East in Saltfleet, (ONTBIRDS Digest, Volume 96, Issue 11), and seven Short-eared Owls were noted displaying at dusk at the same location on Tuesday February 20th (ONTBIRDS Digest, Volume 96, Issue 20). Barn Owls are one of the rarest birds in southern Ontario. The closest temporal and spatially documented occurrence of one to the Study Area was a specimen found dead in Whitby in December 2012, reported by the Royal Ontario Museum, among other sources, as the first sighting in Durham Region since 1973 (http://blog.rom.on.ca/2012/01/a-rare-and-beautiful-bird).

3. Conclusions and Recommendations

Based on the results of the Owl SAR Survey conducted in February and March of 2012, it is our opinion that the Study Area is not being used by the two targeted owl species, the Barn and Short-Eared Owls, or even owls in general, as none were seen or heard during intensive surveying in 2011 as well.

Habitat loss is generally considered the major reason for owl decline in Canada; however, harsh winters, predation, road mortality and use of rodenticides may have also affected populations. The

Barn Owl in particular is also limited by poor adaptability to cold winter temperatures and high amounts of snowfall (MNR, 2010). For overall protection and mitigation of the existing habitat, resident bird life and present and potential SARs, the following measures were recommended in our 2011 report (GENIVAR, 2011) and reproduced here:

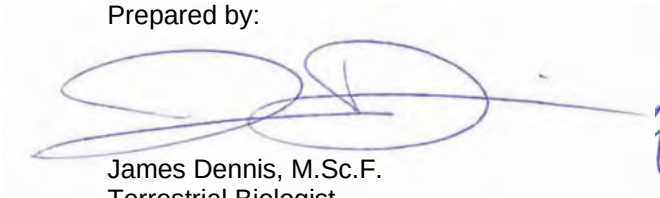
1. Mitigation for the marsh, field and woodland bird species that may be encountered would include adherence to the Breeding Bird Window of May 15 to August 1. If the scheduled construction falls within this window, a breeding bird survey conducted by a qualified biologist would be necessary to document and flag active nests in the proposed work zone. Buffer zones (5-60 m) would be established and respected until the young have fledged or until August 1. Nest sweeps would be conducted every three days during construction to ensure that new nests are not established.

4. Closure

We trust that this evaluation is satisfactory for your current needs. Please contact us if you have any questions or comments.

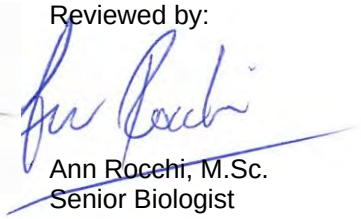
Yours truly,
GENIVAR Inc.

Prepared by:



James Dennis, M.Sc.F.
Terrestrial Biologist

Reviewed by:



Ann Rocchi, M.Sc.
Senior Biologist

JD:nah

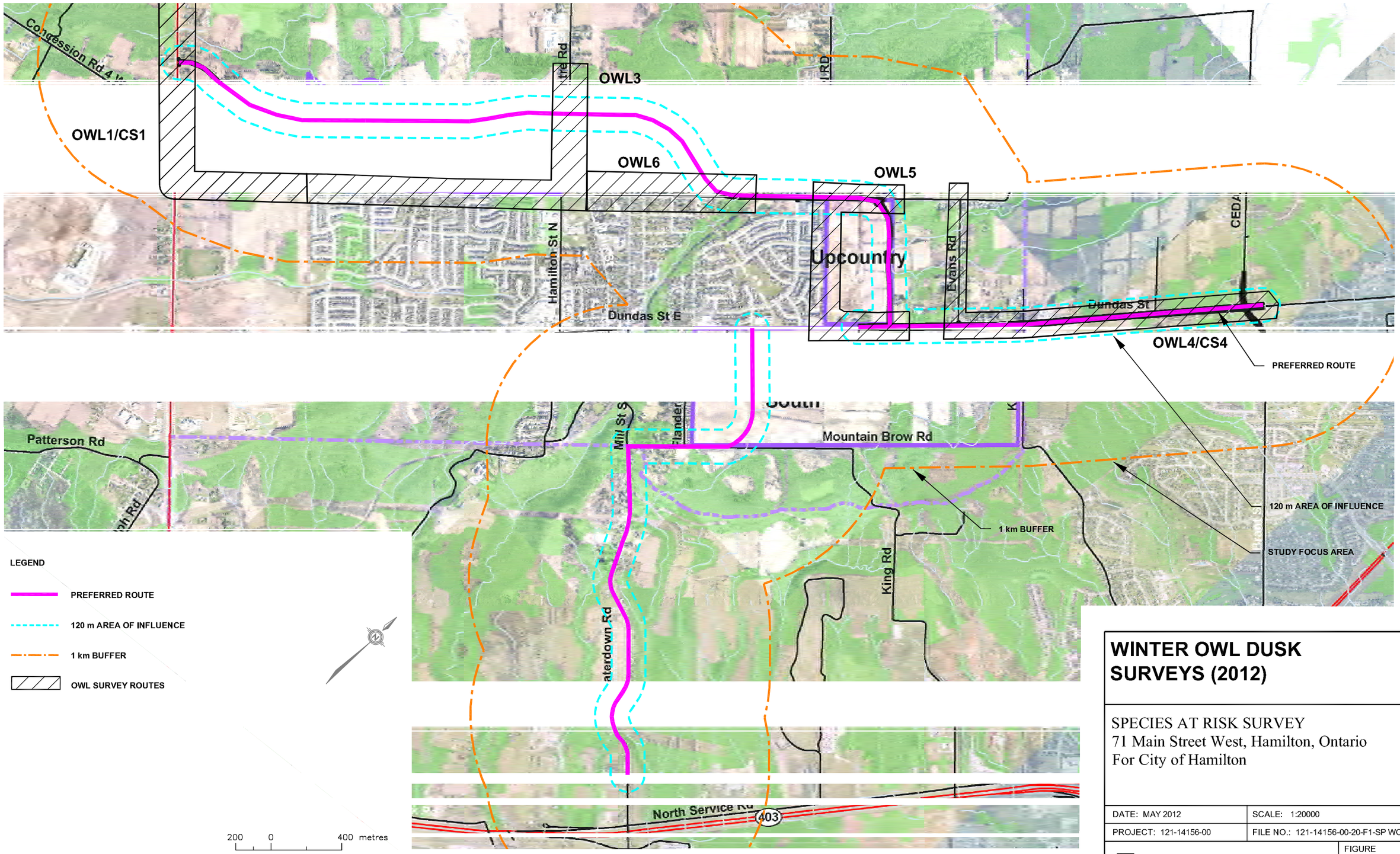
5. Literature Cited

GENIVAR Inc. 2011. Draft New East-West Road Corridor Waterdown Road Corridor Class Environmental Assessment: Phases 2/3 SAR Survey. Prepared for the City of Hamilton. 270 pp.

Ontario Barn Owl Recovery Team. 2010. Recovery strategy for the Barn Owl (*Tyto alba*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 31 pp.

Ontario Ministry of Natural Resources (OMNR). 2012. Response to East-West Road Corridor and Waterdown Road Corridor Phase 2/3 SAR Survey Report (Draft, October 2011). Prepared by Mike Stone, OMNR District Planner February 3, 2012. 3 pp.

Figure



WINTER OWL DUSK SURVEYS (2012)

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: MAY 2012	SCALE: 1:20000
PROJECT: 121-14156-00	FILE NO.: 121-14156-00-20-F1-SP WODS

GENIVAR

FIGURE 1

Appendix

GENIVAR Field Survey Form	Property:	
	Project Number: 121-14156-00	
	Surveyor Name: Rachel Bryan	
	Assistant Name: James Dennis	
Date: Feb 15 / 12	Survey Start Time: 4:30	Survey End Time: 6:30

Weather Conditions:

Temperature	3 to 2 °C	check one:	☑ measured	OR ☐ estimated
Wind	0 Calm (0-2 km/h)	1 Light air (2-6 km/h)	(2) Gentle breeze (12-19 km/h)	
	4 Moderate breeze (20-30 km/h)	5 Fresh breeze (31-39 km/h)	6 Very windy (40+ km/h)	
Precipitation	(0) None	1 Trace	2 Rain	
Sky (% cloud cover)	0 Clear (0-25%)	1 Mostly clear (25-50%)	2 Mostly cloudy (50-75%)	(3) Cloudy (75-100%)

other raptors: RTHA 11
NOSH 1
RLHA 1

Route order: 3 - 1 - 6 - 4 - 5 (x2)

sunset: 5:49 pm

- excellent visibility
- surveyed from vehicle 54 km.

GENIVAR	Property:	
	Project Number: 121-14156-00	
	Surveyor Name: Rachel Bryan	
Field Survey Form	Assistant Name: James Dennis	
Date: 23-Feb-2012	Survey Start Time: 4:40	Survey End Time: 6:40

Weather Conditions:

Temperature	7 to 2 °C check one: ☑ measured OR ☐ estimated	
Wind	**0** Calm (0-2 km/h) **1** Light air (2-6 km/h) **2** Gentle breeze (12-19 km/h) **4** Moderate breeze (20-30 km/h) **5** Fresh breeze (31-39 km/h) **6** Very windy (40+ km/h)	
Precipitation	**0** None **1** Trace **2** Rain	
Sky (% cloud cover)	**0** Clear (0-25%) **1** Mostly clear (25-50%) **2** Mostly cloudy (50-75%) **3** Cloudy (75-100%)	

Sunset: 6:00 pm

route: 1-3-6-5-4
1-3-5-4-6

RTHA- 11

- surveyed from vehicle ~50 km.
- excellent visibility.

GENIVAR	Property:	
	Project Number: 121-	
	Surveyor Name: Rachel Bryan.	
Field Survey Form	Assistant Name: James Dennis	
Date: Feb 28, 2012	Survey Start Time: 4:55	Survey End Time: 6:55

Weather Conditions:

Temperature	2 to 1 °C check one: ☑ measured OR ☐ estimated	
Wind	**0** Calm (0-2 km/h) **1** Light air (2-6 km/h) (2) Gentle breeze (12-19 km/h) **4** Moderate breeze (20-30 km/h) **5** Fresh breeze (31-39 km/h) **6** Very windy (40+ km/h)	
Precipitation	(0 None) **1** Trace **2** Rain	
Sky (% cloud cover)	**0** Clear (0-25%) (1) Mostly clear (25-50%) **2** Mostly cloudy (50-75%) **3** Cloudy (75-100%)	

RTHA-1

Sunset: 6:07 pm

route order: 4 - 5 - 6 - 3 - 1 (x2)

GPS start and end pts of each route. (Zone 17T)

Route 4 @ Evans Rd: 0590841, 4800821 (±5m acc.) elev = 253m

" @ Cedar Springs Rd: 0592792, 4801926 (±5m acc.) elev = 214m

Route 5 @ Dundas: 0591080, 4799909 (±5m acc.) elev = 244m

" @ Parkside: 0590404, 4800486 (±7m acc.) elv = 249m

Route 6 @ creek: 0589743, 4799818 (±6 acc.) elev = 231m

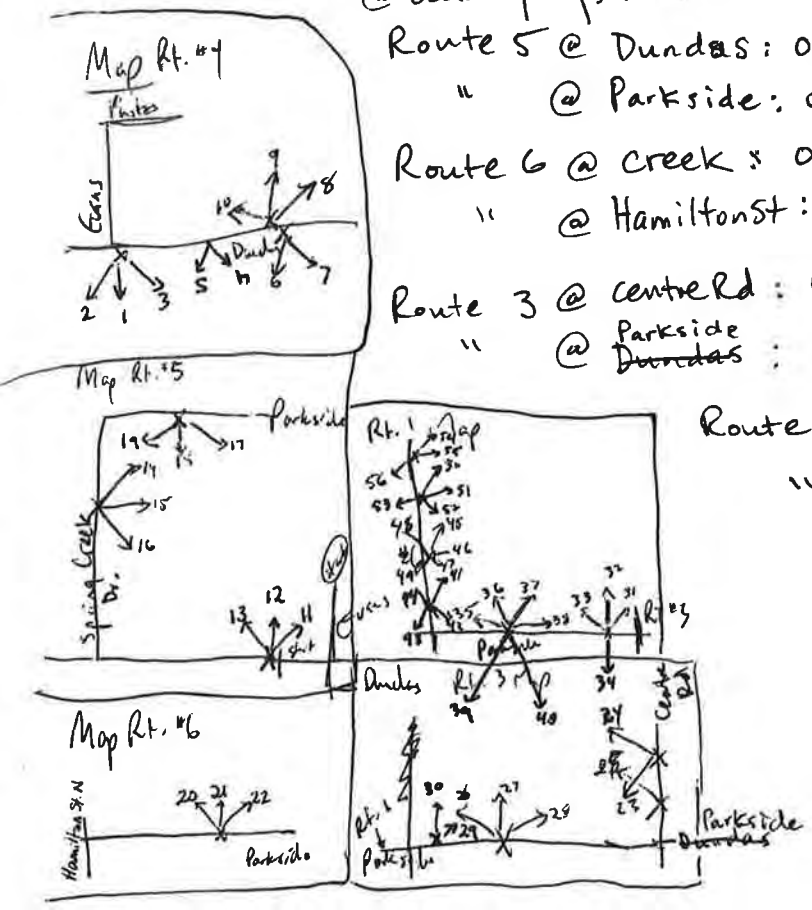
" @ Hamilton St: 0588832, 4798864 (±9 acc) low bat

Route 3 @ centre Rd: 0588271, 4799436 (±8 acc) low bat.

" @ ~~Dundas~~ Parkside: 0587647, 4797646 (±6 acc) low bat

Route 1 @ ~~Dundas~~ Parkside: 0587647, 4797646 (±6 acc.) low bat.

" @ Hwy 6: 0585820, 4797958 (±7 acc.) elev: 242m



excellent visibility

Appendix F

Avian and SAR Survey Report and Point Count Data

Waterdown Avian and SAR Survey Report 2011

1.0 Introduction

This report examines the results of the Avian and Species at Risk (SAR) inventory survey and point count surveys that were conducted in the East-West Corridor and Waterdown Road Corridors area.

Methodology of the point counts and SAR inventory survey is discussed in section (2).

The purpose of the study was to document fauna SAR and their breeding status. Its main focus consists mostly of breeding bird species, however other SAR such as Rusty-patched Bumblebee and Snapping Turtle were also sought. The results of the survey are found in section (3.0).

In order to allow a general overview of the quality of habitat in the study area, a brief discussion of existing disturbance of area's natural cover is provided in section (4.0).

In addition, a list of observed fauna species that were documented during the SAR inventory survey and point count components is found in section (5.0).

2.0 Methodology

This section discusses the point count methods (2.1) and SAR inventory survey methods (2.2) that were used in this study. A list of the targeted species and an overview of the likelihood of their presence at the site can be found in section (2.3).

2.1 Point Counts

The methodology of the eleven point counts stations (A to K) that were conducted at the Waterdown site is based largely upon field protocol developed by the Forest Bird Monitoring Program (FBMP). The primary difference is that three visits were conducted at each station instead of the two that are required. Please note that Points A, B, C, E and I are largely considered to be meadow stations and Points D, F, G, H, J and K are largely considered to be forest stations.

Timing of Visits

The timing of the visits was designed to span the entire breeding period in order to maximize the chances of bird SAR detection.

Each station was visited three times. The first visits occurred between May 22 and May 29; the second between June 11 and June 18; and the third between June 25 and July 3, with at least thirteen days between visits.

Point Count Method

Surveys were conducted only when there was wind strength of less than 3 on the Beaufort Scale with little or no rain.

The tracking of movements was recorded over a period of ten minutes within a radius of 100 metres. The ten minute period was split into two five minute components, “a” and “b”. Only individual birds that were detected within the 100 metre radius were mapped. Birds encountered beyond the 100 metre radius were noted as such onto the data sheets.

2.2 SAR Inventory Survey

The methodology of this component of the study is based largely on breeding bird inventory techniques. The main focus of this survey method was to detect and record breeding bird SAR. Please see Table 1 in section (2.3) of target species and likelihood of breeding due to preferred habitat being present.

Timing of Survey

The Waterdown Site Study Area was visited twice during the breeding bird season with a minimum of ten days between visits.

The first visits occurred between May 21 and June 12, and the second between June 18 and July 10 with a minimum of ten days between visits. Nine days were spent in the field during the first visit period and nine days in the second for a total eighteen days.

Start times ranged from 5:00AM to 5:30AM. A total of 106 hours were spent in the field for an average of 5.9 hours per day. Dates, times and weather conditions are provided on excel spreadsheets.

SAR Inventory Survey Method

All areas with natural cover along the length of the preferred route (120 metre Area of Influence) of the proposed roadway were walked twice during the survey period. These visits were conducted at first light in order to minimize interference from traffic noise. In addition, all areas inside the Study Focus Area (unless posted with No Trespassing signs) were visited twice. Transect lines, approximately 200 metres apart, were walked in order to enable audible detection of bird species.

Recorded songs of bird SAR were played in order to elicit a response. Songs of most species with a low, moderate or a high likelihood of occurrence were broadcast every 200 metres (a minimum of two visits) in areas that were deemed to be suitable as breeding habitat. For example, Hooded Warbler song was played on each visit to mature deciduous forest with thick understory shrub and Louisiana Waterthrush song was broadcast on each visit to streams in mature forest.

Song was not played for certain species such as the Goatsuckers (active in the evening) and Owls (early breeding season). See Targeted SAR Chart for a list of these species.

Generally speaking, birds that were rated with a moderate to high likelihood of occurrence had larger areas of preferred breeding habitat available to them than those with a low likelihood.

2.3 SAR Identified as Possible

This section shows the bird SAR that were targeted for the Waterdown study and the likelihood of possible breeding based on field experience, Ontario Breeding Bird Atlas (OBBA) information and the presence of preferred habitat.

This list is comprised of twenty bird species and includes two species, Eastern Meadowlark and Barn Swallow, which are not currently on the Species at Risk in Ontario (SARO) list.
Seven species were assessed as having a high likelihood of occurring (four of which were observed), four had a moderate likelihood, eight had a low likelihood and one had no likelihood. Additional time and care was given to observation of species with a high and moderate likelihood of occurring.

Table 1

Species	Breeding Habitat Present	Likelihood of Occurrence
Acadian Flycatcher	maple/beech forest present	high
Chimney Swift	chimneys in study area	high, observed
Least Bittern	<5 ha of cattail wetland present	low
Peregrine Falcon	urban habitat present	moderate
Black Tern	no habitat present	none
Cerulean Warbler	some interior forest present	low
Common Nighthawk	urban habitat present	moderate
Hooded Warbler	some understory habitat present	moderate
Louisiana Waterthrush	streams in forest present	high
Red-headed Woodpecker	open woodland present	moderate
Barn Owl	fields present but few structures	low
Bobolink	meadow and hay fields present	high, observed
Whippoorwill	marginal habitat present	low
Short-eared Owl	marginal habitat present	low
Golden-winged Warbler	hydro right-of-way present	high
Canada Warbler	some cedar swamp present	low
Henslow's Sparrow	some wet fields present	low
Prothonotary Warbler	swamp habitat present	low
Eastern Meadowlark	field habitat present	high, observed
Barn Swallow	open habitat and structures present	high, observed

3.0 Results

This section highlights the findings of this study in regards to fauna SAR that were documented during the point count survey (3.1) and SAR inventory survey (3.2). Additional information concerning other observed species (3.3) is also provided in order to facilitate a greater overview of the site's quality of habitat.

3.1 Point Counts

- A pair of Bobolink (Provincially Threatened) was documented during the point count on May 23 at Station A. The male was first observed on May 22 and again on June 4. This was the only fauna SAR that was found during the point count component of the study.
- A combined total of six Barn Swallows were recorded from four point count stations. Please see point count data spreadsheets in Waterdown folder for additional information.

- A total of 56 species birds were documented in the eleven stations including highlights such as Scarlet Tanager, Ovenbird, Wood Thrush, Vesper Sparrow, Eastern Towhee and Bobolink (mentioned above). The significance of these species is discussed below in the section (3.3).

3.2 SAR Survey

- Three territories of Bobolink were documented in this component of the study. The first of these territories is the same as the one mentioned at Station A in the point count section above.
- The second territory of Bobolink was documented on May 21 at Hwy 5 and Kearns Road. A male and female were present in this location. The male was observed chasing a Barn Swallow, singing/displaying and interacting with the female. Neither of the pair was relocated on subsequent visits. According to the OBBA, the threshold date for this species is May 31.
- The third territory of Bobolink was recorded on May 22 with a minimum of five males and one female observed. A portion of these fields lies inside of the study area and east of the Flatt Road Extension. On June 12, three males and two females were observed. On both dates, a male was seen displaying to and then landing near a female.
- Three Snapping Turtles (Special Concern) were documented during the survey, all on June 18. The location of these individuals was close to the preferred route of the proposed roadway, north of Parkside Drive. They were apparently on the move with two on land and the other in a shallow creek. The carapace of all three individuals was judged to be twelve inches long or greater.
- Three foraging Chimney Swifts (Provincially Threatened) were observed on July 2 over downtown Waterdown at the intersection of Hwy 5 and Hamilton Street.
- A Barn Swallow was observed being chased by a male Bobolink on May 21 in the Kearns Road area.
- Two Eastern Meadowlarks were observed (same fields as the third territory of Bobolinks) on May 22 in the fields east of the Flatt Road extension. Another Eastern Meadowlark was observed on June 18 near Station A.

3.3 Observed Species

- A combined total of 96 fauna species were recorded as possibly breeding at the Waterdown site. Please see a list of observed species in section (5.0)
- Nine species of herpetofauna and ten species of mammal were observed over the course of the survey.
- A total of 85 bird species were recorded over the course of the study. This total excludes three species that were thought to be migrants, (not meeting threshold dates; Alder Flycatcher, Least Flycatcher and Magnolia Flycatcher), two migrants out of range of traditional breeding grounds, (Wilson's Warbler and Swainson's

Thrush) and three foraging, (Ring-billed Gull, Black-crowned Night Heron and Purple Martin). These last three species were presumed to be breeding nearer to Lake Ontario and outside of the study area.

- Highlights include Ruffed Grouse, Blue-winged Warbler, American Woodcock, Brown Creeper, Brown Thrasher, Eastern Towhee, Scarlet Tanager, Veery, Winter Wren and Wood Thrush. These and the above mentioned species in the point count survey are considered highlights in that they are most frequently found in more rural situations. These species may have specific habitat requirements and/or are sensitive to impacts that are found the urban landscape. For example, Scarlet Tanager prefers large mature tracts of deciduous or mixed forest and is considered sensitive to forest fragmentation which allows their nests to be parasitized by Brown-headed Cowbirds. Whereas, Ovenbird, a ground-nesting species is vulnerable to disturbance from off-leash dogs and nest predation by cats.

4.0 Discussion of Disturbance

Sensitivity to disturbance is one of the contributing factors as to whether a bird SAR is present or absent. In that the Study Focus Area is in close proximity to the town of Waterdown, human disturbance should be mentioned as a possible reason as to why particular species were not found even though good breeding habitat exists. For example, in the area south of Mountain Brow Road and below the escarpment, habitat exists for Louisiana Waterthrush (and to a lesser extent Acadian Flycatcher and Hooded Warbler); however, numerous pathways used by people and off-leash dogs may disturb breeding attempts in this area.

Disturbance from dirt bikes, ATVs and an extensive trail network was observed throughout the woodland and meadow areas north of the preferred route. This large area is north of Parkside Drive between Hwy 6 and Centre Street.

By comparison the area on the escarpment south of Mountain Brow Road (along the Bruce Trail) was relatively quiet and less intruded upon. Similar undisturbed conditions exist in the woodlands east of Waterdown Road between Hwy 403 and the end of Old Waterdown Road.

5.0 List of Observed Fauna Species

Alder Flycatcher (migrant?)
American Crow
American Goldfinch
American Redstart
American Robin
American Woodcock
Baltimore Oriole
Bank Swallow
Barn Swallow
Black-billed Cuckoo
Black-capped Chickadee
Black-crowned Night Heron (foraging)
Blue Jay
Blue-gray Gnatcatcher
Blue-winged Warbler
Bobolink
Brown Creeper
Brown Thrasher
Brown-headed Cowbird
Canada Goose
Cedar Waxwing
Chimney Swift
Chipping Sparrow
Common Grackle
Common Yellowthroat
Cooper's Hawk
Downy Woodpecker
Eastern Kingbird
Eastern Meadowlark
Eastern Phoebe
Eastern Towhee
Eastern Wood-Pewee
Field Sparrow
Gray Catbird
Great Blue Heron
Great Crested Flycatcher
Green Heron
Hairy Woodpecker

Horned Lark
House Finch
House Sparrow
House Wren
Indigo Bunting
Killdeer
Least Flycatcher (migrant?)
Magnolia Warbler (migrant?)
Mallard
Mourning Dove
Mourning Warbler
Northern Cardinal
Northern Flicker
Northern Rough-winged Swallow
Ovenbird
Pileated Woodpecker
Pine Warbler
Purple Martin (foraging)
Red-bellied Woodpecker
Red-breasted Nuthatch
Red-eyed Vireo
Red-tailed Hawk
Red-winged Blackbird
Ring-billed Gull (foraging)
Rock Pigeon
Rose-breasted Grosbeak
Ruby-throated Hummingbird
Ruffed Grouse
Savanna Sparrow
Scarlet Tanager
Song Sparrow
Spotted Sandpiper
Swainson's Thrush (migrant)
Swamp Sparrow
Tree Swallow
Turkey Vulture
Veery
Vesper Sparrow
Warbling Vireo
White-breasted Nuthatch

Wild Turkey
Willow Flycatcher
Wilson's Warbler (migrant)
Winter Wren
Wood Duck
Wood Thrush
Yellow Warbler

Herpetofauna

Grey Treefrog	(heard)	Northern Spring Peeper	(heard)
Striped Chorus Frog	(heard)	Northern Leopard Frog	(heard)
American Toad	(seen)	Green Frog	(seen)
MIdland Painted Turtle	(dead)	Snapping Turtle	
Eastern Garter Snake			

Mammals

Eastern Chipmunk	Eastern Cottontail
Meadow Vole	Red Fox
Red Squirrel	White-tailed Deer
Coyote	Grey Squirrel
Raccoon	Striped Skunk

6.0 References

Cadman M.D., Sutherland D.A., Beck G.G., Lepage D., and Couturier A.R. (eds.) 2007. **Atlas of the Breeding Birds of Ontario, 2001-2005**. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto xxii + 706pp.

Ontario Breeding Bird Atlas, 2001. *Guide for Participants*. Atlas Management Board, Federation of Ontario Naturalists, Don Mills.

Forest Bird Monitoring Program: Site Set-Up and Bird Survey Instructions. Spring 2007 Revised Edition.

Waterdown SAR Survey **Visit 1 May 23 2011** **Visit 1 07:42 AM**
Point Counts **Visit 2 June 18 2011** **Visit 2 05:54 AM**
Visit 3 July 3 2011 **Visit 3 07:04 AM**

Station A

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
1	BOBO			1	1	2
1	COGR			1		1
1	RWBL	4				4
1	HOLA	1				1
1	SAVS	1				1
1	SOSP	1				1
1	INBU		1			1
1	GCFL				1	1
1	FISP				1	1
1	OVEN		1			1
1	AMCR		1			1
1	BAOR				1	1
2	WIFL	1			1	2
2	EAME	1				1
2	SOSP	2			1	3
2	EUST			1		1
2	RBGU			7		7
2	AMRO			1	2	3
2	FISP	1				1
2	COYE	1			1	2
2	YWAR			1		1
2	COGR			1		1
2	RWBL				2	2
2	BHCO		1			1
2	BCCH		1			1
2	AMCR		1			1
2	NOCA		1		1	2
2	REVI		1			1
2	HOWR				1	1

prepared by Michael H. King

Waterdown SAR Survey **Visit 1 May 23 2011** **Visit 1 07:42 AM**
Point Counts **Visit 2 June 18 2011** **Visit 2 05:54 AM**
Visit 3 July 3 2011 **Visit 3 07:04 AM**

Station A

Visit	Species Code	1st 5 min	1st 5 min		2nd 5 min	2nd 5 min		total count
		<100	>100		<100	>100		
3	WILF	2			1			3
3	YWAR	1						1
3	SOSP	3			1			4
3	RWBL	2			2			4
3	COYE	1						1
3	BARS	1						1
3	NOFL					2		2
3	BHCO		1					1
3	BCCH					1		1
3	AMCR		1					1
3	REVI		1					1
3	AMGO		1					1
3	NOCA					1		1
3	INBU					1		1
Visit 1	**temp**	17 C						
	wind	f-2						
	noise code	0						
	sky	5 over 10						
Visit 2	**temp**	17 C						
	wind	f-2						
	noise code	1						
	sky	3 over 10						
Visit 3	**temp**	21 C						
	wind	f-2						
	noise code	1						
	sky	0 over 10						

prepared by Michael H. King

Waterdown SAR Survey
Point Counts

Station B

Visit 1 May 23 2011
Visit 2 June 18 2011
Visit 3 July 3 2011

Visit 1 08:10 AM
Visit 2 06:23 AM
Visit 3 07:25 AM

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
1	BHCO	1				1
1	MALL			1		1
1	COYE	1		1		2
1	SOSP	2	1			3
1	INBU			2		2
1	RWBL		1	6	1	8
1	BLJA	2				2
1	BAOR	1				1
1	NOCA			1		1
1	CANG				1	1
1	TUVU				2	2
2	MODO		1			1
2	SAVS	1				1
2	SOSP	3				3
2	BHCO	1				1
2	YWAR	2		1		3
2	RWBL	1				1
2	INBU	1				1
2	BAOR	1				1
2	AMGO			1		1
2	GRHE			1		1
2	VESP				1	1
2	WILF		1			1
2	NOCA				1	1
2	AMCR		1			1
2	REVI		1			1
2	GCFL				1	1
2	HOWR		1			1
2	FISP		1			1
2	NOFL		1			1

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Waterdown SAR Survey
Point Counts

Station B

Visit 1 May 23 2011
Visit 2 June 18 2011
Visit 3 July 3 2011

Visit 1 08:10 AM
Visit 2 06:23 AM
Visit 3 07:25 AM

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
3	BHCO	1				1
3	SOSP	3		1		4
3	INBU	1		1		2
3	WILF	1				1
3	BLJA	1				1
3	REVI	1				1
3	COYE	1				1
3	HOLA	1				1
3	AMGO		1		2	3
3	BARS	1				1
3	DOWO			1		1
3	KILL		1			1
3	NOCA		1			1
3	NOFL		1			1
3	AMCR				1	1
Visit 1	**temp**	17 C				
	wind	f-2				
	noise code	0				
	sky	5 over 10				
Visit 2	**temp**	19 C				
	wind	f-1				
	noise code	1				
	sky	5 over 10				
Visit 3	**temp**	21 C				
	wind	f-2				
	noise code	1				
	sky	0 over 10				

prepared by Michael H. King

Waterdown SAR Survey
Point Counts

Station C

Visit 1	**May 23 2011**	**Visit 1 09:25 AM**
Visit 2	**June 18 2011**	**Visit 2 07:00 AM**
Visit 3	**July 3 2011**	**Visit 3 09:14 AM**

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
1	AMGO	2		1		3
1	AMRE	1				1
1	INBU	1				1
1	YWAR	1				1
1	RWBL	2				2
1	AMRO	2				2
1	HOWR	1				1
1	EAWP			1		1
1	WAVI	1				1
1	REVI				1	1
1	KILL				1	1
1	SPSA				1	1
1	CANG		1			1
1	SOSP				1	1
1	AMCR				1	1
2	GCFL			1		1
2	NOCA	1				1
2	SOSP	1		1		2
2	BCCH			1		1
2	AMGO	2				2
2	EAWP	1				1
2	WBNU	2				2
2	REVI	1				1
2	DOWO	1				1
2	AMCR		1		1	2
2	AMRO		1			1
2	KILL		1			1
2	INBU				1	1

prepared by Michael H. King

Waterdown SAR Survey
Point Counts

Station C

Visit 1 May 23 2011
Visit 2 June 18 2011
Visit 3 July 3 2011

Visit 1 09:25 AM
Visit 2 07:00 AM
Visit 3 09:14 AM

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
3	SOSP	2				2
3	NOCA	1				1
3	NOFL	1				1
3	BCCH	4				4
3	WBNU	1				1
3	DOWO			1		1
3	INBU			1		1
3	AMGO	1				1
3	GRCA			1		1
3	AMCR				1	1
Visit 1	**temp**	19 C				
	wind	f-2				
	noise code	1				
	sky	6 over 10				
Visit 2	**temp**	20 C				
	wind	f-2				
	noise code	1				
	sky	5 over 10				
Visit 3	**temp**	24 C				
	wind	f-2				
	noise code	1				
	sky	0 over 10				

prepared by Michael H. King

Waterdown SAR Survey
Point Counts

Station D

Visit 1 May 23 2011
Visit 2 June 18 2011
Visit 3 July 3 2011

Visit 1 09:50 AM
Visit 2 08:07 AM
Visit 3 09:47 AM

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
1	AMRO			2		2
1	SWSP			1		1
1	WIFL	1				1
1	RWBL	3	1		1	5
1	AMGO	1				1
1	BARS			4		4
1	MALL			2		2
1	RBGR		1			1
1	RTHA				1	1
1	COYE		1			1
2	SWSP	1				1
2	AMGO			1		1
2	SAVS	1				1
2	SOSP	2			1	3
2	YWAR	1				1
2	WIFL			1		1
2	RWBL	7	3			10
2	COYE	1				1
2	EUST			1		1
2	KILL		1			1
2	WAVI		1			1
2	HOWR				1	1
2	NOFL				1	1
2	AMRO				1	1
2	GCFL		1			1
2	RTHA		1			1
2	MODO			1		1

prepared by Michael H. King

Waterdown SAR Survey
Point Counts

Station D

Visit 1	**May 23 2011**	**Visit 1 09:50 AM**
Visit 2	**June 18 2011**	**Visit 2 08:07 AM**
Visit 3	**July 3 2011**	**Visit 3 09:47 AM**

Visit	Species Code	1st 5 min <100	1st 5 min >100	2nd 5 min <100	2nd 5 min >100	total count
3	BANS	1		1		2
3	SOSP	2		2		4
3	COYE	2		1		3
3	WIFL	1	1			2
3	RWBL	5			1	6
3	AMGO			2		2
3	SWSP			1		1
3	TRES	1				1
3	BARS			1		1
3	WAVI		1			1
3	NOFL				1	1
3	GRHE				1	1
3	AMCR				1	1
3	EUST		5			5
3	NOCA				1	1
3	MODO				1	1
3	AMRO				1	1

Visit 1	**temp**	20 C
	wind	f-2
	noise code	1
	sky	6 over 10

Visit 2	**temp**	21 C
	wind	f-2
	noise code	1
	sky	5 over 10

Visit 3	**temp**	24 C
	wind	f-2
	noise code	1
	sky	0 over 10

Chimney Assessment Form

Page 2

Chimney height above roofline (m): .7 m	Number of Open Flues: 1	9	3	Colour of Chimney: Red Brick

Total Chimney Height (m) = 1 (Number of stories in building) × 3 m (approx height of one story) + 0.7 (Height above roofline (m)) = 3.7 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

Assessed from roadside

MODO
AMRO

Created by:

BIRD STUDIES CANADA / ÉTUDES D'OISEAUX CANADA
understand appreciate conserve / comprendre apprécier conserver

Canadian co-partner of / un partenaire canadien de
BirdLife INTERNATIONAL

In partnership with:

Ontario

The Ontario Trillium Foundation / La Fondation Trillium de l'Ontario

Environment Canada / Environnement Canada
Ontario Region / Région de l'Ontario

McIlwraith Field Naturalists

May 16, 2011

Chimney Assessment Form

Survey Square Details

Survey Square	Habitat Type
CS-2	DOWNTOWN

Observer Details

Name	Email Address/Contact Info
ANN ROCCHI	ann.rocchi@gennivan.com

Building Details

Street Address	City	Prov.	Postal Code
299 Dundas St E	London	ON	

Owner Name	Phone Number	Email Address
COACH HOUSE BRIDAL SALON	(705) 689-8826	

Type of building (please check one):

- [x] House
- [ ] Church
- [x] Store — CONVERTED CENTURY HOME
- [ ] Lowrise Apartment
- [ ] School
- [ ] Factory
- [ ] Highrise Apartment
- [ ] Hospital
- [ ] Other, please specify: _____

Surrounding habitat (please check one):

- [ ] Commercial/Office
- [ ] Industrial
- [ ] Low-density Housing
- [ ] Community/Regional Facilities
- [ ] Open
- [ ] Medium-density Housing
- [x] Downtown
- [ ] Shopping
- [ ] High-density Housing

Chimney Details

Site Name	Chimney Code
CS-2-2	WA-299-1

GPS coordinates (DD.dddd):
Lat. 43 19 58 30 °N
Long. 79 53 37 62 °W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

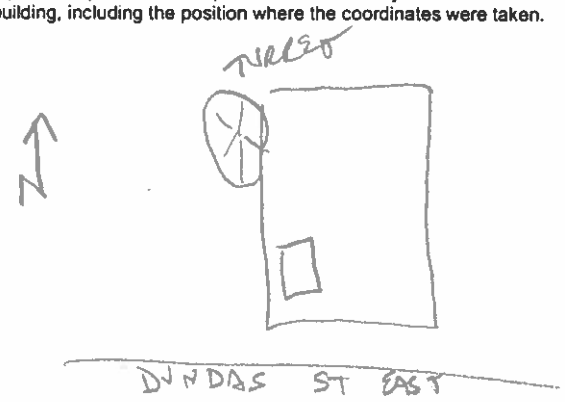
Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- [x] Brick
- [ ] Stucco
- [ ] Concrete
- [ ] Stone
- [ ] Other, please specify: _____

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.



If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- [ ] Metal Liner
- [ ] Terra Cotta Liner
- [ ] Animal Guard
- [ ] Spark Protector
- [x] Other, please specify: No Mod

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- [ ] Round → Diameter (cm): _____
- [ ] Square → Width (cm): _____
- [x] Rectangular → Width (cm): 40 Length (cm): 60

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

2 x 3 bricks

Chimney Assessment Form

IK x 6

Chimney height above roofline (m): 1.08	Number of Open Flues: (1)	Colour of Chimney: Red Brick

Total Chimney Height (m) = 3 (Number of stories in building) × 3 m (approx height of one story) + 1.08 (Height above roofline (m)) = 10.08 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

Observed from parking lot
2 [illegible] chimney [illegible] and 5
at [illegible] church

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McIlwraith Field Naturalists

May 16, 2001

Chimney Assessment Form

Survey Square Details

Survey Square	Habitat Type
CS-2	DOWNTOWN

Observer Details

Name	Email Address/Contact Info
ANN RACCHI	ann.racchi@ogmivan.com

Building Details

Street Address	City	Prov.	Postal Code
317 DUNDAS ST EAST	WATERDOWN	ON	L0R 2H0

Owner Name	Phone Number	Email Address
LION'S CLUB / LITTLE THEATRE	(905)-690 7889	

Type of building (please check one):

- ☐ House ☐ Church ☐ Store
- ☐ Lowrise Apartment ☐ School ☐ Factory
- ☐ Highrise Apartment ☐ Hospital ☑ Other, please specify: THEATRE / HALL

Surrounding habitat (please check one):

- ☐ Commercial/Office ☐ Industrial ☐ Low-density Housing
- ☐ Community/Regional Facilities ☐ Open ☐ Medium-density Housing
- ☑ Downtown ☐ Shopping ☐ High-density Housing

Chimney Details

Site Name: CS-2-1

Chimney Code: WA - 317 - 1

GPS coordinates (DD.dddd):
Lat. 43° 20 02 69 °N
Long. 79 53 32 21 °W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- ☑ Brick ☐ Stucco
- ☐ Concrete ☐ Stone
- ☐ Other, please specify:

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.

If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

maybe?

- ☐ Metal Liner ☐ Terra Cotta Liner
- ☐ Animal Guard ☐ Spark Protector
- ☐ Other, please specify: No Mods

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- ☐ Round → Diameter (cm): ____
- ☐ Square → Width (cm): .5m (2½ bricks)
- ☐ Rectangular → Width (cm): ____ Length (cm): ____

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

LATER IMAGE CHIMNEY

Chimney Assessment Form

Page 2

= x . C

Chimney height above roofline (m): .72	Number of Open Flues: 1	Colour of Chimney: Red Brick

Total Chimney Height (m) = 3 (Number of stories in building) × 3 m (approx height of one story) + .72 (Height above roofline (m)) = 9.72 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

Observed Swift Parking lot - 1 within immediate chimney in lot (Kitchener Church)

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Chimney Assessment Form

Survey Square Details

Survey Square	Habitat Type
CS-2	Downtown

Observer Details

Name	Email Address/Contact Info
ANN ROCCHI	ann.rocchi@gmrivan.com

Building Details

Street Address	City	Prov.	Postal Code
21 MILL ST N	WATERDOWN	ON	

Owner Name	Phone Number	Email Address
LITCHOUSE CHURCH	( )	

Type of building (please check one):

- ☐ House
- ☐ Church
- ☐ Store
- ☐ Lowrise Apartment
- ☐ School
- ☐ Factory
- ☐ Highrise Apartment
- ☐ Hospital
- ☐ Other, please specify: _____

Surrounding habitat (please check one):

- ☐ Commercial/Office
- ☐ Industrial
- ☐ Low-density Housing
- ☐ Community/Regional Facilities
- ☐ Open
- ☐ Medium-density Housing
- ☑ Downtown
- ☐ Shopping
- ☐ High-density Housing

Chimney Details

Site Name: CS-2-3

Chimney Code: WA (2)

GPS coordinates (DD.dddd):
Lat. 43° 20'05.50" N
Long. 79° 53' 32.44" W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

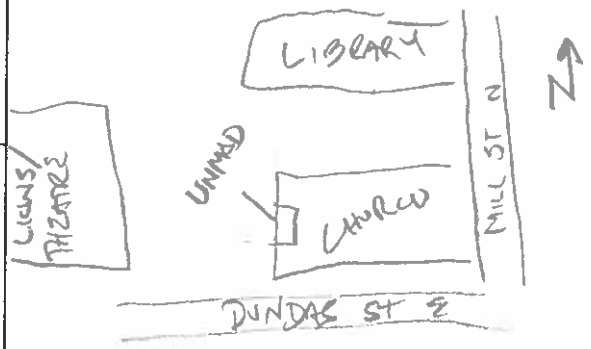
Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- ☑ Brick
- ☐ Stucco
- ☐ Concrete
- ☐ Stone
- ☐ Other, please specify: _____

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.



If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- ☐ Metal Liner
- ☐ Terra Cotta Liner
- ☐ Animal Guard
- ☐ Spark Protector
- ☐ Other, please specify: No Mod

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- ☐ Round → Diameter (cm): _____
- ☐ Square → Width (cm): _____
- ☑ Rectangular → Width (cm): 50 Length (cm): 80

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

2.5 x 4 bricks

Chimney Assessment Form

Page 2

15 x 6

Chimney height above roofline (m): .90	Number of Open Flues: 1	Colour of Chimney: Red Brick

Total Chimney Height (m) = 1 (Number of stories in building) × 3 m (approx height of one story) + 0.9 (Height above roofline (m)) = 3.9 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

Observed from parking lot. 1 other unmodified chimney in lot (Lion's Club)

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MAY 17, 2011

Chimney Assessment Form

Page 1

Survey Square Details

Survey Square	Habitat Type
CS3	MDH / OPEN

Observer Details

Name	Email Address/Contact Info
ANN	ann.rocchi@gmail.com

Building Details

Street Address	City	Prov.	Postal Code
221 Main St S			

Owner Name	Phone Number	Email Address
	( )	

Type of building (please check one):

- [x] House
- [ ] Church
- [ ] Store
- [ ] Lowrise Apartment
- [ ] School
- [ ] Factory
- [ ] Highrise Apartment
- [ ] Hospital
- [ ] Other, please specify: _____

Surrounding habitat (please check one):

- [ ] Commercial/Office
- [ ] Industrial
- [ ] Low-density Housing
- [ ] Community/Regional Facilities
- [x] Open
- [x] Medium-density Housing
- [ ] Downtown
- [ ] Shopping
- [ ] High-density Housing

Chimney Details

Site Name: CS3 - 6

Chimney Code: WA - 221 - 1, - 2, - 3

GPS coordinates (DD.dddd):
Lat. 43° 19' 41 38" °N
Long. 79° 53 21 45" °W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- [ ] Brick
- [ ] Stucco
- [ ] Concrete
- [ ] Stone
- [ ] Other, please specify:

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.

If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- [ ] Metal Liner
- [ ] Terra Cotta Liner
- [1] Animal Guard
- [ ] Spark Protector
- [2] Other, please specify: Na Mod

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- [ ] Round → Diameter (cm): _____
- [ ] Square → Width (cm): _____
- [x] Rectangular → Width (cm): 40 Length (cm): 80

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

2 bricks x 4 bricks

Chimney Assessment Form

35 x 5

Chimney height above roofline (m): 1.95	Number of Open Flues: 3 & 4	Colour of Chimney: RED BRICK

Total Chimney Height (m) = 2 (Number of stories in building) × 3 m (approx height of one story) + 1.95 (Height above roofline (m)) = 7.95 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

OBSERVED FROM DRIVEWAY END / ←

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MAY 17, 2011

Chimney Assessment Form

Survey Square Details

Survey Square	Habitat Type
CS3	MDH / OPEN

Observer Details

Name	Email Address/Contact Info
ANN ROCCHI	ann.rocchi@genivar.com

Building Details

Street Address	City	Prov.	Postal Code
174 MAIN ST S	WATERDOWN	ON	

Owner Name	Phone Number	Email Address
	( )	ann.rocchi@genivar.com

Type of building (please check one):

- [x] House
- [ ] Church
- [ ] Store
- [ ] Lowrise Apartment
- [ ] School
- [ ] Factory
- [ ] Highrise Apartment
- [ ] Hospital
- [ ] Other, please specify: _____

Surrounding habitat (please check one):

- [ ] Commercial/Office
- [ ] Industrial
- [ ] Low-density Housing
- [ ] Community/Regional Facilities
- [ ] Open
- [x] Medium-density Housing
- [ ] Downtown
- [ ] Shopping
- [ ] High-density Housing

Chimney Details

Site Name: CS3-4

Chimney Code: WA-174-1

GPS coordinates (DD.dddd):
Lat. 43° 19' 43.72" N
Long. 79° 53' 23.14" W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

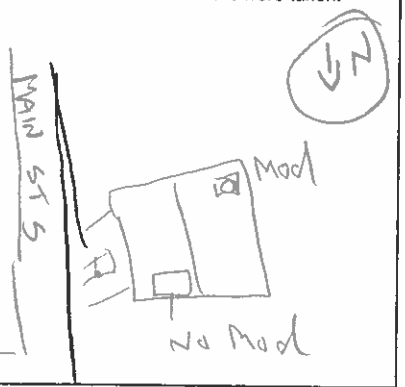
Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- [ ] Brick
- [ ] Stucco
- [ ] Concrete
- [ ] Stone
- [ ] Other, please specify:

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.



If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- [ ] Metal Liner
- [ ] Terra Cotta Liner
- [ ] Animal Guard
- [x] Spark Protector
- [x] Other, please specify: No Mod

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- [ ] Round → Diameter (cm): _____
- [ ] Square → Width (cm): _____
- [x] Rectangular → Width (cm): 30 Length (cm): 50

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

1.5 x 2.5

Chimney Assessment Form

Page 2

20 x 5

Chimney height above roofline (m): 1.2	Number of Open Flues: 1 & 2	Colour of Chimney: RED BRICK

Total Chimney Height (m) = 1 (Number of stories in building) × 3 m (approx height of one story) + 1.2 (Height above roofline (m)) = 4.2 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

OBSERVED FROM ROAD BLACK SQUIRREL ENTERED OPEN CHIMNEY.

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My 17 | Cn1

Chimney Assessment Form

Survey Square Details

Survey Square	Habitat Type
CS3	MDH / OPEN

Observer Details

Name	Email Address/Contact Info
ANN ROCCHI	ann rocchi @ genivon.com

Building Details

Street Address	City	Prov.	Postal Code
36 UNION ST	WATERLOO	ONT	

Owner Name	Phone Number	Email Address
"THE ENGLEWOOD PLACE"	( )	

Type of building (please check one):

- [x] House
- [ ] Church
- [ ] Store
- [ ] Lowrise Apartment
- [ ] School
- [ ] Factory
- [ ] Highrise Apartment
- [ ] Hospital
- [ ] Other, please specify: _____

Surrounding habitat (please check one):

- [ ] Commercial/Office
- [ ] Industrial
- [ ] Low-density Housing
- [ ] Community/Regional Facilities
- [ ] Open
- [x] Medium-density Housing
- [ ] Downtown
- [ ] Shopping
- [ ] High-density Housing

Chimney Details

Site Name: CS3 - 2

Chimney Code: W9 - 3C - 1

GPS coordinates (DD.dddd):

Lat. 43° 19' 55.85" ° N

Long. 79° 53' 21.58" ° W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- [x] Brick
- [ ] Stucco
- [ ] Concrete
- [ ] Stone
- [ ] Other, please specify: _____

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.

If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- [x] Metal Liner
- [ ] Terra Cotta Liner
- [ ] Animal Guard
- [ ] Spark Protector
- [x] Other, please specify: No Mud ? Metal Tray ?

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- [ ] Round → Diameter (cm): _____
- [x] Square → Width (cm): 40
- [ ] Rectangular → Width (cm): _____ Length (cm): _____

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

2 x 2 bricks

Chimney Assessment Form

Page 2

Chimney height above roofline (m): 0.84	Number of Open Flues: 1? & 2	Colour of Chimney: RED BRICK

Total Chimney Height (m) = 1 (Number of stories in building) × 3 m (approx height of one story) + 0.84 (Height above roofline (m)) = 3.84 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

OBSERVED FROM ROAD. BOTH CHIMNEYS MAY HAVE METAL LINERS

WAS HARD TO SEE WHILE OBSERVE

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MAY 17, 2011

Chimney Assessment Form

Page 1

Survey Square Details

Survey Square	Habitat Type
CS3	DOWNTOWN / RIPARIAN

Observer Details

Name	Email Address/Contact Info
ANN ROCCHI	ann.rocchi@gmvon.com

Building Details

Street Address	City	Prov.	Postal Code
324 DUNDAS ST EAST	WATERDOWN	ONT	

Owner Name	Phone Number	Email Address
MacLEOD'S AMERICAN HOUSE	(905) 690 1058	

Type of building (please check one):

- [x] House / RESTAURANT
- [ ] Church
- [ ] Store
- CONVERTED 1824 STAGEHOUSE
- [ ] Lowrise Apartment
- [ ] School
- [ ] Factory
- [ ] Highrise Apartment
- [ ] Hospital
- [ ] Other, please specify: _____

Surrounding habitat (please check one):

- [ ] Commercial/Office
- [ ] Industrial
- [ ] Low-density Housing
- [ ] Community/Regional Facilities
- [ ] Open
- [ ] Medium-density Housing
- [x] Downtown
- [ ] Shopping
- [ ] High-density Housing

Chimney Details

Site Name: CS3 - 1

Chimney Code: WA - 324 - 1

GPS coordinates (DD.dddd):

Lat. 43° 20' 03.74" °N

Long. 79° 53' 30.30" °W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- [x] Brick
- [ ] Stucco
- [ ] Concrete
- [ ] Stone
- [ ] Other, please specify:

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.

If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- [ ] Metal Liner
- [ ] Terra Cotta Liner
- [ ] Animal Guard
- [ ] Spark Protector
- [x] Other, please specify: No Mudo

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- [ ] Round → Diameter (cm): _____
- [x] Square → Width (cm): 60 cm
- [ ] Rectangular → Width (cm): _____ Length (cm): _____

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

3 x 3 bricks

Chimney Assessment Form

Page 2

30 x 6

Chimney height above roofline (m): 1.92 m	Number of Open Flues: 1	Colour of Chimney: RED BRICK

Total Chimney Height (m) = 2 (Number of stories in building) × 3 m (approx height of one story) + 1.92 (Height above roofline (m)) = 7.92 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

OBSERVED FROM PARKING LOT. 2 OTHER OPEN CHIMNEYS ACROSS DUNDAS STREET, LIONS CLUB & LIGHTHOUSE CHURCH (NW CORNER)

- 3 OPEN CHIMNEYS ON SE CORNER ABOVE DYNAMIC BODY PILATES BUT STARLINGS NESTING

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McIlwraith Field Naturalists

May 17 2011

Chimney Assessment Form

Survey Square Details

Survey Square	Habitat Type
CS3	MDH

Observer Details

Name	Email Address/Contact Info
Ann Racchi	ann.racchi@gemivan.com

Building Details

Street Address	City	Prov.	Postal Code
88 Main St S	Waterdown	ON	

Owner Name	Phone Number	Email Address
	( )	ann.racchi@gemivan.com

Type of building (please check one):

- [x] House
- [ ] Church
- [ ] Store
- [ ] Lowrise Apartment
- [ ] School
- [ ] Factory
- [ ] Highrise Apartment
- [ ] Hospital
- [ ] Other, please specify: _____

Surrounding habitat (please check one):

- [ ] Commercial/Office
- [ ] Industrial
- [ ] Low-density Housing
- [ ] Community/Regional Facilities
- [ ] Open
- [x] Medium-density Housing
- [ ] Downtown
- [ ] Shopping
- [ ] High-density Housing

Chimney Details

Site Name: CS3 - 5

Chimney Code: WA - 88 - 1

GPS coordinates (DD.dddd):
Lat. 43°19'53.06" °N
Long. 79°53'20.18" °W

NOTE: Chimney codes are created using the following scheme:

City Initials - Site Initials - Chimney Number

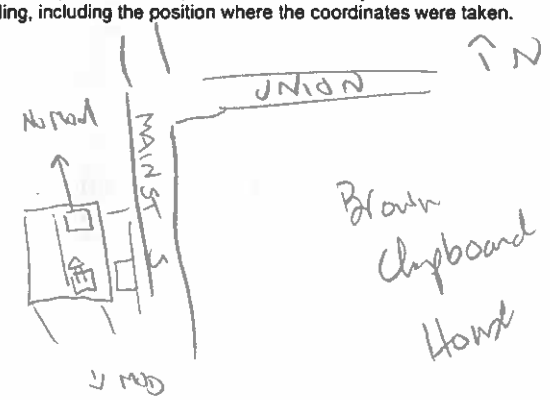
Eg.	City Name	Site Name	No. of Chimneys	Code
	Port Rowan	Public Library	1	PR-PL-1
	London	141 Wortley	2	LO-141-1
				LO-141-2

Number of years active (if known):

Chimney material (please check one):

- [x] Brick
- [ ] Stucco
- [ ] Concrete
- [ ] Stone
- [ ] Other, please specify: _____

If possible, please draw a picture of the chimney location on the building, including the position where the coordinates were taken.



If the chimney is modified (cap, liner, etc.), please check the appropriate modification:

- [ ] Metal Liner
- [ ] Terra Cotta Liner
- [ ] Animal Guard
- [x] Spark Protector
- [x] Other, please specify: No MOD

Please select the **SHAPE** of your chimney and provide the appropriate estimated measurements:

- [ ] Round → Diameter (cm): _____
- [x] Square → Width (cm): 40
- [ ] Rectangular → Width (cm): _____ Length (cm): _____

NOTE: Measurements can sometimes be estimated by counting bricks. Standard bricks have the following measurements: **20cm x 9cm x 6cm (L x W x H)**

Chimney Assessment Form

Page 2

15 x 6 cm

Chimney height above roofline (m): 0.9	Number of Open Flues: 1 or 2	Colour of Chimney: RED BRICK

Total Chimney Height (m) = 2 (Number of stories in building) × 3 m (approx height of one story) + 0.9 (Height above roofline (m)) = 6.9 m

If swifts are present, are they: ☐ **Nesting** ☐ **Roosting** ☐ **Unknown**

Additional Comments:

OBSERVED FROM ROAD.

Created by:

BIRD STUDIES CANADA / ÉTUDES D'OISEAUX CANADA
understand appreciate conserve / comprendre apprécier conserver

Canadian co-partner of / un partenaire canadien de
BirdLife INTERNATIONAL

In partnership with:

Ontario

The Ontario Trillium Foundation / La Fondation Trillium de l'Ontario

Environment Canada / Environnement Canada
Ontario Region / Région de l'Ontario

McIlwraith Field Naturalists

Appendix H

Woodland Vole Survey Field Notes

Appendix H: Woodland Vole Survey: Field Notes and Transcribed Trap Locations

Waterdown North Survey Area - Transect 1				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
1-1	0586644	4797773	236	12
1-2	0586638	4797779	240	7
1-3	0586631	4797785	264	9
1-4	0586625	4797787	236	7
1-5	0586620	4797784	243	6
1-6	0586609	4797789	247	6
1-7	0586608	4797804	249	11
1-8	0586613	4797820	247	8
1-9	0586613	4797829	n/a	n/a
1-10	0586606	4797824	230	9
1-11	0586594	4797836	240	9
1-12	0586585	4797816	245	8
1-13	0586603	4797812	249	6
1-14	0586605	4797803	255	6
1-15	0586602	4797796	247	6
1-16	0586599	4797780	234	11
1-17	0586619	4797786	257	8
1-18	0586620	4797776	242	8
1-19	0586624	4797770	257	7
1-20	0586622	4797760	244	8

Waterdown North Survey Area - Transect 2				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
2-1	0586761	4797906	255	8
2-2	0586762	4797913	240	6
2-3	0586763	4797910	241	8
2-4	0586758	4797915	245	7
2-5	0586755	4797922	247	5
2-6	0586752	4797926	244	11
2-7	0586745	4797934	244	14
2-8	0586736	4797944	251	8
2-9	0586731	4797948	249	6
2-10	0586724	4797966	240	8
2-11	0586722	4797962	237	7
2-12	0586712	4797974	232	6
2-13	0586729	4797969	248	9
2-14	0586735	4797975	247	6
2-15	0586740	4797977	252	7
2-16	0586757	4797983	249	7
2-17	0586761	4797983	266	6
2-18	0586778	4797982	251	6
2-19	0586785	4797980	240	9
2-20	0586792	4797968	266	9

Waterdown North Survey Area - Transect 3				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
3-1	0586999	4798075	265	14
3-2	0586972	4798082	264	8
3-3	0586963	4798085	257	10
3-4	0586966	4798075	250	8
3-4b	n/a	n/a	n/a	n/a
3-5	0586944	4798090	259	13
3-6	0586935	4798062	245	11
3-7	0586936	4798058	235	10
3-8	0586930	4798049	269	11
3-9	0586923	4798051	263	7
3-10	0586922	4798052	249	11
3-11	0586918	4798047	244	10
3-12	0586903	4798023	240	8
3-13	0586897	4798023	242	9
3-14	0586899	4798023	248	7
3-15	0586880	4798025	247	7
3-16	0586871	4798037	247	7
3-17	0586858	4798041	258	8
3-18	0586856	4795042	241	8
3-19	0586850	4798036	240	6

Waterdown Escarpment Woods Survey Area - Transect 1				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
1-1	0591041	4798402	234	n/a
1-2	0591046	4798413	228	10
1-3	0591058	4798429	230	n/a
1-4	0591068	4798418	237	7
1-5	0591080	4798425	247	10
1-6	0591094	4798447	237	6
1-7	0591100	4798443	217	6
1-8	0591115	4798462	226	9
1-9	0591094	4798486	241	8
1-10	0591113	4798489	232	6
1-11	0591132	4798483	233	6
1-12	0591137	4798506	245	8
1-13	0591153	4790524	249	6
1-14	0591173	4798526	251	6
1-15	0591174	4798537	247	6
1-16	0591183	4798544	269	5
1-17	0591190	4798559	250	5
1-18	0591206	4798555	243	6
1-19	0591217	4798564	257	8
1-20	0591229	4798583	226	7

Waterdown Escarpment Woods Survey Area - Transect 2				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
2-1	0591220	4798704	237	6
2-2	0591236	4798693	242	7
2-3	0591250	4798689	231	6
2-4	0591252	4798695	222	20
2-5	0591269	4798677	195	7
2-6	0591273	4798684	219	7
2-7	0591296	4798685	222	7
2-8	0591312	4798690	233	9
2-9	0591310	4798681	237	8
2-10	0591341	4798682	220	7
2-11	0591349	4798664	217	7
2-12	0591382	4798646	219	6
2-13	0591381	4798624	233	8
2-14	0597389	4798615	242	7
2-15	0591411	4798592	232	7

Waterdown Escarpment Woods Survey Area - Transect 3				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
3-1	0591441	4798624	233	7
3-2	0591451	4798624	238	9
3-3	0591452	4798617	244	6
3-4	0591475	4798613	239	7
3-5	0591445	4798692	242	6
3-6	0591449	4798706	246	8
3-7	0591455	4798718	240	7
3-8	0591456	4798720	249	6
3-9	0591469	4790729	n/a	n/a
3-10	0591479	4798735	249	6
3-11	0591487	4798740	252	7
3-12	0591500	4798750	237	14
3-13	0591508	4798773	245	9
3-14	0591509	4798769	243	10
3-15	0591525	4798796	244	8
3-16	0591526	4798799	241	7
3-17	0591540	4798811	244	6
3-18	0591527	4798820	246	6
3-19	0591536	4798829	247	8
3-20	0591543	4798857	241	11
3-21	0591543	4798860	256	9
3-22	0591534	4798881	231	10
3-23	0591591	4798924	222	5
3-24	0591599	4798932	235	5
3-25	0591599	4798946	262	6

Waterdown Road South Survey Area - Transect 1				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
1-1	0591750	4796669	138	6
1-2	0591762	4796662	155	9
1-3	0591756	4796661	128	7
1-4	0591762	4796661	139	7
1-5	0591769	4796651	134	9
1-6	0591776	4796659	129	7
1-7	0591776	4796658	117	7
1-8	0591788	4796659	131	8
1-9	0591789	4796651	127	7
1-10	0591785	4796657	125	8
1-11	0591791	4796648	118	7
1-12	0591799	4796646	112	8
1-13	0591811	4796652	123	7
1-14	0591812	4796643	127	9
1-15	0591809	4796650	131	9
1-16	0591826	4796652	135	7
1-17	0591834	4796656	123	7
1-18	0591840	4796651	141	7
1-19	0591848	4796659	143	6
1-20	0591856	479672	142	6

Waterdown Road South Survey Area - Transect 2				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
2-1	0591817	4796768	156	8
2-2	0591814	4796771	159	6
2-3	0591803	4796771	160	8
2-4	0591791	4796773	152	8
2-5	0591789	4796770	146	7
2-6	0591789	4796767	133	6
2-7	0591782	4796756	138	8
2-8	0591778	4796770	130	6
2-9	0591765	4796772	142	6
2-10	0591766	4796759	133	5
2-11	0591761	4796766	123	7
2-12	0591764	4796752	124	6
2-13	0591760	4796153	126	6
2-14	0591756	4796748	134	6
2-15	0591751	4796750	136	7
2-16	0691748	4796753	132	8
2-17	0591745	4796744	140	7
2-18	0591744	4796735	147	5
2-19	0591741	4796736	145	5
2-20	n/a	n/a	n/a	n/a

Waterdown Road South Survey Area - Transect 3				
Trap #	**Easting** (m)	**Northing** (m)	**Elevation** (m)	**Accuracy** (m)
3-1	0591723	4796778	149	5
3-2	0591729	4796782	140	6
3-3	0591734	4796789	140	7
3-4	0591741	4796790	140	7
3-5	0591745	4796787	143	6
3-6	0591749	4796787	134	7
3-7	0591753	4796779	155	6
3-8	0591759	4796783	140	6
3-9	0591769	4796790	140	6
3-10	0591764	4796801	130	6
3-11	0591765	4796800	125	7
3-12	0591761	4796804	124	7
3-13	0591771	4796804	132	6
3-14	0591780	4796787	177	8
3-15	0591791	4796793	149	6
3-16	0591797	4796798	143	7
3-17	0591806	4796799	148	6
3-18	0591807	4796802	115	6
3-19	0591811	4796803	131	5
3-20	0591823	4796809	138	8

GENIVAR

Woodland Vole – Pitfall Traps
Field Survey Form

Property:	Waterdown North
Project Number:	
Surveyor Name:	EAC, DJR, RWJD
Assistant Name(s):	trap setting
Date: Aug 31/11	Survey Start Time: / Survey End Time:

Trap #	UTM Co-ordinates		Habitat in trap vicinity
1-1	0586644	236m	
	4797773	12m	
1-2	0586638	240m	
	4797779	to 7	
1-3	0586631	264m	~~Ginseng?~~ just No. - young hickory
	4797785	to 9m.	
1-4	0586625	236m	
	4797787	7m.	
1-5	0586620	243m	
	4797784	6m	
1-6	0586609	247m.	
	4797789	6m	
1-7	0586608	249m	
	4797804	11m	
1-8	0586613	247m	
	4797820	8m	
1-9	0586613		
	4797829		
1-10	0586606	230m	
	4797824	9m	
1-11	0586594	240m	
	4797836	9m.	
1-12	0586585	245m	
	4797816	8m.	
1-13	0586603	249m.	
	4797812	6m	
1-14	0586605	255	
	4797803	6m.	
1-15	0586602	247m	
	4797796	6m.	
1-16	0586599	234m	
	4797780	11m	
1-17	0586619	257m	
	4797786	8m	
1-18	0586620	242m	
	4797776	8m	
1-19	0586624	257m	
	4797770	7m.	
1-20	0586628	244m	
	4797760	8m	

→ 0586630 4797778

WN Transect #2 Aug 31/11

Trap #	UTM Co-ordinates		Habitat in trap vicinity
2-1	0586761	255m	
	4797906	8m.	
2-2	0586762	240m.	
	4797913	6m	
2-3	0586763	241m.	
	4797910	8m	
2-4	0586758	245m.	
	4797915	7m	
2-5	0586755	247m	
	4797922	5m.	
2-6	0586752	244m	
	4797926	11m	
2-7	0586745	244m	
	4797934	14m	
2-8	0586735	251m	
	4797944	8m	
2-9	0586731	249m	
	4797948	6m	
2-10	0586724	240m	
	4797966	8m.	
2-11	0586722	237m	
	4797962	7m	
2-12	0586712	232m.	
	4797974	6m	
2-13	0586729	248m	
	4797969	9m.	
2-14	0586735	247m	
	4797975	6m.	
2-15	0586740	252	
	4797977	7m.	
2-16	0586757	249m	
	4797983	7m	
2-17	0586761	266m	
	4797983	6m	
2-18	0586778	251m	
	4797982	6m	
2-19	0586785	240m	
	4797980	9m	
2-20	0586792	266m	
	4797968	9m.	

Pics 6-9

monarch larvae on milkweed NE end of Westernmost prop.

Entering lg woodlot along Bruce Trail // - v. close to road

4-3
Aug 12

dogwood, Lonicera, buckthorn, Shagbark hick., W grape

canopy - shagbark hick., sugar maple, unknown tree (Prunus sp.?) 150, 151 - several in forest
walnut (along roadside), wh. ash, basswood, odd wh. oak further in
- dominated by hickory to W, changes to more wh ash + basswood towards E end of lot. + some walnut, w elm, red oak

pic 154

moved into s. maple dom. forest. 17T 0572436 4801626 acc. 10 m. (156) W ← (155) E → (a bit east of, here)
(on slope) W. elm, basswood; wh ash, w. oak, bl. cherry

robin
slurry woodpecker (little patch of red on crown)

understy bl. currant, buckthorn, bl. cherry (young), hawthorn, wh ash (young)
Lonicera, st. sumac, choke cherry, apple (v. large trees),
dogwood.

ground plants - 3-leaved ground plant (152), St. John's wort, W. grape, V creeper type plant,
tall ench. nightshade, goldenrod (Eda) (along trail)
unknown plant (153) grasses, mosses,
strawberry, garlic mustard, kidney-leaved violet?
Hackelia virg., sm. ench. nightshade

in s. maple forest, less undergrowth - mostly saplings + grasses.
choke cherry, plant 157, tall ench. night.,
lower ground more wh + gr ash, walnut, jewelweed, goldenrod
red oak, raspberry, basswood,
g. mustard, fall meadow rue,

at west thicket to N of trail buckthorn + hawthorn. - several trenches // to road

4-4
Aug 12

marshy area W of resid. prop.
17T 0572471
4801810
to 10 m.
facing E (158)

- cattail, willows, dogwood, grasses
- p. loosestrife, marsh marigold
  jewelweed seems fern, sp. joe-pye
- trees around wet area incl:
  bur oak, gr. ash, red oak, basswood, wh. ash,

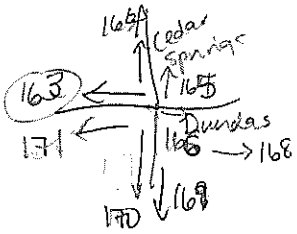
S of wetland on private prop!!
following crk bed S.
not flowing

- wh ash, Lonicera, w. oak, walnut, mostly grasses, Hackelia, unknown (159), buckthorn, w. grape.

hopped fence just W of Cedar Springs (161) W ← (160) → E.

(162 accidental)

along roadside, wh willow, wh ash, gr. ash, walnut, Sumac, Lonicera, ashleaf maple, basswood, dogwood, w. grape, wh oak, buckthorn, shagbark hick., cottonwood, at corner



- lots of walnuts on NW side
  ashleaf maple, sumac, wh ash,

NE · Scot's pine, wh cedar, ashleaf maple, buckthorn, wh ash, wh pine, bl. spruce, honey locust, sl. maple, wh mulberry, walnuts

E of Ced Sp - red pine, apple, walnut, ashleaf, Scot's pine + unknown evergreen, bl. spruce, catalpa, walnut, weeping willow, w. grape, high bush cran., gr. ash, N. maple,

another lg one on adj prop — set back to E

White mulberry (167) (toppled but crown still alive + sticking E, wh pop
- leaves unlobed (+ large), but lustrous + smooth, only hairs along the vein axils, bud + leaf scars run ⊥ wh
- at the forest edge

SE corner - meadow / dist'd area,
also fenced off area
- teasels, cat tail, willows (silvery + weeping), ashleaf, thistles, grasses,
mowed grass

Walking west along Dundas from Cedar Springs — 4-5
- to south mostly residential & some patchy woodland. Aug 12

SW corner - mostly all ashleaf maple + sumac, N. maple, sm. walnut,
enormous wild rose fruit the size of gr. olives! (smooth twigs)
W. grape, V. creeper, Lonicera, dogwood, wh. ash.
unknown 'shrub' (172) weeping willow in backyard & pool
mulberry @ back of yard - v. shiny — wh? Red pine, N. maple
gr. ash, bl spruce, silver slender willow, wh spruce,
bur oak, wh cedar, basswood, silver maple, buckthorn,
wh. elm, mystery tree, lilac,

pic of large rock outcrop (173) facing W,
facing back at it to E (174)
- outcrop on S. side covered by vines & obscured by shrubs / trees,
- open meadow across from Bruce trail entrance (175) (& beside other entrance)

Am goldfinch.

forest on S. side, Wh meadow & field.
- black maple, hawthorn, wh ash, gr ash, basswood
ashleaf maple, sumac, apple, dogwood, bl. cherry
red oak,
butternut (B) (176, 177) 17T 0592336 to 6m 4801296
bitternut hickory (9 leaflets)

more ash on W side of woods (along road) - gr. ash, reddish twigs
garlic mustard (throughout)
raspberry,
Lonicera,
tall enuch nightshade,
kidney leaf violet?

looking W (178)
E side of woods. Siberian elm, buckthorn, grasses, hawthorn, sumac, gr. ash, Lonicera, bl. cherry, basswood huge dogwoods wh, elm, red oak,

chickadee

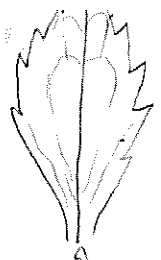
more limestone in this area, big hunks of rubble.

further in more W. elm, basswood, red oak dam, young S. maple, shagbark hickory, wh pine red baneberry, mayapple raspberry (43°21.4344 N 79° 51.6230 W)

another butternut (past wh. pines (179, 180)
43.35714N 79.86025W next reading 43.35724N 79.86038W

W of Cdn Ref. Church. 1:41 pm – 2:56
South side of road, moving W

4-6 Aug 12



- open meadow - typical veg.
  forest edge - silver slender willow, buckthorn, bl. locust, w. grape
  road thru middle - open sunny
  Phragmites, N. maple, kidney leaved violet, garlic must.
  burdock, wh. aster (stalk densely hairy, leaves clasping stem, hairy top + bottom (10 teeth/lobes), ragweed, motherwort, plantain, timothy, sw clover, wh. spruce, goldenrod.
  v creeper, couple small walnuts.

(181) facing S. into field on W side - Phragmites, open meadow, sm wetland on E side? canman reed + Typha
W side gr. ash.

(182) facing S to W of meadow. dev. occurring
hedgerow.
- buckthorn, red oak, wh spruce, poison ivy, sm walnut
shagbark hickory

roadside - thistles, etc., Asparagus?
buckthorn, Siberian elm - Landscaped to Kearns Rd.

North Side

(183) facing E - starting @ Novak Prop (N of Kearns) - prop. fully landscaped
wh oak, walnut, shagbark hick, buckthorn, wild q., dogwood, red oak
lilac, lonicera, sumac, smokebush, horsechestnut,
typical grassy/weedy roadside
tuckyard, wh elm, walnut to W, aspen sp to rear
along road - Siberian elm, buckthorn, sumac

FROGS.
- N. Leop. Frog

tuckyard | wetland
(184)
(185)
- Siberian elm, bl. locust, wh willow, wh elm.
E wh poplar, hawthorn, walnut, red osier dogwood
E cottonwood

roadside all long grasses.

res. property
open manicured lawn - ashleaf maple, weep. willow, hawthorn, buckthorn, walnuts, N. maple, wh pine? apple,
gr. ash, r. maple, buckthorn, hawthorn, W. grape, w elm, walnut, dogwood, cranberry, sm wild rose, v. creeper,

(186) N into Cornfield (W of church) E of →
- sm wetland area in foreground.
Ash (gr) feathery fern? along roadway dogwood (spp.)
Prunus sp, red osier dog, Lonicera, w. grape, sil. maple, hazelnut

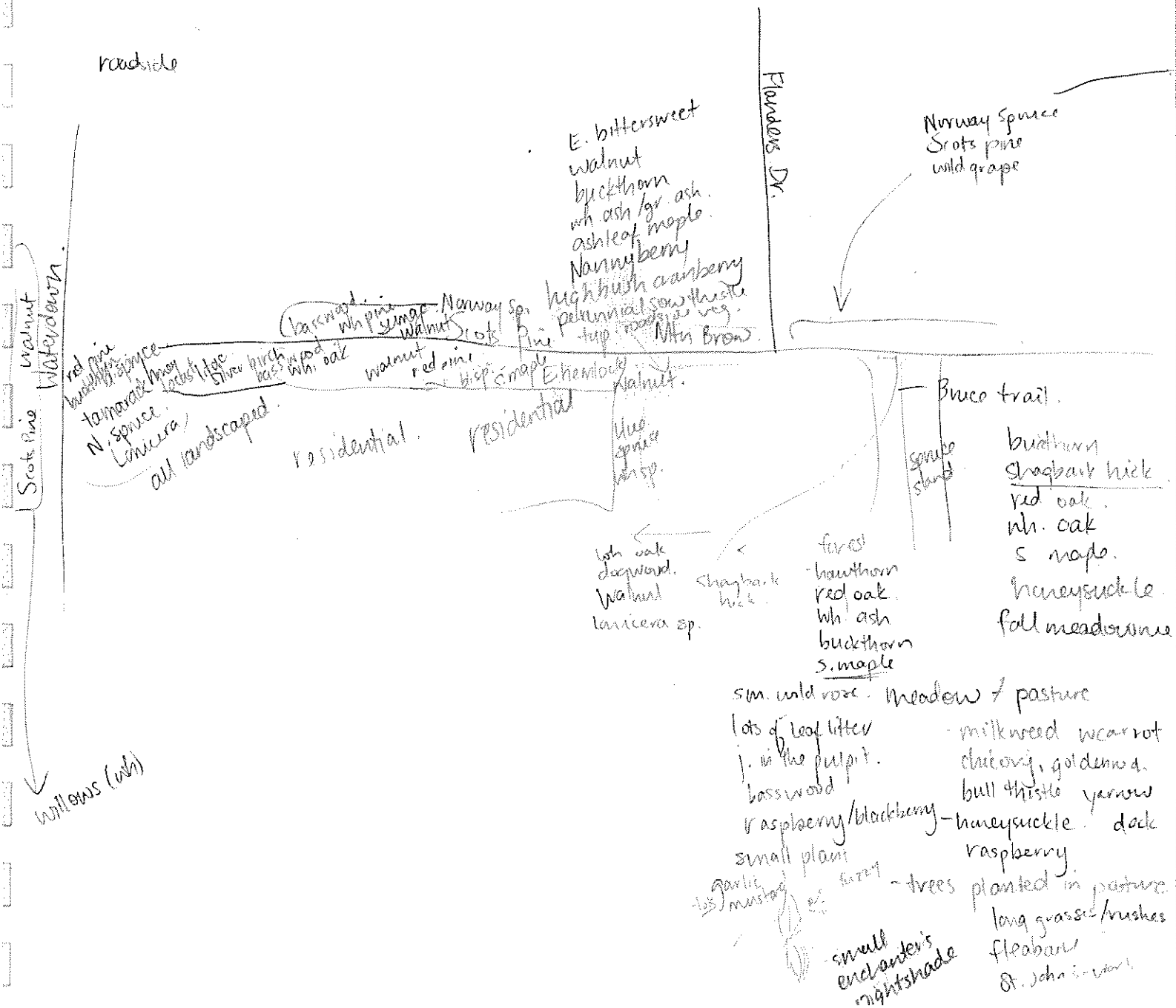
did not go in to forest

Drainage

GENIVAR	Property: N-S corridor (Mtn Brow - Waterdown)
	Project Number: 111-19698-00
	Surveyor Name: E. Corstorphine
Field Survey Form	Assistant Name: E Taylor
Date: Aug 9/11	Survey Start Time: 3:29 pm | Survey End Time: 6:18

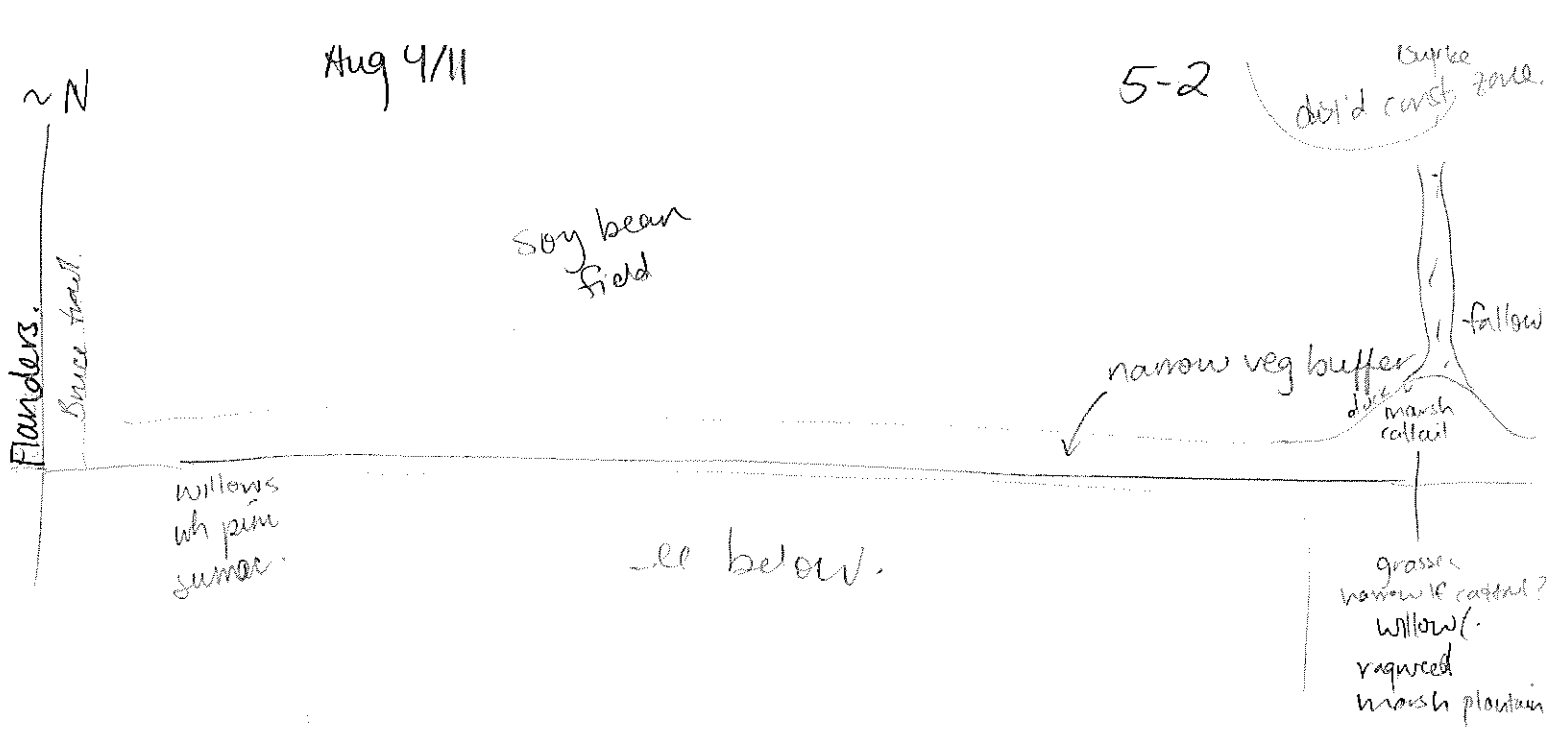
Weather Conditions:

Temperature	23 °C check one: ☐ measured OR ☑ estimated
Wind	0 Calm (0-2 km/h) (1) Light air (2-6 km/h) 2 Gentle breeze (12-19 km/h) 4 Moderate breeze (20-30 km/h) 5 Fresh breeze (31-39 km/h) 6 Very windy (40+ km/h)
Precipitation	(0) None for now 1 Trace 2 Rain
Sky (% cloud cover)	0 Clear (0-25%) 1 Mostly clear (25-50%) (2) Mostly cloudy (50-75%) 3 Cloudy (75-100%)



Aug 9/11

5-2

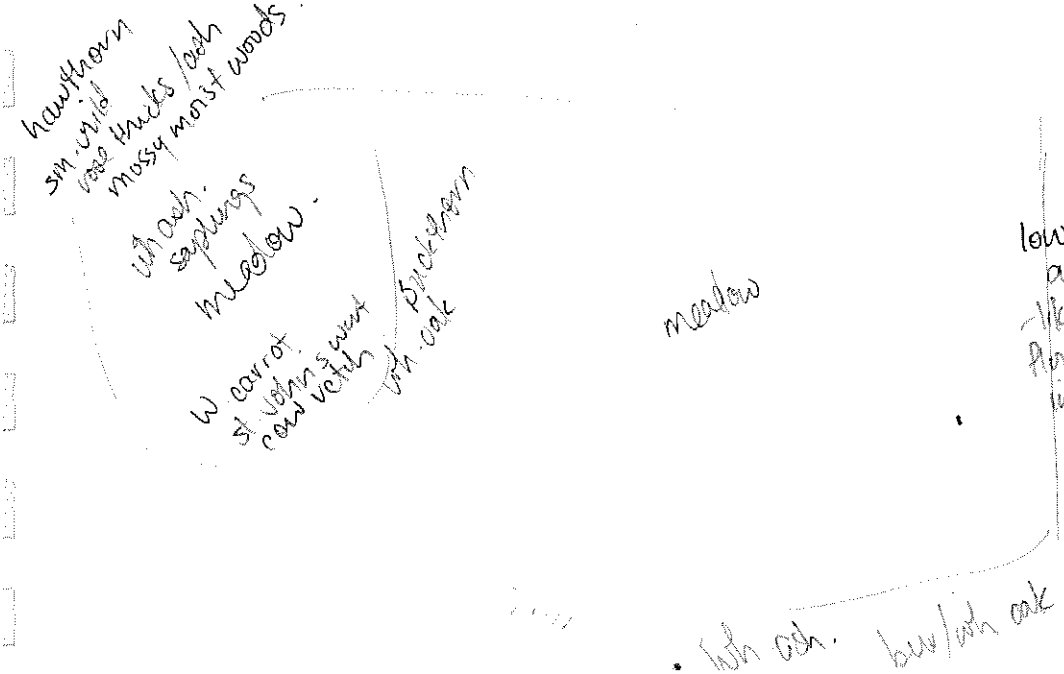


N. side (veg buffer)
- shagbark hick
- buckthorn
- dogwood
- bur oak
- wh. ash
- W. grape
- goldenrod, grasses.
- St. John's wort
- walnut
- wh. oak.
- Lonicera
- willows
- E. bittersweet
- hawthorn.
- Sm. wild rose.
- W carrot

fallow field - W. carrot, dock, ragweed, thistle. foxtail grass
(was corn field)

S. side - hawthorn, buckthorn, wh. ash.

- opens into another meadow
- grasses & milkweed, odd tree
cow vetch, edn thistle
bull thistle, St John's wort
sedges, goldenrod



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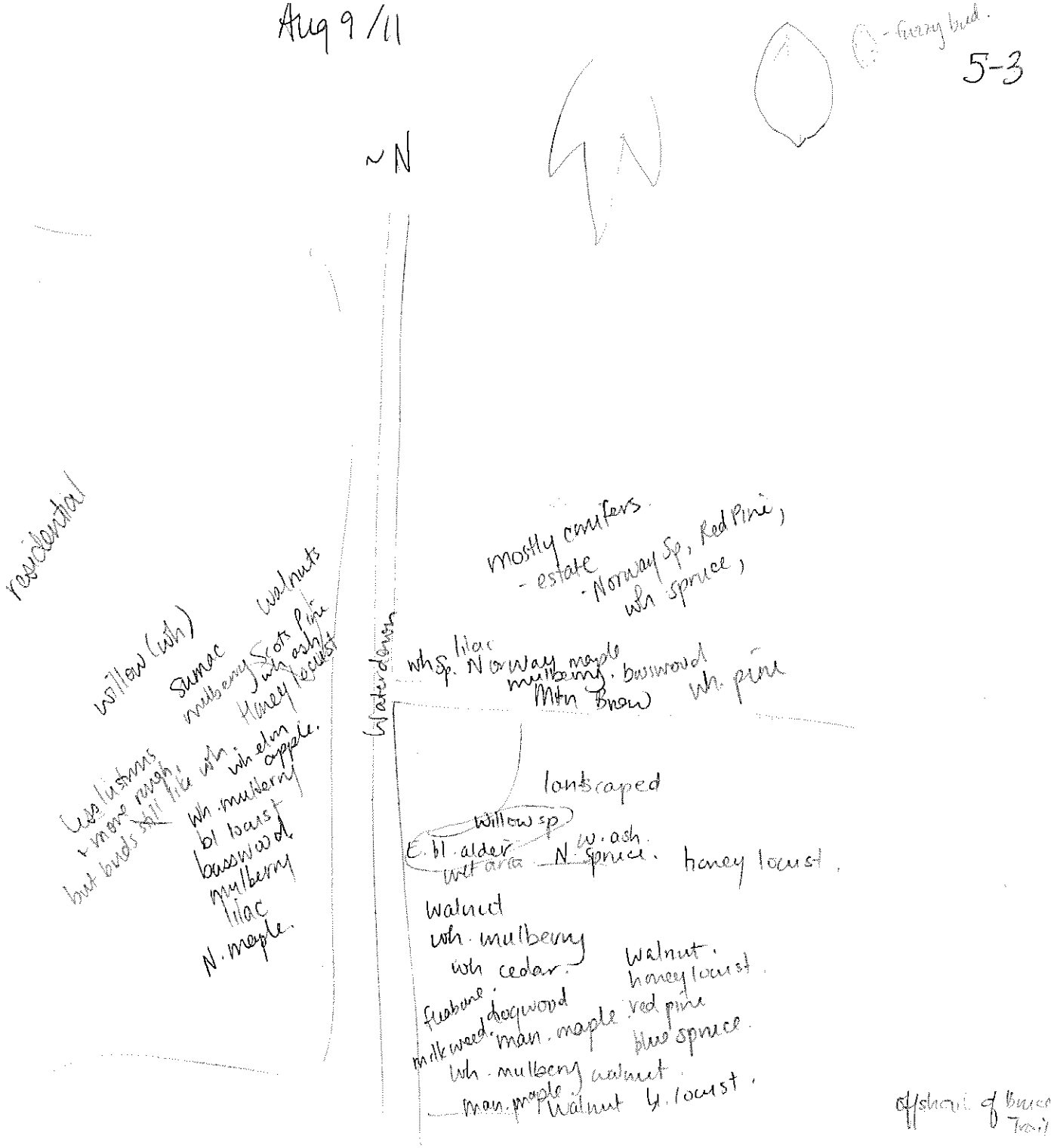
5-3


~N
Grey bird.
residential
willow (wh)
Sumac
mulberry
walnuts
Scots Pine
wh ash
Honey locust
wh elm
apple.
wh. mulberry
bl locust
basswood
mulberry
lilac
N. maple.
Less lustrous
+ more rough
but buds still like wh
Waterdown
wh Sp. lilac
Norway maple
mulberry
basswood
Mtn Snow
wh. pine
mostly conifers
- estate
- Norway Sp, Red Pine,
wh spruce)
landscaped
Willow sp
E. bl. alder
wet area
N. spruce.
w. ash.
honey locust.
Walnut
wh. mulberry
wh cedar.
Walnut.
honey locust.
fleabane
milkweed
dogwood
man. maple
red pine
blue spruce
wh. mulberry
walnut
man. maple
Walnut
bl. locust.
off shoot of Bruce Trail

(7)-1 - south end of waterdown E. side.

GENIVAR	Property: Waterdown S.
	Project Number: 111-19698-00
	Surveyor Name: E. Corstorphine (EAC)
Field Survey Form	Assistant Name: —
Date: Aug. 8/11	Survey Start Time: 1:23 pm | Survey End Time:

Weather Conditions:

Temperature	27 °C check one: ☐ measured OR ☑ estimated
Wind	0 Calm (0-2 km/h) (1) Light air (2-6 km/h) 2 Gentle breeze (12-19 km/h) 4 Moderate breeze (20-30 km/h) 5 Fresh breeze (31-39 km/h) 6 Very windy (40+ km/h)
Precipitation	(0) None 1 Trace 2 Rain
Sky (% cloud cover)	0 Clear (0-25%) (1) Mostly clear (25-50%) 2 Mostly cloudy (50-75%) 3 Cloudy (75-100%)

2 habitat types on E side of rd → cultural meadow (was dist'd recently?)
moist decid. forest.

meadow sp. - lots of exposed sandy/gravelly soils
- ragweed - v. dry.
clovers (all dead now)
P. goldenbean, purple vetch
purple bean ? curly cues?
W. carrot, Cda thistle
milkweed, Cda goldenrod.
teasel, dock
assorted graminoids - redtop?
St John's wort bull thistle

lots of butterflies - monarchs (several), tiny blue/grey one. (white) + orthopterans; bees...

closer to forest edge
- more goldenrod, W carrot, fleabane
timothy

plant ? cluster of long lance-shaped leaves @ ground level. (5)

asters - not yet in flower. (L)
hairless, leaves clasping, alternate, hairless leaves, smooth margin, smaller, narrower leaves on flowering stalk.

Pictures: in field

N (1) ↑
4 ← → 2
↓
S 3

17T 0592175 143m
4796434 to 5m

Forest (picture facing N along ridge, 10)
trees: red oak, basswood, S. maple, Wh oak, E. hickory.
Wh. ash, shagbk hickory, W.bl. cherry
Wh. elm, slippery elm (forked veins)
understy: witch hazel, hawthorn, Wh pine
common buckthorn, S maple
ironwood (shaggy bark in strips)
bl locust

Understy (6,7,8,9) 11,12,13 14,15,16,
seedling (ash), ironwood?
Sm. wild rose, false sol. seal, twinflower
- moss along ridge top
fall meadowrue.
hop clover
dogwood - opp. spots on stem
- plant ? alt leaves along stem (like Solidago) - no hair on leaves or stem
- leaf toothed (sample)

Walked N along ridge.
- towards N it opens up a bit more, more meadow sp. (Solidago, carrot, Wh sweet clover, fleabane, burdock, bl. locust

* neat Lonicera sp. pic # 17, 18

Aug 8/11

7-2

ridge

Down slope

A 17T 0592202
4796462
elev. 154 m
acc. to 11 m

B

- meandering stream, mostly dry now.

B 17T 0591960
4796567
elev. 144 m
acc. 7 m

19
22 ← → 20
21

- Xmas tree fern
- finely toothed
- floodplain / valley
- jewelweed
- alder (E. black alder) - lg trees
- mystery tree - 25, 26, 27
- basswood
- wild grape
- raspberry
- tripinnate fern (no spores yet)
- hickory
- sm wild rose

23, 24

most of trees

- soil in riverbed seems high in Fe v. red.

E. chipmunk

ridge

C - almost under hydro line

ridge

- plank kind of like ginseng but not quite right (28, 29), seems more heavily toothed, have ☂ flowers or seeds
- connected by underground rhizomes

17T 0579920
4796565
elev 136 m
acc to 7 m

- currant
- sk. cabbage,
- plants in flood plain (30-35) wh. snakeroot ? water hemlock ?

river valley

36
37
38
40
39

Some parts of stream have standing water, fish + frogs in here

A

At edge of hydro corridor

- can't get in
- too thick

on other side of stream

walnut
wh ash

- red oak, s. maple, hickory, hawthorn, staghorn sumac, fleabane, w. carrot, raspberry, tease, burdock, sm wild rose, willows (cattail gone), strawberry, tall meadowrue

- ironwood on this side are dead (exposed to sun)

woodsorrel

17T 0592038
4796577
123m
acc. to 7m

There is a lot of downed woody debris in forest on east side of valley.

odd. w. cherry

- under hydro corridor - thick veg
thickets of sm. wild rose, staghorn sumac, hawthorn, goldenrod, w. carrot

C 17T 0591937
4796604
elev. 143m
acc 5m

- forest on other side - s. maple (thin trees) r. oak, wh oak.

Valley

horsetail, beech, s. maple, basswood
shagbark hickory, wh. pine

41 - vine on basswood

7-3 Aug 8/11 17T 0592093 4796656 elev. 140 m acc 6 m.

found a trail on far ridge, leads to hydro corridor + across

- along path there are woodland sunflower? vultures, hawk + turkey strawberry, red oak, hawthorn, sumac, honeysuckle, Am goldfinch raspberry, w. carrot, eur. wh. poplar, lg tooth aspen, sm wild rose, willow sp., goldenrod

cedar waxwing robin

E. chipmunk

- in more open central areas, mild weed. More plentiful.

other side of hydro corridor (trail in woods on this side) - follows along E side of ark.

17T 0591998 4796698 N ↑ (43) 159 m acc. to 7m ↓ (44)

- forest. s. maple, red oak, basswood., ironwood, beech, wh. ash, odd wh pine
- forest is thick, v. little understory, no ground plants (few grasses, saplings,

hydro corridor

can hear road.

- broad grass

Cda mayflower

Carex plantaginea

- as near valley edge, more sun in under storey + get more saplings, witch hazel (similar to other areas, first ridge surveyed)

17T 0591811 4796819 156 m acc 8m slight change in forest (brief).

- bracken fern, tr. aspen, wh. birch, more (plant · 45) witch hazel, thicker understory (less maple in canopy, more red oak, wh. pine, aspen) wh oak + hemlock saplings.

17T 0591762 4796888 Wrng elev. 173m acc. 7m

N 146 ↑ 19 ← → 47 ↓ 18

in valley - basswood, s. maple, ironwood, shagbark hickory, fall meadowrue, J in the Pulpit, false sol. seal, red baneberry - poison ivy,

creepy lawnchairs

17T 0591558 4797167 174m 15 m acc.

back up on ridge (on E side of valley)

- more fiveleaved 'ginseng-like' plants, buckthorn, false sol. seal, burdock along trail, hops-like plant/vine wh. ash, w. grape., witch hazel, s. maple, hawthorn wh. oak,
- met a road shortly after. @ 5:52 pm
- still quite a ways from Waterdown forest in between - will have to cut across.

- v. close to farmer's field.

on east ridge heading for waterdown

- hawthorn, wh ash, buckthorn, weird vine (reminds me of flax) wh cedar, grasses.
- wild turkey, cardinal?
- v other hill
- west side - sugarbark + maple

17T 0591334 1797242 167 m 6m acc. to road @ 6:14 pm

↳ leaves opp, toothless, hairless, long slender point

N 50 ↑ 53 ← → 287 ↓

stream channel v. incised here - tough to cross.

pic 54 ↓

east side houses.] along rd - walnut (several), willow, apple, ash (not wh? 9 leaflets)
red pine, norway sp, yellow (?) birch - not flaking tho., lilac
red? oak (shiny), honey locust (cultivar?), ~~horsechestnut~~ ohio buckeye, silv. maple,
slag. sumac, wh. cedar,
little leaf linden, tulip tree
hawthorn
wh oak

m. dove.

hayfield to west
- teasels along roadside
w. carrot, milkweed,

---

reached a pt where no houses, narrow meadow along east side.
- teasel, milkweed, dock, goldenrod., w. carrot, wh sw clover (tall)
hop hornbeam

- forest same as always · can pull off to look @ closer - gravel rd.

back to car @ 6:36

7-4
Aug 8/11

Appendix J

Vegetation Species List by Vegetation Zone

Appendix J: Plant Species List by Vegetation Zone

* Vegetation zones correspond to those on Figure 5: Site Vegetation Characteristics, and can be loosely described as:

1 – Waterdown North Area
2 – Centre Road to Parkside Drive at Grindstone Creek
3 – Grindstone Creek to Dundas Street west of Evans Road
4 – Dundas Street east to Cedar Springs Road
5 – Dundas Street to residential Section of Waterdown Road
6 – Waterdown Escarpment Woods (south of Mountain Brow Road)
7 – Waterdown Road south

† observations recorded during woodland vole survey

Species Name	Vegetation Zone*						
	1	2	3	4	5	6†	7
Trees, Deciduous							
American Beech (*Fagus grandifolia*)	✓						✓
Amur Maple (*Acer ginnala*)	✓			✓			
Apple sp. (*Malus* sp.)	✓		✓	✓			✓
Basswood (*Tilia americana*)			✓	✓	✓		✓
Balsam Poplar (*Populus balsamifera*)			✓				
Bitternut Hickory (*Carya cordiformis*)				✓			✓
Black Cherry (*Prunus serotina*)	✓	✓	✓	✓			✓
Black Locust (*Robinia pseudoacacia*)	✓			✓			✓
Black Maple (*Acer nigrim*)				✓			
Black Walnut (*Juglans nigra*)	✓		✓	✓	✓		✓
Blue Ash (*Fraxinus quadrangulata*)			✓				
Blue Beech (*Carpinus caroliniana*)						✓	✓
Bur Oak (*Quercus macrocarpa*)			✓	✓	✓	✓	
Butternut (*Juglans cinerea*)			✓	✓			
Eastern Cottonwood (*Populus deltoides*)	✓		✓	✓			✓
European Black Alder (*Alnus glutinosa*)			✓		✓		✓
European White Poplar (*Populus alba*)							✓
Green Ash (*Fraxinus pennsylvanica* var. *subintegerrima*)	✓	✓	✓	✓	✓	✓	
Honey Locust – thornless (*Gleditsia triacanthos* var. *inermis*)			✓	✓	✓		✓
Horsechestnut (*Aesculus hippocastanum*)	✓		✓	✓			✓
Ironwood (*Ostrya virginiana*)						✓	✓
Large-toothed Aspen (*Populus grandidentata*)							✓
Little-leaf Linden (*Tilia cordata*)				✓			✓
Manitoba Maple (*Acer negundo*)	✓		✓	✓	✓		✓
Mountain Ash (*Sorbus* sp.)			✓				
Northern Catalpa (*Catalpa speciosa*)				✓			
Norway Maple (*Acer platanoides*)			✓	✓	✓		✓
Ohio Buckeye (*Aesculus glabra*)							✓
Red Ash (*Fraxinus pennsylvanica*)			✓				

Red Maple (*Acer rubrum*)				✓			
Red Oak (*Quercus rubra*)	✓	✓	✓	✓		✓	✓
Sassafras (*Sassafras albidum*)							✓
Shagbark Hickory (*Carya ovata*)			✓	✓	✓	✓	✓
Siberian Elm (*Ulmus pumila*)			✓	✓			
Silver Maple (*Acer saccharinum*)	✓	✓	✓	✓	✓	✓	✓
Sugar Maple (*Acer saccharum*)	✓	✓	✓	✓	✓	✓	✓
Trembling Aspen (*Populus tremuloides*)	✓	✓	✓	✓			✓
Tulip-Tree (*Liriodendron tulipifera*)							✓
White (Weeping) Willow (*Salix alba*)	✓		✓	✓	✓		✓
White Ash (*Fraxinus americana*)	✓	✓	✓	✓	✓	✓	✓
White Birch (*Betula papyrifera*)	✓	✓	✓	✓	✓		✓
White Elm (*Ulmus americana*)	✓	✓	✓	✓	✓		✓
White Mulberry (*Morus alba*)		✓	✓	✓	✓		✓
White Oak (*Quercus alba*)			✓	✓	✓	✓	✓
Willow sp. (*Salix* sp.)	✓					✓	
Wych Elm (*Ulmus glabra*)							✓
Yellow Birch (*Betula alleghaniensis*)		✓					
Trees, Coniferous							
Blue Spruce (*Picea pungens*)	✓		✓	✓	✓		✓
Eastern Hemlock (*Tsuga canadensis*)					✓		
Eastern White Cedar (*Thuja occidentalis*)	✓		✓	✓			✓
Norway Spruce (*Picea abies*)		✓	✓	✓	✓		✓
Red Pine (*Pinus resinosa*)	✓		✓	✓	✓		✓
Scot's Pine (*Pinus sylvestris*)			✓	✓	✓		
Tamarack (*Larix laricina*)			✓		✓		
White Pine (*Pinus strobus*)	✓		✓	✓	✓		✓
White Spruce (*Picea glauca*)	✓		✓	✓	✓		✓
Shrubs							
Alder sp. (*Alnus* sp.)	✓						
Choke Cherry (*Prunus virginiana*)	✓		✓	✓		✓	
Common Blackberry (*Rubus allegheniensis*)	✓				✓	✓	✓
Common Buckthorn *Rhamnus cathartica*)	✓	✓	✓	✓	✓	✓	✓
Common Plum (*Pyrus communis*)	✓			✓			
Dogwood sp. (*Cornus* sp.)	✓			✓	✓		
Hawthorn sp. (*Crataegus* sp.)	✓	✓	✓	✓	✓	✓	✓
High-bush Cranberry (*Viburnum trilobum*)			✓	✓	✓		
Honeysuckle (*Lonicera* sp.)	✓	✓	✓	✓	✓		✓
Lilac sp. (*Syringa* sp.)	✓		✓	✓	✓		✓
Maple-Leaved Viburnum (*Viburnum acerifolium*)							✓
Nannyberry (*Viburnum lentago*)			✓		✓		
Prickly Gooseberry (*Ribes cynobati*)	✓						
Red Osier Dogwood (*Cornus stolonifera*)	✓	✓	✓	✓		✓	
Red Raspberry (*Rubus pubescens*)	✓	✓	✓	✓	✓	✓	✓
Round-Leaved Dogwood (*Cornus rugosa*)			✓				✓
Smooth Serviceberry (*Amelanchier laevis*)	✓		✓				
Smooth Wild Rose (*Rosa blanda*)	✓			✓	✓	✓	✓

Snowberry (*Symphoricarpos albus*)						✓	
Staghorn Sumac (*Rhus typhina*)	✓	✓	✓	✓			✓
Twinflower (*Linnaea borealis*)							✓
Virginia Virgin's Bower (*Clematis virginiana*)			✓				
Virginia Creeper (*Parthenocissus quinquefolia*)	✓		✓	✓		✓	✓
Wild Black Currant (*Ribes americanum*)	✓		✓	✓			
Wild Crabapple (*Malus coronaria*)	✓						
Wild Grape (*Vitis sp*.)	✓	✓	✓	✓	✓	✓	✓
Willow sp. (*Salix* sp.)	✓	✓	✓		✓		✓
Wintergreen (*Gaultheria procumbens*)							✓
Witch-Hazel (*Hamamelis virginiana*)	✓						✓
Herbaceous Plants							
Alsike Clover (*Trifolium hybridum*)	✓	✓					
Bedstraw sp. (*Galium sp.*)							✓
Bittersweet Nightshade (*Solanum dulcamara*)			✓		✓	✓	
Bouncing Bet (*Saponaria officinalis*)				✓			
Bull Thistle (*Cirsium vulgare*)	✓	✓	✓	✓	✓		✓
Burdock sp. (*Arctium sp.*)	✓		✓	✓			✓
Canada Goldenrod (*Solidago canadensis*)	✓	✓			✓		✓
Canada Thistle (*Cirsium arvense*)	✓	✓	✓	✓	✓		✓
Canada Mayflower (*Maianthemum canadense*)							✓
Cardinal Flower (*Lobelia cardinalis*)	✓						
Celandine (*Chelidonium majus*)	✓						
Chicory (*Cichiorium intybus*)	✓	✓		✓	✓		✓
Climbing Poison Ivy (*Rhus radicans negundo*)							✓
Common Milkweed (*Asclepias syriaca*)	✓	✓	✓		✓		✓
Common Mullein (*Verbascum thapsus*)							✓
Common Plantain (*Plantago major*)	✓			✓			✓
Common St. John's-Wort (*Hypericum perforatum*)	✓		✓	✓	✓		✓
Common Wood Sorrel (*Oxalis montana*)	✓						
Cow Vetch (*Vicia cracca*)	✓	✓		✓	✓		✓
Curled Dock (*Rumex crispus*)	✓	✓	✓	✓	✓		✓
Dame's Rocket (*Hesperis matronalis*)			✓				
Dog Strangling Vine (*Cynanchum rossicum*)						✓	✓
Fall Meadow Rue (*Thalictrum pubescens*)	✓			✓	✓	✓	✓
False Nettle (*Boehmeria cylindrical*)							
False Solomon's Seal (*Maianthemum racemosum*)	✓		✓				✓
Field Bindweed (*Convolvulus arvensis*)			✓				
Field Pennycress (*Thlaspi arvense*)	✓						
Fleabane sp. (*Erigeron sp.*)	✓	✓	✓		✓		✓
Garlic Mustard (*Alliaria petiolata*)	✓		✓	✓	✓		✓
Goldenrod spp. (*Solidago* spp.)	✓	✓	✓	✓	✓	✓	✓
Herb Robert (*Geranium robertianum*)			✓	✓		✓	✓
Hog Peanut Vine (*Amphicarpaea bracteata*)							
Jewelweed (*Impatiens capensis*)	✓		✓	✓			✓

Large-Leaved Aster (*Aster macrophyllus*)						✓	
Manroot (*Marah* sp.)	✓	✓			✓		
Marsh Marigold (*Caltha palustris*)	✓			✓			
Mayapple (*Podophyllum peltatum*)	✓		✓	✓✓			
Motherwort (*Leonurus cardiaca*)			✓	✓		✓	
Ox-eye Daisy (*Leucanthemum vulgare*)			✓				✓
Perennial Sow Thistle (*Sonchus arvensis*)			✓	✓	✓		✓
Poison Ivy (*Rhus radicans rydbergii*)	✓	✓		✓		✓	✓
Prairie Goldenbean (*Thermopsis rhombifolia*)	✓			✓			✓
Purple Loosestrife (*Lythrum salicaria*)		✓		✓	✓		
Ragweed sp. (*Ambrosia* sp.)	✓		✓	✓	✓		✓
Red Baneberry (*Actaea rubra*)	✓						✓
Rough Bedstraw (*Galium asprellum*)							✓
Running Burning Bush (*Euonymus obovatus*)						✓	✓
Skunk Cabbage (*Symplocarpus foetidus*)		✓	✓				
Small Enchanter's Nightshade (*Circaea alpine*)	✓	✓		✓	✓	✓	✓
Small Jack-In-The-Pulpit (*Arisaema triphyllum*)	✓		✓		✓	✓	✓
Spotted Joe-Pye Weed (*Eupatorium maculatum*)	✓	✓	✓				
Spotted Water Hemlock (*Cicuta maculata*)	✓		✓				✓
Spreading Dogbane (*Apocynum androsaemifolium*)	✓						
Stinging Nettle (*Urtica dioica*)	✓						
Tall Buttercup (*Ranunculus acris*)			✓				✓
Tall Enchanter's Nightshade (*Circaea lutetiana canadensis)*	✓			✓		✓	✓
Teasel (*Dipsacus sylvestris*)	✓		✓	✓			✓
Turtlehead (*Chelone glabra*)			✓				
Virginia Stickseed (*Hackelia virginiana*)	✓			✓			
Water Parsnip (*Sium suave*)	✓						
Water Plantain (*Alisma plantago-aquatica*)	✓						
White Clover (*Trifolium repens*)							✓
White Snakeroot (*Eupatorium rugosum*)						✓	✓
White Sweet Clover (*Melilotus alba*)	✓	✓					✓
Wild Carrot (*Daucus carota*)	✓	✓	✓	✓			✓
Wild Lettuce (*Lactuca sp.*)	✓				✓		
Wood Lily (*Lilium philadelphicum*)	✓						
Woodland Strawberry (*Fragaria vesca*)	✓			✓		✓	✓
Yarrow (*Achilea millefolium*)					✓		
Yellow Iris (*Iris pseudacorus*)			✓				
Ferns and Allies							
Bracken Fern (*Pteridium aquilinum*)							✓
Christmas Fern (*Polystichum acrostichoides*)							✓
Field Horsetail (*Equisetum arvense*)		✓	✓				
Ostrich Fern (*Matteuccia struthiopteris*)	✓						
Scouring Rush (*Equisetum hyemale*)		✓					
Sensitive Fern (*Onoclea sensibilis*)	✓	✓	✓	✓			
Woodland Horsetail (*Equisetum sylvaticum*)			✓				

Graminoids							
Barnyard Grass (*Echinochloa crusgalli*)	✓			✓			
Common Cattail (*Typha latifolia*)	✓	✓	✓	✓	✓		✓
Common Reed (*Phragmites australis*)	✓		✓	✓			
Foxtail Barley (*Hordeum jubatum*)	✓				✓		
Grasses (Poaceae)	✓	✓	✓	✓	✓	✓	✓
Plantain-leaved Sedge (*Carex plantaginea*)							✓
Rushes					✓		
Sedges (*Carex* sp.)	✓					✓	✓
Timothy (*Phleum pretense*)	✓			✓			✓

Appendix K

List of Faunal Species Observed in the Study Area

Appendix L: List of Observed Fauna Species

	Species	Scientific Name
Birds		
	Alder Flycatcher	*Empidonax alnorum*
	American Crow	*Corvus brachyrhynchos*
	American Goldfinch	*Carduelis tristis*
	American Redstart	*Setophaga ruticilla*
	American Robin	*Turdus migratorius*
	American Woodcock	*Scolopax minor*
	Baltimore Oriole	*Icterus galbula*
	Bank Swallow	*Riparia riparia*
	Barn Swallow	*Hirundo rustica*
	Black-billed Cuckoo	*Coccyzus erythropthalmus*
	Black-capped Chickadee	*Poecile atricapillus*
	Black-crowned Night Heron	*Nycticorax nycticorax*
	Blue Jay	*Cyanocitta cristata*
	Blue-gray Gnatcatcher	*Polioptila caerulea*
	Blue-winged Warbler	*Vermivora pinus*
	Bobolink	*Dolichonyx oryzivorus*
	Brown Creeper	*Certhia americana*
	Brown Thrasher	*Toxostoma rufum*
	Brown-headed Cowbird	*Molothrus ater*
	Canada Goose	*Branta canadensis*
	Cedar Waxwing	*Bombycilla cedrorum*
	Chimney Swift	*Chaetura pelagica*
	Chipping Sparrow	*Spizella passerina*
	Common Grackle	*Quiscalus quiscula*
	Common Yellowthroat	*Geothlypis trichas*
	Cooper’s Hawk	*Accipiter cooperii*
	Downy Woodpecker	*Picoides pubescens*
	Eastern Kingbird	*Tyrannus tyrannus*
	Eastern Meadowlark	*Sturnella magna*
	Eastern Phoebe	*Sayornis phoebe*
	Eastern Towhee	*Pipilo erythrophthalmus*
	Eastern Wood-Pewee	*Contopus virens*
	Field Sparrow	*Spizella pusilla*
	Gray Catbird	*Dumetella carolinensis*
	Great Blue Heron	*Ardea herodias*
	Great Crested Flycatcher	*Myiarchus crinitus*
	Green Heron	*Butorides virescens*
	Hairy Woodpecker	*Picoides villosus*
	Horned Lark	*Eremophila alpestris*
	House Finch	*Carpodacus mexicanus*
	House Sparrow	*Passer domesticus*
	House Wren	*Troglodytes aedon*
	Indigo Bunting	*Passerina cyanea*
	Killdeer	*Charadrius vociferus*

	Least Flycatcher	*Empidonax minimus*
	Magnolia Warbler	*Dendroica magnolia*
	Mallard	*Anas platyrhynchos*
	Mourning Dove	*Zenaida macroura*
	Mourning Warbler	*Oporornis philadelphia*
	Northern Cardinal	*Cardinalis cardinalis*
	Northern Flicker	*Colaptes auratus*
	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
	Ovenbird	*Seiurus aurocapillus*
	Pileated Woodpecker	*Dryocopus pileatus*
	Pine Warbler	*Dendroica pinus*
	Purple Martin	*Progne subis*
	Red-bellied Woodpecker	*Melanerpes carolinus*
	Red-breasted Nuthatch	*Sitta canadensis*
	Red-eyed Vireo	*Vireo olivaceus*
	Red-tailed Hawk	*Buteo jamaicensis*
	Red-winged Blackbird	*Agelaius phoeniceus*
	Ring-billed Gull	*Larus delawarensis*
	Rock Pigeon	*Columba livia*
	Rose-breasted Grosbeak	*Pheucticus ludovicianus*
	Ruby-throated Hummingbird	*Archilochus colubris*
	Ruffed Grouse	*Bonasa umbellus*
	Savanna Sparrow	*Passerculus sandwichensis*
	Scarlet Tanager	*Piranga olivacea*
	Song Sparrow	*Melospiza melodia*
	Spotted Sandpiper	*Actitis macularia*
	Swainson's Thrush	*Catharus ustulatus*
	Swamp Sparrow	*Melospiza georgiana*
	Tree Swallow	*Tachycineta bicolor*
	Turkey Vulture	*Cathartes aura*
	Veery	*Catharus fuscescens*
	Vesper Sparrow	*Pooecetes gramineus*
	Warbling Vireo	*Vireo gilvus*
	White-breasted Nuthatch	*Sitta carolinensis*
	Wild Turkey	*Meleagris gallopavo*
	Willow Flycatcher	*Empidonax traillii*
	Wilson's Warbler	*Wilsonia pusilla*
	Winter Wren	*Troglodytes troglodytes*
	Wood Duck	*Aix sponsa*
	Wood Thrush	*Hylocichla mustelina*
	Yellow Warbler	*Dendroica petechia*
Herpetofauna		
	American Toad	*Bufo americanus*
	Eastern Garter Snake	*Thamnophis sirtalis sirtalis*
	Dekay’s Brown Snake	*Storeria dekayi*
	Green Frog	*Rana clamitans*
	Gray Treefrog	*Hyla versicolor*
	Midland Painted Turtle	*Chrysemys picta marginata*

	Northern Leopard Frog	*Rana pipiens*
	Northern Spring Peeper	*Pseudacris crucifer*
	Eastern Snapping Turtle	*Chelydra serpentina*
	Western (Striped) Chorus Frog	*Pseudacris triseriata*
	Wood Frog	*Rana sylvatica*
Mammals		
	Coyote	*Canis latrans*
	Eastern Chipmunk	*Tamias striatus*
	Eastern Cottontail	*Sylvilagnus floridanus*
	Grey Squirrel	*Sciurus carolinensis*
	Masked Shrew	*Sorex cinereus*
	Meadow Jumping Mouse	*Zapus hudsonius*
	Meadow Vole	*Microtus pennsylvanicus*
	Northern Short-tailed Shrew	*Blarina brevicauda*
	Raccoon	*Procyon lotor*
	Red Fox	*Vulpes vulpes*
	Red Squirrel	*Tamiasciurus hudsonicus*
	Southern Red-backed Vole	*Myodes gapperi*
	Striped Skunk	*Mephitis mephitis*
	White-tailed Deer	*Odocoileus virginianus*
Fish		
	Brook Stickleback	*Culaea inconstans*
	Central Mud Minnow	*Umbra limi*
	Creek Chub	*Semolitus atromaculatus*
	Pumpkinseed	*Lepomis gibbosus*
Invertebrates		
	Banded Woollybear Caterpillar	*Pyrrharctica isabella*
	Cicada	Family Cicadidae
	Eastern Tent Caterpillar	*Malacosoma americanum*
	Giant Water Bug	*Lethorcerus americanus*
	Great Diving Beetle	*Dytiscus marginalis*
	Japanese Beetle	*Popillia japonica*
	Land Snail	*Cepaea* sp.
	Monarch	*Danaus plexippus*
	Preying Mantis	Family Mantidae
	Yellow Garden Spider	*Argiope aurantia*

Owl Species at Risk
Winter 2012 Survey Results
New East-West Road Corridor
And Waterdown Road Corridor
City of Hamilton
Halton Region

May 2012

Prepared for:
City of Hamilton
c/o Melanie Jajko
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario L8P 4Y5

Prepared by:
GENIVAR Inc.
294 Rink Street
Peterborough, Ontario K9J 2K2

Project No. 121-14156-00

Distribution:
6 c Client
1 c Electronic Client
1 c File

GENIVAR

Project No. 121-14156-00

May 2, 2012

City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario
L8P 4Y5

Re: New East-West and Waterdown Road Corridor Class EA
Owl Species At Risk (SAR) Winter 2012 Survey Results
City of Hamilton, City of Burlington, Halton Region, Ontario

1. Introduction

GENIVAR was retained by the City of Hamilton in 2011 to complete a Species at Risk Survey for the new East-West and Waterdown Road Corridors. A Draft Phase 2/3 SAR Survey report was submitted to the City of Hamilton on October 11, 2011. In response to Ministry of Natural Resources (MNR) comments dated February 3, 2012, additional surveys for owl SAR species were required.

GENIVAR Inc. was retained by the City of Hamilton in February of 2012 to complete additional surveys for Owl Species at Risk (SAR) for the new East-West and Waterdown Road Corridors. Through ongoing discussion with the Ontario Ministry of Natural Resources (OMNR), a survey protocol was provided by the OMNR for the purpose of this study and is described in greater detail below.

The Owl SAR surveys were conducted in February 2012 along the 2011 routes during the optimal timing window for owl surveys (February to March) and included an additional survey route as suggested by MNR staff. This report outlines the results of these Owl SAR surveys.

2. Owl Species at Risk Survey

2.1 Methodology

GENIVAR conducted nocturnal owl surveys for Barn Owl (*Tyto alba*) and Short-eared Owl (*Asio flammeus*) from April to July 2011 following methodology outlined within the Ontario Nocturnal Owl Survey recommended by Bird Studies Canada. Any owl observations were also to be noted during intensive spring breeding birds surveys conducted during the same time period of the overall SAR

294 Rink Street, Suite 103, Peterborough, Ontario K9J 2K2
Telephone: 705.743.6850 • Fax: 705.743.8366• www.genivar.com

study. This methodology incorporated the use of pre-recorded call playbacks followed by a timed listening period. No owl species were visually observed or heard calling back in response to audio recordings during any of the owl surveys. Furthermore, no owls of any species were observed within the study area by any of the surveyors from April to August.

Although survey methodology including playbacks is one of the most widely used techniques for locating and surveying owls, OMNR staff noted that Barn Owl and Short-eared Owl do not typically respond to playbacks, and as such, an alternate survey methodology was recommended. In addition, optimal timing windows for owl surveys fall within winter months (November through March) when owls are generally more active and visible. Recommendations for the field program as per Guelph District MNR staff (Mike Stone, pers. comm., February 3, 2012) were followed and are described in detail below.

Rather than employ the use of playbacks, the recommended methodology involved a roadside survey conducted from a moving vehicle, with one person driving and the other scanning the horizon for owls within suitable habitat areas. In addition to the locations surveyed in the 2011 owl surveys, the field(s) east of the Centre Road woodland were included in the 2012 survey route. Three (3) sampling sessions were to be conducted for each location and began approximately two (2) hours before dusk. Qualified biologists among GENIVAR field staff were selected for this survey based upon background experience, subject knowledge and familiarity with the Study Area.

These sampling sessions will be conducted on three (3) separate occasions approximately five (5) days apart under weather conditions allowing for good visibility and hearing conditions. To allow for temporal variation in survey time, different locations will be surveyed at different times on each of the three survey dates. Surveyors scanned the horizon for birds flying low over the area, approximately 1-3 m above the ground. Foraging owls generally fly close to the ground and may hover before dropping down onto their prey.

The surveys were conducted along five routes, four of which had been used for the owl SAR surveys conducted in 2011. The four routes used previously were Owl 1, Owl 3, Owl 4 and Owl 5. Owl 2 was not included in the 2012 winter surveys due to access restrictions. A new route, Owl 6, was added based on MNR recommendations. Each route was travelled twice in its entirety during each survey date. The order of the routes changed between dates, but not always within dates due to time constraints. Scans lasted between 1 to 2 minutes per point, with approximately 18 points between all six routes.

All routes are presented in Figure 1. See field notes for route orders (Appendix).

GENIVAR staff conducted the prescribed surveys on February 15, 23 and 28 (at the required intervals of a minimum of five (5) days apart). Details regarding survey conditions are summarized in Table 1.

Table 1: Owl SAR Survey Conditions

Date	Official Sunset*	Survey Start/End	Environmental Conditions
February 15	17:44	16:30/18:30	Cloudy (75-100%), gentle breeze (12-19 km/h), no precipitation, 2°C low
February 23	17:58	16:40/18:40	Mostly cloudy (50-75%), gentle breeze, no precipitation, 2°C low
February 28	18:04	16:55/18:55	Mostly clear (25-50%), gentle breeze, no precipitation, 1°C low

*Environment Canada http://weatheroffice.gc.ca/canada_e.html

Scans lasted between 1 to 2 minutes per point, with approximately 18 points between all six routes.

2.2 Results

No owl species were visually sighted or heard. Other raptors sighted and recorded during the winter owl surveys included Red-tailed Hawk *(Buteo jamaicensis)* (six sightings over the three survey dates), Rough-Legged Hawk *(Buteo Lagopus)* (one sighting during the February 15th survey) and Northern Shrike *(Lanius excubitor)* (one sighting during the February 15th survey). These raptors are not listed on the provincial SAR list. All field observations are included in the Appendix.

Although Barn Owls and Short-eared Owls were not observed in Waterdown during the winter 2012 survey, the sampling program was conducted during a period of peak Short-eared Owl activity in the Hamilton area. Short-eared Owls were first listed in the Hamilton Naturalist Club's weekly summary on Saturday February 11th at 10th Road and 11th Road East in Saltfleet, (ONTBIRDS Digest, Volume 96, Issue 11), and seven Short-eared Owls were noted displaying at dusk at the same location on Tuesday February 20th (ONTBIRDS Digest, Volume 96, Issue 20). Barn Owls are one of the rarest birds in southern Ontario. The closest temporal and spatially documented occurrence of one to the Study Area was a specimen found dead in Whitby in December 2012, reported by the Royal Ontario Museum, among other sources, as the first sighting in Durham Region since 1973 (http://blog.rom.on.ca/2012/01/a-rare-and-beautiful-bird).

3. Conclusions and Recommendations

Based on the results of the Owl SAR Survey conducted in February and March of 2012, it is our opinion that the Study Area is not being used by the two targeted owl species, the Barn and Short-Eared Owls, or even owls in general, as none were seen or heard during intensive surveying in 2011 as well.

Habitat loss is generally considered the major reason for owl decline in Canada; however, harsh winters, predation, road mortality and use of rodenticides may have also affected populations. The

Barn Owl in particular is also limited by poor adaptability to cold winter temperatures and high amounts of snowfall (MNR, 2010). For overall protection and mitigation of the existing habitat, resident bird life and present and potential SARs, the following measures were recommended in our 2011 report (GENIVAR, 2011) and reproduced here:

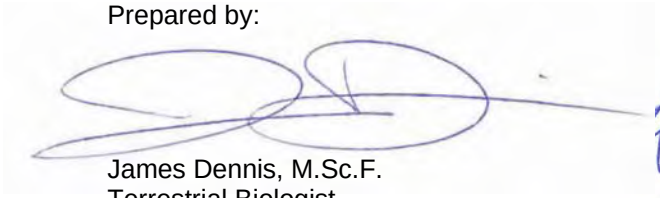
1. Mitigation for the marsh, field and woodland bird species that may be encountered would include adherence to the Breeding Bird Window of May 15 to August 1. If the scheduled construction falls within this window, a breeding bird survey conducted by a qualified biologist would be necessary to document and flag active nests in the proposed work zone. Buffer zones (5-60 m) would be established and respected until the young have fledged or until August 1. Nest sweeps would be conducted every three days during construction to ensure that new nests are not established.

4. Closure

We trust that this evaluation is satisfactory for your current needs. Please contact us if you have any questions or comments.

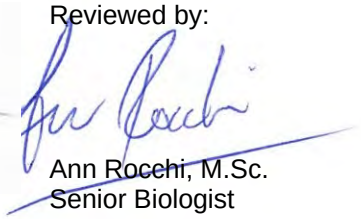
Yours truly,
GENIVAR Inc.

Prepared by:



James Dennis, M.Sc.F.
Terrestrial Biologist

Reviewed by:



Ann Rocchi, M.Sc.
Senior Biologist

JD:nah

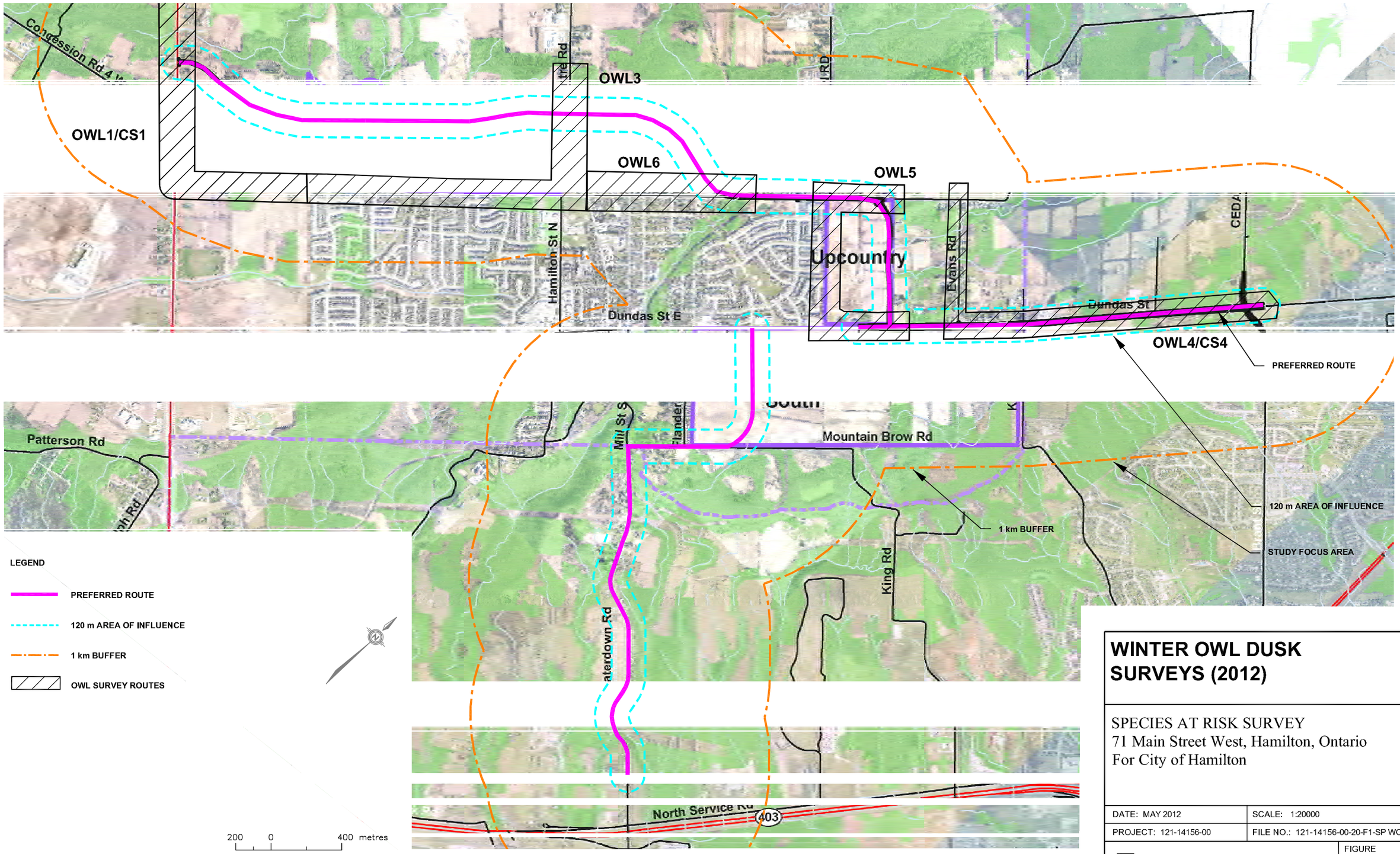
5. Literature Cited

GENIVAR Inc. 2011. Draft New East-West Road Corridor Waterdown Road Corridor Class Environmental Assessment: Phases 2/3 SAR Survey. Prepared for the City of Hamilton. 270 pp.

Ontario Barn Owl Recovery Team. 2010. Recovery strategy for the Barn Owl (*Tyto alba*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 31 pp.

Ontario Ministry of Natural Resources (OMNR). 2012. Response to East-West Road Corridor and Waterdown Road Corridor Phase 2/3 SAR Survey Report (Draft, October 2011). Prepared by Mike Stone, OMNR District Planner February 3, 2012. 3 pp.

Figure



WINTER OWL DUSK SURVEYS (2012)

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: MAY 2012	SCALE: 1:20000
PROJECT: 121-14156-00	FILE NO.: 121-14156-00-20-F1-SP WODS

GENIVAR

FIGURE 1

Appendix

GENIVAR Field Survey Form	Property:	
	Project Number: 121-14156-00	
	Surveyor Name: Rachel Bryan	
	Assistant Name: James Dennis	
Date: Feb 15 / 12	Survey Start Time: 4:30	Survey End Time: 6:30

Weather Conditions:

Temperature	3 to 2 °C	check one:	☑ measured	OR ☐ estimated
Wind	0 Calm (0-2 km/h)	1 Light air (2-6 km/h)	(2) Gentle breeze (12-19 km/h)	
	4 Moderate breeze (20-30 km/h)	5 Fresh breeze (31-39 km/h)	6 Very windy (40+ km/h)	
Precipitation	(0) None	1 Trace	2 Rain	
Sky (% cloud cover)	0 Clear (0-25%)	1 Mostly clear (25-50%)	2 Mostly cloudy (50-75%)	(3) Cloudy (75-100%)

other raptors: RTHA 11
NOSH 1
RLHA 1

Route order: 3 - 1 - 6 - 4 - 5 (x2)

sunset: 5:49 pm

- excellent visibility
- surveyed from vehicle 54 km.

GENIVAR	Property:	
	Project Number: 121-14156-00	
	Surveyor Name: Rachel Bryan	
Field Survey Form	Assistant Name: James Dennis	
Date: 23-Feb-2012	Survey Start Time: 4:40	Survey End Time: 6:40

Weather Conditions:

Temperature	7 to 2 °C check one: ☑ measured OR ☐ estimated	
Wind	**0** Calm (0-2 km/h) **1** Light air (2-6 km/h) **2** Gentle breeze (12-19 km/h) **4** Moderate breeze (20-30 km/h) **5** Fresh breeze (31-39 km/h) **6** Very windy (40+ km/h)	
Precipitation	**0** None **1** Trace **2** Rain	
Sky (% cloud cover)	**0** Clear (0-25%) **1** Mostly clear (25-50%) **2** Mostly cloudy (50-75%) **3** Cloudy (75-100%)	

Sunset: 6:00 pm

route: 1-3-6-5-4
1-3-5-4-6

RTHA- 11

- surveyed from vehicle ~50 km.
- excellent visibility.

GENIVAR	Property:	
	Project Number: 121-	
	Surveyor Name: Rachel Bryan.	
Field Survey Form	Assistant Name: James Dennis	
Date: Feb 28, 2012	Survey Start Time: 4:55	Survey End Time: 6:55

Weather Conditions:

Temperature	2 to 1 °C check one: ☑ measured OR ☐ estimated	
Wind	**0** Calm (0-2 km/h) **1** Light air (2-6 km/h) (2) Gentle breeze (12-19 km/h) **4** Moderate breeze (20-30 km/h) **5** Fresh breeze (31-39 km/h) **6** Very windy (40+ km/h)	
Precipitation	(0 None) **1** Trace **2** Rain	
Sky (% cloud cover)	**0** Clear (0-25%) (1) Mostly clear (25-50%) **2** Mostly cloudy (50-75%) **3** Cloudy (75-100%)	

RTHA-1

Sunset: 6:07 pm

route order: 4 - 5 - 6 - 3 - 1 (x2)

GPS start and end pts of each route. (Zone 17T)

Route 4 @ Evans Rd: 0590841, 4800821 (±5m acc.) elev = 253m

" @ Cedar Springs Rd: 0592792, 4801926 (±5m acc.) elev = 214m

Route 5 @ Dundas: 0591080, 4799909 (±5m acc.) elev = 244m

" @ Parkside: 0590404, 4800486 (±7m acc.) elv = 249m

Route 6 @ creek: 0589743, 4799818 (±6 acc.) elev = 231m

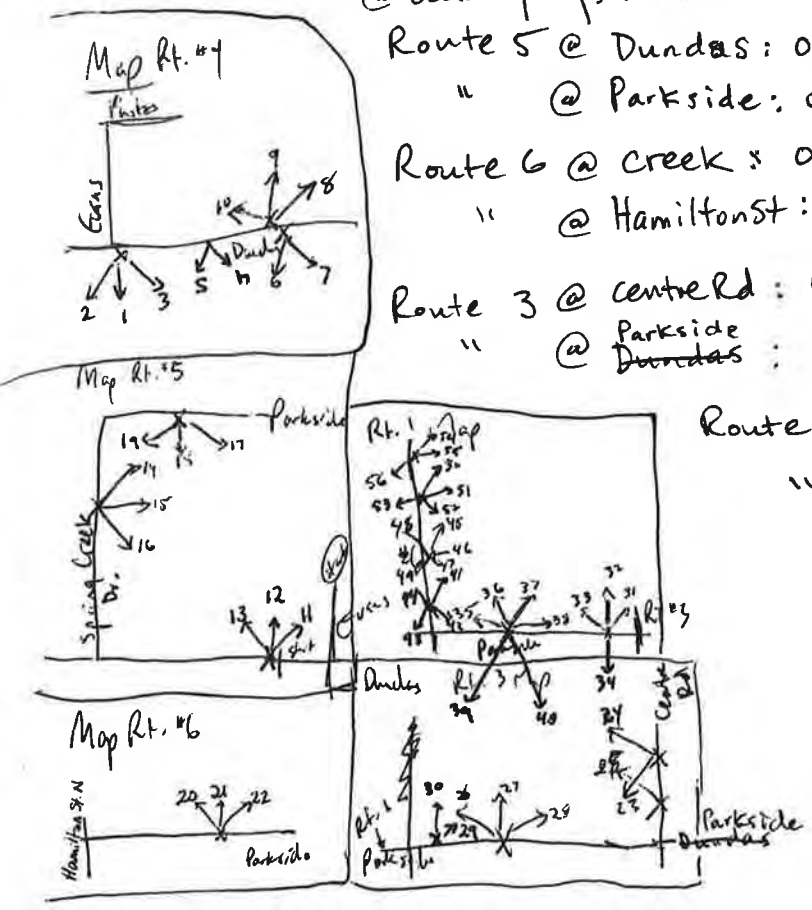
" @ Hamilton St: 0588832, 4798864 (±9 acc) low bat

Route 3 @ centre Rd: 0588271, 4799436 (±8 acc) low bat.

" @ ~~Dundas~~ Parkside: 0587647, 4797646 (±6 acc) low bat

Route 1 @ ~~Dundas~~ Parkside: 0587647, 4797646 (±6 acc.) low bat.

" @ Hwy 6: 0585820, 4797958 (±7 acc.) elev: 242m



excellent visibility

New East-West Road Corridor
Waterdown Road Corridor
Class Environmental Assessment
2012 Jefferson Salamander Sampling

April 2012

Prepared for:
City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, ON L8P 4Y5

Prepared by:
GENIVAR Inc.
1091 Gorham Street, Suite 301
Newmarket, Ontario L3Y 8X7

Project No. 111-19698-01

Distribution:
6 c Client
1 c File

GENIVAR

Project No. 111-19698-01

April 30, 2012

City of Hamilton
c/o Melanie Jajko
Project Manager, Growth Management Division
Planning and Economic Department
71 Main Street West, 6th Floor
Hamilton, Ontario
L8P 4Y5

Re: New East-West and Waterdown Road Corridor Class EA
2012 Jefferson Salamander Sampling Report
City of Hamilton, City of Burlington, Halton Region, Ontario

Dear Ms Jajko:

GENIVAR Inc. is pleased to provide you with this report documenting the results of the 2012 Jefferson Salamander sampling conducted as a continuation of the New East-West and Waterdown Road Corridor Class Environmental Assessment. We have provided six (6) hard copies and one (1) digital copy as requested.

GENIVAR Inc. was retained in 2011 by the City of Hamilton to complete a Species at Risk (SAR) Survey for the above project. Through ongoing discussion with the Hamilton and Halton Conservation Authorities and the Ontario Ministry of Natural Resources (OMNR), it was noted that the there was potential for numerous SAR species to exist on or within the area of influence of the proposed works. The study findings outlined within our Draft report (October, 2011) confirmed the presence of eight (8) of the thirty-five (35) Species at Risk that had previously been identified as potentially present in the Study Area. Comments from OMNR suggested additional sampling for Jefferson Salamanders would be needed early in the spring of 2012 (OMNR, 2012). GENIVAR, in consultation with the appropriate regulatory agencies, created a work plan to survey the site and surrounding areas using accepted field protocols, known habitat requirements and timing of aggregations to provide the highest degree of probability of encountering Jefferson Salamanders. The results of the 2012 sampling events are recorded within this report.

1091 Gorham Street, Suite 301, Newmarket, Ontario L3Y 8X7
Telephone: 905-853-3303 • Fax: 905-853-1759 • www.genivar.com

Thank you for the opportunity to complete this assessment. Please contact the undersigned if you have any questions.

Yours truly,
GENIVAR Inc.

Dan Reeves, M.Sc.
Project Biologist

EAC:nah

Table of Contents

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Appendices

1. Introduction

GENIVAR Inc. was retained by the City of Hamilton to complete a Species at Risk (SAR) Survey for the new East-West and Waterdown Road Corridors. During the initial project meetings, and through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it was noted that there was potential for numerous SAR species to exist on or within the area of influence of the proposed works. The project was broken into three distinct phases (Phases 1-3) based on the specific timing windows for optimal observation of the identified SAR. Field surveys for 35 species were conducted during spring and summer of 2011. Field phases and protocols were developed and approved by appropriate regulating agencies using the accepted field protocols with the highest degree of probability of encountering the selected species and/or protecting their habitat.

Jefferson Salamander (*Ambystoma jeffersonianum*) was included in Phase 1 of the 2011 SAR surveys. A species-specific survey was conducted during April 2011 in seven (7) ponds within the study area. Nine ponds were originally targeted for the surveys following discussion with the OMNR; however, two of these ponds were not surveyed due to landowner permission issues. Although there were no salamanders observed during the 2011 field season, additional surveys were recommended by the OMNR determine whether the absence of salamanders was due to study timing (after the breeding season) or the absence of Jefferson Salamanders in the areas surveyed. Four (4) ponds were chosen through consultation with the OMNR for the 2012 field survey. Refer to Figures 1 and 2.

2. Species Background

Upon discussion with the local OMNR Species at Risk Biologist, a draft copy of the Sampling Protocol for Determining the Presence/Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011) was obtained. Within the document, the species is described as:

“The Jefferson Salamander is a relatively large (15 to 18 cm) mole salamander (family Ambystomatidae). It is a dark, brownish-gray salamander with small, pale blue flecks on the limbs and lower sides. It has relatively long toes and the adpressed limbs of males (front limb folded towards the tail and back limb folded towards the head) overlap by more than one and a half costal folds. Jefferson Salamanders also have a relatively wide head. *A. jeffersonianum* was first described by Green in 1827 (as *Salamandra jeffersonianum*) from an area near Jefferson College, Canonburg, Pennsylvania. *A. jeffersonianum* populations within Ontario seem to be more closely associated with Carolinian type forests than with other deciduous forest types. This may reflect climatic factors that similarly limit the northern distribution of Carolinian forest and Jefferson Salamander. Jefferson Salamander breed in the very early spring (late March or early April). Salamanders emerge from over wintering sites and migrate during rain or on very humid nights to the breeding ponds with males usually preceding females to the ponds. Once in the ponds, males will court females then deposit a spermatophore on the bottom of the pond. The female will pick up the spermatophore with her cloaca and will then lay ten or more clutches of approximately 30 eggs usually on the stem of submerged vegetation, such as willow (*Salix*) branches, near the periphery of the pond. In Ontario larvae hatch from egg masses about mid-April at a length of 8.9 to 15.2 mm. Larvae remain in the pond for 61-110 days, over which time they develop limbs and grow 3 to 8 times their hatching size. Individuals metamorphose at 28 to 44 mm SVL (the length from the snout to the posterior portion of the vent) and leave the pond for the surrounding forested areas, where they usually enter

burrows or rock crevices and forage for the remainder of the summer and fall. They overwinter below the frost line.

The identification of the Jefferson Salamander is complicated by the fact that all of the Ontario populations of this species exist with female, mostly polyploid, nuclear hybrids. Although these females, called unisexuals, have one or more sets of Blue-spotted Salamander (*Ambystoma laterale*) chromosomes and one or more sets of Jefferson Salamander chromosomes, they are not, as is generally believed, hybrids that have resulted from the crossing of these two species. The Blue-spotted and Jefferson Salamanders are rarely, if ever, found in the same ponds so hybridization would be unlikely. But, the critical evidence that rejects normal hybridization events is based on the examination of mitochondrial DNA (*mt*DNA) that is only inherited from females. Wherever they occur, all the unisexual individuals have a similar *mt*DNA that is very different from the *mt*DNA of either *A. jeffersonianum* or *A. laterale*. The unisexual individuals apparently exist and perpetuate themselves by swapping chromosomes from a sperm donor who breeds at the same time in the same pond. Because the unisexuals are more common than the Jefferson Salamander and, those that live with *A. jeffersonianum*, use and require Jefferson's sperm, viable unisexual eggs or larvae signify the presence of Jefferson Salamander males in a breeding pond. Additionally, because most unisexuals are triploid and carry two sets of the sperm donor's chromosomes, it is possible to distinguish Blue-spotted from Jefferson Salamander breeding ponds. The unisexuals would be, respectively, *Ambystoma* (2) *laterale* – *jeffersonianum* (LLJ) or *Ambystoma laterale* – (2) *jeffersonianum* (LJJ) in ponds with *A. laterale* or *A jeffersonianum*. Microsatellite loci are used to distinguish the unisexuals from the Blue-spotted and Jefferson salamanders and can also be used to distinguish different nuclear combinations in the hybrids."

3. Field Program

Through ongoing discussion with the appropriate Conservation Authorities and Ontario Ministry of Natural Resources (OMNR), it was noted that there is potential for populations of Jefferson Salamanders (*Ambystoma jeffersonianum*) or unisexuals (*Abystoma* (2) *laterale – jeffersonianum* (LLJ) or *Ambystoma laterale* – (2) *jeffesonianum* (LJJ)) within the study area. Accepted field sampling protocols require the capture and collection of tissue (tail tipping) which requires the need for an ESA (Endangered Species Act) permit, a Scientific Collectors permit, and an approved Animal Care Protocol from the OMNR Wildlife Animal Care Committee. All permits and licensing surrounding the survey and tail-tipping of this species were approved and in place before sampling began. Wildlife Scientific Collectors Permitting (#1067380) was obtained on March 12, 2012, the Permit for Species Protection or Recovery (#GU-B-011-12) was issued March 9, 2012, and the Wildlife Animal Care Committee Approval (#12-247) was obtained March 9, 2012 (Appendix A).

3.1 Sampling Methodology

Preferred methodology for presence/absence studies for this species are outlined within the Sampling Protocol for Determining the Presence/Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011). This document, along with continued discussion with appropriate regulating agencies was the basis for methodology creation. The same methodology was used for both the 2011 and 2012 surveys. Details of this methodology are outlined below.

3.1.1 Site Selection

The larger project area (outlined within Figure 1) was surveyed in 2011 and 2012 to determine candidate Jefferson Salamander survey locations based on the four main habitat criteria that the OMNR uses to determine pond suitability for breeding Jefferson Salamanders (Karolyne Pickett, OMNR Guelph District, Species at Risk Biologist, pers. comm., 2011):

1. Documented breeding of other amphibians in the pond (e.g. documented frog calls, documented presence of tadpoles);
2. Presence of egg attachment sites in the pond, such as the presence of low shrubs, twigs, fallen tree branches, submerged riparian vegetation or emergent vegetation to which salamander egg masses can attach to (e.g. presence of Red-Osier Dogwood along the margins of the pond);
3. Pond is free of predatory fish species; and
4. Pond has suitable hydro-period: water must remain present in the pond depression long enough for eggs to develop into juvenile salamanders, typically until mid to late summer. However some types of wetlands which may be used for breeding may have permanent or semi-permanent water. Hydro-period is typically a function of pond size, depth, volume (influenced by snow melt), flow rate, detritus, forest crown cover and ambient temperature. A pond's hydro-period may vary from year to year. For example, a shallow pond may not provide a suitable hydro-period in a dry year.

Candidate sites were selected based on results from the 2011 Jefferson Salamander survey (Genivar, 2011), background and field surveys, and approved by the OMNR prior to sampling. Prior to the site visit, satellite images of the property, land use, and topographical maps were reviewed to identify potential locations.

Of the nine (9) ponds surveyed in 2011, only four (4) of the ponds were deemed suitable for further investigation, based on the criteria outlined above. Refer to Figures 1 and 2.

3.1.2 Animal Collection

A suitable number (as approved by OMNR) of un-baited minnow traps (five (5) for Pond 4 and ten (10) for Ponds 2, 5 and 6) were placed in potential breeding locations within the study area and their locations were recorded with a handheld GPS. Traps were checked the morning after they were set, and any species captured were photographed and documented. The survey was conducted over five (5) non-consecutive days during the breeding season, as outlined within the OMNR protocol. The start and end of monitoring was confirmed based on discussions with OMNR staff as well as Dr. James Bogart at the University of Guelph.

The following methods were utilized during the surveys:

1. Trap Setting
    a. A long rope was attached to each minnow trap before it was submerged into the water. The rope was secured to a nearby tree or shrub and placement of each trap was recorded with a handheld GPS.
    b. Placement of traps was evenly distributed throughout the pond/wetland to ensure good overall coverage and a range of microhabitat types were covered.

c. Each trap was marked with appropriate flagging tape/signage stating the UTM co-ordinate, trapper name, contact number, and dates.
d. Surrounding habitat information was noted, as well as weather conditions and time of trap setting.
e. Traps were placed in the evening and checked the following morning, approximately 12-14 hours after setting.

2. Trap Checking
    a. The trap was removed from water.
    b. The following was recorded for each trap (where applicable):
        i. Trap #
        ii. All species caught in the trap and quantity.
        iii. Photograph number, measurements and sex (if possible) for all salamander species observed.
        iv. Sample number of any suspect Jefferson salamanders obtained.
        v. Note indicating if captured salamanders were recaptured, and their general condition.
        vi. Note indicating if trap was re-set in same location.

Additional observations were collected surrounding each pond and trap location. These observations generally included: additional species present, egg masses for salamander or other species, and vegetation characteristics of immediate area or vicinity. Traps were only used within one pond to minimize the risk of cross-contamination.

3.1.3 Tail Clipping

As different unisex combinations of Jefferson salamanders are virtually impossible to identify visually, small tail clippings (less than 5 mm) of all suspect Jefferson salamanders encountered during trap surveys were to be collected and preserved in 70% ethanol for subsequent DNA extractions and microsatellite examination. The salamanders would then have been released at the location they were captured. In the unlikely event that injuries or death were to occur, the OMNR would have been notified by way of the weekly updates and summary report at the end of the survey season. DNA extraction and analysis would have been performed at the University of Guelph by Dr. James Bogart. Tail clipping protocol is outlined below:

1. Clean, un-used nitrile gloves would be used for handing of each salamander and would be changed at each trap.
2. One researcher would gently hold the suspect individual on a sterile, flat, clean background medium, while another researcher used a sterile single edge razor to snip off the tail tip (less than 5 mm).
3. The tail clipping would be immersed in 70% ethanol within a sample tube, and labeled appropriately for transport to the lab.
4. The subject salamander would then be returned to the edge of the water and observed to ensure that it was uninjured. Any injuries or fatalities would be documented and reported to the OMNR.
5. All sampling equipment would be sterilized between uses using alcohol.

3.1.4 Laboratory Analysis

Tail tips require microsatellite analysis for DNA extraction and arrangements for this procedure were made with Dr. James Bogart at the University of Guelph. Dr. Bogart was contacted prior to the field program and was anticipating any samples. Laboratory analysis was not required in 2012 as no salamanders were captured.

3.1.5 Egg Mass Surveys

In addition to the methodology described above, the Sampling Protocol for Determining the Presence/ Absence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (OMNR, 2011) suggests a visual inspection for egg masses in sample locations. Throughout the duration of the sampling season (March 14 to March 26, 2012), visual egg mass surveys were conducted from the water's edge. Any egg masses observed were described, photographed and reported to the OMNR. There were no salamander egg masses observed during the survey; however, Wood Frog (*Rana sylvatica*) egg masses were observed within Pond 5 on March 19, 2012.

3.2 Results and Discussion

Of the nine (9) ponds surveyed in 2011, only four (4) of the ponds were deemed suitable for further investigation. Refer to Figure 2 for details. Traps were set in the afternoon/evening and checked the following morning on: March 14, 2012, March 15, 2012, March 16, 2012, March 20, 2012, and March 26, 2012. Landowner permission was not granted for Pond 2 until March 16, 2012; as a result only two trap nights were recorded for this pond. Traps nights were numbered 1 – 5 sequentially based on date. Sampling results are summarized in Table 1.

Table 1: Jefferson Salamander Sampling Results

Pond	Survey nights	Species Present
Pond 2	4 - 5	Brook Stickleback (*Culaea inconstans*)
		Creek Chub (*Semolitus atromaculatus*)
		Finescale Dace (*Phoxinus neogaeus*)
		Wood Frog (*Rana sylvatica*)
		Great Diving Beetle (*Dytiscus marginalis*)
		Gastropoda – unidentified snail
Pond 4	1 - 5	Brook Stickleback (*Culaea inconstans*)
		Creek Chub (*Semolitus atromaculatus*)
		Green Frog (*Rana clamitans*)
		Green Frog Tadpoles (*Rana clamitans*)
		Crayfish
		unidentified Belastomatidae
		Damselfly Nymph

Pond	Survey nights	Species Present
Pond 5	1 - 5	Green Frog Tadpoles (*Rana clamitans*)
		Wood Frog (*Rana sylvatica*)
		Wood Frog Tadpole (*Rana sylvatica*)
		Great Diving Beetle (*Dytiscus marginalis*)
		Giant Water Bug (*Lethocerus americanus*)
		Dragonfly Nymph
		Water Scorpion
Pond 6	1 – 5	Brook Stickleback (*Culaea inconstans*)
		Great Diving Beetle (*Dytiscus marginalis*)

All ponds, with the exception of Pond 5, had fish species present during one or all of the sampling events, and most ponds that were sampled had at least one fish species, with Brook Stickleback being the most prevalent. Most ponds also had some evidence of supporting, in some capacity, amphibian populations, as Green Frog or Wood Frog adults and/or tadpoles were observed in three out of four ponds. Pond 5 exhibited the greatest diversity of reptile and amphibian species. A mature Snapping Turtle (*Chelydra serpentina*) overwintering in the pond, was first observed on March 13, 2012 when there was still ice covering the pond. The turtle was observed on subsequent visits on March 14 and 15, 2012. An aggregation of approximately 20 to 30 breeding Wood Frogs were observed in Pond 5, between Traps 4 and 5, on the evening of March 19, 2012. Egg masses were evident at that time, and tadpoles were present in Trap 5 on March 26, 2012. Green Frog tadpoles were also recorded in Pond 5 on the last two trap nights (March 20 and 26, 2012). Field notes are provided in Appendix D.

The 2012 sampling program was conducted during a period of peak Jefferson Salamander activity based on reports of breeding activity in surrounding areas (J. Bogart pers. comm. March 16, 2012). In addition to the five (5) trapping nights (two (2) for Pond 2) that occurred, visual inspection for salamander egg masses was conducted at each pond throughout the survey period. It is unlikely that our trapping season (March 14 to March 26, 2012) would have missed the breeding season. It is also unlikely that Jefferson Salamanders were successfully breeding within the ponds surveyed, as no adults or egg masses were observed during a relatively intensive field program. Further, given the presence of predatory fish species in Ponds 2, 4 and 6 for the second year in a row, these ponds are considered unsuitable as breeding aggregation ponds for Jefferson Salamanders.

It is our opinion that based on our intensive field program yielding no individuals of this species, the lack of visual observation of egg masses in either year of survey, and the presence of predatory species within most of the ponds, the survey ponds are not currently used as breeding aggregations for Jefferson Salamanders.

4. Conclusions and Recommendations

Based on the results of the 2012 Jefferson Salamander sampling program, it is our opinion that the ponds surveyed do not support breeding habitat for Jefferson Salamanders. There were no individuals or egg masses observed, and the presence of predatory fish species within most of the ponds make it unlikely that the ponds are being used as breeding aggregations.

Pond 5 should be considered Significant Wildlife Habitat (SWH) as a seasonal concentration area for woodland amphibian breeding habitat. Seasonal concentration areas are areas where animals occur in relatively high densities at specific periods in their life cycle and/or particular seasons. Pond 5 meets the criteria for significance outlined within the Significant Wildlife Habitat Ecoregion Criteria (OMNR, 2009), as it located adjacent to a woodland and supports a breeding population of more than 20 individuals of a recognized species (Wood Frog). While turtle over-wintering areas are considered candidate SWH as specialized habitat for wildlife, a single over-wintering individual does not satisfy the criteria for significance. To be considered SWH, a water body must support a minimum of five (5) over-wintering individuals from one or more of the listed species (Midland Painted Turtle (*Chrysemys picta marginata*) and Snapping Turtle), or a single Northern Map Turtle (*Graptemys geographica*).

Pond 5 is approximately 500 m from the proposed road corridor between Highway 6 and Centre Road. The potential for negative impacts associated with the development is not considered significant given the distance between the breeding pond and the proposed road corridor. No further mitigative measures are proposed.

5. Closure

This report has been prepared by GENIVAR Inc. The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in this report. The conclusions presented herein respecting current conditions represent the best judgment of the assessors based on current environmental standards. GENIVAR Inc. attests that to the best of our knowledge, the information presented in this report is accurate. The use of this report for other projects without written permission of the City of Hamilton and GENIVAR Inc. is solely at the user's own risk.
Thank you for the opportunity to complete this report. We trust that this information is satisfactory for your current requirements. Please contact us if we can be of further assistance.

Report prepared by:
GENIVAR Inc.

Erin Corstorphine, M.Sc.
Biologist

Dan Reeves, M.Sc.
Project Biologist

Reviewed by:

Ann Rocchi, M.Sc.
Senior Biologist

6. Literature Cited

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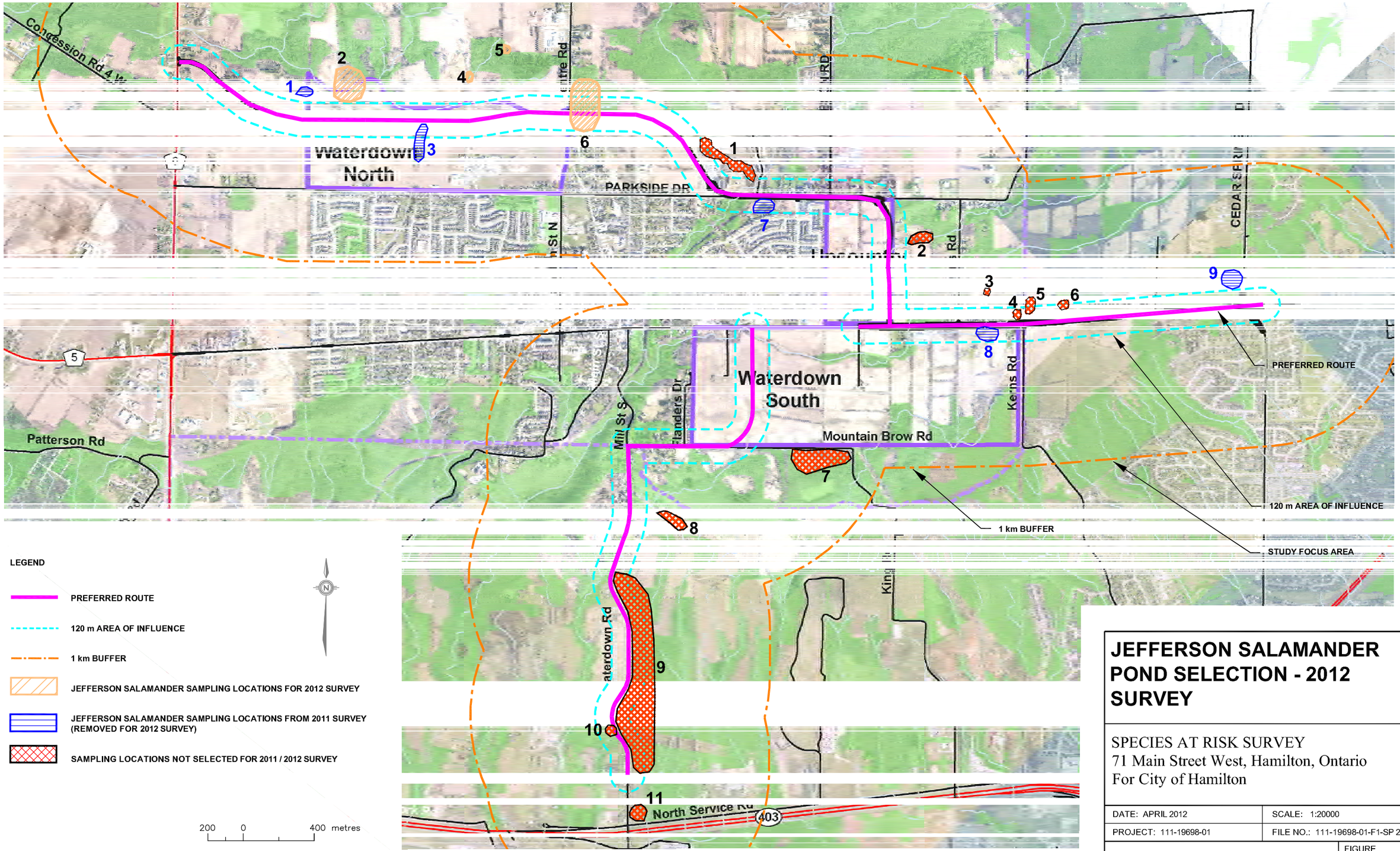
Figures



LEGEND

- PREFERRED ROUTE
- 120 m AREA OF INFLUENCE
- 1 km BUFFER
- JEFFERSON SALAMANDER SAMPLING LOCATIONS FOR 2012 SURVEY
- JEFFERSON SALAMANDER SAMPLING LOCATIONS FROM 2011 SURVEY (REMOVED FOR 2012 SURVEY)
- SAMPLING LOCATIONS NOT SELECTED FOR 2011 / 2012 SURVEY

200 0 400 metres

JEFFERSON SALAMANDER POND SELECTION - 2012 SURVEY

SPECIES AT RISK SURVEY
71 Main Street West, Hamilton, Ontario
For City of Hamilton

DATE: APRIL 2012	SCALE: 1:20000
PROJECT: 111-19698-01	FILE NO.: 111-19698-01-F1-SP 2012

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FIGURE 1