Appendix K: Botanical Species List

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Abies balsamea	Balsam Fir	?	S5		5	-3	N
Abutilon theophrasti	Velvetleaf	IX	SNA			4	I
Acer negundo	Manitoba Maple	C	S5		0	-2	N
Acer nigrum	Black Maple	U	S4?		7	3	N
Acer platanoides	Norway Maple	IX	SNA		0	5	I
Acer rubrum	Red Maple	C	S5		4	0	N
Acer saccharinum	Silver Maple	C	S5		5	-3	N
Acer saccharum	Sugar Maple	C	S5		4	3	N
Acer tataricum ssp. ginnala	Amur Maple	-	SNA			5	I
Acer x freemanii	Swamp Maple	hyb	SNA				N
Achillea millefolium	Common Yarrow	-	SNA			3	I
Actaea pachypoda	White Baneberry	C	S5		6	5	N
Actaea rubra ssp. rubra	Red Baneberry	U	S5		5	5	N
Ageratina altissima var. altissima	White Snakeroot	C	S5		5	3	N
Agrimonia gryposepala	Hooked Agrimony	C	S5		2	2	N
Agrostis gigantea	Redtop	IX	SNA		0	0	I
Agrostis stolonifera	Creeping Bentgrass	IX	SNA		0	-3	I
Alliaria petiolata	Garlic Mustard	IX	SNA		0	0	I
Allium tricoccum	Wild Leek	C	S4		7	2	N
Alnus incana ssp. rugosa	Speckled Alder	R	S5		6	-5	N
Ambrosia artemisiifolia	Annual Ragweed	C	S5		0	3	N
Ambrosia trifida	Great Ragweed	C	S5		0	-1	N
Amphicarpaea bracteata	American Hog-peanut	C	S5		4	0	N
Anemone acutiloba	Sharp-lobed Hepatica	C	S5		6	5	N
Anemone canadensis	Canada Anemone	C	S5		3	-3	N
Anemone virginiana	Tall Anemone	C	S5		4	5	N
Angelica atropurpurea	Great Angelica	C	S5		6	-5	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Apocynum cannabinum	Hemp Dogbane	C	S5		3	0	N
Arctium lappa	Great Burdock	IX	SNA				I
Arctium minus	Common Burdock	IX	SNA		0	5	I
Arisaema triphyllum	Jack-in-the-pulpit	C	S5		5	-2	N
Asclepias incarnata ssp. incarnata	Swamp Milkweed	C	S5		6	-5	N
Asclepias syriaca	Common Milkweed	C	S5		0	5	N
Asparagus officinalis	Garden Asparagus	IX	SNA		0	3	I
Athyrium filix-femina	Common Lady Fern	C	S5		4	0	N
Barbarea vulgaris	Bitter Wintercress	IX	SNA		0	0	I
Berberis vulgaris	European Barberry	IX	SNA		0	3	I
Betula alleghaniensis	Yellow Birch	C	S5		6	0	N
Bidens cernua	Nodding Beggarticks	C	S5		2	-5	N
Bidens frondosa	Devil's Beggarticks	C	S5		3	-3	N
Boehmeria cylindrica	False Nettle	C	S5		4	-5	N
Bromus inermis	Smooth Brome	IX	SNA		0	5	I
Calamagrostis canadensis	Bluejoint Reedgrass	C	S5		4	-5	N
Carex bebbii	Bebb's Sedge	C	S5		3	-5	N
Carex blanda	Woodland Sedge	C	S5		3	0	N
Carex cephalophora	Oval-leaved Sedge	-	S5		5	3	N
Carex grayi	Gray's Sedge	R	S4		8	-4	N
Carex jamesii	James' Sedge	R	S4		8	5	N
Carex lacustris	Lake Sedge	C	S5		5	-5	N
Carex lupulina	Hop Sedge	C	S5		6	-5	N
Carex pensylvanica	Pennsylvania Sedge	C	S5		5	5	N
Carex retrorsa	Retrorse Sedge	C	S5		5	-5	N
Carex rosea	Rosy Sedge	C	S5		5	5	N
Carex sparganioides	Burreed Sedge	C	S4S5		5	0	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Carex vulpinoidea	Fox Sedge	C	S5		3	-5	N
Carya cordiformis	Bitternut Hickory	C	S5		6	0	N
Carya ovata var. ovata	Shagbark Hickory	C	S5		6	3	N
Catalpa speciosa	Northern Catalpa	IX	SNA		0	3	I
Caulophyllum thalictroides	Blue Cohosh	X	S5		6	5	N
Celastrus orbiculatus	Oriental Bittersweet	-	SNA		0	5	I
Celtis occidentalis	Common Hackberry	U	S4		8	1	N
Cerastium fontanum	Common Mouse-ear Chickweed	IX	SNA		0	3	I
Chelone glabra	White Turtlehead	C	S5		7	-5	N
Cichorium intybus	Chicory	IX	SNA		0	5	I
Cicuta maculata	Spotted Water-hemlock	C	S5		6	-5	N
Circaea canadensis ssp. canadensis	Canada Enchanter's Nightshade	C	S5		3	3	N
Cirsium arvense	Canada Thistle	IX	SNA		0	3	I
Cirsium vulgare	Bull Thistle	IX	SNA		0	4	I
Clinopodium vulgare	Field Basil	-	S5		4	5	N
Convallaria majalis	European Lily-of-the-valley	IX	SNA		0	5	I
Convolvulus arvensis	Field Bindweed	IX	SNA		0	5	I
Cornus alternifolia	Alternate-leaved Dogwood	C	S5		6	5	N
Cornus obliqua	Pale Dogwood	C	S5		5	-4	N
Cornus racemosa	Gray Dogwood	C	S5		2	-2	N
Cornus sericea	Red-osier Dogwood	C	S5		2	-3	N
Corylus americana	American Hazelnut	C	S5		5	4	N
Cuscuta gronovii	Swamp Dodder	C	S5		4	-3	N
Cyperus esculentus var. leptostachyus	Perennial Yellow Flatsedge	U	S5		1	-3	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Cystopteris bulbifera	Bulblet Fern	C	S5		5	-2	N
Dactylis glomerata	Orchard Grass	IX	SNA		0	3	I
Daucus carota	Wild Carrot	IX	SNA		0	5	I
Dipsacus fullonum	Common Teasel	IX	SNA		0	5	I
Doellingeria umbellata	Flat-top White Aster	C	S5		6	-3	N
Dryopteris carthusiana	Spinulose Wood Fern	C	S5		5	-2	N
Dryopteris cristata	Crested Wood Fern	X	S5		7	-5	N
Dryopteris marginalis	Marginal Wood Fern	C	S5		5	3	N
Dryopteris x boottii	(Dryopteris cristata X Dryopteris intermedia)	-	SNA				I
Echinochloa crus-galli	Large Barnyard Grass	IX	SNA		0	-3	I
Echinocystis lobata	Wild Mock-cucumber	C	S5		3	-2	N
Elaeagnus umbellata	Autumn Olive	IX	SNA		0	3	I
Elymus repens	Creeping Wildrye	IX	SNA		0	3	I
Elymus virginicus	Virginia Wildrye	C	S5		5	-2	N
Epilobium ciliatum	Northern Willowherb	C	S5		3	3	N
Epilobium hirsutum	Hairy Willowherb	IX	SNA		0	-4	I
Epipactis helleborine	Eastern Helleborine	IX	SNA		0	5	I
Equisetum arvense	Field Horsetail	C	S5		0	0	N
Equisetum hyemale ssp. affine	Common Scouring-rush	C	S5		2	-2	N
Equisetum pratense	Meadow Horsetail	R	S5		8	-3	N
Erigeron annuus	Annual Fleabane	C	S5		0	1	N
Erythronium americanum	Yellow Trout-lily	C	S5		5	5	N
Euonymus obovatus	Running Strawberry Bush	C	S4		6	5	N
Euthamia graminifolia	Grass-leaved Goldenrod	C	S5		2	-2	N
Eutrochium maculatum	Spotted Joe Pye Weed	C	S5		3	-5	N
Fagus grandifolia	American Beech	C	S4		6	3	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Forsythia viridissima	Green-stemmed Forsythia	-	SNA				I
Fragaria vesca	Woodland Strawberry	U	S5		4	4	N
Fragaria virginiana	Wild Strawberry	C	S5		2	1	N
Frangula alnus	Glossy Buckthorn	IX	SNA		0	-1	I
Fraxinus americana	White Ash	C	S4		4	3	N
Fraxinus nigra	Black Ash	-	S4		7	-4	N
Fraxinus pennsylvanica	Green Ash	-	S4		3	-3	N
Galium aparine	Cleavers	C	S5		4	3	N
Galium mollugo	Smooth Bedstraw	IX	SNA		0	5	I
Galium palustre	Marsh Bedstraw	X	S5		5	-5	N
Geranium maculatum	Spotted Geranium	C	S5		6	3	N
Geranium robertianum	Herb-Robert	C	S5		0	5	N
Geum aleppicum	Yellow Avens	C	S5		2	-1	N
Geum canadense	White Avens	C	S5		3	0	N
Geum fragarioides	Barren Strawberry	-	S5		5	5	N
Geum urbanum	Wood Avens	IX	SNA		0	5	I
Glechoma hederacea	Ground Ivy	IX	SNA		0	3	I
Gleditsia triacanthos	Honey-locust	IX	S2?		3	0	N
Glyceria striata	Fowl Mannagrass	C	S5		3	-5	N
Hackelia virginiana	Virginia Stickseed	U	S5		5	1	N
Heracleum maximum	Cow-parsnip	X	S5		3	-3	N
Heracleum sphondylium	Meadow Cow Parsnip		SNA				I
Hesperis matronalis	Dame's Rocket	IX	SNA		0	5	I
Hydrophyllum virginianum	Virginia Waterleaf	C	S5		6	-2	N
Hypericum perforatum ssp. perforatum	Common St. John's-wort	IX	SNA		0	5	I
Impatiens capensis	Spotted Jewelweed	C	S5		4	-3	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Inula helenium	Elecampane	IX	SNA		0	5	I
Juglans cinerea	Butternut	C	S2?	END	6	2	N
Juglans nigra	Black Walnut	C	S4?		5	3	N
Juncus dudleyi	Dudley's Rush	C	S5		1	0	N
Juncus tenuis	Path Rush	C	S5		0	0	N
Lactuca serriola	Prickly Lettuce	IX	SNA		0	0	I
Laportea canadensis	Wood Nettle	C	S5		6	-3	N
Lapsana communis	Common Nipplewort	IX	SNA		0	5	I
Leersia oryzoides	Rice Cutgrass	C	S5		3	-5	N
Leersia virginica	Virginia Cutgrass	U	S4		6	-3	N
Leonurus cardiaca ssp. cardiaca	Common Motherwort	IX	SNA		0	5	I
Leucanthemum vulgare	Oxeye Daisy	IX	SNA		0	5	I
Ligustrum vulgare	European Privet	IX	SNA		0	1	I
Linaria vulgaris	Butter-and-eggs	IX	SNA		0	5	I
Lobelia cardinalis	Cardinal Flower	R	S5		7	-5	N
Lobelia inflata	Indian-tobacco	C	S5		3	4	N
Lobelia siphilitica	Great Blue Lobelia	C	S5		6	-4	N
Lonicera tatarica	Tartarian Honeysuckle	IX	SNA		0	3	I
Lycopus americanus	American Water-horehound	C	S5		4	-5	N
Lycopus uniflorus	Northern Water-horehound	C	S5		5	-5	N
Lysimachia ciliata	Fringed Loosestrife	C	S5		4	-3	N
Lysimachia nummularia	Creeping Jennie	IX	SNA		0	-4	I
Lythrum salicaria	Purple Loosestrife	IX	SNA		0	-5	I
Maianthemum canadense	Wild Lily-of-the-valley	C	S5		5	0	N
Maianthemum racemosum ssp. racemosum	False Solomon's-seal	C	S5		4	3	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Maianthemum stellatum	Star-flowered False Solomon's-seal	C	S5		6	1	N
Matteuccia struthiopteris var. pensylvanica	Ostrich Fern	C	S5		5	-3	N
Medicago lupulina	Black Medic	IX	SNA		0	1	I
Melilotus albus	White Sweet-clover	IX	SNA		0	3	I
Melilotus officinalis	Yellow Sweet-clover	IX	SNA		0	3	I
Mentha canadensis	Canada Mint	C	S5		3	-3	N
Mitchella repens	Partridge-berry	X	S5		6	2	N
Monarda fistulosa	Wild Bergamot	C	S5		6	3	N
Morus alba	White Mulberry	IX	SNA		0	0	I
Myosotis sylvatica	Woodland Forget-me-not	-	SNA		0	5	I
Oenothera biennis	Common Evening Primrose	X	S5		0	3	N
Onoclea sensibilis	Sensitive Fern	C	S5		4	-3	N
Ostrya virginiana	Eastern Hop-hornbeam	C	S5		4	4	N
Oxalis stricta	Upright Yellow Wood-sorrel	C	S5		0	3	N
Panicum capillare ssp. capillare	Common Panicgrass	C	S5		0		N
Parthenocissus vitacea	Thicket Creeper	C	S5		3	3	N
Pastinaca sativa	Wild Parsnip	IX	SNA		0	5	I
Persicaria lapathifolia	Pale Smartweed	C	S5		2	-4	N
Persicaria maculosa	Spotted Lady's-thumb	IX	SNA		0	-3	I
Persicaria pensylvanica	Pennsylvania Smartweed	X	S5		3	-4	N
Persicaria punctata	Dotted Smartweed	-	S5		4	-5	N
Persicaria virginiana	Virginia Smartweed	X	S4		6	0	N
Petasites japonicus	Japanese Butterbur	-	SNA		0	-5	I
Phalaris arundinacea var. arundinacea	Reed Canary Grass	C	S5		0	-4	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Philadelphus coronarius	European Mock-orange	IX	SNA				I
Phleum pratense ssp. pratense	Common Timothy	IX	SNA		0	3	I
Phragmites australis ssp. australis	European Reed	IC	SNA				I
Physocarpus opulifolius	Eastern Ninebark	C	S5		5	-2	N
Picea abies	Norway Spruce	IX	SNA		0	5	I
Picea glauca	White Spruce	X	S5		6	3	N
Pilea pumila	Canada Clearweed	U	S5		5	-3	N
Pinus strobus	Eastern White Pine	C	S5		4	3	N
Pinus sylvestris var. sylvestris	Scots Pine	IX	SNA		0	5	I
Plantago major	Common Plantain	IX	SNA		0	-1	I
Poa palustris	Fowl Bluegrass	C	S5		5	-4	N
Poa pratensis	Kentucky Bluegrass	IX	S5		0	1	N
Podophyllum peltatum	May-apple	C	S5		5	3	N
Polystichum acrostichoides	Christmas Fern	C	S5		5	5	N
Populus alba	White Poplar	IX	SNA		0	5	I
Populus balsamifera	Balsam Poplar	U	S5		4	-3	N
Populus deltoides	Eastern Cottonwood	C	S5		4	-1	N
Populus grandidentata	Large-toothed Aspen	C	S5		5	3	N
Populus tremuloides	Trembling Aspen	C	S5		2	0	N
Potentilla indica var. indica	Mock-strawberry	-	SNA		0	4	I
Potentilla recta	Sulphur Cinquefoil	IX	SNA		0	5	I
Prunella vulgaris	Self-heal	-	S5		0		N
Prunus avium	Sweet Cherry	IX	SNA		0	5	I
Prunus serotina var. serotina	Black Cherry	C	S5		3	3	N
Prunus virginiana var. virginiana	Choke Cherry	C	S5		2	1	N
Quercus alba	White Oak	C	S5		6	3	N
Quercus macrocarpa	Bur Oak	C	S5		5	1	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Quercus rubra	Northern Red Oak	C	S5		6	3	N
Ranunculus abortivus	Kidney-leaved Buttercup	C	S5		2	-2	N
Ranunculus acris	Tall Buttercup	IX	SNA		0	-2	I
Ranunculus repens	Creeping Buttercup	IX	SNA		0	-1	I
Rhamnus cathartica	Common Buckthorn	IX	SNA		0	3	I
Rhus typhina	Staghorn Sumac	C	S5		1	5	N
Ribes americanum	Wild Black Currant	C	S5		4	-3	N
Ribes cynosbati	Prickly Gooseberry	C	S5		4	5	N
Robinia pseudoacacia	Black Locust	IX	SNA		0	4	I
Rosa canina	Dog Rose	-	SNA		0	5	I
Rosa multiflora	Multiflora Rose	IX	SNA		0	3	I
Rosa palustris	Swamp Rose	U	S5		7	-5	N
Rubus allegheniensis	Allegheny Blackberry	X	S5		2	2	N
Rubus idaeus ssp. strigosus	Wild Red Raspberry	C	S5		0	-2	N
Rubus occidentalis	Black Raspberry	X	S5		2	5	N
Rudbeckia hirta	Black-eyed Susan	C	S5		0	3	N
Rumex crispus	Curly Dock	IX	SNA		0	-1	I
Sagittaria latifolia	Broad-leaved Arrowhead	C	S5		4	-5	N
Salix alba	White Willow	-	SNA		0	-3	I
Salix amygdaloides	Peach-leaved Willow	X	S5		6	-3	N
Salix eriocephala	Heart-leaved Willow	X	S5		4	-3	N
Salix interior	Sandbar Willow	C	S5		3	-5	N
Salix lucida	Shining Willow	-	S5		5	-4	N
Salix matsudana	Corkscrew Willow	-	SNA				I
Salix petiolaris	Meadow Willow	C	S5		3	-4	N
Salix viminalis	Basket Willow	-	SNA		0	5	I
Salix x fragilis	(Salix alba X Salix euxina)	hyb	SNA		0	-4	I

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Salix x pendulina	(Salix babylonica X Salix euxina)	-	SNA				I
Sambucus racemosa	Red Elderberry	X	S5		5	2	N
Sanguinaria canadensis	Bloodroot	C	S5		5	4	N
Scirpus atrovirens	Dark-green Bulrush	C	S5		3	-5	N
Scrophularia marilandica	Carpenter's Square Figwort	R	S4		7	4	N
Setaria pumila ssp. pumila	Yellow Foxtail	IX	SNA				I
Setaria viridis var. viridis	Green Foxtail	IX	SNA		0	5	I
Smilax herbacea	Herbaceous Carrionflower	C	S4?		5	0	N
Solanum dulcamara	Climbing Nightshade	IX	SNA		0	0	I
Solidago altissima	Tall Goldenrod	C	S5		1	3	N
Solidago caesia	Blue-stemmed Goldenrod	C	S5		5	3	N
Solidago caesia var. caesia	Blue-stemmed Goldenrod	C	S5		5	3	N
Solidago canadensis	Canada Goldenrod	C	S5		1	3	N
Solidago flexicaulis	Zigzag Goldenrod	C	S5		6	3	N
Solidago juncea	Early Goldenrod	C	S5		3	5	N
Solidago nemoralis	Gray-stemmed Goldenrod	C	S5		2	5	N
Sonchus arvensis	Field Sow-thistle	IX	SNA			1	I
Sorbus aucuparia	European Mountain-ash	IX	SNA		0	5	I
Sorbus decora	Northern Mountain-ash	-	S5		8	3	N
Stachys tenuifolia	Smooth Hedge-nettle	-	SU				I
Symphoricarpos albus	Common Snowberry	R	S5		7	4	N
Symphyotrichum cordifolium	Heart-leaved Aster	C	S5		5	5	N
Symphyotrichum ericoides	White Heath Aster	C	S5		4	4	N
Symphyotrichum firmum	Glossy-leaved Aster	-	S4?				N
Symphyotrichum lanceolatum ssp. lanceolatum	Panicled Aster	C	S5		3	-3	N

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Symphyotrichum lateriflorum	Calico Aster	C	S5		3	-2	N
Symphyotrichum novae-angliae	New England Aster	C	S5		2	-3	N
Symphyotrichum pilosum	White Heath Aster	C	S5		4	2	N
Symphyotrichum puniceum var. puniceum	Swamp Aster	C	S5		6	-5	N
Symphyotrichum urophyllum	Arrow-leaved Aster	C	S4		6	5	N
Symplocarpus foetidus	Skunk Cabbage	C	S5		7	-5	N
Syringa vulgaris	Common Lilac	IX	SNA		0	5	I
Tanacetum vulgare	Common Tansy	IX	SNA		0	5	I
Taraxacum officinale	Common Dandelion	IX	SNA		0	3	I
Teucrium canadense	Canada Germander	u	S4S5		6	-2	N
Thalictrum dioicum	Early Meadow-rue	C	S5		5	2	N
Thalictrum pubescens	Tall Meadow-rue	C	S5		5	-2	N
Thlaspi arvense	Field Penny-cress	IX	SNA		0	5	I
Thuja occidentalis	Eastern White Cedar	C	S5		4	-3	N
Tilia americana	American Basswood	C	S5		4	3	N
Tilia cordata	Little-leaf Linden	-	SNA				I
Torilis japonica	Erect Hedge-parsley	IX	SNA		0	5	I
Toxicodendron radicans var. radicans	Eastern Poison Ivy	C	S5		5	-1	N
Toxicodendron radicans var. rydbergii	Western Poison Ivy	X	S5		0	0	N
Tragopogon dubius	Yellow Goat's-beard	IX	SNA		0	5	I
Trifolium pratense	Red Clover	IX	SNA		0	2	I
Trifolium repens	White Clover	IX	SNA		0	2	I
Trillium grandiflorum	White Trillium	C	S5		5	5	N
Tussilago farfara	Colt's-foot	IX	SNA		0	3	I

Scientific Name	Common Name	Regional Rarity	S Rank	COSEWIC	CC	CW	Native Status
Typha angustifolia	Narrow-leaved Cattail	IX	SNA		3	-5	I
Typha latifolia	Broad-leaved Cattail	C	S5		3	-5	N
Ulmus americana	American Elm	C	S5		3	-2	N
Urtica dioica	Stinging Nettle	IX	S5				N
Verbascum thapsus ssp. thapsus	Common Mullein	IX	SNA				I
Verbena hastata	Blue Vervain	C	S5		4	-4	N
Verbena urticifolia	White Vervain	C	S5		4	-1	N
Veronica officinalis	Common Speedwell	IX	SNA		0	5	I
Viburnum lentago	Nannyberry	C	S5		4	-1	N
Viburnum opulus ssp. opulus	Cranberry Viburnum	IS	SNA		0	0	I
Viburnum opulus ssp. trilobum	Highbush Cranberry	C	S5		5	-3	N
Viburnum rafinesquianum	Downy Arrowwood	X	S5		7	5	N
Vicia cracca	Tufted Vetch	IX	SNA		0	5	I
Vitis riparia	Riverbank Grape	C	S5		0	-2	N
Amelanchier sp.	Serviceberry species	-					
Carex sp	Sedge Species	-					
Crateagus sp	Hawthorn species	-					
Fraxinus sp	Ash species	-					
Geum sp	Avens Species	-					
Malus sp	Apple Species	-					
Salix sp	Willow Species	-					
Viola sp	Violet Species	-					

Legend

Scientific Name and Common Name (NHIC, 2019)

Based on NHIC's species list for Ontario downloaded on May 29, 2019.

S-Ranks (NHIC, 2019)

Provincial Rarity List

S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

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

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

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

S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

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.

COSEWIC (NHIC, 2019)

Federal Rarity List

EXT	Extinct - A species that no longer exists.
EXP	Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
END	Endangered - A species facing imminent extirpation or extinction.
THR	Threatened - A species likely to become endangered if limiting factors are not reversed.
SC	Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR	Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD	Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)

Coefficient of Conservatism and Coefficient of Wetness (NHIC, 2019)

CC = Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of ecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.

CW = Coefficient of Wetness. -Value between 5 and –5. A value of –5 is assigned to Obligate Wetland (OBL) and 5 to Obligate Upland (UPL), with intermediate values assigned to the remaining categories (Oldham et al., 1995).

Regional Rarity: Brant County

Oldham (2017).

I	Introduced; thought to have been present in the Carolinian Zone or individual CZ area prior to European settlement; believed to be deliberately or inadvertently introduced to the CZ by humans (followed by a status, below)
C	Common
U	Uncommon
R	Rare
H	Historic records only (generally >30 years)
X	Present; status unknown or not specified in source lists
?	Unconfirmed report
hyb	Hybrid

Native Status

VASCAN database (Brouillet et al. 2010)

N	Native to Ontario
I	I

References

Brouillet L, Desmet P, Coursol F, Meades SJ, Favreau M, Anions M, Bélisle P, Gendreau C, Shorthouse D, and contributors (2010+). Database of Vascular Plants of Canada (VASCAN). Online at http://data.canadensys.net/vascan and http://www.gbif.org/dataset/3f8a1297-3259-4700-91fc-acc4170b27ce, released on 2010-12-10. Version [xx]. GBIF key: 3f8a1297-3259-4700-91fc-acc4170b27ce. Data paper ID: doi: http://doi.org/10.3897/phytokeys.25.3100 [accessed on [07/24/2019]]

Natural Heritage Information Centre (NHIC) (2019). All Species. Available at: https://www.ontario.ca/page/get-natural-heritage-information

Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

Appendix L: Hedgerow Assessment

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-1	**Moderate.** Single row of trees, approximately 15 m wide and 625 m long. Canopy appears to have gaps with abundant shrubs.	**Low**. There appears to be a gap of approximately 100 m to the south and the connection to the north is disrupted by Lynden Rd. and a strip of residential properties.	**Low.** The canopy had large gaps.	4
HR-2	**Moderate.** Single row of trees, approximately 15 m wide and 275 m long. Canopy was continuous conifer trees.	**Low**. The hedgerow connects to a marsh community at its west end but did not have any natural features to the east.	**Low.** This hedgerow was largely manicured planted trees.	3
HR-3	**Moderate**. A patch of shrubs approximately 100 m long and 25 m wide. Canopy was sparse but shrub layer was dense.	**Low**. A small wetland patch was located southwest of this hedgerow but no natural features were present to the northeast.	**Low**. This hedgerow was predominately shrubs with some deciduous trees and dead Ash (*Fraxinus sp.*).	3
HR-4	**Moderate**. This hedgerow was approximately 470 m long and 15 m wide. The canopy was continuous except for one small gap approximately 20 m wide.	**High**. This hedgerow connected a larger cultural thicket to a marsh and swamp thicket with a cultural meadow to the south. This hedgerow falls along a functional linkage.	**Moderate**. Provides treed habitat connecting wetland and upland community.	1
HR-5	**Low.** Approximately 285 m long and 20 m wide. Sparse Canopy cover with a dense shrub layer.	**High.** Connects a thicket with a swamp pocket to a marsh community to the north. This hedgerow appears to be the only connection for the marsh. This hedgerow falls along a functional linkage.	**Moderate**. Connects an isolated wetland and provides a connection to an upland cultural community.	1

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-6	**Low.** Approximately 150 m long and 10 m wide. Canopy cover was low and the shrub layer was dense.	**Low**. A small wetland patch was located southwest of this hedgerow but no natural features were present to the northeast.	**Moderate**. A small wetland pocket at the west end of the hedgerow (too small to map) may provide additional habitat for wildlife along with the large cultural meadow to the south.	3
HR-7	**Low.** Approximately 250 m long and 10 m wide. There were a couple canopy gaps to the north.	**High**. Connects a forest community to the north to the large cultural thicket and wetland patch to the south.	**High**. This hedgerow was adjacent to a cultural meadow which will provide additional habitat for species moving along this corridor.	1
HR-8	**Low**. Approximately 490 m long and a single tree wide with large canopy gaps.	**Moderate**. Connects an otherwise isolated marsh to a cultural thicket and forest further north (approximately 100m away).	**Low**. Trees are sparse with little shrub cover.	3
HR-9	**Low.** This hedgerow was 715 m long and 10m wide with very wide canopy gaps.	**Low**. There were wide canopy gaps and low shrub cover. It extends out of a forest patch to the north but does not connect to the south.	**Low**. Trees are sparse with little shrub cover.	3
HR-10	**Low**. Small hedgerow (105m by 10m) with a large canopy gap.	**High**. Extends out of a forest community towards an isolated marsh community to the south. There is a small gap (approximately 30 m) between the hedgerow and the marsh.	**Moderate**. Trees were spaced out with little shrub cover. Connects wetland and upland habitat.	1

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-11	**High**. Approximately 200 m by 20 m and wider towards the north. Canopy appears to be continuous.	**High**. Connects a naturalizing plantation and watercourse to the north with a swamp thicket and forest patch to the south.	**Moderate**. Canopy looks reminiscent of the forest community to the north and connects upland and wetland communities.	1
HR-12	**Moderate**. Approximately 230 m by 10 m wide. There was a small canopy gap used to access the field to the east.	**High**. Connects a naturalizing plantation and watercourse to the north with a swamp thicket and forest patch to the south.	**Moderate**. Trees appear to be large and the canopy was almost continuous with the plantation to the north and the forest to the south.	1
HR-13	**Moderate**. 725 m long with a varying width. Hedgerow was two mature trees wide to the north and narrowed down to 10 m wide at the south end. Canopy cover becomes sparse towards the south end.	**Moderate**. Connects marsh communities along the two watercourses. Becomes quite sparse between watercourses with little tree or shrub cover.	**Moderate**. This hedgerow had some larger trees that may provide temporary habitat and connects two watercourses.	2
HR-14	**Low**. 340 m long and approximately 15 m wide. Canopy cover was sparse. There was a canopy gap of approximately 100 m.	**Moderate**. Connects marsh communities along the two watercourses. Becomes quite sparse between watercourses with little tree or shrub cover.	**Low**. This hedgerow had large canopy gaps that could really hinder wildlife movement.	3
HR-15	**Moderate**. Approximately 220 m long and 20 m wide with two projections. Canopy cover was contiguous.	**Moderate**. The hedgerow extends north toward a marsh community. To the south there was a 30 m gap to HR-13 with Powerline Rd between them.	**Moderate**. Hedgerow was reasonably wide especially where the westward projection proving a greater protection of wildlife moving along the corridor.	2

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-16	**Low**. Approximately 230 m by 15 m. It was a single tree wide with canopy gaps.	**Low**. This hedgerow was connected to a marsh community to the north but nothing to the south.	**Low**. There are a couple large trees present but there were canopy gaps and no habitat connection.	3
HR-17	**Low**. Approximately 625 m long and 10 m wide. There were large gaps in the canopy with minimal shrub cover.	**High**. This hedgerow connects two small tributaries to a large forest patch to the north.	**Moderate**. There was little cover on a very narrow hedgerow. Two watercourses provide water along the hedgerow.	2
HR-18	**Low**. Long (450 m) and narrow (10 m) strip of manicured trees.	**Low**. Connected to a large forest patch to the north but nothing to the south.	**Low**. Trees were all one species with mown lawn on either side.	3
HR-19	**Low**. Long (1010 m) and narrow (10 m) strip of primarily manicured trees.	**Moderate**. Connected to a large forest patch to the north and a small wetland pocket located along it.	**Low**. Trees were all one species with mown lawn on either side.	2
HR-20	**Low**. Narrow (10 m) strip along Park Rd N. Canopy clover was discontinuous.	**Low**. Connected to a forest patch to the north but nothing to the south.	**Low**. This hedgerow had large canopy gaps that could really hinder wildlife movement and does not connect any features.	3
HR-21	**Low**. Narrow (10 m) consisted of trees located at the rear of residential houses with manicured lawns below tree canopy.	**Low**. Does not connect to any natural features.	**Low**. Does not connect or provide much habitat.	4
HR-22	**Low**. Narrow (10 m) that was a single tree wide with large canopy gaps.	**Low**. Connected to a forested valleyland to the north with nothing to the south.	**Low**. Does not connect or provide much habitat.	3

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-23	**Low**. Narrow (10 m) that was a single tree wide with large canopy gaps.	**Low**. Connected to a forested valleyland to the north with nothing to the south.	**Low**. Does not connect or provide much habitat.	3
HR-24	**Moderate**. Approximately 25 m wide with large trees and an old overgrown laneway.	**Moderate**. Connected a forested valleyland to the south to a meadow with a watercourse through it to the north. The north end was approximately 120 m away from the PSW. There was a gap between the features that could limit its functionality.	**Moderate**. This is a wider hedgerow with a mature contiguous canopy. Could provide cover for a variety of species.	2
HR-25	**Low**. Narrow with very little tree cover.	**Low**. Did not connect any features.	**Low**. Does not provide much habitat or resources for wildlife.	4
HR-26	**Low**. Narrow (10 m) that was a single tree wide with large canopy gaps.	**Low**. Connected to a forested valleyland and PSW to the north with a meadow and watercourse to the south.	**Low**. Largely meadow with little cover provides little wildlife resources.	3
HR-27	**Low**. Single tree wide with some small canopy gaps.	**Low**. Connected to a cultural thicket and was approximately 100 m away from the PSW. Nothing present to the north.	**Low**. Does not connect or provide much habitat.	3
HR-28	**Moderate**. Narrow to the north and widens slightly to the south. It had a protrusion to the west. Canopy cover appeared to be contiguous.	**High**. Connected an isolated marsh to the forest to the south.	**High**. The marsh provides diversity of habitat and a water source to wildlife.	1

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-29	**Low**. It was a single tree wide at the western half and getting sparser towards the east.	**Low**. Does not connect any NHS features.	**Low**. Does not connect or provide much habitat.	4
HR-30	**Low**. It was a single tree wide and contains two 90° bends.	**Low**. Does not connect any NHS features.	**Low**. Does not connect or provide much habitat.	4
HR-31	**Low**. Single tree wide with some small canopy gaps.	**Low**. Connected to a marsh to the west but nothing to the east.	**Low**. Does not provide much habitat.	3
HR-32	**Moderate**. It was generally a single tree wide and contains a 90° bend. There were a couple small canopy gaps.	**High**. Provided moderate connection between marsh and swamp communities as well as cultural thickets.	**Moderate**. Connects a variety of habitats together that would otherwise be isolated.	1
HR-33	**Low**. Single tree wide with some small canopy gaps.	**Low**. Connected to a swamp thicket to the west but nothing to the east.	**Low**. Does not provide much habitat.	3
HR-34	**Moderate**. One of the wider hedgerows (approximately 30 m) with a large canopy gap.	**Low**. Extends south out of a PSW but does not connect to anything to the south.	**Moderate**. Provides upland habitat adjacent to a large wetland feature.	3
HR-35	**Low**. Single tree wide with some small canopy gaps.	**Low**. Does not connect any NHS features.	**Low**. Does not provide much habitat.	4
HR-36	**Low**. Single tree wide with some small canopy gaps.	**Low**. The east end was close to a mixed forest block but did not connect to NHS features.	**Low**. Does not provide much habitat.	3
HR-37	**Low**. Single tree wide with canopy gaps.	**High**. Connected PSW to the south with a large forest block to the north.	**Moderate.** Hedgerow connects wetland and upland habitats but does not provide much habitat itself.	1

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-38	**Moderate**. Generally, was a single tree wide but with some larger canopy trees and only one notable gap.	**High**. Connected two forest patches and extends north to the tributary of Jones Creek.	**Moderate**. Larger canopy trees can provide greater habitat along the hedgerow.	1
HR-39	**Low**. Narrow (10 m) that was a single tree wide with large canopy gaps increasing to the south.	**Low**. Connected to a valleyland to the south but nothing to the north.	**Low**. Sparse canopy with little cover provides little wildlife resources.	3
HR-40	**Low**. Narrow (10 m) that was a single tree wide with large canopy gaps.	**Moderate**. Connected to a forest patch to the south with a gap between the hedgerow and the watercourse to the north.	**Low**. Sparse canopy with little cover provides little wildlife resources.	2
HR-41	**Moderate**. Narrow with dense contiguous canopy.	**High**. Connected the PSW with an isolated forest patch.	**High**. Connects wetland and upland habitat with a contiguous canopy.	1
HR-42	**Low**. Single tree wide with some small canopy gaps.	**High**. Connected forest patch to the north to a swamp thicket that has the potential to be complexed into the PSW.	**High**. Connects wetland and upland habitat with a contiguous canopy.	1
HR-43	**Low**. Single tree wide with some small canopy gaps.	**High**. Connected two patches of the PSW.	**Moderate**. Connects two communities that have a mix of upland and wetland communities.	1
HR-44	**Low**. Single tree wide with some canopy gaps.	**Moderate**. Connected to a forest patch with PSW within it to the north but nothing to the south.	**Moderate**. The hedgerow includes a ditch to provide water to wildlife.	3

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-45	**Low**. Single tree wide with some canopy gaps	**High**. Connects PSW with isolated wetlands.	**Low**. Sparse canopy with little cover provides little wildlife resources. Enhancement will be required for this to be an effective linkage.	2
HR-46	**Low**. Narrow with very little tree cover.	**Low**. Connected to a wetland patch to the north but nothing to the south.	**Low**. Does not provide much habitat or resources for wildlife.	3
HR-47	**Low.** Single row of trees, approximately 15 m wide and 160m long. Canopy was continuous conifer trees.	**Low**. Does not connect any NHS features.	**Low.** This hedgerow was largely manicured planted trees.	4
HR-48	**Low**. Narrow feature (10 m) that was a single tree wide with large canopy gaps.	**Low**. Did not connect any NHS features. North end was near the PSW with a cultural thicket between.	**Low**. Sparse canopy with little cover provides little wildlife resources.	4
HR-49	**Low**. Narrow feature (10 m) that was a single tree wide with canopy gaps.	**Moderate**. Extends out of forest/PSW patch to a cultural thicket that is attached to another PSW patch.	**Low**. Sparse canopy with little cover provides little wildlife resources.	2
HR-50	**Low**. Narrow feature (10 m) that was a single tree wide with canopy gaps.	**Low**. Did not connect any NHS features.	**Low.** Sparse canopy with little cover provides little wildlife resources.	4
HR-51	**Low**. Narrow feature (10 m) that was a single tree wide with canopy gaps.	**Low**. Did not connect any NHS features.	**Low.** Does not provide much habitat.	4
HR-52	**Low**. Narrow feature (10 m) that was a single tree wide with large canopy gaps.	**Low**. Did not connect any NHS features.	**Low.** Does not provide much habitat.	4

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-53	**Low**. Narrow feature (10 m) consisted of trees along a property line with manicured lawns below tree canopy.	**Low**. Did not connect to any NHS features.	**Low**. Does not connect or provide much habitat.	4
HR-54	**Low**. Narrow feature (10 m) that was a single tree wide with canopy gaps.	**Low**. Does not connect any NHS features. Located near a small swamp pocket.	**Low.** Does not provide much habitat.	4
HR-55	**Low**. Narrow feature (10 m) that was a single tree wide with some canopy gaps.	**Low**. Connected to a forest patch to the south and nothing to the north.	**Low.** Does not provide much habitat.	3
HR-56	**Low**. Narrow feature (10 m) that was a single tree wide with some canopy gaps.	**High**. Connected two forest patches.	**Moderate**. Larger canopy trees can provide greater habitat along the hedgerow.	1
HR-57	**Low**. Narrow feature (15 m) that was a single tree wide with some canopy gaps.	**High**. Connected two forest patches.	**Moderate**. Larger canopy trees can provide greater habitat along the hedgerow. Contained a mix of meadow and treed areas.	1
HR-58	**Moderate**. Contained a variety of tree sizes with larger trees in the eastern branch.	**High**. Connected a swamp to a large forest patch to the north.	**High**. Connects wetland and upland habitat with a contiguous canopy.	1
HR-59	**High**. Wider feature 25 m with a contiguous canopy cover.	**Low**. This feature was connected to a large plantation to the west but nothing to the right.	**Moderate**. The width of this feature may allow for it to provide habitat to generalist species.	3

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-60	**Low**. Narrow feature (10 m) that was a single tree wide with some canopy gaps.	**High**. Connected to a forest patch to the northwest but nothing to the southeast.	**Low.** Does not provide much habitat.	3
HR-61	**Low**. Narrow feature (10 m) that was a single tree wide.	**High**. Connected to a marsh and watercourse to the northeast but nothing to the southwest.	**Moderate**. Provides an upland covered refuge along the watercourse.	3
HR-62	**Moderate**. Narrow but dense hedgerow with a contiguous canopy.	**Moderate**. Gap between south end of feature and mash was approximately 35 m. nothing present to the north.	**Low.** Does not provide much habitat.	3
HR-63	**High**. Approximately 325 m by 30 m wide with a multi-tree wide canopy that was continuous.	**High**. Connected two marsh communities.	**High**. Directly connects two wetlands with upland habitat.	1
HR-64	**Moderate**. Approximately 25 m wide and 310 m long with some small canopy gaps.	**Low**. Connected to a marsh community to the north but nothing to the south.	**Moderate.** Provides treed upland habitat adjacent to a mash.	3
HR-65	**Moderate**. Approximately 25 m wide and 370 m long with some small canopy gaps.	**Low**. Not connected to any NHS features.	**Low.** Does not provide much habitat.	4
HR-66	**Low**. Single tree wide with little canopy gaps.	**High**. Connects two forest patches.	**Moderate**. The hedgerow includes a ditch to provide water to wildlife.	1
HR-67	**Low**. Single tree wide with some small canopy gaps.	**Low**. Connected to a forest patch to the south but nothing to the north.	**Low.** Does not provide much habitat.	3

Hedgerow ID	Dimensions & Continuity	Connectivity/Linkage	Habitat Potential	Category
HR-68	**Moderate**. This hedgerow was approximately 200 m long and 15 m wide. The canopy was continuous.	**Low**. Connected to a marsh patch to the south but nothing to the north.	**Moderate.** Provides treed upland habitat adjacent to a mash.	3
HR-69	**Moderate.** Approximately 25 m wide and 220 m long with a small gap approximately 10 m wide.	**High.** Connects two marsh communities that are hydrologically connected through the hedgerow. This hedgerow falls along a functional linkage.	**High.** A wider hedgerow with a watercourse a the south end provides a more diverse and protected corridor.	1
HR-70	**Moderate**. This hedgerow was approximately 325 m long and 15 m wide. There were small gaps in the canopy.	**Moderate**. Directly connected to a marsh patch to the north and almost connected to a marsh to the south with a 25 m wide gap.	**Moderate.** Provides treed upland habitat adjacent to a mash.	1
HR-71	**Moderate**. This hedgerow was approximately 325 m long and 15 m wide. There were small gaps in the canopy.	**High**. Directly connected to a marsh patch to the north and south.	**Moderate.** Provides treed upland habitat adjacent to a mash.	1

Appendix M: Bird Species List

Background Resources and 2022 Field Investigation Results

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
	X	X		*Accipiter striatus*	Sharp-shinned Hawk	S5	NAR	NAR	G5
	X	X		*Accipiter cooperii*	Cooper's Hawk	S4	NAR	NAR	G5
	X			*Accipiter gentilis*	Northern Goshawk	S4	NAR	NAR	G5
	X	X		*Buteo platypterus*	Broad-winged Hawk	S5B			G5
X	X	X	X	*Buteo jamaicensis*	Red-tailed Hawk	S5	NAR	NAR	G5
	X	X		*Circus hudsonius*	Northern Harrier	S5B,S4N	NAR	NAR	G5
		X		*Haliaeetus leucocephalus*	Bald Eagle	S4	SC	NAR	G5
X	X	X	X	*Pandion haliaetus*	Osprey	S5B			G5
	X	X		*Aix sponsa*	Wood Duck	S5B,S3N			G5
	X	X		*Anas rubripes*	American Black Duck	S4			G5
X	X	X	X	*Anas platyrhynchos*	Mallard	S5			G5
X	X	X	X	*Branta canadensis*	Canada Goose	S5			G5
		X		*Bucephala clangula*	Common Goldeneye	S5			G5
	X			*Cygnus buccinator*	Trumpeter Swan	S4	NAR	NAR	G4
	X			*Cygnus olor*	Mute Swan	SNA			G5
	X	X		*Lophodytes cucullatus*	Hooded Merganser	S5			G5
		X		*Mergus merganser*	Common Merganser	S5			G5
	2			*Spatula discors*	Blue-winged Teal	S3B,S4M			G5
	2	X		*Chaetura pelagica*	Chimney Swift	S3B	THR	THR	G4G5
	X	X	X	*Archilochus colubris*	Ruby-throated Hummingbird	S5B			G5
	2			*Chordeiles minor*	Common Nighthawk	S4B	SC	SC	G5
X	X	X	X	*Cathartes aura*	Turkey Vulture	S5B,S3N			G5
X	X	X	X	*Charadrius vociferus*	Killdeer	S4B			G5
		X		*Hydroprogne caspia*	Caspian Tern	S3B,S5M	NAR	NAR	G5
X		X	X	*Larus delawarensis*	Ring-billed Gull	S5			G5

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
	X	X		*Larus argentatus*	Herring Gull	S4B,S5N			G5
	X	X	X	*Actitis macularius*	Spotted Sandpiper	S5B			G5
	2			*Bartramia longicauda*	Upland Sandpiper	S2B			G5
X	X			*Scolopax minor*	American Woodcock	S4B			G5
		X		*Tringa melanoleuca*	Greater Yellowlegs	S4B,S5M			G5
		X		*Tringa flavipes*	Lesser Yellowlegs	S3S4B,S5M		THR	G5
		X		*Tringa solitaria*	Solitary Sandpiper	S4B,S5M			G5
X	X	X	X	*Columba livia*	Rock Pigeon	SNA			G5
X	X	X	X	*Zenaida macroura*	Mourning Dove	S5			G5
X	X	X	X	*Megaceryle alcyon*	Belted Kingfisher	S5B,S4N			G5
	X	X	X	*Coccyzus erythropthalmus*	Black-billed Cuckoo	S4S5B			G5
	X	X	X	*Coccyzus americanus*	Yellow-billed Cuckoo	S4B			G5
	X			*Falco sparverius*	American Kestrel	S4			G5
		X		*Falco columbarius*	Merlin	S5	NAR	NAR	G5
	X			*Bonasa umbellus*	Ruffed Grouse	S5			G5
X	X	X	X	*Meleagris gallopavo*	Wild Turkey	S5			G5
	X			*Perdix perdix*	Gray Partridge	SNA			G5
	X			*Phasianus colchicus*	Ring-necked Pheasant	SNA			G5
		X		*Antigone canadensis*	Sandhill Crane	S5B,S3N			G5
	2			*Gallinula galeata*	Common Gallinule	S3B			G5
	X			*Porzana carolina*	Sora	S5B			G5
	X			*Rallus limicola*	Virginia Rail	S4S5B			G5
	X	X	X	*Eremophila alpestris*	Horned Lark	S4			G5
X	X	X	X	*Bombycilla cedrorum*	Cedar Waxwing	S5			G5
X	X	X	X	*Cardinalis cardinalis*	Northern Cardinal	S5			G5

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
X	X	X	X	*Passerina cyanea*	Indigo Bunting	S5B			G5
	X	X	X	*Pheucticus ludovicianus*	Rose-breasted Grosbeak	S5B			G5
	X	X		*Piranga olivacea*	Scarlet Tanager	S5B			G5
	X	X		*Certhia americana*	Brown Creeper	S5			G5
X	X	X	X	*Corvus brachyrhynchos*	American Crow	S5			G5
X		X		*Corvus corax*	Common Raven	S5			G5
X	X	X	X	*Cyanocitta cristata*	Blue Jay	S5			G5
		X		*Acanthis flammea*	Common Redpoll	S5			G5
	X	X		*Haemorhous purpureus*	Purple Finch	S5			G5
	X	X	X	*Haemorhous mexicanus*	House Finch	SNA			G5
		X		*Spinus pinus*	Pine Siskin	S5			G5
X	X	X	X	*Spinus tristis*	American Goldfinch	S5			G5
	2	X	X	*Hirundo rustica*	Barn Swallow	S4B	THR	THR	G5
	X			*Petrochelidon pyrrhonota*	Cliff Swallow	S4S5B			G5
		X		*Progne subis*	Purple Martin	S3B			G5
X	2	X		*Riparia riparia*	Bank Swallow	S4B	THR	THR	G5
	X	X	X	*Stelgidopteryx serripennis*	Northern Rough-winged Swallow	S4B			G5
X	X	X	X	*Tachycineta bicolor*	Tree Swallow	S4S5B			G5
X	X	X	X	*Agelaius phoeniceus*	Red-winged Blackbird	S5			G5
	2		X	*Dolichonyx oryzivorus*	Bobolink	S4B	THR	THR	G5
	X	X	X	*Icterus spurius*	Orchard Oriole	S4B			G5
X	X	X	X	*Icterus galbula*	Baltimore Oriole	S4B			G5
X	X	X	X	*Molothrus ater*	Brown-headed Cowbird	S5			G5
X	X	X	X	*Quiscalus quiscula*	Common Grackle	S5			G5
	2		X	*Sturnella magna*	Eastern Meadowlark	S4B,S3N	THR	THR	G5

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
		X		*Lanius borealis*	Northern Shrike	S4B,S5N			G5
X	X	X	X	*Dumetella carolinensis*	Gray Catbird	S5B,S3N			G5
	X			*Mimus polyglottos*	Northern Mockingbird	S4			G5
		X	X	*Toxostoma rufum*	Brown Thrasher	S4B			G5
	2	X		*Baeolophus bicolor*	Tufted Titmouse	S3			G5
X	X	X	X	*Poecile atricapillus*	Black-capped Chickadee	S5			G5
		X		*Cardellina pusilla*	Wilson's Warbler	S5B			G5
	2	X		*Cardellina canadensis*	Canada Warbler	S5B	SC	SC	G5
	X	X	X	*Geothlypis philadelphia*	Mourning Warbler	S5B			G5
X	X	X	X	*Geothlypis trichas*	Common Yellowthroat	S5B,S3N			G5
		X		*Leiothlypis peregrina*	Tennessee Warbler	S5B			G5
	X	X		*Leiothlypis ruficapilla*	Nashville Warbler	S5B			G5
	X	X		*Mniotilta varia*	Black-and-white Warbler	S5B			G5
	X			*Parkesia noveboracensis*	Northern Waterthrush	S5B			G5
	X			*Seiurus aurocapilla*	Ovenbird	S5B			G5
		X		*Setophaga americana*	Northern Parula	S5B			G5
X	X	X	X	*Setophaga petechia*	Yellow Warbler	S5B			G5
	X	X		*Setophaga pensylvanica*	Chestnut-sided Warbler	S5B			G5
	X	X		*Setophaga magnolia*	Magnolia Warbler	S5B			G5
		X		*Setophaga tigrina*	Cape May Warbler	S5B			G5
	X	X		*Setophaga caerulescens*	Black-throated Blue Warbler	S5B			G5
		X		*Setophaga coronata*	Yellow-rumped Warbler	S5B,S4N			G5
	X	X		*Setophaga virens*	Black-throated Green Warbler	S5B			G5
		X		*Setophaga fusca*	Blackburnian Warbler	S5B			G5
	X	X		*Setophaga pinus*	Pine Warbler	S5B,S3N			G5

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
		X		*Setophaga castanea*	Bay-breasted Warbler	S5B			G5
		X		*Setophaga striata*	Blackpoll Warbler	S5B			G5
	X	X	X	*Setophaga ruticilla*	American Redstart	S5B			G5
	X			*Setophaga citrina*	Hooded Warbler	S4B	NAR	NAR	G5
		X		*Setophaga palmarum*	Palm Warbler	S5B			G5
	X		X	*Vermivora cyanoptera*	Blue-winged Warbler	S4B			G5
	2			*Ammodramus savannarum*	Grasshopper Sparrow	S4B	SC	SC	G5
	X	X		*Junco hyemalis*	Dark-eyed Junco	S5			G5
X	X	X	X	*Melospiza melodia*	Song Sparrow	S5			G5
		X		*Melospiza lincolnii*	Lincoln's Sparrow	S5B			G5
	X	X		*Melospiza georgiana*	Swamp Sparrow	S5B,S4N			G5
	X		X	*Passerculus sandwichensis*	Savannah Sparrow	S5B,S3N			G5
		X		*Passerella iliaca*	Fox Sparrow	S5B,S3N			G5
	X	X		*Pipilo erythrophthalmus*	Eastern Towhee	S4B,S3N			G5
	X			*Pooecetes gramineus*	Vesper Sparrow	S4B			G5
X	X	X	X	*Spizella passerina*	Chipping Sparrow	S5B,S3N			G5
	X		X	*Spizella pallida*	Clay-colored Sparrow	S4B			G5
	X	X	X	*Spizella pusilla*	Field Sparrow	S4B,S3N			G5
		X		*Spizelloides arborea*	American Tree Sparrow	S5			G5
	X	X		*Zonotrichia albicollis*	White-throated Sparrow	S5			G5
		X		*Zonotrichia leucophrys*	White-crowned Sparrow	S5B,S3N			G5
X	X	X	X	*Passer domesticus*	House Sparrow	SNA			G5
	X		X	*Polioptila caerulea*	Blue-gray Gnatcatcher	S4B			G5
		X		*Corthylio calendula*	Ruby-crowned Kinglet	S5B,S3N			G5
		X		*Regulus satrapa*	Golden-crowned Kinglet	S5			G5

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
	X	X		*Sitta canadensis*	Red-breasted Nuthatch	S5			G5
	X	X	X	*Sitta carolinensis*	White-breasted Nuthatch	S5			G5
X	X	X	X	*Sturnus vulgaris*	European Starling	SNA			G5
	X	X	X	*Thryothorus ludovicianus*	Carolina Wren	S4			G5
X	X	X	X	*Troglodytes aedon*	House Wren	S5B			G5
	X	X		*Troglodytes hiemalis*	Winter Wren	S5B,S4N			G5
	X	X		*Catharus fuscescens*	Veery	S5B			G5
		X		*Catharus minimus*	Gray-cheeked Thrush	S4?B,S4M			G5
		X		*Catharus ustulatus*	Swainson's Thrush	S5B			G5
		X		*Catharus guttatus*	Hermit Thrush	S5B,S4N			G5
	2	X	X	*Hylocichla mustelina*	Wood Thrush	S4B	SC	THR	G4
	X	X		*Sialia sialis*	Eastern Bluebird	S5B,S4N	NAR	NAR	G5
X	X	X	X	*Turdus migratorius*	American Robin	S5			G5
X	2	X	X	*Contopus virens*	Eastern Wood-pewee	S4B	SC	SC	G5
		X		*Empidonax flaviventris*	Yellow-bellied Flycatcher	S5B			G5
	2			*Empidonax virescens*	Acadian Flycatcher	S1B	END	END	G5
	X	X		*Empidonax alnorum*	Alder Flycatcher	S5B			G5
	X	X	X	*Empidonax traillii*	Willow Flycatcher	S4B			G5
	X	X	X	*Empidonax minimus*	Least Flycatcher	S5B			G5
	X		X	*Myiarchus crinitus*	Great Crested Flycatcher	S5B			G5
	X	X	X	*Sayornis phoebe*	Eastern Phoebe	S5B			G5
	X	X	X	*Tyrannus tyrannus*	Eastern Kingbird	S4B			G5
		X		*Vireo solitarius*	Blue-headed Vireo	S5B			G5
	X			*Vireo flavifrons*	Yellow-throated Vireo	S4B			G5
X	X	X	X	*Vireo gilvus*	Warbling Vireo	S5B			G5

APPENDIX M – Bird Species List

2022 Field Survey	OBBA	Ebird	Plan B (2020)	Scientific Name	Common Name	S RANK	ESA (SARO)	SARA (COSEWIC)	G RANK
		X		*Vireo philadelphicus*	Philadelphia Vireo	S5B			G5
	X	X	X	*Vireo olivaceus*	Red-eyed Vireo	S5B			G5
X	X		X	*Ardea herodias*	Great Blue Heron	S4			G5
		X		*Ardea alba*	Great Egret	S2B,S3M			G5
	X	X		*Butorides virescens*	Green Heron	S4B			G5
X	X	X	X	*Colaptes auratus*	Northern Flicker	S5			G5
X	X	X	X	*Dryobates pubescens*	Downy Woodpecker	S5			G5
X	X	X	X	*Dryobates villosus*	Hairy Woodpecker	S5			G5
	X	X	X	*Dryocopus pileatus*	Pileated Woodpecker	S5			G5
	X			*Melanerpes erythrocephalus*	Red-headed Woodpecker	S3	END	END	G5
	X	X	X	*Melanerpes carolinus*	Red-bellied Woodpecker	S5			G5
	X	X		*Sphyrapicus varius*	Yellow-bellied Sapsucker	S5B,S3N			G5
	X			*Podilymbus podiceps*	Pied-billed Grebe	S4B,S2N			G5
		X		*Aegolius acadicus*	Northern Saw-whet Owl	S5			G5
	X	X		*Bubo virginianus*	Great Horned Owl	S4			G5
	X	X		*Megascops asio*	Eastern Screech-Owl	S4	NAR	NAR	G5
	X			*Strix varia*	Barred Owl	S5			G5
		1		*Nannopterum brasilianum*	Neotropic Cormorant	SNA			G5
		1		*Nannopterum auritum*	Double-crested Cormorant	S5B,S4N	NAR	NAR	G5

Appendix N: Species at Risk Screening Results

APPENDIX N – Species at Risk Screening

Species		Status				Data Source	Habitat Requirements	Discussion of Species Occurrence and NHS Considerations in Study Area
Scientific Name	Common Name	SARA	ESA	G-Rank	S-Rank			
BIRDS								
Riparia riparia	Bank Swallow	THR	THR	G5	S4B	OBBA[1], eBird[2]	Nests in burrows made in clay or gravel riverbanks or steep riverbank cliffs, lakeshore bluffs, gravel pits, road cuts, and similar. Nesting sites are limiting factor for species presence.	**Habitat Potential**: Bank Swallow records are present for the area at large, suggesting that nesting habitat could be present - anticipated to have the highest potential to occur along the Grand River or other watercourses with steep, vertical banks, which will be captured by the municipal Natural Heritage System designations.
Hirundo rustica	Barn Swallow	THR	THR	G5	S4B	Plan B[3], OBBA, eBird	Prefers farmland, lake/river shorelines, wooded clearings, urban populated areas, rocky cliffs and wetlands. They nest inside or outside buildings, under bridges and in road culverts, or on rock faces and caves.	**Present:** Barn Swallows were recorded during breeding bird surveys conducted within the study area. Anthropogenic structures are not appropriate to include in Natural Heritage System policies, but alteration or destruction of structures providing habitat will have requirements under the *Endangered Species Act*, and proposed development of adjacent foraging areas should be assessed in the context of impacts to habitat function.
Dolichonyx oryzivorus	Bobolink	THR	THR	G5	S4B	Plan B, NHIC[4], OBBA, eBird	Occurs in prairies, hayfields, meadows, and other open habitats with dense ground cover. Nests on the ground in dense grasses. Area-sensitive; thought to require large tracts of contiguous habitat (>50 ha) in order to establish a territory.	**Present:** Has been documented by multiple sources in the study area. Agricultural fields are widespread in the area, although at the time of this SWS the vast majority were found to be under active cultivation with row crops and therefore not presently providing habitat. That said, if agricultural fields are allowed to go fallow or if management practices otherwise change, suitable habitat could become available. Updated habitat evaluations are to be completed as part of site-specific assessment studies at a later date.
Cardellina canadensis	Canada Warbler	THR	SC	G5	S5B	OBBA	An area-sensitive (>30 ha territory) and interior forest species. Primarily found in: dense, mixed forests with closed canopy; wet cedar bottomlands; and/or shrubby undergrowth in cool, moist, mature woodlands. Nests are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks.	**Habitat Potential**: Canada Warbler was not observed within the study area nor reported directly by background sources. Larger woodland areas along watercourses in the study area could feasibly provide suitable habitat conditions for this species but these areas are anticipated to be captured under municipal Natural Heritage System designations.
Chaetura pelagica	Chimney Swift	THR	THR	G4	S3B	OBBA	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer. Now, most are found in urban areas in large, uncapped chimneys.	**Unlikely:** Prior eBird records of this species in the vicinity of the study area are largely centered around the urban areas of Brantford, in keeping with the habitat requirements. Undeveloped portions of the study area do not generally have chimneys or other suitable features that could support nesting by Chimney Swift, and anthropogenic nesting structures such as chimneys are not appropriate to assess under municipal natural heritage system policies.
Chordeiles minor	Common Nighthawk	THR	SC	G5	S4B	eBird	Nests in open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, and lakeshores. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings, and along gravel roads and railways, they tend to occupy natural sites.	**Unlikely:** Potentially suitable habitat features could feasibly be present in the study area. However, based on the observed conditions, these potential features are anticipated to be anthropogenic features such as gravel roofs and parking lots, agricultural areas, and similar, rather than natural open woodlands or rock barrens. Anthropogenic structures are not appropriate to include in Natural Heritage System policies, and as a Special Concern species there are no regulatory requirements for Common Nighthawk habitat under the *Endangered Species Act*.

[1] Species reported via the Ontario Breeding Bird Atlas (OBBA) for one or more of the 10x10 km squares containing the study area.
[2] Species reported via the eBird.org community science website within or in close proximity to the study area.
[3] Species observed within the study area during field investigations completed for the 2020 Comprehensive EIS completed by Plan B Natural Heritage.
[4] Species occurrence record(s) present for one or more of the 1x1 km squares covering the study area via the Ontario Natural Heritage Information Center (NHIC) database.

APPENDIX N – Species at Risk Screening

Species		Status				Data Source	Habitat Requirements	Discussion of Species Occurrence and NHS Considerations in Study Area
Scientific Name	Common Name	SARA	ESA	G-Rank	S-Rank			
Sturnella magna	Eastern Meadowlark	THR	THR	G5	S4B	Plan B, NHIC, OBBA, eBird	Nests in open grasslands with dense ground cover, hay fields, meadows, fallow fields. Generally requires large tracts of grassland (>50 ha) but has been observed to use mosaics of smaller grassland areas, pastures, and similar.	**Present:** Has been documented by multiple sources in the study area. Agricultural fields are widespread in the area, although at the time of this SWS the vast majority were found to be under active cultivation with row crops and therefore not presently providing habitat. That said, if agricultural fields are allowed to go fallow or if management practices otherwise change, suitable habitat could become available. Updated habitat evaluations are to be completed as part of site-specific assessment studies at a later date.
Contopus virens	Eastern Wood-Pewee	SC	SC	G5	S4B	Plan B, OBBA, eBird	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	**Present:** Eastern Wood-pewee was documented in the study area via breeding bird surveys. Woodlands, particularly larger deciduous and mixed forest patches, could feasibly support nesting populations of this species.
Ammodramus savannarum	Grasshopper Sparrow	SC	SC	G5	S4B	OBBA	Nests in well-drained grassland or prairie, hayfields, or weedy fallow fields with relatively low, sparse vegetation; requires perches for singing. Area-sensitive; typically associated with habitat patches >10 ha.	**Habitat Potential**: Habitats which support Bobolink or Eastern Meadowlark frequently also support Grasshopper Sparrow, although this species is quiet and more difficult to detect from a distance than the other two and would be easy to overlook from a roadside survey. Future site-specific assessments should review for this species in suitable habitat.
Melanerpes erythrocephalus	Red-headed Woodpecker	END	END	G5	S3	OBBA	Found in a variety of habitats, including oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, beaver ponds and burns. Requires cavity trees with at least 40 cm DBH; requires about 4 ha for a territory.	**Habitat Potential**: This species was not documented in the study area, but occurrences of it in various parts of southern Ontario seem to have been increasing in recent years (possibly as an effect of climate change) so it could feasibly be present in future where habitat conditions are suitable. Suitable woodlands are anticipated to be captured under Natural Heritage System designations. Future site-specific assessments should review for habitat conditions that could support this species.
Hylocichla mustelina	Wood Thrush	THR	SC	G4	S4B	Plan B, NHIC, OBBA, eBird	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	**Present:** Wood Thrush was documented in the study area via breeding bird surveys. Woodlands, particularly larger deciduous forest patches, could feasibly support nesting populations of this species.
INSECTS								
Danaus plexippus	Monarch	SC	SC	G4	S2N, S4B	OBA[5]	Exist primarily where milkweeds (Asclepias spp.), the obligate larval host plants, and other wildflowers exist. It is a ubiquitous species that can use abandoned farmland, roadsides, urban gardens and parks, and other anthropogenic open spaces as easily as high-quality natural meadows.	**Present:** This ubiquitous butterfly was observed during field investigations, and is anticipated to occur in the study area in association with unmown fields and meadows, suburban gardens, unmown road rights-of-way, and similar areas, particularly where milkweed is present.
Pieris virginiensis	West Virginia White	Not listed	SC	G2	S3	OBA	A butterfly of moist, deciduous woodlands containing Toothwort (Cardamine spp.) as the obligate larval host plants. The OBA contains two records of this species, dated 1990, for the 10x10 km square covering the northeast portion of the study area.	**Habitat Potential**: A historical record based on the date of the observation in the OBBA. No toothwort species were found during the botanical inventory due to the timing of site visits but there are background records near both study areas. The Jones Creek valleylands contain floodplain forest and mesic woodlands that are optimal for toothwort; these areas are anticipated to be captured under Natural Heritage System designations.

[5] Species reported via the Ontario Butterfly Atlas (OBA) for one or more of the 10x10 km squares containing the study area.

APPENDIX N – Species at Risk Screening

Species		Status				Data Source	Habitat Requirements	Discussion of Species Occurrence and NHS Considerations in Study Area
Scientific Name	Common Name	SARA	ESA	G-Rank	S-Rank			
MAMMALS								
Myotis leibii	Eastern Small-footed Myotis	END	END	G4	S2S3	General Screening	This species typically roosts on the ground under rocks, in rock crevices, talus slopes and rock piles, though it will occasionally inhabit buildings or roost under tree bark. Overwintering habitat occurs in caves and mines that remain above 0°C.	**Probable:** Although no rockpiles or out crops were noted during site investigation. There is a potential that they may be present. Future studies should assess for potential habitat. Removal of or impact to habitat features as a result of future site alteration could have additional regulatory requirements under the *Endangered Species Act*.
Myotis lucifugus	Little Brown Myotis	END	END	G3	S3	General Screening	Maternity roosting is associated primarily with forest habitat containing snags (i.e., standing cavity trees and/or trees with loose or peeling bark, cracks, or similar features which would allow roosting), although isolated trees providing quality habitat features may also be important in locations with sparse woodland. Roosting will also occur in buildings (attics, barns, etc.; large numbers may congregate in suitable structures). Overwintering habitat occurs in caves and mines that remain above freezing.	**Probable:** Woodlands with trees containing suitable roosting habitat features are present in the study area. Although acoustic surveying or other detailed analysis was not completed for this SWS, Aquafor's past experience indicates that this species is highly likely to be found where habitat conditions are suitable. Removal of trees or impacts to treed areas as a result of future site alteration (including, potentially, individual specimen trees and hedgerows) may have additional regulatory requirements under the *Endangered Species Act*.
Myotis septentrionalis	Northern Long-eared Myotis	END	END	G2	S3	General Screening	Maternity roosting is associated primarily with forest habitat containing snags (i.e., standing cavity trees and/or trees with loose or peeling bark, cracks, or similar features which would allow roosting). Occasionally found in structures (attics, barns etc.). Overwintering habitat occurs in caves and mines that remain above freezing.	**Probable:** Woodlands with trees containing suitable roosting habitat features are present in the study area. Although acoustic surveying or other detailed analysis was not completed for this SWS, Aquafor's past experience indicates that this species is highly likely to be found where habitat conditions are suitable. Removal of trees or impacts to treed areas as a result of future site alteration (including, potentially, individual specimen trees and hedgerows) may have additional regulatory requirements under the *Endangered Species Act*.
Perimyotis subflavus	Tri-coloured Bat	END	END	G3	S3?	General Screening	Maternity roosting occurs in trees or dead clusters of leaves or arboreal lichens on trees; oaks and maples preferred, particularly large-diameter specimens. Overwintering habitat occurs in caves and mines that remain above freezing.	**Probable:** Deciduous and mixed forest habitats in the study area have the potential to support this species. Although acoustic surveying or other detailed analysis was not completed for this SWS, Aquafor's past experience indicates that this species is highly likely to be found where habitat conditions are suitable. Removal of trees or impacts to treed areas as a result of future site alteration (including, potentially, individual specimen trees and hedgerows) may have additional regulatory requirements under the *Endangered Species Act*.
PLANTS								
Fraxinus nigra	Black Ash	Not listed	END	G5	S4	iNaturalist[6]	Predominantly a wetland species found in swamps, floodplains, and fens. Black Ash is highly susceptible to Emerald Ash Borer, and its decline is primarily due to the invasion of this pest species.	**Present**: A "research grade" observation record from the iNaturalist website confirms this species' presence in the study area. Forest and wetland communities within Jones Creek valleyland generally, have the correct conditions to support Black Ash. Any forest community should be searched for this species during site specific studies.
Juglans cinerea	Butternut	END	END	G3	S2?	NHIC, iNaturalist	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows.	**Present**: A "research grade" observation record from the iNaturalist website confirms this species' presence in the study area. Butternuts were found by Aquafor staff in two ELC polygons, 259.01 and 211.05. It is highly likely that more specimens are located in the valleylands of Jones Creek, Phelps Creek, and the Grand River.

[6] Species reported via the iNaturalist.org community science website within or in close proximity to the study area.

APPENDIX N – Species at Risk Screening

Species		Status				Data Source	Habitat Requirements	Discussion of Species Occurrence and NHS Considerations in Study Area
Scientific Name	Common Name	SARA	ESA	G-Rank	S-Rank			
Arisaema dracontium	Green Dragon	SC	SC	G5	S3	NHIC	Grows in somewhat wet to wet deciduous forests along streams, particular in forests dominated by maple, ash, and elm.	**Habitat Potential**: The Jones Creek valleylands may contain appropriate habitat as there were sections that contained a higher abundance of maples within the floodplain. No specimens were noted during the botanical inventory. It is noted, however, that suitable potential habitat areas are captured within Natural Heritage System designations.
REPTILES AND AMPHIBIANS								
Emydoidea blandingii	Blanding's Turtle	END	THR	G4	S3	NHIC, ORAA[7], iNaturalist	Typically found in large wetlands and shallow lakes with abundant vegetation. Individuals are known to travel long distances overland from water during the nesting season in search of mates or egg-laying sites (which occur in open habitats with low vegetation cover and high sun exposure). The ORAA contains numerous records of this species, particularly for the 10x10 km square covering the Tutela Heights portion of the study area.	**Possible:** Aquatic and wetland habitat in the study area could potentially provide habitat for this species, and it was noted in multiple background records for the general vicinity. The majority of potential Blanding's Turtle habitat is anticipated to be captured under Natural Heritage System criteria (e.g., wetlands, watercourses) although smaller ponds and wetlands that do not meet NHS thresholds could also provide some habitat function, and nesting areas could occur in exposed gravel or sandy sites at a distance from water (i.e., outside of other NHS boundaries).
Heterodon platirhinos	Eastern Hog-nosed Snake	THR	THR	G5	S3	ORAA	This species prefers sandy, well-drained habitats such as beaches and dry forests; requires the presence of toads as a prey source. The ORAA contained eight records of this species for the 10x10km square covering the southern portion of the study area (i.e., Tutela Heights area), as recently as 2016, and one dated 1983 for the northeast.	**Unlikely:** Soils in the study area were generally silty loam to sandy loam with no notable sandy patches which meet the description of preferred habitat for this species. It is possible that the ORAA records are associated with particular habitat locations further west and were flagged simply based on the scale of the ORAA, or are historical.
Lampropeltis triangulum	Eastern Milksnake	SC	Not listed	G5	S4	ORAA, iNaturalist	Milksnake is a habitat generalist that tends to be associated with rocky outcrops, forest/field edges, old foundations, barns, and similar areas. It is known to be cryptic and difficult to locate even during dedicated surveys to detect it.	**Possible:** This species tends to be cryptic an is a habitat generalist, therefore could potentially be present and have suitable habitat features throughout the current study area.
Ambystoma jeffersonianum	Jefferson Salamander	END	END	G4	S2	ORAA, iNaturalist	Associated with woodlands containing vernal pools (i.e., temporary spring ponds or wetlands) to provide breeding habitat. Surrounding forest provides adult dispersal habitat and shelter (e.g., in old rodent burrows, under rocks and logs/stumps). The ORAA contained three records of this species in the northeastern portion of the study area, dated 1990-1991.	**Habitat Potential**: Potentially a historic record, considering the dates of prior observation and lack of flag in the NHIC database. Potentially suitable habitat for this species could feasibly be present in the study area but is anticipated to be captured in Natural Heritage System criteria (e.g., woodlands, valleylands).
Chrysemys picta marginata	Midland Painted Turtle	SC	Not listed	G5	S4	NHIC, ORAA, iNaturalist	Commonly found in waterbodies and slow-moving watercourses with soft substrates, basking sites, and aquatic vegetation. Nests in sandy or loamy soil in sunny locations and may travel a distance from water to find suitable nest sites. This species is still relatively common and widespread in Ontario wherever suitable habitat is present.	**Probable:** Aquatic and wetland habitat in the study area is anticipated to provide habitat for this species, as it is still a fairly ubiquitous turtle in southern Ontario and utilizes a variety of habitat types. The majority of potential habitat is anticipated to be captured under Natural Heritage System criteria (e.g., wetlands, watercourses) although smaller ponds and wetlands that do not meet NHS thresholds could also provide habitat for this species, and nesting areas could occur in exposed gravel or sandy sites at a distance from water (i.e., outside of other NHS boundaries). A recent nesting site was noted in ELC polygon 175.06.

[7] Species reported via the Ontario Reptile and Amphibian Atlas (ORAA) for one or more of the 10x10 km squares containing the study area.

APPENDIX N – Species at Risk Screening

Species		Status				Data Source	Habitat Requirements	Discussion of Species Occurrence and NHS Considerations in Study Area
Scientific Name	Common Name	SARA	ESA	G-Rank	S-Rank			
Graptemys geographica	Northern Map Turtle	SC	SC	G5	S3	NHIC, ORAA, iNaturalist	This species is generally restricted to large, permanent lakes and rivers with slow-moving water and soft substrates, plus an abundance of molluscs which are the primary food source of females. Habitat must contain suitable basking sites such as emergent rocks and fallen trees.	**Habitat Potential**: It is anticipated that the records of Northern Map Turtle in the vicinity of the study area are associated with the Grand River, as this species' preference for large permanent water bodies is well known. As such, any potential occurrences or habitat features that could be associated with this species are anticipated to be captured in Natural Heritage System criteria associated with the Grand River and other watercourses.
Regina septemvittata	Queensnake	END	END	G5	S2	ORAA	Queensnakes live in streams and rivers with good water quality, rocky or gravel bottoms, and an abundance of crayfish (their primary food source). This is a highly aquatic species seldom found an any distance from water. Numerous records of Queensnake exist in the ORAA but are restricted to those squares overlapping the Grand River.	**Habitat Potential**: It is anticipated that the records of Queensnake in the vicinity of the study area are associated with the Grand River, as it is noted that it rarely occurs away from water. As such, any potential occurrences or habitat features that could be associated with this species are anticipated to be captured in Natural Heritage System criteria associated with the Grand River and other watercourses.
Thamnophis saurita	Eastern Ribbonsnake	SC	SC	G5	S4	iNaturalist	Eastern Ribbonsnake are found close to water, most commonly marshes. They hibernate in underground burrows or rock crevices to hibernate together.	**Probable:** The northern study area has many records of this species within the Cold Springs Creek Complex (PSW) and to the north in the Tertiary study area. The riparian areas along Jones Creek has patches of marsh that have the potential to provide habitat.
Chelydra serpentina	Snapping Turtle	SC	SC	G5	S4	NHIC, ORAA, iNaturalist	Generally, inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	**Probable:** Aquatic and wetland habitat in the study area is anticipated to provide habitat for this species, as it is still a fairly ubiquitous turtle in southern Ontario and utilizes a variety of habitat types. The majority of potential habitat is anticipated to be captured under Natural Heritage System criteria (e.g., wetlands, watercourses) although smaller ponds and wetlands that do not meet NHS thresholds could also provide habitat for this species, and nesting areas could occur in exposed gravel or sandy sites at a distance from water (i.e., outside of other NHS boundaries).
Apalone spinifera	Spiny Softshell	END	END	G5	S2	iNaturalist	These turtles are highly aquatic turtles and are generally restricted to large, permanent lakes and rivers with slow-moving water and soft substrates.	**Habitat Potential:** It is anticipated that the records of Spiny Softshell in the vicinity of the study area are associated with the Grand River, as this species' preference for large permanent water bodies is well known. As such, any potential occurrences or habitat features that could be associated with this species are anticipated to be captured in Natural Heritage System criteria associated with the Grand River and other watercourses.
FISH								
Moxostoma duquesnei	Black Redhorse	THR	THR	G5	S2	DFO[8]	This species lives in pools and riffles of medium-sized rivers and streams that are usually less than 2 m deep, have few aquatic plants, have a moderate to fast current, and provide a sand or gravel substrate. General habitat under the ESA for this species has not been specifically defined but can be expected to include both the watercourse itself and the adjacent floodplain and riparian zone which support aquatic habitat function.	**Present:** DFO's aquatic SAR mapping indicates that critical habitat for this species is present in the Grand River adjacent to the Tutela Heights portion of the study area.

[8] Species occurrence noted for the study area via Fisheries and Oceans Canada (DFO) aquatic species at risk mapping.

APPENDIX N – Species at Risk Screening

Species		Status				Data Source	Habitat Requirements	Discussion of Species Occurrence and NHS Considerations in Study Area
Scientific Name	Common Name	SARA	ESA	G-Rank	S-Rank			
Ammocrypta pellucida	Eastern Sand Darter	THR	END	G4	S2	NHIC, DFO	Eastern Sand Darter is found in shallow habitats within lakes, streams, and rivers with clean, sandy bottoms. Provincially regulated habitat for this species is defined under O.Reg. 832/21, section 12, and generally includes: occupied watercourses up to the high water mark, plus any adjacent area that either consists of naturally-occurring vegetation or is within 30 m of the high water mark.	**Present:** DFO's aquatic SAR mapping indicates that critical habitat for this species is present in the Grand River adjacent to the Tutela Heights portion of the study area. Regulated habitat is expected to be present within and adjacent to the Grand River as defined by O.Reg. 832/21.
Notropis photogenis	Silver Shiner	THR	THR	G5	S2S3	NHIC, DFO	This species prefers moderate to large watercourses with swift currents that are free of vegetation and have clean gravel or boulder substrate. The provincial general habitat description for this species includes occupied reaches plus shallow nearshore habitats and vegetated sections associated with those reaches, and the adjacent floodplains and riparian edges.	**Present:** DFO's aquatic SAR mapping indicates that critical habitat for this species is present in the Grand River adjacent to the Tutela Heights portion of the study area. SAR habitat considerations will apply to the Grand River. However, relative to the purpose of this SWS assessment, the Grand River, its floodplain, and associated riparian zones are part of the Natural Heritage System and will therefore be afforded protection under municipal policy.

Appendix O: Significant Wildlife Habitat Assessment Results

Appendix O: Significant Wildlife Habitat Assessment (EcoRegion 7E)

Table 1.1 Seasonal Concentration Areas of Animals.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
Waterfowl Stopover and Staging Areas (Terrestrial) **Rationale:** Habitat important to migrating waterfowl.	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grains in the Long Point, Rondeau, Lk. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	Fields with sheet water during Spring (mid-March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available.	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300m radius, dependent on local site conditions and adjacent land use is the significant wildlife habitat. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates).	Areas of sheet water during spring melt or high concentrations of waterfowl were not observed or reported in the study area. Known, accessible concentration areas are often flagged as "hotspots" by local birders and would be associated with past records. However, areas on private property that are not accessible from roadsides or public lands could be present.
Waterfowl Stopover and Staging Areas (Aquatic) **Rationale:** Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked Duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water)	Studies carried out and verified presence of: • Aggregations of 100 or more of listed species for seven days, results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH • The combined area of the ELC ecosites and a 100m radius area is the SWH • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded).	Concentrations of the noted species in the required numbers for significance have not been reported for the study area. Any water bodies, watercourses, or wetland plus their adjacent riparian habitats which could potentially provide this habitat type are anticipated to be captured in other Natural Heritage System considerations.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
Shorebird Migratory Stopover Area **Rationale:** High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH.	Studies confirming: • Presence of three or more of listed species and >1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for three years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	Concentrations of the noted species in the required numbers for significance have not been reported for the study area. Any shorelines or other flooded areas which could potentially provide this habitat type are anticipated to be captured in other Natural Heritage System considerations.
Raptor Wintering Area **Rationale:** Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class: *Forest*: FOD, FOM, FOC. *Upland*: CUM; CUT; CUS; CUW. Bald Eagle: *Forest community Series*: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering (hawk/owl) sites need to be > 20 ha with a combination of forest and upland • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; • One of more Bald Eagles or; • At least 10 individuals and two of the listed hawk/owl species To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	Candidate - It is possible that the valleylands and forests along Jones Creek at the northeast corner of the North Brantford study area could provide this type of habitat in conjunction with cultural thicket, cultural meadow and adjacent agricultural fields. Additionally, there is a large forest block in Tutela Heights study area (contains W69) that along with adjacent agricultural fields could also provide this type of habitat. Further studies would be required to determine if habitat is in use.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
Bat Hibernacula **Rationale:** Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat (Note: Tri-coloured Bat was previously included in this category, but due to the listing of this species as Endangered it has been removed from consideration as SWH)	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known.	• All sites with confirmed hibernating bats are SWH. The area includes 200m radius around the entrance of the hibernaculum for most development types and 1000m for wind farms. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”	Caves and mines that could provide bat hibernacula are not known to occur in the study area.
Bat Maternity Colonies **Rationale:** Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	• Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario. • Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees. Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred	• Maternity Colonies with confirmed use by; >10 Big Brown Bats >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”.	**Candidate** - Forested ecosites in the study area were not subjected to targeted surveys for bats but are expected to support the noted bat species and contained habitat features consistent with the noted criteria.
Turtle Wintering Areas **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles: *ELC Community Classes*: SW, MA, OA and SA *ELC Community Series*: FEO and BOO Northern Map Turtle: Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.	• Presence of five over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep- water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar.– May). Congregation of turtles is more common where wintering areas are limited and therefore significant	**Candidate** - Five ponds were noted within the two study areas (W2, W3, W68, W72, and W73) that have potential to provide overwintering habitat.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
Reptile Hibernaculum **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct) • Note: If there are Special Concern Species present, then site is SWH Note: Sites for hibernation possess specific habitat parameters (e.g., temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e., strong hibernation site fidelity). Other critical life processes (e.g., mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH	Candidate or potential features were not specifically observed during field investigations but should be reviewed during site-specific studies that can assess sites in more detail.
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff) **Rationale:** Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.	Cliff Swallow Northern Rough- winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles, cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (two years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/ permitted Mineral Aggregate Operation.	Studies confirming: • Presence of one or more nesting sites with eight or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects	Not observed or anticipated in study area. One individual Northern Rough-winged Swallow and no Cliff Swallows were documented during past and current breeding bird surveys.
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **Rationale:** Large colonies are important to local bird population, typically sites are	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6	Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. Most nests in trees are 11 to 15 m from ground, near the top of the tree	Studies confirming: • Presence of two or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the	Not observed or anticipated in study area based on habitat conditions that were documented.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
only known colony in area and are used annually.		SWD7 FET1		presence of fresh guano, dead young and/or eggshells	
Colonially - Nesting Bird Breeding Habitat (Ground) **Rationale:** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1–6 MAS1–3 CUM CUT CUS	Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. • Presence of five or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	Not observed or anticipated in study area based on habitat conditions that were documented.
Migratory Butterfly Stopover Areas **Rationale:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern:</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: <u>Field</u>: CUM, CUT, CUS <u>Forest</u>: FOC, FOD, FOM, CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie or Lake Ontario • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct) • MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 **or** >3000 with the presence of Painted Ladies or Red Admirals is to be considered significant.	The study area does not fall within 5 km of either Lake Ontario or Lake Erie and therefore does not meet the candidacy criteria.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	**Habitat Criteria**	**Defining Criteria**	
Landbird Migratory Stopover Areas **Rationale:** Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds and migrant raptor species	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Woodlots >5 ha in size and within 5 km of Lake Erie and Lake Ontario. If woodlands are rare in an area of shoreline, woodland fragments 2-5 ha can be considered for this habitat • If multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Erie and Lake Ontario are more significant • Sites have a variety of habitats; forest, grassland and wetland complexes. • The largest sites are more significant • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH.	Studies confirm: • Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least five different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Mar to May) and fall (Aug to Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	The study area does not fall within 5 km of either Lake Ontario or Lake Erie and therefore does not meet the candidacy criteria.
Deer Winter Congregation Areas **<u>Rationale:</u>** Deer movement during winter in the southern areas of Eco- region 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots >100 ha in size or, if large woodlots are rare in a planning area, woodlots >50 ha • Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. • Large woodlots >100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant.	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by white- tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques, ground or road surveys, or a pellet count deer density survey	MNRF data does not identify any significant deer congregation habitat in the study area.

Table 1.2.1 Rare Vegetation Communities.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Assessment of Habitat Presence in Study Area
	ELC Ecosite Code	Habitat Description	Detailed Information	Defining Criteria	
Cliffs and Talus Slopes **Rationale:** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment.	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes	The required ELC ecosites were not identified in the study area.
Sand Barren **Rationale:** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket- like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.	A sand barren area >0.5 ha in size	• Confirm any ELC Vegetation Type for Sand Barrens • Site must not be dominated by exotic or introduced species (<50% vegetative cover is composed of exotic sp.)	The required ELC ecosites were not identified in the study area.
Alvar **Rationale:** Alvars are extremely rare habitats in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: *1) Carex crawei* *2) Panicum philadelphicum* *3) Eleocharis compressa* *4) Scutellaria parvula* *5) Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 7E	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover	An Alvar site > 0.5 ha in size. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie.	• Field studies that identify four of the five Alvar Indicator Species at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is composed of exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses	The required ELC ecosites and indicator species were not identified in the study area.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Assessment of Habitat Presence in Study Area
	ELC Ecosite Code	Habitat Description	Detailed Information	Defining Criteria	
Old Growth Forest **Rationale:** Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland area is >0.5ha	Field Studies will determine: • If dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present) • The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH. • Determine ELC vegetation types for the forest forest area containing the old growth characteristics	No known old growth forests are known within the landscape and no forests included in the field investigations demonstrated appropriate characteristics.
Savannah **Rationale:** Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.	Field studies confirm one or more of the Savannah indicator species listed in Appendix N of the Significant Wildlife Habitat Technical Guide (SWHTG; MNRF 2000) should be present. Note: Savannah plant spp. list from Ecoregion 7E should be used. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is composed of exotic sp.).	The required ELC ecosites with noted indicator species were not identified in the study area.
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.	Field studies confirm one or more of the Prairie indicator species listed in Appendix N of the SWHTG should be present. Note: Prairie plant spp. list from Ecoregion 7E should be used • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is composed of exotic sp.).	The required ELC ecosites with noted indicator species were not identified in the study area.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Assessment of Habitat Presence in Study Area
	ELC Ecosite Code	Habitat Description	Detailed Information	Defining Criteria	
Other Rare Vegetation Communities **Rationale:** Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M. The MNRF/NHIC will have up to date listing for rare vegetation communities.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG.	Confirmed - Four rare vegetation communities were identified in the study area during field investigations: • FODM2-3 (FOD2-3) - Dry – Fresh Hickory Deciduous Forest, S3S4 • FODM7-4 (FOD7-4) – Fresh – Moist Black Walnut Lowland Deciduous Forest, S2S3 • FODM7-5 (FOD7-5) - Fresh – Moist Black Maple Lowland Deciduous Forest, S3 • FODM9-5 (FOD9-5) - Fresh – Moist Bitternut Hickory Deciduous Forest, S3S4 • SWTM2-3 (SWT2-9) - Gray Dogwood Mineral Deciduous Thicket, S3S4

Table 1.2.2 Specialized Habitats of Wildlife considered SWH.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
Waterfowl Nesting Area **Rationale:** Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.	Studies confirmed: • Presence of three or more nesting pairs for listed species excluding Mallards, or; • Presence of ten or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest.	Waterfowl nesting in the required numbers and/or species was not documented in the study area and was not indicated via background data. That said, site-specific assessment should consider potential habitats that are located on private property where survey access may have been limited. Core habitat features (wetlands) are anticipated to be captured in other Natural Heritage System considerations, but the noted adjacent uplands to 120 m could extend into proposed development areas.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **Rationale:** Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey <u>Special Concern:</u> Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on sight lines from the nest to the development and inclusion of perching and foraging habitat • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥ 3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid-August.	A single Osprey and no Bald Eagles were documented in the study area during past or current field investigations. The single Osprey documented in the past survey was not observed at a location containing suitable potential nesting or foraging habitat (i.e., was not near a watercourse crossing, pond, or similar feature). The single Osprey observed by Aquafor staff was similarly a flyover and not associated with specific habitat areas. Any noted habitat types and features in the study area (i.e., lakes, ponds, rivers, wetlands, and contiguous woodlands) are anticipated to be captured in other Natural Heritage System considerations.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
				• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”	
Woodland Raptor Nesting Habitat **Rationale:** Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	Northern Goshawk Cooper’s Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/ forest stands >30 ha with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	Studies confirm: • Presence of one or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH. • Broad-winged Hawk and Cooper’s Hawk – A 100m radius around the nest is the SWH. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area.	None of the noted indicator species were documented during breeding bird surveys or other field investigations, although it is understood that the vast majority of those surveys took place from roadsides and other accessible locations and therefore may have under-represented remote forested communities. There is no interior forest habitat present within the study area.
Turtle Nesting Areas **Rationale:** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle- nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	Studies confirm: • Presence of five or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100 m area of habitat • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method.	**Candidate** - One observation of a recent turtle nest was recorded in ELC polygon 175.06 in a sandy gravel patch along a northeast facing slope. There is the potential for other nesting sites outside of the features surveyed.
Seeps and Springs **Rationale:** Seeps/Springs are typical of	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats.	Any forested area (with <25% meadow/field/ pasture) within the headwaters of a stream or river system. Seeps and springs are important feeding and drinking areas especially in the winter will	Field Studies confirm: Presence of a site with two or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering	No seeps or springs were noted during field investigations but site-specific studies should be completed to confirm outside of these areas.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
headwater areas and are often at the source of coldwater streams.		Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	typically support a variety of plant and animal species	the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat.	
Amphibian Breeding Habitat (Woodland) **Rationale:** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Tree Frog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	Presence of a wetland, pond or woodland pool (including vernal pools) >500 m^2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat	Studies confirm: • Presence of breeding population of one or more of the listed newt/salamander species or two or more of the listed frog species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230 m radius of woodland area • If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat.	Confirmed - Aquafor's survey station E reported at least 20 total individuals of two of the listed species (Spring Peeper and Gray Tree Frog). Adjacent woodland includes only small treed patches along property margins and isolated trees; given the overall scarcity of habitat in the SWS study area, such areas that might be considered marginal habitat in other locations could have greater significance in the study area and are recommended to be reviewed in the context of provincial and local significance by future site-specific assessments.
Amphibian Breeding Habitat (Wetlands) **Rationale:** Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog American Bullfrog	ELC Community Classes: SW MA FE BO OA SA Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bullfrog) may be adjacent to woodlands.	• Wetlands >500 m^2 (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation.	Studies confirm: • Presence of breeding population of one or more of the listed newt/salamander species or two or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog/toad species with Call Level Codes of 3 or; wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1.	Amphibian surveys did not specifically identify any locations meeting the number and species requirements for this SWH category.
Woodland Area-Sensitive Bird Breeding Habitat **Rationale:** Large, natural blocks of mature woodland	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. • Interior forest habitat is at least 200 m from forest edge habitat.	Studies confirm: • Presence of nesting or breeding pairs of three or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer when birds are singing and defending their	Of the noted indicator species for this category, only Pileated Woodpecker was identified in the study area during breeding bird surveys. There is no interior forest habitat present within the study area.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite Codes	Habitat Criteria	Defining Criteria	
habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker Special Concern: Cerulean Warbler Canada Warbler	SWD		territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	

Table 1.3. Habitats of Species of Conservation Concern considered SWH.

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite	Habitat Criteria	Defining Criteria	
Marsh Breeding Bird Habitat **Rationale:** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan Special Concern: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 *For Green Heron*: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.	Studies confirm: • Presence of five or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of four or more of the listed species. • Note: any wetland with breeding of one or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	The required numbers and species of indicator birds were not recorded in nor reported from any portion of the study area. The valleyland along Phelps Creek is undefined with a wide strip of meadow marsh (MAM) and shallow marsh (MAS) that could provide habitat, but further studies are required to confirm if the noted indicator species are present in this habitat. Regardless, valleyland and watercourse features will be protected as part of the Natural Heritage System.
Open Country Bird Breeding Habitat **Rationale:** This wildlife habitat is declining throughout	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last five years).	Field Studies confirm: • Presence of nesting or breeding of two or more of the listed species. • A field with one or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC	The vast majority of open lands are under active agricultural cultivation and do not provide suitable habitat conditions for the noted species. Should conditions change (e.g., if fields are left to go fallow) conditions favourable for this

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite	Habitat Criteria	Defining Criteria	
Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	<u>Special Concern:</u> Short-eared Owl		• Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least five years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species	ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	habitat type could easily develop.
Shrub/Early Successional Bird Breeding Habitat **Rationale:** This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	<u>Indicator Spp</u>: Brown Thrasher Clay-coloured Sparrow <u>Common Spp:</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher <u>Special Concern:</u> Yellow- breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	Large field areas succeeding to shrub and thicket habitats >10 ha in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or livestock pasturing in the last five years). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.	Field Studies confirm: • Presence of nesting or breeding of one of the indicator species and at least two of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	Some of the noted indicator and common species were documented in the study area (Brown Thrasher, Field Sparrow, Black-billed Cuckoo, Willow Flycatcher). However, individual survey stations and/or habitats were only associated with low numbers of individual species and no single location met the required diversity threshold to be considered SWH in this category. Most of the locations where the noted species were observed were small patches of habitat along field edges rather than larger contiguous areas of habitat.
Terrestrial Crayfish **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare	Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crayfish or Meadow Crayfish (*Cambarus diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish.	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. Both species are a semi- terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.	Studies Confirm: • Presence of one or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial Sites • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult	Terrestrial crayfish burrows were not observed nor reported in the study area.
Special Concern and Rare Wildlife Species **Rationale:** These species are quite rare or have experienced significant population declines in	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed	Confirmed - Special Concern species (Wood Thrush, Eastern Wood-pewee, Monarch) were documented in the study area, with potential for other species and their habitat to also be present (primarily Midland Painted Turtle and Snapping Turtle). Significant habitats of these species would include areas that are integral

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Ecosite	Habitat Criteria	Defining Criteria	
Ontario.		location information may lack accuracy		field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat.	to their important life processes; not every observation location of a Special Concern species is necessarily going to represent an important habitat. For the noted species, important habitats are expected to include woodlands (for Eastern Wood-pewee and Wood Thrush nesting) and ponds/wetlands and adjacent turtle nest sites. All of these features have been previously discussed under other SWH categories or other constraints identified for this study.

Table 1.4.1 Animal Movement Corridors

Habitat	Species	CANDIDATE SWH		CONFIRMED SWH	Assessment of Habitat Presence in Study Area
		ELC Eco-sites	Habitat Criteria	Defining Criteria	
Amphibian Movement Corridors **<u>Rationale:</u>** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog American Bullfrog	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat –Wetland)	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should have at least 15m of vegetation on both sides of waterway or be up to 200m wide of woodland habitat and with gaps <20 m • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat	Confirmed - Significant amphibian breeding habitat was documented at Aquafor's survey station E, and therefore the movement corridor between the noted pond/wetland and the adjacent wooded areas has been identified as SWH.

Table 1.5.1 Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 7E

<table>
<tr><th rowspan="2">EcoDistrict</th><th rowspan="2">Wildlife Habitat and Species</th><th colspan="2">CANDIDATE SWH</th><th>CONFIRMED SWH</th><th rowspan="2">Assessment of Habitat Presence in Study Area</th></tr>
<tr><th>Ecosites</th><th>Habitat Criteria and Information</th><th>Defining Criteria</th></tr>
<tr><td>7E-2</td><td>Bat Migratory Stopover Area

Rationale: Stopover areas for long distance migrant bats are important during fall migration.

Hoary Bat
Eastern Red Bat
Silver-haired Bat</td><td>No specific ELC types.</td><td>• Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas.
• This is the only known bat migratory stopover habitats based on current information.</td><td>• Long Point (42°35’N, 80°30’E, to 42°33’N, 80°03’E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration.
• The confirmation criteria and habitat areas for this SWH are still being determined.</td><td>The study area is not located at Long Point and therefore this category does not apply.</td></tr>
</table>

Appendix P: 2022 Streamflow and Precipitation Monitoring Results

Appendix P is provided as a digital appendix.