APPENDIX 2

Terrestrial Resources (Dougan & Associates):

2.1 MNR Comments on Draft Technical Work Plan
2.2 NHIC List of Squares Queried (20141204)
2.3 Local Resident Wildlife Observations from within and adjacent to the Erbsville South Environmental Study Area
2.4 Vascular Plant Species List
2.5 Wetland Assessment Correspondence with MNRF
2.6 Salamander Trapping Approvals
2.7 Birds Documented During the 2013 Breeding Bird Season
2.8 Master List of Wildlife Observations for the Erbsville South Study Area and Vicinity
2.9 Assessment of Potential Significant Wildlife Habitat
2.10 BHA Report August 22, 2016
2.11 BHA Genetic Test Result
2.12 MNRF Mapping – Blandings Turtle Habitat

2.1 MNR Comments on Draft Technical Work Plan

From: Norminton, Lorraine (MNR) [mailto:lorraine.norminton@ontario.ca]
Sent: Friday, July 19, 2013 4:08 PM
To: Robyn McMullen
Cc: Buck, Graham (MNR)
Subject: FW: 34168 - Erbsville South Environmental Study - Technical Work Plan

July 19, 2013

Robyn McMullen
Policy Planner, Growth Management
Integrated Planning and Public Works, City of Waterloo
100 Regina Street South
PO BOX 337, Station Waterloo
Waterloo, ON N2J 4A8

Dear Robyn,

Thank you for the opportunity to review the Draft Technical Work Plan for the Erbsville South Environmental Study. We understand that information gathered in this phase will provide field staff with an initial understanding of the Primary and Extended Area.

The Ministry has reviewed the study and offers the following comments.

Wetlands

Ministry staff note that there is a Provincially Significant Wetland, **The Sunfish Lake Laurel Creek Wetland Complex** within the study area.

Digital mapping for wetlands and other natural heritage features is available from Land Information Ontario (LIO). LIO manages key provincial datasets, and is responsible for housing most of the Ministry's digital natural heritage and resource data. MNR Guelph District recommends contacting LIO to obtain relevant feature mapping. Datasets include wetlands ('Wetland Unit' dataset), ANSI ('ANSI'), wooded areas ('Wooded Areas'), wintering areas ('Wintering Areas'), Aquatic Resource Areas ('Aquatic Resource Areas Summary') and the Ontario Hydrographic Network water resource layer ('Ontario Hydrographic Network'). The LIO Warehouse also includes spatial data from a variety of other sources and agencies, including federal ministries and conservation authorities. The LIO website provides instructions on how to request/obtain data, and a full listing of all data in the Warehouse. The link to the LIO website is as follows: http://www.mnr.gov.on.ca/en/Business/LIO/index.html. In addition, LIO staff can be contacted at lio@ontario.ca or at (705) 755-1878.

Winter Wildlife Survey
Please note that the study area is known as a Deer Wintering Area.

Snake Surveys
In your Field Investigations section you state that surveys will consist of hibernacula searches and coverboard surveys. Milksnakes will typically not be detected under boards until after the boards have been in place for 2-3 years. Negative results from cover board surveys are therefore inconclusive for the first two years of the survey. We have attached the MNR Guelph District Milksnake survey protocol.

Turtle Surveys
Based on the Ministry's assessment of the natural features on and adjacent to the site we suggest a proper turtle survey be completed. As stated in the Environmental Study on p3 field visits are planned to occur between April and June. The ministry recommends that surveys begin just after ice off and may run to mid June. Two surveys in June runs the risk of not detecting turtles because they may have stopped basking. We have attached the MNR's Blanding's Turtle survey. It might be useful as a reference for a basking turtle survey.

Incidental Wildlife Surveys
There is no discussion on bat surveys. Are bats being covered along with incidental wildlife observations?

Potential Additional Tasks

Salamander Surveys
Regarding the comment made about salamanders, the need for a survey should based on the habitats present in the area, not the Ministry informing them they need a survey.

- If there is suitable foraging, dispersal and overwintering habitat on the property and a suitable breeding pond within 300 meters or;
- If there is a suitable breeding pond on site and/or suitable foraging, dispersal and overwintering on site or within 300 meters.

Species at Risk
Ministry staff notes that there is a 'known' record of species at risk within the study area. The Northern Map turtle is listed as Special Concern both provincially and nationally.

The Natural Heritage Information Centre (NHIC) is responsible for maintaining a central repository of data and information on rare species in the province of Ontario. This data can be searched via the Biodiversity Explorer internet tool available at www.biodiversityexplorer.mnr.gov.on.ca. The Biodiversity Explorer can be used to find locations of species at risk (referred to as Element Occurrences (EO)) in any part of the province. MNR's Guelph District forwards its EO data to the NHIC at regular intervals in support of the NHIC's mandate.

The Natural Heritage Information Centre (NHIC) is responsible for maintaining a central repository of data and information on rare species in the province of Ontario. This data can be searched via the Biodiversity Explorer internet tool available at https://www.biodiversityexplorer.mnr.gov.on.ca/nhicWEB/mainSubmit.do. The Biodiversity Explorer can be used to find locations of species at risk (referred to as Element Occurrences (EO)) in any part of the province. MNR's Guelph District forwards its EO data to the NHIC at regular intervals in support of the NHIC's mandate.

Please note that because the province has not been surveyed comprehensively for the presence of species at risk (SAR), the absence in the NHIC database of an EO in a particular geographic area does not indicate the absence of the species in that area. Consequently, the presence of an EO is useful to flag the presence of the species in the area, but is not an appropriate tool to determine whether a species is absent, or whether it should be surveyed for or not in a particular area.

Consequently, we provide the following advice with respect to determining the presence of species at risk on a property for which a land-use change is being proposed (note that some of the following may not apply to a given type of proposed activity, or for a given study area):

I. Habitat Inventory

The District recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities and aquatic habitats in the study area should be 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, we recommend you collect data on the physical characteristics of the

waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

II. Potential SAR on the property

A list of species at risk that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of species at risk known to occur in the county or regional municipality within which the area is located. The list of species at risk known to occur in the Region of Waterloo is attached. The species-specific COSEWIC status reports (www.cosewic.gc.ca) are a good source of information on species at risk habitat needs and will be helpful in determining the suitability of the property's ecosites for a given species.

Please note that the Species at Risk in Ontario list (SARO) is a living document and is amended periodically as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO list can be accessed on the webpage http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276722.html.

COSSARO also maintains a list of species to be assessed in the future. It is recommended to take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of the activity is more than 6 months away, or the project will be undertaken over a period greater than 6 months. The list can be viewed by going to http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/244543.html and clicking on the link Priority List of Species to be Assessed and Classified by COSSARO.

III. SAR surveys

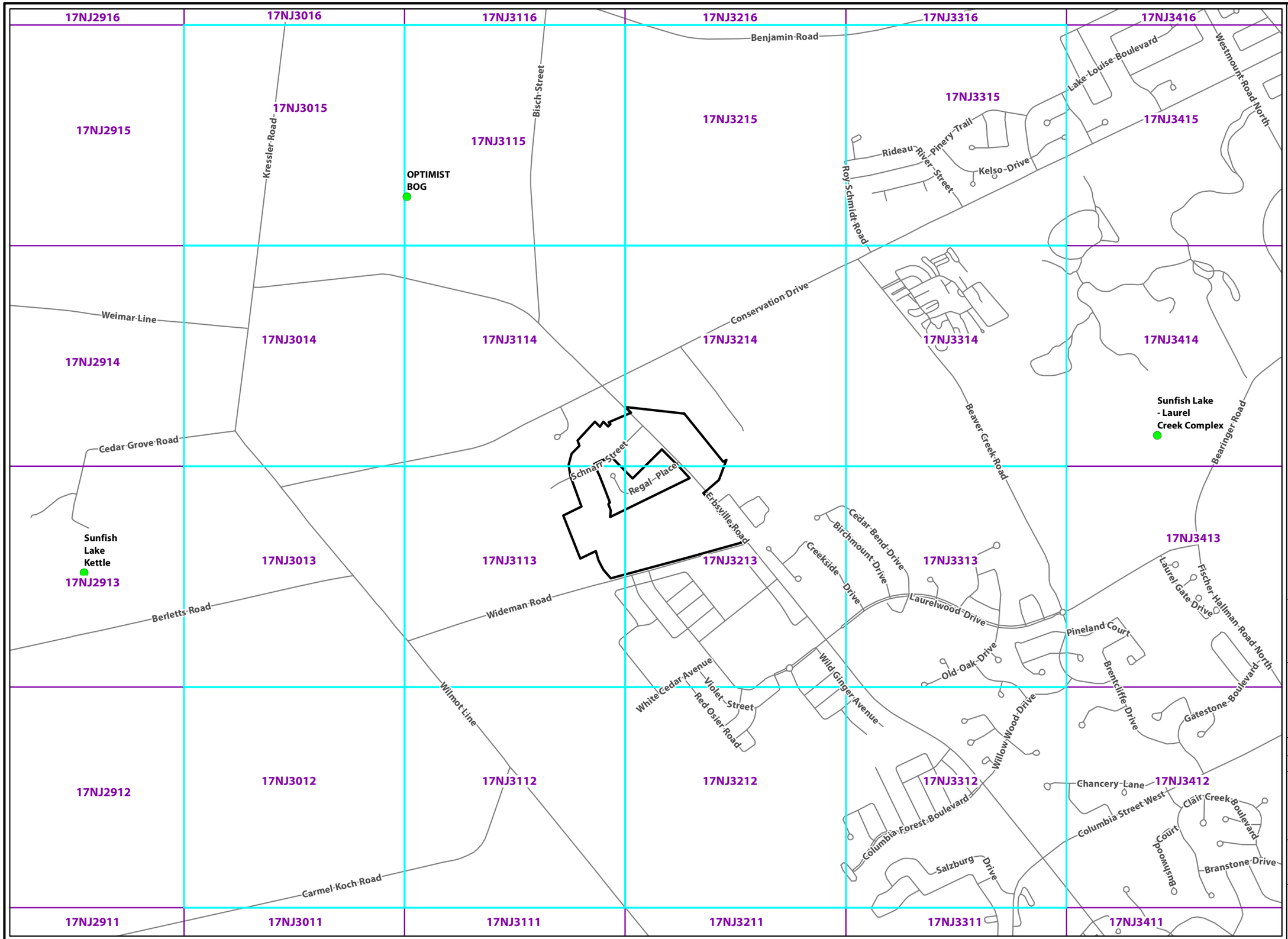
The District is of the opinion that each species at risk identified under Step II should be surveyed for, regardless of whether or not the species has been previously recorded in the area, or whether previous records are historical in nature. The survey report should describe how each species at risk was surveyed for, and provide a rationale for why, if any, certain species appearing on the county/ regional municipal list were not the subject of the survey. These rationales must be based on evidence demonstrating either that: suitable habitat for the species is not present on the property or; the project will not have any impacts -including indirect impacts- on the species. Some SAR surveys require an *Endangered Species Act 2007* permit and/or a Scientific Collector's Permit; please contact me if you require further direction regarding these permits.

Please contact Graham Buck, Species at Risk Biologist (519-826-4505) if your investigations reveal the presence of species at risk on the subject property. We would be happy to provide further advice regarding the provisions of the *Endangered Species Act* at that time.

If you have any further questions please feel free to give me a call.

Sincerely,

Lorraine Norminton
District Planner
Ministry of Natural Resources, Guelph District
1 Stone Rd West
Guelph, ON N1G 4Y2
(P) 519-826-4912
(F) 519-826-4929
email: lorraine.norminton@ontario.ca



Legend

- NHIC Natural Areas
- Road
- NHIC Query Location
- UTM Grid 1km Squares
- Study Area (includes the Primary and Extended Study Areas)

0 250 500 Metres

Erbsville South Environmental Study NHIC Query

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CLIENT: SUNVEST DEVELOPMENT CORPORATION

N W E S
UTM Zone 17 NAD83

DATE: OCTOBER 2014

SCALE: 1:16,000

DRAWN BY: LC

CHECKED BY:

Figure: 1

Appendix 2.3. Local resident wildlife observations from within and adjacent to the Erbsville South Environmental Study area.

	Common Name	Scientific Name	Conservation Status						Area Sensitivity[7]	2008	2009		2011	2012			2013																																				2014														2016
			National	Provincial		Regional		Local		Oct	Aug	Sep	May	May		Jun	May								June										July				August				September						Oct	April				May			June					July		May
			COSEWIC[1]	MNRF[2]	Srank[3]	MNR former 'Central' Region[4]	BCR 13[5]	RMW[6]		Oct	24	3	13	3	29	12	15	18	19	20	22	25	26	27	31	1	3	6	8	9	12	17	22	23	29	30	1	12	20	23	3	5	10	31	2	7	14	15	18	21	29	3	13	18	21	24	10	25	27	4	8	21	22	27	2	27	22
	Damselflies																																																																		
1	Ebony Jewelwing	**Calopteryx maculata**	---	---	S5	n/a	n/a	?	n/a																																																						X				
	Dragonflies																																																																		
1	Delta-spotted Spiketail	**Cordulegaster diastatops**	---	---	S4	n/a	n/a	?	n/a																																																						X				
	Butterflies																																																																		
1	Spring Azure	**Celastrina lucia**	---	---	S5	n/a	n/a	?	n/a																										X																											X					
2	Milbert's Tortoiseshell	**Nymphalis milberti**	---	---	S5	n/a	n/a	?	n/a																																						X																				
3	Painted Lady	**Vanessa cardui**	---	---	S5	n/a	n/a	?	n/a																																								X																		
4	Viceroy	**Limenitis archippus**	---	---	S5	n/a	n/a	?	n/a																														X																												
5	Eyed Brown	**Lethe eurydice**	---	---	S5	n/a	n/a	?	n/a																										X																																
6	Monarch	**Danaus plexippus**	SC	SC	S4B	n/a	n/a	?	n/a																													X																													
	Crustaceans																																																																		
1	Unidentified crayfish species	**Cambaridae sp.**	?	?	?	n/a	n/a	?	n/a																								X		X																																
	Amphibians																																																																		
1	Spotted Salamander	**Ambystoma maculatum**	---	---	S4	C and W	n/a	R	---	Bruce Boehmer (665 Erbsville Rd. tenant) told Karl Konze (D&A) on Sept. 20, 2013 that he had seen them before under their lawn furniture next to the pond																																																									
2	American Toad	**Anaxyrus americanus**	---	---	S5	A and W	n/a	---	---																										X																														X		
3	Northern Leopard Frog	**Lithobates pipiens**	NAR	NAR	S5	A and W	n/a	---	---																				X	X															X																					
	Reptiles																																																																		
1	Snapping Turtle	**Chelydra serpentina**	SC	SC	S3	A and W	n/a	---	---																				X	X																X	X			X																
2	Midland Painted Turtle	**Chrysemys picta marginata**	---	---	S5	A and W	n/a	---	---																X																																										
3	Blanding's Turtle	**Emydoidea blandingii**	THR	THR	S3	U and W	n/a	R?	---																																																										X
4	Northern Map Turtle	**Graptemys geographica**	SC	SC	S3	U and L	n/a	---	AS						X																																																				
5	Eastern Milksnake	**Lampropeltis t. triangulum**	SC	NAR	S4	U and W	n/a	R?	---																																											X															
6	Eastern Gartersnake	**Thamnophis sirtalis sirtalis**	---	---	S5	C and W	n/a	---	---																													X																	X												
	Birds																																																																		
1	Canada Goose	**Branta canadensis**	---	---	S5	n/a	---	---	---														X																																												
2	Wood Duck	**Aix sponsa**	---	---	S5	n/a	PS	---	---																											X																															
3	Mallard	**Anas platyrhynchos**	---	---	S5	n/a	---	---	---																																																X										
4	American Bittern	**Botaurus lentiginosus**	---	---	S4B	n/a	PS	S	AS								X																																																	
5	Great Blue Heron	**Ardea herodias**	---	---	S4	n/a	PS	U	---													X																																X													
6	Great Egret	**Ardea alba**	---	---	S2B	n/a	PS	---	---													X																																													
7	Green Heron	**Butorides virescens**	---	---	S4B	n/a	PS	U	---																														X			X	X																								
8	Turkey Vulture	**Cathartes aura**	---	---	S5B	n/a	---	U	---																																												X														
9	Osprey	**Pandion haliaetus**	---	---	S5B	n/a	PS	p	---																																																									X	
10	Bald Eagle	**Haliaeetus leucocephalus**	NAR	SC	S4B	n/a	PS	---	AS	Elizabeth Caston (IBI Group) notified Karl Konze (D&A) on Oct. 19, 2012 that Deb Swidrovich had told her that Bald Eagles had been seen in the area. Exact location(s) and date(s) were not provided; also seen Jan 2015.																																																									
11	Red-shouldered Hawk	**Buteo lineatus**	NAR	NAR	S4B	n/a	PS	R	AS	X																																																									
12	Red-tailed Hawk	**Buteo jamaicensis**	NAR	NAR	S5	n/a	---	---	---																																																					X					
13	Spotted Sandpiper	**Actitis macularius**	---	---	S5	n/a	PS	---	---											X																																															
14	Unidentified Owl species	?	?	?	?	n/a	---	?	?	In an email from Deb Lehman (local resident) to Robyn McMullen (City) dated May 25, 2012, Deb describes having heard owls in the winter in the ESL.																																																									
15	Ruby-throated Hummingbird	**Archilochus colubris**	---	---	S5B	n/a	---	U	---																				X																																						
16	Red-headed Woodpecker	**Melanerpes erythrocephalus**	THR	SC	S4B	n/a	PS	U	---			X		X				X																																																	
17	Red-bellied Woodpecker	**Melanerpes carolinus**	---	---	S4	n/a	---	R	---																																															X											
18	Northern Flicker	**Colaptes auratus**	---	---	S4B	n/a	PS	---	---																				X			X		X																																	
19	Pileated Woodpecker	**Dryocopus pileatus**	---	---	S5	n/a	---	U	AS							X																																																			
20	Alder Flycatcher	**Empidonax alnorum**	---	---	S5B	n/a	---	U	---																	X																																								
21	Willow Flycatcher	**Empidonax traillii**	---	---	S5B	n/a	---	U	---																X																																										
22	American Crow	**Corvus brachyrhynchos**	---	---	S5B	n/a	---	---	---																																		X																			X					
23	Horned Lark	**Eremophila alpestris**	---	---	S5B	n/a	---	---	---																					X	X																																				
24	Barn Swallow	**Hirundo rustica**	THR	THR	S4B	n/a	PS	---	---											X	X					X														X																				X		X	X		X	
25	House Wren	**Troglodytes aedon**	---	---	S5B	n/a	---	---	---																																				X																	X					
26	Eastern Bluebird	**Sialia sialis**	NAR	NAR	S5B	n/a	---	U	---																		X	X																																								
27	Brown Thrasher	**Toxostoma rufum**	---	---	S4B	n/a	PS	U	---													X											X																																		
28	Northern Mockingbird	**Mimus polyglottos**	---	---	S4	n/a	---	p	---										X																																																
29	Canada Warbler	**Cardellina canadensis**	THR	SC	S4B	n/a	PS	R	AS		X		X					X																																																	
30	Wilson's Warbler	**Cardellina pusilla**	---	---	S4B	n/a	---	---	---																																																	X									
31	Song Sparrow	**Melospiza melodia**	---	---	S5B	n/a	---	---	---																													X																													
32	Swamp Sparrow	**Melospiza georgiana**	---	---	S5B	n/a	---	U	---																																																						X				
33	Red-winged Blackbird	**Agelaius phoeniceus**	---	---	S4	n/a	---	---	---																																																					X	X				
34	American Goldfinch	**Spinus tristis**	---	---	S5B	n/a	---	---	---																																							X																			
	Mammals																																																																		
1	Unidentified shrew species	**Sorcidae sp.**	---	---	?	n/a	n/a	?	---																																									X																	
2	Beaver	**Castor canadensis**	---	---	S5	n/a	n/a	S	---															X									X				X		X																											
3	Peromyscus mouse sp.	**Peromyscus sp.**	---	---	S5	n/a	n/a	---	---																																			X																							
4	Muskrat	**Ondatra zibethicus**	---	---	S5	n/a	n/a	---	---																																																X			X							
5	Coyote	**Canis latrans**	---	---	S5	n/a	n/a	S	---																					X																																					
6	Mink	**Mustela vison**	---	---	S4	n/a	n/a	S	---																																									X						X											
7	White-tailed Deer	**Odocoileus virginianus**	---	---	S5	n/a	n/a	---	---											X			X																																				X								

LEGEND

General

--- = not significant
n/a = not applicable
? = status unknown/unclear

Federal Conservation Status

1. Federal (COSEWIC) Status: Status assigned by the Committee on the Status of Endangered Wildlife in Canada. (COSEWIC, 2015; COSEWIC, 2016)

EXT Extinct. A species that no longer exists.
EXP Extirpated. A species no longer existing in the wild in Canada, but occurring elsewhere in the wild.
END Endangered. A species facing imminent extirpation or extinction throughout its range.
THR Threatened. A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
VUL or SC Vulnerable or Special Concern. A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events, but does not include an extirpated, endangered or threatened species.
IND Indeterminate. A species for which there is insufficient information to support a status designation.
NAR Not At Risk. A species that has been evaluated and found to be not at risk.

Provincial Conservation Status

2. Provincial (MNRF) Status: Status assigned by the Ministry of Natural Resources and Forestry (OMNRF, 2016).

EXP Extirpated. Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.
END Endangered. Lives in the wild in Ontario but is facing imminent extinction or extirpation.
THR Threatened. Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
SP Special Concern. Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.

3. Provincial rarity ranks (SRANKS) are evaluated and assigned by the (Ontario) Natural Heritage Information Centre (NHIC, 2016)

S5 = Secure—Common, widespread, and abundant in the nation or state/province.
S4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S3 = Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
_ _B = Breeding migrants (***i.e.*** S5B). Those without any suffixes are considered resident species.
SE = Exotic; not believed to be a native component of Ontario's flora.

Regional Conservation Status

4. **Bird Conservation Region (BCR) 13 status designations** have been prepared by Environment Canada (2014).

PS = Priority Species for Conservation

Local Conservation Status

6. Local Conservation Status based on Regional Municipality of Waterloo status designations (RMW, 1985a; RMW, 1985b; RMW, 1996)

R = rare
S = scarce
U = uncommon
p = potential: not known to breed in RMW, but would be regarded as significant if it did

Area Sensitivity

7. Area sensitivity designations based on OMNR (2000) (See Appendix C & G)

AS = Area Sensitive

REFERENCES

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2015. Canadian Wildlife Species at Risk. October 2015. Committee on the Status of Endangered Wildlife in Canada. Web site: http://www.cosewic.gc.ca/eng/sct0/rpt/rpt_csar_e.cfm [accessed 13 September 2016]
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RMW (Regional Municipality of Waterloo). 1985b. Appendix 4: Mammals in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.
RMW (Regional Municipality of Waterloo). 1996. Revisions to Waterloo Region's Significant Species List: Breeding Birds Component. Report to Planning and Culture Committee PC-96-021. Approved by Council: April 25, 1996.

	Scientific Name	Common Name	Conservation Status					CC	CW	Native Status	Location (ELC Polygon)
			Global	National	Provincial		Local				
			G Rank	COSEWIC	MNRF	S Rank	Waterloo				
1	*Acer negundo*	Box Elder	G5			S5		0	-2	N	3,7,10,17,23
2	*Acer platanoides*	Norway Maple	GNR			SNA		0	5	I	16
3	*Acer rubrum*	Red Maple	G5			S5		4	0	N	19,25,27,33
4	*Acer saccharinum*	Silver Maple	G5			S5		5	-3	N	17
5	*Acer saccharum*	Sugar Maple	G5			S5		4	3	N	5,7,21,24,32,33,42
6	*Achillea millefolium*	Yarrow	G5			S5		0	3	N	26
7	*Actaea pachypoda*	White Baneberry	G5			S5		6	5	N	24
8	*Actaea rubra*	Red Baneberry	G5			S5		5	5	N	27
9	*Aesculus glabra*	Ohio Buckeye	G5			S1		10	-1	N	6
10	*Agrimonia gryposepala*	Tall Hairy Groovebur	G5			S5		2	2	N	4,10,33
11	*Agrostis gigantea*	Redtop	G4G5			SNA		0	0	I	14,15
12	*Agrostis stolonifera*	Spreading Bentgrass	G5			S5		0	-3	N	31
13	*Ajuga reptans*	Carpet-bugel	GNR			SNA		0	5	I	27
14	*Alliaria petiolata*	Garlic Mustard	GNR			SNA		0	0	I	3,5,6,7
15	*Alnus incana*	Speckled Alder	G5			S5		6	-5	N	19
16	*Ambrosia artemisiifolia*	Annual Ragweed	G5			S5		0	3	N	28
17	*Anemone canadensis*	Canada Anemone	G5			S5		3	-3	N	10
18	*Aralia hispida*	Bristly Sarsaparilla	G5			S5	R	8	5	N	27
19	*Aralia nudicaulis*	Wild Sarsaparilla	G5			S5		4	3	N	27
20	*Arctium lappa*	Greater Burdock	GNR			SNA				I	21
21	*Arctium minus*	Lesser Burdock	GNR			SNA		0	5	I	17
22	*Arisaema triphyllum*	Jack-in-the-pulpit	G5			S5		5	-2	N	7,19,24,27,32
23	*Asclepias incarnata*	Swamp Milkweed	G5			S5		6	-5	N	2,12,23,31
24	*Asclepias syriaca*	Kansas Milkweed	G5			S5		0	5	N	10,21,32
25	*Asparagus officinalis*	Garden Asparagus-fern	G5?			SNA		0	3	I	7
26	*Athyrium filix-femina*	Ladyfern	G5			S5		4	0	N	24,27,32,33
27	*Barbarea vulgaris*	Yellow Rocket	GNR			SNA		0	0	I	7
28	*Betula alleghaniensis*	Yellow Birch	G5			S5		6	0	N	2,19,21,24,27,33
29	*Betula papyrifera*	Paper Birch	G5			S5		2	2	N	19,21,32
30	*Bidens frondosa*	Devil's Beggar-ticks	G5			S5		3	-3	N	1,2
31	*Boehmeria cylindrica*	False Nettle	G5			S5		4	-5	N	27
32	*Bromus inermis*	Awnless Brome	GNR			SNA		0	5	I	13,17,23,26,28,34,36
33	*Calamagrostis canadensis*	Canada Blue-joint	G5			S5		4	-5	N	31
34	*Caltha palustris*	Marsh Marigold	G5			S5		5	-5	N	1,3,8,19,27
35	*Carex aquatilis*	Water Sedge	G5			S5		7	-5	N	29
36	*Carex arctata*	Black Sedge	G5?			S5		5	5	N	33
37	*Carex aurea*	Golden-fruited Sedge	G5			S5		4	-4	N	12,32

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38	*Carex comosa*	Bristly Sedge	G5			S5		5	-5	N	25
39	*Carex gracilescens*	Slender Wood Sedge	G5?			S4		7	5	N	12
40	*Carex gracillima*	Graceful Sedge	G5			S5		4	3	N	4,5,10,27,32,33
41	*Carex hystericina*	Porcupine Sedge	G5			S5		5	-5	N	12,15,18
42	*Carex intumescens*	Bladder Sedge	G5			S5		6	-4	N	27,29
43	*Carex lacustris*	Lake-bank Sedge	G5			S5		5	-5	N	3
44	*Carex lupulina*	Hop Sedge	G5			S5		6	-5	N	1
45	*Carex pensylvanica*	Pennsylvania Sedge	G5			S5		5	5	N	33
46	*Carex pseudocyperus*	Cyperus-like Sedge	G5			S5		6	-5	N	18,27,29
47	*Carex radiata*	Stellate Sedge	G4			S4		4	5	N	19
48	*Carex retrorsa*	Retrorse Sedge	G5			S5		5	-5	N	31
49	*Carex scabrata*	Rough Sedge	G5			S5	R	8	-5	N	27
50	*Carex stipata*	Stalk-grain Sedge	G5			S5		3	-5	N	14,15,27,29,31
51	*Carex stricta*	Tussock Sedge	G5			S5		4	-5	N	3,4,8
52	*Carex vulpinoidea*	Fox Sedge	G5			S5		3	-5	N	12,14,18
53	*Caulophyllum thalictroides*		G4G5			S5		6	5	N	5,24
54	*Chelidonium majus*	Greater Celadine	GNR			SNA		0	5	I	7
55	*Chelone glabra*	White Turtlehead	G5			S5		7	-5	N	23
56	*Cichorium intybus*	Chicory	GNR			SNA		0	5	I	13,28,36
57	*Cicuta bulbifera*	Bulb-bearing Water-hemlock	G5			S5		5	-5	N	19,27,31
58	*Cicuta maculata*	Spotted Water-hemlock	G5			S5		6	-5	N	8,37
59	*Cinna latifolia*	Slender Wood Reedgrass	G5			S5		7	-4	N	31
60	*Circaea lutetiana*	Southern Broadleaf Enchanter's Nightshade	G5			S5		3	3	N	4,7,17,24,32,33,34
61	*Cirsium arvense*	Canada Thistle	GNR			SNA		0	3	I	13,21,23,36,
62	*Cirsium vulgare*	Bull Thistle	GNR			SNA		0	4	I	10,32,
63	*Clintonia borealis*	Blue Bead-lily	G5			S5		7	-1	N	27,
64	*Convallaria majalis*	European Lily-of-the-valley	G5			SNA		0	5	I	4,
65	*Coptis trifolia*	Goldthread	G5			S5		7	-3	N	19,27,
66	*Cornus alternifolia*	Alternate-leaf Dogwood	G5			S5		6	5	N	5,7,10,24,28,32,
67	*Cornus amomum*	Silky Dogwood	G5			S5		5	-4	N	3
68	*Cornus canadensis*	Bunchberry	G5			S5		7	0	N	27
69	*Cornus racemosa*	Stiff Dogwood	G5?			S5		2	-2	N	19,21,29,31
70	*Cornus sericea*	Red-osier Dogwood	G5			S5		2	-3	N	1,2,3,8,12,17,18,19,21,22,23, 29,31,33,37
71	*Cystopteris bulbifera*	Bulblet Fern	G5			S5		5	-2	N	27
72	*Dactylis glomerata*	Orchard Grass	GNR			SNA		0	3	I	13,17,34,36

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73	*Daucus carota*	Wild Carrot	GNR			SNA		0	5	I	10,13,17,18,21,23,26,28,36
74	*Diphasiastrum digitatum*	Fan Club-moss	G5			S5		5	5	N	27
75	*Dipsacus fullonum*	Fuller's Teasel	GNR			SNA		0	5	I	10,21,34
76	*Dryopteris carthusiana*	Spinulose Shield Fern	G5			S5		5	-2	N	21,24,27,32
77	*Dryopteris cristata*	Crested Shield-fern	G5			S5		7	-5	N	19,20,27
78	*Dryopteris marginalis*	Marginal Wood-fern	G5			S5		5	3	N	24
79	*Echinocystis lobata*	Wild Mock-cucumber	G5			S5		3	-2	N	32
80	*Elymus repens*	Creeping Wild-rye	GNR			SNA		0	3	I	22,23
81	*Elymus virginicus*	Virginia Wild-rye	G5			S5		5	-2	N	1
82	*Epilobium ciliatum ssp. glandulosum*	Willow-herb	G5T5			SU		6	3	I	23,31
83	*Epipactis helleborine*	Eastern Helleborine	GNR			SNA		0	5	I	24,33,
84	*Equisetum arvense*	Field Horsetail	G5			S5		0	0	N	1,2,4,8,17,19,21,26,27,28,29, 32,33
85	*Erigeron philadelphicus*	Philadelphia Fleabane	G5			S5		1	-3	N	13,21,26,36
86	*Erythronium americanum*	Yellow Trout-lily	G5			S5		5	5	N	7
87	*Eupatorium maculatum*	Spotted Joe-pye Weed	G5			S5		3	-5	N	1,12,18,19,22,23,27,29,31,32, 37
88	*Eupatorium perfoliatum*	Common Boneset	G5			S5		2	-4	N	12,15,19,31,33
89	*Eurybia macrophylla*	Large-leaf Wood-aster	G5			S5		5	5	N	21
90	*Euthamia graminifolia*	Flat-top Fragrant-golden-rod	G5			S5		2	-2	N	12,18,22,31,32
91	*Fagus grandifolia*	American Beech	G5			S4		6	3	N	24,33
92	*Fragaria virginiana*	Virginia Strawberry	G5			S5		2	1	N	4,5,17,21,22,24,26,32,33,34
93	*Frangula alnus*	Glossy Buckthorn	GNR			SNA		0	-1	I	19
94	*Fraxinus nigra*	Black Ash	G5			S5		7	-4	N	21,27,29
95	*Fraxinus pennsylvanica*	Green Ash	G5			S5		3	-3	N	2,4,5,7,10,17,21,28,32,33,34, 42
96	*Galium odoratum*	Sweet Bedstraw	GNR			SNA				I	8
97	*Geranium maculatum*	Wild Crane's-bill	G5			S5		6	3	N	21
98	*Geranium robertianum*	Herb-robert	G5			SNA		0	5	I	10,21,24,32
99	*Geum aleppicum*	Yellow Avens	G5			S5		2	-1	N	10,17
100	*Geum canadense*	White Avens	G5			S5		3	0	N	4,10,34
101	*Geum urbanum*	Clover-root	G5			SNA		0	5	I	21,34
102	*Glechoma hederacea*	Ground Ivy	GNR			SNA		0	3	I	7
103	*Glyceria grandis*	American Mannagrass	G5			S4S5		5	-5	N	14,29,31
104	*Glyceria striata*	Fowl Manna-grass	G5			S5		3	-5	N	1,25,27,29
105	*Gymnocarpium dryopteris*	Oak Fern	G5			S5		7	0	N	27
106	*Hemerocallis fulva*	Orange Daylily	GNA			SNA		0	5	I	7,23,28

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107	*Hypericum perforatum*	A St. John's-wort	GNR			SNA		0	5	I	21
108	*Impatiens capensis*	Spotted Jewel-weed	G5			S5		4	-3	N	1,8,12,17,19,23,25,27,29,31
109	*Juglans cinerea*[1]	Butternut	G4	END	END	S3?		6	2	N	7,10
110	*Juglans nigra*	Black Walnut	G5			S4	R+*	5	3	N	7, 27,34,42
111	*Juncus canadensis*	Canada Rush	G5			S5	R	6	-5	N	12,18
112	*Juncus effusus var. solutus*	A Rush	G5T5			S5?		4	-5	N	12,14,15,31
113	*Juncus tenuis*	Path Rush	G5			S5		0	0	N	15
114	*Laportea canadensis*	Wood Nettle	G5			S5		6	-3	N	25
115	*Larix decidua*	European Larch	G5			SNA		0	5	I	4
116	*Larix laricina*	American Larch	G5			S5		7	-3	N	2,19,29
117	*Leersia oryzoides*	Rice Cutgrass	G5			S5		3	-5	N	15,19,30,31
118	*Lemna minor*	Lesser Duckweed	G5			S5		2	-5	N	19,30
119	*Liriodendron tulipifera*	Tulip Tree	G5			S4		8	2	N	42
120	*Lobelia siphilitica*	Great Blue Lobelia	G5			S5		6	-4	N	3
121	*Lonicera tatarica*	Tartarian Honeysuckle	GNR			SNA		0	3	I	3
122	*Lotus corniculatus*	Birds-foot Trefoil	GNR			SNA		0	1	I	13,17,23,28,36
123	*Lycopus americanus*	American Bugleweed	G5			S5		4	-5	N	12
124	*Lycopus uniflorus*	Northern Bugleweed	G5			S5		5	-5	N	2,31
125	*Lysimachia ciliata*	Fringed Loosestrife	G5			S5		4	-3	N	1,4,29
126	*Maianthemum canadense*	Wild-lily-of-the-valley	G5			S5		5	0	N	19,24,27,32,33
127	*Maianthemum racemosum*	False Solomon's-seal	G5			S5		4	3	N	24,27,32,33
128	*Maianthemum stellatum*	Starflower False Solomon's-seal	G5			S5		6	1	N	8
129	*Matteuccia struthiopteris*	Ostrich Fern	G5			S5		5	-3	N	5,7,8,19,21,25,27,29,33
130	*Medicago lupulina*	Black Medic	GNR			SNA		0	1	I	26
131	*Medicago sativa*	Alfalfa	GNR			SNA		0	5	I	13,36
132	*Melilotus albus*	White Sweet Clover	G5			SNA		0	3	I	13,28,34,36
133	*Melilotus officinalis*	Yellow Sweetclover	GNR			SNA		0	3	I	18
134	*Mentha arvensis*	Corn Mint	G5			S5		3	-3	N	1,12,18,19,29
135	*Mitchella repens*	Partridge-berry	G5			S5		6	2	N	27
136	*Mitella nuda*	Naked Bishop's-cap	G5			S5		6	-3	N	19,27,33
137	*Muhlenbergia frondosa*	Wirestem Muhly	G5			S4	R*	5	-3	N	32
138	*Myosotis laxa*	Small Forget-me-not	G5			S5		6	-5	N	4,5,8
139	*Myosotis scorpioides*	True Forget-me-not	G5			SNA		0	-5	I	6,19,29
140	*Onoclea sensibilis*	Sensitive Fern	G5			S5		4	-3	N	1,2,3,4,17,19,21,25,26,27,32, 33,37

[1] Genetic status (pure or hybrid) undetermined

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141	*Osmunda cinnamomea*	Cinnamon Fern	G5			S5		7	-3	N	27
142	*Osmunda regalis*	Royal Fern	G5			S5		7	-5	N	25,27,29
143	*Ostrya virginiana*	Eastern Hop-hornbeam	G5			S5		4	4	N	7,21,24
144	*Parthenocissus quinquefolia*	Virginia Creeper	G5			S4?	R+	6	1	N	3,19
145	*Parthenocissus vitacea*	Virginia Creeper	G5			S5		3	3	N	1,8,24,27,28,32,34
146	*Phalaris arundinacea*	Reed Canary Grass	G5			S5		0	-4	N	1,14,17,18,21,22,23,29,30,31
147	*Phleum pratense*	Meadow Timothy	GNR			SNA		0	3	I	13,17,23,34,36
148	*Phragmites australis*	Common Reed	G5			S4?		0	-4	N	12,15,22
149	*Physalis heterophylla*	Clammy Ground-cherry	G5			S4		3	5	N	7
150	*Picea abies*	Norway Spruce	G5			SNA		0	5	I	6,16,42
151	*Picea glauca*	White Spruce	G5			S5	R+	6	3	N	4,6,17,42
152	*Picea pungens*	Blue Spruce	G5			SNA				I	7,16
153	*Pilea pumila*	Canada Clearweed	G5			S5		5	-3	N	31
154	*Pinus nigra*	Black Pine	GNR			SNA		0	-5	I	6,16
155	*Pinus strobus*	Eastern White Pine	G5			S5		4	3	N	2,4,6,21,27,32,33,42
156	*Plantago lanceolata*	English Plantain	G5			SNA		0	0	I	13,36
157	*Plantago major*	Nipple-seed Plantain	G5			S5		0	-1	N	13,26,36
158	*Poa compressa*	Canada Bluegrass	GNR			SNA		0	2	I	34
159	*Poa pratensis*	Kentucky Bluegrass	G5			S5		0	1	N	6,10,14,16,32,34
160	*Podophyllum peltatum*	May Apple	G5			S5		5	3	N	34
161	*Polygala paucifolia*	Gay-wing Milkwort	G5			S5		6	3	N	33
162	*Polygonatum biflorum*	Giant Solomon's Seal	G5			S4		8	3	N	7
163	*Polygonum amphibium*	Water Smartweed	G5			S5		5	-5	N	31
164	*Populus balsamifera*	Balsam Poplar	G5			S5		4	-3	N	3,4,17,29,31,32,37
165	*Populus deltoides*	Eastern Cottonwood	G5			S5		4	-1	N	3,4,5,8,42
166	*Populus tremuloides*	Trembling Aspen	G5			S5		2	0	N	2,3,4,5,6,17,19,21,23,24,26,27,28,32,33
167	*Prunella vulgaris*	Self-heal	G5			S5		5	5	N	17,27,29,32
168	*Prunus serotina*	Wild Black Cherry	G5			S5		3	3	N	5,6,7,10,21,24,32,33
169	*Prunus virginiana*	Choke Cherry	G5			S5		2	1	N	4,5,7,21,24,27,32,34
170	*Pteridium aquilinum*	Bracken Fern	G5			S5		2	3	N	21,26,32
171	*Pyrola elliptica*	Shinleaf	G5			S5		5	5	N	19,33
172	*Quercus rubra*	Northern Red Oak	G5			S5		6	3	N	34,42
173	*Ranunculus abortivus*	Kidney-leaved Buttercup	G5			S5		2	-2	N	27
174	*Ranunculus acris*	Tall Butter-cup	G5			SNA		0	-2	I	13,36
175	*Ranunculus bulbosus*	Bulbous Butter-cup	GNR			SNA		0	-3	I	3
176	*Ranunculus hispidus var. caricetorum*		G5T5			S5		5	-5	N	3,8

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177	*Rhamnus cathartica*	Buckthorn	GNR			SNA		0	3	I	1,3,4,7,8,10,17,21,23,24,28,32,33,34,42
178	*Rhus typhina*	Staghorn Sumac	G5			S5		1	5	N	24,
179	*Ribes americanum*	Wild Black Currant	G5			S5		4	-3	N	1,4,7,8,17,21,22,
180	*Ribes cynosbati*	Prickly Gooseberry	G5			S5		4	5	N	33
181	*Ribes triste*	Swamp Red Currant	G5			S5		6	-5	N	17
182	*Robinia pseudoacacia*	Black Locust	G5			SNA		0	4	I	7,10
183	*Rorippa nasturtium-aquaticum*	True Watercress	GNR			SNA		0	-5	I	1,29
184	*Rosa multiflora*	Multiflora Rose	GNR			SNA		0	3	I	22
185	*Rubus allegheniensis*	Allegheny Blackberry	G5			S5		2	2	N	21,24,26,32
186	*Rubus idaeus ssp. strigosus*	Common Red Raspberry	G5T5			S5		0	-2	N	3,7,10,21,23,32
187	*Rubus pubescens*	Catherinettes Berry	G5			S5		4	-4	N	1,2,4,19,21,27
188	*Rudbeckia hirta*	Black-eyed Susan	G5			S5		0	3	N	26
189	*Rumex crispus*	Curly Dock	GNR			SNA		0	-1	I	14,18,22,23,29
190	*Sagittaria latifolia*	Broadleaf Arrowhead	G5			S5		4	-5	N	12,18,19,30,31
191	*Salix amygdaloides*	Peach-leaved Willow	G5			S5		6	-3	N	17
192	*Salix bebbiana*	Bebb's Willow	G5			S5		4	-4	N	12,17,31
193	*Salix discolor*	Pussy Willow	G5			S5		3	-3	N	1
194	*Salix eriocephala*	Heart-leaved Willow	G5			S5		4	-3	N	12,19,22
195	*Salix exigua*	Sandbar Willow	G5			S5		3	-5	N	31
196	*Salix nigra*	Black Willow	G5			S4?		6	-5	N	31
197	*Salix petiolaris*	Meadow Willow	G5			S5		3	-4	N	12,31
198	*Sambucus nigra ssp. canadensis*	Common Elderberry	G5T5			S5		5	-2	N	21
199	*Sanguinaria canadensis*	Bloodroot	G5			S5		5	4	N	7
200	*Schoenoplectus tabernaemontani*	Soft-stem Club-rush	G5			S5		5	-5	N	12,14,18,31
201	*Scirpus atrovirens*	Dark-green Bulrush	G5?			S5		3	-5	N	1,12,14,15,18,22,23,29
202	*Scirpus cyperinus*	Cottongrass Bulrush	G5			S5		4	-5	N	31
203	*Scutellaria galericulata*	Hooded Skullcap	G5			S5		6	-5	N	12,19,23,31
204	*Scutellaria lateriflora*	Mad Dog Skullcap	G5			S5		5	-5	N	27
205	*Silene latifolia*	A Catchfly	GNR			SNA		0	5	I	7
206	*Sium suave*	Hemlock Water-parsnip	G5			S5		4	-5	N	1
207	*Solanum dulcamara*	Climbing Nightshade	GNR			SNA		0	0	I	1,3,10,19,21,23,25,27,29,31,32
208	*Solidago canadensis*	Canada Goldenrod	G5			S5		1	3	N	10,13,14,17,18,21,22,23,26,28,32,33,34,36
209	*Solidago rugosa*	Rough-leaf Goldenrod	G5			S5		4	-1	N	19,21,29
210	*Spiraea alba*	Narrow-leaved Meadow-sweet	G5			S5		3	-4	N	1,19,23,31,37

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211	*Symphyotrichum lanceolatum*	Panicled Aster	G5			S5		3	-3	N	1,22
212	*Symphyotrichum novae-angliae*	New England Aster	G5			S5		2	-3	N	17,23
213	*Symphyotrichum puniceum*	Swamp Aster	G5			S5		6	-5	N	18,21,22,31,37
214	*Symphytum officinale*	Common Comfrey	GNR			SNA		0	5	I	17
215	*Syringa vulgaris*	Common Lilac	GNR			SNA		0	5	I	7,42
216	*Tanacetum vulgare*	Common Tansy	GNR			SNA		0	5	I	23
217	*Taraxacum officinale*	Brown-seed Dandelion	G5			SNA		0	3	I	2,5,6,7,10,13,17,21,28,32,36
218	*Thelypteris palustris*	Marsh Fern	G5			S5		5	-4	N	2,19,27
219	*Thlaspi arvense*	Field Penny-cress	GNR			SNA		0	5	I	21
220	*Thuja occidentalis*	Eastern White Cedar	G5			S5		4	-3	N	1,2,4,7,8,10,16,17,19,21,27,28,29,32,33,37,42
221	*Tilia americana*	American Basswood	G5			S5		4	3	N	7,10,21,23,24,34
222	*Tilia cordata*	Little-leaf Linden	GNR			SNA				I	6
223	*Toxicodendron radicans*	Poison Ivy	G5			S5		0	0	N	7
224	*Trientalis borealis*	Northern Starflower	G5			S5		6	-1	N	19,27
225	*Trillium erectum*	Red Trillium	G5			S5		6	1	N	5,7
226	*Trillium grandiflorum*	White Trillium	G5			S5		5	5	N	7
227	*Triosteum aurantiacum*	Coffee Tinker's-weed	G5			S5		7	5	N	21
228	*Tsuga canadensis*	Eastern Hemlock	G4G5			S5		7	3	N	21,24,27,33
229	*Tussilago farfara*	Colt's Foot	GNR			SNA		0	3	I	1,17,19,21,22,24
230	*Typha angustifolia*	Narrow-leaved Cattail	G5			SNA		3	-5	I	12,15,17,18,19,22,31
231	*Typha latifolia*	Broad-leaf Cattail	G5			S5		3	-5	N	14,15,19,23,29,31
232	*Ulmus americana*	American Elm	G5?			S5		3	-2	N	6
233	*Ulmus pumila*	Siberian Elm	GNR			SNA		0	5	I	17
234	*Urtica dioica*	Stinging Nettle	G5			S5		0	-1	N	1,3,23,27,31
235	*Verbascum thapsus*	Great Mullein	GNR			SNA		0	5	I	23
236	*Verbena hastata*	Blue Vervain	G5			S5		4	-4	N	12
237	*Veronica officinalis*	Gypsy-weed	G5			SNA		0	5	I	21,24
238	*Viburnum opulus*	Guelder-rose Viburnum	G5			SNA		0	0	I	1,2,4,21,22,24,28,32
239	*Viburnum opulus var. americanum*	Highbush Cranberry	G5T5			S5		5	-3	N	32
240	*Vicia cracca*	Tufted Vetch	GNR			SNA		0	5	I	13,17,23,36
241	*Vinca minor*	Periwinkle	GNR			SNA		0	5	I	5,6,7,8
242	*Viola conspersa*	American Bog Violet	G5			S5		4	-2	N	5,6
243	*Viola cucullata*	Marsh Blue Violet	G4G5			S5		5	-5	N	1,3
244	*Viola sororia*	Woolly Blue Violet	G5			S5		4	1	N	5,6
245	*Vitis riparia*	Riverbank Grape	G5			S5		0	-2	N	17,21,23,24,28,32
1	*Allium sp*	Onion Species									17

	Scientific Name	Common Name	Conservation Status					CC	CW	Native Status	Location (ELC Polygon)
			Global	National	Provincial		Local				
			G Rank	COSEWIC	MNRF	S Rank	Waterloo				
2	*Bidens sp*	Beggar's Ticks Species									19,
3	*Carex sp*	Sedge Species									2,5,14,19,21,22,24,25,37
4	*Catalpa sp*	Catalpa Species									42
5	*Crataegus sp*	Hawthorn Species									32,34
6	*Cynanchum sp*	Swallow-wort Species									24
7	*Dryopteris sp*	Wood Fern Species									2,4
8	*Eleocharis sp*	Spikerush Species									18,31
9	*Galium sp*	Bedstraw Species									7,10,27
10	*Geum sp*	Avens Species									22
11	*Iris sp*	Iris Species									1
12	*Juncus sp*	Rush Species									15
13	*Lamium sp*	Deadnettle Species									4
14	*Lonicera sp*	Honeysuckle Species									4,
15	*Malus sp*	Apple Species									21,
16	*Poa sp*	Bluegrass Species									29
17	*Polygonum sp*	Smartweed Species									2,10,12
18	*Ranunculus sp*	Buttercup Species									1,29,
19	*Ribes sp*	Currant Species									19,
20	*Rosa sp*	Rose Species									3,21,
21	*Salix sp*	Willow Species									8,16,18,23,26,29,37
22	*Sambucus sp*	Elderberry Species									22,27,
23	*Tulipa sp*	Tulip Species									6

Vascular Plant List Legend

Scientific Name & Common Name (NHIC, 2011)

G Rank (NHIC, 2014)

G1 critically imperiled on a global scale; **G2** imperiled on a global scale; **G3** vulnerable on a global scale; **G4** apparently secure on a global scale; **G5** secure on a global scale; **GX** Presumed Extinct, Not located despite intensive searches and virtually no likelihood of rediscovery; **GH** Possibly Extinct, Missing; known from only historical occurrences but still some hope of rediscovery; **G#G#** Range Rank—A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community; **GU** Unrankable—-Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. Whenever possible, the most likely rank is assigned and the question mark qualifier is added (e.g., G2?) to express uncertainty, or a range rank (e.g., G2G3) is used to delineate the limits (range) of uncertainty; **GNR** Unranked—Global rank not yet assessed; **GNA** Not Applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities; **?** Inexact Numeric Rank—Denotes inexact numeric rank (e.g., G2?); **Q** Questionable taxonomy—Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority; **C** Captive or Cultivated Only—At present extant only in captivity or cultivation, or as a reintroduced population not yet established; **T#** Infraspecific Taxon (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1.

COSEWIC (NHIC, 2011)

NAR Not At Risk, a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances; **SC** Special Concern, a wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats; **T** Threatened, a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; **E** Endangered, a wildlife species facing imminent extirpation or extinction; **XT** Extirpated, a wildlife species that no longer exists in the wild in Canada, but exists elsewhere; **X** Extinct, a wildlife species that no longer exists.

MNR (NHIC, 2011)

NAR Not At Risk; **SC** Special Concern; **THR** Threatened; **END** Endangered; **EXP** Extirpated

S Rank (NHIC, 2011)

SX Presumed Extirpated; **SH** Possibly Extirpated (Historical); **S1** Critically Imperiled; **S2** Imperiled; **S3** Vulnerable; **S4** Apparently Secure; **S5** Secure; **SNR** Unranked; **SU** Unrankable (conflicting information about status or trends); **SNA** Not Applicable (A conservation status rank is not applicable because the species is not a suitable target for conservation activities.); **S#S#** Range Rank (used to indicate any range of uncertainty about the status of the species or community). **S?** Not Ranked Yet; or if following a ranking, Rank Uncertain (e.g. S3?).

Waterloo (RMW, 1999)

R Rare in the Regional Municipality of Waterloo; **R+** significant but only if demonstrably indigenous-most populations in Waterloo are thought to be of non-indigenous origin; **S5** Very common and demonstrably secure in Ontario. **R*** significant, but may prove to be too common to be so regarded in the future

CC (Oldham, M.J., W.D. Bakowsky and D.A. Sutherland, 1995)

Coefficient of Conservatism is a value (**0 to 10**) assigned to native species in Ontario based on its degree of fidelity to a specific vegetation community type. The lower this value, the more likely the plant is to be found in a wide variety of plant community types including disturbed sites. The presence of plants with a coefficient of conservatism of 9 or 10 indicates later-successional native plants that have undergone only minor disturbance.

CW (Oldham, M.J., W.D. Bakowsky and D.A. Sutherland, 1995)

Coefficient of Wetness is a value (**-5 to +5**) assigned to native species in Ontario based on their affinity for wet or dry habitats. The gradient runs from obligate wetland species at -5, facultative wetland species from -4 to -2, facultative species from -1 to +1, facultative upland species from +2 to +4, and upland species at +5.

Native Status (Dougan & Associates, 2011)

N native; **I** introduced (determined based on S rank and Exotic rank for Ontario)

Vascular Plant List References

Dougan & Associates. 2011. Ontario Master Plant List.

Frank, R. and A. Anderson. 2009. The Flora of Wellington County. Wellington County Historical Society, Fergus Ontario. 145 pp.

Oldham, M.J., W.D. Bakowsky and D.A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Ontario Ministry of Natural Resources, Natural Heritage Information Centre.

NHIC (Natural Heritage Information Centre). 2011. Ontario Vascular Plant Species List. Biodiversity Explorer Online Database. Ontario Ministry of Natural Resources.

Regional Municipality of Waterloo (RMW). 1999. Significant species List. Native vascular plants component. PC-99-028.1 Appendix A.

Wetland Complexing Assessment - Chronology of Events & Correspondence

1. **October 4, 2013:** The Technical Work Plan receives approval including the following:
   "*Wetland Assessment: A small unevaluated wetland has been identified and will be reviewed by a Certified OWES Wetland Evaluator. The assessment will include correspondence with MNR and GRCA, one field visit in summer 2013, formation of an opinion on whether the wetland should be complexed with the existing PSW – Sunfish Lake Laurel Creek Wetland Complex, and submission of a brief letter report to MNR for approval and copied to GRCA. This is not intended to be a full wetland evaluation update as per the Ontario Wetland Evaluation System.*"
2. **July 29, 2014:** MNRF declines to attend wetland site walk, stating that they will rely on GRCA for wetland boundaries and that a decision on the PSW matter can be made based on the wetland assessment letter.
3. **August 18, 2014:** Wetland site walk is carried out. Wetland boundaries are staked. GRCA requests that the pond (ELC polygon 18) be included in the wetland assessment letter. Discussions with GRCA indicate that, until MNRF determines wetland status, they cannot discuss the possibility of re-routing the watercourse or a wetland compensation scenario. GRCA staff also state that if PSW status is confirmed by MNRF they would not be willing to discuss watercourse re-routing or a wetland removal/compensation option.
4. **September 24, 2014:** Wetland assessment letter submitted to MNRF (Attachment A)
5. **October 31, 2014:** MNRF email response indicates that the wetland will be included in the PSW complex (Attachment B)
6. **December 15, 2014:** Site walk is carried out with MNRF to discuss the possibility of alternate wetland scenarios. MNRF indicated that they were open to the discussion of alternate scenarios with submission of an appropriate rationale.
7. **December 2014 – March 2015:** An intensive review of possible wetland scenarios is undertaken by the technical team (IBI Group, D&A, C. Portt & Associates, JTB Environmental Systems Inc., LVM inc. and NRSI) and discussed with Sunvest Development Corporation.
8. **March 17, 2015:** A detailed wetland information package (Attachment C) is sent to MNRF proposing an alternative scenario and providing rationale as to why it is preferable to in-situ protection of the watercourse and wetland.
9. **April 1, 2015:** MNRF response letter is received stating that the PSW designation will remain in place (Attachment D).
10. **April 7, 2015:** Telephone conversation with MNRF indicates that they intend to provide a more detailed letter explaining their decision regarding the wetland.
11. **June 1, 2015:** MNRF staff re-review the wetland information and confirm via email (Attachment E) that the PSW designation will remain. They encourage further discussion with GRCA, stating that the conservation authority may be able to authorize an alternative scenario despite the PSW designation.

Appendix 2.5
Attachment A

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph ON N1E 5R3 • T 519.822.1609 • F 519.822.5389 • www.dougan.ca

September 24, 2014

Art Timmerman, Management Biologist
Ministry of Natural Resources – Guelph District
1 Stone Road West
Guelph, ON
N1G 4Y2

Dear Mr. Timmerman:

RE: Erbsville South Environmental Study, PSW Complexing Assessment, Sunfish Lake – Laurel Creek PSW

This letter pertains to the Erbsville South Environmental Study currently being carried out on behalf of Sunvest Development Corporation for the area located on the east and west side of Erbsville Road and north of Wideman Road, Waterloo Ontario. As we have discussed, there are several small unevaluated wetlands near the intersection of Erbsville Road and Wideman Road which may have potential to be complexed with the Sunfish Lake – Laurel Creek PSW. We have reviewed this wetland in detail and are seeking your guidance on whether or not MNR will include it in the PSW complex. The findings of our field studies for this area are as follows:

Wetland Characterization

The wetlands in question include:

- two contiguous wetland communities located in the northwest corner of the intersection of Wideman Road and Erbsville Road with an area of 0.78 ha. These wetlands are shown on the attached map as polygons 14 and 15.
- One wetland community located behind the residence at 665 Erbsville Road (north of Wideman Road). This wetland is shown on the attached map as polygon 18.

Polygon 14 is a 0.57 ha mineral meadow marsh with a complex of cultural meadow in drier patches (Figure 1). It was examined by an OWES certified ecologist on May 17, 2013, July 16, 2013 and July 22, 2014. A small watercourse, not evident on GRCA mapping, flows through this polygon. This watercourse is augmented by the stormwater pond south of Wideman Road. Water enters the wetland through a culvert under Wideman Road, meanders through the polygon, and flows into the roadside ditch along Erbsville Road, eventually outletting to Wideman Creek. According to Cam Portt (C. Portt and Associates), this watercourse is warmer than Wideman Creek. Fish were observed in the watercourse during 2013 and 2014 surveys and thus it is considered fish habitat. Plant species recorded in the marsh include Soft Rush (*Juncus effusus*), Reed Canary Grass (*Phalaris arundinacea*), Kentucky Bluegrass (*Poa pratensis*), Redtop (*Agrostis gigantea*), Dark-green Bulrush (*Scirpus atrovirens*), Fox Sedge (*Carex vulpinoidea*), Stalk-grain Sedge (*Carex stipata*), Curly Dock (*Rumex crispus*), Broad-leaf Cattail (*Typha latifolia*), American Mannagrass (*Glyceria grandis*) and Canada Goldenrod (*Solidago*

canadensis). Soil assessment completed during the May 2013 visit showed 38 cm of sandy clay over sandy clay loam. Neither mottles nor gley were evident in the sample, however the water table was encountered at 20 cm depth.

Photo 1: Mineral meadow marsh, polygon 14 [taken July 22, 2014]

Photo 2: Watercourse in mineral meadow marsh, polygon 14 [taken July 22, 2014]

On April 27, 2007, five Spring Peepers (*Pseudacris crucifer*) and four Northern Leopard Frogs (*Lithobates pipiens*) were heard calling from this polygon by Dougan & Associates staff. Up to a dozen Spring Peepers were heard calling from this same polygon on April 27, 2013. Since Spring Peepers typically occur in forested habitats outside of the breeding season, seasonal migration from forested sites to

breeding sites is likely occurring. The nearest forested cover is approximately 180 m to the west, and is part of the Sunfish Lake – Laurel Creek PSW. It is also possible, although far less likely, that the Spring Peepers could have come from east of Erbsville Road, either over the road or through the culvert at Wideman Creek. Lastly, numerous Barn Swallows (*Hirundo rustica*) were observed foraging over the polygon on July 22, 2014. Barn Swallow is designated Threatened in Ontario and Canada, and the species and its habitat is protected under the Endangered Species Act, 2007. One pair was documented nesting under the gazebo next to the pond in 2013.

Polygon 15 is a 0.20 ha cattail mineral shallow marsh associated with the roadside ditch (Figure 1). It was also examined by an OWES certified Ecologist on May 17, 2013, July 16, 2013 and July 22, 2014. Cattails (*Typha angustifolia* & *T. latifolia*) are the dominant plant species. Associate species include Common Reed (*Phragmites australis*), Dark-green Bulrush, Soft Rush, Redtop, Path Rush (*Juncus tenuis*), Stalk-grain Sedge, Common Boneset (*Eupatorium perfoliatum*), Porcupine Sedge (*Carex hystericina*), and Rice Cutgrass (*Leersia oryzoides*). Standing water was not present during the July 2013 visit, however, some pockets of standing water were present during the July 2014 visit. Soil assessment completed during the July 2013 visit showed four distinct horizons including 14 cm of fibric organics over 14 cm of silty clay loam (with some organic content), over 20 cm of humic organics, over 6+ cm of silty sand. The water table was located in the humic organic layer at 32 cm depth below ground surface. Three Spring Peepers were heard calling from the wetland habitat along the ditch on the west side of Erbsville Road on April 27, 2007. As discussed above, these individuals likely originated from the forested habitats that are part of the Sunfish Lake – Laurel Creek PSW, a short distance to the west.

Photo 3: Mineral cattail marsh, polygon 15 [taken July 16, 2013]

Polygon 18 is a 0.17 ha shallow aquatic community bordered by a ring of emergent wetland vegetation (Figure 1). It was most recently examined by an OWES certified Ecologist on August 19, 2014. The shape, size and location of this feature indicates that it is a dug pond which has gone through some natural succession towards a wetland community. The pond is separated from the PSW by a narrow strip of mowed lawn 1 to 5 metres wide. There is no surface water connection between the pond and PSW. The open water portion covers approximately 80% of the polygon. Emergent vegetation around the perimeter of the pond includes Narrow-leaved Cattail, Soft-stem Club-rush (*Schoenoplectus tabernaemontanii*), Broadleaf Arrowhead (*Sagittaria latifolia*), Dark-green Bulrush, Reed Canary Grass, Sedges (*Carex* sp) and Spikerush (*Eleocharis* sp). Wetland vegetation also exists on the slope surrounding the pond including such species as Red-osier Dogwood (*Cornus sericea*), Willow (*Salix* sp.), Spotted Joe-pye Weed (*Eupatorium maculatum*) and Flat-top Fragrant-golden-rod (*Euthamia graminifolia*).

Photo 4: Shallow aquatic, polygon 18 [taken August 19, 2014]

Photo 5: Mowed strip separating polygon 18 from PSW [taken August 19, 2014]

Polygon 18 supports a variety of wildlife species. In 2007, four species of frogs and toads were heard calling from the pond, including small numbers of American Toad (*Anaxyrus americanus*), Spring Peeper, Green Frog (*Lithobates clamitans*) and Northern Leopard Frog. Some of them almost certainly reside within the adjacent PSW outside the breeding season. In addition, several Green Frog tadpoles and two Red-spotted Newts (*Notophthalmus v. viridescens*), were caught as part of the 2014 salamander trapping exercise. The local tenant on the property also indicated to Dougan & Associates staff that they have observed salamanders under debris/lawn furniture directly next to the pond. Based on their description, they were most likely referring to Spotted Salamander (*Ambystoma maculatum*). Although this species was not caught during the five nights of trapping conducted in

April 2014, it is known to occur in the Forested Hills ESPA south of Wideman Road. Although it would not be considered ideal, it is possible that this species could use the pond as breeding habitat. Midland Painted Turtle (*Chrysemys picta marginata*) and Snapping Turtle (*Chelydra serpentina*), a 'Species at Risk' designated Special Concern in Ontario and Canada, have been documented from the pond within the last two years. In addition to providing foraging habitat for turtles, it is also possible that the pond functions as overwintering habitat. If this was the case, it may qualify as Significant Wildlife Habitat under the Provincial Policy Statement (2014). In addition to supporting a few common species of birds along its margins, the pond functions as foraging habitat for the provincially and nationally Threatened Barn Swallow; one pair was documented nesting under the eaves of the nearby gazebo in 2013. The gazebo is only 5 m from the edge of the pond. Finally, one unidentified species of minnow was caught during the salamander trapping exercise in 2014.

PSW Complexing Assessment

The OWES Southern Manual (3rd edition, version 3.2, 2013) provides three rules for wetland complexing. The following table lists each of these rule and provides comments with regard to the wetlands in question.

Wetland Complexing Rules	Assessment
1. **Watersheds**: Wetlands must not be complexed across watershed except in rare circumstances. For example, it can be difficult to determine to which watershed wetlands in major headwater areas, such as the Oak Ridges Moraine among others, belong. These wetlands can be considered for complexing because of their cumulative importance in functions such as ground water recharge, water quality improvement, flood attenuation, and erosion control. The test for determining whether a complex should be defined is the comfort level of the biologist in defending the complex on grounds of wetland function.	The wetlands in question and the Sunfish Lake – Laurel Creek PSW are located within the Laurel Creek Watershed. Map 3.2-1 of the Laurel Creek Watershed Study (GRCA, 1992) indicates that the PSW crosses several subcatchments one of these being # 309, within which these wetlands are situated.
2. **Distance**: The maximum distance between units of a complex must not exceed 0.75 km straight line distance, i.e. "as the crow flies".	At the closest point, the wetland in polygons 14 & 15 is located approximately 32 m (0.03 km) straight line distance from the Sunfish Lake – Laurel Creek PSW. The wetland in polygon 18 is located less than 4 m straight line distance from the Sunfish Lake – Laurel Creek PSW.
3. **Lacustrine Wetlands**: Lacustrine wetlands often occur at the mouths of streams entering the lake. As long as these wetlands are within the 0.75 km distance criterion, they may be considered as units of a complex, i.e. they are not considered to be in different watersheds. On the other hand, shoreline wetlands connected to one another by bands of submergent vegetation will not necessarily be complexes. Again, it is up to the professional judgment of the biologist to ensure that the complex is justified on functional grounds.	The wetlands are not lacustrine.

Size may also be relevant to the decision on whether or not to complex this wetland. According to the OWES manual, wetlands less than 2 ha in size may be included as part of a PSW, but only when the wetland provides some important ecological benefit (*i.e*. fish spawning, rare species, seepage area, corridor function). As previously noted, these wetlands are less than 2 ha in size. The wetlands and PSW are both situated within the Laurel Creek Watershed.

The wetlands are also functionally related to the PSW. The wetland in polygons 14 & 15 is hydrologically connected to the PSW via surface water. The creek that passes through this wetland flows northward through a roadside ditch and into Wideman Creek. Both Wideman Creek (which originates in the PSW) and the creek that passes through the wetland in polygons 14 & 15 support fish habitat. The wetland in polygons 14 & 15 also provides breeding habitat for Spring Peepers that probably reside within the forested habitats of the PSW outside the breeding season. The wetland in polygon 18 is anthropogenic in origin and is not hydrologically connected to the PSW via surface water, however it provides habitat for frogs, toads, salamanders, turtles, breeding birds and fish, including habitat for two Species at Risk, Snapping Turtle (designated Special Concern in Ontario) and Barn Swallow (designed Threatened in Ontario and protected under the Endangered Species Act, 2007). Similar to polygons 14 & 15, the PSW almost certainly provides habitat for Spring Pepper outside of the breeding season. Red-spotted Newts are also likely reliant on these adjacent forested habitats.

Some historic information about the condition of this wetland and watercourse in relation to an upstream SWM pond has been gathered by IBI Group and City staff. This additional information is provided in Appendix A.

I trust this information will be sufficient to allow you to make a decision on whether or not to include these wetlands in the PSW complex. Please feel free to contact me if you have any additional questions or concerns on this matter.

Sincerely,

Wendy Frise, Ecologist
BES, Cert. Ecosystem Restoration, OWES, ISA Arborist
519.822.1609 x.26
wfrise@dougan.ca

cc:
Elizabeth Caston, IBI Group

Legend

- Vegetation Community
- Wetland (Confirmed by GRCA Aug. 18, 2014)
- Wetland Edge (Confirmed by GRCA Aug. 18, 2014)
- Watercourse (Surveyed August 2014)
- Watercourse (GRCA)
- Watercourse (Orthoimage Interpretation by D&A)

0 20 40 Metres

Sources:
2010 Orthoimagery First Base Solutions;
2006 Orthoimagery Grand River Conservation Authority.

Erbsville South Environmental Study Wetland Complexing Assessment

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PROJECT: DA06-038-03

CLIENT: SUNVEST DEVELOPMENT CORPORATION

N W E S
UTM Zone 17 NAD83

DATE: SEPTEMBER 2014
SCALE: 1:1,100
DRAWN BY: LC
CHECKED BY: KK

Figure: 1

Appendix A. Drainage information provided by IBI Group and City of Waterloo

From:	Elizabeth Caston
To:	Wendy Frise
Cc:	Thomas Hardacre; Betty White
Subject:	34168 - Erbsville South Environmental Study - Drainage Review
Date:	August-25-14 3:45:25 PM
Attachments:	image001.png Air Photos through Time_Assembled August 2014.pdf

---

Wendy:

City staff and ourselves have been able to find some more information on the drainage issues from the Subdivision south of Wideman Road as it affects the Michaels Property (north or Wideman Road). Robyn also provided a series of airphotos over time (see attached). Hopefully this information will assist with your submission to MNR.

The Laurel Creek Village (LCV) SWM pond was designed to control stormwater runoff from the subdivision to pre-development runoff rates. It outlets to a culvert under Wideman Road that existed prior to development. While the peak flows from the outlet of LCV did not increase, the duration and volume of flows through the culvert would have increased resulting in a longer duration of flows through the lands to the north side of Wideman Road. The owner complained a few times about his wet fields and the fact that his animals couldn't use part of the field. As a result of the complaint, the developer of LCV undertook some work in the Michael's field with the installation of a hickenbottom and drainage pipe that took low flows at a low point at the north end of the Wideman culvert and directed it westward. We found some photos taken in 2004 showing the hickenbottom and what looks like the path of the covered pipe to the west. If you enlarge the 2006 airphoto you can see a faint line to the wetland. If you do the same to the 2009 photo (three years later!) the line is no longer visible and the stream becomes more defined to what we see today. This was probably due to removal (accidental or otherwise) and/or lack of maintenance – we certainly didn't notice anything on our site walk last week. Prior to 2006 the airphotos do show a faint straight line connecting the Wideman culvert to the Erbsville Road ditch but certainly not as defined as we see today.

I will forward the 2004 photos under separate e-mail. Again note the changes in the vegetation that we see today.

Regards, Liz

Elizabeth Caston BES

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1930

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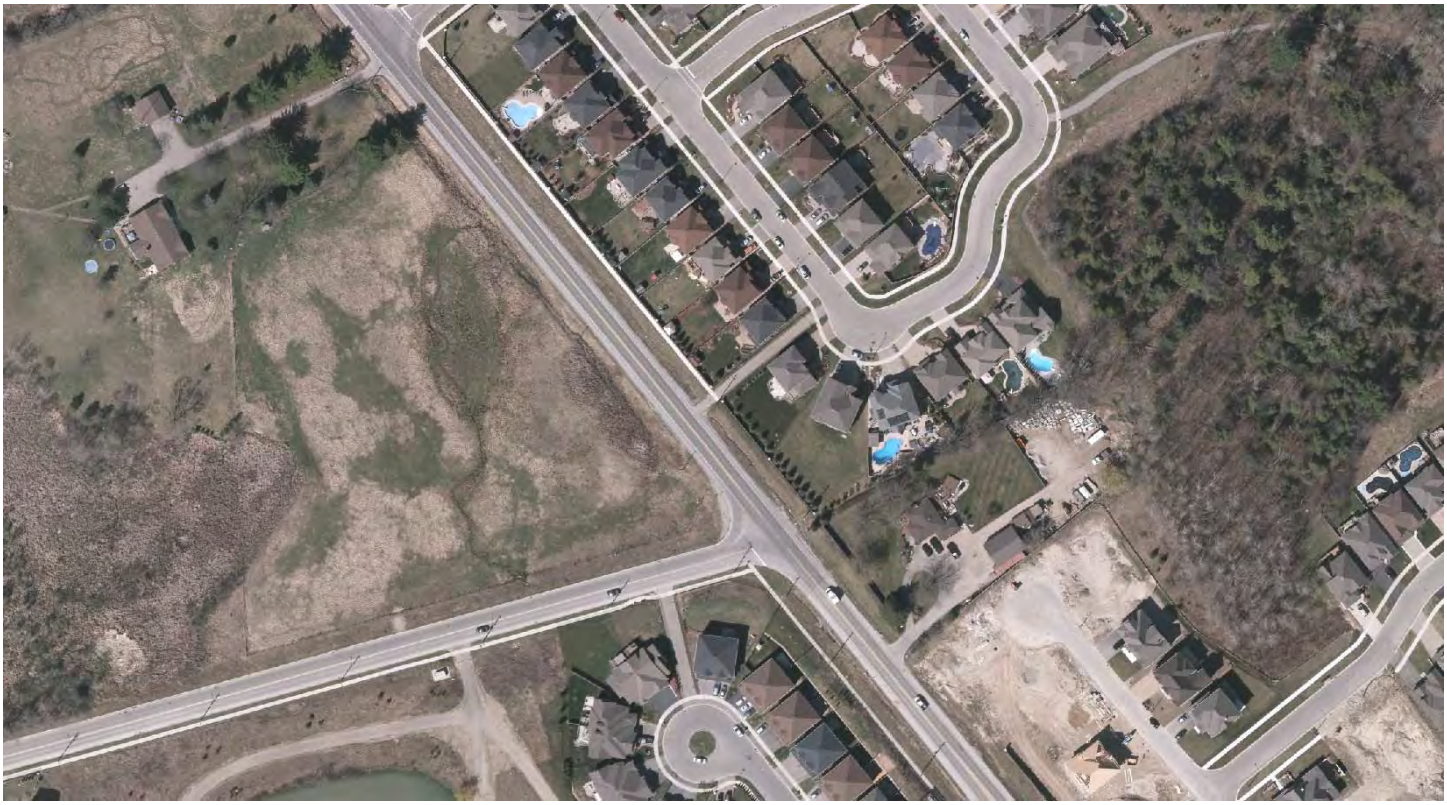


Site photos taken following installation of Hickenbottom and drainage pipe

Photo #1. May 21, 2004

Photo #2. July 19, 2004

Photo #3. July 19, 2004

Photo #4. July 19, 2004

Appendix 2.5
Attachment B

From: Timmerman, Art (MNR) [mailto:art.timmerman@ontario.ca]
Sent: October-31-14 12:11 PM
To: Karl Konze <kkonze@dougan.ca>; Wendy Frise <wfrise@dougan.ca>; Buck, Graham (MNR) <Graham.Buck@ontario.ca>
Cc: Marriott, David (MNR) <David.Marriott@ontario.ca>; Laurence, Anne Marie (MNR) <annemarie.laurence@ontario.ca>; Tony Zammit <tzammit@grandriver.ca>
Subject: FW: Erbsville Wetland
Importance: High

Karl and Wendy:

RE: Erbsville South Environmental Study, PSW Complexing Assessment, Sunfish Lake – Laurel Creek PSW

In your letter of September 24, 2014 you asked for my decision on the whether two small wetland areas near the intersection of Wideman Road and Erbsville Road should be included as part of the provincially significant Sunfish Lake - Laurel Creek Wetland Complex.

The first area consists of Dougan & Associates' polygons 14 and 15 and is 0.78 ha in size. Identified functions and values of this wetland area include fish habitat, breeding habitat for spring peepers and foraging habitat for barn swallows. The second area consists of Dougan & Associates' polygon 18 and is 0.17 ha in size. Identified functions and values of this wetland area include fish habitat, breeding habitat for four species of frogs and toads, habitat for red-spotted newts, possible breeding habitat for spotted salamanders, foraging habitat and possible overwintering habitat for two species of turtles and foraging habitat for barn swallows.

Based on the detailed information provided to me in your September 24th letter and my knowledge and understanding of the guidelines for wetland complexing found in the Ontario Wetland Evaluation System Southern Manual The OWES Southern Manual (3rd edition, version 3.2, 2013), I will be adding both wetland areas to the Sunfish Lake - Laurel Creek Wetland Complex. In the near future, our wetlands layer in GIS will be updated to reflect this change.

Sincerely,

Art Timmerman
Management Biologist
Ontario Ministry of Natural Resources and Forestry
Guelph District

Appendix 2.5
Attachment C

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN
77 Wyndham Street South • Guelph ON N1E 5R3 • T 519.822.1609 • F 519.822.5389 • www.dougan.ca

March 17, 2015

Art Timmerman, Management Biologist
Ministry of Natural Resources and Forestry – Guelph District
1 Stone Road West
Guelph, ON
N1G 4Y2

Dear Mr. Timmerman:

RE: Erbsville South Environmental Study, PSW Complexing Assessment, Sunfish Lake – Laurel Creek PSW

This letter follows up on discussions in December 2014 regarding potential complexing of wetlands within the study area of the Erbsville South Environmental Study, which is currently underway on behalf of Sunvest Development Corporation for areas located on the east and west side of Erbsville Road and north of Wideman Road, in the City of Waterloo. It has been prepared based on input and discussion between our firm and IBI Group (hydrology, stormwater management, environmental planning, land use history), C. Portt and Associates (fisheries), and JTB Environmental Systems Inc. (fluvial geomorphology). David Stephenson of NRSI provided peer review support on behalf of Sunvest Development Corp.

As discussed previously, there are several small unevaluated wetlands near the intersection of Erbsville Road and Wideman Road which may have potential to be complexed with the Sunfish Lake – Laurel Creek PSW. We assessed these wetlands in detail and a summary of our ecological characterization was submitted to you in a letter dated Sept 24, 2014. The letter also included some background and historical information that indicated that the largest unevaluated feature, located just west of Erbsville Road and north of Wideman Road (hereafter referred to as the southeast (SE) Wetland), has undergone changes from former pasture uses and is now receiving significant flows from a stormwater facility located just south of Wideman Road. Subsequently you indicated (email October 31, 2014) that the identified features and their resources warrant inclusion in the PSW.

In early December 2014, I contacted you to request a field visit to review the wetlands in question, as you were not on site during the staking of the wetland boundaries with Grand River Conservation Authority (August 18, 2014). Based on discussions with you and our environmental study team during the December 15, 2014 site walk, we understand that

MNRF could consider a scenario where the SE Wetland does not become part of the PSW if sufficient information is provided to support the case that: a) there was a previous flow diversion to the PSW to the west via a hickenbottom drain (that may now be plugged); b) protection of the SE Wetland as PSW would be impractical due to existing and future impacts of the adjacent roads; and c) an acceptable alternative exists for enhancement of the existing PSW and watercourses for overall benefits to the wetland and aquatic systems.

Our project team has now completed an intensive review of possible future scenarios for the SE Wetland and associated watercourse, supported by groundwater data from LVM, and additional observations of flow conditions under subzero winter conditions. Through this process we have identified and evaluated an alternative that we believe would provide the greatest long term benefits in regards to wetland cover and functions, optimizing aquatic habitat and groundwater discharge inputs, wildlife habitat functions, water quality (including temperature), hydrology and stream functions. We have prepared the following information for your consideration, including appendices, the contents of which are discussed below:

1. Future Development Assumptions and Background
2. Scenario Comparison (Figures 1 and 2)
3. Wetland Enhancement Alternative
4. Functional Assessment of Enhancement Alternative
5. Conclusions

Appendices

A. History of the Site, Historic Aerial Photos and Stormwater Runoff Information (IBI/City)
B. Watercourse Existing Conditions and Temperature Logger Data (including flow condition observations on January 26, 2015) (Fisheries, C. Portt and Associates)
C. Watercourse Existing Conditions (Fluvial perspective, JTB Environmental Systems Inc.)

1. Future Development Assumptions and Background

Appendix A contains background context information on historic drainage and changes associated with development to the south of Wideman Road. Importantly, the development of lands south of Wideman Road led to changes in flow into what is now the SE Wetland, and there was an initiative to divert some of these flows westward to the PSW. The archival aerial photos indicate that the associated watercourse (unnamed SWM pond tributary) became evident after the construction of the SWM facility located south of Wideman Road.

The following assumptions on future conditions are based on existing planning information and direction from existing subwatershed studies.

- Widening of Erbsville Road by the Region to a 30.5 m ROW requires additional property on west side of Erbsville Road. The road will likely be designed with an urban cross-section including storm drainage that will discharge to Wideman Creek. The future road widening

as defined by the Official Plan for the Regional Municipality of Waterloo, will be taken by the Region either as a condition of or pre-requisite to any future Planning Act application. The widening would extend along the entire frontage of Erbsville Road. Water mains and sanitary sewers have already been installed.

- There will be a new roadway entrance into property across from Forest Gate Crescent
- Wideman Creek Culvert Replacement (per SWS recommendations) is planned to convey Regional Storm. Culvert design includes an open bottom with dimensions supporting passage for small to medium-sized wildlife.

The Laurel Creek Watershed Study was completed in 1993 by the City of Waterloo in conjunction with the GRCA. One of the major recommendations from that study was that subwatershed studies be completed during the preparation of new district plans. As a consequence, several subwatershed studies have been completed throughout the Laurel Creek Watershed since 1993. In 1996, the Final Subwatershed Management Plan for Subwatersheds #313 and #309 (SWS) was completed by Planning Initiatives Ltd. and Associates. Subwatersheds #313 and #309 comprise a large portion of the west side of the City of Waterloo. More specifically, Subwatershed #313 drains to Clair Creek, a major tributary of Laurel Creek, whereas Subwatershed #309, which is immediately to the north and contains Wideman Creek, drains to Laurel Creek. .

The hamlet of Erbsville, at the corner of Conservation Drive and Erbsville Road, has been identified as a flood damage centre, because runoff will overtop this intersection during a Regional Storm. Therefore as a management target, regional storm peak flows and flood levels must be maintained or reduced wherever possible. However, the existing CSP culvert under Erbsville Road results in backing up the Regional Storm flows in the Wideman tributary. Those flows overtop at a low point at the west end of the site, and spill into the main branch of Laurel Creek upstream of the hamlet.

In order to eliminate this spill, the Subwatershed Study recommended that the culvert under Erbsville Road should be upgraded to convey the full Regional Storm flow volumes. The study also stated that "*since the Wideman Tributary flows will not be increased as a result of development, the culvert improvement is not a requirement prior to development south of Wideman Road, but rather a requirement of the Erbsville Road functional design…. Design and construction of the new culvert should also consider features which provide opportunities for wildlife movement through the culvert such as culvert dimensions, shape of opening, culvert material, colour, acoustics within the culvert and entrance vegetation/appearance.*" The current analysis includes a proposed concrete box culvert to replace the existing CSP pipe, which will eliminate the existing spill from the Wideman Tributary to the main branch of Laurel Creek.

2. Scenario Comparison (Figures 1 and 2)

Figures 1 and 2 (attached) present the "Existing Conditions" and "Alternative" scenarios; Table 1 compares the two scenarios. Figure 1 depicts the existing conditions and constraints if the

SE Wetland is protected as PSW, and the SWM pond tributary is retained in its current location.

As discussed above, future road widening is planned that will ultimately impact these features and their functions. Figure 2 presents an alternative strategy, borne out of our Team's screening of a long list of options, which we believe maximizes benefits to the local ecosystem. In the Alternative scenario the existing SWM pond tributary is removed and SWM pond flows redirected westward: regular flows would be piped underground toward the PSW and outletted into a new channel; and major flows piped underground directly to Wideman Creek. The new channel design would be completed at the detailed design stage, but we anticipate a short run where width and depth are governed by flow volumes at a designated storm discharge rate. Given the short distance, and assuming a low slope, this would be a run-dominated feature, which could include pools for habitat.

The SE Wetland is removed under the Alternative scenario, with enhancements to the PSW and Creek corridor (discussed in detail later in this letter) providing net benefits to the wetland and stream system. The existing qroundwater inputs along the roadside ditch portion of the SWM pond tributary would be collected in a perforated pipe set in a French drain (coarse gravel with filter cloth sock to maintain integrity over time) and discharged to surface within the Wideman Creek floodplain. A 'new' roadside ditch for the road runoff, would be designed to capture and retain flow for infiltration purposes (i.e. using a rock check-dam barrier to limit downgradient flow to Wideman Creek) to address potential water quality issues.

From a fluvial perspective, any works that divert surface flow from the SWM pond tributary will benefit Wideman Creek by eliminating potentially contaminated runoff from the road surface, which currently enters the SWM pond tributary and flows directly to Wideman Creek. If the flow from the SWM outlet is diverted to the PSW, and/or piped from the outlet to a point lower in the system (i.e. outletting to surface within the floodplain/floodlimit of Wideman Creek), the overall water quality will be improved. Road runoff will still be an issue, but the transport of that runoff and the interaction of sediments and water can be dealt with more effectively from a water quality perspective through ditch design.

Table 1. Comparison of Existing Conditions to Alternative Scenario

Scenario 1. Maintain Existing Conditions	Scenario 2. Wetland Enhancement Alternative
• SWM pond flows continue to dominate SE Wetland and watercourse feature, affecting wetland hydrology and habitat functions; benefits of groundwater discharge to Creek not optimized.	• Regular flows from SWM pond redirected in a new channel to PSW; major events piped directly to Creek floodplain.; groundwater discharge collected and isolated along Erbsville Rd. to optimize benefits to Creek.
• Maintains status quo with respect to existing warmwater bait fishery.	• Existing SWM pond tributary replaced by two channels flowing into Wideman Creek via the PSW and a new groundwater-fed channel; expanded fish community opportunities
• Nominal opportunity for improvement of discharge into Wideman Creek; SWM pond flows have higher temperature on average that neutralize groundwater discharge benefits; difficult to achieve effective cooling due to proximity to road and related development.	• SWM flows entering PSW could raise temperatures in a short section of Wideman Creek, but increases likely mitigated as water conveyed via PSW will be well-shaded and also tend to cool off overnight; French drain capture of groundwater discharge in existing ditch will maximize it benefits; overall cooler water entering Wideman Creek at two locations with overall thermal benefit.
• From a fluvial perspective the ditch portion of the SWM pond tributary channel along Erbsville Road is currently entrenched, disconnected on the roadside and becoming more entrenched over time through downcutting by storm events; lateral migration is inhibited by the roadway toe of slope with no opportunity to migrate; this creates a long-term potential problem for the stability of the road slope. Reconstruction in place would perpetuate road proximity and flow impacts.	• Natural channel design can address all flow conditions in both new channels, eliminating down-cutting and water quality issues.
• Planned Erbsville Rd. widening will result in net loss of wetland area and functions; persistent road-kill, noise and water quality impacts.	• Planned Erbsville Rd. widening will not significantly impact scenario; net benefits to Creek corridor, water quality, and wildlife protection; consolidation of habitats away from Erbsville Rd.
• A 30-metre buffer along the roadside ditch would have negligible terrestrial benefits due to habitat fragmentation and road proximity.	• Buffers will serve to reinforce existing and enhanced habitats, providing well-integrated habitat cover.
• SE Wetland lacks resilience due to size and location; invasive Common Reed threatens native habitats and nearby PSW; limited opportunity for enhancement.	• Large cattail marsh in the PSW is generally more resilient to regular SWM flows; major event flow diversion avoids scouring; stilling and polishing of flows before entering Creek; extensive opportunities for enhancement of wetland and habitat functions (including Barn Swallow foraging)
Conclusion: The Existing Conditions scenario will see ecosystem area, quality and functions become more impaired over time; it cannot contribute net benefits to local ecosystems in the long term.	**Conclusion: The Alternative scenario consolidates and better protects wetland, aquatic and groundwater features and functions, for net benefits to local ecosystem area, quality and functions in the long term.**

3. Wetland Enhancement Alternative

The alternative strategy includes new watercourses, enlargement and enhancement of the existing PSW, and creation of new floodplain wetlands along the Wideman Creek corridor. Figure 2 also indicates the substantial network of buffers which will contribute more robust, connected natural cover. Several areas of potential wetland expansion and enhancement are identified (A, B, C, D). Table 2 summarizes the approximate areas created or enhanced (based on preliminary grading and groundwater review), their potential habitat characteristics, and technical requirements to achieve their construction and implementation.

Table 2. Summary of Potential Wetland Enhancement Areas

Potential Areas	Rationale and Approach
A (+/- 0.09 ha)	• Groundwater not close to the surface in this area, excavations to achieve wetland expansion would be set back from Wideman Road • Grading for wetland creation in this area would increase regional flood storage • Grading in this area could add potential turtle nesting habitat
B (+/- 0.16 ha)	• Groundwater is close to the surface (0.3 to 0.5 m depth), some grading would be necessary to create wetland conditions • Expand wetland by cutting down the banks of the pond (currently manicured turf) • Grading in this area would provide more suitable turtle nesting habitat • Foraging habitat for Barn Swallow likely increased
C (+/- 0.17 ha) (Existing dug pond)	• Current pond surface at 348.53 masl and overflow is piped to the Creek • Enhance open water and add more diverse microhabitats than are currently present • Add basking logs, nest boxes and other elements to increase value to diverse wildlife • Refine pond outlet to ensure maximum benefits to biota
D (+/- 0.53 ha)	• Groundwater is close to the surface and areas of discharge are present. • Wetland conditions would be created in this area with only minor grading. • Groundwater inputs can be augmented with surface water (re-direction of surface flows from rooftops etc.) • Reinforcement/ enhancement of the corridor with natural cover along Wideman Creek, (previously discussed with agencies as a landscape scale east-west linkage).

4. Functional Assessment of Enhancement Alternative

For comparative purposes it is important to understand how functions of the existing SE Wetland would be maintained or otherwise affected under the 'Alternative' scenario shown in Figure 2. The contributing attributes and functions (including habitat area and diversity) are considered in Table 3.

Table 3. Functional Assessment of Enhancement Alternative

Existing Functions / Values	Enhancement Action	Outcomes
Wetland Area		
Existing SE wetland is 0.78 ha total, including 0.57 ha of mineral meadow marsh and 0.2 ha of cattail mineral shallow marsh.	Creation of new wetland areas along edges of existing PSW and in PSW; potential for more than 1 ha of more diverse wetland and associated habitats.	There will be an increase in total wetland area.
Flora & Fauna		
SE Wetland supports a native plant community (meadow marsh and shallow marsh) but also contains a colony of invasive Common Reed (*Phragmites australis*)	Potential for plant and/or seedbank salvage; eradication of Common Reed; creation of more diverse wetlands ranging from open water to thicket swamp.	The new wetlands would support more diverse native plant communities and would be less likely to degrade over time than the SE Wetland.
Breeding and foraging habitat for amphibians (Spring Peepers and Northern Leopard Frogs); these are reliant on the PSW for completion of their yearly life cycles.	Wetland creation would take amphibian breeding habitat into consideration; an improved riparian corridor and open culvert created connecting to downstream habitats along Wideman Creek. Construction to avoid key breeding periods (birds, amphibians); wildlife rescue from SE wetland.	PSW populations will be sustained and potentially enhanced. Concentrates habitats away from the roads for a net benefit. Noise, road kills and future road works will have lower impacts on the new wetlands.
Foraging habitat for provincially threatened Barn Swallow	Functions will be replicated in new wetland habitats.	Relocating Barn Swallow foraging habitat away from roads will benefit the species in long term.
Aquatic Resources		
Existing SWM pond tributary supports warmwater baitfish.	Existing SWM pond tributary replaced with two new channels, one connecting SWM pond culvert outlet to PSW (eventually flowing into Wideman Creek); the new second channel fed with groundwater via French drain, outletting to Wideman Creek; enhancement of dug pond and its overflow outlet system.	Existing SWM pond bottom draw reduces temperature of outflows. Shading and nighttime cooling of flows through PSW; enhancement of existing dug pond can also reduce outflow temperature to Creek; groundwater release to Creek just upstream of Erbsville Rd. culvert. Likely overall benefits to Wideman Creek thermal regime and fishery.
Hydrology / Fluvial Geomorphology		
SWM pond tributary conveys flows to Wideman Creek (a cold water system); includes a section of roadside ditch before entering Creek.	Stream will be diverted a short distance to the west, within the buffer of the PSW. Flows will still outlet to Wideman Creek.	From a fluvial perspective, there are no issues within the PSW; potential impacts of the additional flow on Wideman Creek between the PSW and Erbsville Road (which currently does not receive SWM flow inputs) need to be considered. There is potential for adjustment in the channel, but considered low risk based on the flow rates; easily tracked with a monitoring program.

Existing Functions / Values	Enhancement Action	Outcomes
		Improved future condition of watercourse.
Flood mitigation by intercepting storm runoff from surrounding lands including roads. This acts to smooth out sharp runoff peaks during storm events.	Flood functions will be replicated in created wetlands. Local surface flows of backyards/roof runoff may reinforce water balance of new wetlands.	No net impacts; lower sediment impacts and potential enhancements to baseflow and quality. Potential enhancement of flood storage.
Groundwater discharge in a section of the roadside ditch in vicinity of the driveway at 665 Erbsville Road.	Groundwater discharge area protected with flows collected and conveyed through a French drain, with outflow into a short section of new channel outletting to Wideman Creek upstream of road crossing culvert.	Improvement to condition of groundwater discharge and improved riparian/fish habitat. The roadside slope is currently eroding into the ditch; French drain will remove this source of degraded water quality.
Fine sediment trapped in SE Wetland but road runoff and downstream sediment loading are prevalent.	Water quality improvements through opportunity for stormwater to drop excess sediments, potential removal of excess nutrients or contaminants via uptake by wetland vegetation. Road runoff treated separately.	Re-routing the watercourse closer to the PSW and away from roads will reduce negative impacts from existing road runoff and future increased impacts of widened road.

5. Conclusions

Based on consideration of several possible future scenarios for the Erbsville South SE Wetland and the associated SWM pond tributary, our Study Team believes that the assignment of PSW status would likely be inappropriate and not assure its future integrity, given the origin of this feature, its ongoing reliance on urban stormwater, and the likely impacts of future road works. If designated as PSW and protected in its current state as per Figure 1, the ecosystem quality and functions will become more impaired over time, with minimal opportunity for net improvements to the local ecosystem in the long term.

The 'Alternative' scenario presented in Figure 2, wherein the SWM pond tributary is re-routed to the PSW and the SE Wetland removed, the localized groundwater discharge collected in a French drain for discharge to the Creek via a short new channel, and extensive wetland expansion and enhancement beside the PSW and along the Creek corridor, would result in net benefits to local ecosystem area, quality and functions for the long term. Existing groundwater data and a preliminary grading assessment support the viability of these initiatives. From a fluvial perspective, diversion of surface flow away from the SWM pond tributary will benefit Wideman Creek as the overall water quality and thermal regime will be improved. Road runoff and sediment can be addressed separately from a water quality perspective through appropriate ditch design.

Therefore we believe that the 'Alternative' scenario provides a better solution, not only due to benefits to the local natural systems, but by facilitating planned roadway upgrades and ensuring efficient future development of the adjoining lands.

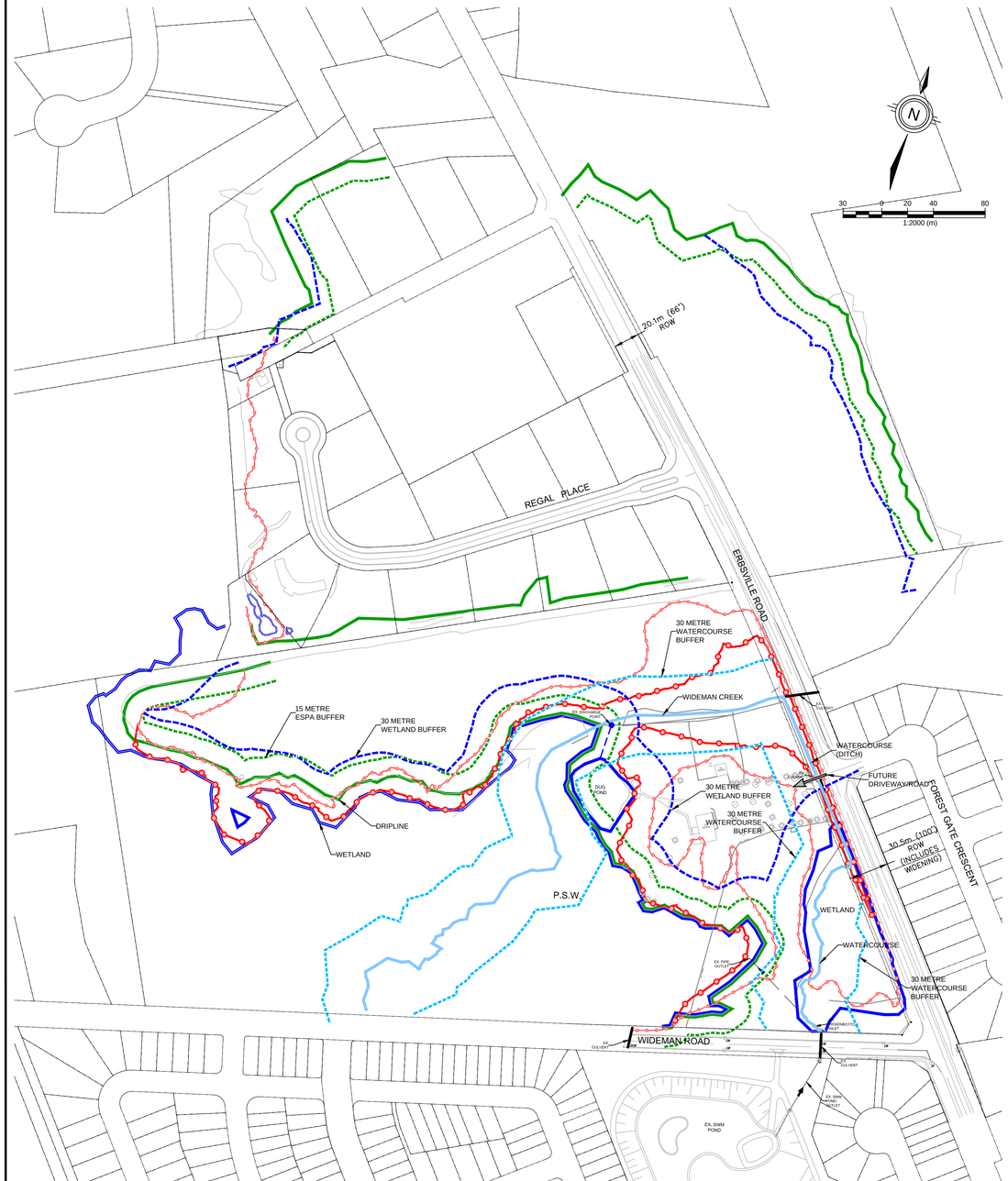
We trust that this information will assist in your review of the wetland status. Our Team would appreciate a meeting with you prior to your final decision on the PSW status and will get in touch with you in the next few days in this regard.

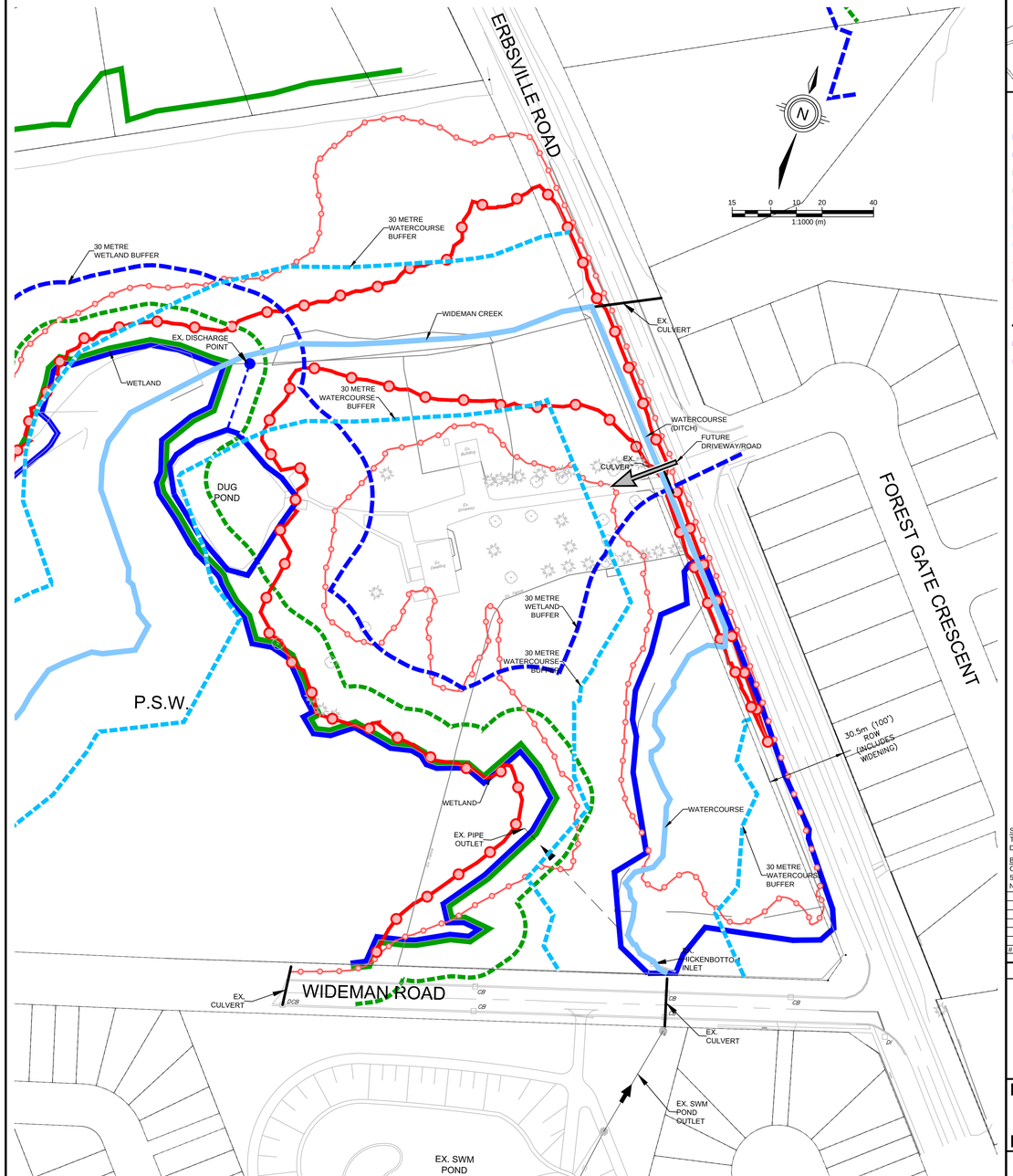
Sincerely,

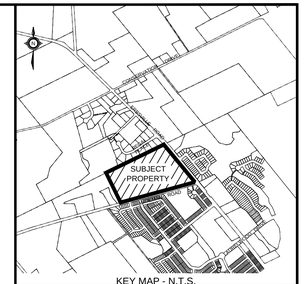
Jim Dougan, MSc, OALA (Hon)
Director & Senior Ecologist
519.822.1609 x.24
jdougan@dougan.ca

cc: Peter DeGroot (Sunvest Development Corp.)
Elizabeth Caston / Thomas Hardacre / John Perks (IBI Group)
Cam Portt (C. Portt & Associates)
John Bebee (JTB Environmental Systems Inc.)
Chris Helmer (LVM Inc.)
David Stephenson (NRSI)

Figures







LEGEND

- WETLAND BOUNDARY
- 30 METRE WETLAND BUFFER
- ESPA BOUNDARY
- 15 METRE ESPA BUFFER
- CENTRELINE EX. WATERCOURSE
- CENTRELINE PROP. WATERCOURSE
- 30 METRE WATERCOURSE BUFFER
- EXISTING FLOODLINE
- FLOODLINE BASED ON CULVERT REPLACEMENT
- EX. PIPE
- EX. CULVERT
- PROP. FRENCH DRAIN
- PROP. PIPE
- FUTURE DRIVEWAY / ROAD

SURVEY INFO:
TOPOGRAPHIC SURVEY COMPLETED BY IBI GROUP INC.
DATED SEPT. 2009.

BENCHMARK - ELEVATION: 351.844m
CONCRETE MONUMENT No. 030-03-006, REGISTERED PLAN 58M-376. SOUTH SIDE OF WIDEMAN ROAD AT THE NORTHEAST CORNER OF LOT 22, REGISTERED PLAN 58M-376.

#	DATE	BY	DESCRIPTION

REVISIONS

APPROVALS

IBI GROUP
101 - 410 Albert Street
Waterloo ON N2L 3V3 Canada
tel 519 585 2255 fax 519 585 2269
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CITY OF WATERLOO
REGIONAL MUNICIPALITY OF WATERLOO

ERBSVILLE SOUTH ENVIRONMENTAL STUDY

WATERLOO, ON

ENVIRONMENTAL CONSTRAINTS FIGURE 1- EXISTING CONDITIONS

DESIGNED BY:	-	SCALE HORIZ:	AS NOTED
DRAWN BY:	P.KIGGINS	SCALE VERT:	N/A
CHECKED BY:	A.KROESS	FILE NUMBER:	34168
DATE:	MARCH 17, 2015	SHEET NUMBER:	1

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KEY MAP - N.T.S.

LEGEND

- WETLAND BOUNDARY
- 30 METRE WETLAND BUFFER
- ESPA BOUNDARY
- 15 METRE ESPA BUFFER
- CENTRELINE EX. WATERCOURSE
- CENTRELINE PROP. WATERCOURSE
- 30 METRE WATERCOURSE BUFFER
- EXISTING FLOODLINE
- FLOODLINE BASED ON CULVERT REPLACEMENT
- EX. PIPE
- EX. CULVERT
- PROP. FRENCH DRAIN
- PROP. PIPE
- WETLAND ENHANCEMENT AREA
- WETLAND BUFFER SMOOTHING
- 30 METRE WETLAND BUFFER SMOOTHING AREAS
- FUTURE DRIVEWAY/ROAD

SURVEY INFO:
TOPOGRAPHIC SURVEY COMPLETED BY IBI GROUP INC.
DATED SEPT. 2009.

BENCHMARK - ELEVATION: 351.844m
CONCRETE MONUMENT No. 030-03-006, REGISTERED PLAN 58M-376. SOUTH SIDE OF WIDEMAN ROAD AT THE NORTHEAST CORNER OF LOT 22, REGISTERED PLAN 58M-376.

#	DATE	BY	DESCRIPTION

REVISIONS

APPROVALS

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CITY OF WATERLOO
REGIONAL MUNICIPALITY OF WATERLOO

ERBSVILLE SOUTH ENVIRONMENTAL STUDY

WATERLOO, ON

ENVIRONMENTAL CONSTRAINTS FIGURE 2 - ALTERNATIVE

DESIGNED BY:	-	SCALE HORIZ:	AS NOTED
DRAWN BY:	P.KIGGINS	SCALE VERT:	N/A
CHECKED BY:	A.KROESS	FILE NUMBER:	34168
DATE:	MARCH 17, 2015	SHEET NUMBER:	2

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Appendix A: Background Information on Changes to Historic Drainage Conditions Affecting SE Wetland and Tributary Watercourse

- *Prepared from Information Provided by IBI Group and City of Waterloo*

Appendix A

Background Information on Changes to Historic Drainage Conditions Affecting SE Wetland and Tributary Watercourse

Prepared from Information Provided by IBI Group and City of Waterloo

Changes to Historic Drainage Conditions

City staff and IBI have assembled information on past drainage issues originating from the development of a subdivision south of Wideman Road as it affects the Michaels Property (north or Wideman Road). Robyn McMullen, City Planner, provided a series of airphotos from 1930 to 2009 (attached) which show previous land uses and conditions. The Laurel Creek Village (LCV) SWM pond was designed to control stormwater runoff from the subdivision to pre-development runoff rates. It outlets to a culvert under Wideman Road that existed prior to development. While the peak flows from the outlet of LCV did not increase, the duration and volume of flows through the culvert have increased resulting in a longer duration of flows through the lands to the north side of Wideman Road. The previous owner (Michaels) complained a few times about his increasingly wet fields and the fact that his livestock could no longer use this part of the field. The developer of LCV undertook some work in the Michael's field with the installation of a hickenbottom inlet and drainage pipe that diverted low flows at a low point at the north end of the Wideman culvert and directed it westward to the PSW. Photos taken in 2004 showing the hickenbottom and what looks like the path of the covered pipe to the west. If enlarged, the 2006 airphoto reveals a faint line to the wetland. If you do the same to the 2009 photo (three years later) the line is no longer visible and the stream becomes more defined, comparable to today. This was probably due to removal (accidental or otherwise) and/or lack of maintenance of the diversion. Prior to 2006 the airphotos do show a faint straight line connecting the Wideman culvert to the Erbsville Road ditch but certainly not as defined as today. The 2004 site photos are also informative as to the previous pasture cover compared to the SW Wetland that exists today.

Stormwater Contributions from Wideman and Erbsville Roads

Runoff generated from from Erbsville Road and Wideman Road currently drains toward the SE wetland and Wideman Creek via a small tributary and open roadside ditch.

Runoff from the west side of Erbsville Road (rural cross-section) sheet flows into a road-side ditch, which discharges to a portion of the SE wetland area and tributary along its length, and ultimately outlets to the Wideman Creek. The total drainage area from the west side of Erbville Road toward the SE wetland feature is approximately 0.150ha. Drainage from the east side of Erbsville Road drains east directly to the Wideman Tributary downstream of Erbsville Road.

Wideman Road had been a rural cross-section, with runoff discharging as sheet flow onto the adjacent lands via road-side ditches to the north and south of the roadway. Wideman Road was urbanized in 2006, whereby runoff was collected in a new storm sewer, and routed to the SWM outlet culvert draining under Wideman Road to the creek feature. The total drainage area from Wideman Road to the outlet culvert is approximately 0.593ha. Note that the Stormwater Management Pond from the adjacent Laurel Creek Village subdivision to the south also drains to this same culvert outlet location.

1930

1946

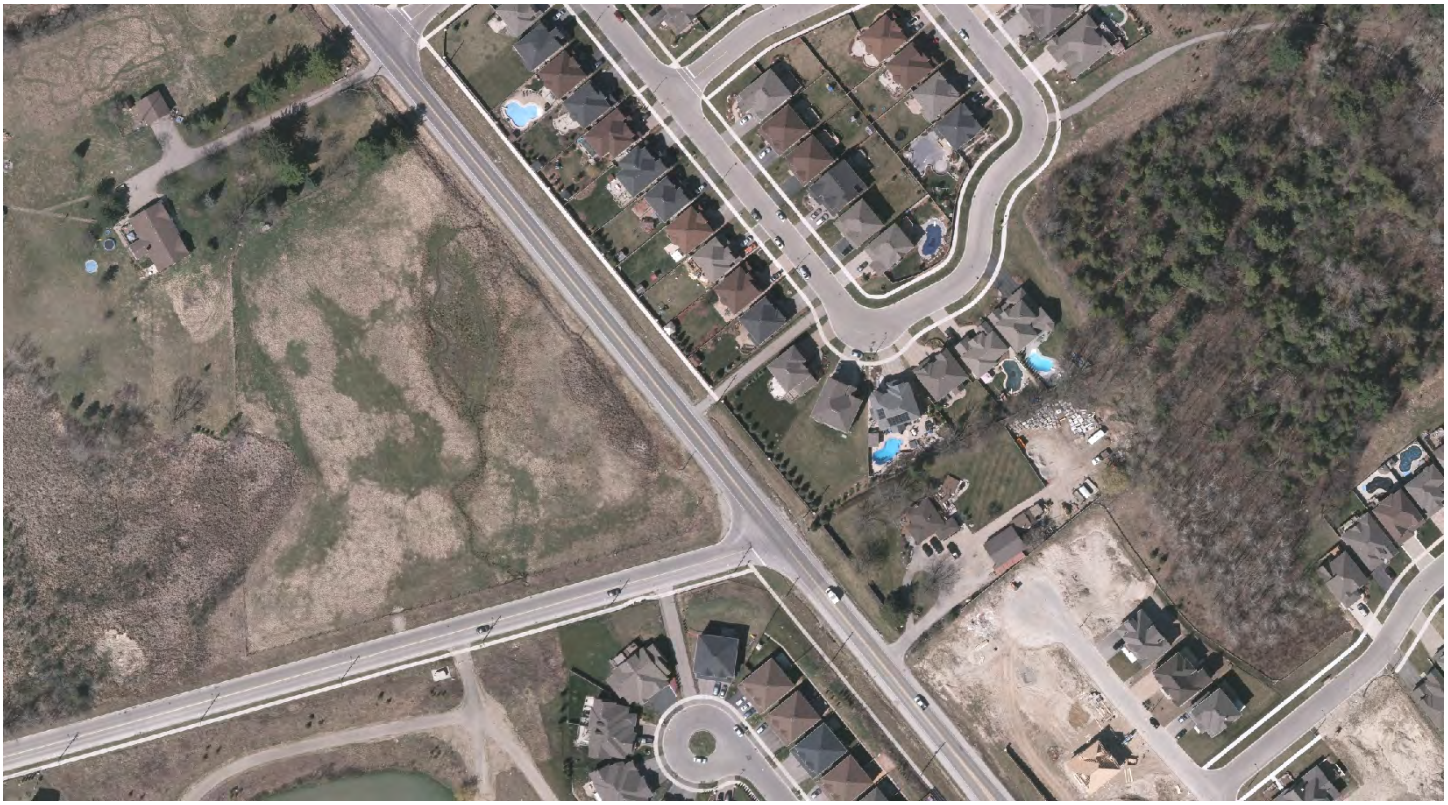
1993

2003

2006

2009

2012



Site photos taken following installation of Hickenbottom and drainage pipe

Photo #1. May 21, 2004

Photo #2. July 19, 2004

Photo #3. July 19, 2004

Photo #4. July 19, 2004

Appendix B: Watercourse Existing Conditions (including January 2015) and Temperature Monitoring

- *C. Portt, February 23 2015*

Appendix B. Watercourse Existing Conditions (including January 2015) and Temperature Monitoring

C. Portt, February 23 2015

Part 1: Existing Conditions

Methods

The watercourse was examined and approximately 60 m of the watercourse was electrofished by C. Portt and Associates staff (C. Portt, J. Reid) using a Halltech backpack electrofisher (150 v, 60 hertz, 511 electroseconds) on May 30, 2014. All fish captured were identified to species and released. The channel width was measured at ten approximately equidistant locations through the electrofished reach and the depth was measured to the nearest centimetre at 6 approximately equidistant points across the channel at each of these locations. The substrate at each transect was also noted.

Wideman Creek was walked from Erbsville Road to its source on January 20, 2015, noting ice cover and locations where groundwater discharge was evident and the SWM pond tributary was also examined on that date.

Results

Five species and a total of 62 fish were captured by electrofishing the SWM pond tributary (Table 1). The mean width of the watercourse through the electrofished reach was 0.56 metres and the mean depth was 5 cm. The dominant substrate was silt, with some gravel present at three of the ten transects.

Table 1. Fish captured by electrofishing a reach of the SWM pond tributary on May 30, 2014.

Common name	Scientific Name	Catch
fathead minnow	*Pimephales promelas*	40
brook stickleback	*Culaea inconstans*	8
Iowa darter	*Etheostoma exile*	12
white sucker	*Catostomus commersonii*	1
northern redbelly dace	*Chrosomus eos*	1

The source of the watercourse that is referred to as the SWM pond tributary is water exiting the SWM pond on the south-east of Wideman Road. This water emerges from a culvert on the north-west side of Wideman Road and flows diagonally across a field to the Erbsville Road ditch. It then flows along the Erbsville Road ditch to Wideman Creek. The section across the field has apparently developed primarily as a consequence of flow from the SWM pond. The Erbsville Road ditch has been excavated. There is watercress along the Erbsville Road ditch in places indicating that groundwater discharge occurs. The volume of this discharge is thought to be quite small because most of the ditch was frozen when examined on January 20, 2015, in contrast to Wideman Creek proper which was completely open upstream from Erbsville Road (Photo 3).

Appendix B. Watercourse Existing Conditions (including January 2015) and Temperature Monitoring

C. Portt, February 23 2015

Watercress has been observed along the Erbsville Road ditch in places, indicating that groundwater discharge occurs. The volume of this discharge is thought to be quite small because most of the ditch was frozen when examined on January 20, 2015 (Photograph 1 and Photograph 2), in contrast to Wideman Creek proper which was completely open from Erbsville Road (Photograph 3) upstream to its source. There was no unfrozen connection between the portion of the wetland to which it is proposed to discharge the SWM pond in the future and Wideman Creek on that date.

Photograph 1. The Erbsville Road ditch upstream from the driveway culvert south-east of Wideman Creek. January 20, 2015.

Appendix B. Watercourse Existing Conditions (including January 2015) and Temperature Monitoring

C. Portt, February 23 2015

Photograph 2. The Erbsville Road ditch downstream from the driveway culvert south-east of Wideman Creek. January 20, 2015.

Photograph 3. Wideman Creek upstream from Erbsville Road. January 20, 2015.

Part 2: Water Temperature Monitoring

Methods

Temperature loggers (WaterTemp Pro V2, Onset Corporation) were deployed at a number of locations in Laurel Creek and in Wideman Creek near its confluence with Laurel Creek in late May of 2015 (see map following text). Loggers were installed in the SWM pond tributary and in Wideman Creek upstream from the confluence with this tributary in late June of 2015, however the logger in the SWM pond tributary did not log temperatures correctly until it was re-initialized on July 2. Synchronized temperature readings at 15 minute intervals are available from July 2 to the last data retrieval in late October of 2015. The loggers are still in place.

Appendix B. Watercourse Existing Conditions (including January 2015) and Temperature Monitoring

C. Portt, February 23 2015

Results

The maximum daily water temperatures from July 3 to August 31 in the SWM pond tributary, Wideman Creek, and Laurel Creek just downstream from the confluence with Wideman Creek are presented in Figure 1. The maximum daily temperature of the SWM pond tributary was consistently higher than at the other three locations and exceeded 25°C on occasion. The maximum temperature of Wideman Creek upstream from the SWM pond tributary was 18.8°C. Wideman Creek near Laurel Creek and Laurel Creek downstream from Wideman Creek had similar maximum temperatures which were intermediate to the other two locations. The daily minimum temperatures show a similar pattern (Figure 2).

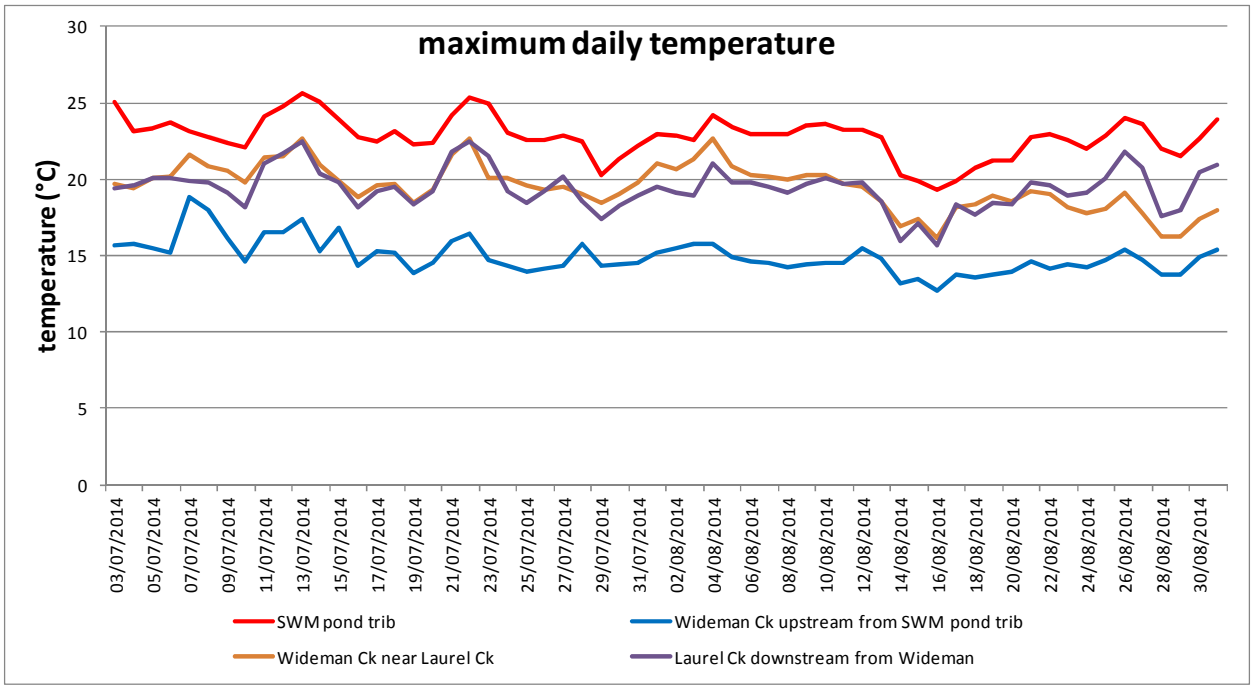


Figure 1. Maximum daily water temperature in the SWM pond tributary, Wideman Creek upstream from the confluence with the SWM pond tributary, Wideman Creek near Laurel Creek and Laurel Creek downstream from Wideman Creek.

C. Portt, February 23 2015

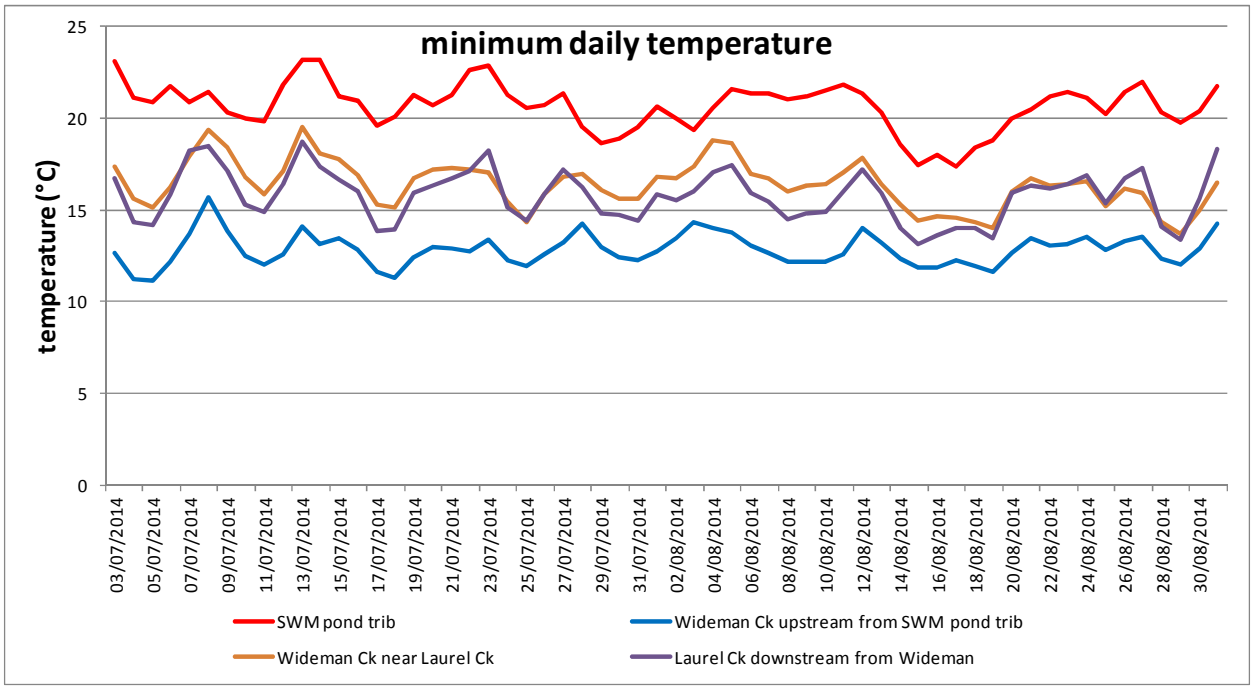


Figure 2. Minimum daily water temperature in the SWM pond tributary, Wideman Creek upstream from the confluence with the SWM pond tributary, Wideman Creek near Laurel Creek and Laurel Creek downstream from Wideman Creek.

The water temperatures at 15 minute intervals from 10:45 on July 2 to 23:45 on July 7 are presented in Figure 3. The SWM pond tributary was, on average, 9.4 C° warmer than Wideman Creek upstream from their confluence and, on average, 5.0 C° warmer than Wideman Creek near Laurel Creek. The temperature difference between the SWM pond tributary and Wideman Creek is largest at night because the creek cools off more than the water in the SWM pond.

Discussion

The water leaving the SWM pond was consistently and substantially warmer than Wideman Creek during July and August. Redirecting the flow from the SWM pond to the wetland may shift the influence of this warmer water further upstream. On the other hand, the night-time cooling effect is likely to be higher in the wetland than it is in the pond, and the water surface will be more shaded in the wetland than in the pond, which could moderate the temperature of the water leaving the pond before it reaches Wideman Creek.

C. Portt, February 23 2015

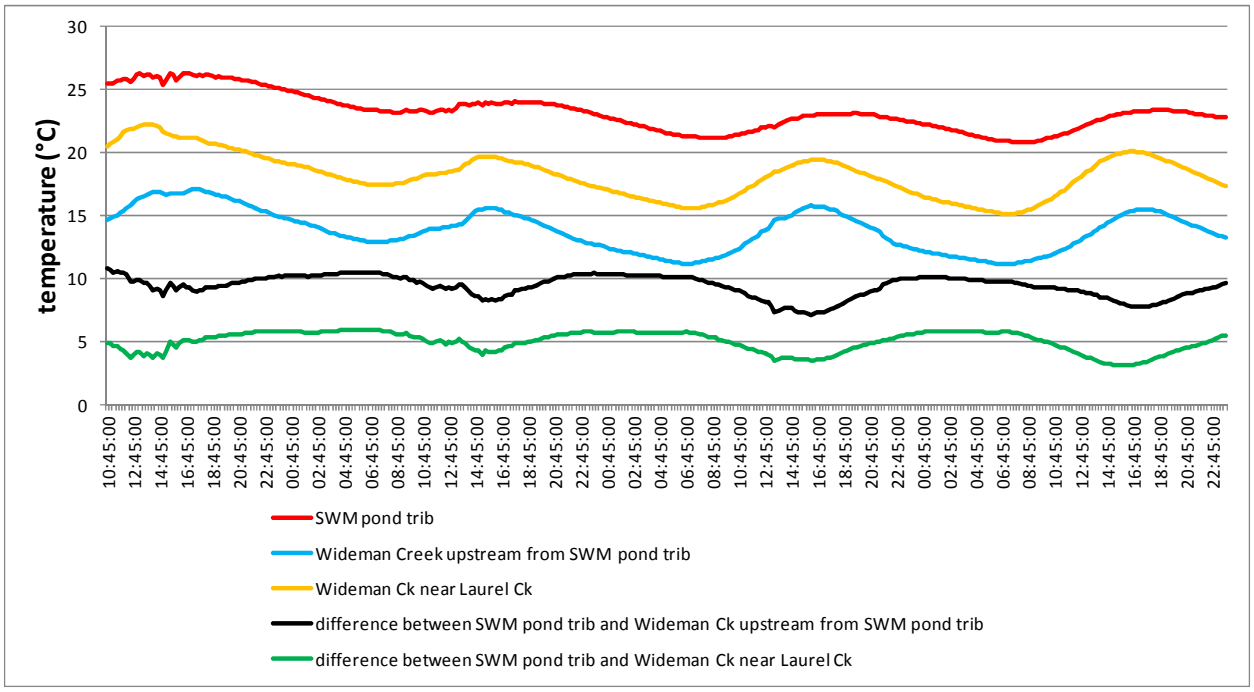


Figure 3. Water temperature in the SWM pond tributary, Wideman Creek upstream from the SMW pond tributary and Wideman Creek near Laurel Creek, and the difference in temperature between the SWM pond tributary and the two Wideman Creek locations, from July 2 – 7, 2015.

LEGEND

- STUDY AREA BOUNDARY
- EXTENDED STUDY AREA BOUNDARY FOR HABITAT ASSESSMENTS AND SPECIES INVENTORIES
- AREA NOT INCLUDED IN STUDY AREA
- 828 LOCATION OF TEMPERATURE LOGGERS

IBI GROUP
101 - 410 Albert Street
Waterloo ON N2L 3V3 Canada
tel 519 585 2255 fax 519 585 2269
ibigroup.com

SCALE	1:4000
DATE	FEBRUARY 2015
PROJECT No.	34168

CITY OF WATERLOO
REGIONAL MUNICIPALITY OF WATERLOO

ERBSVILLE SOUTH ENVIRONMENTAL STUDY

TEMPERATURE LOGGER LOCATIONS

FIGURE 1

FILE:J:\34168_TechnclStudy\5.9 Drawings\59pln\layouts\Figures\34168F-Temperature Loggers.dwg LAYOUT:11 x 17 L
LAST SAVED BY:Paul.kiggins, Tuesday, February 24, 2015 3:04:59 PM PLOTTED BY:Paul Kiggins Tuesday, February 24, 2015 3:05:07 PM

Appendix C: Watercourse Existing Conditions

- *JTB Environmental Systems Inc., March 2014*

The following is an excerpt from JTB Environmental Systems Inc. which describes the outlet tributary that flows through the SE wetland.

General Morphology

This watercourse is dominated by an actively incising bed, indicated by a number of knickpoints (localized abrupt changes in slope), which has eroded down to the native till. The banks of the reach appear stable due to the dense vegetation along the channel banks. There are many patches of in-channel vegetation, which effectively acts as a sediment trap for fine sediment passing through the reach. The downstream limit is dominated by a wetland where the channel loses its definition and the substrate is dominated by fine silt and organic deposits.

Adjacent to the channel is predominantly grassland, with a wetland (headwaters of Wideman Creek) immediately to the west. As previously mentioned, this channel discharges a SWM pond for a residential development on the south side of Wideman Road.

Figure 1 Typical channel with in-stream vegetation (left) and downstream limit at wetland (right)

Geomorphic Assessments

The reach scored on the low range of the multiple assessments, mainly due to the amount of incision that is occurring in the reach (Table 10).

Table Tributary geomorphic assessment summary

Assessment	Score	Classification
RGA	0.81	In Adjustment
RSAT	25	Fair
RRAF	39	Marginal

In general, the banks appeared stable due to the dense riparian vegetation stabilizing them. The poor scores arose from the lack of morphological features on the bed, as well as the indicators of channel incision prevalent along the

upper portion of the reach. Moving downstream, the eroded material is deposited near the wetland, and the layer of fine material is about 0.3m over the native till. There is evidence of island formation, indicating that although the banks appear stable, there may be some planometric adjustment occurring. This could also be due to localized zones of more readily erodible till, which would preferentially erode to that alignment.

Table RGA results for Tributary

Form/Process	Factor Value	Classification
Evidence of Aggradation	0.75	In Adjustment
Evidence of Degradation	1.00	In Adjustment
Evidence of Widening	0.50	In Adjustment
Evidence of Planometric Adj.	1.00	In Adjustment

Table RSAT results for Tributary

Category	Score	Classification
Channel Stability	6	Good
Channel Scouring/Deposition	3	Fair
Physical Instream Habitat	4	Fair
Water Quality	3	Fair
Riparian Habitat Conditions	5	Good
Biological Indicators	4	Fair

Table RRAF results for Tributary

Parameter	Score	Classification
Instream Substrate Characterization	5	Poor
Morphological Diversity and Flow Conditions	8	Marginal
Channel Stability (Base Level)	6	Marginal
Bank Stability	8	Marginal
Riparian Vegetative Zone Width	12	Suboptimal

Erosion Thresholds

The longitudinal profile revealed that a reach break was necessary at approximately 70 m, with the upstream reach possessing a slope of 1.9 % and the downstream reach possessing a slope of 0.5 %. The upper reach was observed to be the most active in terms of observed incision, which can be seen in Figure 6 in the form of localized changes in slope (knickpoints), notably at approximately 25 m.

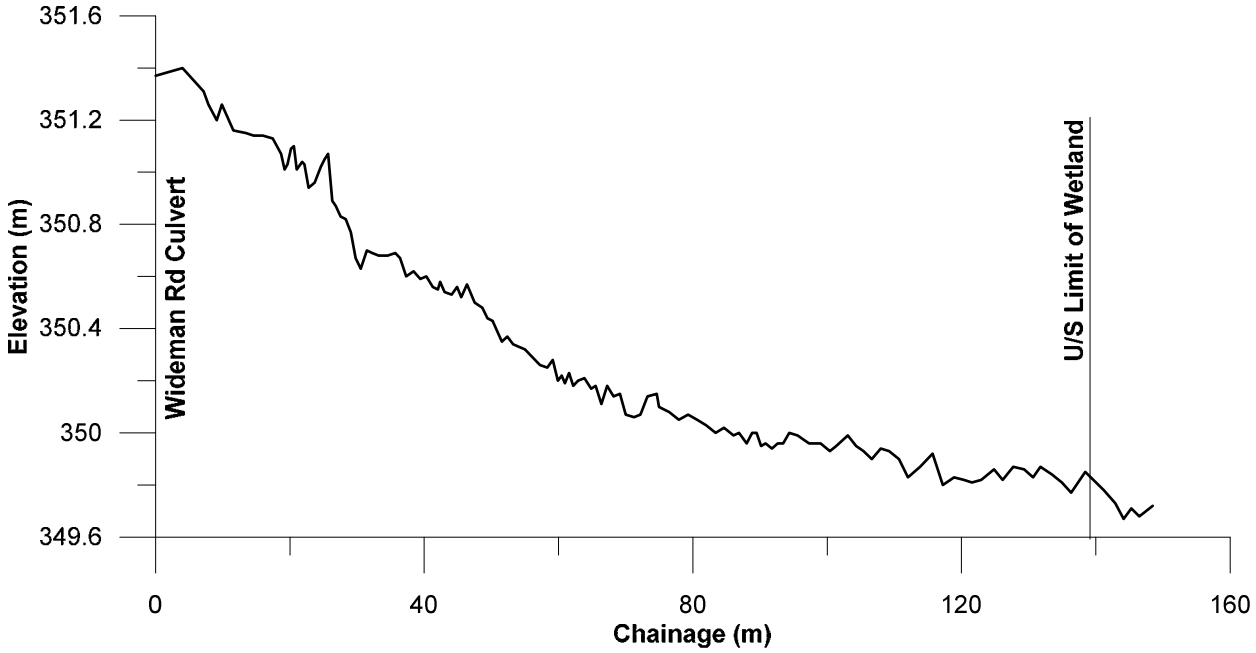


Figure 2 Tributary longitudinal profile

Four cross sections in the upper reach were selected as representative sections for the erosion threshold analysis. The remainder of the sections surveyed were in the lower reach which possessed the lower slope. As such, these lower reach sections would have a lower shear stress for a given discharge, and thus would not be the controlling sections.

Table Tributary cross section summary

	# XS	Median	St.Dev.	Max	Min	W/h
Bankfull Width W_{bf} (m)	4	1.93	0.74	2.68	0.91	24.38
Mean Bankfull Depth h_{bf} (m)		0.08	0.04	0.16	0.07	
Wetted Width (m)		1.42	0.54	2.00	0.86	17.60
Mean Wetted Depth (m)		0.09	0.03	0.13	0.07	

The same boundary materials identified for Wideman Creek were used for this tributary (Table 8). As with Wideman Creek, the shear stress was found to govern the calculated discharges. A Manning roughness coefficient of 0.045 was selected for the hydraulic analysis (Chow, 1959). The critical discharge for the tributary was found to be approximately 0.6 m^3/s to 0.8 m^3/s. It should be noted that the range of critical discharges spanned over an order of magnitude, with the mean and median converging on a similar result. This critical discharge is similar to the estimated discharge during the reach survey on July 17, 2014 (Table 15).

It should be noted that the area received a summer convective storm of approximately 23mm on July 15th, 2014 (two days prior to the site survey). This was confirmed by the rain gauge readings at the University of Waterloo weather station (UW Weather Station, 2014). It is possible that the observed discharge through this tributary was still elevated due to the SWM pond outflow, however the schematics of the pond were not reviewed to confirm this.

Table Critical discharge for Tributary

	Mean	St.Dev.	Max	Min	Median
Wetted Discharge (m^3/s)	0.07	0.01	0.08	0.06	0.08
Bankfull Discharge (m^3/s)	0.12	0.01	0.12	0.11	0.12
Critical Discharge (m^3/s)	0.08	0.07	0.18	0.03	0.06

Appendix 2.5
Attachment D

Ministry of Natural Resources and Forestry

Ministère des Richesses naturelles et des Forêts

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

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

Ontario

April 1, 2015

Jim Dougan
Dougan & Associates
77 Wyndham Street South
Guelph, Ontario
N1E 5R3

Dear Mr. Dougan:

RE: Erbsville South Environmental Study, PSW Complexing Assessment

In a letter dated Sept. 24, 2014 you provided me with your ecological characterisation and historical information on an unevaluated wetland feature on the west side of Erbsville Road, and north of Wideman Road, in the City of Waterloo. Based on the information provided, and consistent with the guidelines for wetland complexing found in the 'Ontario Wetland Evaluation System (OWES), Southern Manual, 3rd Edition, Version 3.2 (2013)', I concluded that the subject wetland would be included as part of the Sunfish Lake – Laurel Creek provincially significant wetland (PSW) complex. This position was provided by email on Oct. 31, 2014.

In December 2014, I agreed to participate in a field visit to view the wetland since I had not previously been on-site. During the field visit I was asked to consider a scenario where the wetland in question would not become part of the PSW complex. The consideration of this scenario was based on the project team's position that sufficient information could be provided to support an alternative that would enhance the aquatic features of the existing PSW and watercourses.

A technical report (dated March 17, 2015) was provided to the Ministry for review that addressed the above scenario. I have had an opportunity to review this report and can provide the following comments for the project team's consideration. It is important to note that wetland evaluations are considered open files, where new wetlands are evaluated and existing wetlands re-evaluated under the OWES. The report does not appear to provide any new information for the subject wetland that would suggest that the feature should not be included in the Sunfish Lake – Laurel Creek PSW complex. In addition, the reporting does not provide a convincing argument that the proposed scenario would provide greater long term ecological benefits as suggested in the report.

Based on the above comments, the significant status of the subject wetland will remain in place. If new information becomes available for this wetland, however, staff may reassess the status of this feature under the OWES.

Sincerely,

Art Timmerman
Management Biologist
Guelph District

cc: Tony Zammit, Grand River Conservation Authority

Appendix 2.5
Attachment E

From: Buck, Graham (MNRF) [mailto:Graham.Buck@ontario.ca]
Sent: June-01-15 3:51 PM
To: Jim Dougan
Subject: RE: Erbsville Wetland

Hi Jim,

I have reviewed the project information provided by Dougan and Associates and the Ministry is not in a position to change the wetland designation from PSW to non PSW. As described by Art there is a strict protocol we must adhere to with respect to designating a wetland as PSW. I encourage you to discuss this matter with GRCA, as I believe they are able to authorize this project, even with the PSW designation.

Also Art did not mention, as he was probably not aware, the entire area, both wetland and terrestrial is designated by the Ministry as general habitat of Blanding's Turtle. There are two Blanding's Turtle records, Laurel Creek Reservoir and Wilmot Line, which are within 2 kilometers of this site.
This adds another layer of protection of the wetland. If GRCA does authorize the project the Ministry would need to issue an overall benefit permit for Blanding's Turtle. In addition any development of the terrestrial habitats on the property will also need to consider this species.

Hopefully we can chat further when you have a chance. I am out of the office tomorrow and back on Wednesday.

Sincerely,

Graham Buck

Management Biologist
Ministry of Natural Resources and Forestry
Guelph District
1 Stone Road West Guelph ON
N1G 4Y2
519 826 4505
graham.buck@ontario.ca

February 28, 2014

Karl, (Dougan and Associates)

The OMNR Wildlife Animal Care Committee has reviewed and approved the renewal of your protocol: "Capture and Tissue Sample Collection for Genetic Analysis of the "Jefferson Salamander Complex."

Your protocol number for 2014 is #14-143

Protocol approvals are valid for one calendar year only and must be kept current. Should amendments to projects or procedures be deemed necessary, the researcher must contact the Wildlife Animal Care Committee and provide updated information for review.

A summary report will be required annually or upon completion of this project, stating number of animals handled, injuries, fatalities and any problems that may have occurred. This report is necessary for our files plus it will expedite the process if this protocol is to be renewed in the future.

Please note that if there are multiple unanticipated injuries or mortalities the project must be stopped. A report is to be submitted to the Wildlife Animal Care Committee with amendments to rectify the issue(s) prior to resumption.

Researchers who are not collaborating with an expert in animal pathology/physiology or who have limited expertise in this area should seek appropriate assistance in the event of an unexpected and unexplained mortality. Specimens should be submitted for necropsy to the nearest Canadian Cooperative Wildlife Health Centre facility in the event of an unexpected mortality or mortality of a SAR. Make arrangements prior to commencing field work. Contact information for CCWHC facilities can be found at http://www.ccwhc.ca/contact_us.php

Please ensure that you have also contacted the appropriate Ministry of Natural Resources District Office(s) in your study area for the required permit(s) before this research begins. It is also your responsibility to provide them with a copy of this approval.

Good luck with your project,

Sarah

(I have attached a copy of our J. Salamander standard protocol for your future reference)

Sarah Fraser (Crosgrey), Chair
Wildlife Animal Care Committee
Ontario Ministry of Natural Resources
Cell: 226-374-8285
Fax: 519-268-6746
sarah.fraser@ontario.ca

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

March 28, 2014

Karl Konze
Dougan & Associates
77 Wyndham St. South
Guelph, ON N1E 5R3

RE: Wildlife Scientific Collectors Authorization #1076389

Dear Karl,

As requested, I am sending along the above Wildlife Scientific Collectors Authorization. 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, email or by fax 519 826-4929.

This Wildlife Scientific Collectors Authorization is valid until December 31st, 2014. You are expected to adhere to all conditions on the authorization as well as those on the schedule A, approved Animal Care Protocol #14-143 and ESA permit #GU-B-004-14. Please also note that you are expected to have these documents with you while you are collecting.

If you have any questions please don't hesitate to contact me at the number below, Graham Buck at 519 826-4505 or Art Timmerman at 519 826-4935.

Sincerely,

Michele Bonaldo
Ministry of Natural Resources
Resources 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	Local Reference No. / N° de référence local	Issuer Account No. / N° de compte du délivreur de permis
1076389	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. Konze	Karl	Runnar

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

Dougan and Associates Ecological Consulting and Design

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	City/Town/Municipality / Ville/village/municipalité	Province/State Province/Etat	Postal Code/Zip Code Code Postal/Zip
77 Wyndham St. S.	Guelph	ON	N1E 5R3

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

[X] **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

[X] **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 Salamander			NW Waterloo S of Laurel Creek NW of Wideman n Erbsville Rd

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)
2014-03-28	2014-12-31

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	
[X]	[ ]	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		2014-03-28

Signature of Authorization holder / Signature du titulaire de l'autorisation	Date (YYYY-MM-DD)
Karl Konze	2014-03-28

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 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 No1076389
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: as established in attached approved Animal Care Protocol
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: Ian Richards, Dylan White, Steve Hill, Wendy Frise, Mary Young
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, or Art Timmerman at 519 826-4935)

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**

Karl Konze _____ March 28th. 2014

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

Karl Konze
Dougan & Associates
77 Wyndham Street South,
Guelph, Ontario, N1E 3K7

Dear Mr. Konze:

Re: Permit GU-B-004-14 Issued Under s.17(2)(b) of the *Endangered Species Act*, 2007

Enclosed you will find Permit No. GU-B-004-14 issued under s.17(2)(b) of the *Endangered Species Act*, 2007 for your project "Capture and Tissue Sample Collection for Genetic Analysis of the Jefferson Salamander Complex".

Please read the Permit and all attached schedules carefully prior to initiating your project; you must work in accordance with all written conditions and schedules for the duration of the Permit. In particular, please note that the Permit is in effect until 31 December 2014. You are required to submit a report prior to this date in accordance with the conditions of your permit. In addition, please note that a copy of the Permit must be on site whenever an authorized activity will be undertaken.

Please keep in mind the requirement to follow your Animal Care Protocol as approved by the MNR Animal Care Committee.

Should any of the project parameters change, or if it is not possible to comply with the Permit conditions, please contact Graham Buck Species at Risk Biologist of the MNR Guelph District office at 519-826-4505 or graham.buck@ontario.ca immediately to obtain advice.

Additionally, if any protected species other than those identified in the Permit are observed during the undertaking of your project, please notify the MNR Guelph District office.

Please be advised that it is also your responsibility to be aware of and comply with all other relevant provincial or federal legislation, municipal by-laws, other MNR approvals or required approvals from other agencies.

Sincerely,

Ian Hagman
District Manager, Guelph District

Ontario

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: Karl Konze
Dougan & Associates
77 Wyndham Street South,
Guelph, Ontario, N1E 3K7
(519) 822-1609 x22
kkonze@dougan.ca

Permit No: **GU-B-004-14**

Assistants:
Steve Hill
Ian Richards
Dylan White
Wendy Frise
Mary Anne Young

Effective Date: Date of issuance

Expiry Date: 31/12/2014

Project Title: Capture and Tissue Sample Collection for Genetic Analysis of the Jefferson Salamander Complex

Project Description: The project will assist in the protection and recovery of Jefferson Salamander by investigating whether Jefferson Salamanders (or associated polyploids) are present within and adjacent to properties being considered for development. This survey work will improve knowledge on the species' range and distribution, and provide information towards identifying any habitat for the species on the property.

Authorization: This permit authorizes Karl Konze 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 the conditions set out in schedules A, B and C which are attached to and form part of this permit.

Project Location: City of Waterloo Wideman Rd and Erbsville Rd
Pond A: 531939E 4813559N; Pond B: 532246E 4813761N. See Schedule C.

Issued by:

Ian Hagman
District Manager - Guelph District
Ministry of Natural Resources

Date of Issuance: MARCH 10, 2014

Appendix 2.7. Birds documented during the 2013 Breeding Bird Season.

	Common Name[1]	Scientific Name[1]	Code	Conservation Status					Area Sensitivity[7]	2013 Breeding Bird Survey Evidence[8]		Highest Breeding Evidence[8]
				National	Provincial		Regional	Local				
				COSEWIC[2]	OMNRF[3]	Srank[4]	BCR 13[5]	RMW[6]		June 7	June 14	
1	Canada Goose	*Branta canadensis*	CANG	---	---	S5	PS	---	---	8H, 18FY	2H	Confirmed
2	Wood Duck	*Aix sponsa*	WODU	---	---	S5	---	---	---		1H	Possible
3	Mallard	*Anas platyrhynchos*	MALL	---	---	S5	---	---	---	1H	1P	Probable
4	Hooded Merganser	*Lophodytes cucullatus*	HOME	---	---	S5	---	R	---		1H	Possible
5	Wild Turkey	*Meleagris gallopavo*	WITU	---	---	S4	---	---	---		1H	Possible
6	Great Blue Heron	*Ardea herodias*	GRBH	---	---	S5	PS	U	---	1X	1X	N/A
7	Sharp-shinned Hawk	*Accipiter striatus*	SSHA	NAR	NAR	S5	---	R	AS	1H		Possible
8	Red-tailed Hawk	*Buteo jamaicensis*	RTHA	NAR	NAR	S5	---	---	---	1H		Possible
9	Killdeer	*Charadrius vociferus*	KILL	---	---	S5	PS	---	---	1H		Possible
10	Spotted Sandpiper	*Actitis macularius*	SPSA	---	---	S5	PS	---	---	1H	2P, 1H	Probable
11	Mourning Dove	*Zenaida macroura*	MODO	---	---	S5	---	---	---	2S, 2H	4S, 3H	Possible
12	Black-billed Cuckoo	*Coccyzus erythropthalmus*	BBCU	---	---	S4	PS	U	---	1S		Possible
13	Great Horned Owl	*Bubo virginianus*	GHOW	---	---	S5	---	---	---		1H	Possible
14	Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	---	---	S4	---	R	---	1S	1T	Probable
15	Downy Woodpecker	*Picoides pubescens*	DOWO	---	---	S5	---	---	---	3H	1S, 1H	Probable
16	Northern Flicker	*Colaptes auratus*	NOFL	---	---	S5	PS	---	---	1S, 1H	2S, 3H	Possible
17	Pileated Woodpecker	*Dryocopus pileatus*	PIWO	---	---	S4S5	---	U	AS		1H	Possible
18	Eastern Wood-Pewee	*Contopus virens*	EAWP	SC	SC	S5	PS	---	---	3S	1T	Probable
19	Alder Flycatcher	*Empidonax alnorum*	ALFL	---	---	S5	---	U	---	2S	2T	Probable
20	Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	---	---	S5	---	---	---	1S	1T, 1S	Probable
21	Eastern Kingbird	*Tyrannus tyrannus*	EAKI	---	---	S5	PS	---	---	1P	1H	Probable
22	Warbling Vireo	*Vireo gilvus*	WAVI	---	---	S5	---	U	---		1S	Possible
23	Red-eyed Vireo	*Vireo olivaceus*	REVI	---	---	S5	---	---	---	2S	1T	Probable
24	Blue Jay	*Cyanocitta cristata*	BLJA	---	---	S5	---	---	---	3S, 1H	1T, 2S	Probable
25	American Crow	*Corvus brachyrhynchos*	AMCR	---	---	S5	---	---	---	R	R	Possible
26	Horned Lark	*Eremophila alpestris*	HOLA	---	---	S5	---	---	---		1H	Possible
27	Tree Swallow	*Tachycineta bicolor*	TRES	---	---	S5	---	---	---	1P, 2H	1H	Probable
28	Barn Swallow	*Hirundo rustica*	BARS	THR	THR	S5	PS	---	---	3H	2P, 2H	Probable
29	Black-capped Chickadee	*Poecile atricapillus*	BBCH	---	---	S5	---	---	---	1S, 1H		Possible
30	White-breasted Nuthatch	*Sitta carolinensis*	WBNU	---	---	S5	---	---	AS	1S	1S	Possible
31	House Wren	*Troglodytes aedon*	HOWR	---	---	S5	---	---	---	3S	2T	Probable
32	American Robin	*Turdus migratorius*	AMRO	---	---	S5	---	---	---	6S, 5H, 1FY	3S, 4H, 2FY	Confirmed
33	Gray Catbird	*Dumetella carolinensis*	GRCA	---	---	S5	---	---	---	2S, 1H	1T	Probable
34	Brown Thrasher	*Toxostoma rufum*	BRTH	---	---	S5	PS	U	---		1H	Possible

	Common Name[1]	Scientific Name[1]	Code	Conservation Status					Area Sensitivity[7]	2013 Breeding Bird Survey Evidence[8]		Highest Breeding Evidence[8]
				National	Provincial		Regional	Local				
				COSEWIC[2]	OMNRF[3]	Srank[4]	BCR 13[5]	RMW[6]		June 7	June 14	
35	European Starling	*Sturnus vulgaris*	EUST	---	---	SE	---	---	---	R	R	Possible
36	Cedar Waxwing	*Bombycilla cedrorum*	CEDW	---	---	S5	---	---	---	1P, 3H	1P	Probable
37	Mourning Warbler	*Geothlypis philadelphia*	MOWA	---	---	S5	---	U	---	1S	1T	Probable
38	Common Yellowthroat	*Geothlypis trichas*	COYE	---	---	S5	---	---	---	3S	2T	Probable
39	Yellow Warbler	*Setophaga petechia*	YWAR	---	---	S5	---	---	---	9S	5T, 2S	Probable
40	Chipping Sparrow	*Spizella passerina*	CHSP	---	---	S5	---	---	---	1S	1T	Probable
41	Field Sparrow	*Spizella pusilla*	FISP	---	---	S5	PS	---	---	2S	1T	Probable
42	Song Sparrow	*Melospiza melodia*	SOSP	---	---	S5	---	---	---	5S, 1H	2T, 1H	Probable
43	Swamp Sparrow	*Melospiza georgiana*	SWSP	---	---	S5	---	U	---	2S	1T	Probable
44	Northern Cardinal	*Cardinalis cardinalis*	NOCA	---	---	S5	---	---	---	2S	2T, 2H	Probable
45	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	---	---	S5	PS	---	---		1S	Possible
46	Indigo Bunting	*Passerina cyanea*	INBU	---	---	S5	---	---	---	3S	1T	Probable
46	Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	---	---	S5	---	---	---	R	R	Possible
47	Common Grackle	*Quiscalus quiscula*	COGR	---	---	S5	---	---	---	R	R	Possible
48	Brown-headed Cowbird	*Molothrus ater*	BHCO	---	---	S5	---	---	---	R	R	Possible
49	Baltimore Oriole	*Icterus galbula*	BAOR	---	---	S5	PS	---	---	2S, 1H	1H	Possible
50	American Goldfinch	*Spinus tristis*	AMGO	---	---	S5	---	---	---	2H	2S, 1H	Possible
51	House Sparrow	*Passer domesticus*	HOSP	---	---	SE	---	---	---	R	R	Possible

LEGEND

General

--- = not significant

= Birds not nesting within the study area observed during the breeding season

Taxonomy and Nomenclature

1. Taxonomy and **Nomenclature** follow American Ornithologists' Union Check-list of North American Birds 7th edition (AOU, 1998) and 54th supplement to the AOU Check-list of North American Birds (Chesser *et al*., 2013).

Federal Conservation Status

2. Federal (COSEWIC) Status: Status assigned by the Committee on the Status of Endangered Wildlife in Canada. (COSEWIC, 2015; COSEWIC, 2016)

EXT = Extinct. A wildlife species that no longer exists.
EXP = Extirpated. A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
END = Endangered. A wildlife species facing imminent extirpation or extinction.
THR = Threatened. A wildlife species likely to become endangered if limiting factors are not reversed.
SC = Special Concern. A wildlife species that may become a threatened or an endangered wildlife species because of a combination of biological characteristics and identified threats.
NAR = Not at Risk. A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

Provincial Conservation Status

3. Provincial (MNRF) Status: Status assigned by the Ministry of Natural Resources and Forestry (OMNRF, 2016).

EXP = Extirpated. A native species that no longer exists in the wild in Ontario but still exists elsewhere in the world.
END = Endangered. A native species facing extinction or extirpation in Ontario.
THR = Threatened. A native species at risk of becoming endangered in Ontario.
SC = Special Concern. A native species that lives in the wild in Ontario that may become endangered or threatened due to a combination of biological characteristics and identified threats.

4. Provincial rarity ranks (SRanks) are evaluated & assigned by the (Ontario) Natural Heritage Information Centre (NHIC, 2016)

S5 = Secure—Common, widespread, and abundant in the nation or state/province.
S4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S3 = Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
_ _B = Breeding migrants (*i.e.* S5B). Those without any suffixes are considered resident species.
SE = Exotic; not believed to be a native component of Ontario's flora.

Regional Conservation Status

5. Bird Conservation Region (BCR) 13 status designations have been prepared by Environment Canada (EC, 2014).

PS = Priority Species of conservation concern

Local Conservation Status

6. Local Conservation Status based on RMW (1996)

p = potential: not known to breed in RMW, but would be regarded as significant if it did; R = rare; S = scarce; U = uncommon

Area Sensitivity

7. Area sensitivity designations based on OMNR (2000) (See Appendix C & G)

AS = Area Sensitive

Highest Breeding Status and Breeding Evidence Codes

8. Highest breeding evidence codes based on the Atlas of the Breeding Birds of Ontario (Cadman *et al*., 2007).

R = species observed in its breeding season, but no breeding evidence data collected
X = species observed in its breeding season, but no evidence of breeding (*i.e.* flyover only)
H = Species observed in its breeding season in suitable nesting habitat
S = Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat.
P = Pair observed in their breeding season in suitable nesting habitat
T = Permanent territory presumed through registration of territorial song on at least two days, a week or more apart, at the same place.
A = Agitated behaviour or anxiety calls of an adult
FY = Recently fledged young or downy young, including young incapable of sustained flight.
CF = Adult carrying food for young.

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Appendix 2.8. Master list of wildlife observations for the Erbsville South study area and vicinity.

	Common Name	Scientific Name	Code	Conservation Status						Area Sensi-tivity[7]	Observation Dates[8]																																										
				National	Provincial		Regional		Local		2007	2012		2013															2014															2016									2008 – 2016
				COSEWIC[1]	OMNRF[2]	Srank[3]	Former 'Central' Region[4]	BCR 13[5]	RMW[6]		May – June	May	June 5	Apr 27	May 8	May 16	May 17	May 22	June 4	June 7	June 14	June 15	June 19	July 16	Aug 14	Sept 20	Oct 21	Oct 22	Feb 4	Apr 4	Apr 8	Apr 9	Apr 10	Apr 11	Apr 14	Apr 15	Apr 24	May 5	May 6	May 13	June 4	June 20	July 22	Mar 29	Apr 20	Apr 26	Apr 27	June 9	June 10	June 12	June 20	July 11	Obs. from local residents
	Odonates																																																				
1	Ebony Jewelwing	*Calopteryx maculata*	EBJE	---	---	S5	n/a	n/a	?	n/a	X																														X		X										X
2	Common Green Darner	*Anax junius*	CGDA	---	---	S5	n/a	n/a	?	n/a																													X	X			X										
3	Delta-spotted Spiketail	*Cordulegaster diastatops*	DSSP	---	---	S4	n/a	n/a	?	n/a																																											X
	Butterflies																																																				
1	Juvenal's Duskywing	*Erynnis juvenalis*	JUDU	---	---	S5	n/a	n/a	?	n/a											X																																
2	Hobomok Skipper	*Poanes hobomok*	HOSK	---	---	S5	n/a	n/a	?	n/a											X																																
3	Spring Azure	*Celastrina lucia*	SPAZ	---	---	S5	n/a	n/a	?	n/a																																											X
4	Pearl Crescent	*Phyciodes tharos*	SUCR	---	---	S4	n/a	n/a	?	n/a											X																																
5	Mourning Cloak	*Nymphalis antiopa*	MOCL	---	---	S5	n/a	n/a	?	n/a											X																																
6	Milbert's Tortoiseshell	*Nymphalis milberti*	MITO	---	---	S5	n/a	n/a	?	n/a																																											X
7	Painted Lady	*Vanessa cardui*	PALA	---	---	S5	n/a	n/a	?	n/a																																											X
8	Viceroy	*Limenitis archippus*	VICE	---	---	S5	n/a	n/a	?	n/a																																											X
9	Eyed Brown	*Lethe eurydice*	EYBR	---	---	S5	n/a	n/a	?	n/a																																										X	X
10	Little Wood Satyr	*Megisto cymela*	LIWS	---	---	S5	n/a	n/a	?	n/a	X																																										
11	Monarch	*Danaus plexippus*	MONA	SC	SC	S4B	n/a	n/a	?	n/a	X															X																											X
	Crustaceans																																																				
1	Unidentified crayfish species	*Cambaridae sp.*	CRSP	?	?	?	?	n/a	?	n/a																																											X
	Amphibians																																																				
1	Red-spotted Newt	*Notophthalmus v. viridescens*	RSNE	---	---	S5	C and W	n/a	R	---	X																							X																			
2	Spotted Salamander	*Ambystoma maculatum*	SPOS	---	---	S4	C and W	n/a	R	---																																											X
3	Eastern Red-backed Salamander	*Plethodon cinereus*	ERBS	---	---	S5	A and W	n/a	R?	---													X																				X					X					
4	American Toad	*Anaxyrus americanus*	AMTO	---	---	S5	A and W	n/a	---	---	X		X	X																													X										X
5	Gray Treefrog	*Hyla versicolor*	GRTR	---	---	S5	A and W	n/a	---	---	X							X				X																											X	X			
6	Spring Peeper	*Pseudacris crucifer*	SPPE	---	---	S5	A and W	n/a	---	---	X			X				X																	X				X	X													
7	American Bullfrog	*Lithobates catesbeianus*	AMBU	---	---	S4	C and W	n/a	R	AS																													X	X	X												
8	Green Frog	*Lithobates clamitans*	GRFR	---	---	S5	A and W	n/a	---	---	X		X					X	X		X	X	X	X									X			X			X	X	X	X	X					X	X	X	X		
9	Northern Leopard Frog	*Lithobates pipiens*	NLFR	NAR	NAR	S5	A and W	n/a	---	---	X		X	X	X				X					X	X	X						X						X	X	X	X	X	X		X		X	X	X	X	X		X
10	Wood Frog	*Lithobates sylvaticus*	WOFR	---	---	S5	A and W	n/a	---	---	X													X																					X								
	Unidentified Lithobates frog species	*Lithobates sp.*	LISP	---	---	?	?	n/a	?		X																																										
	Reptiles																																																				
1	Snapping Turtle	*Chelydra serpentina*	SNTU	SC	SC	S3	A and W	n/a	---	---																X													X	X							X			X			X
2	Midland Painted Turtle	*Chrysemys picta marginata*	MPTU	---	---	S5	A and W	n/a	---	---											X					X																					X						X
3	Blanding's Turtle	*Emydoidea blandingii*	BLTU	THR	THR	S3	U and W	n/a	R?	---																																							X				X
4	Northern Map Turtle	*Graptemys geographica*	MATU	SC	SC	S3	U and L	n/a	---	AS																																											X
5	Eastern Milksnake	*Lampropeltis t. triangulum*	EAMI	SC	---	S4	U and W	n/a	R?	---																																											X
6	Eastern Ribbonsnake	*Thamnophis sauritus*	NORI	SC	SC	S4	U and W	n/a	R	---			X																																								
7	Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	EAGA	---	---	S5	C and W	n/a	---	---									X	X						X													X			X								X			X
	Birds																																																				
1	Canada Goose	*Branta canadensis*	CANG	---	---	S5	n/a	---	---	---				X	X	X				X	X			X							X	X					X	X	X	X				X			X						X
2	Wood Duck	*Aix sponsa*	WODU	---	---	S5	n/a	PS	---	---											X											X					X																X
3	Mallard	*Anas platyrhynchos*	MALL	---	---	S5	n/a	---	---	---	X					X				X	X											X		X			X	X		X	X				X			X	X	X			X
4	Blue-winged Teal	*Anas discors*	BWTE	---	---	S4	n/a	PS	---	---																																					X						
5	Hooded Merganser	*Lophodytes cucullatus*	HOME	---	---	S5B	n/a	---	R	---											X																																
6	Wild Turkey	*Meleagris gallopavo*	WITU	---	---	S5	n/a	---	---	---		X						X			X		X							X																							

	Common Name	Scientific Name	Code	Conservation Status						Area Sensitivity[7]	Observation Dates[8]																																										
				National	Provincial		Regional		Local		2007	2012		2013															2014															2016									2008 – 2016
				COSEWIC[1]	OMNRF[2]	Srank[3]	Former 'Central' Region[4]	BCR 13[5]	RMW[6]		May – June	May	June 5	Apr 27	May 8	May 16	May 17	May 22	June 4	June 7	June 14	June 15	June 19	July 16	Aug 14	Sept 20	Oct 21	Oct 22	Feb 4	Apr 4	Apr 8	Apr 9	Apr 10	Apr 11	Apr 14	Apr 15	Apr 24	May 5	May 6	May 13	June 4	June 20	July 22	Mar 29	Apr 20	Apr 26	Apr 27	June 9	June 10	June 12	June 20	July 11	Obs. from local residents
7	American Bittern	*Botaurus lentiginosus*	AMBI	---	---	S4B	n/a	PS	S	AS																																											X
8	Great Blue Heron	*Ardea herodias*	GBHE	---	---	S4	n/a	PS	U	---	X				X						X					X												X			X		X										X
9	Great Egret	*Ardea alba*	GREG	---	---	S2B	n/a	PS	---	---																X																											X
10	Green Heron	*Butorides virescens*	GRHE	---	---	S4B	n/a	PS	U	---	X															X																								X			X
11	Turkey Vulture	*Cathartes aura*	TUVU	---	---	S5B	n/a	---	U	---			X																	X									X	X			X										X
12	Osprey	*Pandion haliaetus*	OSPR	---	---	S5B	n/a	---	p	---																							X																				X
13	Bald Eagle	*Haliaeetus leucocephalus*	BAEA	NAR	SC	S2N,S4B	n/a	PS	---	AS																																											X
14	Sharp-shinned Hawk	*Accipiter striatus*	SSHA	NAR	NAR	S5	n/a	---	R	AS										X																																	
15	Red-shouldered Hawk	*Buteo lineatus*	RSHA	NAR	NAR	S4B	n/a	PS	R	AS																																											X
16	Red-tailed Hawk	*Buteo jamaicensis*	RTHA	NAR	NAR	S5	n/a	---	---	---	X			X						X																								X									X
17	Killdeer	*Charadrius vociferus*	KILL	---	---	S5B	n/a	PS	---	---	X					X				X	X					X									X		X																
18	Spotted Sandpiper	*Actitis macularius*	SPSA	---	---	S5	n/a	PS	---	---						X				X	X																													X			X
19	American Woodcock	*Scolopax minor*	AMWO	---	---	S4B	n/a	PS	---	---																					X										X												
20	Caspian Tern	*Hydroprogne caspia*	CATE	NAR	NAR	S3B	n/a	PS	---	---																																					X						
21	Mourning Dove	*Zenaida macroura*	MODO	---	---	S5	n/a	---	---	---	X						X		X	X	X								X									X												X			
22	Black-billed Cuckoo	*Coccyzus erythropthalmus*	BBCU	---	---	S5B	n/a	PS	U	---										X																																	
23	Great Horned Owl	*Bubo virginianus*	GHOW	---	---	S4	n/a	---	---	---											X																																
24	Ruby-throated Hummingbird	*Archilochus colubris*	RTHU	---	---	S5B	n/a	---	U	---																																											X
25	Belted Kingfisher	*Megaceryle alcyon*	BEKI	---	---	S4B	n/a	PS	U	---																						X					X	X			X												
26	Red-headed Woodpecker	*Melanerpes erythrocephalus*	RHWO	THR	SC	S4B	n/a	PS	U	---																																											X
27	Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	---	---	S4	n/a	---	R	---										X	X								X			X						X															X
28	Downy Woodpecker	*Picoides pubescens*	DOWO	---	---	S5	n/a	---	---	---	X									X	X																X																
29	Hairy Woodpecker	*Picoides villosus*	HAWO	---	---	S5	n/a	---	U	AS	X																																										
30	Northern Flicker	*Colaptes auratus*	NOFL	---	---	S4B	n/a	PS	---	---	X			X					X	X	X																X																X
31	Pileated Woodpecker	*Dryocopus pileatus*	PIWO	---	---	S5	n/a	---	U	AS	X									X	X												X	X																			X
32	Eastern Wood-Pewee	*Contopus virens*	EAWP	SC	SC	S4B	n/a	PS	---	---										X	X																																
33	Alder Flycatcher	*Empidonax alnorum*	ALFL	---	---	S5B	n/a	---	U	---	X									X	X																																X
34	Willow Flycatcher	*Empidonax traillii*	WIFL	---	---	S5B	n/a	---	U	---																																											X
35	Eastern Phoebe	*Sayornis phoebe*	EAPH	---	---	S5B	n/a	---	---	---	X																					X					X					X											
36	Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	---	---	S4B	n/a	---	---	---	X									X	X																																
37	Eastern Kingbird	*Tyrannus tyrannus*	EAKI	---	---	S4B	n/a	PS	---	---	X					X				X	X																						X										
38	Warbling Vireo	*Vireo gilvus*	WAVI	---	---	S5B	n/a	---	U	---	X										X																																
39	Red-eyed Vireo	*Vireo olivaceus*	REVI	---	---	S5B	n/a	---	---	---										X	X																																
40	Blue Jay	*Cyanocitta cristata*	BLJA	---	---	S5	n/a	---	---	---	X			X		X	X			X	X								X			X					X																
41	American Crow	*Corvus brachyrhynchos*	AMCR	---	---	S5B	n/a	---	---	---	X			X		X				X	X								X	X				X				X			X				X								X
42	Horned Lark	*Eremophila alpestris*	HOLA	---	---	S5B	n/a	---	---	---											X																X																X
43	Tree Swallow	*Tachycineta bicolor*	TRES	---	---	S4B	n/a	---	---	---	X				X	X				X	X																X													X			
44	Barn Swallow	*Hirundo rustica*	BARS	THR	THR	S4B	n/a	PS	---	---	X									X	X																		X	X	X		X						X	X			X
45	Black-capped Chickadee	*Poecile atricapillus*	BCCH	---	---	S5	n/a	---	---	---	X		X				X			X						X		X	X								X	X					X		X								
46	Red-breasted Nuthatch	*Sitta canadensis*	RBNU	---	---	S5	n/a	---	U	AS	X																							X									X										
47	White-breasted Nuthatch	*Sitta carolinensis*	WBNU	---	---	S5	n/a	---	---	AS	X									X	X																								X								
48	House Wren	*Troglodytes aedon*	HOWR	---	---	S5B	n/a	---	---	---	X					X				X	X																																X
49	Golden-crowned Kinglet	*Regulus satrapa*	GCKI	---	---	S5B	n/a	---	R	---																							X																				
50	Eastern Bluebird	*Sialia sialis*	EABL	NAR	NAR	S5B	n/a	---	U	---																																											X
51	Veery	*Catharus fuscescens*	VEER	---	---	S4B	n/a	---	U	AS	X																																										
52	American Robin	*Turdus migratorius*	AMRO	---	---	S5B	n/a	---	---	---	X					X	X		X	X	X								X		X		X		X		X				X	X	X		X		X			X			
53	Gray Catbird	*Dumetella carolinensis*	GRCA	---	---	S4B	n/a	---	---	---	X									X	X																																

	Common Name	Scientific Name	Code	Conservation Status						Area Sensi-tivity[7]	Observation Dates[8]																																									
				National	Provincial		Regional		Local		2007	2012		2013															2014															2016									2008 – 2016
				COSEWIC[1]	OMNRF[2]	Srank[3]	Former 'Central' Region[4]	BCR 13[5]	RMW[6]		May – June	May	June 5	Apr 27	May 8	May 16	May 17	May 22	June 4	June 7	June 14	June 15	June 19	July 16	Aug 14	Sept 20	Oct 21	Oct 22	Feb 4	Apr 4	Apr 8	Apr 9	Apr 10	Apr 11	Apr 14	Apr 15	Apr 24	May 5	May 6	May 13	June 4	June 20	July 22	Mar 29	Apr 20	Apr 26	Apr 27	June 9	June 10	June 12	June 20	July 11	Obs. from local residents
54	Brown Thrasher	*Toxostoma rufum*	BRTH	---	---	S4B	n/a	PS	U	---																																										X
55	Northern Mockingbird	*Mimus polyglottos*	NOMO	---	---	S4	n/a	---	p	---																																										X
56	European Starling	*Sturnus vulgaris*	EUST	---	---	SNA	n/a	---	---	---	X					X			X	X	X															X	X						X		X	X			X												
57	Cedar Waxwing	*Bombycilla cedrorum*	CEDW	---	---	S5B	n/a	---	---	---	X									X	X								X																								
58	Northern Waterthrush	*Parkesia noveboracensis*	NOWA	---	---	S5B	n/a	---	U	---	X																																										
59	Mourning Warbler	*Geothlypis philadelphia*	MOWA	---	---	S4B	n/a	---	U	---										X	X																															
60	Common Yellowthroat	*Geothlypis trichas*	COYE	---	---	S5B	n/a	---	---	---	X									X	X																						X		X			X	X	X			
61	Yellow Warbler	*Setophaga petechia*	YWAR	---	---	S5B	n/a	---	---	---						X				X	X																	X			X	X											
62	Pine Warbler	*Setophaga pinus*	PIWA	---	---	S5B	n/a	---	U	AS	X																																										
63	Canada Warbler	*Cardellina canadensis*	CAWA	THR	SC	S4B	n/a	PS	R	AS																																										X
64	Wilson's Warbler	*Cardellina pusilla*	WIWA	---	---	S4B	n/a	---	---	---																																										X
65	American Tree Sparrow	*Spizelloides arborea*	ATSP	---	---	S4B	n/a	---	---	---																																		X									
66	Chipping Sparrow	*Spizella passerina*	CHSP	---	---	S5B	n/a	---	---	---										X											X						X		X	X			X		X								X
67	Field Sparrow	*Spizella pusilla*	FISP	---	---	S4B	n/a	PS	---	---	X									X	X					X											X				X												
68	Savannah Sparrow	*Passerculus sandwichensis*	SAVS	---	---	S4B	n/a	PS	---	AS	X									X																																
69	Song Sparrow	*Melospiza melodia*	SOSP	---	---	S5B	n/a	---	---	---	X			X		X	X			X	X											X					X	X	X	X	X	X	X						X		X			X
70	Swamp Sparrow	*Melospiza georgiana*	SWSP	---	---	S5B	n/a	---	U	---	X									X	X																X																
71	White-throated Sparrow	*Zonotrichia albicollis*	WTSP	---	---	S5B	n/a	---	U	---																X																										
72	Northern Cardinal	*Cardinalis cardinalis*	NOCA	---	---	S5	n/a	---	---	---	X		X							X	X																X								X								
73	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	---	---	S4B	n/a	PS	---	---	X					X					X																					X											
74	Indigo Bunting	*Passerina cyanea*	INBU	---	---	S4B	n/a	---	---	---										X	X																					X											
75	Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	---	---	S4	n/a	---	---	---	X			X		X	X		X	X	X			X								X	X				X	X	X	X	X	X						X	X	X	X			X
76	Common Grackle	*Quiscalus quiscula*	COGR	---	---	S5B	n/a	---	---	---	X									X	X																X	X	X	X												
77	Brown-headed Cowbird	*Molothrus ater*	BHCO	---	---	S4B	n/a	---	---	---	X									X	X											X	X				X															
78	Baltimore Oriole	*Icterus galbula*	BAOR	---	---	S4B	n/a	PS	---	---	X									X	X																					X								X			
79	House Finch	*Haemorhous mexicanus*	HOFI	---	---	SNA	n/a	---	---	---	X																										X						X										
80	American Goldfinch	*Spinus tristis*	AMGO	---	---	S5B	n/a	---	---	---	X					X	X			X	X																X						X							X	X			X
81	House Sparrow	*Passer domesticus*	HOSP	---	---	SNA	n/a	---	---	---											X											X																				
	Mammals																																																			
1	Virginia Opossum	*Didelphis virginiana*	VIOP	---	---	S4	n/a	n/a	R	---																				X																						
2	Unidentified shrew species	*Sorcidae sp.*	SHSP	---	---	?	n/a	---	---														X																													X
3	Eastern Cottontail	*Sylvilagus floridanus*	EACO	---	---	S5	n/a	n/a	---	---									X					X			X		X	X								X										X	X				
4	Eastern Chipmunk	*Tamias striatus*	EACH	---	---	S5	n/a	n/a	---	---	X		X						X								X			X																				X			
5	Woodchuck	*Marmota monax*	WOOD	---	---	S5	n/a	n/a	---	---													X						X																X								
6	Gray Squirrel	*Sciurus carolinensis*	GRSQ	---	---	S5	n/a	n/a	---	---	X																		X		X										X	X											
7	Red Squirrel	*Tamiasciurus hudsonicus*	RESQ	---	---	S5	n/a	n/a	---	---	X																										X				X												
8	Beaver	*Castor canadensis*	BEAV	---	---	S5	n/a	n/a	S	---					X					X																		X	X	X													X
9	Unidentified peromyscus mouse	*Peromyscus sp.*	PMSP	---	---	S5	n/a	n/a	---																																											X
10	Meadow Vole	*Microtus pennsylvanicus*	MEVO	---	---	S5	n/a	n/a	---	---																	X		X																							
11	Muskrat	*Ondatra zibethicus*	MUSK	---	---	S5	n/a	n/a	---	---																												X															X
12	Domestic Dog	*Canis lupus familiaris*	DODO	n/a	n/a	n/a	n/a	n/a	n/a	n/a																			X																							
13	Raccoon	*Procyon lotor*	RACC	---	---	S5	n/a	n/a	---	---																			X																X			X	X				
14	Mink	*Mustela vison*	MINK	---	---	S4	n/a	n/a	S	---																																										X
15	Striped Skunk	*Mephitis mephitis*	STSK	---	---	S5	n/a	n/a	---	---																			X																							
16	White-tailed Deer	*Odocoileus virginianus*	WTDE	---	---	S5	n/a	n/a	---	---	X		X		X		X		X	X						X	X	X	X	X											X				X			X	X		X		X

LEGEND

General

--- = not significant

= Migrants passing through the study area.

= Birds not nesting within the study area observed during the breeding season

Federal Conservation Status

1. Federal (COSEWIC) Status: Status assigned by the Committee on the Status of Endangered Wildlife in Canada. (COSEWIC, 2015; COSEWIC, 2016)

EXT Extinct. A species that no longer exists.

EXP Extirpated. A species no longer existing in the wild in Canada, but occurring elsewhere in the wild.

END Endangered. A species facing imminent extirpation or extinction throughout its range.

THR Threatened. A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

VUL or SC Vulnerable or Special Concern. A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events, but does not include an extirpated, endangered or threatened species.

IND Indeterminate. A species for which there is insufficient information to support a status designation.

NAR Not At Risk. A species that has been evaluated and found to be not at risk.

Provincial Conservation Status

2. Provincial (MNRF) Status: Status assigned by the Ministry of Natural Resources and Forestry (OMNRF, 2016).

EXP Extirpated. Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.

END Endangered. Lives in the wild in Ontario but is facing imminent extinction or extirpation.

THR Threatened. Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.

SP Special Concern. Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.

3. Provincial rarity ranks (SRanks) are evaluated & assigned by the (Ontario) Natural Heritage Information Centre (NHIC, 2016)

S5 = Secure—Common, widespread, and abundant in the nation or state/province.

S4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S3 = Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

_ _B = Breeding migrants (*i.e.* S5B). Those without any suffixes are considered resident species.

SE = Exotic; not believed to be a native component of Ontario's flora.

Regional Conservation Status

4. **Conservation of Herpetofauna** based on the Ontario Ministry of Natural Resources former 'Central Region' (Plourde *et al.*, 1989).

W = Widespread = Any species that occurs throughout Central Region.

A= Abundant = Any species that occurs in high numbers in Central Region.

C = Common = Any species that occurs in moderate numbers in Central Region.

L = Local = Any species that is restricted in its distribution in Central Region, either geographically or because of specialized habitat requirements.

U = Uncommon = Any species that occurs in low numbers to Central Region, or is seldom observed because of its secretive nature.

R = Rare = Any species that, because of its biological characteristics or because it occurs at the fringe of its range exists in small numbers or in very restricted areas in Central Region. These species may be threatened with extirpation in the Region.

5. **Bird Conservation Region (BCR) 13 status designations** have been prepared by Environment Canada (2014).

PS = Priority Species for Conservation

Local Conservation Status

6. Local Conservation Status based on RMW 1985a, RMW 1985b, and RMW 1996.

p = potential: not known to breed in RMW, but would be regarded as significant if it did; R = rare; S = scarce; U = uncommon

Area Sensitivity

7. Area sensitivity designations based on OMNR (2000) (See Appendix C & G)

AS = Area Sensitive

REFERENCES

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Environment Canada. 2014. Bird Conservation Strategy for Bird Conservation Region 13 in Ontario Region: Lower Great Lakes/St. Lawrence Plain – Abridged Version – July 2014. Available online at: https://www.ec.gc.ca/mbc-com/default.asp?lang=En&n=F43BE8A4-1

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RMW (Regional Municipality of Waterloo). 1985a. Appendix 3: Reptiles and Amphibians in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.

RMW (Regional Municipality of Waterloo). 1985b. Appendix 4: Mammals in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.

RMW (Regional Municipality of Waterloo). 1996. Revisions to Waterloo Region's Significant Species List: Breeding Birds Component. Report to Planning and Culture Committee PC-96-021. Approved by Council: April 25, 1996.

The list of Significant Wildlife Habitat (SWH) features and functions assessed are based on the Significant Wildlife Habitat Technical Guide (OMNR, 2000) and Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (OMNRF, 2015). Since there are differences between the two documents, the SWH categories contained in the Ecoregion Criteria Schedules are shown in *blue italic type*.

SWH Feature or Function	Polygon	Comments	OMNR 2000	OMNRF 2015
Seasonal Concentrations of Animals				
Winter deer yard *Deer yarding areas*	---	The identification of winter deer yards is a Ministry of Natural Resources and Forestry (MNRF) responsibility. According to MNRF's Land Information Ontario warehouse, winter deer yards are not present within or adjacent to the Erbsville South study area.	No	No
Deer Winter Congregation Areas	See Fig. 6-1	The majority of wetland woodland areas within the study area are considered Stratum 2 deer wintering areas. See Figure 6-1.	n/a	**Yes**
Colonial bird nesting sites	---	See Ecoregion 6E Criteria Schedule interpretation & assessment below.	No	n/a
Colonially nesting bird breeding habitat (bank & cliff)	---	No Northern Rough-winged Swallows, Cliff Swallows, or Bank Swallows were documented from the study area. Barn Swallows were documented in the study area but are now designated Threatened in Ontario and therefore protected through the Endangered Species Act, 2007.	n/a	No
Colonially nesting bird breeding habitat (trees/shrubs)	1, 2, 3, 30, & 31	3 listed species, Great Blue Heron (GBHE), Great Egret (GREG), & Green Heron (GRHE) were documented over the course of the many field visits. While a GBHE/GREG heronry is not present in or adjacent to the study area, since much greater heron activity would have been observed if it were, the wetland west of Regal Place may support breeding by GRHE. Multiple observations were documented. Breeding of 1 or more GRHE is considered as SWH.	n/a	**Candidate**
Colonially nesting bird breeding habitat (ground)	---	No gulls were documented flying past the site and no suitable nesting habitat (*i.e.* islands or peninsulas associated with open water or in marshy areas) exists with the study area.	n/a	No
Waterfowl stopover and staging areas	---	See Ecoregion 6E Criteria Schedule interpretation & assessment below.	No	n/a
Waterfowl stopover and staging areas (terrestrial)	---	Suitable stopover habitat (*i.e.* field flooded during spring melt and run-off) does not occur within the study area.	n/a	No
Waterfowl stopover and staging areas (aquatic)	---	The wetland features within the study area (*i.e.* pond, marsh habitat & watercourse margins) are too small to support the numbers & species of waterfowl required to be considered SWH.	n/a	No
Waterfowl nesting habitat *Waterfowl nesting areas*	---	Not enough waterfowl nesting habitat (*i.e.* upland habitat bordering existing wetlands), is present to qualify as SWH. Only two qualifying species of waterfowl were documented (Mallard and Hooded Merganser), both in numbers below the SWH threshold.	No	No
Shorebird migratory stopover sites *Shorebird migratory stopover areas*	---	None detected or expected to occur in the study area. Suitable migratory stopover habitat is marginal in quality and restricted to larger wetland pools and creekside habitat within the more open sections of the Provincially Significant Wetland (Polygons 12, 19 & 45), as well as the edge around the dug pond (polygon 18). Thresholds listed in the MNR Ecoregion 6E Criteria Schedule would not be close to being met.	No	No
Landbird migratory stopover areas *Landbird migratory stopover areas*	---	None of any significance is expected to occur. The study area is too far (*i.e.* greater than 5 km away) from the Great Lakes shoreline.	No	No
Raptor winter feeding and roosting	---	No areas of any significance are expected to occur in the study area. The agricultural fields continue to be in active cultivation	No	No

SWH Feature or Function	Polygon	Comments	OMNR 2000	OMNRF 2015
Raptor wintering area		and would not support suitable overwintering habitat. Local birdwatchers have not reported any observations on the ONTBIRDS Listserv during the past 4 years.		
Wild Turkey winter range	---	Wild Turkeys were recorded four times over the course of the many field visits made to the study area. None were observed in winter.	No	Not addressed
Turkey Vulture summer roosting areas	---	None detected. Suitable roosting habitat is considered marginal and only one bird was observed during the summer suggesting no habitat is present.	No	Not addressed
Reptile Hibernacula	---	See Ecoregion 6E Criteria Schedule interpretation & assessment below.	Not likely	n/a
Turtle wintering areas	18, Laurel Cr.	Two Midland Painted Turtles were observed basking from the pond behind 665 Erbsville Road in the summer of 2013. Later in June 2016, a Blanding's Turtle was documented at the same location. In May 2014, a Snapping Turtle was recorded from Laurel Creek south of the laneway at the end of Schnarr Street (*i.e.* west of Regal Place). On May 22nd 2016 a Blanding's Turtle was documented crossing the laneway next to the creek. Both sites constitute suitable overwintering habitat.	n/a	**Candidate**
Snake hibernaculum	??	None specifically detected, however, Eastern Gartersnake was documented on 6 occasions by D&A, as well as by local residents. A local resident also found a dead Eastern Milksnake at the corner of Erbsville Road and Conservation Drive.	n/a	**Candidate**
Bat hibernacula *Bat hibernacula*	---	None detected or expected to occur. Hibernacula may be present in caves, mine shafts, underground foundations and karsts.	No	No
Bat maternity colonies	---	Maternity colonies are normally found in tree cavities, vegetation and buildings (buildings are not considered to be SWH). Habitat is not present (*i.e.* Mature Deciduous/Mixed forest >10 ha with >25 cm DBH trees). Regardless, forested areas will be protected.	n/a	No
Bat migratory stopover area	---	There are no landscape features that are large enough to function as a navigational corridor for bats during migration.	n/a	No
Bullfrog concentration areas	See text	Bullfrog was documented from the stormwater management pond at the SW corner of the Regal Place property.	**Candidate**	Not addressed
Migratory butterfly stopover areas *Migratory butterfly stopover areas*	---	None of any significance is expected to occur. The study area is too far (*i.e.* greater than 5 km away) from the Lake Ontario shore.	No	No
Rare Vegetation Communities or Specialised Habitats for Wildlife				
Alvars *Alvar*	---	None were detected or are expected to occur.	No	No
Tall-grass prairies *Tall-grass prairie*	---	None were detected or are expected to occur.	No	No
Savannahs *Savannah*	---	None were detected or are expected to occur.	No	No
Cliffs and talus slopes	---	None were detected or are expected to occur.	No	No
Sand barrens	---	None were detected or are expected to occur.	No	No
Rare forest types	---	None of the forest types present on the property are recognized to be "rare" (*i.e.* S1 – S3) according to the Natural Heritage Information Centre (2014).	No	n/a
Other rare vegetation communities	---	No S1 to S3 vegetation communities were documented from the study area.	n/a	No
Habitat for area-sensitive species	See text	Based on OMNR (2000), six area sensitive breeding bird species were documented during the breeding season. Four were associated with the large wooded block north of Wideman Road, one was associated with the marsh west of Schnarr Street, and	**Candidate**	Split into various groups below

SWH Feature or Function	Polygon	Comments	OMNR 2000	OMNRF 2015
		one with the open country habitat at the northwest corner of Wideman Road and Erbsville Road. In addition to the birds, two additional species of area sensitive herpetofauna, American Bullfrog and Northern Map Turtle were documented.		
Marsh bird breeding habitat	1, 2, 3, 30, & 31	Based on OMNRF (2015), two of the listed species, American Bittern and Green Heron, were documented from the study area. However, the Bittern was observed on May 15, 2013 and may have been a migrant. Multiple Green Herons were observed over the many visits to the marsh west of Regal Place suggesting nesting is possible. Breeding of 1 or more Green Herons is considered as SWH.	n/a	**Candidate**
Woodland area-sensitive bird breeding habitat	---	Based on OMNRF (2015), only two of a required three listed species were documented from the study area: Red-breasted Nuthatch and Veery (in 2007).	n/a	No
Open country bird breeding habitat	---	Based on OMNRF (2015), only one of the listed species, Savannah Sparrow, was documented from the study area. Presence of at least 2 of the 5 listed species is required to be SWH.	n/a	No
Shrub/early successional bird breeding habitat	W end of Schnarr St. to Laurel Cr., south to Regal Place turning circle.	Based on OMNRF (2015), one of the listed "indicator" species (Brown Thrasher) and 2, possibly 3 of the listed "common" species (Black-billed Cuckoo and Field Sparrow) were documented over the course of the many survey visits. All were seen in the same area. According to the threshold, SWH designation would be met.	n/a	**Candidate**
Forests providing a high diversity of habitats	See locations described in the text	These treed areas include a diversity of habitats, with numerous vertical layers of vegetation, cavity trees, fallen logs, leaf litter, and diversity of microhabitats and species compositions. Polygons 2 & 3 are swamp and although they are somewhat disturbed do have diversity of vertical vegetation layers, wetter/drier areas, diversity in canopy coverage, and species composition. Polygons 19, 21, 24, 27, 29, 32, & 33 create a contiguous complex of treed habitat. They are minimally disturbed and provide diversity of vertical veg layers, cavity trees, fallen logs and varying amounts of leaf litter, wetter/drier areas, and diversity in species age and composition. Polygon 27 & 29 also contain seeps.	**Candidate**	Not addressed
Old-growth or mature forest stands *Old growth forest*	---	No old-growth or mature forest stands exist in the study area.	No	No
Foraging areas with abundant mast	---	No areas with significant cover from nut or berry producing vegetation occur within the study area.	No	Not addressed
Amphibian woodland breeding ponds *Amphibian breeding habitat (woodland)*	30 – 31 46 – 47 & riparian corridor east of 35	Suitable breeding habitat (*i.e.* wetland, and ponds inside or within 120 m of a woodland) occurs within and directly adjacent to the study area.	**Candidate**	**Candidate**
Amphibian breeding habitat (wetlands)	---	Suitable breeding habitat (*i.e.* wetlands & pools >500 m^2 in size and >120 m from a woodland) is not present within the study area.	n/a	No
Turtle nesting habitat *Turtle nesting areas*	Bare patches of earth west of Schnarr	Turtles nest opportunistically in areas of bare earth or sparse vegetation with mostly unobstructed exposure to sunlight. Nesting has been reported from along the laneway west of Schnarr St., in the manicured verge at the Regal Place turning circle, an isolated patch of earth on the Regal Place property, as	**Candidate**	**Candidate**

SWH Feature or Function	Polygon	Comments	OMNR 2000	OMNRF 2015
	St. south to Regal Place turning circle.	well as the sand box at 665 Erbsville Road. According to OMNRF (2015), individual Snapping Turtle and Northern Map Turtle nest would qualify as SWH. However, municipal road embankments/shoulders are not SWH. Five or more Midland Painted Turtle nests, as required to qualify, were not observed or reported.		
Specialized raptor nesting habitat	---	One woodland raptor species was documented (on one occasion) from the study area over the course of the many survey visits: Sharp-shinned Hawk. However, it is not clear if it was associating with any of the wooded features present or simply passing through while foraging.	No	n/a (split into 2 groups)
Bald Eagle and Osprey nesting, foraging & perching habitat	---	In October 2012, a local resident told IBI Group that she had seen Bald Eagles in the area; a photograph of an eagle in flight was provided in June 2015. Given the small size of the study area, proximity to existing residential development, no observations of Bald Eagle during the summer months of 2013 or 2014, and lack of super canopy trees within the study area, it is unlikely that they nest within the study area. No Osprey were documented during the study.	n/a	No
Woodland raptor nesting habitat	---	One woodland raptor species, Sharp-shinned Hawk, was documented (on one occasion) from the study area over the course of the many survey visits. It is not clear if it was associating with any of the wooded features present or simply passing through while foraging.	n/a	No
Mineral licks	---	None detected.	No	Not addressed
Mink, River Otter, Marten, and Fisher denning sites	---	Based on the study area's location in Ontario, River Otter, Marten and Fisher are unlikely to occur in the study area. No Mink were detected over the course of the 33 visits to the study area, but one dead mink was observed along Erbsville Road by a local resident.	None found	Not addressed
Highly diverse areas	---	The study area is not located within the Carolinian Zone, Frontenac Axis, or other regions identified within the SWH Technical Guide (OMNR, 2000). Furthermore the site does not contain rare vegetation types or regionally significant species richness.	No	Not addressed
Seeps and springs *Seeps and springs*	See text	Seeps and spring confirmed in polygons 16 & 29, suspected in polygon 1, 27 & 31 based on wetland characteristics, and possible in polygons 46 & 47 (both offsite).	**Candidate**	**Candidate**
Terrestrial crayfish	See text	Two areas with terrestrial crayfish were noted: polygon 13 near the wetland (polygon 45), and polygon 16 near the pond.	n/a	**Candidate**
Species of Conservation Concern				
Species identified as nationally endangered or threatened by COSEWIC which are not protected in regulation under Ontario's *Endangered Species Act.*	---	None detected.	No	Not addressed
Species identified as "Special Concern" in Ontario based on lists of *Special Concern, Threatened, Endangered, Extirpated or Extinct Species of Ontario* that	Turtles Bare patches of earth at west end of Schnarr	Seven species designated "Special Concern" in Ontario were documented/reported from or close to the study area: **Monarch (*Danaus plexippus*)** One individual was documented from the Erbsville South study area in 2013. Monarch was also documented in 2007. Suitable host plants are scattered throughout the study area, mostly from	**Candidate**	**Candidate**

SWH Feature or Function	Polygon	Comments	OMNR 2000	OMNRF 2015
are periodically updated by OMNRF. *Special Concern and rare wildlife species*	Street, south to Regal Place turning circle. RHWO Laneway on either side of Laurel Creek. EAWP Locations described in species account.	along the edges meadows and wetlands, as well as agricultural fields. **Snapping Turtle (*Chelydra serpentina*)** Nesting has been reported from the west end of Schnarr St., the manicured verge at the Regal Place turning circle, as well as the sand box at 665 Erbsville Road. Other nesting locations within the study area may have also been used as turtles select sites opportunistically. The Schnarr St. nesting area is also coincident with the reported baby Northern Map Turtle location. **Northern Map Turtle (*Graptemys geographica*)** No nest site found but 'toonie' sized baby found at NW corner of Regal Place property. Given the species habitat preferences and known range, local nesting was considered an anomaly. **Bald Eagle (*Haliaeetus leucocephalus*)** See "Bald Eagle and Osprey nesting, foraging & perching habitat" text in the above cell. **Red-headed Woodpecker (*Melanerpes erythrocephalus*)** Breeding birds were documented from either side of the laneway crossing Laurel Creek. **Eastern Wood-Pewee (*Contopus virens*)** Observed at 3 locations in 2013: in woods north of laneway at west end of Schnarr St.; in woods east of field, east of Erbsville Rd.; and woods west of pond at 665 Erbsville Rd. **Canada Warbler (*Cardellina canadensis*)** The closest that this species was recorded during the breeding season was from along Conservation Dr., 300 m+ away from the study area.		
Species that are listed as rare (S1–S3) or historical in Ontario based on records kept by the Natural Heritage Information Centre in Peterborough. *Special Concern and rare wildlife species*	See section above	Snapping Turtle and Northern Map Turtle have a provincial rarity rank of S3. Both are also designated "Special Concern" in Ontario and are discussed in the section above. Great Egret (*Ardea alba*) has a rank of S2 in the breeding season. However it was not considered to be breeding locally.	**Candidate**	**Candidate**
Species whose populations appear to be experiencing substantial declines in Ontario.	1, 2, 4, 6, 7, 10, 13, 24, 25, 37, 44	Information on population declines was incorporated into the assessment conducted by Environment Canada (EC, 2014). Fourteen of the breeding species documented from the study area by D&A and local residents between 2012 and 2014 were identified as Priority Species of conservation concern in Bird Conservation Region 13, the Lower Great Lakes-St. Lawrence Plain. The population objective for all but one was "Maintain Current", "Increase", or "Recovery". For Canada Goose it was "Decrease". The 14 species included: Canada Goose, Killdeer, Spotted Sandpiper, Black-billed Cuckoo, Belted Kingfisher, Northern Flicker, Eastern Wood-Pewee, Eastern Kingbird, Barn Swallow, Brown Thrasher, Field Sparrow, Savannah Sparrow, Rose-breasted Grosbeak, and Baltimore Oriole).	**Candidate**	Not addressed
Species that have a high percentage of their global population in Ontario and are rare or uncommon in the planning area	---	Information on species range was incorporated in to the assessment conducted by Environment Canada and in the preparation of their lists of Priority Species of conservation concern (EC, 2014). See discussion above.	**Candidate**	Not addressed

SWH Feature or Function	Polygon	Comments	OMNR 2000	OMNRF 2015
Species that are rare within the planning area, even though they may not be provincially rare	*Fauna*: 2, 3, 4, 18, 24, 30 *Flora*: 12, 18, 27, & 32	The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (OMNRF, 2015) does not include this subcategory. The application of this category is constrained by a lack of current and scientifically-derived status lists for most biota within the local planning area. Therefore the findings should be viewed with caution. *Fauna* According to the Regional Municipality of Waterloo (RMW, 1985a; RMW, 1985b); RMW, 1996), 8 resident or breeding wildlife species documented from and directly adjacent to the study area are considered to be "rare"; Red-spotted Newt, Eastern Red-backed Salamander, American Bullfrog, Eastern Milksnake, Hooded Merganser, Sharp-shinned Hawk, Red-bellied Woodpecker & Virginia Opossum. It is not specified whether the presence of one individual should trigger SWH. *Flora* Four locally rare plant species were recorded in the study area (RMW, 1999). Locations and abundance of each of these species is discussed in detail in *the Vascular Plants* Section.	**Candidate**	Not addressed
Species that are subjects of recovery programs (*e.g.*, the Black Duck Joint Venture of the North American Waterfowl Management Plan)	---	None are present.	No	Not addressed
Species considered important to the municipality, based on recommendations from the Conservation Advisory Committee	---	We are not aware of any such list for this area.	No	Not addressed
Animal Movement Corridors				
Animal Movement Corridors	Laurel Creek riparian corridor. Wideman Creek riparian corridor and woods.	Local connectivity is important for general wildlife dispersal. Two main animal movement corridors were identified within and adjacent to the study area: the Laurel Creek riparian corridor, and the Wideman Creek riparian corridor and woodlands. The Laurel Creek riparian corridor encompasses the entire extended study area, wraps around the northern edge of the primary study area, crosses Erbsville Road, and runs along the eastern edge of the primary study area. The Wideman Creek riparian corridor crosses Erbsville Rd. through the southern part of the primary study area. It joins up with the Laurel Creek riparian corridor by passing through the large forest block directly north of Wideman Road.	**Candidate**	Includes thresholds for only 2 groups (described below)
Amphibian movement corridors	---	No amphibian movement corridors between breeding and summer habitat were detected.	Included above	No
Deer movement corridors	---	Deer wintering habitat is not present within or adjacent to the study area, therefore, no significant deer movement corridors are present. Deer movement corridors should be unbroken by roads and residential areas.	Included above	No

References

COSEWIC (Committee on the Status of Endangered Wildlife in Canada) 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentine* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2015. Canadian Wildlife Species at Risk. October 2015. Committee on the Status of Endangered Wildlife in Canada. Web site: http://www.cosewic.gc.ca/eng/sct0/rpt/rpt_csar_e.cfm [accessed 13 September 2016]

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2016. COSEWIC Wildlife Species Assessments (detailed version), April 2016. Available at: http://www.cosewic.gc.ca/rpts/201604/Detailed_species_assessments_e.pdf

EC (Environment Canada) 2014. Bird Conservation Strategy for Bird Conservation Region 13 in Ontario Region: Lower Great Lakes/St. Lawrence Plain - Abridged Version - July 2014. 34 pp. Available at: http://www.ec.gc.ca/mbc-com/F43BE8A4-376F-4525-B1CD-2E78B43989D8/BCR_13_ON%20FINAL_Abridged_October_2014.pdf

NHIC (Natural Heritage Information Centre). 2016. NHIC Species Lists. Available at: https://www.ontario.ca/page/get-natural-heritage-information

OMNR (Ontario Ministry of Natural Resources). 2000. Significant Wildlife Habitat Technical Guide. 139 pp. Available at: http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@fw/documents/document/mnr_e001285.pdf

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E, January, 2015. 39 pp. Available at: https://www.ontario.ca/document/significant-wildlife-habitat-ecoregional-criteria-schedules-ecoregion-6e

RMW (Regional Municipality of Waterloo). 1985a. Appendix 3: Reptiles and Amphibians in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.

RMW (Regional Municipality of Waterloo). 1985b. Appendix 4: Mammals in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.

RMW (Regional Municipality of Waterloo). 1996. Revisions to Waterloo Region's Significant Species List: Breeding Birds Component. Report to Planning and Culture Committee PC-96-021. Approved by Council: April 25, 1996.

RMW (Regional Municipality of Waterloo). 1999. Significant Species List. Native vascular plants component. PC-99-028.1 Appendix A.

Sunvest Development Corporation

Butternut Health Assessment

August 22, 2016

DOUGAN & ASSOCIATES
ECOLOGICAL CONSULTING & DESIGN

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Enclosures:

1. Information from the Ministry of Natural Resources and Forestry about Butternut and the *Endangered Species Act, 2007*
2. Butternut Health Assessor's Report
3. Original data forms
4. Electronic and printed copies of the Excel data spreadsheet (BHA Tree Analysis)

Ministry of Natural Resources and Forestry

Species At Risk
P.O. Box 7000, 300 Water Street
Peterborough ON K9J 8M5

Ministère des Richesses naturelles et des Forêts

Espèces en péril
C.P. 7000, 300, rue Water
Peterborough ON K9J 8M5

The enclosed Butternut Health Assessor's Report documents the results of the Butternut health assessment that was conducted by the designated Butternut Health Assessor (BHA) identified in the top section of the report. If there are other Butternut trees (of any size or age) at the site that may be affected by the activity and they are not identified in the enclosed BHA Report, they too must be assessed by a designated BHA.

Butternut is listed as an endangered species on the Species at Risk in Ontario List, and as such, it is protected under the *Endangered Species Act, 2007* (ESA) from being killed, harmed, or removed. If you are planning to undertake an activity that may affect Butternut, you may be eligible to follow the requirements set out in section 23.7 of Ontario Regulation 242/08 under the ESA, or you may need to seek an authorization under the ESA (e.g., a permit).

Please visit e-laws at the link provided below for the legal requirements of eligible activities under section 23.7 of Ontario Regulation 242/08 and conditions that must be fulfilled. Information about Butternut is also available at: http://www.ontario.ca/environment-and-energy/butternut-trees-your-property.

If you are eligible to kill, harm or take Butternut under section 23.7 of the regulation, your first step is to submit the BHA Report and the original data forms enclosed in this package to the local Ministry of Natural Resources and Forestry (MNRF) District Manager. Note that MNRF cannot accept photocopies or scanned electronic copies of the data forms.

Note regarding changes:

If the enclosed BHA Report does not identify which Butternut tree(s) are proposed to be killed, harmed, or taken in Table 1 (i.e., if "unknown" is indicated in the second last column of Table 1), or, if the information in the last two columns of Table 1 has changed since the date this BHA Report was produced, **do not make any edits to the BHA Report**. Instead, please attach a cover letter that identifies which Butternut tree(s) are proposed to be killed, harmed, or taken (by referencing the tree identification numbers) when you submit the enclosed BHA Report to the local MNRF District Manager.

The BHA Report must be submitted at least 30 days prior to registering an eligible activity to kill, harm, or remove a Butternut tree. During this 30 day period, no Butternut trees (of any category) may be killed, harmed, or removed, and MNRF may contact you for an opportunity to examine the trees. If MNRF chooses to examine the trees, a representative of MNRF will contact you using the information you supplied when you submitted the BHA Report.

If you are eligible to follow the rules in regulation under section 23.7, you may register your activity using the "Notice of Butternut Impact" form on the MNRF Registry **after the 30 day period has elapsed**.

If you are **not** eligible to follow the rules in regulation under section 23.7, please contact the local MNRF district office to determine whether you will need to seek an authorization (e.g., a permit). A link to the directory of MNRF offices is provided below.

Note that municipal by-laws and legislation other than the ESA may also be applicable to the removal or harming of trees.

Please retain this information and a copy of the BHA Report (including copies of all data forms) for your records, along with any other documentation you may receive from MNRF should an examination of the trees occur. If you have any questions, please contact your local MNRF district office.

Links:

Endangered Species Act, 2007:
http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07e06_e.htm

Ontario Regulation 242/08 (refer to section 23.7):
http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm

MNRF Office Locations:
https://www.ontario.ca/government/ministry-natural-resources-and-forestry-regional-and-district-offices

Butternut Health Assessor's Report Number: 229-161

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Email address

Site location: 720 Erbsville Road, Waterloo, Ontario

Date(s) of Butternut health assessment: July 11, 2016)
Date BHA Report prepared: August 8, 2016

Map datum used: X NAD83 ☐ WGS84

Total number of trees assessed in this BHA Report: 9

The assessed trees were numbered on site using (white paint. The numbers at the site correspond to the tree numbers referenced in this report.

This BHA Report includes the following tables:

- Table 1: Butternut Trees Assessed
- Table 2: Trees Determined by BHA to be Butternut Hybrids
- Table 3: Summary of Assessment Results

Note to BHAs: add/remove table rows as necessary

Table 1: Butternut Trees Assessed

Tree #	UTM coordinates		Category[1] (1, 2, or 3[2])	dbh[3] (cm)	Cultivated? (Y/N)	Proposed to be: (enter one: unknown[4], killed, harmed or taken)	If tree is proposed to be killed, harmed, or taken, indicate reason tree is proposed to be killed, harmed or taken:
1	532217.50	4814210.96	3	26	N	N	

[1] The extent to which the tree is affected by Butternut Canker is presented in the Excel document titled, "BHA Tree Analysis" that accompanies this BHA Report.
[2] Category 3 trees are not eligible to be killed, harmed or taken under section 23.7 of Ontario Regulation 242/08.
[3] dbh: diameter at breast height, rounded to nearest cm (if tree is shorter than breast height, enter zero)
[4] In this column, "unknown" indicates that at the time of assessment, there are no proposals to kill, harm or take this tree that are known to the BHA.

Tree #	UTM coordinates		Category[1] (1, 2, or 3[2])	dbh[3] (cm)	Cultivated? (Y/N)	Proposed to be: (enter one: unknown[4], killed, harmed or taken)	If tree is proposed to be killed, harmed, or taken, indicate reason tree is proposed to be killed, harmed or taken:
2	532176.72	4814199.21	3	39	N	N	
3	532166.40	4814208.49	3	41	N	N	
4	532160.74	4814209.91	2	5	N	N	
5	532171.17	4814209.40	3	22	N	N	
6	532167.29	4814192.95	3	31	N	N	
7	532172.82	4814184.87	3	42	N	N	
8	532080.30	4814203.08	2	14	N	N	
9	532082.61	4814193.76	2	14	N	N	

Table 2: Trees Determined by BHA to be Butternut Hybrids

Tree #	UTM coordinates		Method used (genetic testing or field identification):
1	532217.50	4814210.96	Genetic
3	532166.40	4814208.49	Genetic
4	532160.74	4814209.91	Genetic
5	532171.17	4814209.40	Genetic
7	532172.82	4814184.87	Genetic
8	532080.30	4814203.08	Genetic
9	532082.61	4814193.76	Genetic

Table 3: Summary of Assessment Results

Result:	**Total #:**	**Important information for persons planning activities that may affect Butternut:**
Category 1	0	• A Category 1 tree is one that is affected by butternut canker to such an advanced degree that retaining the tree would not support the protection or recovery of butternut in the area in which the tree is located; and is considered “non-retainable”. • During the 30 day period that follows your submission of this BHA Report to the MNRF District Manager, no Butternut trees (of Category 1, 2, or 3) may be killed, harmed, or taken, and MNRF may contact you for an opportunity to examine the trees. • Category 1 trees may be killed, harmed or taken **after** the 30 day period that follows submission of this BHA Report to the MNRF District Manager, unless the results of an MNRF examination indicate that the assessment has not been conducted in accordance with the

Result:	Total #:	Important information for persons planning activities that may affect Butternut:
		document entitled “Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the *Endangered Species Act, 2007”*.
Category 2	0	• A Category 2 tree is one that is not affected by Butternut Canker, or is affected by Butternut Canker but the degree to which it is affected is not too advanced and retaining the tree could support the protection or recovery of butternut in the area in which the tree is located, and is considered “retainable”. • During the 30 day period that follows your submission of this BHA Report to the MNRF District Manager, no Butternut trees (of Category 1, 2, or 3) may be killed, harmed, or taken, and MNRF may contact you for an opportunity to examine the trees. • Activities that may kill, harm or take up to a **maximum of ten (10)** Category 2 trees may be eligible to follow the rules in section 23.7 of Ontario Regulation 242/08, in accordance with the conditions and requirements set out in the regulation. • Refer to e-Laws for the legal requirements of eligible activities under section 23.7 of Ontario Regulation 242/08 and conditions that must be fulfilled: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm • Activities that may kill, harm or take more than ten (10) Category 2 trees are not eligible to follow the rules in section 23.7 of Ontario Regulation 242/08. Contact the local MNRF district office for information on how to seek an ESA authorization (e.g., a permit) or consider an alternative that would be eligible for the regulation.
Category 3	0	• A Category 3 tree is one that may be useful in determining sources of resistance to Butternut Canker, and is considered “archivable”. • Category 3 trees are not eligible to be killed, harmed or taken under section 23.7 of Ontario Regulation 242/08. • Contact the local MNRF district office for information on how to seek an ESA authorization, or consider an alternative that will avoid killing, harming or taking any Category 3 trees.
Cultivated	0	• An activity that involves killing, harming, or taking a cultivated Butternut tree that was not required to be planted to fulfill a condition of an ESA permit or a condition of a regulation, may be eligible for the exemption provided by subsection 23.7 (11) of O. Reg. 242/08. • Prior to undertaking the activity, the owner or occupier of the land on which the Butternut is located (or person acting on their behalf) will need to determine whether the exemption for cultivated trees is applicable by determining whether or not the tree was cultivated as a result of the requirements for an exemption under O. Reg. 242/08 or a condition of a permit issued under the ESA. This information can be accessed by contacting the local MNRF district office. • The owner or occupier of the land on which the Butternut is located (or person acting on their behalf) is encouraged to append the details regarding whether the tree was planted to satisfy a requirement (e.g., the permit number or registration number) to this BHA Report for their records.
Hybrid	9	• Hybrid Butternut trees are not protected under the ESA, but their removal may be subject to municipal by-laws and other legislation.

Butternut Health Assessor’s Comments:

Tissue could not be collected from trees 2 and 6 for genetic testing because they were too high. Based on their proximity to the confirmed hybrids, and appearance, it is likely that they are hybrids as well.

This concludes the summary of the BHA Report. A complete BHA Report must also include:

1. All original (hard copy) data forms (i.e., all completed sets of Form 1 and Form 2), and
2. Electronic and printed copies of the Excel data analysis spreadsheet.

0cm 3cm 15cm

Butternut Data Collection Form 1 - 2010 Edition

(PLEASE USE BLOCK LETTERS)

Surveyor ID or BHA # 0229

Date (dd/mm/yyyy) 07 - 11 - 2016

Shaded fields are mandatory for Butternut Health Assessments

Surveyor Contact

First ZACK Last HARRIS

Email ZHARRIS@DOUGAN.CA

Telephone (519) 822-1609 Telephone Other ( ) - x32

Property Owner (check if same as surveyor) ☐

First Last

or Company SUNVEST DEVELOPMENT CORP.

Email

Telephone ( ) - Telephone Other ( ) - x

Property Owner's Mailing address

Address 401 VICTORIA ST NORTH Postal Code N2B3C3 Prov. ON

City KITCHENER

Tree Location (if different from mailing address)

Address/(911#) 720 ERBSVILLE ROAD

Township WOOLWICH Lot Con

City WATERLOO

Directions

☒ Yes ☐ No Can Share Location Information with other Butternut Recovery Organizations?

☒ Yes ☐ No Site visits OK? (prior arrangments will always be made for a site vist)

> (Greater than)
< (Less than)

Butternut Trees Tally by Diameter Class

(Do a dot tally in blank space; write total# in box for each)

Tree Condition	< 3 cm	3-15 cm	16-30cm	>30 cm
Vigorous: > 50% Live Crown Minor or no cankers	00	03	02	04
Poor Vigor: <50% Live Crown or >50% Live Crown + heavily cankered stem	00	00	00	00
Dead	00	00	00	00

Historically, do some trees produce seeds? ☒ Y ☐ N ☐ Unkown

Estimated area containing butternut for properties > 1 acre (0.4 hectares): 0.2 ☐ Acres ☒ Hectares

Overall Property Description (area(s) containing Butternut)

☐ Rolling Upland ☐ Bottomland
☐ Valley Slope ☐ Variable
☒ Tableland ☐ Unknown

Vegetation Community/ies

☐ Open ☐ Fencerow
☐ Shrubland ☐ Roadside
☒ DeciduousForest ☐ Quary
☐ ConiferForest ☐ UrbanYard
☐ MixedForest ☐ UrbanPark

Other WOODLAND

Soil Drainage

☐ Well Drained
☐ Moderately Drained
☐ Poorly Drained
☒ Unknown

Soil Texture

☐ Clay ☐ Sand
☐ Clay Loam ☐ Variable
☐ Loam ☐ Unknown
☒ Loamy Sand

Soil Depth

☒ > 1metre
☐ 30 - 99cm
☐ < 30cm
☐ Variable
☐ Unknown

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Suite 233, 266 Charlotte St.
Peterborough, ON, K9J 2V4
www.fgca.net

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Butternut Data Collection FORM 2 (2010 Edition)

(PLEASE USE BLOCK LETTERS)

Fill when Form 1 indicates canker is well established. The information opn Form 2 must be filled out for all trees when doing a Butternut Health Assessment.

Shaded fields are mandatory for Butternut Health Assessments

Site Code(A,B,...Z, AA...): ERB

Surveyor ID or BHA #: 0229

Surveyor Last Name: HARRIS

Date (dd/mm/yyyy): 07 - 11 - 2016

Tree ID Numbering: 1,2,3,...Starting from 1 for each site

Tree # 001

Zone 17 | Easting 532217 | Northing 4814210

Crown Class: 2 | Live Crown %: 100 | Main Stem Length(m) Below crown: 01

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 5 | DBH(cm): 26

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown: #Epic-Live: 02 | #Epic-Dead: 02 | Bark Type: D | # Callused Wounds: 02

	#Open	#Sooty
Root	0	0
=<2m	0	0
>2m		

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: JUGNIGR

DBH FOR DOMINANT STEM. HYBRID? - PITH. WOUNDS NOT FROM CANKER.

Tree # 002

Zone 17 | Easting 532176 | Northing 4814199

Crown Class: 1 | Live Crown %: 100 | Main Stem Length(m) Below crown: 05

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 2 | DBH(cm): 039

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown: #Epic-Live: 00 | #Epic-Dead: 00 | Bark Type: D | # Callused Wounds: 03

	#Open	#Sooty
Root	01	04
=<2m	00	01
>2m	00	01

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: ALENEGU

NO TISSUE COLLECTED - TOO HIGH.

Tree # 003

Zone 17 | Easting 532166 | Northing 4814208

Crown Class: 1 | Live Crown %: 100 | Main Stem Length(m) Below crown: 04

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 1 | DBH(cm): 041

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown: #Epic-Live: 00 | #Epic-Dead: 02 | Bark Type: D | # Callused Wounds: 00

	#Open	#Sooty
Root	01	01
=<2m	00	00
>2m	00	00

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: SALALBA / ACENEGU

STUMP RE-SPROUT, WAS CUT 5+ YEARS AGO.

Tree # 004

Zone 17 | Easting 532160 | Northing 4814209

Crown Class: 4 | Live Crown %: 100 | Main Stem Length(m) Below crown: 02

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 3 | DBH(cm): 005

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown: #Epic-Live: 00 | #Epic-Dead: 00 | Bark Type: S | # Callused Wounds: 00

	#Open	#Sooty
Root	00	02
=<2m	00	00
>2m	00	00

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: ACENEGU / JUGNIGR

STUMP RE-SPROUT - WAS CUT 5+ YEARS AGO.

Tree # 005

Zone 17 | Easting 532171 | Northing 4814209

Crown Class: 3 | Live Crown %: 100 | Main Stem Length(m) Below crown: 05

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 2 | DBH(cm): 022

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown: #Epic-Live: 01 | #Epic-Dead: 02 | Bark Type: S | # Callused Wounds: 01

	#Open	#Sooty
Root	00	03
=<2m	00	00
>2m	00	00

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: ACENEGU / JUGNIGR

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Butternut Data Collection FORM 2 (2010 Edition)

(PLEASE USE BLOCK LETTERS)

Shaded fields are mandatory for Butternut Health Assessments

Fill when Form 1 indicates canker is well established. The information opn Form 2 must be filled out for all trees when doing a Butternut Health Assessment.

Site Code(A,B,...Z, AA...): ERB

Surveyor ID or BHA #: 0229

Surveyor Last Name: HARRIS

Date (dd/mm/yyyy): 07 - 11 - 2016

Tree ID Numbering: 1,2,3,...Starting from 1 for each site

Tree 006

Tree #: 006 | Zone: 17 | Easting: 532167 | Northing: 4814192

Crown Class: 1 | Live Crown %: 100 | Main Stem Length(m) Below crown: 09

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 1 | DBH(cm): 031

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown:

	#Open	#Sooty
00 #Epic-Live		
01 #Epic-Dead		
D Bark Type		
05 # Callused Wounds		
Root	00	04
=<2m	00	00
>2m	00	00

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: JUGCINE / ACENEGU

NO TISSUE - TOO HIGH

Tree 007

Tree #: 007 | Zone: 17 | Easting: 532172 | Northing: 4814184

Crown Class: 2 | Live Crown %: 100 | Main Stem Length(m) Below crown: 02

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 2 | DBH(cm): 042

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☒ Seed Set ☐ None

Assess below live crown:

	#Open	#Sooty
00 #Epic-Live		
02 #Epic-Dead		
D Bark Type		
01 # Callused Wounds		
Root	00	02
=<2m	00	01
>2m		

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: JUGNIGR / JUGCINE

A FEW DEVELOPING FRUIT. OTHER STEM HAS SOOTY SPOTS.

Tree 008

Tree #: 008 | Zone: 17 | Easting: 532080 | Northing: 4814203

Crown Class: 3 | Live Crown %: 100 | Main Stem Length(m) Below crown: 04

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 1 | DBH(cm): 014

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown:

	#Open	#Sooty
01 #Epic-Live		
02 #Epic-Dead		
S Bark Type		
02 # Callused Wounds		
Root	00	00
=<2m	00	01
>2m	00	01

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: ACEPLAT / JUGCINE / PICPUNG

LARGE SPLIT IN BARK NOT LIKELY FROM CANKER.

Tree 009

Tree #: 009 | Zone: 1 | Easting: 532082 | Northing: 4814193

Crown Class: 3 | Live Crown %: 100 | Main Stem Length(m) Below crown: 04

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: 1 | DBH(cm): 014

Butternut Origin: ☐ Natural ☐ Planted ☒ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☒ None

Assess below live crown:

	#Open	#Sooty
00 #Epic-Live		
00 #Epic-Dead		
S Bark Type		
01 # Callused Wounds		
Root	00	01
=<2m	00	01
>2m	01	00

Metres from badly cankered tree: ☒ < 40 ☐ > 40 ☐ None Found

Competing Species: ACEPLAT / JUGNIGR

Tree

Tree #: | Zone: 1 | Easting: | Northing:

Crown Class: | Live Crown %: | Main Stem Length(m) Below crown:

Twig Dieback ☐ | Branch Dieback ☐ | Defoliation ☐ | Discolouration ☐ | #Stems: | DBH(cm):

Butternut Origin: ☐ Natural ☐ Planted ☐ Unknown

Seed Signs: ☐ Male Flowers ☐ Female Flowers ☐ Seed Set ☐ None

Assess below live crown:

	#Open	#Sooty
#Epic-Live		
#Epic-Dead		
Bark Type		
# Callused Wounds		
Root		
=<2m		
>2m		

Metres from badly cankered tree: ☐ < 40 ☐ > 40 ☐ None Found

Competing Species:

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BHA Tree Analysis (version: December 2013)

This table is to be completed by a designated Butternut Health Assessor (BHA).

BHA Report #	229-161	Assessment Date(s)	11-Jul-16	Total # Butternut Trees in BHA Report	9
BHA ID #	229	BHA Name	Zack Harris		
Landowner / Client Name			Sunvest Development Corp.		
Property Location			720 Erbsville Road, Waterloo, Ontario		

input field data										automatic calculations from field data						Categories: 1: non-retainable, 2: retainable, 3: archivable				
			# bole cankers				# root flare (RF) cankers													
Tree #	Live Crown %	Tree dbh (cm)	sooty (S) (will be assigned 2.5 cm per canker)		open (O) (will be assigned 5 cm per canker)				<40 m from cankered tree? (Y or N)	Circ. (cm) = Pi x dbh	total bole canker width (sooty x 2.5 + open x 5)	total RF canker width (sooty x 2.5 + open x 5)	bole canker % of circ.	RF canker % of circ.	total bole & root canker % of 2xCirc	LC% >/= 50 & BC% = 0	LC% >70 & BRC % <20	LC% >70 & BC % <20	Preliminary tree call	FINAL TREE CALL a Cat 2, dbh>20cm <40m from a Cat 1
			S <2 m	S >2 m	O <2 m	O >2 m	RF S	RF O		Circ (cm)	BC (cm)	RC (cm)	BC%	RC%	BRC%					
1	100	26	0		0		0	0	Y	81.64	0.0	0.0	**0.0**	**0.0**	**0.0**	2	2	2	**2**	**3**
2	100	39	1	1	0	0	4	1	Y	122.5	5.0	15.0	**4.1**	**12.2**	**8.2**	1	2	2	**2**	**3**
3	100	41	0	0	0	0	1	1	Y	128.7	0.0	7.5	**0.0**	**5.8**	**2.9**	2	2	2	**2**	**3**
4	100	5	0	0	0	0	2	0	Y	15.7	0.0	5.0	**0.0**	**31.8**	**15.9**	2	2	2	**2**	**2**
5	100	22	0	0	0	0	3	0	Y	69.08	0.0	7.5	**0.0**	**10.9**	**5.4**	2	2	2	**2**	**3**
6	100	31	0	0	0	0	4	0	Y	97.34	0.0	10.0	**0.0**	**10.3**	**5.1**	2	2	2	**2**	**3**
7	100	42	1		0		2	0	Y	131.9	2.5	5.0	**1.9**	**3.8**	**2.8**	1	2	2	**2**	**3**
8	100	14	1		0		0	0	Y	43.96	2.5	0.0	**5.7**	**0.0**	**2.8**	1	2	2	**2**	**2**
9	100	14	1	0	0	1	1	0		43.96	7.5	2.5	**17.1**	**5.7**	**11.4**	1	2	2	**2**	**2**
10										0	0.0	0.0	#####	#####	#####	####	###	###	##	**#DIV/0!**
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31										0	0.0	0.0	#####	#####	#####	####	###	###	##	**#DIV/0!**

Blanding's Turtle Habitat Erbsville Block Plan

Legend

BLTU_Cat2_update_Sept4_2015fin1

BLTU_Cat3_ErbsvilleBlockPlan

1 : 6,000

0 350

meters

Produced by:
Graham Buck

Produced on: Tuesday, May 10, 2016
File Name: Reviews_Screenings.mxd

Spatial Reference: UTM Zone 17N
Datum: NAD 1983 (spheroid: GRS_1980)

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