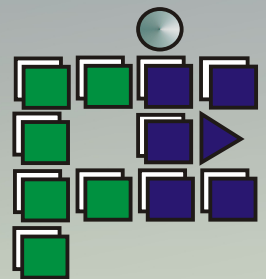




Appendix J

Terrestrial Resources



PLANNERS

CONSULTING

ENGINEERS &

LANDSCAPE

ARCHITECTS

Appendix J

- Appendix J1:** Wildlife observed in the Forbes Creek Subwatershed - spring/summer 1995 by Environmental Advisory Services Inc. for the Cambridge Natural Areas Inventory.
- Appendix J2:** Notes from a conversation between Tina Tschanz and Karl Konze (Dougan and Associates) on December 8th, 2000.
- Appendix J3:** Vegetation Constraint Assessment Methodology
- Appendix J4:** Vegetation Community Attributes and Constraint Rankings
- Appendix J5a:** Vascular Plant Checklist for the Forbes Creek Subwatershed
- Appendix J5b:** Explanation of Coefficient of Conservatism (cc), Coefficient of Wetness (cw), Srank and Native Status
- Appendix J6:** Wildlife Constraint Assessment Methodology
- Appendix J7:** Wildlife Observed Within and Immediately Adjacent to the Forbes Creek Subwatershed by Dougan and Associates 2000-2002.
- Appendix J8:** Environmentally Sensitive Policy Areas (ESPAs)
- Appendix J9a:** Regional Municipality of Waterloo – Planning, Housing and Community Services Department Report - Evaluation of Natural Areas in the Forbes Creek Subwatershed as Potential New Environmentally Sensitive Policy Area
- Appendix J9b:** Regional Municipality of Waterloo – Forbes Creek Headwaters (Proposed Environmentally Sensitive Policy Area) Draft Fact Sheet
- Appendix J9c:** Regional Municipality of Waterloo – Proposed ESPA: Forbes Creek Headwaters Location Map
- Appendix J10:** Existing Linkages and Corridors between Subwatersheds
- Appendix J11:** Existing Linkages and Corridors within the Forbes Creek Subwatershed

Appendix J1: Wildlife observed in the Forbes Creek Subwatershed - spring/summer 1995.

Data compiled from Cambridge Natural Areas Inventory Table 5 and field notes.

COMMON NAME		Conservation Status ^{1,2,3,4}		Cambridge N.A.I. Unit Numbers ⁵											
				25A	25B	25C	25D	32	33	35	36A	36B	37		
Herpetofauna															
1	American Toad		N/A	X		X	no wildlife data			X				X	
2	Spring Peeper		N/A	X						X	X				
3	Bullfrog	RS	N/A		X										
4	Northern Leopard Frog		N/A						X	X				X	
5	Wood Frog		N/A	X							X	X			
Birds															
1	Green Heron	RS	Level 4				no wildlife data		X						
2	Turkey Vulture	RS	Level 4	X											
3	Canada Goose			X						X					
4	Northern Harrier	RS	Level 4							X					
5	Red-tailed Hawk			X						X	X	X			
6	Common Snipe	RS	Level 2						X						
7	Mourning Dove				X					X					
8	Ruby-throated Hummingbird	RS	Level 3								X				
9	Downy Woodpecker			X					X	X	X				
10	Northern Flicker			X						X	X				
11	Eastern Wood-Pewee			X					X	X	X			X	
12	Great Crested Flycatcher			X						X					
13	Eastern Kingbird		Level 3								X				
14	Red-eyed Vireo			X							X				
15	Blue Jay			X						X	X				
16	American Crow									X					
17	Black-capped Chickadee		Level 4	X					X		X				
18	White-breasted Nuthatch										X				
19	Brown Creeper	RS	Level 2								X				
20	American Robin			X		X				X	X				X
21	Gray Catbird		Level 4	X					X		X	X			X
22	European Starling					X									
23	Cedar Waxwing									X					
24	Yellow Warbler					X									
25	Mourning Warbler	RS	Level 2	X											
26	Song Sparrow			X											
27	Northern Cardinal			X		X					X	X			
28	Rose-breasted Grosbeak			X							X				
29	Red-winged Blackbird			X	X	X					X	X	X		
30	Common Grackle			X							X				
31	Baltimore Oriole									X					
32	American Goldfinch										X				
Mammals															
1	Eastern Cottontail		N/A	X			no								
2	Eastern Chipmunk		N/A	X						X					
3	Red Squirrel		N/A								X				

Appendix J1 continued: Wildlife observed in the Forbes Creek Subwatershed - spring/summer 1995. Data compiled from Cambridge Natural Areas Inventory Table 5 including field notes.

COMMON NAME		Conservation Status ^{1,2,3,4}		Cambridge N.A.I. Unit Numbers ⁵											
				25A	25B	25C	25D	32	33	35	36A	36B	37		
Mammals continued..															
4	Coyote	RS	N/A	X									X		
5	Raccoon		N/A	X											
6	Striped Skunk		N/A										X		
7	White-tailed Deer		N/A	X						X					

LEGEND

RS = Regionally Significant = Officially recognized by the Regional Municipality of Waterloo to be significant within its jurisdiction.

Level 1 = Bird species of conservation concern for the Regional Municipality of Waterloo (highest level of concern)

Level 2 = Bird species of conservation concern for the Regional Municipality of Waterloo (greater than Level 3)

Level 3 = Bird species of conservation concern for the Regional Municipality of Waterloo (less than Level 2)

Level 4 = Bird species of conservation concern for the Regional Municipality of Waterloo (lowest level of concern)

N/A = Not applicable

X = Species recorded from Unit

REFERENCES

1. Regional Municipality of Waterloo, 1985. Appendix 3: Reptiles and Amphibians in *Environmentally Sensitive Policy Areas Technical Appendix*. Approved by Council: 1986.
2. Regional Municipality of Waterloo, 1985. Appendix 4: Mammals in *Environmentally Sensitive Policy Areas Technical Appendix*. Approved by Council: 1986.
3. 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.
4. Couturier, A. 1999. Conservation Priorities for the Birds of Southern Ontario. 14pp + 38pp Technical Appendices, and Priority Species Lists.
5. Environmental Advisory Services Limited. 1996. *City of Cambridge Natural Areas Inventory*.

Appendix J2: Notes from a conversation between Tina Tschanz and Karl Konze (Dougan and Associates) on December 8th, 2000.

- Tina Tschanz lives at 300 Blackbridge Road, just east of Guelph Avenue and Hwy 24.
- She attended the Open House on December 7th 2000.

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- Pileated Woodpeckers have been resident for years in her woods. Both Downy and Hairy Woodpeckers are also resident year round she says.
- She believes the White-tailed Deer are resident more or less year round on her property. They reside within the cedars. At dawn and dusk they move to the creek to drink water. She has seen 22 deer at once! She has given permission to hunt deer on her property to a bow hunter. She does not know his name.
- The bow hunter told her that there all kinds of deer around. He has also seen Wild Turkey (most recently last year - 1999) and their tracks in his pursuits. Tina has also seen a Wild Turkey on one occasion. Otherwise she hears "clucking" on occasion and believes it is them.
- Two springs ago (1999), she had a male Ring-necked Pheasant visit her feeder, but it promptly disappeared.
- She has also seen a Ruffed Grouse (described as "brown and speckled, plump") cross Blackbridge Road between Hwy 24 and her house.
- She regularly sees Ruby-throated Hummingbirds at her feeder. She says they usually arrive May 8th and depart September 8th.
- She has seen a pair of Red Fox around her property. She says they look to be in good physical condition. They regularly frequent the "Forbes Ponds" in the marsh immediately south of Blackbridge Road. These are not the online ponds.
- She mentioned that she has fireflies along the creek.
- She used to remember seeing more frogs around her are that the past several years. She used to notice them when they crossed the road by her house. She thinks they are not as common anymore. I can't remember but I do not think she mentioned any spring choruses. She did state however, that she does hear them on occasion. She did not know what kind they were.
- It is usually pretty wet behind her house. Sometimes the water comes pretty close to their home. However, the surface water disappears by June more or less?
- Wood Ducks and Mallards regularly come to their woods to nest in spring, but when the water levels recede she thinks they disappear too.
- Some of the other mammals she has noted seeing are: Raccoon, Striped Skunks, Opossum, and Coyote.
- She described what sounded like an Eastern Phoebe nesting alongside their house in summer.
- I asked her if she had any snakes and she said she had lots. They sounded like Eastern Garter Snakes and Brown Snakes
- She also mentioned that she had lots of different kinds of butterflies.
- She believes she sees a Sharp-shinned Hawk year around (She keeps a feeder all year round). One hit her window once while chasing a Black-capped Chickadee.
- Feeder birds she has seen included: House Finch, Red and White-breasted Nuthatch, Northern Cardinal, Blue Jay and Dark-eyed Junco.
- In the summer she also sees Indigo Bunting and Rose-breasted Grosbeak.
- She said that the neighbours to the east of her along Blackbridge Road have Eastern Bluebirds.
- She recalls seeing an owl once before, when they pulled into their driveway. They saw it in their headlights. By their description, it may be an Eastern Screech-Owl? It was too large to be a Great Horned Owl.

APPENDIX J3: VEGETATION CONSTRAINT ASSESSMENT METHODOLOGY

Identified units were ground truthed using *The Ecological Land Classification for Southern Ontario* (ELC) to assess habitats present. The following biological factors were evaluated and rated for vegetation features present. These factors are known to contribute to overall biological functions of any given community or habitat connection

Vegetation Unit Category

Vegetation features were assigned following the ELC protocol.

Structural Diversity

This is a measure of the age distribution and stratum representation (e.g., mosses, herbaceous, groundcovers, low shrubs, tall shrubs, saplings (< 10cm dbh), subcanopy, canopy, emergents) of the plant community. Communities containing a broad representation of old-growth as well as immature and sapling trees, combined with extensive seedling and shrub growth, and prolific development of ground covers, provide optimum conditions for plant and animal diversity.

CLASS 1 = only 1-2 strata represented

CLASS 2 = 2 - 3 strata well represented

CLASS 3 = \geq 4 strata (high structural diversity ("old-growth" characteristics))

Average Canopy Tree Diameter / Relative Age

This reflects the average diameter range of trees in the dominant tree canopy measured at 1.4 metres (DBH) above the ground.

CLASS 1 = < 15 cm (immature)

CLASS 2 = 15-30 cm (immature)

CLASS 3 = > 30 cm (mature)

Canopy Closure

Communities with a greater degree of canopy closure are more sensitive to disturbance and environmental stresses such as those caused by clearing, grading and future pedestrian traffic.

CLASS 1 = <25% closure

CLASS 2 = 25-50% closure

CLASS 3 = >50% closure

Topography

Communities located on complex topographic features contain greater habitat structure, are more sensitive to disturbance than those on flat or uniformly variable topographic features.

CLASS 1 = flat - undulating/regular hummocks, <10%

CLASS 2 = gentle to average slope topography, 10 - 25%

CLASS 3 = complex/steep to very steep topography, >25%

Slope

Communities located on steeper slopes are more sensitive to disturbance. Agricultural lands are excluded from this assessment.

CLASS 1 = flat to gentle slope (<10%)

CLASS 2 = moderate slope (10-25%)

CLASS 3 = steep slope (>25%)

Seepage/Drainage Conditions

Communities with poor drainage, or subject to groundwater discharge conditions, are more sensitive to disturbance and environmental stresses such as those caused by clearing, grading and future pedestrian traffic. In addition, they frequently contribute moisture that sustains adjoining communities.

CLASS 1 = well-drained without evidence of seasonal water tables or seepage; water table never within top 30cm for less than 1 month, if at all

CLASS 2 = imperfectly-drained; water table within top 30 cm of soil for 1-3 month(s) of the year, or with evidence of intermittent groundwater discharge; includes perched conditions

CLASS 3 = poorly-drained; water table within top 30 cm of soil for at least 3 months of the year; and/or with evidence of relatively continuous groundwater discharge; includes perched conditions.

Constraint Rating

Communities were rated for the types and degree of biological constraints, in combination with particular identified physical constraints. Ratings of high, medium or low, based on the capability to withstand the types of impacts associated with urbanization to mixed residential uses. Factors considered included the sensitivity of vegetation to the following changes or impacts in local environment:

- i) moisture regime changes affecting water tables or surface hydrology;
- ii) edge and/or canopy disturbance;
- iii) soil compaction and root zone disturbance;
- iv) microclimate modification;
- v) modification of physical habitat attributes through grading;
- vi) potential effects of introductions of exotic species; and
- vii) potential effects of relatively intensive pedestrian use.

Constraint ratings were assigned according to the following criteria:

HIGH - native plant communities with highly significant (i.e. Class 3) habitat attributes present; specifically: three indicators of Class 3 (minimum score of 9) for: Structural Diversity, Average Canopy Tree Diameter/ Relative Age, and Canopy Closure. In addition, a Class 3 rating in the following individual categories would indicate a high constraint: Slope and Seepage/Drainage.

MEDIUM - native plant communities with moderately significant habitat attributes present; specifically: three indicators of Class 2 or 3 (score range of 6-8) for Structural Diversity, Average Canopy Tree Diameter/ Relative Age, and the Canopy Closure. In addition, a Class 2 rating in the following individual categories would indicate a medium constraint: Slope and Seepage/Drainage.

LOW - limited significant habitat attributes present (less than a minimum total sum of 6 for Structural Diversity, Average Canopy Tree Diameter/ Relative Age, and the Canopy Closure); no slope or drainage constraints.

Constraint ratings should be interpreted as follows:

HIGH - major constraints of drainage, slope/topography, erosion potential, significant botanical features, with minimal capability for mitigation.

MEDIUM - moderate constraints of the above; impacts can be mitigated with appropriate precautionary and rehabilitative measures.

LOW - limited constraints; type of vegetation lacks significance to warrant preservation, or can be readily re-established following disturbance.

APPENDIX J4: Vegetation Community Attributes and Constraint Rankings

A	C	D	I	E	F	G	H	B	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	
Map No.	Area (m ²) of polygon	Area (m ²) of polygon contained within the subwatershed	Area (hectares) of polygon contained within the subwatershed	Community Class	Community Series	Community Series Code	ELC Ecosite	ELC Code	Addition of columns K, L & M for first round of constraint ranking	Structural Diversity	Average Canopy Tree Diameter / Relative Age	Canopy Closure	Topography	Slope	Seepage / Drainage Conditions	Hedgerow Priority Class	Significant Plants	Constraint Ranking (Vegetation)	Forest Interior Habitat	Grassland Habitat (>10 ha)	Wildlife Data	Significant Wildlife (Waterloo Region)	Birds of Conservation Priority for Waterloo	Frogs and Toads	Salamanders	Snakes	Turtles	Constraint Ranking (Wildlife)	Comments	
1.00	11307.47	11307.47	1.13	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	4	2	1	1	1	1	3		Yes	High	Yes		Yes	1	2						Medium	
1.01	139460.01	125103.53	12.51	Forest	Deciduous Forest	FOD	Dry Fresh-Sugar Maple Deciduous Forest	FOD5	9	3	3	3	2	2	1		Yes	High	Yes		Yes	2	5						High	Polygon unit is partially outside subwatershed.
1.02	27315.47	18699.78	1.87	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes		1						Low	Polygon unit is partially outside subwatershed.
1.03	41595.53	41595.53	4.16	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low												
1.04	10685.29	10685.29	1.07	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	4	2	1	1	1	1	3		Yes	High			Yes	1							Medium	
1.05	314.03	314.03	0.03	Hedgerow	Hedgerow	Hedgerow	Hedgerow									3														
1.06	529.02	529.02	0.05	Hedgerow	Hedgerow	Hedgerow	Hedgerow									3														
1.07	40358.2	40358.20	4.04	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															
1.08	3156.3	3156.30	0.32	Swamp	Deciduous Swamp	SWD	Maple Mineral Deciduous Swamp	SWD3	7	2	2	3	1	1	3			High			Yes								Low	
1.09	11156.63	11156.63	1.12	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1						Yes								Low	
1.10	787.17	787.17	0.08	Hedgerow	Hedgerow	Hedgerow	Hedgerow									3														
1.11	84337.25	84337.25	8.43	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															
1.12	1472.65	1472.65	0.15	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	4	2	1	1	1	1	3			High			Yes									
1.13	1772.72	1772.72	0.18	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	2	1			Medium			Yes	1							Medium	
1.14	301710.32	163545.83	16.35	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															Polygon unit is partially outside subwatershed.
1.15	35026.2	977.53	0.10	Forest	Deciduous Forest	FOD	Fresh-Moist Sugar Maple Deciduous Forest	FOD6	7	2	2	3	2	3	1			High												Polygon unit is partially outside subwatershed.
1.16	9705.51	5137.35	0.51	Hedgerow	Hedgerow	Hedgerow	Hedgerow		5	2	1	2	1	1	1	2														Polygon unit is partially outside subwatershed.
1.17	2061.49	2061.49	0.21	Hedgerow	Hedgerow	Hedgerow	Hedgerow		5	2	1	2	1	1	1	2														
1.18	59521.22	59521.22	5.95	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															
1.19	93218.36	54680.34	5.47	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															Polygon unit is partially outside subwatershed.
1.20	23639.18	16743.09	1.67	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low												Polygon unit is partially outside subwatershed.
1.21	103056.1	9564.11	0.96	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															Polygon unit is partially outside subwatershed.
1.22	85601.04	3661.00	0.37	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	2	1	1			Low			Yes	1	2						Medium	Polygon unit is partially outside subwatershed. Polygon is 8.56 ha in size.
2.00	60349.29	60349.29	6.03	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	5	2	1	2	1	1	3		Yes	High	Yes		Yes	2	3						High	Habitat supports Forest Interior habitat.
2.01	7218.84	7218.84	0.72	Forest	Deciduous Forest	FOD	Fresh - Moist Sugar Maple Deciduous Forest	FOD6	8	2	3	3	2	2	1			Medium	Yes										High	Habitat supports Forest Interior habitat.
2.02	14715.37	14715.37	1.47	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High			Yes		1	1					Low	
2.03	7490.4	7490.40	0.75	Swamp	Deciduous Swamp	SWD	Mineral Deciduous Swamp	SWD4	7	2	2	3	1	1	3			High			Yes	1	1						Medium	
2.04	10537.84	10537.84	1.05	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															
2.05	6649.79	6649.79	0.66	Swamp	Coniferous Swamp	SWC	Organic White Cedar Swamp	SWC	7	2	2	3	1	1	3			High	Yes		Yes								High	Habitat supports Forest Interior habitat.
2.06	3360.46	3360.46	0.34	Open Water	Open Aquatic	OAO	Open Aquatic	OAO	3	1	1	1	1	1	3			High			Yes							Low	Also referred to as Pond "I"	
2.07	1584.43	1584.43	0.16	Hedgerow	Hedgerow	Hedgerow	Hedgerow		4	2	1	1	1	1	1	2														
2.08	11173.84	11173.84	1.12	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low												
2.09	9100.01	9100.01	0.91	Swamp	Coniferous Swamp	SWC	Organic White Cedar Swamp	SWC3	7	2	2	3	1	1	3		Yes	High	Yes		Yes								High	Habitat supports Forest Interior habitat.
2.10	2707.76	2707.76	0.27	Swamp	Thicket Swamp	SWT	Mineral Thicket Swamp	SWT2	4	2	1	1	2	1	3			High												
2.11	17007.04	17007.04	1.70	Forest	Deciduous Forest	FOD	Fresh - Moist Sugar Maple Deciduous Forest	FOD6	8	2	3	3	2	2	1			Medium	Yes		Yes								High	Habitat supports Forest Interior habitat.
2.12	10388.39	10388.39	1.04	Swamp	Deciduous Swamp	SWD	Maple Mineral Deciduous Swamp	SWD3	7	2	2	3	1	1	3			High	Yes		Yes		1						High	Habitat supports Forest Interior habitat.
2.13	4545.32	4545.32	0.45	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High												
2.14	1719.57	1719.57	0.17	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High			Yes									
2.15	7365.69	7365.69	0.74	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low												
2.16	885.49	885.49	0.09	Hedgerow	Hedgerow	Hedgerow	Hedgerow		4	2	1	1	1	1	1	2														
2.17	21906.1	21906.10	2.19	Agricultural	Row Crop	Row Crop	Row Crop						1	1	1															
2.18	1749.65	1749.65	0.17	Hedgerow	Hedgerow	Hedgerow	Hedgerow		3	1	1	1	1	1	1	2														
3.00	1050.5	1050.50	0.11	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM	4	2	1	1	1	1	2			Medium			Yes									
3.01	59801.34	59801.34	5.98	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes									
3.02	39534.2	39534.20	3.95	Forest	Deciduous Forest	FOD	Dry Fresh Sugar Maple Deciduous Forest	FOD6	7	2	2	3	2	2	1			Medium	Yes		Yes	1	3		1			Medium		
3.03	8140.4	8140.40	0.81	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	4	2	1	1	1	1	3			High			Yes									
3.04	1827.84	1827.84	0.18	Hedgerow	Hedgerow	Hedgerow	Hedgerow		6	2	2	2	1	1	1	1														
3.05	46397.57	31196.23	3.12	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	2	1	1			Low												Polygon unit is partially outside subwatershed.
3.06	3750.96	3750.96	0.38	Cultural	Cultural Woodland	CUW	Mineral Cultural Woodland	CUW	6	2	2	2	1	1	1			Medium			Yes									
4.00	8536.26	8536.26	0.85	Swamp	Deciduous Swamp	SWD	Maple Mineral Deciduous Swamp	SWD3	7	2	2	3	1	1	3			High			Yes	1	1	2					Medium	
4.01	683.26	683.26	0.07	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM	4	2	1	1	1	1	3			High			Yes									
4.02	26047.92	26047.92	2.60	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM	4	2	1	1	1	1	3			High			Yes	2	3	4					Medium	
4.03	99529.99	99529.99	9.95																											

APPENDIX J4: Vegetation Community Attributes and Constraint Rankings

A	C	D	I	E	F	G	H	B	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE			
Map No.	Area (m ²) of polygon	Area (m ²) of polygon contained within the subwatershed	Area (hectares) of polygon contained within the subwatershed	Community Class	Community Series	Community Series Code	ELC Ecosite	ELC Code	Addition of columns K, L & M for first round of constraint ranking	Structural Diversity	Average Canopy Tree Diameter / Relative Age	Canopy Closure	Topography	Slope	Seepage / Drainage Conditions	Hedgerow Priority Class	Significant Plants	Constraint Ranking (Vegetation)	Forest Interior Habitat	Grassland Habitat (>10 ha)	Wildlife Data	Significant Wildlife (Waterloo Region)	Birds of Conservation Priority for Waterloo	Frogs and Toads	Salamanders	Snakes	Turtles	Constraint Ranking (Wildlife)	Comments			
4.30	416.03	416.03	0.04	Hedgerow	Hedgerow	hedgerow	Hedgerow		3	1	1	1	1	1	1	3																
4.31	12782.5	12782.50	1.28	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low														
4.32	2056.84	2056.84	0.21	Hedgerow	Hedgerow	Hedgerow	Hedgerow		3	1	1	1	1	1	1	2		Low														
4.33	121359.58	117860.33	11.79	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	2	2	1			Low			Yes		2					Low	Partially outside subwatershed. Unit was cut and left to pasture later in summer.			
4.34	3153.24	3153.24	0.32	Forest	Deciduous Forest	FOD	Frest Moist Poplar Deciduous Forest	FOD7	7	2	2	3	1	1	1			Medium			Yes	1		1			Medium					
5.00	4346.07	4346.07	0.43	Forest	Deciduous Forest	FOD	Fresh-Moist Lowland Deciduous Forest	FOD6	7	2	2	3	1	1	1			Medium									Medium					
5.01	31030.97	31030.97	3.10	Swamp	Deciduous Swamp	SWD	Maple Mineral Deciduous Swamp	SWD3	7	2	2	3	1	1	3			High			Yes	1	2	1								
5.02	8761.89	3648.17	0.36	Swamp	Deciduous Swamp	SWD	Mineral Black Ash	SWD4	7	2	2	3	1	1	3			High			Yes									Polygon unit is partially outside subwatershed.		
5.03	16792.26	16792.26	1.68	Swamp	Deciduous Swamp	SWD	Maple Mineral Deciduous Swamp	SWD	7	2	2	3	1	1	3			High														
5.04	4838.53	4838.53	0.48	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM	4	2	1	1	1	1	3			High			Yes		1	1				Low				
5.05	4367.52	4367.52	0.44	Forest	Coniferous Forest	FOC	Fresh-Moist White Cedar Coniferous Forest	FOC4	7	2	2	3	1	1	1			Medium														
5.06	11451.42	11451.42	1.15	Swamp	Deciduous Swamp	SWD	Mineral Deciduous Swamp	SWD4	7	2	2	3	1	1	3			High			Yes											
5.07	7406.56	7406.56	0.74	Cultural	Plantation	CUP	Coniferous Plantation	CUP3	6	1	2	3	1	1	1			Medium			Yes		1					Low				
5.08	4214.07	4214.07	0.42	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	4	2	1	1	1	1	3			High			Yes											
5.09	79262.92	79262.92	7.93	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low														
5.10	2678.01	2678.01	0.27	Hedgerow	Hedgerow	hedgerow	Hedgerow		5	2	1	2	1	1	1	2																
5.11	11142.04	11142.04	1.11	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes											
5.12	9135.01	9135.01	0.91	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM	4	2	1	1	1	1	3			High			Yes											
5.13	773.58	773.58	0.08	Open Water	Open Aquatic	OAO	Open Aquatic		4	2	1	1	1	1	3			High			Yes	1			3			Medium	Also referred to as Pond "H"			
5.14	11752.86	11752.86	1.18	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes		1					Low				
5.15	3296.75	3296.75	0.33	Cultural	Plantation	CUP	Coniferous Plantation	CUP3	5	1	2	2	1	3	1			High														
5.16	31446.51	30129.23	3.01	Agricultural	Row Crop	Row Crop	Row Crop																								Polygon unit is partially outside subwatershed.	
5.17	1168.83	1168.83	0.12	Hedgerow	Hedgerow	Hedgerow	Hedgerow																									
5.18	1306.9	1306.90	0.13	Swamp	Thicket Swamp	SWT	Mineral Thicket Swamp	SWT	3	1	1	1	1	1	3			High														
5.19	29444.19	7907.60	0.79	Agricultural	Row Crop	Row Crop	Row Crop																								Polygon unit is partially outside subwatershed.	
5.20	3495.53	0.00	0.00	Hedgerow	Hedgerow	Hedgerow	Hedgerow		3	1	1	1	1	1	2																Polygon is entirely outside subwatershed boundary.	
5.21	2076.09	0.00	0.00	Hedgerow	Hedgerow	Hedgerow	Hedgerow		3	1	1	1	1	1	2																Polygon is entirely outside subwatershed boundary.	
5.22	54534.58	12208.97	1.22	Agricultural	Row Crop	Row Crop	Row Crop														Yes										Polygon unit is partially outside subwatershed.	
5.23	3162.54	644.75	0.06	Hedgerow	Hedgerow	Hedgerow	Hedgerow		4	1	1	2	1	1	2						Yes	1	1					Medium	Polygon unit is partially outside subwatershed.			
5.24	136015.94	49758.59	4.98	Agricultural	Row Crop	Row Crop	Row Crop														Yes										Polygon unit is partially outside subwatershed.	
5.25	16391.42	0.00	0.00	Cultural	Cultural Woodland	CUW	Mineral Cultural Woodland	CUW1	6	2	1	3	1	1	1			Medium													Polygon is entirely outside subwatershed boundary.	
5.26	19470.26	0.00	0.00	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes		1					Low			Polygon is entirely outside subwatershed boundary.	
5.27	577.24	0.00	0.00	Hedgerow	Hedgerow	Hedgerow	Hedgerow														Yes										Polygon is entirely outside subwatershed boundary.	
5.28	4174.95	0.00	0.00	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes										Polygon is entirely outside subwatershed boundary.	
6.00	2403.1	2403.10	0.24	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High			Yes											
6.01	15553.15	15553.15	1.56	Swamp	Thicket Swamp	SWT	Organic Thicket Swamp	SWT3	4	2	1	1	1	1	3			High			Yes		2					Low				
6.02	10939.79	10939.79	1.09	Swamp	Deciduous Swamp	SWD	Birch-Poplar Organic Deciduous Swamp	SWD7	7	2	2	3	1	1	3			High			Yes		1	2				Low				
6.03	19509.17	19509.17	1.95	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3		Yes	High			Yes		1					Low				
6.04	6816.87	6816.87	0.68	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High			Yes											
6.05	1317.28	1317.28	0.13	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3		Yes	High														
6.06	19390.78	19390.78	1.94	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High			Yes		1					Low				
6.07	9700.16	9700.16	0.97	Agricultural	Row Crop	Row Crop	Row Crop																									
6.08	6387.2	6387.20	0.64	Marsh	Meadow Marsh	MAM	Organic Meadow Marsh	MAM3	4	2	1	1	1	1	3			High			Yes											
6.09	18048.29	18048.29	1.80	Agricultural	Row Crop	Row Crop	Row Crop																									
6.10	5087.03	5087.03	0.51	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	4	2	1	1	1	1	1			Low														
6.11	18811.39	18811.39	1.88	Agricultural	Row Crop	Row Crop	Row Crop																									
6.12	4156.16	4156.16	0.42	Marsh	Meadow Marsh	MAM	Mineral Meadow Marsh	MAM2	4	2	1	1	1	1	3			High														
6.13	18844.89	18844.89	1.88	Agricultural	Row Crop	Row Crop	Row Crop																									
6.14	3939.33	3939.33	0.39	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	4	2	1	1	1	1	1			Low			Yes		1					Low				
6.15	7270.07	7270.07	0.73	Cultural	Cultural Meadow	CUM	Mineral Cultural Meadow	CUM1	3	1	1	1	1	1	1			Low			Yes											
6.16	1208.56	1208.56	0.12	Hedgerow	Hedgerow	Hedgerow	Hedgerow																									
6.17	91686.39	91686.39	9.17	Agricultural	Row Crop	Row Crop	Row Crop														Yes	1	1					1	Low			
6.18	3425.99																															

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
EQUISETACEAE	Equisetum sp	Horsetail Species		0		
EQUISETACEAE	Equisetum arvense L.	Field Horsetail			S5	N
EQUISETACEAE	Equisetum palustre	Horsetail			S5	N
EQUISETACEAE	Equisetum pratense Ehrh.	Meadow Horsetail	8	-3	S5	N
EQUISETACEAE	Equisetum sylvaticum L.	Woodland Horsetail	7	-3	S5	N
OSMUNDACEAE	Osmunda cinnamomea L.	Cinnamon Fern	7	-3	S5	N
OSMUNDACEAE	Osmunda regalis L. var. spectabilis (Willd.) A. Gray	Royal Fern	7	-5	S5	N
DENNSTAEDTIACEAE	Pteridium aquilinum (L.) Kuhn var. latiusculum (Desv.) L. Underw. ex A. Heller	Bracken Fern	2	3	S5	N
THELYPTERIDACEAE	Thelypteris noveboracensis (L.) Nieuwl.	New York Fern	7	-1	S4S5	N
THELYPTERIDACEAE	Thelypteris palustris Schott var. pubescens (Lawson) Fern.	Marsh Fern	5	-4	S5	N
DRYOPTERIDACEAE	Dryopteris sp	Wood Fern Species		0		N
DRYOPTERIDACEAE	Athyrium filix-femina (L.) Roth ex Mert. var. angustum (Willd.) G. Lawson	Lady-fern	4	0	S5	N
DRYOPTERIDACEAE	Cystopteris bulbifera (L.) Bernh.	Bulblet Fern	5	-2	S5	N
DRYOPTERIDACEAE	Cystopteris tenuis (Michx.) Desv.	Machay's Fragile Fern	6	5	S5	N
DRYOPTERIDACEAE	Deparia acrostichoides (Swartz) M. Kato	Silvery Spleenwort	8	0	S4	N
DRYOPTERIDACEAE	Dryopteris carthusiana (Vill.) H.P. Fuchs	Spinulose Wood Fern	5	-2	S5	N
DRYOPTERIDACEAE	Dryopteris cristata (L.) A. Gray	Crested Wood Fern	7	-5	S5	N
DRYOPTERIDACEAE	Dryopteris intermedia (Muhlenb. ex Willd.) A. Gray	Evergreen Wood Fern	5	0	S5	N
DRYOPTERIDACEAE	Dryopteris marginalis (L.) A. Gray	Marginal Wood Fern	5	3	S5	N
DRYOPTERIDACEAE	Dryopteris X triploidea Wherry	Triploid Wood Fern	5	-1	S3S4	N
DRYOPTERIDACEAE	Matteuccia struthiopteris (L.) Tod. var. pennsylvanica (Willd.) C.V. Morton	Ostrich Fern	5	-3	S5	N
DRYOPTERIDACEAE	Onoclea sensibilis L.	Sensitive Fern	4	-3	S5	N
DRYOPTERIDACEAE	Polystichum acrostichoides (Michx.) Schott	Christmas Fern	5	5	S5	N
PINACEAE	Abies balsamea (L.) Miller	Balsam Fir	5	-3	S5	N
PINACEAE	Picea abies (L.) Karsten	Norway Spruce		5	SE3	I
PINACEAE	Picea glauca (Moench) Voss	White Spruce	6	3	S5	N
PINACEAE	Picea pungens Engelm.	Colorado Spruce			SE1	I
PINACEAE	Pinus strobus L.	Eastern White Pine	4	3	S5	N
PINACEAE	Pinus sylvestris L.	Scotch Pine		5	SE5	I
PINACEAE	Tsuga canadensis (L.) Carriere	Eastern Hemlock	7	3	S5	N
CUPRESSACEAE	Thuja occidentalis L.	Northern White Cedar	4	-3	S5	N
ARISTOLOCHIACEAE	Asarum canadense L.	Wild Ginger	6	5	S5	N
RANUNCULACEAE	Ranunculus sp	Buttercup Species		0		
RANUNCULACEAE	Actaea pachypoda Elliott	White Baneberry	6	5	S5	N
RANUNCULACEAE	Actaea rubra (Aiton) Willd.	Red Baneberry	5	5	S5	N
RANUNCULACEAE	Caltha palustris L.	Marsh Marigold	5	-5	S5	N
RANUNCULACEAE	Clematis virginiana L.	Virginia Virgin-bower	3	0	S5	N
RANUNCULACEAE	Coptis trifolia (L.) Salisb.	Goldthread	7	-3	S5	N

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
RANUNCULACEAE	<i>Ranunculus abortivus</i> L.	Kidney-leaved Buttercup	2	-2	S5	N
RANUNCULACEAE	<i>Ranunculus acris</i> L.	Tall Buttercup		-2	SE5	I
RANUNCULACEAE	<i>Ranunculus hispidus</i> Michx. var. <i>hispidus</i>	Bristly Buttercup	8	0	S3	N
RANUNCULACEAE	<i>Ranunculus recurvatus</i> Poir. var. <i>recurvatus</i>	Hooked Crowfoot	4	-3	S5	N
RANUNCULACEAE	<i>Ranunculus sceleratus</i> L. var. <i>sceleratus</i>	Cursed Crowfoot	2	-5	S5	N
RANUNCULACEAE	<i>Thalictrum dioicum</i> L.	Early Meadowrue	5	2	S5	N
BERBERIDACEAE	<i>Berberis thunbergii</i> DC.	Japanese Barberry		4	SE5	I
BERBERIDACEAE	<i>Podophyllum peltatum</i> L.	May Apple	5	3	S5	N
BERBERIDACEAE	<i>Caulophyllum thalictroides</i> (L.) Michx.	Blue Cohosh	6	5	S5	N
PAPAVERACEAE	<i>Sanguinaria canadensis</i> L.	Bloodroot	5	4	S5	N
PAPAVERACEAE	<i>Stylophorum diphyllum</i> (Michx.) Nutt.	Wood Poppy	9	5	S1	N
ULMACEAE	<i>Ulmus americana</i> L.	American Elm	3	-2	S5	N
MORACEAE	<i>Morus alba</i> L.	White Mulberry		0	SE5	I
URTICACEAE	<i>Boehmeria cylindrica</i> (L.) Sw.	False Nettle	4	-5	S5	N
URTICACEAE	<i>Laportea canadensis</i> (L.) Wedd.	Wood Nettle	6	-3	S5	N
URTICACEAE	<i>Urtica dioica</i> L. ssp. <i>dioica</i>	Stinging Nettle		-1	SE2	I
JUGLANDACEAE	<i>Carya cordiformis</i> (Wangenh.) K. Koch	Bitternut Hickory	6	0	S5	N
FAGACEAE	<i>Fagus grandifolia</i> Ehrh.	American Beech	6	3	S5	N
FAGACEAE	<i>Quercus macrocarpa</i> Michx.	Bur Oak	5	1	S5	N
BETULACEAE	<i>Betula alleghaniensis</i> Britton	Yellow Birch	6	0	S5	N
BETULACEAE	<i>Carpinus caroliniana</i> Walter ssp. <i>virginiana</i> (Marshall) Furlow	American Hornbeam	6	0	S5	N
BETULACEAE	<i>Ostrya virginiana</i> (Miller) K. Koch	Eastern Hop-hornbeam	4	4	S5	N
CARYOPHYLLACEAE	<i>Cerastium arvense</i> L. ssp. <i>arvense</i>	Field Chickweed		5	SE4	I
CARYOPHYLLACEAE	<i>Saponaria officinalis</i> L.	Bouncing-bet		3	SE5	I
CARYOPHYLLACEAE	<i>Silene noctiflora</i> L.	Night-flowering Catchfly		5	SE5	I
CARYOPHYLLACEAE	<i>Silene vulgaris</i> (Moench) Garcke	Maiden's Tears		5	SE5	I
CARYOPHYLLACEAE	<i>Stellaria media</i> (L.) Vill.	Common Starwort		3	SE5	I
POLYGONACEAE	<i>Rumex crispus</i> L.	Curly Dock		-1	SE5	I
CLUSIACEAE	<i>Hypericum perforatum</i> L.	St. John's-wort		5	SE5	I
TILIACEAE	<i>Tilia americana</i> L.	American Basswood	4	3	S5	N
VIOLACEAE	<i>Viola canadensis</i> L.	Canada Violet	6	5	S5	N
VIOLACEAE	<i>Viola pubescens</i> Aiton	Downy Yellow Violet	5	4	S5	N
VIOLACEAE	<i>Viola rostrata</i> Pursh	Long-spur Violet	6	3	S5	N
VIOLACEAE	<i>Viola sororia</i> Willd.	Woolly Blue Violet	4	1	S5	N
CUCURBITACEAE	<i>Echinocystis lobata</i> (Michx.) Torr. & A. Gray	Wild Mock-cucumber	3	-2	S5	N
SALICACEAE	<i>Salix</i> sp	Willow Species		0		
SALICACEAE	<i>Populus balsamifera</i> L. ssp. <i>balsamifera</i>	Balsam Poplar	4	-3	S5	N
SALICACEAE	<i>Populus deltoides</i> Bartram ex Marshall ssp. <i>deltoides</i>	Eastern Cottonwood			SU	

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
SALICACEAE	<i>Populus tremuloides</i> Michx.	Quaking Aspen	2	0	S5	N
SALICACEAE	<i>Salix alba</i> L.	White Willow		-3	SE4	I
SALICACEAE	<i>Salix amygdaloides</i> Anderss.	Peach-leaved Willow	6	-3	S5	N
SALICACEAE	<i>Salix eriocephala</i> Michx.	Heart-leaved Willow	4	-3	S5	N
SALICACEAE	<i>Salix petiolaris</i> Sm.	Meadow Willow	3	-4	S5	N
SALICACEAE	<i>Salix purpurea</i> L.	Basket Willow		-3	SE4	I
BRASSICACEAE	<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	Garlic Mustard		0	SE5	I
BRASSICACEAE	<i>Capsella bursa-pastoris</i> (L.) Medik.	Common Shepherd's Purse		1	SE5	I
BRASSICACEAE	<i>Cardamine diphylla</i> (Michx.) Alph. Wood	Broad-leaved Toothwort	7	5	S5	N
BRASSICACEAE	<i>Hesperis matronalis</i> L.	Dame's Rocket		5	SE5	I
ERICACEAE	<i>Vaccinium angustifolium</i> Aiton	Late Lowbush Blueberry	6	3	S5	N
ERICACEAE	<i>Vaccinium corymbosum</i>	Blueberry	6	3	S5	N
PRIMULACEAE	<i>Lysimachia thyrsoiflora</i> L.	Water Loosestrife	7	-5	S5	N
PRIMULACEAE	<i>Trientalis borealis</i> Raf. ssp. <i>borealis</i>	Northern Starflower	6	-1	S5	N
GROSSULARIACEAE	<i>Ribes cynosbati</i> L.	Prickly Gooseberry	4	5	S5	N
GROSSULARIACEAE	<i>Ribes triste</i> Pall.	Swamp Red Currant	6	-5	S5	N
SAXIFRAGACEAE	<i>Tiarella cordifolia</i> L.	Heart-leaved Foam-flower	6	1	S5	N
ROSACEAE	<i>Crataegus</i> sp	Hawthorn Species		0		
ROSACEAE	<i>Agrimonia gryposepala</i> Wallr.	Tall Hairy Agrimony	2	2	S5	N
ROSACEAE	<i>Fragaria vesca</i> L. ssp. <i>americana</i> (Porter) Staudt	Woodland Strawberry	4	4	S5	N
ROSACEAE	<i>Geum canadense</i> Jacq.	White Avens	3	0	S5	N
ROSACEAE	<i>Geum rivale</i> L.	Purple Avens	7	-5	S5	N
ROSACEAE	<i>Malus pumila</i> Miller	Common Apple		5	SE5	I
ROSACEAE	<i>Potentilla recta</i> L.	Sulphur Cinquefoil		5	SE5	I
ROSACEAE	<i>Potentilla simplex</i> Michx.	Old-field Cinquefoil	3	4	S5	N
ROSACEAE	<i>Prunus cerasus</i> L.	Sour Red Cherry		5	SE1	I
ROSACEAE	<i>Prunus serotina</i> Ehrh.	Wild Black Cherry	3	3	S5	N
ROSACEAE	<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	2	1	S5	N
ROSACEAE	<i>Rubus allegheniensis</i> Porter	Allegheny Blackberry	2	2	S5	N
ROSACEAE	<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i> (Dieck) Focke	Wild Red Raspberry		-2	S5	N
ROSACEAE	<i>Rubus pubescens</i> Raf.	Dwarf Raspberry	4	-4	S5	N
ROSACEAE	<i>Spiraea alba</i> Du Roi	Narrow-leaved Meadow-sweet	3	-4	S5	N
FABACEAE	<i>Medicago sativa</i> L. ssp. <i>sativa</i>	Alfalfa		5	SE5	I
FABACEAE	<i>Melilotus alba</i> Medik.	White Sweet Clover		3	SE5	I
FABACEAE	<i>Melilotus officinalis</i> (L.) Pall.	Yellow Sweet Clover		3	SE5	I
FABACEAE	<i>Robinia pseudo-acacia</i> L.	Black Locust		0	SE5	I
FABACEAE	<i>Vicia cracca</i> L.	Tufted Vetch		5	SE5	I
THYMELAEACEAE	<i>Dirca palustris</i> L.	Eastern Leatherwood	7	0	S4?	N

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
ONAGRACEAE	<i>Circaea lutetiana</i> L. ssp. <i>canadensis</i> (L.) Aschers. & Magnusson	Enchanter's Nightshade	3	3	S5	N
ONAGRACEAE	<i>Epilobium hirsutum</i> L.	Great-hairy Willow-herb		-4	SE5	I
ONAGRACEAE	<i>Oenothera biennis</i> L.	Common Evening-primrose	0	3	S5	N
CORNACEAE	<i>Cornus alternifolia</i> L. f.	Alternate-leaf Dogwood	6	5	S5	N
CORNACEAE	<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	6		S5	N
CORNACEAE	<i>Cornus stolonifera</i> Michx.	Red-osier Dogwood	2	-3	S5	N
CELASTRACEAE	<i>Celastrus orbiculatus</i> Thunb.	Climbing Bittersweet			SE2	I
CELASTRACEAE	<i>Celastrus scandens</i> L.	Climbing Bittersweet	3	3	S5	N
CELASTRACEAE	<i>Euonymus obovata</i> Nutt.	Running Strawberry-bush	6	5	S5	N
AQUIFOLIACEAE	<i>Ilex verticillata</i> (L.) A. Gray	Winterberry	5	-4	S5	N
RHAMNACEAE	<i>Rhamnus cathartica</i> L.	Buckthorn		3	SE5	I
RHAMNACEAE	<i>Rhamnus frangula</i> L.	Glossy Buckthorn		-1	SE5	I
VITACEAE	<i>Parthenocissus quinquefolia</i> (L.) Planchon ex DC.	Virginia Creeper	6	1	S4?	N
VITACEAE	<i>Vitis riparia</i> Michx.	Riverbank Grape	0	-2	S5	N
ACERACEAE	<i>Acer negundo</i> L.	Manitoba Maple		-2	S5	N
ACERACEAE	<i>Acer platanoides</i> L.	Norway Maple		5	SE5	I
ACERACEAE	<i>Acer rubrum</i> L.	Red Maple	4	0	S5	N
ACERACEAE	<i>Acer saccharinum</i> L.	Silver Maple	5	-3	S5	N
ACERACEAE	<i>Acer saccharum</i> Marshall ssp. <i>saccharum</i>	Sugar Maple	5		S5	N
ACERACEAE	<i>Acer X freemanii</i> E. Murr.	Freeman's Maple		0	S5	N
ANACARDIACEAE	<i>Rhus rydbergii</i> Small ex Rydb.	Western Poison Ivy		0	S5	N
ANACARDIACEAE	<i>Rhus radicans</i> L. ssp. <i>negundo</i> (Greene) McNeill	Poison Ivy	5	-1	S5	N
OXALIDACEAE	<i>Oxalis stricta</i> L.	Upright Yellow Wood Sorrel		3	S5	N
GERANIACEAE	<i>Geranium maculatum</i> L.	Wild Geranium	6	3	S5	N
GERANIACEAE	<i>Geranium robertianum</i> L.	Herb-robert		5	SE5	I
BALSAMINACEAE	<i>Impatiens capensis</i> Meerb.	Spotted Jewel-weed	4	-3	S5	N
ARALIACEAE	<i>Aralia nudicaulis</i> L.	Wild Sarsaparilla	4	3	S5	N
APIACEAE	<i>Cicuta maculata</i> L.	Spotted Water-hemlock	6	-5	S5	N
APIACEAE	<i>Daucus carota</i> L.	Queen Anne's Lace			SE5	I
ASCLEPIADACEAE	<i>Asclepias incarnata</i> L. ssp. <i>incarnata</i>	Swamp Milkweed	6	-5	S5	N
ASCLEPIADACEAE	<i>Asclepias syriaca</i> L.	Common Milkweed	0	5	S5	N
SOLANACEAE	<i>Solanum dulcamara</i> L.	Climbing Nightshade		0	SE5	I
HYDROPHYLLACEAE	<i>Hydrophyllum canadense</i> L.	Canada Waterleaf	8	-2	S4	N
HYDROPHYLLACEAE	<i>Hydrophyllum virginianum</i> L.	Virginia Waterleaf	6	-2	S5	N
BORAGINACEAE	<i>Symphytum officinale</i> L. ssp. <i>officinale</i>	Common Comfrey		5	SE5	I
VERBENACEAE	<i>Phryma leptostachya</i> L.	Lopseed	6	5	S4S5	N
VERBENACEAE	<i>Verbena stricta</i>	Hoary Vervain	6	5	S4	N
LAMIACEAE	<i>Leonurus cardiaca</i> L. ssp. <i>cardiaca</i>	Common Motherwort		5	SE5	I

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
LAMIACEAE	<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Bugleweed	4	-5	S5	N
LAMIACEAE	<i>Lycopus uniflorus</i> Michx.	Northern Bugleweed	5	-5	S5	N
LAMIACEAE	<i>Mentha arvensis</i> L. ssp. <i>borealis</i> (Michx.) R.L. Taylor & Macbryde	Corn Mint	3	-3	S5	N
LAMIACEAE	<i>Mentha spicata</i> L.	Spearmint		-4	SE4	I
LAMIACEAE	<i>Prunella vulgaris</i> L. ssp. <i>vulgaris</i>	Common Heal-all		0	SE3	I
LAMIACEAE	<i>Pycnanthemum virginianum</i> (S.) Durand & Jackson es Fern. & Robinson	Virginina Mountain Mint			S4	N
LAMIACEAE	<i>Scutellaria lateriflora</i> L.	Mad Dog Skullcap	5	-5	S5	N
PLANTAGINACEAE	<i>Plantago lanceolata</i> L.	English Plantain		0	SE5	I
PLANTAGINACEAE	<i>Plantago major</i> L.	Nipple-seed Plantain		-1	SE5	I
OLEACEAE	<i>Fraxinus americana</i> L.	White Ash	4	3	S5	N
OLEACEAE	<i>Fraxinus nigra</i> Marshall	Black Ash	7	-4	S5	N
OLEACEAE	<i>Fraxinus pennsylvanica</i> Marshall	Green Ash	3	-3	S5	N
OLEACEAE	<i>Syringa vulgaris</i> L.	Common Lilac		5	SE5	I
SCROPHULARIACEAE	<i>Chelone glabra</i> L.	Turtlehead	7	-5	S5	N
SCROPHULARIACEAE	<i>Verbascum thapsus</i> L.	Common Mullein		5	SE5	I
SCROPHULARIACEAE	<i>Veronica officinalis</i> L.	Common Speedwell		5	SE5	I
CAMPANULACEAE	<i>Lobelia siphilitica</i> L.	Great Blue Lobelia	6	-4	S5	N
CAMPANULACEAE	<i>Lobelia spicata</i>	Spiked Lobelia	6	-4	S5	N
RUBIACEAE	<i>Galium</i> sp	Bedstraw Species		0		
RUBIACEAE	<i>Galium mollugo</i> L.	White Bedstraw		5	SE5	I
RUBIACEAE	<i>Galium triflorum</i> Michx.	Sweet-scent Bedstraw	4	2	S5	N
CAPRIFOLIACEAE	<i>Lonicera tatarica</i> L.	Tartarian Honeysuckle		3	SE5	I
CAPRIFOLIACEAE	<i>Sambucus canadensis</i> L.	Common Elderberry	5	-2	S5	N
CAPRIFOLIACEAE	<i>Sambucus racemosa</i> L. ssp. <i>pubens</i> (Michx.) House	Red-berried Elder	5	2	S5	N
CAPRIFOLIACEAE	<i>Triosteum aurantiacum</i> E.P. Bicknell	Horse Gentian	7	5	S5	N
CAPRIFOLIACEAE	<i>Viburnum lentago</i> L.	Nannyberry	4	-1	S5	N
CAPRIFOLIACEAE	<i>Viburnum opulus</i> L.	Guelder-rose Viburnum		0	SE4	I
ASTERACEAE	<i>Bidens</i> sp	Beggar's Ticks Species		0		
ASTERACEAE	<i>Achillea millefolium</i> L. ssp. <i>millefolium</i>	Common Yarrow		3	SE?	I
ASTERACEAE	<i>Arctium minus</i> (Hill) Bernh. ssp. <i>minus</i>	Lesser Burdock		5	SE5	I
ASTERACEAE	<i>Aster lanceolatus</i> Willd. ssp. <i>lanceolatus</i>	Panicled Aster	3	-3	S5	N
ASTERACEAE	<i>Aster lateriflorus</i> (L.) Britton var. <i>lateriflorus</i>	Calico Aster	3	-2	S5	N
ASTERACEAE	<i>Aster novae-angliae</i> L.	New England Aster	2	-3	S5	N
ASTERACEAE	<i>Chrysanthemum leucanthemum</i> L.	Oxeye Daisy		5	SE5	I
ASTERACEAE	<i>Cirsium vulgare</i> (Savi) Ten.	Bull Thistle		4	SE5	I
ASTERACEAE	<i>Erigeron philadelphicus</i> L. ssp. <i>philadelphicus</i>	Philadelphia Fleabane	1	-3	S5	N
ASTERACEAE	<i>Eupatorium perfoliatum</i> L.	Common Boneset	2	-4	S5	N
ASTERACEAE	<i>Eupatorium rugosum</i> Houtt.	White Snakeroot	5	3	S5	N

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
ASTERACEAE	<i>Euthamia graminifolia</i> (L.) Nutt.	Grass-leaved Goldenrod	2	-2	S5	N
ASTERACEAE	<i>Hieracium caespitosum</i> Dumort ssp. caespitosum	Field Hawkweed			SE5	I
ASTERACEAE	<i>Prenanthes alba</i> L.	White Rattlesnake-root	6	3	S5	N
ASTERACEAE	<i>Senecio aureus</i> L.	Golden Ragwort	7	-3	S5	N
ASTERACEAE	<i>Solidago altissima</i> L. var. altissima	Tall Goldenrod	1	3	S5	N
ASTERACEAE	<i>Solidago caesia</i> L.	Bluestem Goldenrod	5	3	S5	N
ASTERACEAE	<i>Solidago canadensis</i> L.	Canada Goldenrod	1	3	S5	N
ASTERACEAE	<i>Solidago flexicaulis</i> L.	Broad-leaved Goldenrod	6	3	S5	N
ASTERACEAE	<i>Solidago patula</i> Muhlenb. ex Willd.	Rough-leaved Goldenrod	8	-5	S5	N
ASTERACEAE	<i>Solidago rugosa</i> Aiton ssp. rugosa	Rough Goldenrod	4	-1	S5	N
ASTERACEAE	<i>Taraxacum officinale</i> G. Weber	Common Dandelion		3	SE5	I
ASTERACEAE	<i>Tragopogon pratensis</i> L. ssp. pratensis	Meadow Goat's-beard		5	SE5	I
ASTERACEAE	<i>Tussilago farfara</i> L.	Colt's Foot		3	SE5	I
ASTERACEAE	<i>Aster ericoides</i> L. ssp. ericoides	Heath Aster	4	4	S5	N
ASTERACEAE	<i>Aster puniceus</i> L. var. puniceus	Purple-stemmed Aster	6	-5	S5	N
ASTERACEAE	<i>Eupatorium maculatum</i> L. ssp. maculatum	Spotted Joe-pye Weed	3	-5	S5	N
ALISMATACEAE	<i>Alisma plantago-aquatica</i> L.	Broad-leaved Water-plantain	3	-5	S5	N
ARACEAE	<i>Arisaema triphyllum</i> (L.) Schott ssp. triphyllum	Jack-in-the-pulpit	5	-2	S5	N
ARACEAE	<i>Symplocarpus foetidus</i> (L.) Salisb. ex Nutt.	Skunk Cabbage	7	-5	S5	N
LEMNACEAE	<i>Lemna</i> sp	Duckweed Species		0		
LEMNACEAE	<i>Lemna minor</i> L.	Lesser Duckweed	2	-5	S5	N
JUNCACEAE	<i>Juncus</i> sp	Rush Species		0		
JUNCACEAE	<i>Juncus effusus</i> L. ssp. solutus (Fern. & Wiegand) Hamet-Ahti	Soft Rush	4	-5	S5	N
CYPERACEAE	<i>Carex</i> sp	Sedge Species		0		
CYPERACEAE	<i>Carex arctata</i> Boott	Black Sedge	5	5	S5	N
CYPERACEAE	<i>Carex bebbii</i> (L.H. Bailey) Olney ex Fern.	Bebb's Sedge	3	-5	S5	N
CYPERACEAE	<i>Carex blanda</i> Dewey	Woodland Sedge	3	0	S5	N
CYPERACEAE	<i>Carex bromoides</i> Schkuhr ex Willd.	Brome-like Sedge	7	-4	S5	N
CYPERACEAE	<i>Carex brunnescens</i> (Pers.) Poir. ex Lam. ssp. brunnescens	Brownish Sedge	7	-3	S5	N
CYPERACEAE	<i>Carex canescens</i> L. ssp. canescens	Hoary Sedge	7	-5	S5	N
CYPERACEAE	<i>Carex communis</i> L.H. Bailey	Fibrous-root Sedge	6	5	S5	N
CYPERACEAE	<i>Carex comosa</i> Boott	Bristly Sedge	5	-5	S5	N
CYPERACEAE	<i>Carex crinita</i> Lam.	Fringed Sedge	6	-4	S5	N
CYPERACEAE	<i>Carex cristatella</i> Britton	Crested Sedge	3	-4	S5	N
CYPERACEAE	<i>Carex cryptolepis</i> Mack.	Northeastern Sedge	7	-5	S5	N
CYPERACEAE	<i>Carex flava</i> L.	Yellow Sedge	5	-5	S5	N
CYPERACEAE	<i>Carex gracilescens</i> Steud.	Slender Sedge	7	5	S3	N
CYPERACEAE	<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	3	-4	S5	N

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
CYPERACEAE	<i>Carex hirta</i> L.	Hammer Sedge		4	SE2	I
CYPERACEAE	<i>Carex hirtifolia</i> Mack.	Pubescent Sedge	5	5	S5	N
CYPERACEAE	<i>Carex hitchcockiana</i> Dewey	Hitchcock's Sedge	6	5	S5	N
CYPERACEAE	<i>Carex hystericina</i> Muhlenb. ex Willd.	Porcupine Sedge	5	-5	S5	N
CYPERACEAE	<i>Carex interior</i> L.H. Bailey	Inland Sedge	6	-5	S5	N
CYPERACEAE	<i>Carex intumescens</i> Rudge	Bladder Sedge	6	-4	S5	N
CYPERACEAE	<i>Carex jamesii</i> Schwein.	Nebraska Sedge	8	5	S3	N
CYPERACEAE	<i>Carex laxiflora</i> Lam.	Loose-flowered Sedge	5	0	S5	N
CYPERACEAE	<i>Carex lupulina</i> Muhlenb. ex Willd.	Hop Sedge	6	-5	S5	N
CYPERACEAE	<i>Carex lurida</i> Wahlenb.	Shallow Sedge	6	-5	S5	N
CYPERACEAE	<i>Carex pedunculata</i> Muhlenb. ex Willd.	Longstalk Sedge	5	5	S5	N
CYPERACEAE	<i>Carex pennsylvanica</i> Lam.	Pennsylvania Sedge	5	5	S5	N
CYPERACEAE	<i>Carex plantaginea</i> Lam.	Plantain-leaved Sedge	7	5	S5	N
CYPERACEAE	<i>Carex radiata</i> (Wahlenb.) Small	Stellate Sedge	4	5	S5	N
CYPERACEAE	<i>Carex rosea</i> Schkuhr ex Willd.	Rosy Sedge	5	5	S5	N
CYPERACEAE	<i>Carex scoparia</i>	Sedge	5	5	S5	N
CYPERACEAE	<i>Carex stipata</i> Muhlenb. ex Willd.	Stalk-grain Sedge	3	-5	S5	N
CYPERACEAE	<i>Carex stricta</i> Lam.	Tussock Sedge	4	-5	S5	N
CYPERACEAE	<i>Carex tuckermanii</i> Dewey	Tuckerman Sedge	7	-5	S4	N
CYPERACEAE	<i>Carex vulpinoidea</i> Michx.	Fox Sedge	3	-5	S5	N
CYPERACEAE	<i>Dulichium arundinaceum</i>	Three-way Sedge	7	-5	S5	N
CYPERACEAE	<i>Scirpus atrovirens</i> Willd.	Woolgrass Bulrush	3	-5	S5	N
POACEAE	<i>Agrostis</i> sp	Bentgrass Species		0		
POACEAE	<i>Glyceria</i> sp	Manna Grass Species		0		
POACEAE	<i>Poa</i> sp	Bluegrass Species		0		
POACEAE	<i>Agrostis scabra</i> Willd.	Rough Bentgrass	6	0	S5	N
POACEAE	<i>Bromus inermis</i> Leyss. ssp. <i>inermis</i>	Smooth Brome		5	SE5	I
POACEAE	<i>Dactylis glomerata</i> L.	Orchard Grass		3	SE5	I
POACEAE	<i>Glyceria grandis</i> S. Watson	American Manna Grass	5	-5	S4S5	N
POACEAE	<i>Glyceria striata</i> (Lam.) A. Hitchc.	Fowl Manna Grass	3	-5	S5	N
POACEAE	<i>Elymus hystrix</i> L.	Bottle-brush Grass	5	5	S5	N
POACEAE	<i>Oryzopsis asperifolia</i> Michx.	White-grained Mountain Ricegrass	6	5	S5	N
POACEAE	<i>Phalaris arundinacea</i> L.	Reed Canary Grass	0	-4	S5	N
POACEAE	<i>Phleum pratense</i> L.	Timothy		3	SE5	I
POACEAE	<i>Poa compressa</i> L.	Canada Bluegrass	0	2	S5	N
POACEAE	<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Bluegrass	0	1	S5	N
TYPHACEAE	<i>Typha angustifolia</i> L.	Narrow-leaved Cattail	3	-5	S5	N
TYPHACEAE	<i>Typha latifolia</i> L.	Broad-leaf Cattail	3	-5	S5	N

Appendix J5a: Vascular Plants Checklist for the Forbes Creek Subwatershed.

Family	Latin Name	Common Name	cc	cw	Srank	Native status
LILIACEAE	<i>Allium tricoccum</i> Aiton	Wild Leek	7	2	S5	N
LILIACEAE	<i>Asparagus officinalis</i> L.	Asparagus		3	SE5	I
LILIACEAE	<i>Convallaria majalis</i> L.	European Lily-of-the-valley		5	SE5	I
LILIACEAE	<i>Maianthemum canadense</i> Desf.	Wild-lily-of-the-valley	5	0	S5	N
LILIACEAE	<i>Maianthemum racemosum</i> (L.) Link ssp. <i>racemosum</i>	False Solomon's Seal	4	3	S5	N
LILIACEAE	<i>Maianthemum stellatum</i> (L.) Link	Starflower False Solomon's Seal	6	1	S5	N
LILIACEAE	<i>Polygonatum pubescens</i> (Willd.) Pursh	Downy Solomon's Seal	5	5	S5	N
LILIACEAE	<i>Trillium erectum</i> L.	Red Trillium	6	1	S5	N
LILIACEAE	<i>Trillium grandiflorum</i> (Michx.) Salisb.	White Trillium	5	5	S5	N
LILIACEAE	<i>Uvularia perfoliata</i> L.	Perfoliate Bellwort	10	5	S1	N
IRIDACEAE	<i>Iris versicolor</i> L.	Blueflag	5	-5	S5	N
ORCHIDACEAE	<i>Epipactis helleborine</i> (L.) Crantz	Eastern Helleborine		5	SE5	I
ORCHIDACEAE	<i>Cypripedium calceolus</i> L. var. <i>parviflorum</i> (Salisb.) Hulten	Small Yellow Lady's-slipper	7	-1	S5	N

Appendix J5b: Explanation of Coefficient of Conservatism (cc), Coefficient of Wetness (cw), Srank and Native Status

The information for Coefficients of Conservatism (cc), Coefficient of Wetness (cw), Srank and Native Status was obtained from Newmaster *et. al.* (1998) and Floristic Quality Assessment System for Southern Ontario (M.J. Oldham, W.D. Bakowsky and D.A. Sutherland) December 1995, Natural Heritage Information Centre, Ontario Ministry of Natural Resources.

Coefficient of Conservatism (CC) Definition

Each native taxon was assigned a rank of 0 to 10 ("coefficient of conservatism") based on its degree of fidelity to a range of synecological parameters. Plants found in a wide variety of plant communities, including disturbed sites, were assigned ranks of 0 to 3. Taxa that typically are associated with a specific plant community, but tolerate moderate disturbance, were assigned ranks of 4 to 6. Rankings of 7 to 8 were applied to those taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance. Those plants with high degrees of fidelity to a narrow range of synecological parameters were assigned a value of 9 to 10.

Provincial Rank (SRANK):

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation, needs can be ascertained. The NHIC evaluates provincial ranks on a continual basis and produces updated lists at least annually. The NHIC welcomes information which will assist in assigning accurate provincial ranks.

S1 Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

S2 Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S3 Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.

S4 Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

S5 Very common and demonstrably secure in Ontario.

SH Historically known from Ontario, but not verified recently (typically not recorded in the province in the last 20 years); however suitable habitat is thought to be still present in the province and there is reasonable expectation that the species may be rediscovered.

SR Reported for Ontario, but without persuasive documentation which would provide a basis for either accepting or rejecting the report.

SRF Reported falsely from Ontario.

SX Apparently **extirpated** from Ontario, with little likelihood of rediscovery. Typically not seen in the province for many decades, despite searches at known historic sites.

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

C Cultivated; existing in the province only in a cultivated state; introduced population not yet fully established and self-sustaining.

S? Unranked, or, if following a ranking, rank **uncertain** (e.g. S3?). S? species are thought to be rare in Ontario, but there is insufficient information available to assign a more accurate rank.

Native Status (N or I)

This letter refers to the native status of a plant as defined by the Newmaster et al, 1998 and Floristic Quality Assessment System for Southern Ontario (M.J. Oldham, W.D. Bakowsky and D.A. Sutherland) December 1995, Natural Heritage Information Centre, Ontario Ministry of Natural Resources. "N" represents that the plant is considered native to this region. "I" represents that the plant has been introduced from another region.

Coefficient of Wetness (cw)

The wetness index gives an indication of where plant species are typically found.

Wetness values (coefficient of wetness) are between -5 and 5.

These categories are defined as follows:

-5	Occurs almost always in wetlands under natural conditions (estimated > 99% probability).
-4 to -2	Usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability).
-1 to 1	Equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability).
2 to 4	Occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33 % probability).
5	Occurs almost never in wetlands under natural conditions (estimated < 1 % probability).

Appendix J6: Wildlife Constraint Assessment Methodology

HABITAT CRITERIA

Forest Interior Habitat

Forest interior species are generally considered to be those that nest only within the forest interior and rarely occur near the edge. Most authors recognize the forest interior as the area greater than 100 m away from the forest edge (Riley and Mohr, 1994). This group of species has received special concern over the past decade, since it has been shown that many are undergoing significant population declines due to increased deforestation, forest fragmentation, and nest predation/parasitism.

- Forests blocks that contain forest interior habitat (use 100 m threshold) = **HIGH CONSTRAINT**.

Grassland Habitat

Grasslands are recognized by many as the most imperilled ecosystems worldwide. Native North American Grasslands have dramatically declined in area. In particular, grassland bird populations have shown steeper, more consistent, and more geographically widespread declines than any other behavioural guild of North American species (Department of the Interior Grassland Bird Working Group, 1996).

- Grasslands larger than 20 ha = **HIGH CONSTRAINT**.

SPECIES CRITERIA

Significant Species

- Habitats[†] that are known to support...
 - ...species officially designated as 'endangered', 'threatened' or 'vulnerable', either nationally or provincially, with the exception of Monarch (*Danaus plexippus*), = **HIGH CONSTRAINT**. No minimum number of species is required.
- Habitats[†] that are known to support...
 - ...species with a subnational (Srank)* of S1–S3 = **HIGH CONSTRAINT**
 - ...3+ species with a subnational (Srank)* of S4 = **HIGH CONSTRAINT**
 - ...1–2 single species with a subnational (Srank)* of S4 = **MEDIUM CONSTRAINT**
 - ...species with a subnational (Srank)* of S5 = **LOW CONSTRAINT**
 - * Subnational ranks (Srank) are listed on the Ontario Natural Heritage Information Centre website: <http://www.mnr.gov.on.ca/MNR/nhic/lists>
- Habitats[†] that are known to support...
 - 1–2 regionally significant species** = **MEDIUM CONSTRAINT**
 - 3+ regionally significant species** = **HIGH CONSTRAINT**
 - ** Regionally significant species are those that are either recognized under the Southern Ontario Wetland Evaluation Manual (O.M.N.R., 1994) or other officially adopted regional list (*i.e.* The Regional Municipality of Waterloo, 1985a, 1985b, and 1996).
- Habitats[†] that are known to support...
 - 1–2 bird species of conservation priority*** = **LOW CONSTRAINT**
 - 3–4 bird species of conservation priority*** = **MEDIUM CONSTRAINT**
 - 5+ species of conservation priority*** = **HIGH CONSTRAINT**
 - *** Bird species of conservation priority are those that are recognized by Couturier (1999).

† 'Habitats' should be interpreted as vegetation units described at the Community Class level of the Ecological Land Classification (ELC) scheme (Lee *et al.*, 1998). However, habitat utilization by wildlife species does not always coincide with these arbitrary distinctions. For example, some breeding bird species occur regularly in both Forest and Swamp community classes. In situations where a species was observed in one community class that was adjacent to another community class that the species could also regularly occur in, both habitat units should receive the same constraint rating.

Amphibian Diversity*† (includes vernal ponds, as well as upland habitats)

Frogs and Toads

Proper assessment (detection of all potentially occurring species) is typically dependent on conducting 3 sets of nocturnal calling surveys.

- Habitats that support 1–2 species of frog or toads = **LOW CONSTRAINT**
- Habitats that support 3–4 species of frog or toads = **MEDIUM CONSTRAINT**
- Habitats that support 5+ species of frog or toads = **HIGH CONSTRAINT**

Salamanders

Ideally, surveys should be conducted at night, shortly after ponds become ice-free for pond-breeding species (e.g. *Ambystoma* and *Notophthalmus* sp.). Cover objects, such as logs, rocks and other natural debris should also be overturned in search of terrestrial species (e.g. *Plethodon* sp.)

- Habitats that support 1 species of salamander = **LOW CONSTRAINT**
- Habitats that support 2 species of salamander = **MEDIUM CONSTRAINT**
- Habitats that support 3+ species of salamander = **HIGH CONSTRAINT**

Reptilian Diversity

Assessing reptilian diversity accurately usually requires repeated visits. An absence of observations does not necessarily mean absence of species.

Snakes

Snakes are especially shy and difficult to detect. Therefore, an absence of species detected does not necessarily mean that none are present. Greater success at finding snakes may be achieved by conducting surveys on the first warm and sunny days of spring to correspond with the time snakes leave their subterranean hibernacula. Warm, sunny days in late fall may also be good times to look for these species.

- Habitats that support 1–2 species of snakes = **LOW CONSTRAINT**
- Habitats that support 3 species of snakes = **MEDIUM CONSTRAINT**
- Habitats that support 4+ species of snakes = **HIGH CONSTRAINT**

Turtles

One of the best ways to find turtles are to look for them basking in the sun. However, not all species commonly exhibit this behaviour (e.g. Common Snapping Turtle) and not all days that surveys are conducted are sunny. Repeated visits to the same location should help to determine whether turtles do or do not use a particular site.

- Habitats that support 1 species of turtle = **LOW CONSTRAINT**
- Habitats that support 2 species of turtle = **MEDIUM CONSTRAINT**
- Habitats that support 3+ species of turtle = **HIGH CONSTRAINT**

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Appendix J7: Wildlife observed within and immediately adjacent to the Forbes Creek Subwatershed by Dougan Associates 2000-2002.

	COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS						HIGHEST BREEDING BIRD STATUS ⁷
			FEDERAL	PROVINCIAL		REGIONAL			
			COSEWIC ¹	MNR ¹	SRANK ¹	MNR/BSC/EC ²	Waterloo ^{3,4,5}	Plourde ⁶	
	DAMSELFLIES & DRAGONFLIES								
1	Ebony Jewelwing	<i>Calopteryx maculata</i>	---	---	S5	N/A	N/A	N/A	N/A
2	Emerald Spreadwing	<i>Lestes dryas</i>	---	---	S5	N/A	N/A	N/A	N/A
3	Unidentified Spreadwing species?	<i>Lestes sp.</i> (other than dryas)	?	?	?	N/A	N/A	N/A	N/A
4	Unidentified Bluet species?	<i>Enallagma sp.</i>	?	?	?	N/A	N/A	N/A	N/A
5	Eastern Forktail	<i>Ischnura verticalis</i>	---	---	S5	N/A	N/A	N/A	N/A
6	Common Green Darner	<i>Anax junius</i>	---	---	S5	N/A	N/A	N/A	N/A
	Unidentified Darner sp.	<i>Aeshnidae sp.</i> (other than Anax)	?	?	?	N/A	N/A	N/A	N/A
7	Dot-tailed Whiteface	<i>Leucorrhinia intacta</i>	---	---	S5	N/A	N/A	N/A	N/A
8	Pied Skimmer	<i>Libellula luctuosa</i>	---	---	S5	N/A	N/A	N/A	N/A
9	Common Whitetail	<i>Libellula lydia</i>	---	---	S5	N/A	N/A	N/A	N/A
10	Twelve-spotted Skimmer	<i>Libellula pulchella</i>	---	---	S5	N/A	N/A	N/A	N/A
11	Four-spotted Skimmer	<i>Libellula quadrimaculata</i>	---	---	S5	N/A	N/A	N/A	N/A
12	White-faced Meadowfly	<i>Sympetrum obtrusum</i>	---	---	S5	N/A	N/A	N/A	N/A
13	Unidentified Meadowfly species?	<i>Sympetrum sp.</i> (other than obtrusum)	---	---	?	N/A	N/A	N/A	N/A
	BUTTERFLIES								
1	Arctic Skipper	<i>Carterocephalus palaemon mandan</i>	---	---	S5	N/A	N/A	N/A	N/A
2	Least Skipper	<i>Ancyloxypha numitor</i>	---	---	S5	N/A	N/A	N/A	N/A
3	European Skipper	<i>Thymelicus lineola</i>	---	---	SE	N/A	N/A	N/A	N/A
4	Hobomok Skipper	<i>Poanes hobomok</i>	---	---	S5	N/A	N/A	N/A	N/A
5	Eastern Tiger Swallowtail	<i>Papilio glaucus glaucus</i>	---	---	S4S5	N/A	N/A	N/A	N/A
6	Cabbage White	<i>Pieris rapae</i>	---	---	SE	N/A	N/A	N/A	N/A
7	Clouded (Common) Sulphur	<i>Colias philodice</i>	---	---	S5	N/A	N/A	N/A	N/A
8	Orange Sulphur	<i>Colias eurytheme</i>	---	---	S5	N/A	N/A	N/A	N/A
9	Bronze Copper	<i>Lycaena hyllus</i>	---	---	S5	N/A	N/A	N/A	N/A
10	Spring Azure	<i>Celastrina ladon</i>	---	---	S5	N/A	N/A	N/A	N/A
11	Great Spangled Fritillary	<i>Speyeria cybele</i>	---	---	S5	N/A	N/A	N/A	N/A
12	Meadow Fritillary	<i>Boloria bellona</i>	---	---	S5	N/A	N/A	N/A	N/A
13	Crescent Species	<i>Phyciodes sp</i>	?	?	?	N/A	N/A	N/A	N/A
14	Baltimore Checkerspot	<i>Euphydryas phaeton</i>	---	---	S4	N/A	N/A	N/A	N/A
15	Question Mark	<i>Polygonia interrogationis</i>	---	---	S5	N/A	N/A	N/A	N/A
16	Eastern Comma	<i>Polygonia comma</i>	---	---	S5	N/A	N/A	N/A	N/A
17	Mourning Cloak	<i>Nymphalis antiopa</i>	---	---	S5	N/A	N/A	N/A	N/A
18	Milbert's Tortoiseshell	<i>Nymphalis milberti</i>	---	---	S5	N/A	N/A	N/A	N/A
19	American Lady	<i>Vanessa virginiensis</i>	---	---	S5	N/A	N/A	N/A	N/A
20	Painted Lady	<i>Vanessa cardui</i>	---	---	SZB	N/A	N/A	N/A	N/A
21	Red Admiral	<i>Vanessa atalanta</i>	---	---	SZB?	N/A	N/A	N/A	N/A

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	COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS						HIGHEST BREEDING BIRD STATUS ⁷
			FEDERAL	PROVINCIAL		REGIONAL			
			COSEWIC ¹	MNR ¹	SRANK ¹	MNR/BSC/EC ²	Waterloo ^{3,4,5}	Plourde ⁶	
	BUTTERFLIES continued...								
22	Red-spotted Purple	<i>Limenitis arthemis astyanax</i>	---	---	S5	N/A	N/A	N/A	N/A
23	Viceroy	<i>Limenitis archippus</i>	---	---	S5	N/A	N/A	N/A	N/A
24	Common Ringlet	<i>Coenonympha tullia</i>	---	---	S5	N/A	N/A	N/A	N/A
25	Little Wood-Satyr	<i>Megisto cymela</i>	---	---	S5	N/A	N/A	N/A	N/A
26	Monarch	<i>Danaus plexippus</i>	VUL	NIAC	S5	N/A	N/A	N/A	N/A
	HERPETOFAUNA								
1	Northern Redback Salamander	<i>Plethodon cinereus</i>	---	---	S5	N/A	NO	A & W	N/A
2	American Toad	<i>Bufo americanus americanus</i>	---	---	S5	N/A	Common	A & W	N/A
3	Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	---	---	S5	N/A	Common	A & W	N/A
4	Spring Peeper	<i>Pseudacris crucifer crucifer</i>	---	---	S5	N/A	Common	A & W	N/A
5	Bullfrog	<i>Rana catesbeiana</i>	---	---	S4	N/A	Regionally Significant	C & W	N/A
6	Green Frog	<i>Rana clamitans</i>	---	---	S5	N/A	Common	A & W	N/A
7	Northern Leopard Frog	<i>Rana pipiens</i>	---	---	S5	N/A	Common	A & W	N/A
8	Wood Frog	<i>Rana sylvatica</i>	---	---	S5	N/A	Common	A & W	N/A
	unidentified tadpoles		?	?	?	N/A	?	?	N/A
	unidentified frogs		?	?	?	N/A	?	?	N/A
9	Snapping Turtle	<i>Chelydra serpentina</i>	---	---	S5	N/A	Common	A & W	N/A
10	Midland Painted Turtle	<i>Chrysemys picta marginata</i>	---	---	S5	N/A	Common	A & W	N/A
	unidentified turtle nest remains								N/A
11	Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>	---	---	S5	N/A	Common	A & W	N/A
	BIRDS								
1	Common Loon	<i>Gavia immer</i>	NAR	NIAC	S4B	N/A	N/A	N/A	M
2	Pied-billed Grebe	<i>Podilymbus podiceps</i>	---	---	S4B	N/A	N/A	N/A	M
3	Great Blue Heron	<i>Ardea herodias</i>	---	---	S5B	N/A	N/A	N/A	XF
4	Turkey Vulture	<i>Cathartes aura</i>	---	---	S4B	Level 4	Regionally Significant	N/A	Possible
5	Canada Goose	<i>Branta canadensis</i>	---	---	S5B	---	---	N/A	Confirmed
6	Tundra Swan	<i>Cygnus columbianus</i>	---	---	S3B	---	---	N/A	M
7	Wood Duck	<i>Aix sponsa</i>	---	---	S5B	Level 4	Regionally Significant	N/A	Probable
8	Gadwall	<i>Anas strepera</i>	---	---	S4B	N/A	N/A	N/A	M
9	American Wigeon	<i>Anas americana</i>	---	---	S4B	N/A	N/A	N/A	M
10	American Black Duck	<i>Anas rubripes</i>	---	---	S5B	N/A	N/A	N/A	M
11	Mallard	<i>Anas platyrhynchos</i>	---	---	S5B	---	---	N/A	Probable
12	Northern Shoveler	<i>Anas clypeata</i>	---	---	S4B	N/A	N/A	N/A	M
13	Northern Pintail	<i>Anas acuta</i>	---	---	S5B	N/A	N/A	N/A	M
14	Green-winged Teal	<i>Anas crecca</i>	---	---	S4B	N/A	N/A	N/A	M
15	Ring-necked Duck	<i>Aythya collaris</i>	---	---	S5B	N/A	N/A	N/A	M

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			FEDERAL	PROVINCIAL		REGIONAL			STATUS ⁷
			COSEWIC ¹	MNR ¹	SRANK ¹	MNR/BSC/EC ²	Waterloo ^{3,4,5}	Plourde ⁶	
	<i>BIRDS continued...</i>								
16	Greater Scaup	<i>Aythya marila</i>	---	---	S2B	N/A	N/A	N/A	
17	Bufflehead	<i>Bucephala albeola</i>	---	---	S3B	N/A	N/A	N/A	M
18	Common Goldeneye	<i>Bucephala clangula</i>	---	---	S5B	N/A	N/A	N/A	M
19	Hooded Merganser	<i>Lophodytes cucullatus</i>	---	---	S5B	Level 4	Regionally Significant	N/A	Possible
20	Common Merganser	<i>Mergus merganser</i>	---	---	S5B	N/A	N/A	N/A	M
21	Bald Eagle	<i>Haliaeetus leucocephalus</i>	NAR	END	S4B	N/A	N/A	N/A	M
22	Northern Harrier	<i>Circus cyaneus</i>	NAR	---	S4B	Level 4	Regionally Significant	N/A	Possible
23	Sharp-shinned Hawk	<i>Accipiter striatus</i>	NAR	NIAC	S5B	Level 2	Regionally Significant	N/A	Possible
24	Cooper's Hawk	<i>Accipiter cooperii</i>	NAR	NIAC	S4B	Level 3	Regionally Significant	N/A	Possible
25	Red-tailed Hawk	<i>Buteo jamaicensis</i>	NAR	NIAC	S5B	---	---	N/A	Possible
26	Ruffed Grouse	<i>Bonasa umbellus</i>	---	---	S5	Level 3	---	N/A	Possible
27	American Coot	<i>Fulica americana</i>	---	---	S4B	N/A	N/A	N/A	M
28	Killdeer	<i>Charadrius vociferus</i>	---	---	S5B	---	---	N/A	Possible
29	Spotted Sandpiper	<i>Actitis macularia</i>	---	---	S5B	Level 3	---	N/A	Possible
30	American Woodcock	<i>Scolopax minor</i>	---	---	S5B	Level 4	---	N/A	Possible
31	Ring-billed Gull	<i>Larus delawarensis</i>	---	---	S5B	N/A	N/A	N/A	XF
32	Herring Gull	<i>Larus argentatus</i>	---	---	S5B	N/A	N/A	N/A	XF
33	Rock Dove	<i>Columba livia</i>	---	---	SE	---	---	N/A	Possible
34	Mourning Dove	<i>Zenaida macroura</i>	---	---	S5B	---	---	N/A	Possible
35	Chimney Swift	<i>Chaetura pelagica</i>	---	---	S5B	N/A	N/A	N/A	XF
36	Ruby-throated Hummingbird	<i>Archilochus colubris</i>	---	---	S5B	Level 3	Regionally Significant	N/A	Probable
37	Belted Kingfisher	<i>Ceryle alcyon</i>	---	---	S5B	---	Regionally Significant	N/A	Possible
38	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	---	---	S4	Level 3	Regionally Significant	N/A	Probable
39	Downy Woodpecker	<i>Picoides pubescens</i>	---	---	S5	---	---	N/A	Probable
40	Hairy Woodpecker	<i>Picoides villosus</i>	---	---	S5	---	---	N/A	Probable
41	Northern Flicker	<i>Colaptes auratus</i>	---	---	S5B	---	---	N/A	Possible
42	Pileated Woodpecker	<i>Dryocopus pileatus</i>	---	---	S4S5	Level 2	Regionally Significant	N/A	Possible
43	Eastern Wood-Pewee	<i>Contopus virens</i>	---	---	S5B	---	---	N/A	Possible
44	Alder Flycatcher	<i>Empidonax alnorum</i>	---	---	S5B	Level 3	Regionally Significant	N/A	Possible
45	Willow Flycatcher	<i>Empidonax traillii</i>	---	---	S5B	---	---	N/A	Probable
46	Least Flycatcher	<i>Empidonax minimus</i>	---	---	S5B	Level 3	Regionally Significant	N/A	Probable
47	Eastern Phoebe	<i>Sayornis phoebe</i>	---	---	S5B	Level 3	---	N/A	Probable
48	Great Crested Flycatcher	<i>Myiarchus crinitus</i>	---	---	S5B	---	---	N/A	Possible
49	Eastern Kingbird	<i>Tyrannus tyrannus</i>	---	---	S5B	Level 3	---	N/A	Confirmed
50	Northern Shrike	<i>Lanius excubitor</i>	---	---	S2S3B	N/A	N/A	N/A	M / WR
51	Warbling Vireo	<i>Vireo gilvus</i>	---	---	S5B	---	Regionally Significant	N/A	Possible
52	Red-eyed Vireo	<i>Vireo olivaceus</i>	---	---	S5B	---	---	N/A	Possible
53	Blue Jay	<i>Cyanocitta cristata</i>	---	---	S5	---	---	N/A	Possible

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			COSEWIC ¹	MNR ¹	SRANK ¹	MNR/BSC/EC ²	Waterloo ^{3,4,5}	Plourde ⁶	
	<i>BIRDS continued...</i>								
54	American Crow	<i>Corvus brachyrhynchos</i>	---	---	S5B	---	---	N/A	Possible
55	Horned Lark	<i>Eremophila alpestris</i>	---	---	S5B	Level 3	---	N/A	Probable
56	Tree Swallow	<i>Tachycineta bicolor</i>	---	---	S5B	---	---	N/A	Probable
57	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	---	---	S5B	N/A	N/A	N/A	Probable
58	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	---	---	S5B	---	---	N/A	Possible
59	Barn Swallow	<i>Hirundo rustica</i>	---	---	S5B	N/A	N/A	N/A	Confirmed
60	Black-capped Chickadee	<i>Poecile atricapillus</i>	---	---	S5	Level 4	---	N/A	Confirmed
61	Red-breasted Nuthatch	<i>Sitta canadensis</i>	---	---	S5B	Level 3	---	N/A	Possible
62	White-breasted Nuthatch	<i>Sitta carolinensis</i>	---	---	S5	---	---	N/A	Probable
63	Brown Creeper	<i>Certhia americana</i>	---	---	S5B	Level 2	Regionally Significant	N/A	Probable
64	House Wren	<i>Troglodytes aedon</i>	---	---	S5B	---	---	N/A	Possible
65	Golden-crowned Kinglet	<i>Regulus satrapa</i>	---	---	S5B	N/A	N/A	N/A	M / WR
66	Eastern Bluebird	<i>Sialia sialis</i>	NAR	NIAC	S4S5B	Level 1	Regionally Significant	N/A	Confirmed
67	Hermit Thrush	<i>Catharus guttatus</i>	---	---	S5B	---	---	N/A	M
68	Wood Thrush	<i>Hylocichla mustelina</i>	---	---	S5B	level 4	---	N/A	Probable
69	American Robin	<i>Turdus migratorius</i>	---	---	S5B	---	---	N/A	Confirmed
70	Gray Catbird	<i>Dumetella carolinensis</i>	---	---	S5B	Level 4	---	N/A	Confirmed
71	Brown Thrasher	<i>Toxostoma rufum</i>	---	---	S5B	Level 1	Regionally Significant	N/A	Confirmed
72	European Starling	<i>Sturnus vulgaris</i>	---	---	SE	---	---	N/A	Possible
73	American Pipit	<i>Anthus rubescens</i>	---	---	S4B	N/A	N/A	N/A	M
74	Cedar Waxwing	<i>Bombycilla cedrorum</i>	---	---	S5B	---	---	N/A	Probable
75	Yellow Warbler	<i>Dendroica petechia</i>	---	---	S5B	---	---	N/A	Possible
76	Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	---	---	S5B	Level 1	Regionally Significant	N/A	Possible
77	Pine Warbler	<i>Dendroica pinus</i>	---	---	S5B	Level 3	Regionally Significant	N/A	Probable
78	Palm Warbler	<i>Dendroica palmarum</i>	---	---	S5B	---	---	N/A	M
79	Common Yellowthroat	<i>Geothlypis trichas</i>	---	---	S5B	---	---	N/A	Confirmed
80	American Tree Sparrow	<i>Spizella arborea</i>	---	---	S5B	N/A	N/A	N/A	WR
81	Chipping Sparrow	<i>Spizella passerina</i>	---	---	S5B	---	---	N/A	Probable
82	Vesper Sparrow	<i>Pooecetes gramineus</i>	---	---	S4B	Level 2	Regionally Significant	N/A	Probable
83	Savannah Sparrow	<i>Passerculus sandwichensis</i>	---	---	S5B	Level 1	---	N/A	Possible
84	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	---	---	S4B	Level 3	Regionally Significant	N/A	Possible
85	Song Sparrow	<i>Melospiza melodia</i>	---	---	S5B	---	---	N/A	Confirmed
86	Swamp Sparrow	<i>Melospiza georgiana</i>	---	---	S5B	Level 2	---	N/A	Probable
87	White-throated Sparrow	<i>Zonotrichia albicollis</i>	---	---	S5B	N/A	---	N/A	M
88	Dark-eyed Junco	<i>Junco hyemalis</i>	---	---	S5B	N/A	---	N/A	M / WR
89	Northern Cardinal	<i>Cardinalis cardinalis</i>	---	---	S5	---	---	N/A	Probable
90	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	---	---	S5B	---	---	N/A	Possible
91	Indigo Bunting	<i>Passerina cyanea</i>	---	---	S5B	---	---	N/A	Probable

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	BIRDS continued...								
92	Bobolink	<i>Dolichonyx oryzivorus</i>	---	---	S4B	N/A	---	N/A	X
93	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	---	---	S5B	---	---	N/A	Confirmed
94	Eastern Meadowlark	<i>Sturnella magna</i>	---	---	S5B	Level 2	---	N/A	Probable
95	Rusty Blackbird	<i>Euphagus carolinus</i>	---	---	S5B	N/A	N/A	N/A	M
96	Common Grackle	<i>Quiscalus quiscula</i>	---	---	S5B	---	---	N/A	Confirmed
97	Brown-headed Cowbird	<i>Molothrus ater</i>	---	---	S5B	---	---	N/A	Possible
98	Baltimore Oriole	<i>Icterus galbula</i>	---	---	S5B	---	---	N/A	Confirmed
99	Purple Finch	<i>Carpodacus purpureus</i>	---	---	S5B	N/A	---	N/A	M / WR
100	House Finch	<i>Carpodacus mexicanus</i>	---	---	SE	---	---	N/A	Possible
101	American Goldfinch	<i>Carduelis tristis</i>	---	---	S5B	Level 3	---	N/A	Probable
102	House Sparrow	<i>Passer domesticus</i>	---	---	SE	---	---	N/A	Possible
	MAMMALS								
1	<i>unidentified bat species</i>		?	?		N/A	?	N/A	N/A
2	Eastern Cottontail	<i>Sylvilagus floridanus</i>	---	---	S5	N/A	Common	N/A	N/A
3	Eastern Chipmunk	<i>Tamias striatus</i>	---	---	S5	N/A	Common	N/A	N/A
4	Woodchuck	<i>Marmota monax</i>	---	---	S5	N/A	Common	N/A	N/A
5	Gray Squirrel	<i>Sciurus carolinensis</i>	---	---	S5	N/A	Common	N/A	N/A
6	Red Squirrel	<i>Tamiasciurus hudsonicus</i>	---	---	S5	N/A	Common	N/A	N/A
7	Meadow Vole	<i>Microtus pennsylvanicus</i>	---	---	S5	N/A	Common	N/A	N/A
	<i>unidentified small mammal</i>		?	?	?	N/A	?	N/A	N/A
8	Coyote	<i>Canis latrans</i>	---	---	S5	N/A	Regionally Significant	N/A	N/A
9	Red Fox	<i>Vulpes vulpes</i>	---	---	S5	N/A	Common	N/A	N/A
	<i>unidentified canid</i>		?	?	?	N/A	?	N/A	N/A
10	Raccoon	<i>Procyon lotor</i>	---	---	S5	N/A	Common	N/A	N/A
11	<i>Long-tailed Weasel or Mink?</i>		?	?	?	N/A	?	N/A	N/A
	<i>weasel sp.</i>		?	?	?	N/A	?	N/A	N/A
12	Striped Skunk	<i>Mephitis mephitis</i>	---	---	S5	N/A	Common	N/A	N/A
13	White-tailed Deer	<i>Odocoileus virginianus</i>	---	---	S5	N/A	Common	N/A	N/A

LEGEND

--- = not significant

N/A = Not applicable

? = status unclear due to species uncertainty

1 = Provincial rarity ranks are evaluated and assigned by the Ontario Natural Heritage Information Centre (2001 a,b,c,d,e,f)

NAR = Not at Risk

S5 = Breeding resident. Very common and demonstrably secure in Ontario.

NIAC = Not In Ant Category

S4 = Breeding resident. Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

END = Endangered

S5B = Breeding migrants. Very common and demonstrably secure in Ontario.

S4B = Breeding migrants. Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

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

Appendix J7: Wildlife observed within and immediately adjacent to the Forbes Creek Subwatershed by Dougan Associates 2000-2002.

2 = Birds of conservation priority for the Regional Municipality of Waterloo, as determined by Ontario Ministry of Natural Resources, Birds Studies Canada, and Environment Canada (Couturier, 1999).

Note: Only birds showing breeding evidence are considered.

Note: There are no equivalent ranks for other wildlife species other than birds

Level 1 = Species of conservation concern for the Regional Municipality of Waterloo (highest level of concern)

Level 2 = Species of conservation concern for the Regional Municipality of Waterloo (greater than Level 3)

Level 3 = Species of conservation concern for the Regional Municipality of Waterloo (less than Level 2)

Level 4 = Species of conservation concern for the Regional Municipality of Waterloo (lowest level of concern)

--- = Not of conservation concern in the Regional Municipality of Waterloo and/or not believed to be breeding on site

3,4,5 = List of regionally significant wildlife species based on Regional Municipality of Waterloo (1985a; 1985b; 1996)

6 = Conservation Status of Herpetofauna in the old Ministry of Natural Resources "Central Region" (Plourdeet *al.*, 1989).

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

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

W = Widespread (Any species that occurs throughout Central Region)

7 = Highest Breeding Status codes mostly based on Ontario Breeding Bird Atlas Terminology (Cadman, et al., 1987)

Note: If the highest breeding status is different for areas within the subwatershed boundary compared to areas outside the subwatershed, only the status within the subwatershed is listed.

M = Migrant

WR = Winter Resident

X = species observed in its breeding season (no evidence of breeding)(i.e. flyover only)

XF = species observed foraging in its breeding season (no evidence of breeding)

Possible = Possible breeding species

Probable = Probable breeding species

Confirmed = Confirmed breeding species

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Appendix J8: *Environmentally Sensitive Policy Areas (ESPAs)*

Under the terms of reference for the subwatershed study, identification of existing or potential Environmentally Sensitive Policy Areas (ESPAs) was requested. The following discussion addresses these requirements.

Presently, no ESPAs are recognized in the Forbes Creek subwatershed. In light of information gathered as part of the subwatershed study, the December 1998 Consolidation of the Regional Official Policies Plan was reviewed to determine whether any natural heritage features would now merit such designation. The reader is referred to page 32 of the Regional Official Policies Plan - Environmentally Sensitive Policy Areas.

To qualify as an ESPA, at least two of the four criteria listed in section 4.3.2 b) need to be fulfilled. Based on the information gathered, several natural heritage features within the Forbes Creek subwatershed fulfill at least one and possibly up to three of the four criteria. The four criteria are:

- i) comprise ecological communities deemed unusual, of outstanding quality or particularly representative regionally, provincially or nationally;
- ii) contain critical habitats which are uncommon or remnants of once extensive habitats such as old growth forest, forest interior habitat, Carolinian forest, prairie-savanna, bogs, fens, marl meadows, and cold water streams;
- iii) provide a large area of natural habitat of at least twenty hectares which affords habitat to species intolerant of human intrusion; or
- iv) provide habitat organisms indigenous to the Region recognized as nationally, provincially, or regionally significant; or

Alternatively, ESPA designation can be achieved if one of the criteria listed in 4.3.2b) and two of the five criteria listed in 4.3.2c) are fulfilled. The five criteria listed in 4.3.2 c) are:

- i) contain an unusual diversity of native life forms due to varied topography, contain microclimates, soils, and/or drainage regimes;
- ii) perform a vital ecological function such as maintaining the hydrological balance over a widespread area by acting as a natural water storage discharge or recharge area;
- iii) provide a linking system of relatively undisturbed forest or other natural habitat for the movement of wildlife over a considerable distance;
- iv) serve as major migratory stop-overs; or
- v) contain landforms deemed unusual or particularly representative at the regional scale.

Based on the information gathered, several natural heritage features found within the Forbes Creek subwatershed fulfill at least one and up to four criteria in 4.3.2 b). Similarly, depending on one's interpretation, the natural heritage features contained within the Forbes Creek subwatershed appear to fulfill two or more of the criteria listed in 4.3.2 c). These natural heritage features (*i.e.*, vegetation communities) have been grouped together to simplify discussion and are listed in Table 1., which summarizes various ecological attributes for component vegetation communities. The four 'blocks' identified mirror the existing areas included in the provincially significant Forbes Creek Wetland. However, since ESPAs are not defined by wetland boundaries, the proposed ESPA boundaries would likely extend into upland areas beyond those defined by the PSW.

With respect to criteria 4.3.2 b) ii), blocks A and B contain a limited amount of forest interior habitat. Most wildlife planners refer to 'forest interior' as forested areas at least 100 m away

from the forest edge; some research supports an even greater amount of edge, more than 200 m deep. The Regional Municipality of Waterloo does not use an arbitrary threshold distance when designating areas as forest interior (C. Gosselin *pers. comm.*, 2001). Rather, they evaluate each habitat block based on a variety of unpublished criteria, usually assessed in the field. Criteria include habitat type, overall condition or quality, local topography etc.

Both of the identified habitat blocks containing forest interior also support forest interior bird species. However, the diversity is low, suggesting that the amount of habitat found is not extensive or of high quality. There is not universal agreement as to what constitutes forest interior species. The concept of 'area sensitivity', essentially reflecting a species' tolerance to disturbance and habitat fragmentation" (Macdonald, 1996), is now becoming commonplace. While they often go hand in hand, the two categories do not always contain the same species.

By virtue of their size (see Table 1), all vegetation blocks except for B satisfy the 20 ha size requirement of criteria 4.3.2.b) iii). Even though Block B does not fulfill the area criteria by itself, it does if it is lumped together with Block A. The two blocks are only separated by a narrow (<10m) gap. All habitat blocks support both 'forest interior' and 'area sensitive' wildlife species (as defined in Couturier, 1999). While Mink (*Mustela vison*) does not appear to be overly sensitive to human development, provided suitable habitat remains, the response of the less common Long-tailed Weasel (*Mustela freneta*) to such disturbance is unclear. As 'forest interior' or 'area sensitive' species can generally be considered "intolerant of human disturbance" then all of criterion 4.3.2 b) iii) is fulfilled. It is also important to note that more field study of these vegetation communities may yield additional species considered to be intolerant of human disturbance.

Each habitat block contained several regionally significant plant and wildlife species (as defined in Regional Municipality of Waterloo, 1996; Regional Municipality of Waterloo, 1999). Block A contained a provincially significant species discovered in the subwatershed (Riley, 1989). All significant species are listed in Table 1 according to the habitat polygon they were observed in. Based on these findings, it appears that criterion 4.3.2 b) iv) is fulfilled.

Clearly, parts of the Forbes Creek subwatershed do provide the vital functions listed in 4.3.2 c) ii), but whether they are for a 'widespread' area is subject to interpretation. However, because these vegetation blocks span the entire subwatershed, it is apparent that this criterion certainly applies at this scale.

Block D provides an important link for White-tailed Deer (*Odocoileus virginianus*) (and probably for more secretive species as well) between the Speed River, forested habitats to the north, and into adjoining subwatersheds. This situation appears to meet conditions for 'relatively undisturbed' and 'considerable distance' as described under criterion 4.3.2 c) iii). The Regional Municipality of Waterloo will evaluate application of these criteria by placing each in context with its local environment and in relation to all of the natural heritage resources in their jurisdiction (C. Gosselin *pers. comm.*, 2001). Often, a field visit is necessary for proper evaluation. The significance of other factors such as roadways (e.g. Highway 24), which act as barriers to wildlife movement, are best understood from ground level.

In summary, natural heritage features found within the Forbes Creek subwatershed do fulfill the criteria listed in the Regional Official Plan to be recognized as an ESPA. However, the ultimate determination will be undertaken by Regional staff and the Ecological and Environmental Advisory Committee (EEAC). As part of the present study, dialogue on this matter has been initiated with the Region's Environmental Planner.

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Table 1: ECOLOGICAL ATTRIBUTE SUMMARY OF POTENTIAL ESPA BLOCKS

Potential ESPA Area	Component vegetation units	ELC Community Series	Area (ha)	Provincially Significant Species (Riley, 1989)	Regionally Significant Species (Regional Municipality of Waterloo, 1996 and 1999)	Forest Interior (alone or in combination)	Forest Interior Bird Species (Freemark and Merriam, 1986; Hounsell, 1989)	Area Sensitive Species (Couturier, 1999)	ESPA Designation Criteria Fulfilled									
									4.3.2 a)	4.3.2 b)				4.3.2 c)				
										i)	ii)	iii)	iv)	i)	ii)	iii)	iv)	v)
A	1.00	Thicket Swamp	1.13	Plants: <i>Carex jamesii</i>	Plants: <i>Vaccinium angustifolium</i> , <i>Vaccinium corymbosum</i> , <i>Carex canescens</i> , <i>Carex jamesii</i> , <i>Cypripedium calceolus var parviflorum</i> . Birds: Turkey Vulture, Pileated Woodpecker, Warbling Vireo, Grasshopper Sparrow.	Yes	Hairy Woodpecker, Pileated Woodpecker	Turkey Vulture, Pileated Woodpecker, Savannah Sparrow, Grasshopper Sparrow	No	?	Yes	Yes	Yes	?	Yes	?	No	No
	1.01	Deciduous Forest	13.95			Yes												
	1.04	Thicket Swamp	1.07			No												
	1.08	Deciduous Swamp	0.32			Yes												
	1.22	Cultural Meadow	8.56			No												

Total Area = 25.03

Potential ESPA Area	Component vegetation units	ELC Community Series	Area (ha)	Provincially Significant Species (Riley, 1989)	Regionally Significant Species (Regional Municipality of Waterloo, 1996 and 1999)	Forest Interior (alone or in combination)	Forest Interior Bird Species (Freemark and Merriam, 1986; Hounsell, 1989)	Area Sensitive Species (Couturier, 1999)	ESPA Designation Criteria Fulfilled									
									4.3.2 a)	4.3.2 b)				4.3.2 c)				
										i)	ii)	iii)	iv)	i)	ii)	iii)	iv)	v)
B	2.00	Thicket Swamp	6.03		Plants: <i>Lobelia spicata</i> Birds: Pileated Woodpecker, Warbling Vireo, Brown Creeper.	Yes	Pileated Woodpecker, Brown Creeper	Pileated Woodpecker, Brown Creeper	No	No	Yes	Yes	Yes	No	Yes	?	No	No
	2.01	Deciduous Forest	0.72			Yes												
	2.02	Meadow Marsh	1.47			No												
	2.03	Deciduous Swamp	0.75			No												
	2.05	Coniferous Swamp	0.66			Yes												
	2.06	Open Water	0.34			No												
	2.07	Hedgerow	0.16			No												
	2.08	Cultural Meadow	1.12			No												
	2.09	Coniferous Swamp	0.91			Yes												
	2.10	Swamp Thicket	0.27			Yes												
	2.11	Deciduous Forest	1.70			Yes												
	2.12	Deciduous Swamp	1.04			Yes												
	2.13	Meadow Marsh	0.45			No												
	2.14	Meadow Marsh	0.17			Yes												

Total Area = 15.79

Potential ESPA Area	Component vegetation units	ELC Community Series	Area (ha)	Provincially Significant Species (Riley, 1989)	Regionally Significant Species (Regional Municipality of Waterloo, 1996 and 1999)	Forest Interior (alone or in combination)	Forest Interior Bird Species (Freemark and Merriam, 1986; Hounsell, 1989)	Area Sensitive Species (Couturier, 1999)	ESPA Designation Criteria Fulfilled									
									4.3.2 a)	4.3.2 b)				4.3.2 c)				
										i)	ii)	iii)	iv)	i)	ii)	iii)	iv)	v)
C	4.00	Mineral Swamp	0.85		Plants: <i>Pycnathemum virginianum</i> Birds: Wood Duck, Hooded Merganser, Ruby-throated Hummingbird, Red-bellied Woodpecker, Pileated Woodpecker, Alder Flycatcher, Warbling Vireo, Chestnut-sided Warbler, Vesper Sparrow Mammals: Long-tailed Weasel or Mink	No	Pileated Woodpecker	Wood Duck, Hooded Merganser, Ruby-throated Hummingbird, Red-bellied Woodpecker, Pileated Woodpecker, Alder Flycatcher, Chestnut-sided Warbler, Vesper Sparrow, Long-tailed Weasel ??	No	No	No	Yes	Yes	?	Yes	?	No	No
	4.01	Meadow Marsh	0.07			No												
	4.02	Meadow Marsh	2.60			No												
	4.03	Deciduous Forest	9.95			No												
	4.04	Thicket Swamp	0.50			No												
	4.05	Cultural Meadow	3.02			No												
	4.06	Thicket Swamp	2.57			No												
	4.07	Deciduous Swamp	2.33			No												
	4.08	Deciduous Forest	2.13			No												
4.09	Deciduous Swamp	0.76	No															

Total Area = 24.78

Appendix J9a

Regional Municipality of Waterloo – Planning, Housing
and Community Services Department Report -
Evaluation of Natural Areas in the Forbes Creek
Subwatershed as Potential New Environmentally
Sensitive Policy Area



PLANNING, HOUSING AND COMMUNITY SERVICES DEPARTMENT REPORT

To: Chair Ron Donaldson and Members of the Ecological and Environmental Advisory Committee
Report No: P-EEAC-01-007
File Code: D04-30

Date: November 27, 2001

Subject: **EVALUATION OF NATURAL AREAS IN FORBES CREEK WATERSHED AS POTENTIAL NEW ENVIRONMENTALLY SENSITIVE POLICY AREAS**

RECOMMENDATION:

THAT the Ecological and Environmental Advisory Committee receive Report P-EEAC-01-007 for information and discussion.

SUMMARY:

NIL

REPORT:

The *Regional Official Policies Plan* takes a systematic and scientific approach to the identification of new Environmentally Sensitive Policy Areas. R.O.P.P. Policy 3.1.4(c) makes the identification of potential E.S.P.A.s a matter of Regional interest in the completion of watershed studies. Policy 4.3.4 then states that when a potential E.S.P.A. is identified in a watershed study or other appropriate field study, the Region will consider a R.O.P.P. Amendment to designate the area.

In recent years, the Region has participated in a number watershed and other planning studies which have identified several natural areas fulfilling criteria for designation as new E.S.P.A.s. These include the following areas which are currently being considered for designation as new E.S.P.A.s.

1. Doon South Creek (1994): Proposed Topper Woods E.S.P.A.
2. Portuguese Knoll E.I.S. (1996-97): Proposed Glenvalley Drive Oak Savanna E.S.P.A.
3. Moffat Creek (1997): Proposed Moffat Creek and Clyde Woods E.S.P.A.s
4. Firella Creek (1997): Proposed Firella Creek, Firella West Woods, and Firella East Woods E.S.P.A.s

The Forbes Creek Sub-watershed Study in the Hespeler area was commenced in 2000 and is nearing completion. In the process, areas of high quality natural habitat have been identified within the watershed. Regional staff have been requested to advise as to whether any of these areas should be identified as potential E.S.P.A.s. On September 28 and October 12, 2001 respectively, staff examined the wetlands in the lower reaches of the creek and the woodlands and wetlands in headwater areas. Staff are grateful to Mr. Karl Konze of Dougan & Associates for guiding us through the areas and providing additional detailed field information and mapping. Our observations and the information provided are

summarised below.

1. Background

The Forbes Creek watershed is located in northeastern Hespeler in Cambridge. It encompasses 350 ha, both north and south of Highway 24 (Hespeler Road) at its intersection with Guelph Avenue. Land uses in this area are primarily agricultural and urban residential, although a significant portion of the watershed has been left in a natural state. In the areas north of Highway 24, hedgerows are common and provide valuable links between the blocks of natural areas. The landscape is marked by depressions, hummocky terrain and a kame formation north of Highway 24, while to the south it is relatively flat and less varied.

Forbes Creek originates in the wetlands north of Highway 24. It has an eastern and a western branch which cross under the Highway in culverts, connecting in the meadow marsh south of Blackbridge Road. A large portion of the natural areas in the watershed are wetlands and have recently been recognized by the Ministry of Natural Resources (M.N.R.) as Provincially Significant Wetlands (P.S.W.). The natural areas evaluated as potential E.S.P.A.s have been subdivided into the Forbes Creek Headwaters, which includes all natural areas north of Highway 24, and the Lower Forbes Creek Wetlands, which includes natural areas south of Highway 24 to the edge of the Speed River corridor. All the land under consideration for E.S.P.A. designation is privately owned, with the exception of a parcel north of Highway 24 at Guelph Avenue which is owned by the Ontario Ministry of Transportation.

2. Lower Forbes Creek Wetlands

2.1 General Description

The wetlands comprising this area are relatively diverse, and will be discussed in order from north to south. North of Blackbridge Road is a swamp and marsh wetland (10.2 ha), containing a number of different vegetation communities. The most prevalent community is the Silver Maple swamp, which contains pockets of other species such as Yellow Birch, Black Ash and Eastern White Cedar. Ferns and mosses are often found in the rich soil on the hummocks left by fallen trees in the swamp. Bordering this Silver Maple swamp is a Black Ash swamp, which is small in size. Within this entire swamp area, the eastern branch of Forbes Creek is intermittent, and was dry at the time of the site visit. In the northern area of this woodlot, a trail system weaves through an upland area of Hemlock, Eastern White Cedar and Beech. This trail system leads through the landowner's children's park, which has fairy tale buildings and gnomes along the trailway. In this section of the woodlot, refuse has been left in piles. A cattail marsh occurs along the northern edge of the woodlot, and a conifer plantation is located on the southern edge. No significant plant species were found here, but there is fresh evidence of Pileated Woodpecker activity in the area. There is no evidence, however, that it is breeding anywhere in the watershed, but only that it is using the watershed for foraging. This swamp complex has been identified by the Ministry of Natural Resources (M.N.R.) as a Provincially Significant Wetland (P.S.W.), and is designated as a Locally Significant Natural Area (L.S.N.A.) in the City of Cambridge Official Plan.

South of Blackbridge Road a 7.6 ha meadow marsh ecosystem receives drainage from the surrounding agricultural fields and the two branches of Forbes Creek. A small pocket of marsh extends beyond Blackbridge Road to connect with the culvert under Highway 24, serving both a linkage and a hydrologic function. The meadow complex is located in a valley-like depression, rising gently to agricultural fields on either side. Within this marsh system, four Regionally significant plant species were found:

- Silvery Sedge (*Carex canescens*)
- Broom Sedge (*Carex scoparia*)
- Small Yellow Lady's Slipper (*Cypripedium calceolus* var. *parviflorum*)
- Marsh Horsetail (*Equisetum palustre*)

At its northern end, the marsh gives way to both a meadow swamp and a Birch-Poplar swamp. This entire area serves a water function within the Forbes Creek watershed, and has been identified as both a P.S.W. and a Locally Significant Natural Area (L.S.N.A.).

South of the marsh are two rectangular online ponds (0.7 and 0.8 ha), bordered by planted willows, which were constructed in the 1950s as part of a Wood Duck sanctuary. The area immediately surrounding the ponds and the Willows is mowed regularly by the owner. No Regionally significant plant species were found in the area, but the following Regionally significant wildlife was observed:

- Bullfrog
- Belted Kingfisher ("Possible" breeding status)
- Least Flycatcher ("Probable" breeding status)
-

Both of these ponds have been recognized as part of the P.S.W. complex along Forbes Creek, but have not been given L.S.N.A. status by the City of Cambridge.

Directly east of the online ponds are two natural ponds which have a swamp fringe. Both ponds are relatively small (approximately 0.1 ha each) and shallow, but support populations of herptiles. Between the two ponds is a small (0.3 ha) Scotch Pine and Norway Spruce plantation. Small Yellow Lady's Slipper (*Cypripedium calceolus* var. *parviflorum*) was found in the easternmost pond, as well as Warbling Vireo (which has a "Possible" breeding status). These ponds are also have P.S.W. status, but are not part of an L.S.N.A. designation.

Immediately south of the last online pond is a Scotch Pine-White Pine plantation (2.9 ha). The terrain in this area is hummocky. It does not provide habitat for any significant plant or wildlife species, and is not part of either the P.S.W. or the L.S.N.A. designations. It connects the Forbes Creek corridor to the Speed River corridor.

This entire area is understood to function as a wildlife corridor. The connection to the Speed River corridor and its Mill Pond is strong, but the connection to the natural areas north of Highway 24 is weaker. Deer are reported to use this corridor, but it is unknown how many other wildlife species rely on it for their survival.

2.2 Fulfillment of E.S.P.A. Criteria

Regional staff have evaluated information gathered by Dougan & Associates staff and observed during the September 28/01 site visit with reference to the E.S.P.A. criteria.

4.3.2 *To qualify for designation as an Environmentally Sensitive Policy Area, a natural area must:*

- a) be identified by the Province as a Provincially Significant Life Science Area of Natural and Scientific Interest, Regionally Significant Life Science Area of Natural and Scientific Interest, or a Provincially Significant Earth Science Area of Natural and Scientific Interest;*
No.

or

b) fulfil at least two of the following criteria:

i. *comprise ecological communities deemed unusual, of outstanding quality or particularly representative regionally, provincially or nationally;*

No.

ii. *contain critical habitats which are uncommon or remnants of once extensive habitats such as old growth forest, forest interior habitat, Carolinian forest, prairie-savanna, bogs, fens, marl meadows, and cold water streams;*

No.

iii. *provide a large area of natural habitat of at least twenty hectares which affords habitat to species intolerant of human intrusion; or*

No. The satisfaction of this criterion would depend on how much of the corridor is included in a potential E.S.P.A.. However, due to the corridor's narrow breadth and generally open structure, it does not afford habitat to species intolerant of human intrusion. It does not provide continuous habitat coverage, since Blackbridge Road and the mown areas around the online ponds serve to segment the corridor into blocks.

iv. *provide habitat for organisms indigenous to the Region recognized as nationally, provincially, or regionally significant; or*

Yes. Four Regionally significant plant species and one Regionally significant bird species are found in the high quality natural areas (includes the swamp north of Blackbridge Road, the meadow marsh, and the natural ponds), while two Regionally significant bird species and one Regionally significant herptile are found in the online ponds.

Natural Areas:

- Silvery Sedge (*Carex canescens*)
- Broom Sedge (*Carex scoparia*)
- Small Yellow Lady's Slipper (*Cypripedium calceolus* var. *parviflorum*)
- Marsh Horsetail (*Equisetum palustre*)
- Pileated Woodpecker ("Possible" breeding status)

Online Ponds:

- Bullfrog
- Belted Kingfisher ("Possible" breeding status)
- Least Flycatcher ("Probable" breeding status)

c) Fulfil one of the criteria in b) above and any two of the following:

i. *contain an unusual diversity of native life forms due to varied topography, microclimates, soils, and/or drainage regimes;*

No. Although there is a substantial degree of diversity, it is not unusual in the Region.

- ii. *perform a vital ecological function such as maintaining the hydrological balance over a widespread area by acting as a natural water storage, discharge or recharge area;*
Yes. The corridor does provide an important hydrologic function as the lower part of the Forbes Creek watershed.
- iii. *provide a linking system of relatively undisturbed forest or other natural habitat for the movement of wildlife over a considerable distance;*
No. Although the area may be considered a corridor, it is at most a local level corridor. The corridor does not have the width, the length or the strong connections with other natural areas characteristic of Regionally significant linkages.
- iv. *serve as major migratory stop-overs; or*
No. The online and natural ponds may have a minor stopover function, but are much less significant than the Mill Pond in the Speed River directly south of this area.
- v. *contain landforms deemed unusual or particularly representative at the regional scale.*
No.

To summarise, Regional staff are of the opinion that this area only fulfills E.S.P.A. criteria B4 and C2. It thus falls short of the level of environmental significance necessary to warrant further consideration as a potential new E.S.P.A.. The area north of the online ponds has been given Locally Significant Natural Area (L.S.N.A.) status by the City of Cambridge and the recent extension of the P.S.W. status to include the online and natural ponds may also result in the extension of this L.S.N.A. designation in accordance with Cambridge Official Plan policies. The watershed study consultants will recommend possible changes to the area's L.S.N.A. status if they see fit, and will determine whether the southern plantation should be included within this local designation. The natural area is protected from development by Cambridge Official Plan policies by its P.S.W. status and L.S.N.A. designation.

3. Forbes Creek Headwaters

3.1 General Description

The Forbes Creek Headwaters natural areas are located north of Highway 24. The area consists of three blocks of natural habitat which are connected to one another and to other nearby natural areas by hedgerows. Overall, the landscape is variable, and comprises rolling agricultural fields, kettle depressions, hummocky terrain and a kame formation. The wetland pockets found in the kettle depressions are highly diverse and rich in species, and perform a vital hydrologic function for the Forbes Creek watershed. The natural areas in question for E.S.P.A. designation will be described below, in order from west to east.

The sixteen hectare western upland woodlot is dominated by high-quality Sugar Maple, along with Beech, Basswood, White Ash, Bitternut Hickory and other species. It supports a highly diverse understory, with very little visible presence of non-native species. Although the woodlot has been selectively logged, no adverse impacts are visible. The southern end of the woodlot is located on a kame formation that is the highest point in the Speed River watershed in the Region. Within the woodlot, glaciation has also resulted in the hilly, hummocky terrain and larger rocks on the surface. It has also resulted in the creation of a swamp depression in the northern area of the woodlot. Five Regionally

significant plant species and two Regionally significant bird species were found in this woodlot:

- Silvery Sedge (*Carex canescens*)
- James' Sedge (*Carex jamesii*) (Provincially significant)
- Small Yellow Lady's Slipper (*Cypripedium calceolus* var. *parviflorum*)
- Late Sweet Blueberry (*Vaccinium angustifolium*)
- Highbush Blueberry (*Vaccinium corymbosum*)
- Pileated Woodpecker ("Possible" breeding status)
- Warbling Vireo ("Probable" breeding status)

In addition, Hairy Woodpecker was found in this woodlot, and is a species that typically only utilizes forest interior habitat. The presence of this species indicates that some amount of interior habitat may be provided by this woodlot, even though only 0.4 ha of habitat is more than 100 m from the woodlot edge (100 m is the typical minimum buffer between edge habitat and interior habitat). Overall, this woodlot provides high quality habitat for both vegetation and wildlife.

On the south-western flank of the woodlot is an area of regenerating meadow which contains both the edge of the kame formation as well as habitat for the Regionally significant Grasshopper Sparrow ("Possible" breeding status). However, due to its small size (8.6 ha), the meadow is not considered sufficiently large enough to support breeding area for the Grasshopper Sparrow. The vegetation within this area has a high proportion of non-native species, including a row of planted Black Locust trees.

On the south-eastern flank, the upland woodlot extends into an area of swamp and regenerating meadow. The swamp is located in the remains of a reservoir, and contains the Regionally significant Small Yellow Lady's Slipper (*Cypripedium calceolus* var. *parviflorum*). The regenerating meadow is slightly hummocky, but has no significant features. The meadow does however connect the upland woodlot with the wetlands to the east.

The wetland area (14.1 ha) contains a high diversity of swamp, marsh and associated uplands that contribute to the quality of the habitat in the overall unit. Habitats include a Silver Maple swamp, a conifer swamp, a strip of upland Sugar Maple, a Yellow Birch-Eastern White Cedar swamp, and a cattail marsh. A short area of culvert under the cultivated field connects the upland woodlot with this wetland area. This wetland also contains a small population of unusually large Balsam Firs. It also contains habitat for the Regionally significant Pale-spiked Lobelia (*Lobelia spicata*) and Brown Creeper ("Probable" breeding status). This area also appears to provide some interior habitat as noted by the presence of two sensitive bird species (Hairy Woodpecker and Brown Creeper) observed in the wetlands although it provides only 0.9 ha beyond the 100 m edge buffer. This area serves a valuable hydrological function in the wetland and is also the source for the smaller western branch of Forbes Creek.

Although disconnected from the other two main natural area units, the marsh and swamp in the north-east exhibits significant ecological value. This area is the source of the eastern branch of Forbes Creek, draining through the marsh areas towards Highway 24. Aside from some non-native species in the understorey, the habitat is impressive and valuable to wildlife. Eight significant bird species and one significant plant species were found in this area, as noted below:

- Virginia Mountain Mint (*Pycnanthemum virginianum*)
- Wood Duck ("Probable" breeding status)
- Hooded Merganser ("Possible" breeding status)
- Ruby-throated Hummingbird ("Probable" breeding status)

- Red-bellied Woodpecker ("Probable" breeding status)
- Pileated Woodpecker ("Possible" breeding status)
- Alder Flycatcher ("Possible" breeding status)
- Warbling Vireo ("Probable" breeding status)
- Chestnut-sided Warbler ("Possible" breeding status)

In addition to the significant birds there is an unusually large population of Three-way sedge (*Dulichium arundinacea*) in a meadow marsh and an area of unusually large Red Oaks. The area of upland around the marshes buffers them from the surrounding agricultural fields, although this buffer is thin in areas around the Three-way sedge meadow. North of these wetlands is an open three hectare meadow which contains a small wetland pocket on its northerly edge (0.5 ha). This wetland drains along a swale through the meadow and into the marsh in the main marsh unit, and is currently under consideration for inclusion in the P.S.W. complex.

The highway provides a major obstacle to the movement of wildlife between these natural areas and the wetland corridor to the south. A weak linkage occurs along a hedgerow between the northern marshes and natural areas to the north and east, beyond the watershed boundaries. Overall, the area provides a valuable and highly diverse array of habitat types and also provides a small amount of valuable interior habitat to sensitive wildlife.

3.2 Fulfillment of E.S.P.A. Criteria

Regional staff have evaluated information gathered by Dougan & Associates staff and observed during the September 28/01 site visit with reference to the E.S.P.A. criteria.

4.3.2 *To qualify for designation as an Environmentally Sensitive Policy Area, a natural area must:*

- a) *be identified by the Province as a Provincially Significant Life Science Area of Natural and Scientific Interest, Regionally Significant Life Science Area of Natural and Scientific Interest, or a Provincially Significant Earth Science Area of Natural and Scientific Interest;*

No.

or

- b) *fulfil at least two of the following criteria:*

- i. *comprise ecological communities deemed unusual, of outstanding quality or particularly representative regionally, provincially or nationally;*

Yes. The Three-way sedge meadow comprises an unusually large concentration of this species in the Region. The population of large Balsam Firs in the swamp is also unusual in the Region.

- ii. *contain critical habitats which are uncommon or remnants of once extensive habitats such as old growth forest, forest interior habitat, Carolinian forest, prairie-savanna, bogs, fens, marl meadows, and cold water streams;*

No.

- iii. *provide a large area of natural habitat of at least twenty hectares which affords habitat to species intolerant of human intrusion; or*

Debatable. Although all three main blocks together cover 58.4 ha, there is very little interior habitat within them; each individual block is under 20 ha in size. Each block

has a high edge to interior ratio, and when the 100 m buffer is drawn less than one hectare of interior habitat is left in each block. However, the presence of two sensitive 'forest interior' bird species in the two western blocks suggest that these areas provide some degree of interior habitat. However, it is debatable whether protecting such a small amount of forest interior habitat was the original intention of this criterion, judging by its use in other E.S.P.A.s.

- iv. *provide habitat for organisms indigenous to the Region recognized as nationally, provincially, or regionally significant; or*

Yes. In total, seven significant plant species and nine significant bird species were found in the area.

Plants:

- Silvery Sedge (*Carex canescens*)
- James' Sedge (*Carex jamesii*) (Provincially significant)
- Small Yellow Lady's Slipper (*Cypripedium calceolus* var. *parviflorum*)
- Pale-spiked Lobelia (*Lobelia spicata*)
- Virginia Mountain Mint (*Pycnanthemum virginianum*)
- Late Sweet Blueberry (*Vaccinium angustifolium*)
- Highbush Blueberry (*Vaccinium corymbosum*)

Birds:

- Wood Duck ("Probable" breeding status)
- Hooded Merganser ("Possible" breeding status)
- Ruby-throated Hummingbird ("Probable" breeding status)
- Red-bellied Woodpecker ("Probable" breeding status)
- Pileated Woodpecker ("Possible" breeding status)
- Alder Flycatcher ("Possible" breeding status)
- Warbling Vireo ("Probable" breeding status)
- Brown Creeper ("Probable" breeding status)
- Chestnut-sided Warbler ("Possible" breeding status)

- c) *Fulfil one of the criteria in b) above and any two of the following:*

- i. *contain an unusual diversity of native life forms due to varied topography, microclimates, soils, and/or drainage regimes;*

Yes. The diverse topography of the landscape supports a rich variety of natural habitats. Marshes, swamps, kettle depressions, upland and lowland forests, and upland meadows are all indicative of the variety of microclimates and soil moisture regimes found here.

- ii. *perform a vital ecological function such as maintaining the hydrological balance over a widespread area by acting as a natural water storage, discharge or recharge area;*

Yes. These natural areas are part of the headwaters of Forbes Creek, and serve as the source for both its eastern and western branches. The wetlands in this area collect, retain, and release water into the two branches of Forbes Creek. The marshes and swamps help maintain the hydrologic balance and water quality in the subwatershed, as well as provide valuable wildlife habitat.

- iii. *provide a linking system of relatively undisturbed forest or other natural habitat for the*

movement of wildlife over a considerable distance;

No. The link to the northern natural areas is weak since the only physical connection is a hedgerow. Although culverts under the highway provide hydrologic linkage to the lower watershed, the highway still serves as a significant obstacle to wildlife, and thus this potential linkage is considered weak.

iv. *serve as major migratory stop-overs; or*
No.

v. *contain landforms deemed unusual or particularly representative at the regional scale.*
Yes. A kame-type landform occurs in the southern portion of the upland woodlot. This landform rises to a peak in the woodlot before dropping in height and extending into a wide, hummocky landform in the adjoining agricultural fields. This landform is the highest point in the Speed River watershed within the Region.

Based on fieldwork and observation by Regional staff, it appears that the natural areas in the Forbes Creek Headwaters fulfill criteria B1, B4, C1, C2 and C5. It is less clear whether the area also meets criterion B3. Thus the natural areas in Forbes Creek Headwaters merit consideration as a new E.S.P.A. designation.

3.3 Recommended Boundary

Based on our review of field data and inspection in the field, staff have delineated primary boundaries for a potential E.S.P.A.. Along the upland woodlot, the boundary has been drawn to include the base of the kame formation which extends beyond the woodlot into the meadow to the west, as well as the entire woodlot and swamp depression. The boundary also extends to the east to include both the swamp in the remnant reservoir depression and the surrounding meadow. This meadow has been included as a link to the adjoining lowland swamps. The land is owned by the Ontario Ministry of Transportation, and there does not appear to be much development potential for it given its location on a controlled access highway and its separation from other open fields by the woodlands and wetlands.

The boundaries around the lowland swamp area include the wetland areas but exclude the disturbed areas along the northern and north-western edges. These areas include a built pond, areas of planted trees, and a plantation. The small plantation has not been included since there is a clear gap between it and the main wetland block.

The boundaries along the northern marsh are clear cut, and extend along the visual boundary between the main natural block and the adjoining agricultural fields. The boundary includes a small Silver Maple swamp to the west that serves as a linkage to the natural areas to the north. The proposed boundary includes a small meadow north of the main area which includes a small wetland pocket and swale. Although this area may not seem significant from a vegetation and wildlife standpoint, it does serve a hydrologic function, as seen by the M.N.R.'s consideration to include it as part of the P.S.W..

The boundaries, as drawn on the attached T.D.S. map, encompass 58.4 ha of natural area and provide a high degree of habitat diversity for both wildlife and vegetation.

3. Conclusion

The natural areas within Forbes Creek Headwaters clearly meet the E.S.P.A. designation criteria, and

thus merit further consideration for E.S.P.A. designation. The Lower Forbes Creek Wetlands fail to satisfy sufficient criteria for consideration as a potential E.S.P.A. designation, but are still valuable natural areas at the local level.

CORPORATE STRATEGIC PLAN:

Achieving sustainable growth involves "identifying environmentally-based development capacities through watershed studies" such as the Forbes Creek study. This process also requires the determination of the level of significance of various natural features and the appropriate level of protection they require.

FINANCIAL IMPLICATIONS:

NIL

OTHER DEPARTMENT CONSIDERATIONS:

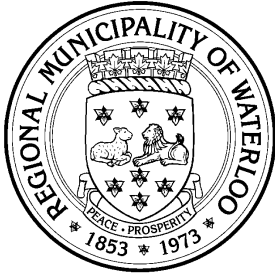
NIL

PREPARED BY: *Sarah Mouneimne*, Environmental Planning Co-op Student
Christopher Gosselin, Manager of Environmental Planning

APPROVED BY: *Larry Kotseff*, Commissioner of Planning, Housing and Community Services

Appendix J9b

Regional Municipality of Waterloo – Forbes Creek
Headwaters (Proposed Environmentally Sensitive
Policy Area) Draft Fact Sheet



FORBES CREEK HEADWATERS

Proposed Environmentally Sensitive Policy Area

Municipality:	City of Cambridge	
Location:	Lot(s): 90, 128	Concession(s): G.C.T.
	General Location: North of Hespeler, at Hespeler Rd. (Hwy 24) and Guelph Ave.	
Ownership:	Private	
Size:	58.4 hectares (144.2 acres)	
Physiographic Region:	Spillway, shallow till and rock ridges	
Eco-region:	Central Grand River	
Soils:	Predominantly well- to poorly-drained silts and sands surrounding pockets of organic soil, with well-drained stone-free loams over gravel and stony till on the kame.	

General Description

The Forbes Creek Headwaters comprises diverse upland and wetland habitats. Most of the wetlands in this E.S.P.A. occur in the glacial kettle depressions characteristic of the local landscape. The wetlands serve as headwaters for Forbes Creek. The varied topography of the landscape sustains a high diversity of habitats which include Maple-Beech and Red Oak upland forests, White Birch-Poplar stands, White Cedar and Silver Maple swamps, cattail and sedge marshes, and areas of meadow.

The easternmost woodland is situated on a kame formation that is the highest point in the Speed River watershed in the Region. This woodland also sustains the Provincially significant sedge, James' Sedge (*Carex jamesii*). In the adjacent lowlands unusually large Balsam Firs distinguish one of the wetland pockets. The northeastern wetland provides breeding habitat for a number of significant breeding birds and contains an unusually large concentration of Three-way Sedge (*Dulichium arundinacea*).

E.S.P.A. Criteria Fulfilled: (based on R.O.P.P. Policy 4.3.2)

B.1 comprise ecological communities deemed unusual, of outstanding quality, or particularly representative regionally, provincially or nationally

The Three-way Sedge wet meadow in the northern wetland pocket is an unusually large concentration of this species in the Region. The population of large Balsam Fir is also unusual in the Region.

B.4 provide habitat for organisms indigenous to the Region recognized as nationally, provincially, or regionally significant

Plants

<i>Carex canescens</i>	Silvery Sedge
<i>Carex jamesii</i> *	James' Sedge
<i>Cypripedium calceolus var parviflorum</i>	Small Yellow Lady's Slipper
<i>Lobelia spicata</i>	Pale-spiked Lobelia
<i>Pycnanthemum virginianum</i>	Virginia Mountain Mint
<i>Vaccinium angustifolium</i>	Late Sweet Blueberry
<i>Vaccinium corymbosum</i>	Highbush Blueberry

*Provincially significant, S3 status

Birds

Wood Duck	<i>Aix sponsa</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Ruby-throated Hummingbird	<i>Archilochus colubris</i>
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Alder Flycatcher	<i>Empidonax alnorum</i>
Warbling Vireo	<i>Vireo gilvus</i>
Brown Creeper	<i>Certhia americana</i>
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>

C.1 contain an unusual diversity of native life forms due to varied topography, microclimates, soils, and/or drainage regimes

The diverse topography of the landscape supports a rich variety of natural habitats. Marshes, swamps, kettle depressions, upland and lowland forests, and upland meadows are all indicative of the variety of microclimates and soil moisture regimes.

C.2 perform a vital ecological function such as maintaining the hydrological balance over a widespread area by acting as a natural water storage, discharge or recharge area

As headwaters for Forbes Creek, the wetlands in this area collect, retain, and release water into the two branches of Forbes Creek. The marshes and swamps help maintain the hydrological balance and water quality in the subwatershed, as well as provide valuable wildlife habitat.

C.5 contain landforms deemed unusual or particularly representative at the regional scale

A kame-type landform occurs in the southern portion of the upland woodlot. This landform rises to a peak in the woodlot before dropping in height and extending into a wide, hummocky landform in the adjoining agricultural fields. This landform is the highest point in the Speed River watershed within the Region.

Revised:

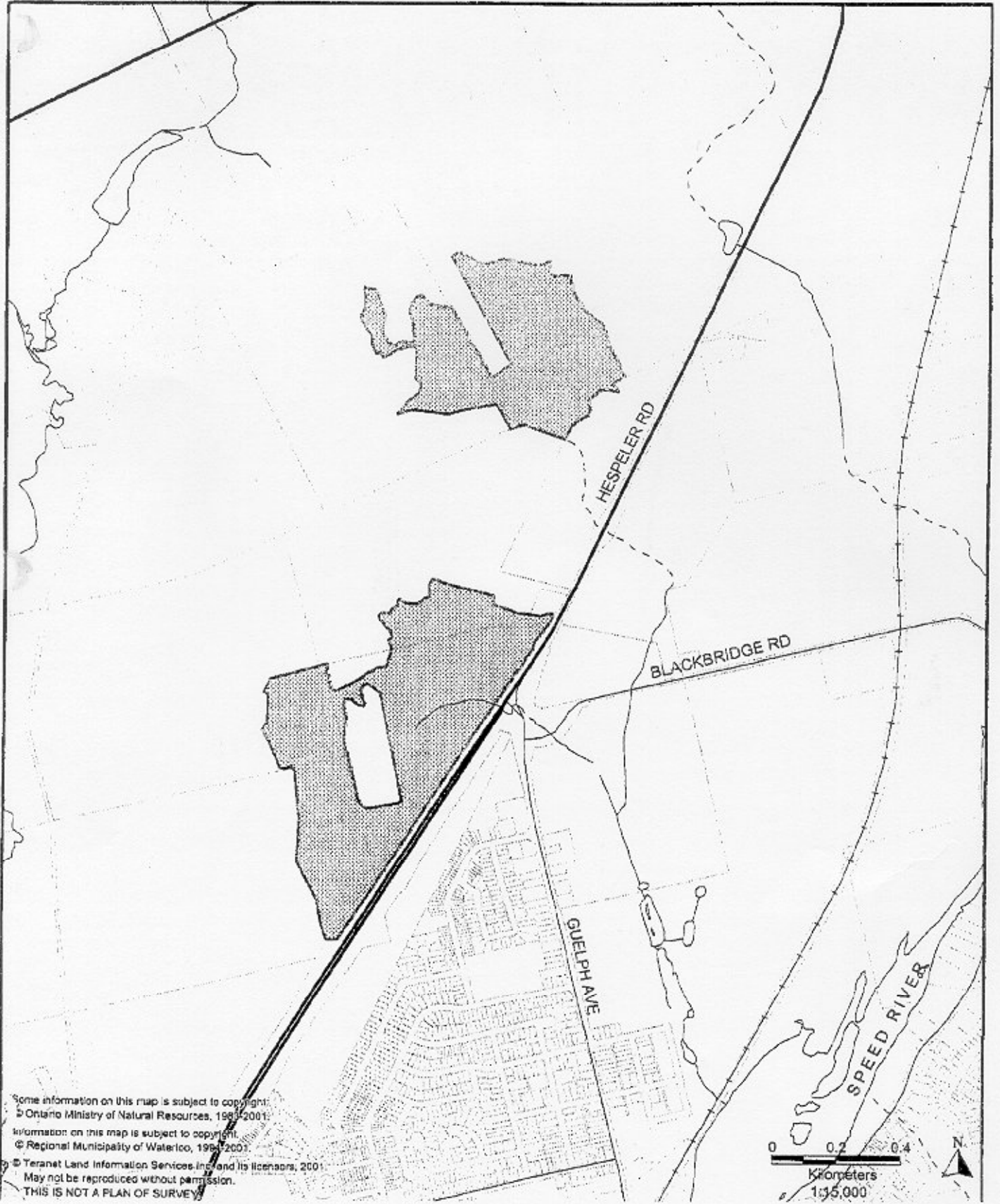
Appendix J9c

Regional Municipality of Waterloo – Proposed ESPA:
Forbes Creek Headwaters Location Map



Proposed ESPA Forbes Creek Headwaters

DRAFT



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Appendix J10: Existing linkages and corridors between subwatersheds

Linkage	Components	Links up...	Comments
A	Railside verge along north side of Speed River and adjacent to Sheffield St.	Vegetation units 7.25/7.26/Speed River floodplain with the Ellis Creek Subwatershed (SW), the Chilligo C.A. in particular.	This is an important link along the Speed River corridor. The railline is still active and is periodically maintained. Mostly unvegetated. Guelph Avenue acts as a barrier to movement. Restoration would enhance linkage function.
B	Roadside verge along south side of Hwy #24 (mainly open, old field veg. communities)	Veg. unit 3.05 and Ellis Creek Subwatershed	Some habitat is maintained adjacent to road. Maple Grove Road is a barrier to movement. Habitat narrows behind homes on Dyer Court.
C	Vegetation (veg.) units 1.16 & 4.21 (hedgerows)	Various core natural areas in Forbes Creek SW with those in the Ellis Creek SW	Long hedgerow across large open fields. Also provides link to small kettle wetland feature. (units 1.12 & 1.13). It intersects Linkage D.
D	Veg. units 4.20 & 4.22 (hedgerows)	Veg. units in 2.00 - 2.14 block (swamp & forests) with veg. unit 1.15 (part of the Ellis Creek SW.)	Hedgerow system is long but links up with small kettle wetland feature (Units 1.12 & 1.13) at midway point. It intersects Linkage C.
E	Veg. unit 4.16 (hedgerow)	Veg. units in 4.00 - 4.09 block (swamp & forest habitats) with Ellis Creek SW.	Hedgerow continues west beyond SW boundary before linking up with the core natural area in the Ellis Creek SW.
F	Unlabelled veg. unit (hedgerow)	Large core natural areas contained in the Ellis Creek with Glenchristie subwatersheds.	Important linkage between Ellis Creek SW and Glenchristie SW. This hedgerow unit does not directly connect up with the Forbes Creek SW. Small (50 m) gap exists at western end of hedgerow.
G	Veg. unit 4.15 (field)	Veg. units in 4.00 - 4.09 block to kettle wetland (part of PSW) & large woodland system to the north	Approximately 50 m gap between naturally vegetated units
H	Veg. unit 4.13 (hedgerow)	Veg. units in 4.00 - 4.09 block to kettle wetland (part of PSW) & large woodland system to the north	Continuous, mature hedgerow composed of some tall trees. Woodland extends NE into larger wooded core area by Glenchristie.
I	Veg. unit 4.10 (hedgerow)	Veg. units in 4.00 - 4.09 block with natural features to the east of Highway #24	Highway #24 acts as a barrier to movement.
J	Roadside verge along north side of Hwy #24 (hedgerow)	Veg. units in 4.00 - 4.09 block with large core wooded area to the northeast	Immediately adjacent to busy Highway #24. Supporting vegetation composed primarily of small shrubs.
K	Veg. unit 5.21 (hedgerow) & narrow rectangular field to north of unit 5.02	Forbes Creek Wetland corridor with natural habitats that are linked back up with the Speed River corridor.	Resulting corridor system would form a complete loop. Blackbridge Road would form a barrier to movement at 2 locations.

Appendix J11: Existing linkages and corridors within the Forbes Creek subwatershed

Linkage	Components	Links up...	Comments
1	Forbes Creek PSW south of Hwy #24	All habitats along length, including Speed River floodplain at south end.	Blackbridge Road bisects this significant corridor.
2	Vegetation (veg.) units 6.08 & 5.09	Corridor #1 (veg. units 6.03, 6.08 etc.) and large swamp north of Hwy. #24 (veg units 2.00 - 2.14).	Highly fragmented by both Blackbridge Rd. and Hwy. #24
3	Veg units 3.00 (marsh) and 3.01 (cultural meadow)	Forbes Creek Wetland corridor and veg unit 3.02 (forest)	Highly fragmented by Blackbridge Road and Guelph Avenue. The vegetation corridor is essentially treeless and would not provide adequate cover for movement by shy or forest-dwelling species. Tree plantings would help enhance it's linkage value.
4	Open space with tractor trail	Habitat block composed of veg. units 1.00, 1.01, 1.04 & 1.08 with habitat block composed of veg units 2.00 - 2.14.	The gap between these large and significant core natural areas is less than 10 m.
5	Veg. units 4.20 & 4.22 (hedgerows)	Habitat block composed of 2.00 - 2.09 with veg. unit 1.15 (forest).	This linkage is coincident with Linkage D which links up natural feature found in the Forbes Creek Subwatershed (SW) with those in the Ellis Creek SW.
6	Veg. unit 4.21 and 4.22 (hedgerows)	Veg. units in 2.00 - 2.14 block with small kettle feature (veg. units 2.12 & 2.13), and veg. units 4.00 - 4.09 block	By providing link to hedgerow 4.21, it helps provide a more significant link
7	Veg. unit 4.24 (hedgerow) and open space	Habitat block composed of veg. units 2.00 - 2.14 with habitat block composed of veg. units 4.00 - 4.09.	Only part of this linkage is vegetated. This linkage along with linkages #6 and #8 help to strengthen the connection between these two large core natural areas.
8	Veg. units 4.27 and 4.30 (hedgerows)	Habitat block composed of veg. units 2.00 - 2.14 with habitat block composed of veg. units 4.00 - 4.09.	Hedgerow system is not continuous and moves past periphery of rural residence.
9	Veg. units 5.09 (cultural meadow) and 5.10 (hedgerow)	Habitat block composed of units 2.00 - 2.09 with habitat block composed of veg. units 5.00 - 5.08 etc..	Highway #24 is a major barrier to movement.
10	Veg. unit 5.20 (hedgerow)	Veg. units in 4.00 - 4.09 block via 4.10 with the Forbes Creek Wetland corridor (ie. 5.00 - 5.08 veg. Block and beyond)	Highway #24 acts as a barrier to movement. Southern third of hedgerow is adjacent to natural habitats linking up with the Speed River corridor.