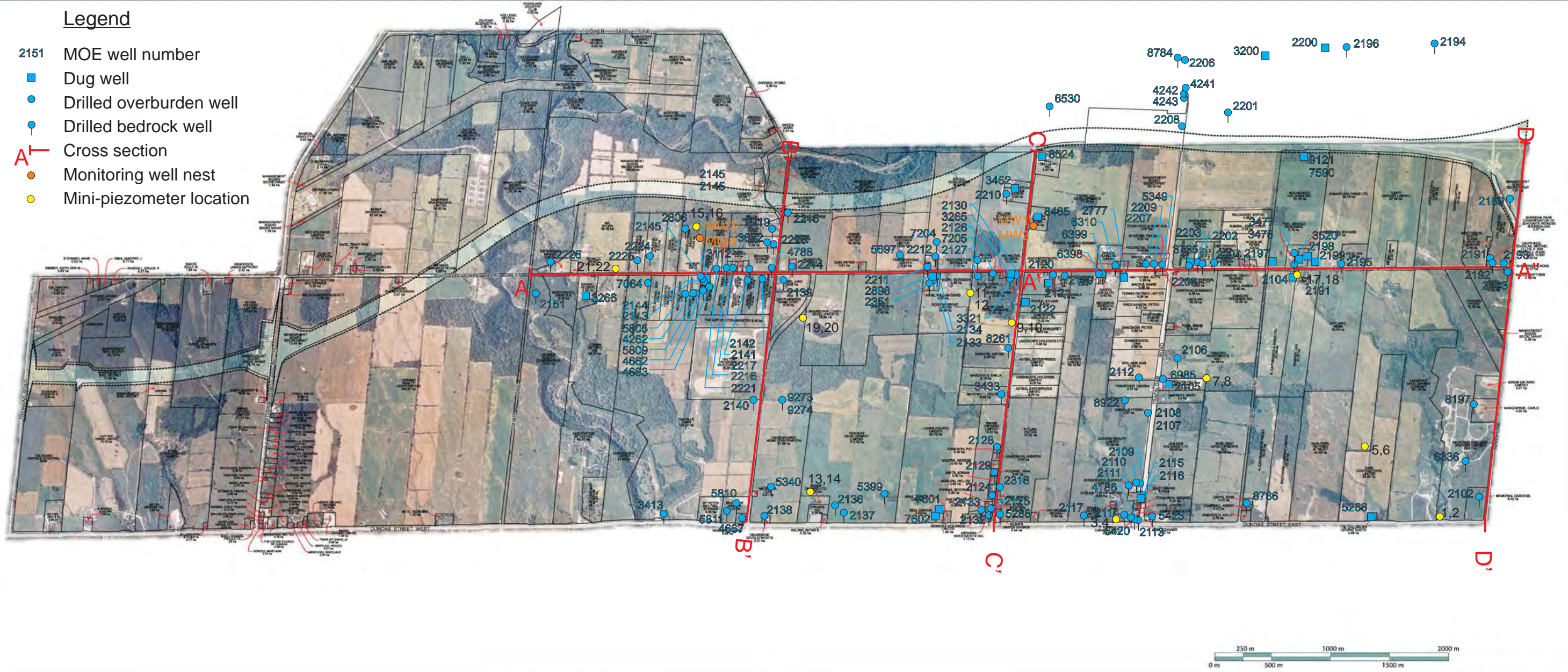


Legend

- 2151 MOE well number
- Dug well
- Drilled overburden well
- Drilled bedrock well
- A— Cross section
- Monitoring well nest
- Mini-piezometer location



Reference: Planning Services Department, Corporate Drafting & Design Office, Town of Oakville.

FIGURE E-1E

WELL LOCATION MAP
 North Oakville Creeks East of Sixteen Mile Creek
 Subwatershed Study
 Oakville, Ontario



208-021/well-loc-plan.cdr

Rare Species Observed in the 14 Mile Creek Fields,
Landscaped Areas and Other Areas

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L,h			Arrow-leaved Aster	<i>Aster urophyllus</i>
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Sedge	<i>Carex projecta</i>
			L,h			Pointed broom sedge	<i>Carex scoparia</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermani</i>
			L,h			Coontail	<i>Ceratophyllum demersum</i>
			L			Emerson's Hawthorn	<i>Crataegus submollis</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			White Grass	<i>Leersia virginica</i>
			L,h			Black Willow	<i>Salix nigra</i>
			L			Rough Goldenrod	<i>Solidago rugosa</i>
			L			Meadowsweet	<i>Spiraea alba</i>
			L,h			Greater Duckweed	<i>Spirodela polyrhiza</i>
			L,h			Northern Water-meal	<i>Wolffia borealis</i>
		L	(+)		Prickly-ash	<i>Zanthoxylum americanum</i>	
Birds			L,h			Cooper's Hawk	<i>Accipiter cooperii</i>

Rare Species Observed in Habitat Unit 1

	Status/Rank				Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced		
Plants			L		Long-fruited Anemone	<i>Anemone cylindrica</i>
			L,h		Arrow-leaved Aster	<i>Aster urophyllus</i>
			L		Bitter Cress	<i>Cardamine pensylvanica</i>
			L		Fringed Sedge	<i>Carex crinita</i>
			P,R,L,h		Slender Sedge	<i>Carex gracillescens</i>
			L		Blunt-broom Sedge	<i>Carex tribuloides</i>
			L		Sedge	<i>Carex tuckermani</i>
			L		Bluebead-lily	<i>Clintonia borealis</i>
			L		Emerson's Hawthorn	<i>Crataegus submollis</i>
			P	+	Honey Locust	<i>Gleditsia triacanthos</i>
			L		Winterberry	<i>Ilex verticillata</i>
			L,h		Black Oak	<i>Quercus velutina</i>
	Birds			L		Turkey Vulture
			L		Black-throated Green Warbler	<i>Dendroica virens</i>
			L		Black-and-white Warbler	<i>Mniotilta varia</i>
			L		Nashville Warbler	<i>Vermivora ruficapilla</i>
Reptiles	SC		P,L		Eastern Milksnake	<i>Lampropeltis triangulum</i>

Rare Species Observed in Habitat Unit 2

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L,h			Arrow-leaved Aster	<i>Aster urophyllus</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L,h			Coontail	<i>Ceratophyllum demersum</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L,h			Star Duckweed	<i>Lemna trisulca</i>
			L,h			Leafy Pondweed	<i>Potamogeton foliosus</i>
			L,h			Black Willow	<i>Salix nigra</i>
Birds			L			Turkey Vulture	<i>Cathartes aura</i>
			L			Black-and-white Warbler	<i>Mniotilta varia</i>
			P			Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
			P			Caspian Tern	<i>Sterna caspia</i>

Rare Species Observed in McCraney Creek

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Fringed Sedge	<i>Carex crinita</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L,h			Star Duckweed	<i>Lemna trisulca</i>
			L,h			Black Willow	<i>Salix nigra</i>
Birds	SC	VUL	P			Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
			L			Black-and-white Warbler	<i>Mniotilta varia</i>

Rare Species Observed in Glen Oaks Creek

	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
Plants			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			R,L,h			River Bulrush	<i>Scirpus fluviatilis</i>
			L,h			Wood Sage	<i>Teucrium canadense</i>

Rare Species Observed in the 16 Mile Creek Hedgerows

	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>
			P	+		Honey Locust	<i>Gleditsia triacanthos</i>

Rare Species Observed in the 16 Mile Creek Fields,
Landscaped Areas and Other Areas

	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
Plants			L,h			Rough Hair Grass	<i>Agrostis scabra</i>
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Fringed Brome	<i>Bromus ciliatus</i>
			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Yellow Sedge	<i>Carex flava</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermani</i>
			L,h			Coontail	<i>Ceratophyllum demersum</i>
			L			Bulbous Water-hemlock	<i>Cicuta bulbifera</i>
			L			Nodding Wood Grass	<i>Cinna latifolia</i>
			L			Field Thistle	<i>Cirsium discolor</i>
			R,L,h			Common Hair Grass	<i>Deschampsia flexuosa</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			P?			Butternut	<i>Juglans cinerea</i>
			L			Mountain Rice	<i>Oryzopsis racemosa</i>
			L,h			Pinkweed	<i>Polygonum pensylvanicum</i>
			R,L			Green-fruited Bur-reed	<i>Sparganium emersum</i>
			L,h			Giant Bur-Reed	<i>Sparganium eurycarpum</i>
		L			Meadowsweet	<i>Spiraea alba</i>	
		L,h			Greater Duckweed	<i>Spirodela polyrhiza</i>	
		L,h			Northern Water-meal	<i>Wolffia borealis</i>	
		L,h			Columbia Water-meal	<i>Wolffia columbiana</i>	
Birds			L			Turkey Vulture	<i>Cathartes aura</i>
			L			Nashville Warbler	<i>Vermivora ruficapilla</i>

Rare Species Observed in Habitat Unit 3

Plants	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
			L,h			Rough Hair Grass	<i>Agrostis scabra</i>
			L,h			Big Bluestem	<i>Andropogon gerardii</i>
			L,h			Canada Milk Vetch	<i>Astragalus canadensis</i>
			P,R,L,h			Slender Yellow False Foxglove	<i>Aureolaria flava</i>
			L,h		*	Sedge	<i>Carex buxbaumii</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Yellow Sedge	<i>Carex flava</i>
			L,h			Sedge	<i>Carex grayi</i>
			L,h			Sedge	<i>Carex grisea</i>
			L			Sedge	<i>Carex projecta</i>
			h		*	Richardson's Sedge	<i>Carex richardsonii</i>
			L,h			Wrinkle-seeded Sedge	<i>Carex rugosperma</i>
			L,h			Pipsissewa	<i>Chimaphila umbellata</i>
			P,h			Hawthorn	<i>Crataegus dissona</i>
			E,h			Hawthorn	<i>Crataegus dodgei</i>
			L,h		*	Hawthorn	<i>Crataegus macrosperma</i>
			P?,L,h		*	Hawthorn	<i>Crataegus scabrida</i>
			L,h			Hawthorn	<i>Crataegus schuettii</i>
			L,h			Shining Cyperus	<i>Cyperus bipartitus</i>
			R,L,h			Common Hair Grass	<i>Deschampsia flexuosa</i>
			P,E,h		*	Burning Bush	<i>Euonymus atropurpurea</i>
			L,h			Dyer's Bedstraw	<i>Galium tinctorium</i>
			L,h		*	Three-cleft Bedstraw	<i>Galium trifidum</i>
			L			Winterberry	<i>Ilex verticillata</i>
			R,L,h			Narrow-leaved Pinweed	<i>Lechea intermedia</i>
			L,h			Star Duckweed	<i>Lemna trisulca</i>
			P,L,h		*	Virginia Yellow Flax	<i>Linum virginianum</i>
			P,R,E,h		*	American Gromwell	<i>Lithospermum latifolium</i>
			P,R,L,h	(+)		Virginia Bluebells	<i>Mertensia virginica</i>
			L,h			Slender Najas	<i>Najas flexilis</i>
			L,h			Sycamore	<i>Platanus occidentalis</i>
			R,L,h			Whorled Milkwort	<i>Polygala verticillata</i>
			L			Water Smartweed	<i>Polygonum amphibium</i>
			L,h			Pinkweed	<i>Polygonum pensylvanicum</i>
			L,h			Leafy Pondweed	<i>Potamogeton foliosus</i>
			R,L,h			Knotty Pondweed	<i>Potamogeton nodosus</i>
			L,h			Chinquapin Oak	<i>Quercus muhlenbergii</i>

Rare Species Observed in Habitat Unit 3

COSEWIC (National Status)	Status/Rank		Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	OMNR (Provincial Status)	Other				
		L			Bristly crowfoot	<i>Ranunculus pensylvanicus</i>
		P,R,L,h			Cut-leaved Goldenrod	<i>Solidago arguta</i>
		R,L,h			Hairy Goldenrod	<i>Solidago hispida</i>
		R,L,h			Stout Goldenrod	<i>Solidago squarrosa</i>
		E,h		*	American Bur-reed	<i>Sparganium americanum</i>
		L,h			Giant Bur-Reed	<i>Sparganium eurycarpum</i>
		R,L,h			Venus' Looking Glass	<i>Specularia perfoliata</i>
		L,h			Woundwort	<i>Stachys palustris</i>
		L,h			Wood Sage	<i>Teucrium canadense</i>

Birds

		L,h			Cooper's Hawk	<i>Accipiter cooperii</i>
		L			Sharp-shinned Hawk	<i>Accipiter striatus</i>
		L			Ruffed Grouse	<i>Bonasa umbellus</i>
SC	VUL	L,h			Red-shouldered Hawk	<i>Buteo lineatus</i>
		L			Turkey Vulture	<i>Cathartes aura</i>
		P			Gray-cheeked Thrush	<i>Catharus minimus</i>
		L			Brown Creeper	<i>Certhia americana</i>
SC	VUL	L,h,P			Cerulean Warbler	<i>Dendroica cerulea</i>
		L			Pine Warbler	<i>Dendroica pinus</i>
		L			Black-throated Green Warbler	<i>Dendroica virens</i>
END					Acadian Flycatcher	<i>Empidonax virens</i>
		P			Northern Shrike	<i>Lanius excubitor</i>
		L			Northern Mockingbird	<i>Mimus polyglottos</i>
		L			Black-and-white Warbler	<i>Mniotilta varia</i>
		L			Blue-gray Gnatcatcher	<i>Poliioptila caerulea</i>
		L			Nashville Warbler	<i>Vermivora ruficapilla</i>

Fish

SC	NIAC	P			Silver Shiner	<i>Notropis photogenis</i>
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Rare Species Observed in Habitat Unit 4

	Status/Rank				Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Needs To Be Confirmed?		
Plants			L		Beggarticks	<i>Bidens tripartitus</i>
			L,h		Pipsissewa	<i>Chimaphila umbellata</i>
			L		Emerson's Hawthorn	<i>Crataegus submollis</i>
			L,h		Star Duckweed	<i>Lemna trisulca</i>
			L,h		Sycamore	<i>Platanus occidentalis</i>
			L,h		Leafy Pondweed	<i>Potamogeton foliosus</i>
			L,h		Chinquapin Oak	<i>Quercus muhlenbergii</i>
			L,h		Greater Duckweed	<i>Spirodela polyrhiza</i>
			L		Downy Arrow-wood	<i>Viburnum rafinesquianam</i>
Birds			L		Brown Creeper	<i>Certhia americana</i>

Rare Species Observed in Habitat Unit 5

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			P,R,L,h			Slender Sedge	<i>Carex gracillescens</i>
			L			Sedge	<i>Carex projecta</i>
			L			Sedge	<i>Carex tuckermani</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			Round-lobed Hepatica	<i>Hepatica americana</i>
			L			Winterberry	<i>Ilex verticillata</i>
			L,h			Star Duckweed	<i>Lemna trisulca</i>
			L,h			Swamp Rose	<i>Rosa palustris</i>
			L,h			Giant Bur-Reed	<i>Sparganium eurycarpum</i>
			L,h			Greater Duckweed	<i>Spirodela polyrhiza</i>
			L			Lowbush Blueberry	<i>Vaccinium angustifolium</i>
			L			Downy Arrow-wood	<i>Viburnum rafinesquianam</i>
			L,h			Northern Water-meal	<i>Wolffia borealis</i>
		L,h			Columbia Water-meal	<i>Wolffia columbiana</i>	
Birds			L			Black-throated Green Warbler	<i>Dendroica virens</i>
			L			Black-and-white Warbler	<i>Mniotilta varia</i>

Rare Species Observed in Habitat Unit 6

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>
Birds			L			Black-and-white Warbler	<i>Mniotilta varia</i>
			L			Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>
			L			Nashville Warbler	<i>Vermivora ruficapilla</i>

Rare Species Observed in Habitat Unit 8

Plants	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Rattlesnake Fern	<i>Botrychium virginianum</i>
			L			Fringed Brome	<i>Bromus ciliatus</i>
			L			Water-arum (Wild Calla)	<i>Calla palustris</i>
			L			Brome-like Sedge	<i>Carex bromoides</i>
			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Fringed Sedge	<i>Carex crinita</i>
		P,R,L,h				Slender Sedge	<i>Carex gracillescens</i>
		L				Inland Sedge	<i>Carex interior</i>
		L				Troublesome Sedge	<i>Carex molesta</i>
		P,L,h		*		Sedge	<i>Carex muhlenbergii</i>
		L				Sedge	<i>Carex projecta</i>
		L,h				Pointed broom sedge	<i>Carex scoparia</i>
		L				Stiff Sedge	<i>Carex stricta</i>
		L				Blunt-broom Sedge	<i>Carex tribuloides</i>
		L				Sedge	<i>Carex tuckermani</i>
		L				Bulbous Water-hemlock	<i>Cicuta bulbifera</i>
		L				Stout Wood Grass	<i>Cinna arundinacea</i>
		L				Nodding Wood Grass	<i>Cinna latifolia</i>
		L				Bluebead-lily	<i>Clintonia borealis</i>
		L				Gold-thread	<i>Coptis trifolia</i>
		L				Emerson's Hawthorn	<i>Crataegus submollis</i>
		L,h				Shining Cyperus	<i>Cyperus bipartitus</i>
		R,L,h				Common Hair Grass	<i>Deschampsia flexuosa</i>
		L,h				Dutchman's-breeches	<i>Dicentra cucullaria</i>
		L				Crested Wood Fern	<i>Dryopteris cristata</i>
		L				Blunt Spike Rush	<i>Eleocharis obtusa</i>
		L,h				Dyer's Bedstraw	<i>Galium tinctorium</i>
		L				Eastern Manna Grass	<i>Glyceria septentrionalis</i>
		L				Round-lobed Hepatica	<i>Hepatica americana</i>
		h				Cow-parsnip	<i>Heracleum maximum</i>
		L				Canada Waterleaf	<i>Hydrophyllum canadense</i>
		L				Winterberry	<i>Ilex verticillata</i>
		P?				Butternut	<i>Juglans cinerea</i>
		L				White Grass	<i>Leersia virginica</i>
		L				Cardinal Flower	<i>Lobelia cardinalis</i>
		L				Tufted Loosestrife	<i>Lysimachia thrysiflora</i>
		L				American Royal Fern	<i>Osmunda regalis</i>

Rare Species Observed in Habitat Unit 8

Status/Rank		Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
COSEWIC (National Status)	OMNR (Provincial Status)				
		L,h	(+)	Ninebark	<i>Physocarpus opulifolius</i>
		L		Water Smartweed	<i>Polygonum amphibium</i>
		L,h		Pinkweed	<i>Polygonum pennsylvanicum</i>
		L,h		Leafy Pondweed	<i>Potamogeton foliosus</i>
		L,h		Swamp White Oak	<i>Quercus bicolor</i>
		L,h		Black Oak	<i>Quercus velutina</i>
		L		Slender Willow	<i>Salix petiolaris</i>
		R,L,h		Water Pimpernel	<i>Samolus valerandi</i>
		L		Meadowsweet	<i>Spiraea alba</i>
		L,h		Greater Duckweed	<i>Spirodela polyrhiza</i>
		L		Downy Arrow-wood	<i>Viburnum rafinesquianam</i>
		L,h		Northern Water-meal	<i>Wolffia borealis</i>
		L,h		Columbia Water-meal	<i>Wolffia columbiana</i>

Bird

		L,h		Cooper's Hawk	<i>Accipiter cooperii</i>
		P		Stilt Sandpiper	<i>Calidris himantopus</i>
		P		Semipalmated Sandpiper	<i>Calidris pusilla</i>
		L		Turkey Vulture	<i>Cathartes aura</i>
		L		Pine Warbler	<i>Dendroica pinus</i>
		L		Black-throated Green Warbler	<i>Dendroica virens</i>
		L		Black-and-white Warbler	<i>Mniotilta varia</i>
		L		Virginia Rail	<i>Rallus limicola</i>
		L		Nashville Warbler	<i>Vermivora ruficapilla</i>

Rare Species Observed in the Shannon's Creek Hedgerows

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>
			P	+		Honey Locust	<i>Gleditsia triacanthos</i>

Rare Species Observed in the Shannon's Creek Fields, Landscaped Areas and Other Areas

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Yellow Sedge	<i>Carex flava</i>
			L			Field Thistle	<i>Cirsium discolor</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
Birds			L			Turkey Vulture	<i>Cathartes aura</i>

Rare Species Observed in the Munn's Creek Hedgerows

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>

Rare Species Observed in the Munn's Creek Fields, Landscaped Areas and Other Areas

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Yellow Sedge	<i>Carex flava</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Field Thistle	<i>Cirsium discolor</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L,h			Pinkweed	<i>Polygonum pennsylvanicum</i>
Birds			L			Turkey Vulture	<i>Cathartes aura</i>

Rare Species Observed in Habitat Unit 9

	Status/Rank			Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other		
Plants			L,h	Arrow-leaved Aster	<i>Aster urophyllus</i>
			L	Beggarticks	<i>Bidens tripartitus</i>
			L	Brome-like Sedge	<i>Carex bromoides</i>
			L	Oval-headed Sedge	<i>Carex cephalophora</i>
			L	Fringed Sedge	<i>Carex crinita</i>
			L	Sedge	<i>Carex projecta</i>
			L	Blunt-broom Sedge	<i>Carex tribuloides</i>
			L	Sedge	<i>Carex tuckermani</i>
			L	Gold-thread	<i>Coptis trifolia</i>
			L	Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L	Round-lobed Hepatica	<i>Hepatica americana</i>
			L	Winterberry	<i>Ilex verticillata</i>
			L,h	Star Duckweed	<i>Lemna trisulca</i>
			L	Water Smartweed	<i>Polygonum amphibium</i>
			L,h	Pinkweed	<i>Polygonum pennsylvanicum</i>
			L,h	Swamp White Oak	<i>Quercus bicolor</i>
			L,h	Swamp Rose	<i>Rosa palustris</i>
			L,h	Swamp Dewberry	<i>Rubus hispidus</i>
			L	Slender Willow	<i>Salix petiolaris</i>
			L	Rough Goldenrod	<i>Solidago rugosa</i>
		R,L	Green-fruited Bur-reed	<i>Sparganium emersum</i>	
		L,h	Giant Bur-Reed	<i>Sparganium eurycarpum</i>	
		L	Meadowsweet	<i>Spiraea alba</i>	
		L,h	Greater Duckweed	<i>Spirodela polyrhiza</i>	
Birds			L	Black-and-white Warbler	<i>Mniotilta varia</i>
			L	Nashville Warbler	<i>Vermivora ruficapilla</i>

Rare Species Observed in Habitat Unit 10

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermani</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			Winterberry	<i>Ilex verticillata</i>
			L,h			Leafy Pondweed	<i>Potamogeton foliosus</i>
			L,h			Swamp Rose	<i>Rosa palustris</i>
			R,L			Green-fruited Bur-reed	<i>Sparganium emersum</i>
		L,h			Greater Duckweed	<i>Spirodela polyrhiza</i>	
Birds			L			Turkey Vulture	<i>Cathartes aura</i>

Rare Species Observed in Habitat Unit 11

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Rattlesnake Fern	<i>Botrychium virginianum</i>
			L			Fringed Brome	<i>Bromus ciliatus</i>
			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
Birds			L			Turkey Vulture	<i>Cathartes aura</i>
			L			Black-throated Green Warbler	<i>Dendroica virens</i>
	SC	VUL	P			Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
			L			Black-and-white Warbler	<i>Mniotilta varia</i>
			L			Nashville Warbler	<i>Vermivora ruficapilla</i>

Rare Species Observed in Habitat Unit 12

Plants	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Sedge	<i>Carex projecta</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermanni</i>
			L			Gold-thread	<i>Coptis trifolia</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L,h			Dyer's Bedstraw	<i>Galium tinctorium</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			Round-lobed Hepatica	<i>Hepatica americana</i>
			L			Winterberry	<i>Ilex verticillata</i>
			L,h			Pinkweed	<i>Polygonum pensylvanicum</i>
			L,h			Swamp Rose	<i>Rosa palustris</i>
			L			Shining Willow	<i>Salix lucida</i>
			L			Slender Willow	<i>Salix petiolaris</i>
			L,h			Giant Bur-Reed	<i>Sparganium eurycarpum</i>
			L,h			Greater Duckweed	<i>Spirodela polyrhiza</i>

Rare Species Observed in Habitat Unit 14

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Yellow Sedge	<i>Carex flava</i>
			L,h			Buttonbush	<i>Cephalanthus occidentalis</i>
			L			Gold-thread	<i>Coptis trifolia</i>
			L			Round-lobed Hepatica	<i>Hepatica americana</i>
			h			Cow-parsnip	<i>Heracleum maximum</i>
			L,h			Black Oak	<i>Quercus velutina</i>
Birds			L			Turkey Vulture	<i>Cathartes aura</i>
	SC	VUL	P			Yellow-breasted Chat	<i>Icteria virens</i>
			L,h			Eastern Bluebird	<i>Sialia sialis</i>

Rare Species Observed in Habitat Unit 15

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>
			L,h			Swamp Dewberry	<i>Rubus hispidus</i>

Rare Species Observed in Habitat Unit 13

	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
Plants			L,h			Arrow-leaved Aster	<i>Aster urophyllus</i>
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Water-arum (Wild Calla)	<i>Calla palustris</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermani</i>
			L,h			Buttonbush	<i>Cephalanthus occidentalis</i>
			L,h			Dyer's Bedstraw	<i>Galium tinctorium</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			Winterberry	<i>Ilex verticillata</i>
			L,h			Swamp White Oak	<i>Quercus bicolor</i>
			L			Bristly crowfoot	<i>Ranunculus pensylvanicus</i>
			L,h			Swamp Rose	<i>Rosa palustris</i>
			L			Rough Goldenrod	<i>Solidago rugosa</i>
			R,L			Green-fruited Bur-reed	<i>Sparganium emersum</i>
			L			Meadowsweet	<i>Spiraea alba</i>
			L,h			Marsh Speedwell	<i>Veronica scutellata</i>
		L,h			Northern Water-meal	<i>Wolffia borealis</i>	
		L,h			Columbia Water-meal	<i>Wolffia columbiana</i>	
Birds			L			Turkey Vulture	<i>Cathartes aura</i>
			h			Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Reptiles	SC		P,L			Eastern Milksnake	<i>Lampropeltis triangulum</i>

Rare Species Observed in Habitat Unit 16

Plants	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
			R,L			Short-awned Foxtail	<i>Alopecurus aequalis</i>
			L,h			Arrow-leaved Aster	<i>Aster urophyllus</i>
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Rattlesnake Fern	<i>Botrychium virginianum</i>
			L			Water-arum (Wild Calla)	<i>Calla palustris</i>
			L			Brome-like Sedge	<i>Carex bromoides</i>
			L,h			Brownish Sedge	<i>Carex brunnescens</i>
			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Sedge	<i>Carex projecta</i>
			L			Stiff Sedge	<i>Carex stricta</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermani</i>
			L,h			Buttonbush	<i>Cephalanthus occidentalis</i>
			L			Stout Wood Grass	<i>Cinna arundinacea</i>
			L			Emerson's Hawthorn	<i>Crataegus submollis</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L,h			Dyer's Bedstraw	<i>Galium tinctorium</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			Winterberry	<i>Ilex verticillata</i>
			L,h			Tall Blue Lettuce	<i>Lactuca biennis</i>
			L,h			Star Duckweed	<i>Lemna trisulca</i>
			L,h			False Pimpernel	<i>Lindernia dubia</i>
			L			Tufted Loosestrife	<i>Lysimachia thrysiflora</i>
			L,h			Leafy Pondweed	<i>Potamogeton foliosus</i>
			L,h			Swamp White Oak	<i>Quercus bicolor</i>
			L			Bristly crowfoot	<i>Ranunculus pensylvanicus</i>
			L,h			Swamp Rose	<i>Rosa palustris</i>
			L,h			Swamp Dewberry	<i>Rubus hispidus</i>
			L			Slender Willow	<i>Salix petiolaris</i>
			R,L,h			River Bulrush	<i>Scirpus fluviatilis</i>
			R,L			Green-fruited Bur-reed	<i>Sparganium emersum</i>
			L,h			Giant Bur-Reed	<i>Sparganium eurycarpum</i>
			L			Meadowsweet	<i>Spiraea alba</i>
			L,h			Marsh St. John's-wort	<i>Triadenum fraseri</i>
			L			Lowbush Blueberry	<i>Vaccinium angustifolium</i>
			L			Downy Arrow-wood	<i>Viburnum rafinesquianam</i>
			L			Sweet White Violet	<i>Viola blanda</i>

Rare Species Observed in Habitat Unit 16

	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
Birds			L,h			Cooper's Hawk	<i>Accipiter cooperii</i>
			L			Grasshopper Sparrow	<i>Ammodramus savannarum</i>
			P			Rough-legged Hawk	<i>Buteo lagopus</i>
			L			Turkey Vulture	<i>Cathartes aura</i>
			P			Northern Shrike	<i>Lanius excubitor</i>
			L			Black-and-white Warbler	<i>Mniotilta varia</i>
			L			Virginia Rail	<i>Rallus limicola</i>
			L			Nashville Warbler	<i>Vermivora ruficapilla</i>
Reptiles			P,L,h			Northern Ribbonsnake	<i>Thamnophis sauritus septentrionalis</i>

Rare Species Observed in Habitat Unit 17

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Yellow Sedge	<i>Carex flava</i>

Rare Species Observed in the Joshua's Creek Hedgerows

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L	(+)		Prickly-ash	<i>Zanthoxylum americanum</i>
Birds			L			Northern Mockingbird	<i>Mimus polyglottos</i>

Rare Species Observed in Habitat Unit 18

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>

Rare Species Observed in the Joshua's Creek Fields,
Landscaped Areas and Other Areas

Plants	Status/Rank			Introduced	Needs To Be Confirmed?	Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other				
			R,L			Short-awned Foxtail	<i>Alopecurus aequalis</i>
			L,h			Arrow-leaved Aster	<i>Aster urophyllus</i>
			L			Beggarticks	<i>Bidens tripartitus</i>
			L			Oval-headed Sedge	<i>Carex cephalophora</i>
			L			Fringed Sedge	<i>Carex crinita</i>
			L			Yellow Sedge	<i>Carex flava</i>
			L			Sedge	<i>Carex projecta</i>
			L			Stiff Sedge	<i>Carex stricta</i>
			L			Blunt-broom Sedge	<i>Carex tribuloides</i>
			L			Sedge	<i>Carex tuckermani</i>
			L,h			Buttonbush	<i>Cephalanthus occidentalis</i>
			L			Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L,h			Dyer's Bedstraw	<i>Galium tinctorium</i>
			P	+		Honey Locust	<i>Gleditsia triacanthos</i>
			L			Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L			Winterberry	<i>Ilex verticillata</i>
			L,h			Star Duckweed	<i>Lemna trisulca</i>
			L,h			Leafy Pondweed	<i>Potamogeton foliosus</i>
			E,h			Common Floating Pondweed	<i>Potamogeton natans</i>
			L,h			Swamp White Oak	<i>Quercus bicolor</i>
			L,h			Marsh Speedwell	<i>Veronica scutellata</i>
			L,h			Columbia Water-meal	<i>Wolffia columbiana</i>

Rare Species Observed in Habitat Unit 19

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L			Emerson's Hawthorn	<i>Crataegus submollis</i>

Rare Species Observed in Habitat Unit 20

	Status/Rank					Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced	Needs To Be Confirmed?		
Plants			L,h			Swamp Dewberry	<i>Rubus hispidus</i>

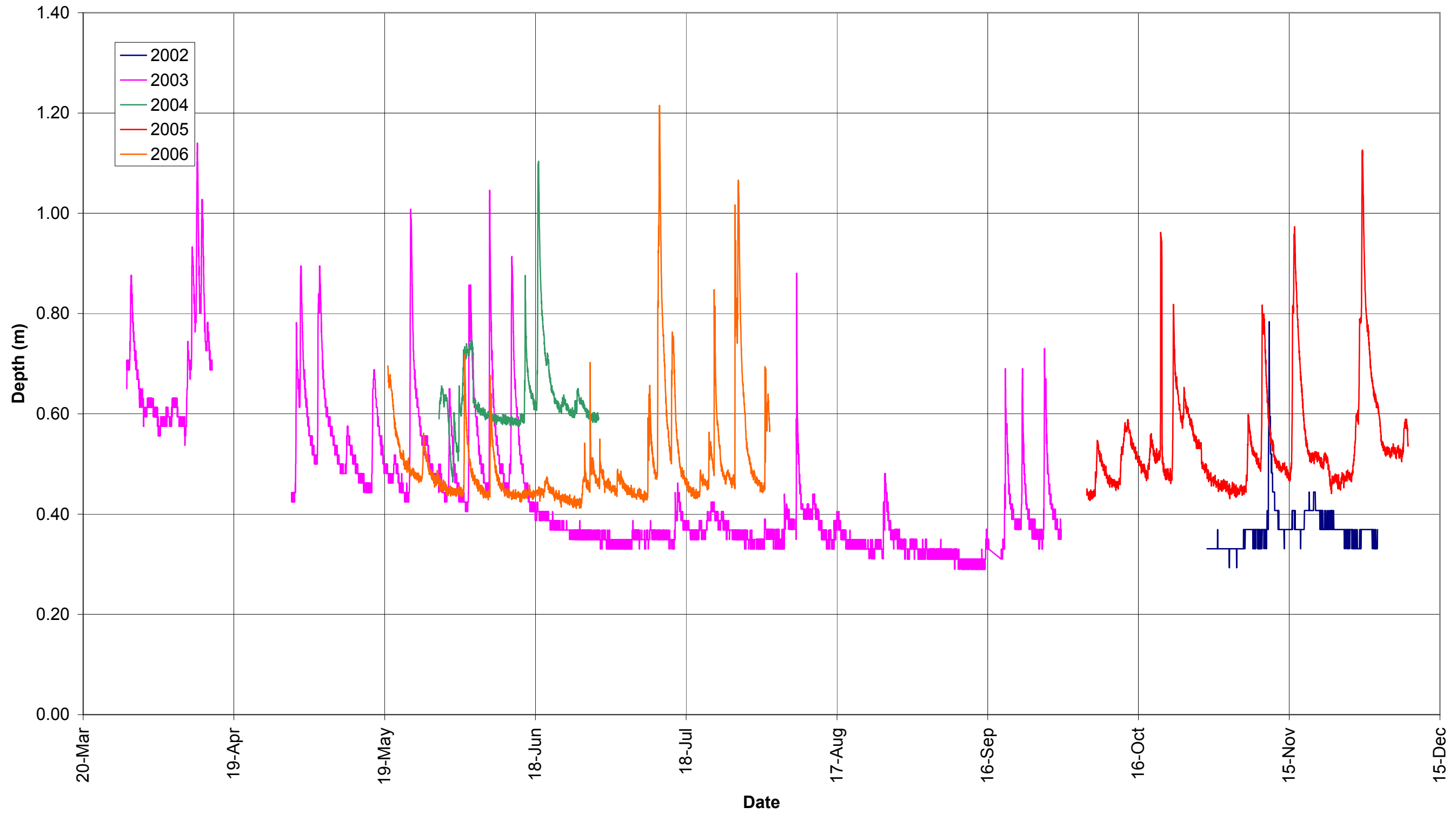
Rare Species Observed in Habitat Unit 21

	Status/Rank				Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced		
Plants			R,L		Short-awned Foxtail	<i>Alopecurus aequalis</i>
			L		Foxtail Sedge	<i>Carex alopecoidea</i>
			L		Oval-headed Sedge	<i>Carex cephalophora</i>
			L		Fringed Sedge	<i>Carex crinita</i>
			L		Blunt-broom Sedge	<i>Carex tribuloides</i>
			L		Sedge	<i>Carex tuckermani</i>
			L,h		Buttonbush	<i>Cephalanthus occidentalis</i>
			L		Emerson's Hawthorn	<i>Crataegus submollis</i>
			L		Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L,h		Dyer's Bedstraw	<i>Galium tinctorium</i>
			L		Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L		Winterberry	<i>Ilex verticillata</i>
			L,h		Star Duckweed	<i>Lemna trisulca</i>
			L		Tufted Loosestrife	<i>Lysimachia thrysiflora</i>
			L		American Royal Fern	<i>Osmunda regalis</i>
	Birds			L,h		Swamp White Oak
			L,h		Swamp Rose	<i>Rosa palustris</i>
			L,h		Swamp Dewberry	<i>Rubus hispidus</i>
			L		Meadowsweet	<i>Spiraea alba</i>
			L,h		Marsh Speedwell	<i>Veronica scutellata</i>
			L		Grasshopper Sparrow	<i>Ammodramus savannarum</i>
			L		Turkey Vulture	<i>Cathartes aura</i>
		L		Pine Warbler	<i>Dendroica pinus</i>	
		h		Orchard Oriole	<i>Icterus spurius</i>	
		P		Northern Shrike	<i>Lanius excubitor</i>	
		L		Blue-winged Warbler	<i>Vermivora pinus</i>	
		L		Nashville Warbler	<i>Vermivora ruficapilla</i>	

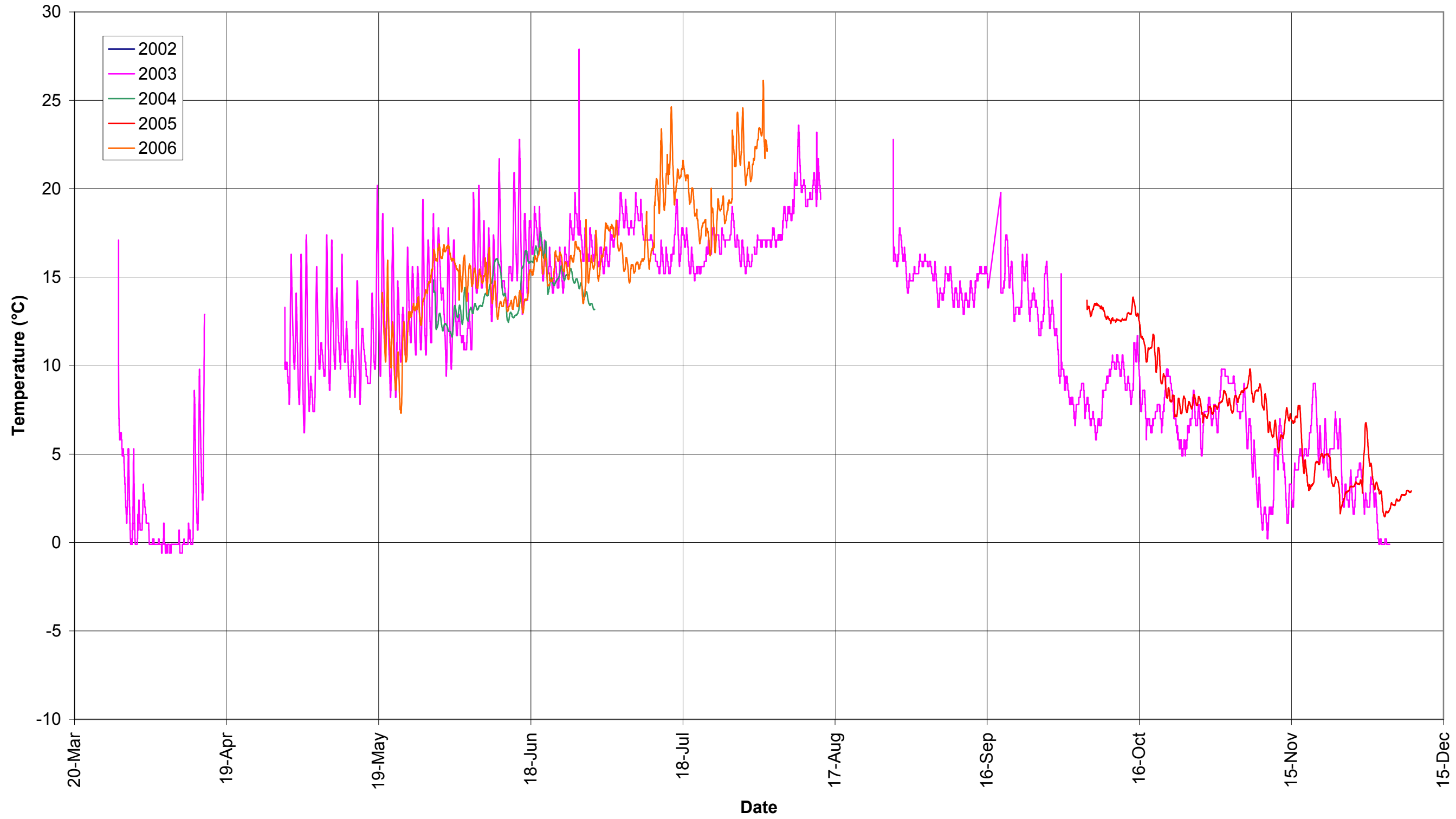
Rare Species Observed in Habitat Unit 22

	Status/Rank				Common Name	Scientific Name
	COSEWIC (National Status)	OMNR (Provincial Status)	Other	Introduced		
Plants			L		Fringed Sedge	<i>Carex crinita</i>
			L		Yellow Sedge	<i>Carex flava</i>
			L		Stiff Sedge	<i>Carex stricta</i>
			L		Blunt-broom Sedge	<i>Carex tribuloides</i>
			L		Sedge	<i>Carex tuckermani</i>
			L,h		Buttonbush	<i>Cephalanthus occidentalis</i>
			L		Leatherwood	<i>Dirca palustris</i>
			L		Blunt Spike Rush	<i>Eleocharis obtusa</i>
			L,h		Dyer's Bedstraw	<i>Galium tinctorium</i>
			L		Eastern Manna Grass	<i>Glyceria septentrionalis</i>
			L,h		Swamp White Oak	<i>Quercus bicolor</i>
			L,h		Swamp Rose	<i>Rosa palustris</i>
			L,h		Swamp Dewberry	<i>Rubus hispidus</i>
			L		Meadowsweet	<i>Spiraea alba</i>
Birds			L,h		Cooper's Hawk	<i>Accipiter cooperii</i>

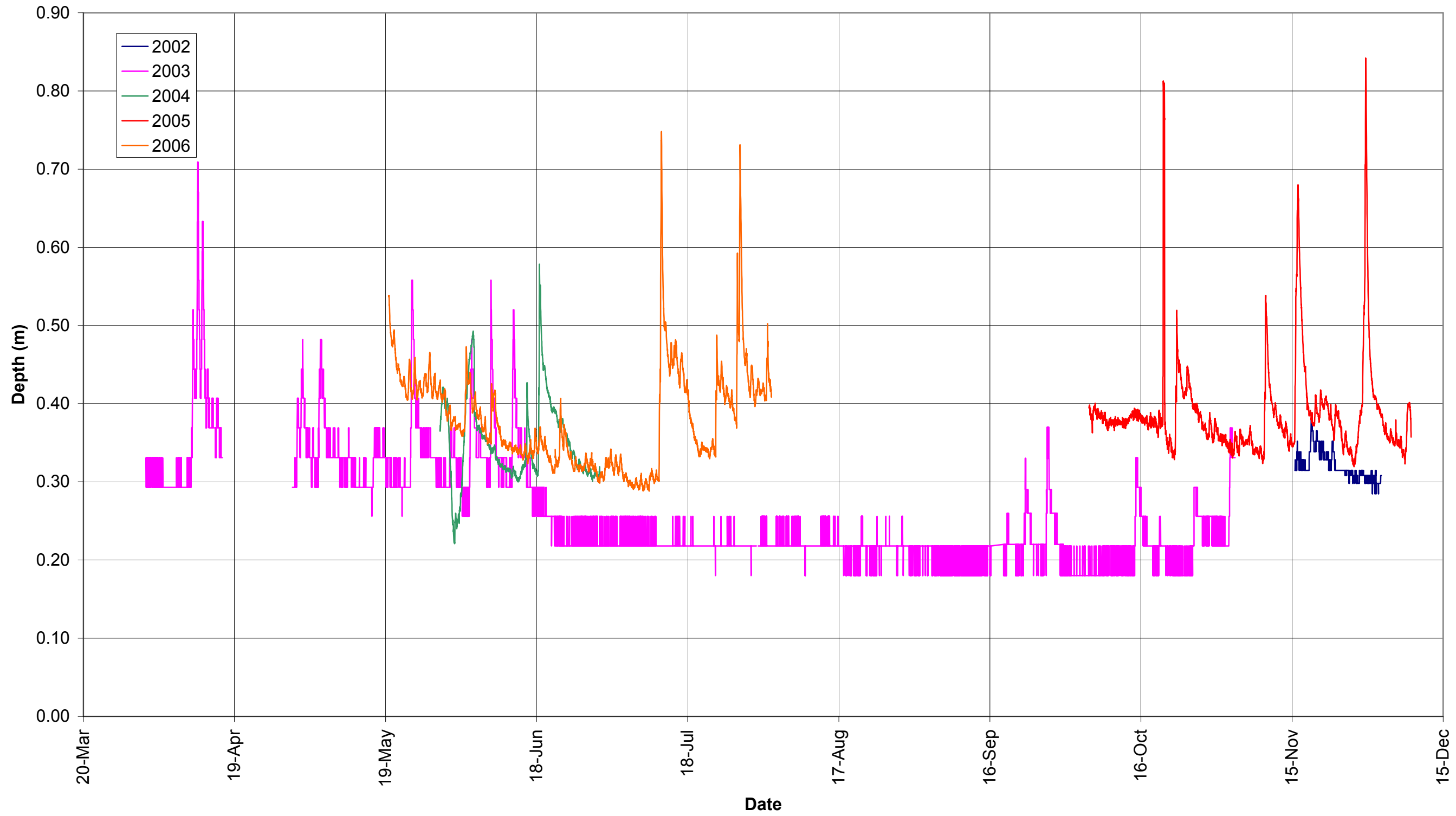
14 Mile Creek East
29 October 2002 - August 3, 2006



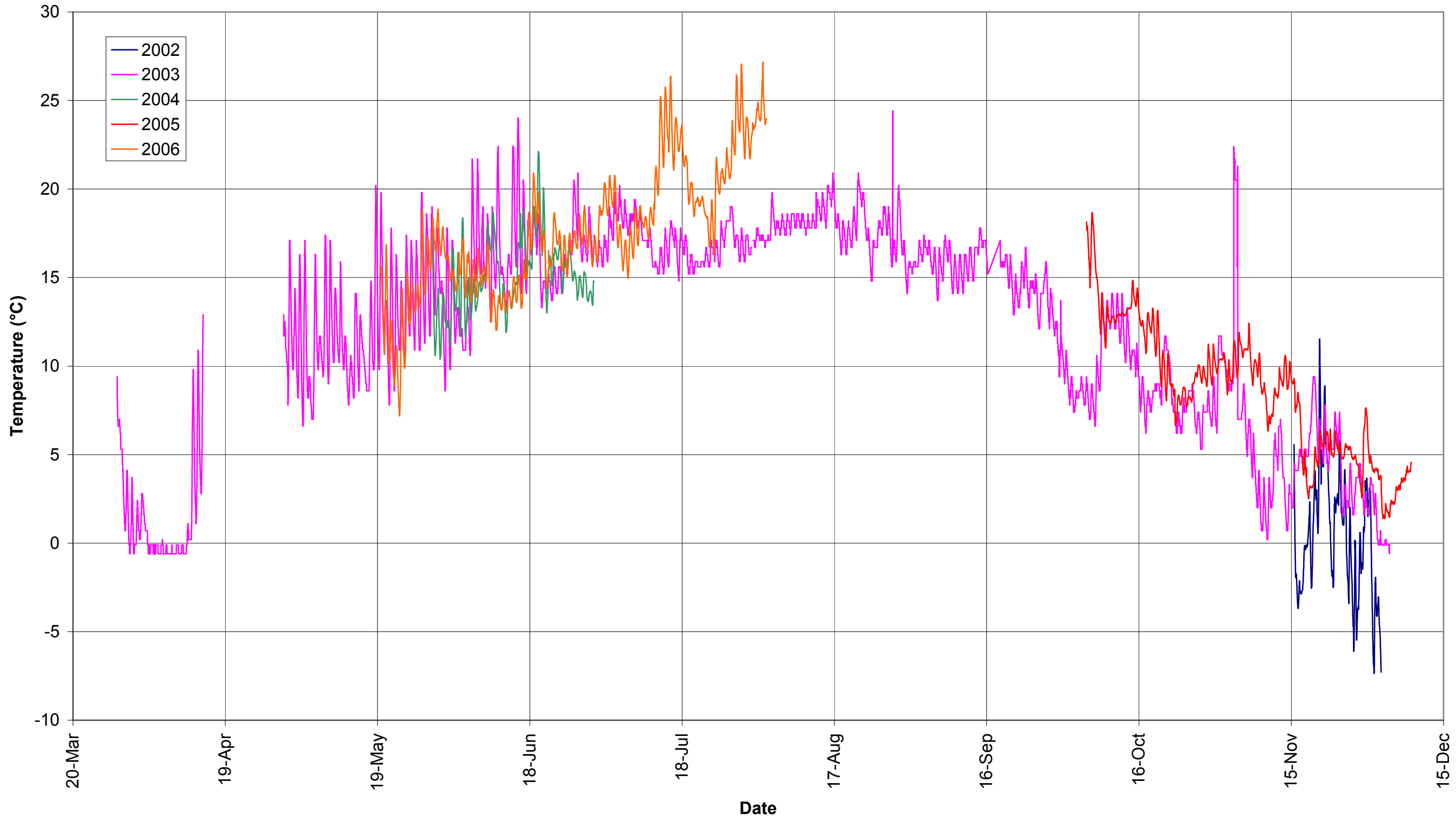
14 Mile Creek East
29 October 2002 - August 3, 2006



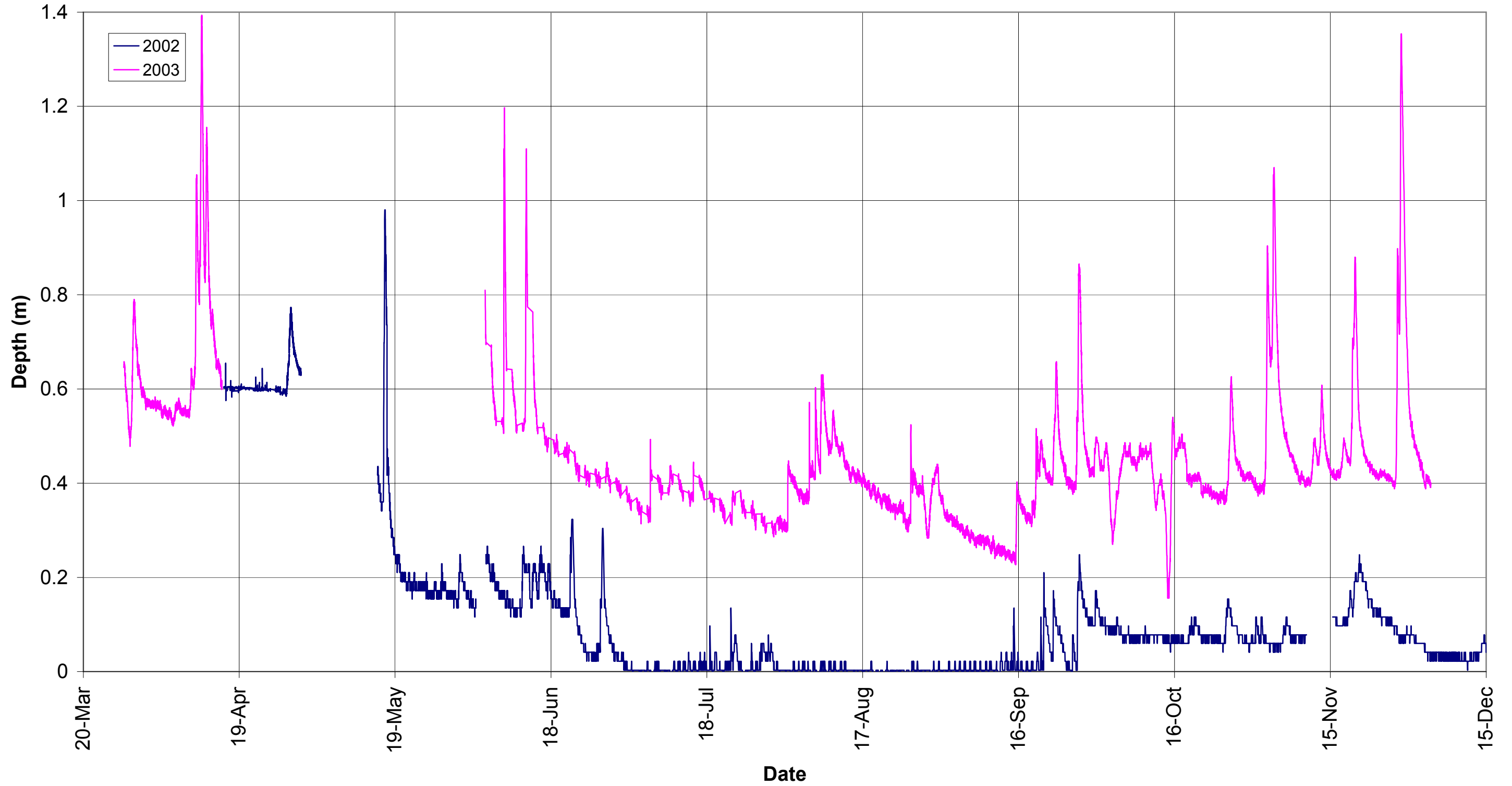
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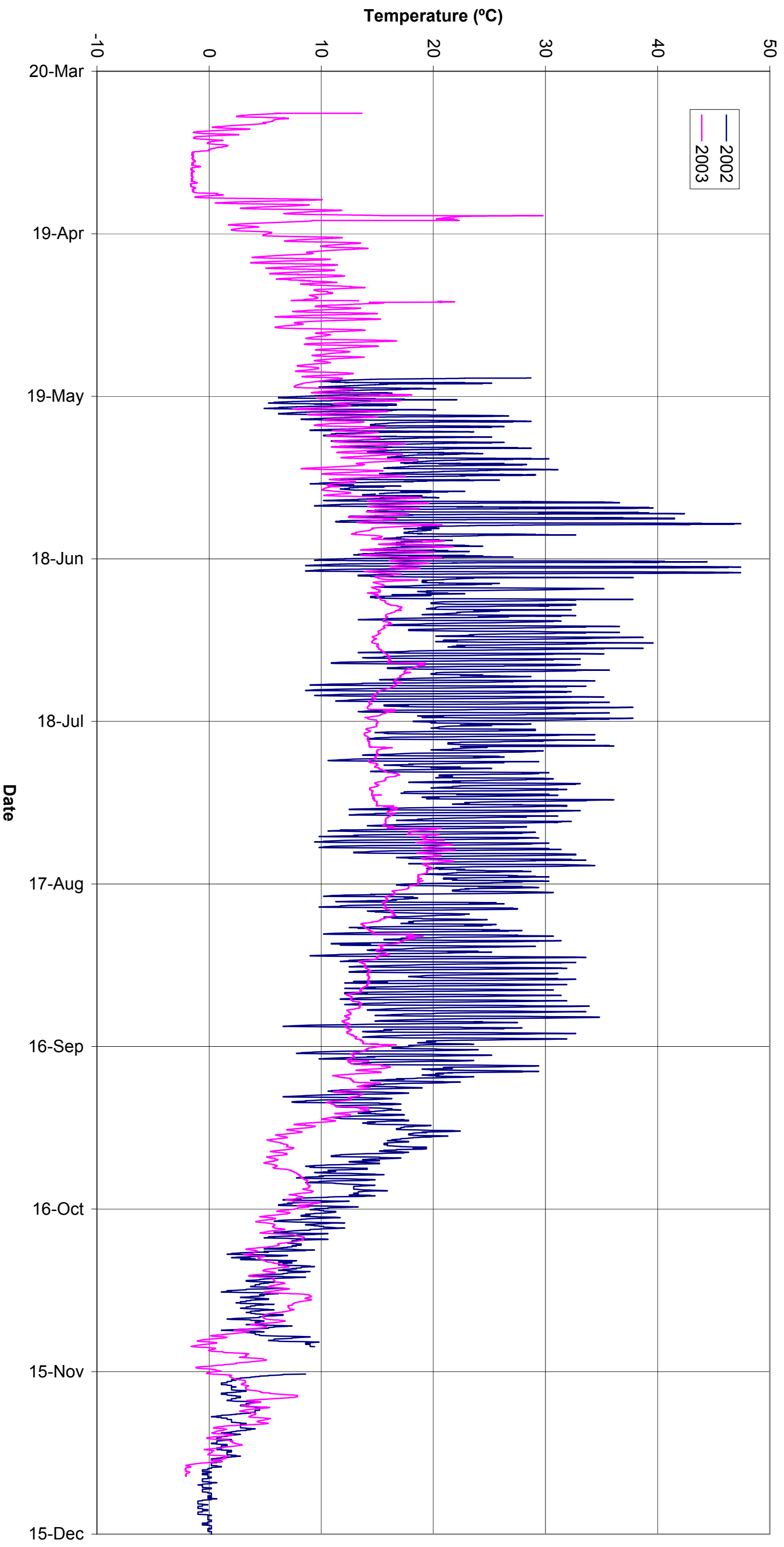
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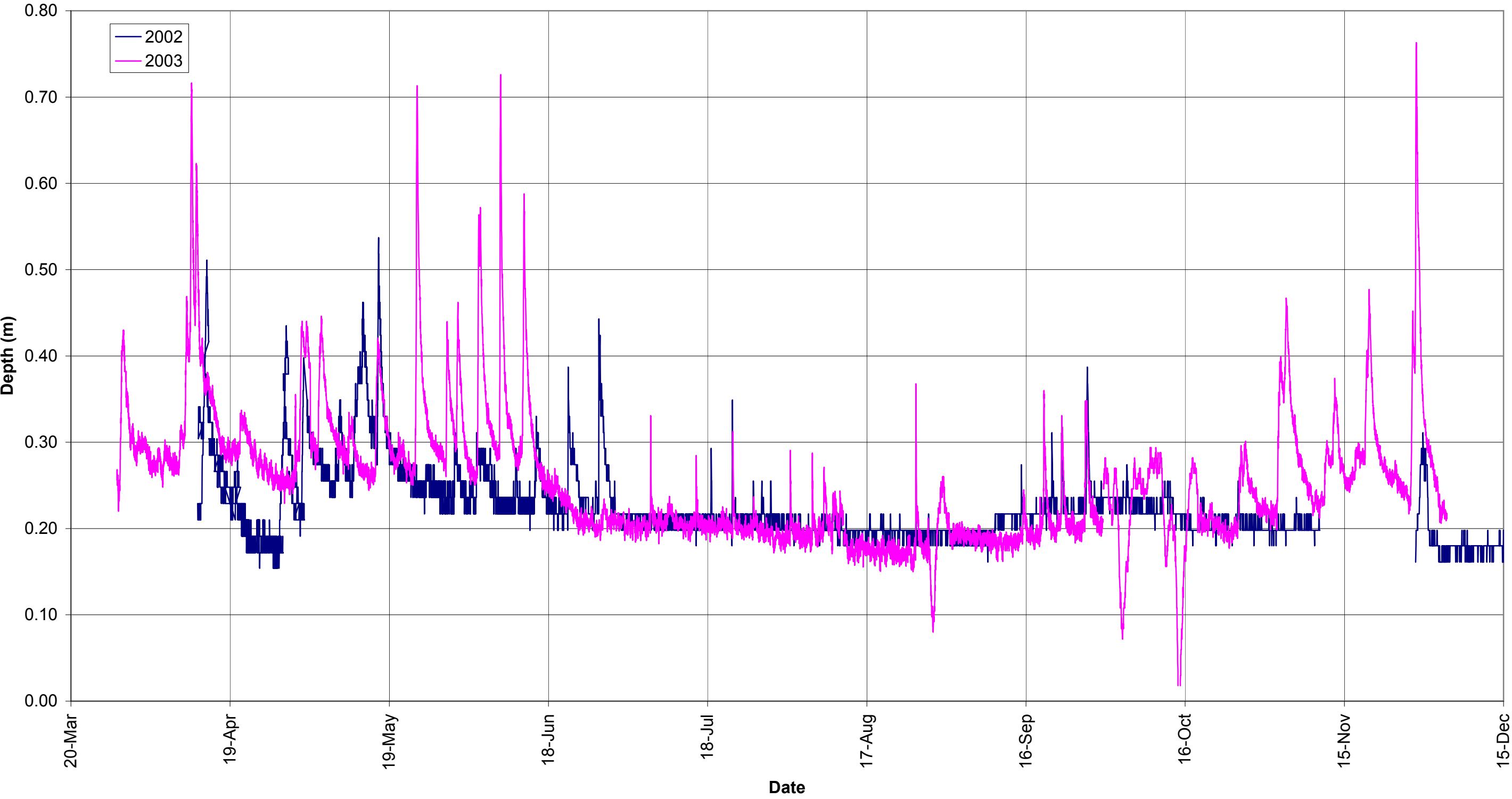
Joshua's Creek
April 16, 2002 - December 4, 2003



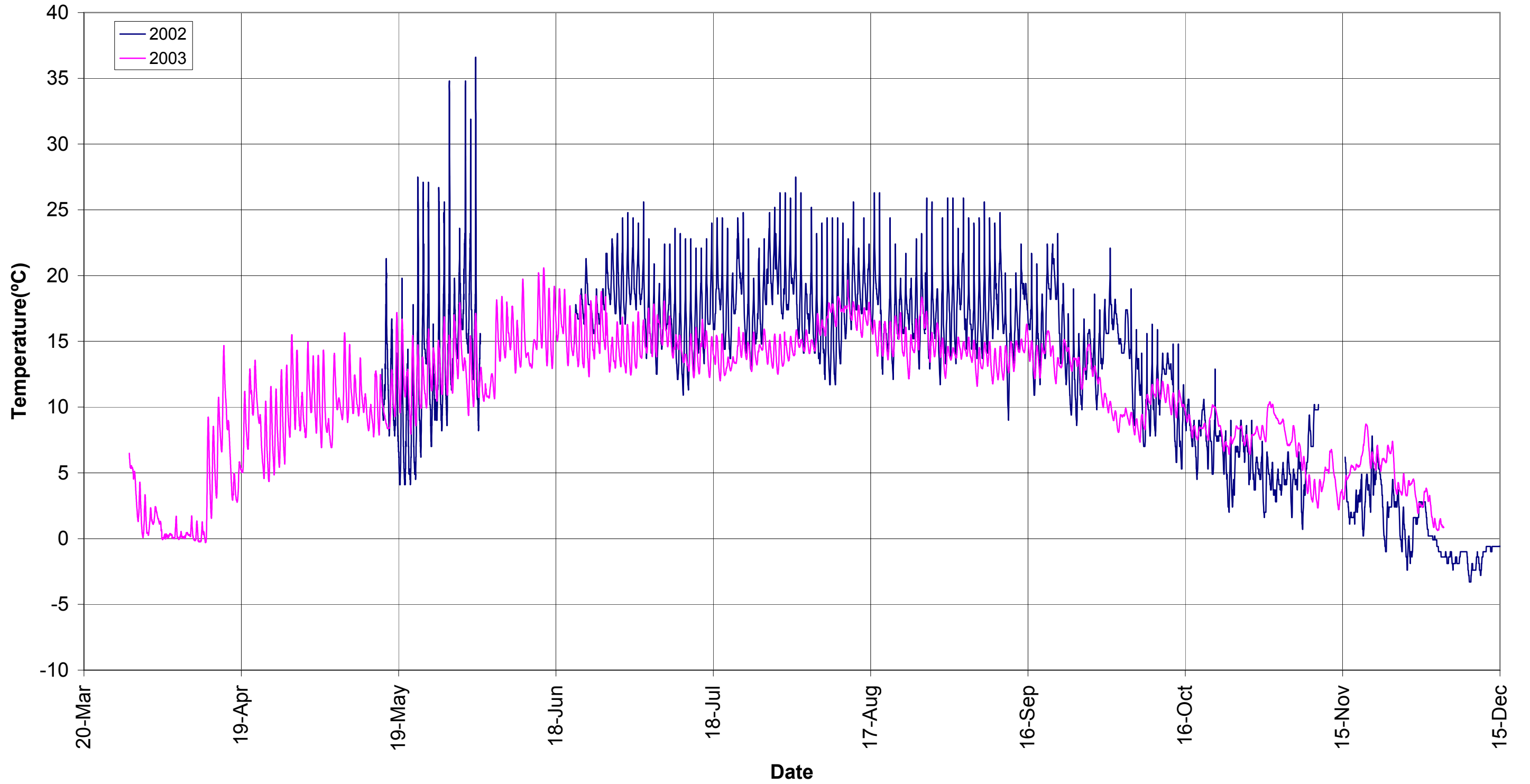
**Joshua's Creek
April 16, 2002 - December 4, 2003**



Morrison Creek
April 12, 2002 - December 4, 2003



Morrison Creek
May 15 2002 - December 4 2003



AQUATIC HABITAT CATEGORIZATION									
SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
JOSHUA'S CREEK	JOSHUA'S CREEK								
JC15	JC-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC10/ JC15	JC-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC10	JC-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC10/ JC9	JC-4	Habitat is very common within the study area	Moderately sensitive to development	Habitat is important but not critical in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC9	JC-5	Habitat is rare within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	Groundwater discharge observed	Has not been modified or degraded (stream in natural state)	Not known to support VTE species or species of concern	Habitat is known to support cold water species	Critical Habitat
JC9	JC-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC9	JC-7	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC9	JC-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC7/ JC9	JC-9	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC7	JC-10	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC7	JC-10A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC8/ JC9	JC-11	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC6/ JC9	JC-12	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC6	JC-13	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC5/ JC6	JC-14	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC1/ JC2/ JC3/ JC5	JC-15	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC10/ JC8B/ JC9	JC-19	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC8B	JC-20	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC7B	JC-20A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat

AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
JC15	JC-22	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC17	JC-27	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC17	JC-27A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC17	JC-28	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC17	JC-29	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC15/ JC16	JC-30	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC16	JC-31	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC16	JC-31A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC16	JC-32	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC17	JC-36	Habitat is common within the study area	Low sensitivity to development	Habitat plays Important role in sustaining fisheries	Groundwater discharge observed	Has not been modified or degraded (stream in natural state)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
EAST MORRISON	EAST MORRISON								
EM1/ EM4	MOC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
EM1	MOC-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
EM1	MOC-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
EM1	MOC-5A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
EM2/ EM3/ EM4	MOC-6	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
WEST MORRISON	WEST MORRISON								
WM1/ WM2	MOC-W1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
WM1	MOC-W2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
WM1	MOC-W3	Habitat is very common within the study area	Low sensitivity to development	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat

AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
WM1	MOC-W5	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
14 MILE CREEK	14 MILE CREEK								
FM1109	14W-1	Habitat is common within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
FM1109	14W-1A	Habitat is common within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
FM1107/ FM1108	14W-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-4	Habitat is very common within the study area	Moderately sensitive to activities	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-9	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-9A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1006/ FM1108	14W-10	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1107	14W-11	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1107	14W-11A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1104/ FM1105	14W-12	Habitat is rare within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
FM1105	14W-13	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1105	14W-14	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1105	14W-14A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1104	14W-16	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1104	14W-17	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1108	14W-18	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat

AQUATIC HABITAT CATEGORIZATION									
SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1109	14W-20								
FM1111	14E-1	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-2A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-3	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-3A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111/ MC1012	14E-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1111	14E-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-7	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1110.1	14E-9	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1110.1	14E-10	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
McCRANEY CREEK	McCRANEY CREEK								
MC1114	MC-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
MC1114	MC-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MC1114	MC-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MC1114	MC-4A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
TAPLOW CREEK	TAPLOW CREEK								
TC1115	TC-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
TC1115	TC-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
TC1115	TC-2A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat

AQUATIC HABITAT CATEGORIZATION									
SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
GLEN OAKS CREEK	GLEN OAKS CREEK								
GO1116	GO-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SHANNON'S CREEK	SHANNON'S CREEK								
SC1	SHC-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
SC1	SHC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
SC1	SHC-3	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
16 MILE CREEK	16 MILE CREEK								
ES5/ ES9	SMA-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES5/ ES8	SMA-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES8	SMA-3	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES7/ ES8	SMA-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES7	SMA-5	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES6/ ES7	SMA-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES5	SMA-7	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES5	SMA-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES5	SMA-9	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
ES4	SMB-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES4	SMB-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES4	SMB-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat

AQUATIC HABITAT CATEGORIZATION									
SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
ES4	SMB-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES3	SMC-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES2/ ES3	SMC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES2	SMC-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES2	SMC-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
ES2	SMC-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16W-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16W-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16W-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16W-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16WA-1A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16WA-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-3	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-6	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-7	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-8	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat

AQUATIC HABITAT CATEGORIZATION									
SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
SM1117	16WA-8A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MUNN'S CREEK	MUNN'S CREEK								
MC2	MUN-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MC1	MUN-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
MC1	MUN-3	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat

Appendix GG - Management Approach and Criteria For Stream Systems

HIGH CONSTRAINT STREAM (RIPARIAN) CORRIDORS (RED)

Approach Required:

- The features in these areas are to be protected and enhanced. No intrusion is permitted except for service crossings at locations that minimize potential impact. Full restoration will be required.
- Width established through following characteristics:
 - Floodplain width
 - Top of valley wall (plus setback for stability)
 - Meander belt width
 - Vegetation feature
 - Fisheries
- Buffer system on all stream corridors to be established through EIR .
- Hydrogeologic study as part of EIR to identify land use and SWM approach to protect / enhance area wide infiltration recharge and groundwater discharge along stream corridor. Specific groundwater discharge areas are to be addressed in the measures identified.
- Erosion areas have been identified. Areas do not currently require mitigation, but should be considered for future work.
- Enhancement opportunities exist and should be included as part of area development including:
 - Removal of ponds or fish barriers as identified in recommendations
 - Stream corridor enhancement as identified in recommendations.
- Flow regime in corridor to be protected through recommended SWM and infiltration approach.

MEDIUM CONSTRAINT LEVEL STREAM (RIPARIAN) CORRIDORS (BLUE)

Approach Required:

The function of these features is to be preserved as discussed above. The stream corridor can be modified (i.e. relocated or invert lowered) if the identified corridor width and function is maintained, subject to agency review and approvals.

The corridor width is identified through the following, where applicable:

- Floodplain width
- Define valley corridor including setback for stability
- Meander belt width
- Coldwater or warmwater fisheries
- In identifying a cross-section for any changes to the secondary streams current stage – storage – discharge conditions should be retained to protect headwater hydrologic function.
- The changes to secondary corridors can include change to location and stream profile with the requirements outlined in this table. In considering changes to the invert elevation, the following approach is required:
 - Any change to invert elevation is to be justified. If required for servicing alternatives are to be developed and evaluated including:
 - roadside ditch drainage
 - roadside ditches with underdrains
 - separate foundation drainage with roadside ditches
- Any changes to the current streams are to consider potential impact to hydrogeologic function. Any change must protect or enhance current recharge / discharge functions.
- Current baseflow conditions are to be protected or enhanced
- Any changes to the current streams are to consider potential impact to hydrogeologic function. Any change must protect or enhance current recharge / discharge functions.
- Any change to a stream corridor must provide a net gain to hydrologic function, (stage/storage) hydrogeologic function (recharge / discharge) and environmental (habitat, water quality).
- Some of the medium constraint streams have been identified where additional flexibility exists through replacement by alternate open drainage systems such as roadside ditches or grassed swales. In this case the meander belt width would not be maintained but open drainage system functions would be maintained. These stream systems are illustrated as blue on **Figure 6.3.16**.

Appendix H: MNR Wetland Classification and ELC

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
1 E	M1-A	0.139	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
2 E	M2	0.038	MAS2-1	Cattail Mineral Shallow Marsh
3 E	M3-A	0.257	MAS2-1	Cattail Mineral Shallow Marsh
3 E	M4-A	0.191	MAM2-10	Forb Mineral Meadow Marsh
4 E	M4-B	0.445	MAM2-9	Jewelweed Mineral Meadow Marsh
5 E	M4-D	0.382	MAM2-10	Forb Mineral Meadow Marsh
5 E	M5-A	0.051	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
5 E	M6-A	0.097	MAS2-1	Cattail Mineral Shallow Marsh
6 E	M8-A	0.244	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
6 E	S1-A	0.247	SWD4-2	White Elm Mineral Deciduous Swamp
6 E	S2-A	0.162	SWD3-1	Red Maple Mineral Deciduous Swamp
6 E	S2-B	0.478	SWD2-2	Green Ash Mineral Deciduous Swamp
6 E	S3-A	0.315	SWD3-3	Swamp Maple Mineral Deciduous Swamp
6 E	S3-B	0.198	SWD3-3	Swamp Maple Mineral Deciduous Swamp
6 E	S3-C	0.278	SWD2-2	Green Ash Mineral Deciduous Swamp
7 E	W7-B	0.036	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
8 E	M9-A	0.054	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
8 E	W7-A	0.039	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
9 E	W7-C	0.035	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
10 E	M10-A	0.011	MAS2-9	Forb Mineral Shallow Marsh
10 E	M10-A	0.097	MAS2-9	Forb Mineral Shallow Marsh
10 E	M10-A	0.110	MAS2-9	Forb Mineral Shallow Marsh
10 E	M11-A	0.053	MAM2-9	Jewelweed Mineral Meadow Marsh
10 E	M3-B	0.037	MAS2-1	Cattail Mineral Shallow Marsh
10 E	M3-B	0.076	MAS2-1	Cattail Mineral Shallow Marsh
10 E	M3-B	0.146	MAS2-1	Cattail Mineral Shallow Marsh
10 E	M4-E	0.079	MAS2-9	Forb Mineral Shallow Marsh
10 E	M6-B	0.103	MAS2-1	Cattail Mineral Shallow Marsh
10 E	S3-D	0.380	SWD3-3	Swamp Maple Mineral Deciduous Swamp
11 E	S2-C	0.203	SWD3-1	Red Maple Mineral Deciduous Swamp
12 E	S21	0.055	SWD4-1	Willow Mineral Deciduous Swamp
12 E	W12-A	0.045	SAS1-1	Pondweed Submerged Shallow Aquatic
13 E	M13-A	0.047	MAS2-1	Cattail Mineral Shallow Marsh
14 E	S2-D	0.320	SWD3-3	Swamp Maple Mineral Deciduous Swamp
15 E	S2-E	2.715	SWD3-3	Swamp Maple Mineral Deciduous Swamp
16 E	M11-B	0.479	MAS2-9	Forb Mineral Shallow Marsh
17 E	M11-B	0.373	MAS2-9	Forb Mineral Shallow Marsh
17 E	M14-A	0.016	MAS2-1	Cattail Mineral Shallow Marsh
17 E	M14-A	0.037	MAS2-1	Cattail Mineral Shallow Marsh
17 E	M14-A	0.053	MAS2-1	Cattail Mineral Shallow Marsh
18 E	M6-A	0.341	MAS2-1	Cattail Mineral Shallow Marsh
19 E	M14-B	0.293	MAS2-1	Cattail Mineral Shallow Marsh
20 E	M15-A	0.214	MAS2-1	Cattail Mineral Shallow Marsh
21 E	M16-A	0.215	MAS2-9	Forb Mineral Shallow Marsh
21 E	M16-B	0.073	MAM2-10	Forb Mineral Meadow Marsh
21 E	M17-A	0.165	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
21 E	M5-B	0.200	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
21 E	M6-A	0.081	MAS2-1	Cattail Mineral Shallow Marsh
21 E	M6-A	0.114	MAS2-1	Cattail Mineral Shallow Marsh
21 E	M6-A	0.154	MAS2-1	Cattail Mineral Shallow Marsh
21 E	M8-B	0.121	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
21 E	M8-B	0.269	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
21 E	M9-B	0.156	MAS2-3	Narrow-leaved Sedge Mineral Shallow Meadow Marsh

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
21 E	S3-E	0.068	SWD3-2	Silver Maple Mineral Deciduous Swamp
21 E	S4-A	0.102	SWD4-2	White Elm Mineral Deciduous Swamp
21 E	S4-A	0.125	SWD4-2	White Elm Mineral Deciduous Swamp
22 E	M4-F	0.016	MAM2-10	Forb Mineral Meadow Marsh
22 E	M8-C	0.027	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
22 E	M8-D	0.105	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
23 E	M18-A	0.254	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
24 E	M26-C	0.655	MAS2-1	Cattail Mineral Shallow Marsh
24 E	M26-C	0.702	MAS2-1	Cattail Mineral Shallow Marsh
24 E	M5-C	0.067	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
25 E	M10-B	0.655	MAS2-9	Forb Mineral Shallow Marsh
25 E	S13-G	0.106		
26 E	M14-C	0.133	MAS2-1	Cattail Mineral Shallow Marsh
26 E	M14-C	0.443	MAS2-1	Cattail Mineral Shallow Marsh
26 E	M14-K	0.080		
26 E	M14-K	0.183		
26 E	M14-K	0.339		<i>no MNR information provided for these wetlands</i>
26 E	M8-Z	0.214		
26 E	S20	0.512		
26 E	S8-B	0.421		
27 E	S5-A	0.099	SWT2-4	Buttonbush Mineral Thicket Swamp
28 E	M20-A	0.043	MAM2-10	Forb Mineral Meadow Marsh
28 E	M20-B	0.056	MAM2-9	Jewelweed Mineral Meadow Marsh
28 E	M5-D	0.056	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
29 E	S6-A	0.139	SWT2-4	Buttonbush Mineral Thicket Swamp
29 E	W7-B	0.023	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
30 E	M20-C	0.034	MAM2-10	Forb Mineral Meadow Marsh
31 E	M5-E	0.051	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
32 E	S7-A	0.081	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
33 E	M6-C	0.071	MAS2-1	Cattail Mineral Shallow Marsh
33 E	W21-A	0.057	SAS1-3	Stonewort Submerged Shallow Aquatic
34 E	M6-C	0.058	MAS2-1	Cattail Mineral Shallow Marsh
35 E	M10-B	0.867		
35 E	M22-A	0.055	MAS2-1	Cattail Mineral Shallow Marsh
35 E	M4-G	0.795	MAM2-10	Forb Mineral Meadow Marsh
35 E	M6-C	0.143	MAS2-1	Cattail Mineral Shallow Marsh
35 E	S21	0.323		
35 E	S8-A	0.400	SWD3-2	Silver Maple Mineral Deciduous Swamp
35 E	W21-B	0.057	SAS1-3	Stonewort Submerged Shallow Aquatic
35 E	W21-B	0.072	SAS1-3	Stonewort Submerged Shallow Aquatic
36 E	M13-B	0.462	MAS2-1	Cattail Mineral Shallow Marsh
36 E	M20-D	0.035	MAM2-10	Forb Mineral Meadow Marsh
36 E	M23	0.171	MAS2-9	Forb Mineral Shallow Marsh
36 E	M5-A	1.778	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
36 E	M5-B	0.541	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
36 E	M6-D	0.039	MAS2-7	Bur-reed Mineral Shallow Marsh
36 E	M8-Z	1.585		
36 E	S11	0.443	SWD3-2	Silver Maple Mineral Deciduous Swamp
36 E	S2-F	0.144	SWD1-2	Bur Oak Mineral Deciduous Swamp
36 E	S2-G	0.248	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
36 E	S2-J	0.192	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
36 E	S2-J	0.823	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
36 E	S3-F	0.163	SWD3-2	Silver Maple Mineral Deciduous Swamp
36 E	S3-F	0.732	SWD3-2	Silver Maple Mineral Deciduous Swamp

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
36 E	S3-G	0.245	SWD3-2	Silver Maple Mineral Deciduous Swamp
36 E	S9	1.724	SWT2-4	Buttonbush Mineral Thicket Swamp
37 E	M19-A	0.200	MAS2-1	Cattail Mineral Shallow Marsh
38 E	S3-M	0.193	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
39 E	S13-A	0.050	SWD4	Mineral Deciduous Swamp
39 E	S5-A	0.255	SWT2-4	Buttonbush Mineral Thicket Swamp
39 E	S8-B	0.112	SWD3-3	Swamp Maple Mineral Deciduous Swamp
40 E	S1-B	0.441	SWD4-2	White Elm Mineral Deciduous Swamp
40 E	S2-K	0.510	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
40 E	S3-H	0.150	SWD3-2	Silver Maple Mineral Deciduous Swamp
40 E	S5-A	0.038	SWT2-4	Buttonbush Mineral Thicket Swamp
41 E	S2-H	0.034	SWD3-2	Silver Maple Mineral Deciduous Swamp
42 E	S13-B	0.451	SWD3-2	Silver Maple Mineral Deciduous Swamp
43 E	M5-A	0.037	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
44 E	M5-A	0.050	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
45 E	M24-A	0.088	MAS2-1	Cattail Mineral Shallow Marsh
46 E	M25-A	0.209	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
47 E	M24-A	0.056	MAS2-1	Cattail Mineral Shallow Marsh
48 E	M3-C	0.031	MAS2-1	Cattail Mineral Shallow Marsh
49 E	M5-E	0.106	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
50 E	M13-A	0.054	MAS2-1	Cattail Mineral Shallow Marsh
51 E	M9-C	0.054	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
52 E	M9-D	0.080	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
53 E	M9-C	0.208	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
54 E	M14-D	0.342	MAS2-1	Cattail Mineral Shallow Marsh
55 E	M15-B	0.506	MAS2-1	Cattail Mineral Shallow Marsh
55 E	W7-B	0.094	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
56 E	M25-B	0.173	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
56 E	M3-C	0.080	MAS2-1	Cattail Mineral Shallow Marsh
56 E	M8-E	0.022	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
57 E	M3-D	0.116	MAS2-1	Cattail Mineral Shallow Marsh
58 E	M26-A	0.136	MAS2-1	Cattail Mineral Shallow Marsh
59 E	M27-A	0.015	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
60 E	M3-E	0.160	MAS2-1	Cattail Mineral Shallow Marsh
60 E	M3-E	0.513	MAS2-1	Cattail Mineral Shallow Marsh
60 E	M6-C	0.760	MAS2-1	Cattail Mineral Shallow Marsh
60 E	S14-A	0.079	SWT2-4	Buttonbush Mineral Thicket Swamp
60 E	S3-I	0.153	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
60 E	S3-J	0.059	SWD4-2	White Elm Mineral Deciduous Swamp
60 E	S3-J	0.108	SWD4-2	White Elm Mineral Deciduous Swamp
61 E	M26-A	0.018	MAS2-1	Cattail Mineral Shallow Marsh
62 E	S15	0.363	MAS2-1	Cattail Mineral Shallow Marsh
63 E	M14-E	0.054	MAS2-1	Cattail Mineral Shallow Marsh
63 E	M18-B	0.111	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
64 E	S6-A	0.042	SWT2-4	Buttonbush Mineral Thicket Swamp
65 E	M6-E	0.075	MAS2-1	Cattail Mineral Shallow Marsh
66 E	M19-B	0.020	MAS2-1	Cattail Mineral Shallow Marsh
66 E	M5-A	0.115	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
66 E	M5-A	0.264	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
67 E	M28	0.015	MAS2-9	Forb Mineral Shallow Marsh
68 E	M13-C	0.094	MAS2-1	Cattail Mineral Shallow Marsh
68 E	M5-F	0.009	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
69 E	M13-C	0.122	MAS2-1	Cattail Mineral Shallow Marsh
70 E	M15-B	0.081	MAS2-1	Cattail Mineral Shallow Marsh

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
71 E	M14-D	0.104	MAS2-1	Cattail Mineral Shallow Marsh
71 E	M8-Y	0.538		
72 E	M3-F	0.153	MAS2-1	Cattail Mineral Shallow Marsh
73 E	M13-D	0.025	MAS2-1	Cattail Mineral Shallow Marsh
73 E	M13-D	0.091	MAS2-1	Cattail Mineral Shallow Marsh
73 E	M8-F	0.039	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
73 E	M8-F	0.045	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
74 E	M19-C	0.049	MAS2-1	Cattail Mineral Shallow Marsh
74 E	M6-C	0.026	MAS2-1	Cattail Mineral Shallow Marsh
74 E	W7-B	0.011	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
74 E	W7-B	0.027	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
75 E	M14-F	0.221	MAS2-1	Cattail Mineral Shallow Marsh
76 E	M14-F	0.251	MAS2-1	Cattail Mineral Shallow Marsh
76 E	M5-A	0.456		
77 E	M9-D	0.108	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
78 E	M9-A	0.048	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
79 E	M29	0.096	MAS2-1	Cattail Mineral Shallow Marsh
79 E	W21-C	0.076	SAS1-1	Pondweed Submerged Shallow Aquatic
80 E	M6-C	0.050	MAS2-1	Cattail Mineral Shallow Marsh
81 E	W30	0.048	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
82 E	M3-H	0.101	MAS2-1	Cattail Mineral Shallow Marsh
83 E	M3-G	0.034	MAS2-1	Cattail Mineral Shallow Marsh
83 E	W12-B	0.023	SAS1-3	Stonewort Submerged Shallow Aquatic
84 E	M14-C	0.071	MAS2-1	Cattail Mineral Shallow Marsh
85 E	M22-B	0.041	MAS2-1	Cattail Mineral Shallow Marsh
85 E	W21-D	0.019	SAS1-1	Pondweed Submerged Shallow Aquatic
86 E	M4-H	0.031	MAM2-10	Forb Mineral Meadow Marsh
87 E	S12	0.019	SWD4-1	Willow Mineral Deciduous Swamp
88 E	M4-I	0.035	MAM2-10	Forb Mineral Meadow Marsh
89 E	M4-J	0.045	MAM2-10	Forb Mineral Meadow Marsh
90 E	M4-K	0.029	MAS2-9	Forb Mineral Shallow Marsh
90 E	M8-G	0.078	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
91 E	M5-A	0.019	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
91 E	S4-B	0.017	SWD4-2	White Elm Mineral Deciduous Swamp
92 E	M31	0.017	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
93 E	M5-E	0.014	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
94 E	M8-H	0.064	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
95 E	M8-I	0.046	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
96 E	M8-J	0.018	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
97 E	M8-K	0.051	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
97 E	M8-L	0.015	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
98 E	M4-L	0.048	MAM2-10	Forb Mineral Meadow Marsh
98 E	M8-M	0.194	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
99 E	M5-E	0.060	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
100 E	S13-C	0.014	SWD4	Mineral Deciduous Swamp
101 E	M5-E	0.030	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
102 E	M8-I	0.023	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
103 E	M14-G	0.045	MAS2-1	Cattail Mineral Shallow Marsh
104 E	M8-N	0.048	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
105 E	M13-A	0.120	MAS2-1	Cattail Mineral Shallow Marsh
105 E	W21-A	0.006	SAS1-3	Stonewort Submerged Shallow Aquatic
105 E	W21-A	0.075	SAS1-3	Stonewort Submerged Shallow Aquatic
106 E	M8-O	0.028	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
107 E	M4-M	0.019	MAM2-10	Forb Mineral Meadow Marsh

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
108 E	S16-A	0.019	SWD3-1	Red Maple Mineral Deciduous Swamp
109 E	M8-P	0.016	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
110 E	M32	0.035	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
111 E	M17-B	0.031	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
112 E	S13-D	0.074	SWD3-1	Red Maple Mineral Deciduous Swamp
113 E	M8-Q	0.035	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
113 E	S16-B	0.032	SWD3-1	Red Maple Mineral Deciduous Swamp
114 E	M33	0.036	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
115 E	S2-I	0.039	SWD3-1	Red Maple Mineral Deciduous Swamp
116 E	S17	0.046	SWT3-7	Winterberry Organic Thicket Swamp
117 E	M5-G	0.022	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
118 E	S18	0.022	SWD3-1	Red Maple Mineral Deciduous Swamp
119 E	S19	0.042	SWD3-1	Red Maple Mineral Deciduous Swamp
120 E	S3-C	0.022	SWD3-1	Red Maple Mineral Deciduous Swamp
121 E	S3-K	0.016	SWD1-2	Bur Oak Mineral Deciduous Swamp
122 E	M34	0.011	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
123 E	S13-E	0.012	SWD2-2	Green Ash Mineral Deciduous Swamp
124 E	S16-C	0.047	SWD3-1	Red Maple Mineral Deciduous Swamp
125 E	S16-D	0.019	SWD3-1	Red Maple Mineral Deciduous Swamp
126 E	M36	0.020	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
126 E	W35	0.006	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
127 E	M5-H	0.067	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
128 E	M14-H	0.134	MAM2-10	Forb Mineral Meadow Marsh
129 E	M4-N	0.075	MAM2-10	Forb Mineral Meadow Marsh
129 E	M4-O	0.031	MAM2-10	Forb Mineral Meadow Marsh
129 E	M5-I	0.009	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
130 E	M5-J	0.026	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
131 E	M5-E	0.009	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
132 E	W21-E	0.118	SAS1-1	Pondweed Submerged Shallow Aquatic
133 E	M26-B	0.034	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
134 E	M10-C	0.022	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
135 E	M6-A	0.018	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
136 E	M5-A	0.030	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
137 E	M4-P	0.018	MAM2-10	Forb Mineral Meadow Marsh
138 E	M8-R	0.017	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
139 E	M13-C	0.020	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
140 E	M22-C	0.044	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
140 E	M37	0.113	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
140 E	M5-A	0.031	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
140 E	S3-L	0.077	SWD4-1	Willow Mineral Deciduous Swamp
141 E	M1-B	0.047	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
141 E	W12-C	0.037	SAS1-3	Stonewort Submerged Shallow Aquatic
142 E	M14-I	0.124	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
142 E	W21-F	0.070	SAS1-3	Stonewort Submerged Shallow Aquatic
143 E	M38	0.058	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
143 E	W7-D	0.029	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
144 E	M8-S	0.038	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
145 E	S13-F	0.005	SWD3-1	Red Maple Mineral Deciduous Swamp
146 E	M8-T	0.019	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
147 E	M39	0.031	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
148 E	M6-F	0.079	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
148 E	W7-B	0.034	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
149 E	W40	0.133	SAM1-2	Duckweed Mixed Shallow Aquatic
150 E	S20	0.152	SWT2-9	Gray Dogwood Mineral Thicket Swamp

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
151 E	M13-A	0.019	MAS2-1	Cattail Mineral Shallow Marsh
151 E	W12-D	0.008	SAS1-1	Pondweed Submerged Shallow Aquatic
152 E	M8-U	0.013	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
153 E	M5-L	0.089	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
153 E	W21-G	0.130	SAS1-3	Stonewort Submerged Shallow Aquatic
154 E	M39	0.083	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
155 E	M4-C	0.033	MAM2-10	Forb Mineral Meadow Marsh
156 E	M6-C	0.051	MAS2-1	Cattail Mineral Shallow Marsh
157 E	M14-J	0.255	MAS2-1	Cattail Mineral Shallow Marsh
158 E	S7-B	0.171		
159 E	M8-X	0.047		
160 E	S7-B	0.025		
161 E	S7-B	0.040		
162 E	M8-M	0.019		
163 E	M5-A	0.150		
164 E	M8-Z	0.250		
164 E	S13-G	0.073		
164 E	W21-D	0.024		
165 E	M14-A	1.349		
166 E	M10-D	0.458		<i>no MNR information provided for these wetlands</i>
167 E	M41	0.252		
167 E	W21-D	0.021		
168 E	M14-A	0.064		
169 E	M14-A	0.041		
170 E	M14-A	0.140		
171 E	M6-B	0.110		
172 E	M6-B	0.036		
173 E	M13-A	0.065		
174 E	M9-C	0.691		
175 E	M5-A	1.006		
176 E	M14-A	0.067		
177 E	M5-A	0.241		
178 E	M5-A	0.184		
179 E	S1-B	0.171		
1 W	M1-A	0.055	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
2 W	M1-A	0.131	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
3 W	M1-B	0.092	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
4 W	M2-A	0.594	MAS2-1	Cattail Mineral Shallow Marsh
4 W	W3-A	0.620	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
5 W	M1-A	0.386	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
5 W	M1-A	0.570	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
5 W	M4-A	0.269	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
6 W	W3-B	0.039	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
7 W	M5-A	0.267	MAS2-1	Cattail Mineral Shallow Marsh
8 W	M6-A	0.045	MAS2-1	Cattail Mineral Shallow Marsh
9 W	M1-C	0.223	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
10 W	M2-B	0.018	MAS2-1	Cattail Mineral Shallow Marsh
10 W	M4-AA	0.103		
10 W	M4-B	0.141	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
11 W	M4-C	0.043	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
12 W	M7-A	0.033	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
13 W	S1-A	0.262	SWD3-1	Red Maple Mineral Deciduous Swamp
14 W	M27	0.026	MAM2-10	Forb Mineral Meadow Marsh
14 W	S8-A	0.009	SWT3-7	Winterberry Organic Thicket Swamp

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
15 W	M8-A	0.006	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
16 W	S3-A	0.088	SWD3-1	Red Maple Mineral Deciduous Swamp
17 W	S4-A	0.024	SWD3-1	Red Maple Mineral Deciduous Swamp
18 W	S4-A	0.025	SWD3-1	Red Maple Mineral Deciduous Swamp
19 W	S5-A	0.036	SWD3-1	Red Maple Mineral Deciduous Swamp
20 W	S3-A	0.012	SWD3-1	Red Maple Mineral Deciduous Swamp
21 W	S3-A	0.056	SWD3-1	Red Maple Mineral Deciduous Swamp
22 W	S5-A	0.007	SWD3-1	Red Maple Mineral Deciduous Swamp
23 W	S5-A	0.008	SWD3-1	Red Maple Mineral Deciduous Swamp
24 W	S5-A	0.011	SWD3-1	Red Maple Mineral Deciduous Swamp
25 W	M1-D	0.015	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
26 W	M1-D	0.037	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
27 W	S1-B	0.017	SWD3-1	Red Maple Mineral Deciduous Swamp
28 W	S1-C	0.028	SWD3-1	Red Maple Mineral Deciduous Swamp
29 W	S1-D	0.034	SWD3-1	Red Maple Mineral Deciduous Swamp
30 W	S3-B	0.019	SWD3-1	Red Maple Mineral Deciduous Swamp
31 W	S6-A	0.107	SWD4	Mineral Deciduous Swamp
32 W	M4-D	0.016	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
33 W	M4-E	0.117	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
34 W	M9-A	0.024	MAS2-1	Cattail Mineral Shallow Marsh
34 W	W3-B	0.022	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
35 W	M9-A	0.141	MAS2-1	Cattail Mineral Shallow Marsh
36 W	S6-B	0.016	SWD3-1	Red Maple Mineral Deciduous Swamp
37 W	S7-A	0.013	SWT2-9	Gray Dogwood Mineral Thicket Swamp
38 W	S1-E	0.041	SWD3-1	Red Maple Mineral Deciduous Swamp
39 W	S4-B	0.024	SWD3-1	Red Maple Mineral Deciduous Swamp
40 W	M9-A	0.012	MAS2-1	Cattail Mineral Shallow Marsh
41 W	M10-A	0.028	MAM2-9	Jewelweed Mineral Meadow Marsh
42 W	W11	0.030	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
43 W	S9-A	0.021	SWD3-1	Red Maple Mineral Deciduous Swamp
44 W	S9-A	0.061	SWD3-1	Red Maple Mineral Deciduous Swamp
45 W	M1-A	0.288	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
46 W	M1-A	0.138	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
46 W	S6-C	0.333	SWD4	Mineral Deciduous Swamp
47 W	M1-D	0.039	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
48 W	S4-D	0.093	SWD3-1	Red Maple Mineral Deciduous Swamp
49 W	S4-D	0.034	SWD3-1	Red Maple Mineral Deciduous Swamp
50 W	S4-E	0.018	SWD3-1	Red Maple Mineral Deciduous Swamp
51 W	M4-F	1.239	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
51 W	S1-F	0.472	SWD3-1	Red Maple Mineral Deciduous Swamp
52 W	M4-G	0.039	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
52 W	S6-D	0.147	SWD3-1	Red Maple Mineral Deciduous Swamp
52 W	S7-B	0.034	SWT3-7	Winterberry Organic Thicket Swamp
53 W	M12-A	0.030	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
54 W	M1-A	1.062	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
55 W	M4-H	0.057	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
55 W	M4-I	0.116	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
55 W	S1-G	0.291	SWD2-1	Black Ash Mineral Deciduous Swamp
56 W	S10-A	0.114	SWD3-3	Swamp Maple Mineral Deciduous Swamp
57 W	S4-C	0.076	SWD4	Mineral Deciduous Swamp
58 W	M14	0.247	MAS2-1	Cattail Mineral Shallow Marsh
58 W	M1-A	0.948	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
59 W	M1-E	0.217	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
60 W	M15-A	0.040	MAS2-1	Cattail Mineral Shallow Marsh

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
60 W	M4-J	0.085	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
61 W	S4-F	0.012	SWD3-1	Red Maple Mineral Deciduous Swamp
62 W	M7-B	0.212	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
62 W	W13-B	0.379	SAS1-3	Stonewort Submerged Shallow Aquatic
63 W	M8-B	0.189	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
64 W	S11	0.027	SWD4-2	White Elm Mineral Deciduous Swamp
65 W	M16	0.089	MAM2-10	Forb Mineral Meadow Marsh
65 W	M4-K	0.165	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
65 W	W3-B	0.568	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
66 W	M4-A	0.066	MAS2-9	Forb Mineral Shallow Marsh
67 W	M12-B	0.027	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
68 W	M1-A	0.418	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
69 W	S12	0.045	SWD4-1	Willow Mineral Deciduous Swamp
70 W	M1-F	0.030	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
71 W	M5-B	0.030	MAS2-1	Cattail Mineral Shallow Marsh
72 W	M17	0.087	MAM2-9	Jewelweed Mineral Meadow Marsh
73 W	M17	0.060	MAM2-9	Jewelweed Mineral Meadow Marsh
74 W	S13-A	0.036	SWT3-7	Winterberry Organic Thicket Swamp
75 W	M4-M	0.037	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
75 W	W3-C	0.007	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
76 W	M18-A	0.048	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
77 W	S3-C	0.022	SWD4-1	Willow Mineral Deciduous Swamp
78 W	M4-N	0.026	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
79 W	M1-G	0.022	MAM2-10	Forb Mineral Meadow Marsh
80 W	M1-L	0.021	MAS3-6	Spike Rush Organic Shallow Marsh
80 W	W3-D	0.018	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
81 W	S13-B	0.023	SWT2-2	Willow Mineral Thicket Swamp
82 W	M1-H	0.011	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
83 W	M20	0.012	MAS2-9	Forb Mineral Shallow Marsh
83 W	S7-C	0.069	SWT2-4	Buttonbush Mineral Thicket Swamp
84 W	S13-C	0.037	SWT2-9	Gray Dogwood Mineral Thicket Swamp
85 W	M21	0.011	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
86 W	M4-O	0.013	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
87 W	M1-I	0.012	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
88 W	S5-B	0.027	SWD4	Mineral Deciduous Swamp
89 W	M1-D	0.027	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
90 W	M1-D	0.028	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
91 W	M1-D	0.018	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
92 W	S13-D	0.028	SWT2-4	Buttonbush Mineral Thicket Swamp
93 W	M4-P	0.041	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
94 W	M22	0.028	MAM2-10	Forb Mineral Meadow Marsh
95 W	M1-J	0.058	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
95 W	S14-A	0.080	SWT2-4	Buttonbush Mineral Thicket Swamp
96 W	M4-Q	0.035	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
97 W	M10-B	0.038	MAM2-10	Forb Mineral Meadow Marsh
98 W	M26-A	0.102	MAM2-10	Forb Mineral Meadow Marsh
99 W	M2-C	0.032	MAS2-1	Cattail Mineral Shallow Marsh
100 W	S10-B	0.032	SWD1-1	Swamp White Oak Mineral Deciduous Swamp
101 W	W19	0.022	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
102 W	M26-B	0.029	MAM2-10	Forb Mineral Meadow Marsh
102 W	M4-R	0.014	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
102 W	S15	0.094	SWD4-2	White Elm Mineral Deciduous Swamp
103 W	M2-D	0.053	MAS2-1	Cattail Mineral Shallow Marsh
104 W	M4-S	0.068	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
105 W	M1-K	0.014	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
105 W	S14-B	0.078	SWT2-9	Gray Dogwood Mineral Thicket Swamp
105 W	S1-H	0.063	SWD4	Mineral Deciduous Swamp
106 W	M4-T	0.029	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
107 W	M18-B	0.025	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
108 W	M4-U	0.027	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
109 W	M9-B	0.046	MAS2-1	Cattail Mineral Shallow Marsh
110 W	M4-V	0.010	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
111 W	S16	0.127	SWT2-4	Buttonbush Mineral Thicket Swamp
112 W	S13-D	0.300	SWT2-9	Gray Dogwood Mineral Thicket Swamp
113 W	S1-I	0.426	SWD1-2	Bur Oak Mineral Deciduous Swamp
113 W	S6-E	0.109	SWD4	Mineral Deciduous Swamp
114 W	S1-I	0.016	SWD1-2	Bur Oak Mineral Deciduous Swamp
115 W	M1-A	0.083	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
115 W	S6-F	0.277	SWD1-2	Bur Oak Mineral Deciduous Swamp
116 W	S1-J	0.426	SWD3-3	Swamp Maple Mineral Deciduous Swamp
117 W	M2-C	0.026	MAS2-1	Cattail Mineral Shallow Marsh
118 W	M4-W	0.031	MAM2-4	Fowl Manna Grass Mineral Meadow Marsh
119 W	M26-C	0.039	MAM2-10	Forb Mineral Meadow Marsh
120 W	M29	0.027	MAS2-8	Rice Cut-grass Mineral Shallow Marsh
121 W	M30	0.022	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
122 W	M31	0.024	MAM2-10	Forb Mineral Meadow Marsh
123 W	W25	0.093	SAF1-3	Duckweed Floating-leaved Shallow Aquatic
124 W	M2-C	0.198	MAS2-1	Cattail Mineral Shallow Marsh
125 W	M5-A	0.135	MAS2-1	Cattail Mineral Shallow Marsh
126 W	M1-D	0.153	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
126 W	M4-X	0.078	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
126 W	M6-B	0.016	MAS2-1	Cattail Mineral Shallow Marsh
126 W	S17-A	0.048	SWD2-2	Green Ash Mineral Deciduous Swamp
126 W	S5-C	0.053	SWD3-1	Red Maple Mineral Deciduous Swamp
127 W	M15-A	0.059	MAS2-1	Cattail Mineral Shallow Marsh
127 W	M32	0.033	MAS2-2	Bulrush Mineral Shallow Marsh
127 W	W13-A	0.026	SAS1-1	Pondweed Submerged Shallow Aquatic
128 W	M15-B	0.223	MAS2-1	Cattail Mineral Shallow Marsh
129 W	M38	0.129		
129 W	M6-C	0.388	MAS2-1	Cattail Mineral Shallow Marsh
130 W	M33	0.075	MAS2-9	Forb Mineral Shallow Marsh
131 W	M12-C	0.141	MAS3-6	Spike Rush Organic Shallow Marsh
131 W	M4-Y	0.043	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
131 W	M4-Y	0.043	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
131 W	M5-C	0.028	MAS2-1	Cattail Mineral Shallow Marsh
131 W	W28	0.484	SAS1-1	Pondweed Submerged Shallow Aquatic
132 W	M6-D	0.027		
132 W	M6-D	0.284	MAS2-1	Cattail Mineral Shallow Marsh
133 W	M34	0.283	MAS2-1	Cattail Mineral Shallow Marsh
134 W	S18	0.038	SWD4-1	Willow Mineral Deciduous Swamp
135 W	M5-D	0.062	MAS2-1	Cattail Mineral Shallow Marsh
136 W	M1-A	0.112	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
136 W	M2-C	0.051	MAS2-1	Cattail Mineral Shallow Marsh
137 W	M2-E	0.299	MAS2-1	Cattail Mineral Shallow Marsh
138 W	M2-E	0.101	MAS2-1	Cattail Mineral Shallow Marsh
139 W	M6-E	0.325	MAS2-1	Cattail Mineral Shallow Marsh
140 W	M10-C	0.150	MAS2-9	Forb Mineral Shallow Marsh
140 W	M9-C	0.263	MAS2-1	Cattail Mineral Shallow Marsh

Wetland #	MNR Map Code	Size (ha)	ELC Code	ELC Name
141 W	M2-F	0.572	MAS2-2	Bulrush Mineral Shallow Marsh
142 W	M6-F	0.311	MAS2-1	Cattail Mineral Shallow Marsh
143 W	S5-D	0.203	SWD3-3	Swamp Maple Mineral Deciduous Swamp
144 W	S1-K	0.443	SWD4-2	White Elm Mineral Deciduous Swamp
145 W	S4-C	0.018	SWD4-2	White Elm Mineral Deciduous Swamp
146 W	S4-C	0.015	SWD4-2	White Elm Mineral Deciduous Swamp
147 W	S3-D	0.023	SWD4-2	White Elm Mineral Deciduous Swamp
148 W	M35	0.054	MAS2-9	Forb Mineral Shallow Marsh
149 W	M26-D	0.859	MAS2-9	Forb Mineral Shallow Marsh
150 W	M15-B	0.076	MAS2-1	Cattail Mineral Shallow Marsh
150 W	M6-G	0.113	MAS2-1	Cattail Mineral Shallow Marsh
151 W	M9-D	0.046	MAS2-1	Cattail Mineral Shallow Marsh
152 W	M4-Z	0.222	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
153 W	S1-L	0.265	SWD3-3	Swamp Maple Mineral Deciduous Swamp
154 W	S1-M	0.040	SWD1-2	Bur Oak Mineral Deciduous Swamp
155 W	S1-L	0.013	SWD3-3	Swamp Maple Mineral Deciduous Swamp
156 W	S8-B	0.059	SWT2-2	Willow Mineral Thicket Swamp
157 W	M5-A	0.039	MAS2-1	Cattail Mineral Shallow Marsh
157 W	S17-B	0.029	SWT2-2	Willow Mineral Thicket Swamp
158 W	M4-L	0.049	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh
159 W	M5-A	0.049	MAS2-1	Cattail Mineral Shallow Marsh
160 W	M5-E	0.045	MAS2-1	Cattail Mineral Shallow Marsh
161 W	M36	0.071	MAS2-1	Cattail Mineral Shallow Marsh
162 W	M37	0.048		
163 W	M4-BB	0.086		
163 W	MM26-E	0.171		
164 W	M1-L	0.028		
164 W	S4-G	0.036		
164 W	W3-B	0.046		
165 W	S5-E	0.050		
166 W	M1-4	0.129		
167 W	M6-H	0.061		
168 W	M6-H	0.060		
169 W	M1-A	0.077		
170 W	M2-E	0.329		
171 W	M2-E	0.485		

no MNR information provided for these wetlands

Sources:

- 1 NRSI 2002-2006
- 2 LGL 2000
- 3 MNR 2003
- 3a Varga 1998, 2002 in MNR 2003
- 3b Goodban 1998, 1999 in MNR 2003
- 3c Crins 1981 in MNR 2003
- 4 Philips Engineering Ltd. 2000
- 5 Stantec et al. 2002
- 6 Geomatics 1993
- 7 SNC-Lavalin Ferrovia 1999
- 8 Ecoplans 1995
- 9 Lamond 1994
- 10 Oldham and Weller 2000
- 11 Dobbyn 1994
- 12 Pourde et al. 1989
- 13 Conservation Halton 2002
- 14 MMM 2003
- 15 Holmes et al. 1991
- 16 Stantec et al. 2004
- 17 Triton Engineering et al. 1992
- 18 Gartner Lee Ltd. 2005
- 19 MMM & LGL 1992

Bird Observations	
X	Observed
CO	Confirmed Breeder
PR	Probable Breeder
PO	Possible Breeder
B	Breeding, evidence level unknown
m	Migrant Bird
sr	Summer Resident
COSEWIC Ranks	
NAR	Not at Risk
DD	Data Deficient
SC	Special Concern
THR	Threatened
END	Endangered
OMNR Ranks	
NIAC	Not in any Category
IND	Indeterminate
VUL	Vulnerable
THR	Threatened
END	Endangered
END-R	Endangered - Regulated (under prov. Endangered Species Act)
Ontario Landbird Conservation Plan	
MC	Maintain Current Population
HD	Halt Decline
RD	Reverse Decline
AS	Assess Status
RE	Recovery
Other Status	
L	Locally Rare in Site District 7E-4
P	Provincially Rare (S1-S3)
h	Locally Rare in the Regional Municipality of Halton
Species of Ecological Sensitivity or Concern	
HD	Moderate to Highly Habitat Dependent
AS	Moderately Area Sensitive Species
f	Sensitive Forest Species
L1 - L4	BSC Conservation Priority Status

APPENDIX E: BIRDS KNOWN FROM THE STUDY AREA AND VICINITY

Status	Ontario Landbird Conservation Plan (Partners in Flight Priority Species)	Species of Ecological Sensitivity or Concern	Ontario Breeding Bird Atlas		NRSI	Christmas Bird Count (Peel-Halton Counties Region)		N Oakville Study Area	Sixteen Mile Creek										Shannon's Creek		Munn's Creek		Morrison Creek																
			1st Atlas (1981-1985)	2nd Atlas (2001-2005)		Count Years 103-105 (2003-2006)	Most Recent Count Data (2005/06)		16 Mile Subwatershed	Hedgerows	Fields, Landscaped Other	Habitat Unit 3	Habitat Unit 4	Habitat Unit 5	Habitat Unit 6	Habitat Unit 7	Habitat Unit 8	Hedgerows	Fields, Landscaped Other	Munn's Subwatershed	Hedgerows	Fields, Landscaped Other	Morrison Subwatershed	Hedgerows	Fields, Landscaped Other	Habitat Unit 10	Habitat Unit 11	Habitat Unit 12											
COSEWIC (National Status)	OMNR (Provincial Status)		Common Name	Scientific Name																																			
NAR	NAC	L1(L3)	Common Loon	<i>Gavia immer</i>	X	X	1(X)																																
NAR	NAC	P	Red-necked Grebe	<i>Podiceps grisescens</i>		X																																	
NAR	NAC	AS	Double-crested Cormorant	<i>Phalacrocorax auritus</i>			1(X)																																
		L1,HD	American Bittern	<i>Botaurus lentiginosus</i>			2(m)																																
			Great Blue Heron	<i>Ardea herodias</i>		X	1(X),2,4,8,5,3,6																																
		L4	Green Heron	<i>Bufoides virescens</i>			1(PO),2(X),5,6(X)																																
		L1	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>			2(m)																																
NAR	IND	P	Trumpeter Swan	<i>Cygnus buccinator</i>		X																																	
			Mute Swan	<i>Cygnus olor</i>		X																																	
			Canada Goose	<i>Branta canadensis</i>		X	1(PR),2,5,13,6,16																																
			Cackling Goose	<i>Branta hutchinsii hutchinsii</i>		X																																	
			Wood Duck	<i>Aix sponsa</i>		X																																	
		L4f	Green-winged Teal	<i>Anas creca</i>		X	1(PR),2(CO),5,3(CO),16																																
		L3	Blue-winged Teal	<i>Anas discors</i>		X	1(PR),2(m),8,5,3,13																																
		L2	Northern Shoveler	<i>Anas platyrhynchos</i>		X																																	
			Gadwall	<i>Anas strepera</i>		X																																	
		L2	American Black Duck	<i>Anas rubripes</i>		X																																	
		L2	Hooded Merganser	<i>Lophodytes cucullatus</i>		X																																	
		L4, f	Common Merganser	<i>Mergus mergamser</i>		X	1(X)																																
		L3	American Goldeneye	<i>Anas americana</i>		X																																	
		AS	Redhead	<i>Aythya americana</i>		X																																	
			Ring-necked Duck	<i>Aythya collaris</i>		X																																	
			Lesser Scaup	<i>Aythya affinis</i>		X																																	
			Greater Scaup	<i>Aythya marila</i>		X																																	
			Harlequin Duck	<i>Histrionicus histrionicus</i>		X																																	
			White-winged Scoter	<i>Melanitta fusca</i>		X																																	
			Long-tailed Duck	<i>Clangula hyemalis</i>		X																																	
			Bufflehead	<i>Bucephala albeola</i>		X																																	
			Common Goldeneye	<i>Bucephala clangula</i>		X																																	
			Red-breasted Merganser	<i>Mergus serrator</i>		X																																	
			Turkey Vulture	<i>Cathartes aura</i>		X	1(X),2(X),8,5,3(X),13,6(X),16																																
		L3,f	Cooper's Hawk	<i>Accipiter cooperii</i>		X	2(B),3																																
NAR	NAC	L3,ASf	Northern Goshawk	<i>Accipiter gentilis</i>		X	2(m)																																
NAR	NAC	L2, f, AS	Sharp-shinned Hawk	<i>Buteo lineatus</i>		X	1(X),2(B),5																																
NAR	NAC	L2,ASf	Red-tailed Hawk	<i>Buteo jamaicensis</i>		X	1(CO),2,4,3,13,6,16																																
NAR	NAC	L2,ASf	Rough-legged Hawk	<i>Buteo lagopus</i>		X	2																																
NAR	SC	MC/AS	Red-shouldered Hawk	<i>Buteo lineatus</i>		X	2(X),6(X)																																
NAR	NAC	L2,AS	Broad-winged Hawk	<i>Circus cyaneus</i>		X	2(m),5																																
NAR	END/R	MC	Northern Harrier	<i>Circus cyaneus</i>		X	1(X)																																
NAR	END/R	RE	Bald Eagle	<i>Haliaeetus leucocephalus</i>		X	6(6f)																																
		L3	Osprey	<i>Pandion haliaetus</i>		X																																	
			Turkey Vulture	<i>Cathartes aura</i>		X	1(X),2(X),8,5,3(X),13,6(X),16																																
		L3,f	Cooper's Hawk	<i>Accipiter cooperii</i>		X	2(B),3																																
NAR	NAC	L3,ASf	Northern Goshawk	<i>Accipiter gentilis</i>		X	2(m)																																
NAR	NAC	L2, f, AS	Sharp-shinned Hawk	<i>Buteo lineatus</i>		X	1(X),2(B),5																																
NAR	NAC	L2,ASf	Red-tailed Hawk	<i>Buteo jamaicensis</i>		X	1(CO),2,4,3,13,6,16																																
NAR	SC	MC/AS	Rough-legged Hawk	<i>Buteo lagopus</i>		X	2																																
NAR	NAC	L2,AS	Broad-winged Hawk	<i>Circus cyaneus</i>		X	2(m),5																																
NAR	END/R	MC	Northern Harrier	<i>Circus cyaneus</i>		X	1(X)																																
NAR	END/R	RE	Bald Eagle	<i>Haliaeetus leucocephalus</i>		X	6(6f)																																
			Turkey Vulture	<i>Cathartes aura</i>		X	1(X),2(X),8,5,3(X),13,6(X),16																																
		L3,f	Cooper's Hawk	<i>Accipiter cooperii</i>																																			

COSEWIC (National Status)	OMNR (Provincial Status)	Other	Ontario Landbird Conservation Plan (Partners in Flight Priority Species)	Species of Ecological Sensitivity or Concern	Scientific Name	Ontario Breeding Bird Atlas		NRSI	Christmas Bird Count (Peel-Halton Counties Region)		Oakville Study Area	Sixteen Mile Creek								Shannon's Creek		Munn's Creek		Morrison Creek																	
						1st Atlas (1981-1985)	2nd Atlas (2001-2005)		Count Years 103-105 (2003-2006)	Most Recent Count Data (2005/06)		16 Mile Subwatershed	Hedgegrows	Fields, Landscaped Other	Habitat Unit 3	Habitat Unit 4	Habitat Unit 5	Habitat Unit 6	Habitat Unit 7	Habitat Unit 8	Shannon's Subwatershed	Hedgegrows	Fields, Landscaped Other	Morrison Subwatershed	Hedgegrows	Fields, Landscaped Other	Habitat Unit 10	Habitat Unit 11	Habitat Unit 12												
	L	MC		L1f	<i>Tennessee Warbler</i>	CO	CO				2,6,5																														
	L			L1f	<i>Blue-winged Warbler</i>	CO	CO				2,6(X)																														
		L1f		L1f	<i>Vermivora pinus</i>	PO	PR			X	1(PO),2(B)																														
		L1f		L1f	<i>Vermivora ruficapilla</i>	PO	PR				2(m),8(m)																														
		RD		L1f	<i>Wilsonia canadensis</i>	PO	PR				2(m),8(m)																														
				L1f	<i>Wilsonia pusilla</i>	PO	PR				1(m),2,5,3																														
				L2 ASf	TANAGERS																																				
					<i>Scarlet Tanager</i>	CO	CO				1(PO),2(X),8(13),5,3(X),8(PO),16																														
					CARDINALS																																				
					<i>Northern Cardinal</i>	CO	CO			X	1(PO),2,4,8,5,3,13,6,16																														
					SUMMER FINCHES																																				
					<i>Indigo Bunting</i>	CO	CO				1(PR),2,4,5,3,6,16																														
					<i>Rose-breasted Grosbeak</i>	CO	CO				1(PO),2,5,3,6,16																														
					<i>Dickcissel</i>	CO	CO				1(PR),2,8,5,6,14,16																														
					SPARROWS																																				
					<i>Ammodramus saviannarum</i>	PR	PO				1(PO),2(m),8(PO)																														
					<i>Grasshopper Sparrow</i>	CO	CO				2																														
					<i>Lapland Longspur</i>	CO	CO				2																														
					<i>Dark-eyed Junco</i>	CO	CO				2,8,5																														
					<i>Swamp Sparrow</i>	CO	CO				2																														
					<i>Lincoln's Sparrow</i>	CO	CO				1(PO),2(X),4,5,3(X)																														
					<i>Song Sparrow</i>	CO	CO				2																														
					<i>Savannah Sparrow</i>	CO	CO				1(CO),2,4,5,3,13,6,14,16																														
					<i>Eastern Towhee</i>	CO	CO				1(CO),2(B),4,5,3(PO),13,6(PO),16																														
					<i>Snow Bunting</i>	CO	CO				1(PR),2(B),5,3(CO),8(CO),16																														
					<i>Vesper Sparrow</i>	CO	CO				2																														
					<i>American Tree Sparrow</i>	CO	CO				1(X),2(B),4,5,16																														
					<i>Sparzella arborea</i>	CO	CO				2																														
					<i>Sparzella pallida</i>	PO	PO				2(B)																														
					<i>Sparzella passerina</i>	CO	CO				1(PO),2,3,16																														
					<i>Sparzella rustula</i>	CO	CO				1(PO),2(B),5,6(CO),16																														
					<i>Zonotrichia albicollis</i>	PO	PO				1(X),2(B),8(15),5,16																														
					<i>Zonotrichia leucophrys</i>	PO	PO				2(B),3(X),5,16																														
					<i>Passerella iliaca</i>	CO	CO				1(X),2,5																														
					BLACKBIRDS																																				
					<i>Red-winged Blackbird</i>	CO	CO				1(CO),2,4,5,3,13,6,16																														
					<i>Bobolink</i>	CO	CO				1(PR),2(X),4,5,3(X),8(PO),16																														
					<i>Euphagus carolinus</i>	CO	CO				2																														
					<i>Molothrus ater</i>	CO	CO				1(PR),2,4,5,3,13,6,16																														
					<i>Brown-headed Cowbird</i>	CO	CO				1(PR),2,5,3,6,16																														
					<i>Common Grackle</i>	CO	CO				1(PO),2,5,3,6,16																														
					<i>Eastern Meadowlark</i>	CO	CO				1(PO),8(PO)																														
					ORIOLES																																				
					<i>Icterus galbula</i>	CO	CO				1(PR),2,4,5,3,6,16																														
					<i>Icterus spurius</i>	CO	CO				2(B),4,																														
					WINTER FINCHES																																				
					<i>Common Redpoll</i>	CO	CO				2																														
					<i>Pine Siskin</i>	CO	CO				2																														
					<i>American Goldfinch</i>	CO	CO				1(CO),2(X),4,5,3(X),6(X),16																														
					<i>House Finch</i>	CO	CO				1(CO),2,5,16																														
					<i>Purple Finch</i>	CO	CO																																		

APPENDIX 13: BREEDING EVIDENCE FOR BIRD SPECIES

Status		Other	Ontario Landbird Conservation Plan (Partners in Flight Priority Species)	Species of Ecological Sensitivity or Concern	Common Name	Scientific Name	NRSI Highest Breeding Evidence
COSEWIC (National Status)	OMNR (Provincial Status)						
NAR	NIAC			L1(L3)	LOONS Common Loon	<i>Gavia immer</i>	X
NAR	NIAC	P			GREBES Red-necked Grebe	<i>Podiceps grisegena</i>	
NAR	NIAC			AS	CORMORANTS Double-crested Cormorant	<i>Phalacrocorax auritus</i>	X
				L1,HD	BITTERNS American Bittern	<i>Botaurus lentiginosus</i>	
					HERONS Great Blue Heron	<i>Ardea herodias</i>	X
				L4	EGRETS Green Heron	<i>Butorides virescens</i>	PO
		P		L1	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	
NAR	IND	P			SWANS Trumpeter Swan Mute Swan	<i>Cygnus buccinator</i> <i>Cygnus olor</i>	
					GEESE Canada Goose Cackling Goose	<i>Branta canadensis</i> <i>Branta hutchinsii hutchinsii</i>	PR
				L4,f	DUCKS Wood Duck	<i>Aix sponsa</i>	FR
				L3	Green-winged Teal Blue-winged Teal	<i>Anas crecca</i> <i>Anas discors</i>	PR
				L2	Northern Shoveler Gadwall	<i>Anas clypeata</i> <i>Anas strepera</i>	
				L2	Mallard American Black Duck	<i>Anas platyrhynchos</i> <i>Anas rubripes</i>	CO
				L4, f	Hooded Merganser Common Merganser	<i>Lophodytes cucullatus</i> <i>Mergus merganser</i>	X
		P		L3	American Wigeon Northern Pintail	<i>Anas americana</i> <i>Anas acuta</i>	
		P		AS	Redhead	<i>Aythya americana</i>	
		P			Ring-necked Duck Lesser Scaup	<i>Aythya collaris</i> <i>Aythya affinis</i>	
		P			Greater Scaup Harlequin Duck	<i>Aythya marila</i> <i>Histrionicus histrionicus</i>	
		P			White-winged Scoter	<i>Melanitta fusca</i>	
		P			Long-tailed Duck	<i>Clangula hyemalis</i>	
		P			Bufflehead	<i>Bucephala albeola</i>	
					Common Goldeneye Red-breasted Merganser	<i>Bucephala clangula</i> <i>Mergus serrator</i>	
				L	VULTURES Turkey Vulture	<i>Cathartes aura</i>	X
NAR	NIAC	L,h		L3,AS,f	HAWKS AND EAGLES Ring-necked Hawk	<i>Accipiter cooperii</i>	PR
NAR	NIAC	L		L2, f, AS	Northern Goshawk	<i>Accipiter gentilis</i>	
NAR	NIAC	L		L2,AS,f	Sharp-shinned Hawk	<i>Accipiter striatus</i>	X
NAR	NIAC	P			Red-tailed Hawk	<i>Buteo jamaicensis</i>	CO
NAR	SC	L,h	MC / AS	L1,AS,f	Rough-legged Hawk Red-shouldered Hawk	<i>Buteo lagopus</i> <i>Buteo lineatus</i>	
NAR	NIAC		MC	L2,f,AS	Broad-winged Hawk	<i>Buteo platypterus</i>	PO
NAR	END-R		RE	AS	Northern Harrier	<i>Circus cyaneus</i>	X
				L3	Bald Eagle Osprey	<i>Haliaeetus leucocephalus</i> <i>Pandion haliaetus</i>	
NAR	NIAC		HD	L2	FALCONS Merlin American Kestrel	<i>Falco columbarius</i> <i>Falco sparverius</i>	X PO
THR	END	P	RE		Peregrine Falcon	<i>Falco peregrinus anatum</i>	
					PHEASANTS Ring-necked Pheasant	<i>Phasianus colchicus</i>	
				L	GROUSE Ruffed Grouse Wild Turkey	<i>Bonasa umbellus</i> <i>Meleagris gallopavo</i>	
				L1	RAILS Sora	<i>Porzana carolina</i>	PR
				L1	Virginia Rail	<i>Rallus limicola</i>	
				L4	Common Moorhen	<i>Gallinula chloropus</i>	
NAR	NIAC			L1	American Coot	<i>Fulica americana</i>	
					CRANES Sandhill Crane	<i>Grus canadensis</i>	m
				L3	PLOVERS Spotted Sandpiper Ruddy Turnstone	<i>Actitis macularia</i> <i>Arenaria interpres</i>	PO
		P		L2	Upland Sandpiper Sill Sandpiper	<i>Bartramia longicauda</i> <i>Callidris himantopus</i>	
		P			Least Sandpiper Semipalmated Sandpiper	<i>Callidris minutilla</i> <i>Callidris pusilla</i>	
					Willet Semipalmated Plover	<i>Catoptrophorus semipalmatus</i> <i>Charadrius semipalmatus</i>	
				L2	Killdeer Wilson's Snipe	<i>Charadrius vociferus</i> <i>Gallinago gallinago</i>	CO X
		P			Marbled Godwit Black-bellied Plover	<i>Limosa fedora</i> <i>Pluvialis squatarola</i>	
				L4	American Woodcock Lesser Yellowlegs Greater Yellowlegs Solitary Sandpiper	<i>Scolopax minor</i> <i>Tringa flavipes</i> <i>Tringa melanoleuca</i> <i>Tringa solitaria</i>	CO
					GULLS Herring Gull Ring-billed Gull Little Gull	<i>Larus argentatus</i> <i>Larus delawarensis</i> <i>Larus minutus</i>	X X X

APPENDIX 13: BREEDING EVIDENCE FOR BIRD SPECIES

COSEWIC (National Status)	OMNR (Provincial Status)	Other	Ontario Landbird Conservation Plan (Partners in Flight Priority Species)	Species of Ecological Sensitivity or Concern	Common Name	Scientific Name	NRSI	
								Status
		P			Glaucous Gull	<i>Larus hyperboreus</i>		
					Greater Black-backed Gull	<i>Larus marinus</i>		
					TERNs			
NAR	NIAC			L4	Common Tern	<i>Sterna hirundo</i>		
NAR	VUL	P		L1	Black Tern	<i>Chlidonias niger</i>		
NAR	NIAC	P			Caspian Tern	<i>Sterna caspia</i>		
					DOVES			
					Rock Pigeon	<i>Columba livia</i>	PR	
					Mourning Dove	<i>Zenaidura macroura</i>	PR	
					CUCKOOS			
				L3	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>		
			RD	L2,f	Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>		
					OWLS			
				L1, f, AS	Northern Saw-Whet Owl	<i>Aegolius acadicus</i>		
NIAC	IND				Boreal Owl	<i>Aegolius funereus</i>		
				L1, f	Long-Eared Owl	<i>Asio otus</i>		
					Great Horned Owl	<i>Bubo virginianus</i>	CO	
NAR	NIAC				Eastern Screech Owl	<i>Otus asio</i>		
					GOATSUCKERS			
				L1	Common Nighthawk	<i>Chordeiles minor</i>		
				RD	Whip-poor-will	<i>Caprimulgus vociferus</i>		
					SWIFTS			
				RD	Chimney Swift	<i>Chaetura pelagica</i>		
					HUMMINGBIRDS			
				L3,f	Ruby-throated Hummingbird	<i>Archilochus colubris</i>	PO	
					KINGFISHERS			
				RD	Belted Kingfisher	<i>Ceryle alcyon</i>		
					WOODPECKERS			
				RD	Northern Flicker	<i>Colaptes auratus</i>	CO	
				L2,AS,f	Pileated Woodpecker	<i>Dryocopus pileatus</i>	X	
				L3, f	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>		
SC	VUL	P	RD	L1	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	X	
					Downy Woodpecker	<i>Picoides pubescens</i>	PR	
					Hairy Woodpecker	<i>Picoides villosus</i>	PO	
				L2,f	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>		
					FLYCATCHERS			
				RD	Eastern Wood Pewee	<i>Contopus virens</i>	CO	
				L3,f	Alder Flycatcher	<i>Empidonax alnorum</i>	PO	
				f	Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>		
					Least Flycatcher	<i>Empidonax minimus</i>	PO	
				MC	Willow Flycatcher	<i>Empidonax traillii</i>	PO	
END		P	RE	L1, f	Acadian Flycatcher	<i>Empidonax virescens</i>		
					Great Crested Flycatcher	<i>Myiarchus crinitus</i>	PO	
				L3,f	Eastern Phoebe	<i>Sayornis phoebe</i>	CO	
			HD	L3	Eastern Kingbird	<i>Tyrannus tyrannus</i>	CO	
					LARKS			
				L3	Horned Lark	<i>Eremophila alpestris</i>	PO	
					SWALLOWS			
				L3	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	X	
				L4	Barn Swallow	<i>Hirundo rustica</i>	PO	
				L2	Purple Martin	<i>Progne subis</i>		
				RD	Bank Swallow	<i>Riparia riparia</i>	X	
				L2	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	X	
					Tree Swallow	<i>Tachycineta bicolor</i>	PO	
					JAYS			
					Blue Jay	<i>Cyanocitta cristata</i>	PR	
					CROWS			
					American Crow	<i>Corvus brachyrhynchos</i>	PO	
					CHICKADEES			
				L4	Black-capped Chickadee	<i>Poecile atricapillus</i>	PR	
		P		L3	Tufted Titmouse	<i>Baeolophus bicolor</i>		
					NUTHATCHES			
				L3, f	Red-breasted Nuthatch	<i>Sitta canadensis</i>	PO	
					White-breasted Nuthatch	<i>Sitta carolinensis</i>	PO	
					CREEPERS			
				L	L2,f	Brown Creeper	<i>Certhia americana</i>	X
					WRENS			
				P	L3	Carolina Wren	<i>Thryothorus ludovicianus</i>	
					L3	Marsh Wren	<i>Cistothorus palustris</i>	
NAR	NIAC			L2	Sedge Wren	<i>Cistothorus platensis</i>	X	
					House Wren	<i>Troglodytes aedon</i>	PR	
				L3, f	Winter Wren	<i>Troglodytes troglodytes</i>	PO	
					KINGLETS			
				L4,f	Ruby-crowned Kinglet	<i>Regulus satrapa</i>		
				L2,f	Golden-crowned Kinglet	<i>Regulus satrapa</i>	PO	
					GNATCATCHERS			
				L	L3	Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	
					THRUSHES			
				L3,HD,f	Veery	<i>Catharus fuscescens</i>	PO	
				f	Hermit Thrush	<i>Catharus guttatus</i>		
		P			Gray-cheeked Thrush	<i>Catharus minimus</i>		
				f	Swainson's Thrush	<i>Catharus ustulatus</i>		
			MC	L4,f	Wood Thrush	<i>Hylocichla ustulata</i>	PR	
NAR	NIAC	L,h		L1	Eastern Bluebird	<i>Sialia sialis</i>		
					American Robin	<i>Turdus migratorius</i>	CO	
					MIMICS			

APPENDIX 13: BREEDING EVIDENCE FOR BIRD SPECIES

COSEWIC (National Status)	Status	OMNR (Provincial Status)	Other	Ontario Landbird Conservation Plan (Partners in Flight Priority Species)	Species of Ecological Sensitivity or Concern	Common Name		Scientific Name		NRSI	NRSI Highest Breeding Evidence
			L		L4	Gray Catbird		<i>Dumetella carolinensis</i>			PO
					L1	Northern Mockingbird		<i>Mimus polyglottos</i>			PO
				RD	L1	Brown Thrasher		<i>Toxostoma rufum</i>			PR
						PIPITS					
						American Pipit		<i>Anthus rubescens</i>			
						WAXWINGS					
						Cedar Waxwing		<i>Bombicilla cedrorum</i>			PO
						SHRIKES					
			P			Northern Shrike		<i>Lanius excubitor</i>			
						STARLINGS					
						European Starling		<i>Sturnus vulgaris</i>			CO
						VIREOS					
					L4	Yellow-throated Vireo		<i>Vireo flavifrons</i>			
						Warbling Vireo		<i>Vireo gilvus</i>			X
						Red-eyed Vireo		<i>Vireo olivaceus</i>			PR
						Philadelphia Vireo		<i>Vireo philadelphicus</i>			PO
					L3	Blue-headed Vireo		<i>Vireo solitarius</i>			
						WOOD WARBLERS					
					f	Black-throated Blue Warbler		<i>Dendroica caerulescens</i>			PO
						Bay-breasted Warbler		<i>Dendroica castanea</i>			X
SC	VUL		L,H,P	AS	L1	Cerulean Warbler		<i>Dendroica cerulea</i>			
					L4, f	Yellow-rumped (Myrtle) Warbler		<i>Dendroica coronata</i>			PO
						Yellow-throated Warbler		<i>Dendroica dominica</i>			
					L1,f,HD	Blackburnian Warbler		<i>Dendroica fusca</i>			
					L1, f	Magnolia Warbler		<i>Dendroica magna</i>			X
						Palm Warbler		<i>Dendroica palmarum</i>			
					L1,f	Chestnut-sided Warbler		<i>Dendroica pensylvanica</i>			PO
						Yellow Warbler		<i>Dendroica petechia</i>			CO
			L		L2,AS,f	Pine Warbler		<i>Dendroica pinus</i>			
						Blackpoll Warbler		<i>Dendroica striata</i>			
						Cape May Warbler		<i>Dendroica tigrina</i>			
			L		L1,f	Black-throated Green Warbler		<i>Dendroica virens</i>			PO
						Common Yellowthroat		<i>Geothlypis trichas</i>			PR
THR			P	RE	L1,AS,f	Hooded Warbler		<i>Wilsonia citrina</i>			
SC	VUL		P	RD / AS	L1	Yellow-breasted Chat		<i>Icteria virens</i>			
			L		L3,AS,f	Black-and-white Warbler		<i>Mniotilta varia</i>			PR
						Cornelious Warbler		<i>Oporornis agilis</i>			
					L2,f	Mourning Warbler		<i>Oporornis philadelphia</i>			
					AS	Northern Parula		<i>Parula americana</i>			
					L4,AS,f	Ovenbird		<i>Seiurus aurocapillus</i>			PO
					L2,f	Northern Waterthrush		<i>Seiurus noveboracensis</i>			
					L2,f	American Redstart		<i>Setophaga ruticilla</i>			PO
						Orange-crowned Warbler		<i>Vermivora celata</i>			
				MC	L1,f	Golden-winged Warbler		<i>Vermivora chrysoptera</i>			
						Tennessee Warbler		<i>Vermivora peregrina</i>			
			L	MC	L1,f	Blue-winged Warbler		<i>Vermivora pinus</i>			
			L		L1,f	Nashville Warbler		<i>Vermivora ruficapilla</i>			PO
				RD	L1,f	Canada Warbler		<i>Wilsonia canadensis</i>			
						Wilson's Warbler		<i>Wilsonia pusilla</i>			m
						TANAGERS					
					L2,AS,f	Scarlet Tanager		<i>Piranga olivacea</i>			PO
						CARDINALS					
						Northern Cardinal		<i>Cardinalis cardinalis</i>			PR
						SUMMER FINCHES					
						Indigo Bunting		<i>Passerina cyanea</i>			PR
				MC		Rose-breasted Grosbeak		<i>Pheucticus ludovicianus</i>			PR
						Dickcissel		<i>Spiza americana</i>			
						SPARROWS					
			L	HD	L3	Grasshopper Sparrow		<i>Ammodramus saviannarum</i>			PO
						Lapland Longspur		<i>Calcarius lapponicus</i>			
					f	Dark-eyed Junco		<i>Junco hyemalis</i>			
					L2	Swamp Sparrow		<i>Melospiza georgiana</i>			PO
						Lincoln's Sparrow		<i>Melospiza lincolni</i>			
						Song Sparrow		<i>Melospiza melodia</i>			CO
				HD	L1	Savannah Sparrow		<i>Passerculus sandwichensis</i>			CO
				RD	L2,f	Eastern Towhee		<i>Pipilo erythrophthalmus</i>			PR
						Snow Bunting		<i>Plectrophenax nivalis</i>			
				HD	L3	Vesper Sparrow		<i>Pooecetes gramineus</i>			X
						American Tree Sparrow		<i>Spizella arborea</i>			
			L		L1	Clay-colored Sparrow		<i>Spizella pallida</i>			
						Chipping Sparrow		<i>Spizella passerina</i>			PR
				RD	L3	Field Sparrow		<i>Spizella pusilla</i>			PR
					L2,f	White-throated Sparrow		<i>Zonotrichia albicollis</i>			X
						White-crowned Sparrow		<i>Zonotrichia leucophrys</i>			X
						Fox Sparrow		<i>Passerella iliaca</i>			
						BLACKBIRDS					
						Red-winged Blackbird		<i>Agelaius phoeniceus</i>			CO
				HD	L2	Bobolink		<i>Dolichonyx oryzivorus</i>			PR
						Rusty Blackbird		<i>Euphagus carolinus</i>			
						Brown-headed Cowbird		<i>Molothrus ater</i>			PR
						Common Grackle		<i>Quiscalus quiscula</i>			PR
				HD	L3	Eastern Meadowlark		<i>Sturnella magna</i>			PR
						ORIOLES					
				RD		Baltimore Oriole		<i>Icterus galbula</i>			PR
			h		L3	Orchard Oriole		<i>Icterus spurius</i>			
						WINTER FINCHES					
						Common Redpoll		<i>Carduelis flammula</i>			
						Pine Siskin		<i>Carduelis pinus</i>			
				L3		American Goldfinch		<i>Carduelis tristis</i>			CO
						House Finch		<i>Carpodacus mexicanus</i>			CO
					L2,f	Purple Finch		<i>Carpodacus purpureus</i>			
					L4, f	Red Crossbill		<i>Loxia curvirostra</i>			
						WEAVERS/FINCHES					
						House Sparrow		<i>Passer domesticus</i>			PO

**EROSION & SEDIMENTATION
SAMPLE WEEKLY INSPECTION REPORT**

Job No:
Report No:
Date:
Inspector:

Project Name:

Inspection Conducted:

Prior to forcasted rainfall event
During rainfall event
After rainfall event

Erosion Control Structures

Overall Performance: Unacceptable Poor Good Excellent

Specific Areas of Concern/Comments:

Action Required: Yes No

If yes, please stipulate:

Evidence of Sediment Accumulation

Sedimentation > 60% full Yes No

Specific Areas of Concern/Comments:

Action Required: Yes No

If yes, please stipulate:

Downstream Natural Area

Overall Performance: Unacceptable Poor Good Excellent

Evidence of Sediment Deposition: Yes No

If yes, please specify:

Action Required: Yes No

Specific Areas of Concern/Comments:

LIST OF MAMMALS KNOWN FROM THE NORTH OAKVILLE SUBWATERSHED STUDY AREA

Status/Rank	Common Name	Scientific Name	Atlas	N Oakville Study Area	16 Mile Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 3	Habitat Unit 4	Habitat Unit 5	Habitat Unit 6	Habitat Unit 7	Habitat Unit 8	Shannon's Subwatershed	Hedgerows Fields, Landscaped, Other	Munn's Subwatershed	Hedgerows Fields, Landscaped, Other	Morrison Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 10	Habitat Unit 11	Habitat Unit 12	Habitat Unit 13	Habitat Unit 14	Habitat Unit 17	Joshua's Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 9	Habitat Unit 15	Habitat Unit 16	Habitat Unit 18	Habitat Unit 19	Habitat Unit 20	Habitat Unit 5	Habitat Unit 22	Fourteen Mile Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 1	Habitat Unit 2	McCraney Creek	Taplow Creek	Glen Oaks Creek				
	?	Northern Short-tailed Shrew	11	2,5	2	2	2																																						
	1	Coyote	11	1,2,5,3	1,2,3	1	1	2																																					
	3	Beaver	11	2	2		2																																						
	5	Star-nosed Mole	11	2	2																																								
	1	Virginia Opossum	11	1,2,5,3	1,2,5,3	1	2,5																																						
	1	Big Brown Bat	11	2,5	2		2																																						
	AS	2 Porcupine	11																																										
		1 Silver-haired Bat	11	2	2		2																																						
		1 Eastern Red Bat	11	2	2		2																																						
		1 Hoary Bat	11	2	2		2																																						
		3 European Hare	11	2	2																																								
		2 Woodchuck	11	1,2,5,3	1,2	1	1	2	1	1	1	1,2	1	1	1	1	1	1	1	1	1	1	1	1,2	1	1	1																		
		1 Striped Skunk	11	1,2,4,5	1,2,5	1	1	1,2,5	1	1	1,2	1	2	1	1	1	1,2,5	1	1	1,2	2	2	1	1,2	1	1,2																			
		2 Meadow Vole	11	1,2,5	1,2,5	1	1	2,5	1	1	2	1,2	1	1	1	1	1,2,5	1	1,2	1,2	1,2	1,2	1,2	1	1,2	1	1,2																		
		1 House Mouse	11	2,5													2,5			2				2		2																			
		2 Ermine	11	2	2		2																																						
		2 Long-tailed Weasel	11	2	2		2																																						
		2 Mink	11	2,5	2,5		2,5																																						
		1 Little Brown Bat	11	5																																									
	P?*	1 Northern Long-eared Bat	11																																										
		1 White-tailed Deer	11	1,2,4,5,3,6	1,2,5,3,6	1	1	1,2,5,6	1	1,3	1,2	1	1,2,3	1	1	1	1,2,5,3	1		1,2,3	1,2,3	1,2,3	1,2,3	1,2		1,2,3	1	1	1,2,3	1	1,2,3	1,2	1,2												
		3 Muskrat	11	1,2,5,3,13	1,2												5																												
		2 White-footed Mouse	11	1,2	2		2																																						
		2 Deer Mouse	11	1	1																																								
		1 Raccoon	11	1,2,4,5,3,14	1,2,5,3	1	1	2,5	1	1	2	1,2	1	1	1	1	1,2,5	1	1	1,2	1	1	1,2	1	1,2	1	1	1,2																	
		1 Norway Rat	11	2,5																																									
		2 Gray Squirrel	11	1,2,5,3,14	1,2,5,3	1	1	1,2,5	1	1	1,2	1	1,2	1	1	1	1,2,5	1		1,2		1,2	1,2	1,2	1	1,2																			
		3 Masked Shrew	11	2,5	2		2										2								2																				
		3 Smoky Shrew	11	2	2		2										2																												
		3 Pigmy Shrew	11																																										
		2 Eastern Cottontail	11	1,2,5	1,2,5	1	1	2,5	1	1	2	1,2	1	1	1	1	1,2,5	1	1	1,2	1,2	1,2	1,2	2		1,2	1	1	1,2																
		2 Eastern Chipmunk	11	1,2,5,3,14	2,5,3		2,5			2		2					1,2			1,2		1,2			1	1,2	1																		
		2 Red Squirrel	11	1,2,14	2		2																																						
		1 Red Fox	11	1,2,5,6	1,2,5,6	1	1	2,5,6	1			1,2	1	1			1,2	1		1,2		1,2	1,2	1	1,2	1																			
		3 Meadow Jumping Mouse	11	2,5	2		2										2								2																				

* P? Currently identified as S3? based on NHIC Website
AS described by TRCA (2003) as a moderately area sensitive species

Sources:
1 NRSI 2002-4 7 SNC-Lavalin Ferroviol 1999
2 LGL 2000 8 Ecoplans 1995
3 MNR 2003 9 Lamond 1994
3a Varga 1998, 2002 in MNR 2003 10 MNR 2000
3b Goodban 1998, 1999 in MNR 2003 11 Dobbyn 1994
3c Crins 1981 in MNR 2003 12 MNR 1989
4 Phillips Engineering Ltd. 2000 13 Conservation Halton 2002
5 Stantec et al., 2002 14 MMM 2003
6 Geomatics 1993 15 Holmes et al 1991

Appendix JJ

Environmental Implementation Report – Contents

General

The Environmental Implementation Report (EIR) is to provide the link between the Management Strategy developed in the Subwatershed Study and Draft Plan submissions. The EIR must demonstrate how the submissions conform to the overall Management Strategy. As well, the EIR should be developed in the context of the Secondary Plan and conform to the planning policy requirement set out.

This Appendix provides an outline of the scope of the EIR and a summary of the content.

As indicated in **Section 7.4.1.2** and illustrated in **Figure 7.4.2**, EIR reports should be developed for the areas denoted. This enables the development of an approach that meets the specific requirements of a specified area with regard to local terrestrial and aquatic conditions from a land use and servicing requirements. It also reduces the chance of the development of one area placing undue environmental protection and/or stormwater management requirements on adjacent properties.

EIR Content Requirements

- **Introduction** – Overview of goals, objectives and targets to be met as outlined in Management Strategy.

- **Background** – Description of study area covered in EIR in the context of North Oakville:
 - Streams
 - Linkages
 - Geology and Hydrogeology
 - Topographical depressions, hydrologic features

- **Site Specific Investigation of Features**
 - Investigate and summarize existing features and characteristics (site investigation): terrestrial, geological, hydrological, and hydrogeological
 - Refine stream buffer requirements as based upon Management Strategy
 - Refine management approach as identifies in management strategy
 - Identify any potential for inclusion of SWM facility (where applicable)
 - Identify specific areas (geological and hydrogeological) for protection and preservation
 - Locate and survey boundaries of the Cores

- **Carry out hydrologic analysis**
 - Confirm pre-development conditions
 - Develop post-development modeling (hydrologic)
 - identify SWM quantity requirements (post development to targets)

- **Carry out hydraulic analysis**

- Refine hydraulic model to reflect more detailed mapping
- Floodlines to be updated and reviewed/approved by Conservation Halton

- **Fluvial geomorphology**
 - Field work and analysis to refine meander belt
 - Develop corridor width based upon **Section 7.4.3.1** and **Figure 6.3.15a, 6.3.15b**

- **Hydrology and Hydrogeology**
 - Field work to identify and further characterize groundwater discharge (to surface water) locations
 - Identify and characterize areas of recharge within study area including stream corridors
 - Refine recharge targets for water balance as discussed in **Section 2.4.4.2**
 - Identify any protection area along stream corridors for recharge/discharge function protection
 - Identify opportunities and means of maintaining water balance (recharge)
 - Identify monitoring locations and develop monitoring plan in context of north Oakville monitoring strategy

- **Riparian corridor refinement**
 - Map corridor along stream to include:
 - Refined floodlines (Regional or 1:100yr)
 - Geomorphologic corridor as per **Figure 6.3.15a**
 - Environmental setback as outlined in **Section 7.4.3.2**
 - Hydrogeologic protection areas as discussed in this appendix
 - Finalize corridor based upon the greatest of those listed in this section

- **Linkages**
 - Refine and delineate linkages in accordance with Management Strategy

- **Develop the approach needed for Stormwater Management to meet the targets set in the Management Strategy**
 - Identify requirements for peak flow control
 - Develop water quality control approach as outlined in **Section 6** of the report.
 - Develop an approach for recharge in accordance with discussion in **Section 7.4.4.2**

- **Drainage and SWM Plan**
 - The overall approach to drainage and SWM is to be described in a Drainage and SWM description and illustrative plan developed.

- **Stream Rehabilitation**
 - Riparian corridor enhancement and/or stream enhancement to be outlined
 - Ensure that identified streams are included (red hatched) see **Figure 6.3.13**

- **Road Crossings**
 - Conceptual plans to be provided for any service crossings (road, sanitary water) to demonstrate environmental feature protection and enhancement
 - This is to include cores, corridors and streams

- **Watercourse relocation or deepening (Blue Streams)**
 - Provide a functional design for any stream relocation or deepening to demonstrate that it provides (and enhances) the function of the existing stream corridor.
 - Work is to be carried out to meet the Comprehensive Fisheries Compensation Plan (CFCP) requirements of DFO.

LIST OF HERPETOFAUNA KNOWN FROM THE SUBWATERSHED STUDY AREA

COSEWIC (National Status) OMNR (Provincial Status) Other Species of Ecological Sensitivity or Concern	Status/Rank	Common Name	Scientific Name	Atlas	N Oakville Study Area	Sixteen Mile Creek								Osego Creek	Shannon's Creek	Munn's Creek	Morrison Creek							Joshua's Creek							Fourteen Mile Creek		McCraney Creek	Taplow Creek	Glen Oaks Creek				
						16 Mile Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 3	Habitat Unit 4	Habitat Unit 5	Habitat Unit 6	Habitat Unit 7	Habitat Unit 8				Osego Subwatershed	Shannon's Subwatershed	Hedgerows Fields, Landscaped, Other	Munn's Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 10	Habitat Unit 11	Habitat Unit 12	Habitat Unit 13	Habitat Unit 14	Habitat Unit 17	Joshua's Subwatershed	Hedgerows Fields, Landscaped, Other	Habitat Unit 9	Habitat Unit 15	Habitat Unit 16				Habitat Unit 18	Habitat Unit 19	Habitat Unit 20	Habitat Unit 5
		REPTILES																																					
		Common Snapping Turtle	<i>Chelydra serpentina</i>	10,9	1,2,3	1,2,3	1	2	3																														
		Midland Painted Turtle	<i>Chrysemys picta marginata</i>	10, 9	1,2,5,3	1,2,3	1	2		1,2,3				3	1,3	1	3	3			1,2,3	2,3	1					1,2	1	2		2							
SC	VUL	Wood Turtle	<i>Glyptemys insculpta</i>	12																																			
	L,h	s Northern Ring-necked Snake	<i>Diadophis punctatus edwardsi</i>	10,12,9	2																																		
	P?	Blanding's Turtle	<i>Emydoidea blandingii</i>	10																																			
SC	P	Northern Map Turtle	<i>Graptemys geographica</i>	10,12																																			
SC	P,L	s Eastern Milksnake	<i>Lampropeltis triangulum</i>	10,9	2,5													2									2		2										
		s Northern Watersnake	<i>Nerodia sipedon sipedon</i>	10,9																																			
		s Smooth Greensnake	<i>Opheodrys vernalis</i>	10,9																																			
		s Dekay's Brownsnake	<i>Storeria dekayi</i>	10,9	1,2,5	1,2	1	2																				2		2									
		s Northern Red-bellied Snake	<i>Storeria occipitomaculata occipitomaculata</i>	10,9	2,5	2							2																										
		s Northern Ribbonsnake	<i>Thamnophis sauritus septentrionalis</i>	10	2,3																																		
SC	P,L,h	s Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>	10,9	1,2,5,3,14	1,2,5	1	1,2,5	1	2	1,2			1	1	1	1	1	1	1,2,5,3	1	1	1,2	1,2	3		1	1,2,3	1	1,3	2,14		1,2	1	1,2,14	1	1	1	2
		AMPHIBIANS																																					
THR	P	HD	Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	10																																		
	P		Jefferson x Blue-spotted Salamander Complex	<i>Ambystoma jeffersonianum - laterale "complex"</i>	10																																		
	P		Jefferson x Blue-spotted Salamander Polybrids	<i>Ambystoma jeffersonianum - laterale polybrids</i>	10																																		
	HD,s	L	Blue-spotted Salamander	<i>Ambystoma laterale</i>	2																																		
	HD,s		Spotted Salamander	<i>Ambystoma maculatum</i>	10,9	2,3,13	3,13		3,13	3										3		3						2		2									
			American Toad	<i>Bufo americanus</i>	10,9	1,2,5,3,13	1,2,3,13	1	2,3,13	1,3	2	1,2,3		1	1	1	1	1	1,2,5,3		1,2,3	1,2	2	2	2	2	2	1,2	3	1,2,3,13	1	1,2	2,3,13	3,13					
		s	Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	10,9	1,5,3,13	1	5,3,13	1		1,2,3								1,2,3		1	2,3	3	1				2		2									
	MR		Common Mudpuppy	<i>Necturus maculosus</i>	10																																		
	HD,s		Red-spotted Newt	<i>Notophthalmus viridescens viridescens</i>	10,9	3													3			3	3																
			Eastern Red-backed Salamander	<i>Plethodon cinereus</i>	10,9	1,2,5,3,13	1,2,13	1	2,13			1							3		1,2							1	2	2									
		s	Northern Spring Peeper	<i>Pseudacris crucifer</i>	10,9	1,2,5,3,13	1,2,5,3,13	1	2,5,3,13	3	1,3	1,2,3	1	1,2,3	3	1,3			1,5,3		1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	2	1,2,3	1,2,3	1,3	1,2,3,13	1,2	2,3	1,2,3,13	3,13		13			
	MR		Western Chorus Frog	<i>Pseudacris triseriata</i>	10,9	1,2,5,3,13	1,2,3	1	2,3			1,2,3		3	3				1,2,5,3	1	3	3	1,2,3	1,2,3			1,2,3	1	1	3	1,2,3	1,3	1,2,3,13	1	2	1,3,13	3,13		
			American Bullfrog	<i>Rana catesbeiana</i>	10	1,3	1,3																																
			Green Frog	<i>Rana clamitans</i>	10,9	1,2,5,3	1,2,3	1	1,2,3	3	3	3	1,2,3		3				1,3		1	3		3	3		1,2,3	1	3	3	3	3	3	3					
			Pickereel Frog	<i>Rana palustris</i>	10,12																																		
			Northern Leopard Frog	<i>Rana pipiens</i>	10,9	1,2,5,3,13	1,2,3	1	2	1	3	1,2,3			1	1	1	1	1,2,5,3	1	1	3	1,2	3	2		1,2,3	1	1,2,3	1,2,3	2	2	2,3	1,2,3,13	1,2	1,2,3	2,3	3	
	HD,s		Wood Frog	<i>Rana sylvatica</i>	10,9	1,2,5,3	1,2,3	1	2	3	2	2,3							2,3		3		3	2,3	2	2	2	2	2	2	2	2	2	2	2	2			

s described by TRCA (2003) as rare or uncommon in Site District 7E4 and have experienced declines in the site district
 HD described by TRCA (2003) as being moderately to highly habitat dependant
 MR described by TRCA (2003) as being moderately to highly restricted in mobility

- Sources:**
- 1 NRSI 2002-4
 - 2 LGL 2000
 - 3 MNR 2003
 - 3a Varga 1998, 2002 in MNR 2003
 - 3b Goodban 1998, 1999 in MNR 2003
 - 3c Crins 1981 in MNR 2003
 - 4 Philips Engineering Ltd. 2000
 - 5 Stantec et al., 2002
 - 6 Geomatics 1993
 - 7 SNC-Lavalin Ferroviar 1999
 - 8 Ecoplans 1995
 - 9 Lamond 1994
 - 10 MNR 2000
 - 11 Dobbyn 1994
 - 12 MNR 1989
 - 13 Conservation Halton 2002
 - 14 MMM 2003
 - 15 Holmes et al 1991

APPENDIX KK
STORMWATER MANAGEMENT FACILITY MONITORING PROTOCOL
TOWN of OAKVILLE

1.0 Purpose

The Town of Oakville often requires the construction of a stormwater management facility or pond as part of land development activities to control flow rate or improve water quality of stormwater runoff from the development. A servicing agreement between the Town and the land developer outlines the conditions and timing for the Town to assume responsibility for the facility. One of the conditions is that the developer carries out a monitoring program. This protocol outlines the details of an acceptable monitoring program to be carried out by the land developer. The three main purposes of the program are as follows:

1. To certify that the pond construction conforms to the approved plans and functions as per the design report. (Is it built as designed?). See Design Conformance Monitoring.
2. To ensure pond performance in removing pollutants and routing flows conforms to the guidelines used in design. (Does it operate as designed?). See Performance Monitoring.
3. To ensure that the pond is maintained during the maintenance and post construction monitoring period. (Is it turned over to the Town in good condition?). See Maintenance Monitoring.

Each of the purposes is realized through different, though related, aspects of the monitoring program.

2. Timing

Two time periods are important for consideration in monitoring:

Construction Period: This is defined as the period following pond construction, during which the land draining to the facility is under development, with active construction activities underway, and land exposed. During this period, erosion and sediment control programs are important in protecting downstream facilities (i.e. sewers, ponds and receiving waters) from excessive sediment loads. This period is often specified in the servicing agreement as two or three years. If the active construction period is extended beyond the time specified in the servicing agreement, the Town may extend the start of the post construction monitoring period.

Post-Construction Period: This period shall be considered to start after the construction period specified in the agreement is complete. This is expected to be the period after the catchment area has been developed and construction activities completed and land stabilized with vegetation. The post construction period shall be as specified in the servicing agreement (usually two years) and follow the construction period. Following the post-construction monitoring period, the municipality will assume the operation of the facility from the property developer, subject to conditions being met in the servicing agreement and in this Protocol.

3. Design Conformance Monitoring

This type of monitoring results in a certificate that the pond construction details are as designed, with exceptions only as agreed upon by the Town and the consultant for the developer and duly noted on as-built plans. This step is usually completed as soon as construction is complete.

The certificate shall include statements to the effect that the following conforms to design:

- all materials used in construction
- the facility volume, bottom elevation, berm elevations, outlet(s) elevations
- sediment forebay features
- inlet and outlet structures elevations and orifice sizes,
- operation of moveable control elements
- flow splitting structures to divert high flows
- emergency spillways
- landscaping including paths
- security aspects such as fencing, grates on sewers and underground control chambers;
warning signs
- wetland plantings

The above is intended to be examples of the items to be checked by the consultant prior to issuing a Design Conformance Certificate. An inspection and physical survey following construction, along with the inspections during construction are usually sufficient to determine that the pond is built as designed and will function as designed.

4. Performance Monitoring

Performance monitoring is needed to ensure that hydraulic and pollutant removal performance is acceptable. Information collected can be used to require alteration of the operations to improve performance such as:

- indicate the need for maintenance
- indicate changes to the hydraulic operation to modify extended detention times, or raise
or
lower the wet pool elevations
- alter inlet flow splitting structures
- indicate need for remedial measures to reduce loadings upstream.

Also the information will be used to assist in characterizing urban runoff in Oakville, add to the knowledge of pond performance and operating characteristics, and identify the need to modify design guidelines for future pond construction.

The following monitoring is required:

- A. *Flow splitter/diversion structure* (if present) - flow at which diversion to the quantity control pond or bypass of the quality control pond initiates.
- this must be determined for at least one event, to confirm diversion structure setting.

Repeat if diversion structure modified.

Timing. Any time after pond is constructed

- B. *Quantity Control Ponds*, i.e. flood control ponds, which are separate from quality control ponds.

- flow measurements at inlet and outlet, and pond elevation, for at least one event with flow, to confirm pond operation. Repeat if outlet settings or structures modified.

Timing. Any time after pond is constructed

- C. *End-of-Pipe facilities*, i.e. water quality control ponds, extended detention ponds, multi-objective water quality/quantity control ponds infiltration basins, filters.
- flow measurements at inlet and outlet for three (3) rainfall induced runoff events per year for two years (six samples total)
 - pond elevation during the events
 - a flow proportioned composite sample for the same events at the inlet and outlet, analysed for the parameters below. If more than one outlet, samples are to be taken for the outlet that takes the lower flows (as opposed to the flood overflow outlet or emergency overflow spillway).
 - operational record for events, including draw down period for the pond
 - results calculated as percent reduction in pollutants for all parameters.

Parameters. Composite samples shall be analysed for the following parameters:
Total suspended solids, total phosphorus, total Kjeldahl nitrogen, ammonia nitrogen, nitrate and nitrite nitrogen (combined), biochemical oxygen demand, chloride, metals (cadmium, chromium, copper, iron, lead, nickel and zinc).

Timing. After post construction (catchment fully developed, with undeveloped land stabilized with vegetation), and prior to assumption.

- E. *Rainfall Data*
- continuous rainfall data must be provided with the flow data, from a gauge within five (5) km of the catchment.

5. **Maintenance Monitoring**

Maintenance shall be carried out by the Developer for the construction and post construction periods, until the facility is assumed by the Town. The following is a suggested list of maintenance inspection items:

- flow splitting, and inlet and outlet structures free from clogging
- litter build up in ponds
- oil sheen or evidence of industrial spill
- safety and security features in good order, ie. fencing, warning signs, gratings secure
- erosion of berms, vegetation healthy
- wetland vegetation need replanting
- sediment build-up in forebay.
- free operation of moveable control elements
- filtration and infiltration media not clogged; pretreatment sediment removal device need for maintenance

Sediment Build-up. The amount of sediment in the water quality pond and sediment fore-bay shall be monitored annually. Sediment buildup in the construction period could be a problem

if construction site erosion and sediment control programs are inadequate. If the sediment accumulation in the forebay at the end of the post construction monitoring period is 50% or more of the expected amount requiring removal identified in the design report, then the developer shall remove the sediment. In the absence of a specified amount for sediment, then a loss of 5% of the pond wet-pool volume shall be considered as the point sediment maintenance is needed. Prior to removal, the Developer shall ensure samples are taken to identify if special handling or disposal requirements apply (refer to Ontario Regulation 347 Waste Management, Environmental Protection Act, and Guideline for Use at Contaminated Sites in Ontario, MOEE, June 1996). General guidance on sediment removal can be found in “Stormwater Management Facility Sediment Maintenance Guide”, (SWAMP/TRCA, 1999). This guide expands on procedure for removing sediments from SWM ponds; includes method for determining sediment removal timing; sediment characteristics and disposal; methodologies for removal; and the costs of removal.

Timing. Maintenance inspections should be initially frequent after major storms in the first year and seasonally thereafter, as determined by experience. Maintenance monitoring should be carried out during the entire construction and post construction period.

6. Reporting

Prior to assumption, the Developer shall submit a report to the Town including the following:

- A statement certifying that the pond is built as designed, listing any differences from the design brief
- Performance monitoring results comparing actual performance to design basis
- Operational changes made to the hydraulic structures to modify flow rates.
- Record of maintenance inspections and activities
- Recommendations for operational improvements, maintenance frequency and design improvements if any.
- Sediment build-up and removal record, including recommended disposal method.

APPENDIX LL: STEP-BY-STEP PROCEDURE FOR CALCULATING STORMWATER QUALITY TARGETS AND EVALUATING THE EFFICIENCY OF CONTROL MEASURES

Land Use Type	Runoff Coefficient				Combined Runoff Coefficient	Event Mean Conc.	
	Impervious Area %	Runoff Coefficient	Pervious Area %	Runoff Coefficient		Suspended Solids - mg/L	Total Phosphorus mg/L
Wetland	1	0.95	99	0.1	0.109	10	0.12
Agriculture	3	0.95	97	0.275	0.295	100	0.2
Woodlot	3	0.95	97	0.15	0.174	70	0.2
Residential Low Dens.	30	0.95	70	0.25	0.460	91	0.36
Residential Med. Dens.	50	0.95	50	0.3	0.625	91	0.36
Ind/Comm	80	0.95	20	0.3	0.820	70	0.3

The area being developed has the following characteristics before application of controls;

Land Use Type	Runoff Coefficient					Area - ha
	Impervious Area %	Runoff Coefficient	Pervious Area %	Runoff Coefficient	Combined Runoff Coefficient	
Pre-development						
Agriculture	3	0.95	97	0.275	0.295	100
Post-development – uncontrolled						
Residential Med. Density	50	0.95	50	0.3	0.625	70
Ind/Comm	80	0.95	20	0.3	0.820	30

Step 1. Calculate Runoff Volume

$$\text{Runoff volume (1000 m}^3\text{)} = \text{Area (ha)} \times \text{runoff coef. (fraction)} \times \text{annual rainfall (mm)} / 100$$

$$\begin{aligned} \text{Runoff volume (pre-development)} \\ &= 100 \times 0.275 \times 785 / 100 \\ &= 231.8 \text{ m}^3 \text{ (1000s)} \end{aligned}$$

Step 2. Calculate Total Phosphorus Target

Target based on predevelopment load from the area to be developed.

Total phosphorus event mean concentrations (EMC) for different land uses can be found in the **Table LL-1**.

Total P Load (pre-development) (Kg/year)
 = Runoff volume (1000 m³) x TP EMC (mg/L)
 = 231.8 x 0.20
 = 46.4 Kg/year
 = Total Phosphorus target

Step 3. Calculate Post Development Runoff Volume and TP Load

Using the same calculations as for Step 1 and step 2, for each type of land use. The table below shows the result.

Table LL-3: Summary of Results						
Post-development – uncontrolled	Combined Runoff Coefficient	Area - ha	Runoff Volume – 1000 m³	Total Phosphorus EMC mg/L	TP Load -Kg/Year	Amount over Target Kg/Year
Residential Med. Density	0.625	70	343.4	0.36	123.6	
Ind/Comm	0.820	30	193.1	0.3	57.9	
Total		100	536.5		181.6	135.2

The total load of 181.6 Kg/year is 135.2 Kg/year above the target load. The load reduction target then is 135.2 Kg/year

Step 4. Account for Infiltration Measures (Best Effort)

Infiltration volume
 = area (ha) x infiltration (mm of runoff)
 = 100 x 17 / 100
 = 17 (1000 m³)

Recalculate TP load assuming all infiltration is from residential areas (other assumptions are possible).

Load reduction
 = Volume reduction (1000 m³) x EMC (mg/L)
 = 17 x 0.36
 = 6.1 Kg/Year

It is assumed that this measure accounts for water that flows into deeper aquifers and/or shallow aquifers that contribute to baseflow. Specific measures need to be constructed to achieve this.

Step 5. Account for Surface Retention Water Loss

Water retained on the surface through on-site source control and conveyance controls by:

- downspout disconnection to grassed surfaces
- routing runoff over grassed swales and open ditches

The assumption is that most of the water that is retained on the surface will percolate into the surface soils only and be lost as evapotranspiration. This amount of water loss can be accounted for by reducing the runoff coefficient or fraction of impervious area that is connected to piped drainage systems.

The reference table above indicates runoff coefficients for different land uses. The pervious areas in developed areas are assumed to have runoff coefficients of 0.25 to 0.3 which accounts for the relatively tight soils in this area. This is much lower than the runoff coefficients for impervious areas of 0.95.

In this example, we will assume that 50 % of the residential area can be redirected to the surface, primarily by disconnecting downspouts. However to be conservative, we will assume that only one half of this flow can be retained on the surface, effectively making the reduction only 25%.

We will also assume that the commercial industrial impervious area can be reduced by 10%, with the same assumption effectively reducing the impervious area by 5%.
A recalculated runoff coefficient with these assumptions accounts for the reduced loadings of Total Phosphorus.

Land Use Type	Impervious Area %	Surface Retention %	Effective Imperv. Area %	Runoff Coefficient	Pervious Area %	Runoff Coefficient	Combined Runoff Coefficient
Residential Med. Density	50	25	37.5	0.95	50	0.3	0.506
Ind/Comm	80	10	75	0.95	20	0.3	0.773

Load reduction accounted for by recalculating runoff volume and TP load as in step 3.

Effective reduction of load - 26.8 Kg/year

Cumulative reduction = 33.0 Kg/ year

Step 6. Account for Stormwater Management Pond (TSS target reduction)

A stormwater management pond needs to be designed to meet total suspended solids (TSS) load targets for the protection of fisheries.

For developments in 14 Mile Creek and East Morrison Creek a Level 1 reduction is required and for the rest, a level 2 reduction is required.

The TSS and total phosphorus reductions expected are as follows:

Level	Total Suspended Solid Removal %	Total Phosphorus Removal %
Enhanced Fishery Protection - Wet	80	65

Pond Level 1		
Normal Fishery Protection - Wet Pond Level 2	70	57

We will assume in this example that the development is on Joshua Creek and thus only requires a Level 2 pond with 70% TSS removal efficiency and 57% TP removal efficiency.

Pond removal calculation

Load to pond

= Uncontrolled load – cumulative reduction from other measures

= 181.6 – 33.0

= 148.6 Kg/year

TP removal in pond (level 2)

= Load to pond x efficiency of removal

= 148.6 x 57/100

= 84.7 Kg/year

Cumulative reduction

= 84.7 + 33.0

= 117.7 Kg/year

This is short of the target reduction of 135.2 Kg/year by 17.5 Kg/year

Step 6b – recalculation of step 6 with upgraded pond

If the pond is upgraded to a level 1 pond for enhanced removal of both TSS and TP, the removal increases:

TP removal in pond (Level 1)

= 148.6 x 65/100

= 96.6 Kg/year

Cumulative reduction

= 96.6 + 33.0

= 129.6Kg/year

This is short of the target reduction of 135.2 Kg/year by only 5.7 Kg/year (or about 4%). The procedure could be repeated with minor improvements in infiltration or surface retention or by assuming that the source controls will have a quantifiable effect that would allow the target to be met.

Land Use Type	Runoff Coefficient				Area - ha	
	Impervious Area %	Runoff Coefficient	Pervious Area %	Combined Runoff Coefficient		
Pre-development						
Agriculture	3	0.95	97	0.275	0.295	100

Table LL-5: Implementation Example – Calculations						
Land Use Type	Runoff Coefficient					Area - ha
	Impervious Area %	Runoff Coefficient	Pervious Area %	Runoff Coefficient	Combined Runoff Coefficient	
Post-development - uncontrolled						
Residential Med. Density	50	0.95	50	0.3	0.625	70
Ind/Comm	80	0.95	20	0.3	0.820	30
Step 1 and 2						
Runoff Volume calculation	with Annual Rainfall		785	Mm		
Annual TP Load Calculation						
Pre-development	Combined Runoff Coefficient	Area - ha	Runoff Volume - 1000 m3	Total Phosphorus EMC mg/L	TP Load -Kg/Year (Target)	
Agriculture	0.295	100	231.8	0.2	46.4	
Step 3 Post-development – uncontrolled						
	Combined Runoff Coefficient	Area - ha	Runoff Volume - 1000 m3	Total Phosphorus EMC mg/L	TP Load -Kg/Year	
Residential Med. Density	0.625	70	343.4	0.36	123.6	Amount over Target Kg/Year
Ind/Comm	0.820	30	193.1	0.3	57.9	
Total		100	536.5		181.6	
						135.2
Step 4						
Infiltration			17	Mm		
Infiltration Volume		100	17.0	1000 m3		
Post-developmet - Runoff volume reduced by infiltration target						
	Combined Runoff Coefficient	Area - ha	Runoff Volume - 1000 m3	Total Phosphorus EMC mg/L	TP Load -Kg/Year	
Residential Med. Density	0.625	70	326.4	0.36	117.5	Amount over Target Kg/Year
Ind/Comm	0.820	30	193.1	0.3	57.9	
Total		100	519.5		175.5	
						129.1
Step 5						
	Combined Runoff Coefficient	Area - ha	Runoff Volume - 1000 m3	Total Phosphorus EMC mg/L	TP Load -Kg/Year	
Post-developmet - Runoff volume reduced by surface retention						
Residential Med. Density	0.506	70	261.2	0.36	94.0	Amount over Target Kg/Year

Table LL-5: Implementation Example – Calculations						
Land Use Type	Runoff Coefficient					Area - ha
	Impervious Area %	Runoff Coefficient	Pervious Area %	Runoff Coefficient	Combined Runoff Coefficient	
Ind/Comm	0.773	30	181.9	0.3	54.6	
Total		100	443.1		148.6	
						102.2
Step 6						
Post-developmet - Runoff volume reduced SWM pond Level 2	TP Load to SWM pond -Kg/Year	TP End of Pipe Efficiency %	TP load Removed Kg/year		TP Load -Kg/Year	
Residential Med. Density	94.0	57	53.6		40.4	Amount over Target Kg/Year
Ind/Comm	54.6	57	31.1		23.5	
Total	148.6		84.7		63.9	
						17.5
Step 6b						
Post-developmet - Runoff volume reduced SWM pond Level 1	TP Load to SWM pond -Kg/Year	TP End of Pipe Efficiency %	TP load Removed Kg/year		TP Load -Kg/Year	
Residential Med. Density	94.0	65	61.1		32.9	Amount over Target Kg/Year
Ind/Comm	54.6	65	35.5		19.1	
Total	148.6		96.6		52.0	
						5.7

North Oakville Aquatic Evaluation

Date: _____ Waterbody/Drainage: _____ Reach ID: _____

Category	Rating Criteria	Findings	Comments
1. Flow	1. Flowing water in Channel 2. Channel Dry 3. Evidence of Ground Water Linkage	_____ _____ _____	
2. Seasonal Habitat Use	1. Evidence of spring spawning 2. Vernal pools present	_____ _____	
3. Vegetated Riparian Zone	1. Absent 2. Present + Less than 5m wide 3. Present + Greater than 5m wide	_____ _____ _____	
4. Canopy Cover	1. Absent 2. Present and <50% 3. Present and >50%	_____ _____ _____	
5. Channel Modifications and Disturbance	1. Channelized 2. Plowed Through 3. Channel Appears Natural	_____ _____ _____	
6. Separation from Agricultural Impact	1. Immediately adjacent (no buffer) 2. Immediately adjacent (with buffer) 3. Separated by >100m	_____ _____ _____	
7. Habitat Features	1. Riffle 2. Pool 3. Woody Debris 4. Boulder 5. Backwater 6. Undercut Banks 7. Vegetation	_____ _____ _____ _____ _____ _____ _____	
8. Channel Substrate	1. Silt 2. Clay 3. Muck 4. Sand 5. Gravel 6. Cobble 7. Boulder	_____ _____ _____ _____ _____ _____ _____	

9. Other Observations (I.e., water colour or turbidity, fish observed (species), water or air temperature if taken, barriers to fish passage,...etc.).

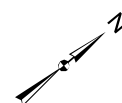
10. Photos Taken (upstream and downstream view): Y/N

<u>Photo #</u>	<u>Description</u>

Field Staff: _____



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



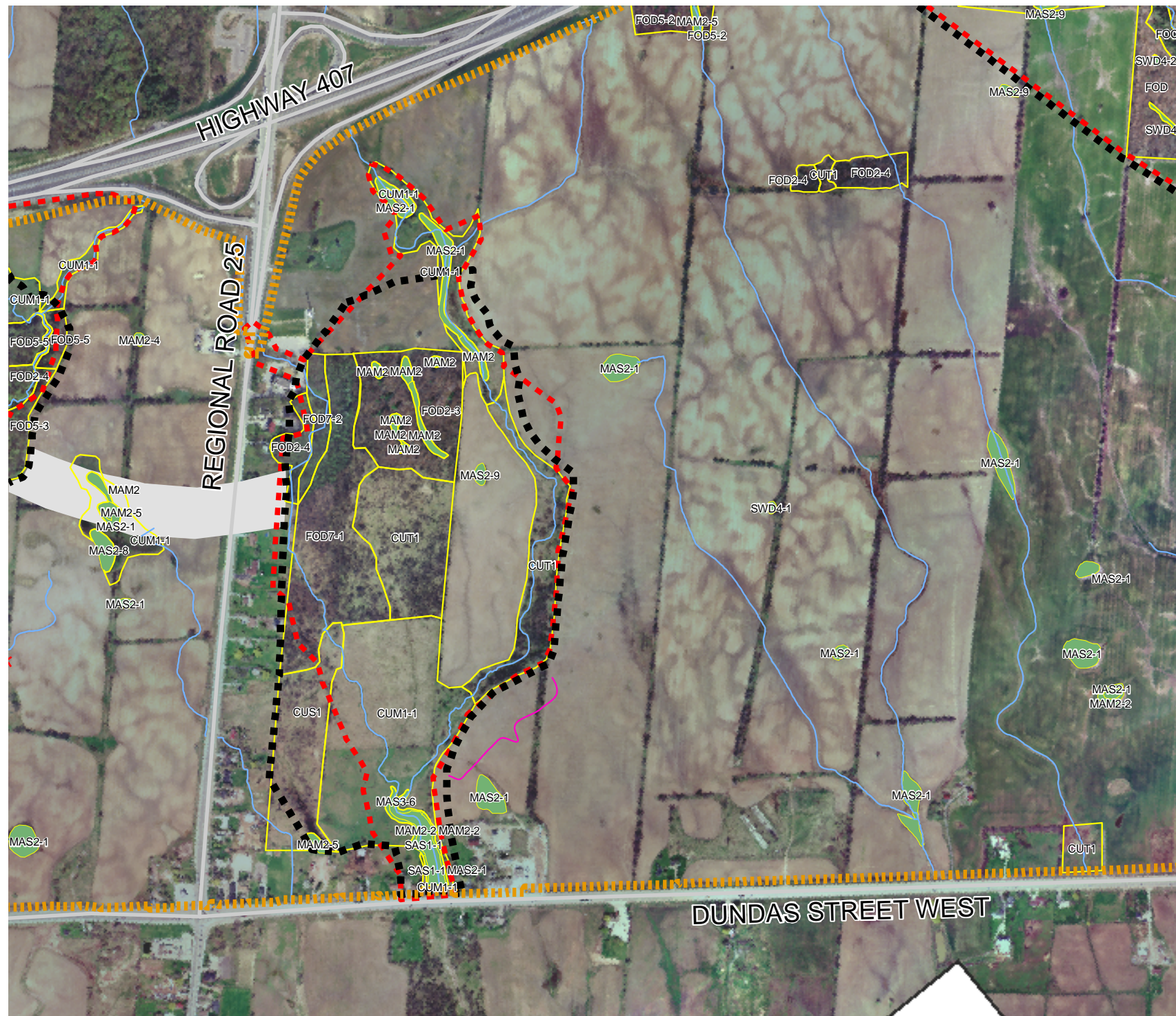
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Meters

Legend

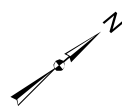
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

**Core Area #1
14 Mile Creek (Main)**

Scale: 1:7,500
August 2006



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



0
|
Meters

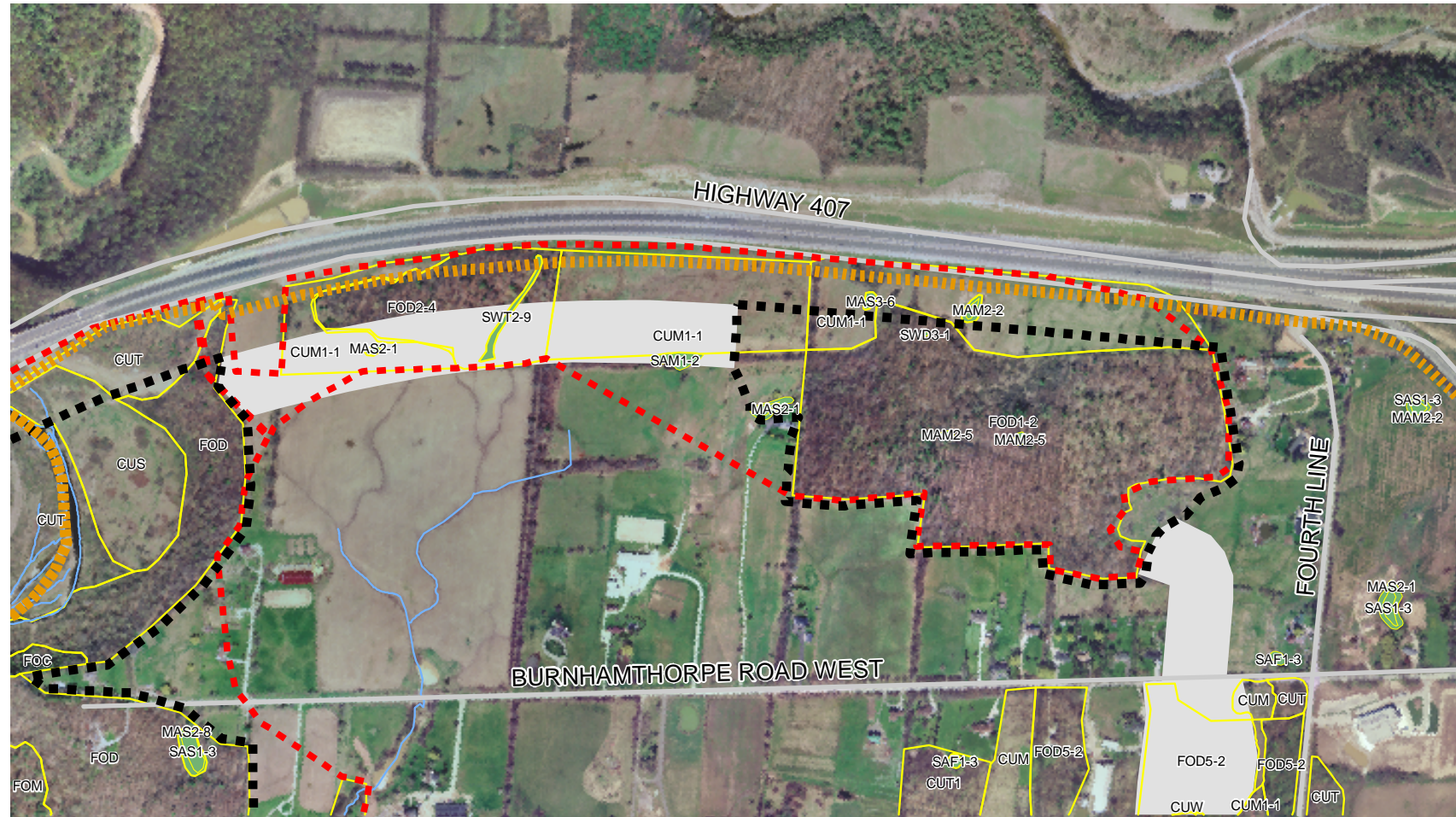
Legend

- Study Area Boundary
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

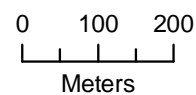
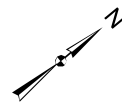
**Core Area #2
14 Mile Creek East
(ORC Lands)**

Scale: 1:10,000
August 2006

Appendix MM 2



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



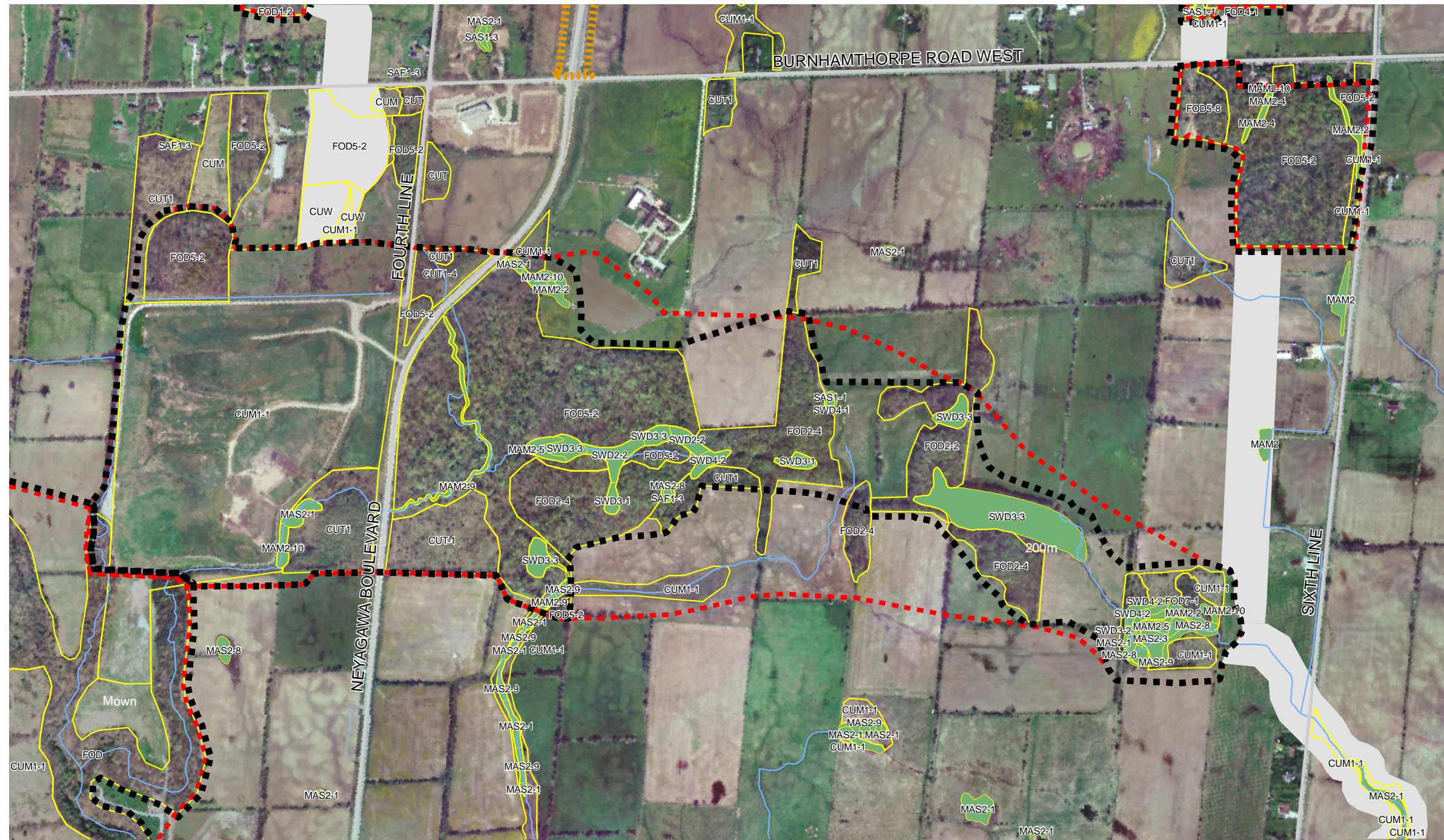
Legend

- Study Area Boundary
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

**Core Area #4
Highway 407 -
East of 16 Mile Creek**

Scale: 1:10,000
August 2006

Appendix MM 4



NORTH OAKVILLE SUBWATERSHED STUDY



0 100
Meters

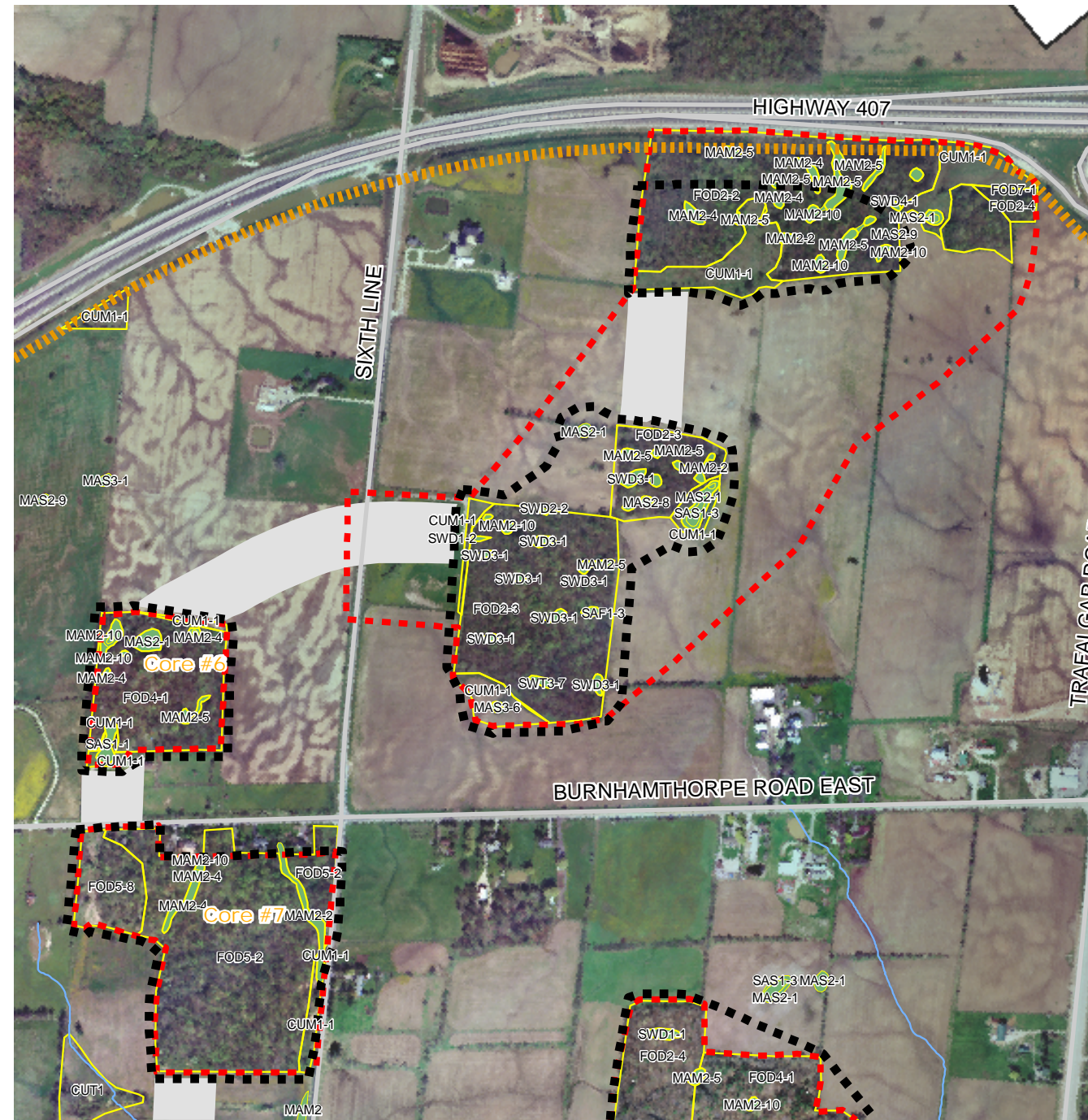
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- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

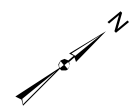
Core Area #5 Neyagawa Woodlot

Scale: 1:10,000
August 2006

Appendix MM 5



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



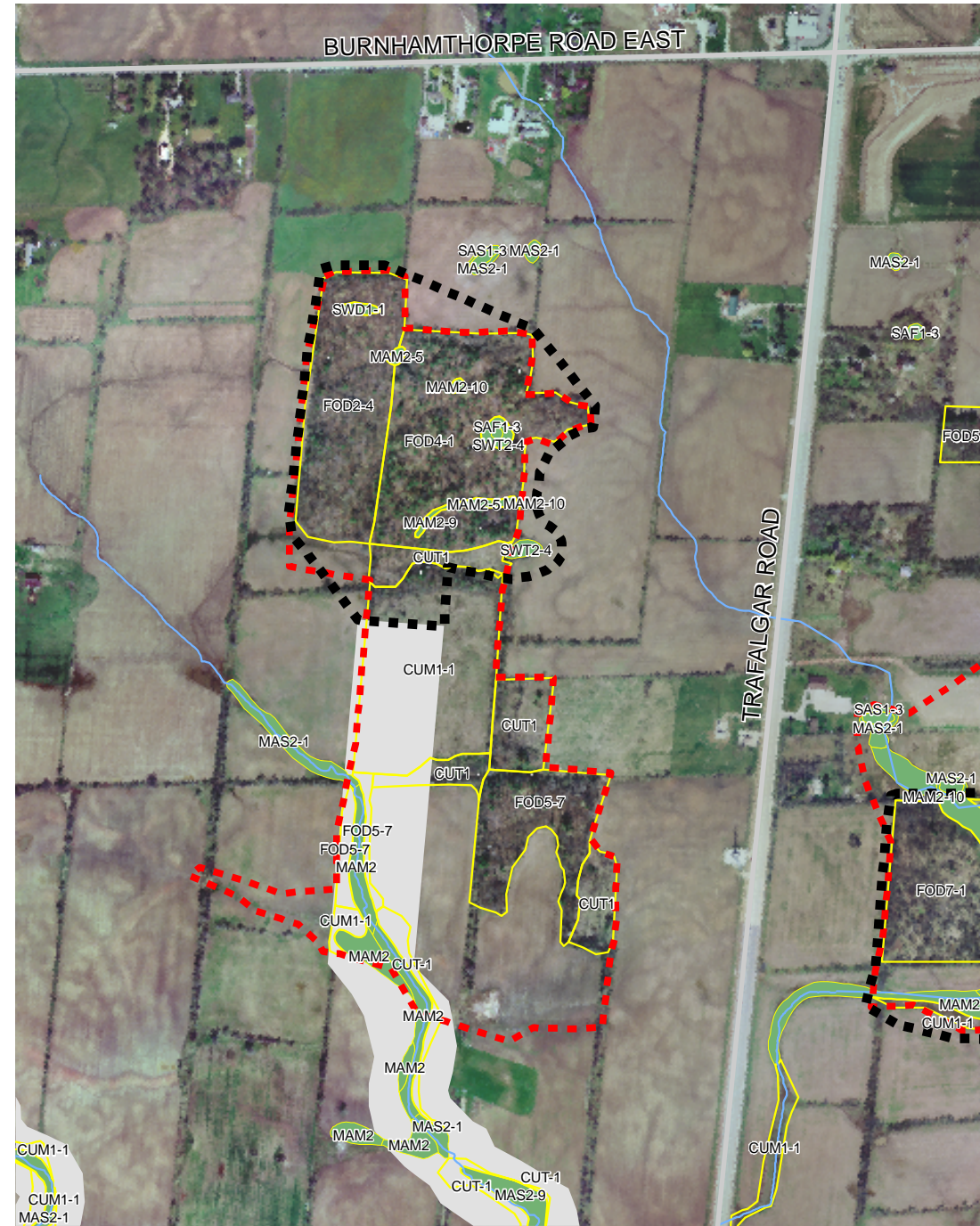
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Meters

Legend

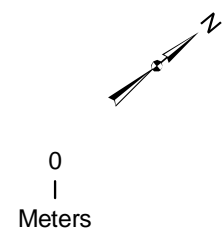
- Study Area Boundary
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

Core Area #6
NW of Burnhamthorpe and 6th Line
Core Area #7
SW of Burnhamthorpe and 6th Line
Core Area #8
Earth Science Woodlots
Scale: 1:10,000
August 2006

Appendix MM 6



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



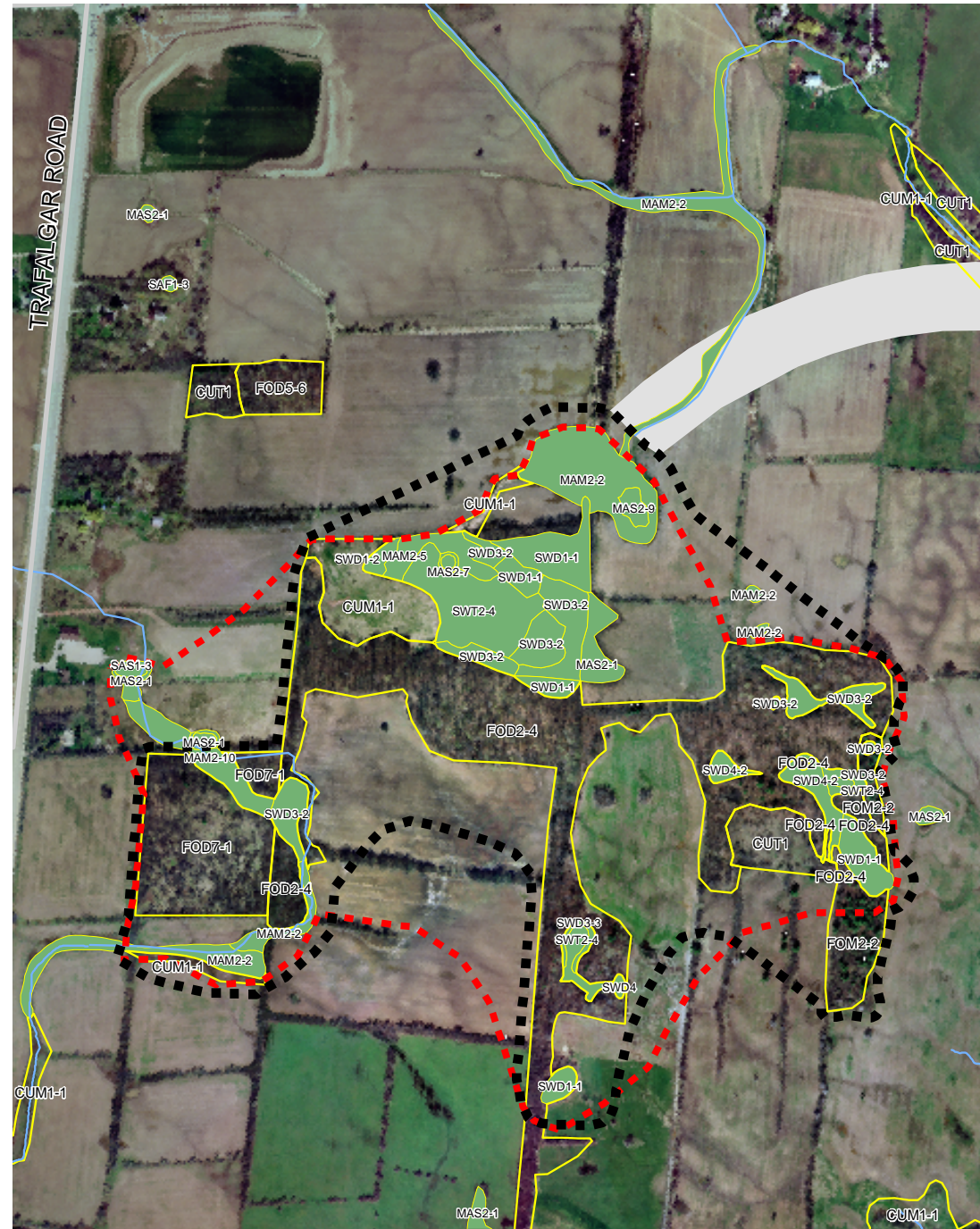
Legend

- Study Area Boundary
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

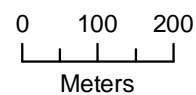
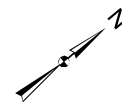
Core Area #9
Trafalgar Woodlot

Scale: 1:10,000
August 2006

Appendix MM 7



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY

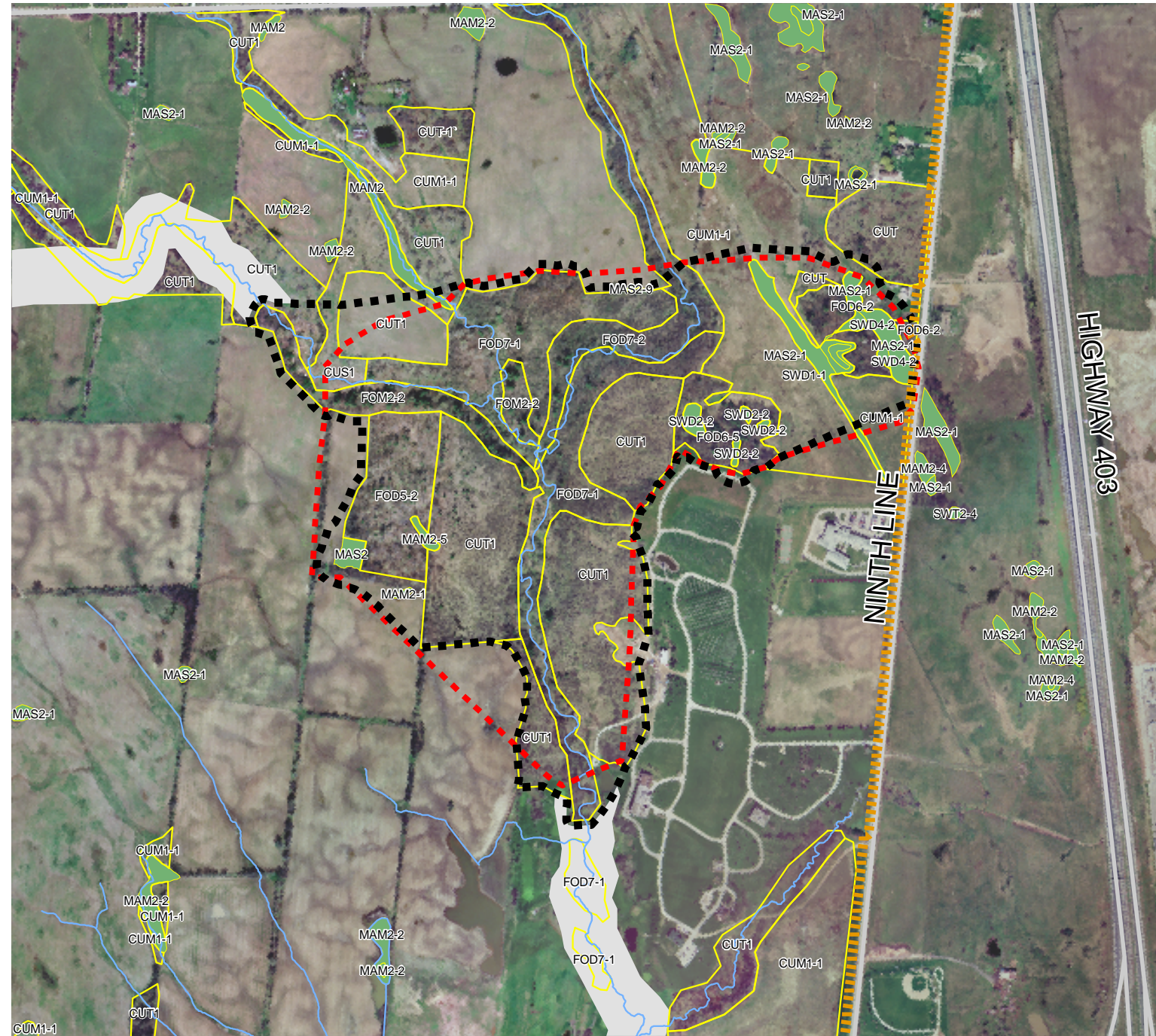


Legend

- Study Area Boundary
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

Core Area #10 Buttonbush

Scale: 1:10,000
August 2006



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



0 100
Meters

Legend

- Study Area Boundary
- Core Area 2006
- Core Area (Developed Through 2004 IAR Process)
- Linkage
- ELC
- Wetland
- Watercourse
- Road

Core Area #11
Joshua's Creek Core

Scale: 1:10,000
August 2006

Appendix MM 9

Reach no.	Date	Temp. C	Flowing water	Defined channel	Riparian zone (m)	Canopy cover (%)	Channel Description	Separation from agriculture (m)	Habitat Features							Substrate						
									Riffle	Pool	Woody debris	Boulder	Back-water	Undercut banks	Vegetation	Silt	Clay	Muck	Sand	Gravel	Cobble	Boulder
Joshua Creek																						
JC -1	June 25/02	18-19	Yes	Yes	<5	<50	Natural	>5	x	x	x	x	x	x	x	x	x	x	x	x	x	x
JC -2	June 25/02	18-29	Yes	Yes	>5	<50	Natural	>5	x	x	x		x	x	x	x	x	x	x	x	x	x
JC -3	June 25/02	N/A	Yes	Yes	>5	>50	Natural	>100	x	x	x					x		x	x		x	
JC -4	May 22/02	18	Yes	Yes	>5	>50	Natural	>100	x	x	x			x	x	x		x	x	x	x	
JC -5	May 22/02	14-15	Yes	Yes	>5	<50	Natural	>100	x	x	x			x	x	x		x	x	x	x	x
JC -6	May 22/02	16-17	Yes	Yes	>5	>50	Natural	>100		x	x				x	x		x		x		x
JC -7	May 22/02	16	Standing	No	<5	>50	Natural	<50			x				x	x		x				
JC -8	May 16/02	18-19	Standing	No	<5	<50	Natural	>5			x				x	x	x	x				
JC -9	May 16/02	20	Yes	Yes	<5	Absent	Natural	>5							x	x		x	x	x		
JC -10	May 16/02	20-21	Yes	No	<5	Absent	Natural	>5			x				x	x	x	x	x	x		
JC -11	May 16/02	19-25	Yes	No	0	Absent	Plowed	0		x					x	x	x	x	x	x		
JC -12	May 22/02	14	Yes	No	<5	>50	Natural	>100			x				x	x	x			x	x	x
JC -13	May 22/02	15-17	Yes	Yes	>5	<50	Natural	>100			x	x			x	x		x	x	x		x
JC -14	May 16/02	17-18	Yes	No	>5	<50	Natural	>100			x				x	x	x	x	x	x		
JC -15	May 22/02	10-13	Standing	No	>5	Absent	Natural	<5							x	x	x	x				
JC -19	May 22/02	16	Yes	Yes	>5	>50	Natural	>100	x	x	x			x	x	x		x	x	x	x	
JC -20	May 22/02	16-17	Yes	Yes	>5	<50	Natural	>5							x	x		x		x		
JC -20A	Included in JC -20																					
JC -22	June 25/02	18	Yes	Yes	>5	>50	Natural	>100	x	x	x				x	x		x	x	x		
JC -27	No Aquatic Habitat																					
JC -27A	Dec 9/03	NA	Yes	No	>5	>50	Natural	>100							x	x		x				
JC -28	July 18/02	21	No	No	>5	>50	Natural	>5		x					x	x	x	x	x	x		
JC -29	No Aquatic Habitat																					
JC -30	July 12/02	N/A	No	No	Absent	Absent	Natural	>100							x		x					
JC -31	No Aquatic Habitat																					
JC -32	No Aquatic Habitat																					
JC -36	Dec 9/03	4	Yes	Yes	>5	>50	Natural	>100	x	x	x	x		x	x				x	x	x	
East Morrison Creek																						
MOC -2	June 26/02	N/A	No	Yes	<5	<50	Natural	<5							x	x		x				
MOC -4	June 25/02	20-22	Yes	Yes	>5	50	Natural	>100		x	x				x	x		x	x	x		
MOC -5	June 26/02	20	No	No	>5	50	Natural	>5							x	x		x				
MOC -6	June 26/02	N/A	No	No	>5	>50	Natural	>100							x	x		x				
West Morrison Creek																						
MOC -W1	June 25/02	19-22	Yes	Yes	>5	50	Natural	<5	x	x	x				x		x	x	x	x		
MOC -W2	June 25/02	25	Standing	No	Absent	Absent	Plowed	0		x					x	x		x				
MOC -W3	July 18/03	22	Yes	Yes	<5	<50	Channelized	0		x					x	x		x		x		x
MOC -W5	July 18/03	52	Yes	No	>5	<50	Natural	>5							x	x	x	x				
Munn's Creek																						
MUN -1	May 10/02	N/A	No	No	0	0	Plowed	0							x	x	x	x				
MUN -2	May 10/02	14	No	No	0	0	Natural	0							x	x	x	x				
MUN -3	May 10/02	12	No	No	0	0	Plowed	0							x	x	x	x		x		x
Shannons Creek																						
SCH -1	May 5/02	12	Yes	No	<5	<50	Natural	>50			x				x	x	x	x				
SCH -2	May 5/02	12	Yes	No	<5	0	Natural	0							x	x	x	x				
SCH -3	May 5/02	20	Yes	Yes	0	0	Plowed	0							x	x	x	x				
Trips to Sixteen Mile Creek																						
SMA -1	July 12/02	28	Yes	Yes	>5	>50	Natural	>100	x	x		x								x	x	x
SMA -2	July 12/02	24	Yes	Yes	>5	>50	Channelized	>5	x	x	x				x	x		x		x		
SMA -3	July 12/02	24	Yes	Yes	>5	>50	Channelized	>5	x	x	x				x	x		x		x		
SMA -4	July 12/02	24	Yes	Yes	>5	50	Natural	>100	x	x	x	x			x	x		x	x	x		x
SMA -6	July 12/02	24	Yes	Yes	>5	50	Natural	>100	x	x	x				x	x		x		x	x	
SMA -7	July 12/02	28	Standing	Yes	>5	>50	Natural	>100		x	x				x			x	x	x	x	x
SMA -8	July 12/02	N/A	No	Yes	>5	>50	Channelized	>50			x				x	x		x				
SMA -9	June 2/04	16	Yes	No	<5	<50	Plowed	<5			x				x	x						
SMB -1	June 2/04	16	Yes	Yes	>5	>50	Natural	>100	x	x	x	x		x	x					x	x	x
SMB -2	June 2/04	15	Yes	Yes	>5	>50	Natural	>100	x	x	x			x						x	x	
SMB -3	June 2/04	14	Yes	Yes	>5	>50	Natural	>100	x	x	x		x	x	x	x					x	
SMB -4	June 2/04	16	Yes	Yes	>5	>50	Natural	>100			x	x			x	x					x	

SMC -1	July 12/02	28	Standing	Yes	>5	>50	Natural	>100			x	x				x		x	x	x
SMC -2	July 12/02	28	Standing	No	>5	<50	Dammed	>100		x					x	x		x		
SMC -3	July 12/02	23	Standing	No	>5	Absent	Dammed	>5							x	x		x		
SMC -4	July 12/02	N/A	No	No	0	Absent	Plowed	0												
SMC -5	July 12/02	N/A	No	No	0	Absent	Plowed	0												
16W - 1	April 21/04	18	No	Yes	>5	>50	Natural	>100			x	x				x			x	x
16W - 2	April 21/04	18	No	Yes	>5	>50	Natural	>100			x	x				x			x	x
16W - 3	July 10/02	18	No	Yes	>5	>50	Natural	>100			x	x				x			x	x
16W - 4	July 10/02	na	No	Yes	>5	>50	Natural	>5							x	x		x		
16WA - 1	July 10/02	-	No	Yes	>5	<50	Natural	<5			x				x	x	x		x	x
16WA -1A	Included in 16WA -1																			
16WA - 2	July 10/02	-	No	No	Absent	Absent	Plowed	0							x		x		x	x
16WA - 3	July 10/02	-	No	No	Absent	Absent	Plowed	0							x		x		x	x
16WA - 4	July 10/02	-	No	No	Absent	Absent	Plowed	0							x		x		x	x
16WA - 5	July 10/02	-	No	No	Absent	Absent	Plowed	0							x		x		x	x
16WA - 6	July 10/02	-	No	No	Absent	Absent	Plowed	0							x		x		x	x
16WA - 7	July 10/02	-	No	No	Absent	Absent	Plowed	0							x		x		x	x
16WA - 8	July 10/02	-	No	No	>5	>50	Natural	>100			x				x	x				
16WA -8A	Included In 16WA -8																			
Fourteen Mile																				
14E - 1	May 23/02	26	Slow	No	>5	absent	Natural	>100			x				x	x	x	x		
14E - 2	May 23/02	22	Slow	No	>5	<50	Natural	<5		x	x	x	x		x	x	x	x	x	x
14E - 2A	Included in 14W -2																			
14E - 3	May 23/02	18-22	Slow	No	<5	<50	Natural	0							x	x	x	x	x	x
14E - 3A	Included in 14E -3																			
14E - 4	May 23/02	22	Standing	No	Absent	Absent	Plowed	0		x	x					x	x		x	x
14E - 5	North of Study area																			
14E - 6	May 23/02	19-25	Slow	No	>5	>50	Natural	>100			x				x	x	x	x	x	x
14E - 7	May 23/02	19	Standing	No	>5	<50	Natural	>100							x	x		x		
14E - 8	May 23/02	19	standing	No	>5	absent	Channelized	>50							x	x		x		
14E - 8A	Included in 14E - 8																			
14E - 9	No Aquatic Habitat																			
14E - 10	No Aquatic Habitat																			
14W - 1	May 7/02	16	Moderate	Yes	>5	<50	Natural	>100		x	x	x	x	x		x	x	x	x	x
14W -1A	Included in 14W - 1																			
14W - 2	May 7/02	16	Moderate	No	>5	<50	Natural	>100		x	x	x		x		x	x		x	x
14W - 3	May 7/02	16	Slow	No	>5	>50	Natural	>100		x	x	x						x	x	x
14W - 4	May 7/02	18	Moderate	Yes	>5	Absent	Natural	0							x	x			x	x
14W - 5	North of Study area																			
14W -5A	North of Study area																			
14W -5B																				
14W - 6	North of Study area																			
14W - 7	North of Study area																			
14W - 8	North of Study area																			
14W - 9	May 7/02	17	Moderate	Yes	>5	>50	Natural	>100		x	x	x				x			x	x
14W -9A	Included In 14W - 9																			
14W - 10	May 7/02	21.5	No	No	>5	Absent	Natural	>100							x	x		x		
14W - 10A	Included in 14W - 10																			
14W - 11	May 10/02	11-14	Moderate	Yes	>5	>50	Natural	>50		x	x	x	x		x	x	x	x	x	x
14W - 11A	Included in 14W -11																			
14W - 12	May 7/02	16	Moderate	Yes	<5	<50	Natural	>50		x	x	x	x		x	x	x		x	x
14W - 13	May 10/02	10 - 16	Slow	No	>5	Absent	Natural	0			x	x			x	x	x	x		
14W - 14	May 7/02	18	Slow	No	<5	Absent	Natural	0							x	x		x		
14W - 15	North of Study area																			
14W - 16	May 7/02	17	Slow	No	>5	Absent	Natural	0		x	x					x	x	x	x	x
14W - 17	May 7/02	17	Slow	No	<5	Absent	Natural	0								x	x			
14W - 17A	Included In 14W - 17																			
14W - 18	May 7/02	16	Slow	Yes	<5	Absent	Natural	0							x	x		x		
14w - 19	North of Study area																			
14W - 19A	North of Study area																			
14W - 20	No Aquatic Habitat																			
14W -20A	North of Study area																			
McCraney																				
MC - 1	May 6/02	18.5	Slow	Yes	<5	<50	Natural	<5			x				x	x	x	x		x
MC - 2	May 6/02	18	Standing	No	<5	<50	Plowed	0							x	x	x	x		

MC - 3	May 6/02	18	Standing	No	>5	Absent	Natural	<5							x	x		x			
MC - 4	May 6/02	20	No	No	Absent	Absent	Plowed	0								x				x	
MC - 4A	Included in MC -4																				
Taplow																					
TC - 1	April 30/02	10.5 - 12	Yes	Yes	<5	Absent	Plowed	0	x	x				x	x	x	x	x	x		
TC - 2	April 30/02	11.5	Yes	No	>5	Absent	Plowed	0						x	x	x	x	x	x		
TC - 2A	Included in TC -2																				
Glen Oaks																					
GO - 1	May 6/ 02	21	Standing	No	Absent	Absent	Plowed	0							x	x	x	x		x	

Oakville North Subwatershed Study

Glossary of Terms

abiotic- Non-living. Climate is an abiotic component of ecosystems

adaptive management- A type of natural resource management that implies making decisions as part of an on-going process. Monitoring the results of actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

Aquifer – A porous water bearing geologic formation generally restricted to materials capable of yielding an appreciable supply of water

Backfill - Earth used to fill a trench or an excavation.

Bankfull Flow - The condition where streamflow fills a stream channel to the top of the bank and at a point where the water begins to overflow onto a floodplain.

Base flow - The portion of stream flow that is not due to storm runoff, and is supported by groundwater seepage into a channel.

Bedload - The sediment in a stream channel that mainly moves by jumping, sliding or rolling on or very near the bottom.

Berm - An earthen mound used to direct the flow of runoff around or through a structure.

Best Management Practice (BMP) - A structural or non-structural device designed to temporarily store or treat stormwater runoff in order to mitigate flooding, reduce pollution and provide other amenities.

Biochemical oxygen demand (BOD) - The quantity of oxygen consumed during the biochemical oxidation of matter over a specified period of time (see also COD).

biological diversity- The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.

Brownfield Sites - Existing development areas, primarily commercial and industrial. Can also refer to a way of redevelopment. May include existing residential areas as well as infilling, depending on the context. This item is generally used in the discussion of providing stormwater management, best management practices, or site remediation cleanup to control runoff from older uncontrolled

"brownfield" areas.

Buffer Strip or Zone - Strips of grass or other erosion-resistant vegetation between a waterway and an area of more intensive land use.

Calibration - A check of the precision and accuracy of measuring equipment.

Catchbasin - Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

Catchment Area - Also referred to as drainage basin, a catchment area is an area drained by a stream or other body of water. The limits of a given catchment area are the heights of land-often called drainage divides, or watersheds-separating it from neighboring drainage systems. The amount of water reaching the river, reservoir, or lake from its catchment area depends on the size of the area, the amount of precipitation, and the loss through evaporation (determined by temperature, winds, and other factors and varying with the season) and through absorption by the earth or by vegetation; absorption is greater when the soil or rock is permeable than when it is impermeable. A permeable layer over an impermeable layer may act as a natural reservoir, supplying the river or lake in very dry seasons. The catchment area is one of the primary considerations in the planning of a reservoir for water-supply purposes.

Channel - A natural stream that conveys water; a ditch or channel excavated for the flow of water.

Channel erosion - The widening, deepening, and headward cutting of small channels and waterways, due to erosion caused by moderate to large floods.

Channel Stabilization - Erosion prevention and stabilization of velocity distribution in a channel using jetties, drops, revetments, structural linings, vegetation and other measures.

Check dam - (a) A log or gabion structure placed perpendicular to a stream to enhance aquatic habitat. (b) An earthen or log structure, used in grass swales to reduce water velocities, promote sediment deposition, and enhance infiltration.

GLOSSARY

Chemical oxygen demand (COD) - A monitoring test that measures all the oxidizable matter found in a runoff sample, a portion of which could deplete dissolved oxygen.

Clay (SOILS) - 1. A mineral soil separate consisting of particles less than 0.002 millimeter in equivalent diameter. 2. A soil texture class. 3. (Engineering) A fine grained soil (more than 50 percent passing the No. 200 sieve) that has a high plasticity index in relation to the liquid limit. (Unified Soil Classification System)

Compaction (SOILS) - Any process by which the soil grains are rearranged to decrease void space and bring them in closer contact with one another, thereby increasing the weight of solid material per unit of volume, increasing the shear and bearing strength and reducing permeability.

Conduit - Any channel intended for the conveyance of water, whether open or closed.

Connectivity (of habitats)- The linkage of similar but separated vegetation stands by patches, corridors, or "stepping stones" of like vegetation. This term can also refer to the degree to which similar habitats are linked.

Corridor- Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows where wildlife feed.

Constructed Swale – constructed drainage course with no visible bed or banks. Conveys runoff on an intermittent basis.

Constructed Watercourse – drainage course with constructed bed or banks. Conveys runoff on an intermittent or continuous basis.

Conveyance – Any natural or manmade channel or pipe in which concentrated water flows.

Critical habitat- Areas designated for the survival and recovery of federally listed threatened or endangered species.

Culvert - A covered channel or a large-diameter pipe that directs water flow below the ground level.

Curbs - Concrete barriers on the edges of streets used to direct stormwater runoff to an inlet or storm drain and to protect lawns and sidewalks from vehicles.

Dam - A barrier to confine or raise water for storage or diversion, to create a hydraulic head, to prevent gully erosion, or for retention of soil, sediment or other debris.

Design storm - A rainfall event of specific size,

intensity, and return frequency (e.g., the 1-year storm) that is used to calculate runoff volume and peak discharge rate.

Detention - The temporary storage of stormwater to control discharge rates, allow for infiltration, and improve water quality.

Detention Structure – A permanent structure for the temporary storage of runoff that is designed to not create a permanent pool of water.

Detention time - The amount of time a parcel of water actually is present in a BMP. Theoretical detention time for a runoff event is the average time parcels of water reside in the basin over the period of release from the BMP.

Dewatering – A process for removing excess water from solids to lessen the overall weight of the wastes.

Dike – An embankment to confine or control water, for example, one built along the banks of a river to prevent overflow to lowlands; a levee.

Discharge - A release or flow of storm water or other substance from a conveyance or storage container.

Diversion - A channel with a supporting ridge on the lower side constructed across the slope to divert water to areas where it can be used or disposed of safely. Diversions differ from terraces in that they are individually designed.

Draft EA - A document which a proponent can opt to submit, before submission of a formal EA document to the Minister, so that issues or concerns respecting the documentation can be resolved between the proponent and the reviewers before the formal submission.

Drainage - 1. The removal of excess surface water or ground water from land by means of surface or subsurface drains. 2. Soil characteristics that affect natural drainage.

Drainage Area (Watershed) – That area contributing runoff to a single point measured in a horizontal plane, which is enclosed by a ridge line.

Ecology- The interrelationships of living things to one another and to their environment, or the study of these interrelationships.

Ecoregion- An area over which the climate is sufficiently uniform to permit development of similar ecosystems on sites that have similar properties. Ecoregions contain many landscapes with different spatial patterns of ecosystems.

Ecosystem- An arrangement of living and non-living things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

Ecosystem management- An ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values

Environment - Environment means: (i) air, land or water; (ii) plant and animal life, including man; (iii) the social, economic and cultural conditions that influence the life of man or a community; (iv) any building, structure, machine or other device or thing made by man; (v) any solid, liquid, gas odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of man, or; (vi) any part or combination of the foregoing and the interrelationships between any two or more of them.

Environmental Impact Statement- A statement of environmental effects of a proposed action and alternatives to it. The EIS is released to other agencies and the public for comment and review.

Ephemeral streams- Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.

Erosion - 1. The process by which the land surface is worn away by the action of water, wind, ice, or gravity. 2. Detachment and movement of soil or rock fragments by water, wind, ice or gravity. The following terms are used to describe different types of water erosion:

Erosion Gully – The erosion process whereby water accumulates in narrow channels and removes the soil from this narrow area to considerable depths ranging from 1 or 2 feet to as much as 75 to 100 feet.

Erosion Rill - An erosion process in which numerous small channels only several inches deep are formed. See rill.

Erosion Sheet - The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not subsequently be removed by surface runoff.

Evapotranspiration - The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil.

Excavation – The process of removing earth, stone, or other materials.

Exfiltration - The downward movement of water through the soil; the downward flow of runoff from the bottom of an infiltration BMP into the soil.

Extended Detention - A stormwater design feature that provides for the gradual release of a volume of water in order to increase settling of pollutants and protect downstream channels from frequent storm events

Facility - Is a collection of industrial process discharging storm water associated with industrial activity within the property boundary or operational unit.

Fertilizer – Materials such as nitrogen and phosphorus that provide nutrients for plants. Commercially sold fertilizers may contain other chemicals or may be in the form of processed sewage sludge.

Filter Fabric – Textile of relatively small mesh or pore size that is used to (a) allow water to pass through while keeping sediment out (permeable), or (b) prevent both runoff and sediment from passing through (impermeable).

Filter Strip – Usually long, relatively narrow area of undisturbed or planted vegetation used to retard or collect sediment for the protection of watercourses, reservoirs, or adjacent properties.

First flush - The delivery of a disproportionately large load of pollutants during the early part of storms due to the rapid runoff of accumulated pollutants. The first flush of runoff has been defined several ways (e.g. , one-half inch per impervious acre).

fisheries habitat- Streams, lakes, and reservoirs that support fish, or have the potential to support fish.

Floodplain - Areas adjacent to a stream or river that are subject to flooding or inundation during a storm event that occurs, on average, once every 100 years (or has a likelihood of occurrence of 1/100 in any given year).

Flora- The plant life of an area.

Forage- All browse and non-woody plants that are eaten by wildlife and livestock.

Forest health- A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

GLOSSARY

Geomorphic processes- Processes that change the form of the earth, such as volcanic activity, running water, and glacial action.

Geomorphology- The science that deals with the relief features of the earth's surface.

Geosynthetic Liners – Synthetic fibers that are made into a flexible, porous fabric for separation, reinforcement, filtration, drainage or a moisture barrier.

Grading - The cutting and/or filling of the land surface to a desired slope or elevation.

Ground Cover – Plants which are low-growing and provide a thick growth which protects the soil as well as providing some beautification of the area occupied.

Groundwater – Water stored underground in the pore spaces between soil particles or rock fractures.

Gully - A channel or miniature valley cut by concentrated runoff through which water commonly flows during and immediately after heavy rains or snow melt. The distinction between gully and rill is one of depth. A gully is sufficiently deep such that it would not be obliterated by normal tillage operations, whereas a rill is of lesser depth and would be smoothed by ordinary farm tillage or grading activities.

Habitat - An area or type of area that supports plant or animal life.

Habitat capability- The ability of a land area or plant community to support a given species of wildlife.

Habitat diversity- A number of different types of wildlife habitat within a given area.

Habitat diversity index- A measure of improvement in habitat diversity.

Halogenated VOCs - Volatile Organic Chemicals (VOCs) that are chemically composed of chlorine, bromine, or iodine. VOCs evaporate readily to the atmosphere and significantly contributes to photochemical smog production and certain health problems.

Hazardous Substance - 1. Any material that poses a threat to human health and/or the environment. Hazardous substances can be toxic, corrosive, ignitable, explosive, or chemically reactive.

Hazardous Waste - By-products of human activities that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity,

or toxicity), or appears on special EPA lists.

Heterogeneities - Soil that is varying in structure or composition at different locations in the area.

Hydrocarbon - A chemical compound that consists entirely of carbon and hydrogen.

Hydrologic cycle- Also called the water cycle, this is the process of water evaporating, condensing, falling to the ground as precipitation, and returning to the ocean as run-off.

Hydrology- The science dealing with the study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

Illicit Connection - Any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges authorized by an NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.

Impervious Area - A hard surface area (e.g., parking lot or rooftop) that prevents or retards the entry of water into the soil, thus causing water to run off the surface in greater quantities and at an increased rate of flow.

Indigenous (species)- Any species of wildlife native to a given land or water area by natural occurrence.

Intermittent stream- A stream that flows only at certain times of the year when it receives water from streams or from some surface source, such as melting snow.

Infiltration – 1. The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. 2. A land application technique where large volumes of wastewater are applied to land, allowed to penetrate the surface and percolate through the underlying soil.

Infiltration Rate (f) - The rate at which stormwater percolates into the subsoil measured in inches per hour.

Inlet - An entrance into a ditch, storm sewer, or other waterway.

Irrigation - Human application of water to agricultural or recreational land for watering purposes.

Landfills - An area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.

Leaching - The process by which soluble constituents are dissolved in a solvent such as water and carried down through the soil.

Level Spreader - A device used to spread out storm water runoff uniformly over the ground surface as sheetflow (i.e., not through channels). The purpose of level spreaders are to prevent concentrated, erosive flows from occurring and to enhance infiltration.

Liner - 1. A relatively impermeable barrier designed to prevent leachate from leaking from a landfill. Liner materials include plastic and dense clay. 2. An insert or sleeve for sewer pipes to prevent leakage or infiltration.

Live Fascines - A bank protection measure consisting of bound and staked rolls of live willow and dogwood cuttings which are laid in trenches that run along the tops of stream banks. The vegetative cuttings grow quickly to establish a shrubby riparian edge which helps to shade the creek and resist bank erosion. The new riparian vegetation also provides habitat for a variety of wildlife.

Live Crib Walls - A bank protection structure in which logs are spiked together and backfilled with soil. Live stakes are planted between the logs. The logs act to retain the soil which when compacted provides a moderate mass for retaining steep slopes. The vegetative cuttings provide shade and erosion protection. These walls are used where habitat is essential at areas of severe slope.

Low flow channel - An incised or paved channel from inlet to outlet in a dry basin which is designed to carry low runoff flows and/or baseflow, directly to the outlet without detention.

Master Plans - Master Plans are long range plans, integrating infrastructure requirements for present and future land use with environmental planning principles. These plans examine the whole infrastructure system in order to outline a framework for planning for subsequent projects and/or developments.

Mitigation – The activities carried out, or proposed, by a proponent of an undertaking to minimize or ameliorate the environmental effects of the undertaking.

Monitoring – The activities carried out by the proponent after approval of an undertaking to determine the environmental effects of the undertaking ("effects monitoring"). Monitoring can also refer to those activities carried out by the MOE

in ensuring that a proponent complies with the EA as accepted and the terms and conditions of the approval of the undertaking ("compliance monitoring"). "Effectiveness monitoring" is a third type of monitoring in which a proponent evaluates how effectively its class EA parent document or proposal, plan or program EA is working in the planning and implementation of its class EA projects or constituent undertaking, respectively.

Naturescaping - Naturescaping is a way of inviting wildlife into your backyard by using native plants that provide shelter, food, and water for our urban wildlife neighbors

Nitrification - The biochemical transformation of ammonium nitrogen to nitrate nitrogen.

Nonpoint Source Pollution - Pollution that does not come from a point source. Nonpoint source pollution originates from aerial diffuse sources that are mostly related to land use.

Nutrient Cycle- The circulation of chemical elements and compounds, such as carbon and nitrogen, in specific pathways from the non-living parts of ecosystems into the organic substances of the living parts of ecosystems, and then back again to the non-living parts of the ecosystem. For instance, nitrogen in wood is returned to the soil as the dead tree decays; the nitrogen again becomes available to living organisms in the soil, and upon their death, the nitrogen is available to plants growing in that soil.

Off-Line - A management system designed to control a storm event by diverting a percentage of stormwater events from a stream or storm drainage system.

Oil and Grease Traps - Devices which collect oil and grease, removing them from water flows.

On-Line - A management system designed to control stormwater in its original stream or drainage channel.

Open Space - Land set aside for public or private use within a development that is not built upon.

Outfall -The point, location, or structure where wastewater or drainage discharges from a sewer pipe, ditch, or other conveyance to a receiving body of water.

Outlet - The point at which water discharges from such things as a stream, river, lake, tidal basin, pipe, channel or drainage area.

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perennial stream- A stream that flows throughout the year and from source to mouth.

Permeability - The quality of a soil that enables water or air to move through it. Usually expressed in inches/hour or inches/day.

Permeable - Soil or other material that allows the infiltration or passage of water or other liquids.

Permit - An authorization, license, or equivalent control document issued by EPA or an approved State agency to implement the requirements of an environmental regulation; e.g., a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Phytoremediation - the use of trees and plants to help clean up toxic waste sites

Point Source - Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

Pond - Still deep water area in a natural or constructed depression with little vegetation throughout.

Porous Pavement - A human-made surface that will allow water to penetrate through and percolate into soil (as in porous asphalt pavement or concrete). Porous asphalt pavement is comprised of irregular shaped crush rock precoated with asphalt binder. Water seeps through into lower layers of gravel for temporary storage, then filters naturally into the soil.

Precipitation - Any form of rain or snow.

predator- An animal that lives by preying on other animals. Predators are at or near the tops of food chains.

Proposal, Plan Or Program EA - An EA for a group of related undertakings and/or initiatives which are proposed collectively to achieve the same purpose.

Rain Barrels - Barrels designed to collect and store rooftop runoff.

Recharge Rate - Annual amount of rainfall which contributes to groundwater as a function of hydrologic soil group.

Reclaim (water reclamation) - Planned use of treated effluent that would otherwise be discharged without being put to direct use.

Recycle - The process of minimizing the generation of waste by recovering usable products that might otherwise become waste. Examples are the recycling of aluminum cans, wastepaper, and bottles.

Redevelopment - Any construction, alteration, or improvement exceeding five thousand square feet of land disturbance performed on sites where existing land use is commercial, industrial, institutional, or multifamily residential.

Rehabilitation - To restore to good or normal condition

Remedial - Fix a problem. i.e. remedial action on a stream to improve erosion conditions.

Remediation - Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a (Superfund) site.

Residual - Amount of pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after the air passes through a scrubbing or other pollutant removal process.

Resilience- The ability of an ecosystem to maintain diversity, integrity, and ecological processes following a disturbance.

Retention - The amount of precipitation on a drainage area that does not escape as runoff. It is the difference between total precipitation and total runoff.

Retrofit - The modification of storm water management systems in developed areas through the construction of wet ponds, infiltration systems, wetland plantings, stream bank stabilization, and other BMP techniques for improving water quality. A retrofit can consist of the construction of a new BMP in the developed area, the enhancement of an older storm water management structure, or a combination of improvement and new construction.

Return interval - A statistical term for the average time of expected interval that an event of some kind will equal or exceed given conditions (e.g., a stormwater flow that occurs every 2 years).

Reuse (water reuse) - (see Reclaim)

Riparian - A relatively narrow strip of land that borders a stream or river, often coincides with the maximum water surface elevation of the 100 year storm.

Riparian Area – Vegetated ecosystems along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding.

Riparian ecosystem- The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

Riparian Habitat - Areas adjacent to rivers and streams that have a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

Roughness Coefficient (Hydraulics) - A factor in velocity and discharge formulas representing the effect of channel roughness on energy losses in flowing water. Manning’s “n” is a commonly used roughness coefficient.

Runoff - That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into the receiving waters.

Sanitary Sewer - A system of underground pipes that carries sanitary waste or process wastewater to a treatment plant.

Sanitary Waste – Domestic sewage.

Sediment Trap - A device for removing sediment from water flows; usually installed at outfall points.

Sedimentation - The process of depositing soil particles, clays, sands, or other sediments that were picked up by flowing water.

Sediments - Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers, and harbors, destroying fish-nesting areas and holes of water animals and cloud the water so that needed sunlight might not reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to be washed off the land after rainfalls.

Sheet Flow – Water, usually storm runoff, flowing in a thin layer over the ground surface.

Slide Gate - A device used to control the flow of water through storm water conveyances.

Sludge - A semi-solid residue from any of a number of air or water treatment processes. Sludge can be a hazardous waste.

Soil - The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of plants.

Soakaway Pit - A pit into which liquids may flow and then percolate slowly into the subsoil.

Source Control - A practice or structural measure to prevent pollutants from entering storm water runoff or other environmental media.

Stakeholder - Any person, agency or group who has a direct interest in the purpose of a proposed undertaking.

Stormceptor - Manufacturer of stormwater quality treatment devices.

Storm Drain - A slotted opening leading to an underground pipe or an open ditch for carrying surface runoff.

Storm Water – Includes storm water runoff, snow melt runoff, surface runoff and drainage. It excludes infiltration.

Stormwater Ponds - A land depression or impoundment created for the detention or retention of stormwater runoff.

Stormwater Wetlands – Shallow, constructed pools that capture stormwater and allow for the growth of characteristic wetland vegetation.

Stratigraphy - The order and relative position of strata, which is a layer or set of successive layers of any deposited substance.

Streamflow - Water flowing in a natural channel, above ground.

Stewardship- Caring for the land and its resources to pass healthy ecosystems to future generations.

Successional Stage - A stage of development of a plant community as it moves from bare ground to climax. The grass-forb stage of succession precedes the woody shrub stage.

Succession- The natural replacement, in time, of one plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.

Sump - A pit or tank that catches liquid runoff for drainage or disposal.

Surface Capping - A layer of clay, or other impermeable material installed over contaminated soil to prevent the entry of rainwater, eliminate direct exposure to contaminated soils, and minimize leachate and the emission of soil gases.

Surface Water - All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams,

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wetlands impoundments, seas, estuaries, etc.); also refers to springs, wells, or other collectors which are directly influenced by surface water.

Sustainability- The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

Swale – Drainage course with no visible bed or banks. Conveys runoff on an intermittent basis.

Thalweg - Line joining the lowest points of successive cross-sections, either along a river channel or, more generally, along the valley that it occupies. More specifically, a thalweg is the line of the fastest flow along the course of a river. This usually crosses and re-crosses the stream channel.

Topography - The physical features of a surface area including relative elevations and the position of natural and human-made features.

Total Phosphorus (TP) – The total amount of phosphorus that is contained within the water column.

Total Suspended Solids (TSS) - The total amount of particulate matter that is suspended in the water column.

Treatment - The act of applying a procedure or chemicals to a substance to remove undesirable pollutants.

Tributary - A river or stream that flows into a larger river or stream.

Turbidity - Describes the ability of light to pass through water. The cloudy appearance of water caused by suspended and colloidal matter (particles).

Two-Year Storm - The 24 hour storm event which exceeds bankfull capacity and occurs on average once every two years (or has a likelihood of occurrence of 1/2 in a given year).

Underground Storage Tanks (USTs) - Storage tanks with at least 10 percent or more of its storage capacity underground.

Understory- The trees and woody shrubs growing beneath the overstory in a stand of trees.

Urbanization - Changing land use from rural characteristics to urban (city-like) characteristics.

Ultrafiltration - The process in which hydrostatic pressure causes water and small dissolved molecules and ions to move across a membrane against a concentration gradient.

U.V. Disinfection - A process of disinfecting that involves subjecting the item, object, or instrument to ultraviolet radiation.

Waste – Unwanted materials left over from a manufacturing or other process.

Water Surface Profile - The longitudinal profile assumed by the surface of a stream flowing in an open channel; the hydraulic grade line.

Water Table - The upper surface or top of the saturated portion of the soil or bedrock layer, indicates the uppermost extent of groundwater.

Water Yield- The runoff from a watershed, including groundwater outflow.

Watercourse – drainage course with visible bed and banks. Conveys runoff on an intermittent or continuous basis.

Watershed - The topographic boundary within which water drains into a particular river, stream, wetland, or body of water.

Waterway – A channel for the passage or flow of water.

Wet pond – A stormwater management pond designed to detain urban runoff and always contain water.

Wet Well - A chamber used to collect water or other liquid and to which a pump is attached.

Wetlands – still shallow water area in a natural depression with significant vegetation throughout.

Wind Break -Any device designed to block wind flow and intended for protection against any ill effects of wind.

Xeriscaping - a method of landscaping using rock gardens, cacti, and other plants that thrive in the desert as a means to conserve water.

List of Acronyms

14E	Fourteen Mile Creek East
14W	Fourteen Mile Creek West
16E	Sixteen Mile Creek East
16W	Sixteen Mile Creek West
AEM	Adaptive Environmental Management
AMSL	Above Mean Sea Level
ANSI	Areas of Natural and Scientific Interest
AOC	Area of Concern
ASL	Above Sea Level
BMP	Best Management Practice
BOD	Biological Oxygen Demand
CAA	Conservation Authorities Act
CAL	Compatible Adjacent Land Uses
COD	Chemical Oxygen Demand
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CTM	Critical Thermal Maximum
CUM	Field Meadow
CUS	Cultural Savannah
CUT	Cultural Thicket
CW	Cultural Woodlands
D ₅₀	Diameter at 50% passing
dbh	Diameter at Breast Height
DFO	Department of Fisheries and Oceans
DRC	Distributed Runoff Control
E	East
EA	Environmental Assessment
EC	Environment Canada
EIR	Environmental Implementation Report
ELC	Ecological Land Classification
EM	East Morrison Creek
END	Endangered
EPA	Environmental Protection Area
EPT	Ephemeroptera, Plecoptera and Trichoptera
ESA	Environmentally Sensitive Area
ET	Evapotranspiration
EXP	Extirpated
EXT	Extinct
FOD	Deciduous Forest Type
FON	Federation of Ontario Naturalists
GAWSER	Guelph Agricultural Watershed Storm Event Runoff Model
GO	Glen Oak Creek
GTA	Greater Toronto Area
h	Rare in Halton Region
ha	Hectare
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HUSP	Halton Urban Structure Plan
I	Infiltration
IAR	Interagency Review
JC	Joshuas Creek

km	kilometer
L	Locally Rare in Site District
m	meter
M	Mega
MC	McCraney Creek
MCCR	Ministry of Citizenship, Culture and Recreation
MMAH	Ministry of Municipal Affairs and Housing
MMM	Marshall Macklin and Monaghan
MNR	Ministry of Natural Resources
MOC	Morrison Creek
MOE	Ministry of Environment
MOEE	Ministry of Environment and Energy, now known as Ministry of Environment
MTO	Ministry of Transportation
MUN	Munns Creek
NHIC	Natural Heritage Information Centre
NONHIA	North Oakville Natural Heritage Inventory and Analysis
NRSI	Natural Resource Solutions Inc.
OBBA	Ontario Bird Banding Association
OBM	Ontario Base Map
ODWS	Ontario Drinking Water Standard
OMAFRA	Ontario Ministry of Agriculture and Food
OMNR	Ontario Ministry of Natural Resources
OP	Official Plan
OPA	Official Plan Amendment
ORC	Ontario Realty Corp
P	Precipitation
PAH	Polynuclear Aromatic Hydrocarbon
PMA	Percent Model Affinity
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PWQO	Provincial Water Quality Objective
QEW	Queen Elizabeth Way
R	Runoff
RDRS	Redside Dace Recovery Strategy
RDRT	Redside Dace Recovery Team
RGA	Rapid Geomorphic Assessment
RM	Regional Municipality
ROW	Right of Way
RSAT	Rapid Stream Assessment Technique
S	Groundwater Storage
SAC	Stakeholder Advisory Committee
SCH	Shannons Creek
SM	Sixteen Mile Creek
Srank	Provincial Ranking
SWM	Stormwater Management
SWMP	Stormwater Management Plan
TAC	Technical Advisory Committee
TC	Taplow Creek
TC	Transport Canada
TDS	Total Dissolved Solids
THR	Threatened
TKN	Total Kjeldahl Nitrogen

TOR	Terms of Reference
TP	Total Phosphorus
TRCA	Toronto Region Conservation Authority
TSH	Totten Sims Hubicki Associates
TSS	Total Suspended Solids
TWWFMMP	Toronto Wet Weather Flow Master Management Plan
VTEE	Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario
VU or VUL	Vulnerable
W	West
WS	Water Storage

LIST OF FISH SPECIES OBSERVED IN THE STUDY AREA

Status				Common Name	Scientific Name	N Oakville Study Area *	Sixteen Mile Creek	Morrison Creek	Joshua's Creek	Fourteen Mile Creek	Taplow Creek
COSEWIC (National Status)	MNR (Provincial Status)	Other	Introduced								
				CYPRINIDAE							
			+	Goldfish	<i>Carassius auratus</i>	1,2,7,23	2			1,2,(6),23,(23)	
SC	THR	P,T		Redside Dace	<i>Clinostomus elongatus</i>	1,7,23,26	(8)	(23),(33)		1,(2)(6),23,(23),26,(4)	
				Lake Chub	<i>Couesius plumbeus</i>		(8)				
			+	Common Carp	<i>Cyprinus carpio</i>	7,23	7,(8),23,(23)				
				Brassy Minnow	<i>Hybognathus hankinsoni</i>	7	7			(6),(23)	
NAR	NIAC			River Chub	<i>Nocomis micropogon</i>	7,23	7,(8),23,(23)				
				Emerald Shiner	<i>Notropis atherinoides</i>	7	7,23,(23)	(23)			
				Common Shiner	<i>Notropis cornutus</i>	2,7,23	7,(8),23,(23)	(23)	2,23,(23)	2,(4),(5),(6),23,(23)	
				Spottail Shiner	<i>Notropis hudsonius</i>		23,(23)				
SC	NIAC	P		Silver Shiner	<i>Notropis photogenis</i>		23,(23)				
NAR	NIAC			Rosyface Shiner	<i>Notropis rubellus</i>	7,23	7,(8),23,(23)				
				Northern Redbelly Dace	<i>Phoxinus eos</i>	7	7,23			(6),(23)	
NAR	NIAC			Bluntnose Minnow	<i>Pimephales notatus</i>	2,7,23,26	7,(8),23,(23)		(23)	2,(4),(5),(6),23,(23),26	
				Fathead Minnow	<i>Pimephales promelas</i>	1,6,7,23,26	23,(23)	2,23,(23)	23,(23)	1,2,(4),(5),(6),23,(23),26,(26)	(23)
				Blacknose Dace	<i>Rhinichthys atratulus</i>	1,2,7,23,26	7,(8),23,(23)	1,2,23,(23),(33)	2,23,(23)	1,2,(4),(5),(6),23,(23),26	
				Longnose Dace	<i>Rhinichthys cataractae</i>	7,8,23	7,8,23,(23)			(5),(6)	
				Creek Chub	<i>Semotilus atromaculatus</i>	1,2,7,8,23,26	7,8,23,(23)	1,2,23,(23),(33)	2,23,(23)	1,2,(2),(4),(5),(6),23,(23),26	(23)
				CENTRARCHIDAE							
				Rock Bass	<i>Ambloplites rupestris</i>	1,7,23	1,7,(8),23,(23)				
NAR	NIAC			Green Sunfish	<i>Lepomis cyanellus</i>	23				23	
				Pumpkinseed	<i>Lepomis gibbosus</i>	1,7,23	(8),23,(23)			1,(6)	
				Largemouth Bass	<i>Micropterus salmoides</i>	2,7,23,26	7,23,(23)			2,(6),23,(23),26	
				Smallmouth Bass	<i>Micropterus dolomieu</i>	7,8,23	7,8,23,(23)			2,(6)	
				GASTEROSTEIDAE							
				Brook Stickleback	<i>Culaea inconstans</i>	1,2,7,23,24,26	(8),23,24	1,2,23,(23),(33)	2,(23)	1,2,(4),(6),23,(23),26	
				Threespine Stickleback	<i>Gasterosteus aculeatus</i>					(23)	

Status				Common Name	Scientific Name	N Oakville Study Area *	Sixteen Mile Creek	Morrison Creek	Joshua's Creek	Fourteen Mile Creek	Taplow Creek
COSEWIC (National Status)	MNR (Provincial Status)	Other	Introduced								
				CATOSTOMIDAE							
				White Sucker	<i>Catostomus commersoni</i>	1,2,7,23,26	7,(8),23,(23)	(23)	2,23,(23)	1,2,(4),(6),23,(23),26	23
				Northern Hog Sucker	<i>Hypentelium nigricans</i>	8	7,8,23,(23)				
				PERCIDAE							
				Rainbow Darter	<i>Etheostoma caeruleum</i>	7,8,23	7,8,23,(23)			23	
			L	Iowa Darter	<i>Etheostoma exile</i>					(23)	
				Fantail Darter	<i>Etheostoma flabellare</i>	7,23	7,(8),23,(23)			(2),(4),(6),(23)	
				Johnny Darter	<i>Etheostoma nigrum</i>	23	(8)	23	23		
				Yellow Perch	<i>Perca flavescens</i>		(8)				
				PETROMYZONTIDAE							
			P	Silver Lamprey	<i>Ichthyomyzon unicuspis</i>	7				(6)	
			+	Sea Lamprey	<i>Petromyzon marinus</i>		(8),(23)				
				SALMONIDAE							
			+	Rainbow Trout	<i>Onchorhynchus mykiss</i>	7,23	7,23			23	
			+	Coho Salmon	<i>Onchorhynchus kitsutch</i>	23	(8),23				
			+	Chinook Salmon	<i>Onchorhynchus tshawytscha</i>	7,23	7,(8),23		23	(4),23	
			+	Brown Trout	<i>Salmo trutta</i>	7,23	7,23				
				Brook Trout	<i>Salvelinus fontinalis</i>	7	7				
				ICTALURIDAE							
				Brown Bullhead	<i>Ameiurus nebulosus</i>	8,23,26	8,23			23,(23),26	
				Stonecat	<i>Noturus flavus</i>	7,8,23	7,8,23,(23)				
				ANGUILLIDAE							
				American Eel	<i>Anguilla rostrata</i>		(8)				

*Note () - fish found in North Oakville but outside of subwatershed study boundary

1 NRSI, 2002
2 LGL, 2000

16 Atlas Square #17PU02, 1987
17 Atlas Square #17NJ90, 2001

Legend
+ Introduced Species

APPENDIX OO

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Electrofishing Results

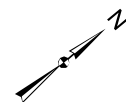
Stream	Site ID	Date	Water Temp (°C)	Habitat Sampled	Shocking Seconds	Length Sampled	Substrate	Species
McCraney	M - 1	05/06/02	19	Vegetation Small Riffles Vernal Pools	130	50m	Gravel, Sand, Silt Clay, Muck	No Fish Caught
Glen Oaks	G - 1	05/06/02	19	Pool	221	25m	Clay, Muck	No Fish Caught
Glen Oaks	G - 2	05/06/02	19	Pool	137	25m	Silt, Muck	No Fish Caught
Taplow	T - 1	05/06/02	17.5	Small Riffles Small Pools	110	40m	Sand, Clay, Muck	No Fish Caught
Fourteen Mile	F - a	04/17/02	Not Recorded	Riffle, Pool Vegetation	511	70m	Gravel, Silt Muck	Creek Chub
Fourteen Mile	F - b	04/18/02	18	Vegetation Small Riffles Pools	337	50m	Gravel, Silt Muck	Creek Chub
Fourteen Mile	F - c	04/25/02	11.5	Undercut Banks Riffle, Pool Woody Debris	107	40m	Sand, Muck Gravel	Creek Chub
Fourteen Mile	F - d	04/25/02	9.5	Riffle, Pool Undercut Banks Woody Debris Riffle, Pool	290	40m	Gravel, Sand Muck	Goldfish, Creek Chub White Sucker, Fathead Minnow Brook Stickleback * REDSIDE DACE
Fourteen Mile	F - e	04/25/02	8.5	Undercut Bank Vegetation	394	70m	Rubble, Gravel Muck	Creek Chub, Blacknose Dace Fathead Minnow, White Sucker Brook Stickleback
Fourteen Mile	F - f	04/24/02	14	Undercut Bank Riffle, Pool Woody Debris Riffle, Pool	410	70m	Rubble, Gravel Muck	Blacknose Dace Brook Stickleback Creek Chub, Fathead Minnow * REDSIDE DACE
Fourteen Mile	F - g	04/23/02	12.5	Undercut Bank Woody Debris Vegetation	71	25m	Rubble, Gravel Sand, Muck	Blacknose Dace Creek Chub Fathead Minnow
Fourteen Mile	F - h	04/18/02	23.5	Pool, Back Water	227	30m	Muck	Creek Chub Fathead Minnow
Fourteen Mile	F - I	04/18/02	25.5	Vernal Pool Vegetation	439	40m	Clay, Gravel	Creek Chub
Tributary to Sixteen Mile Creek	AB	04/17/02	n/a	Riffle, Pool Woody Debris	129	35	Gravel, Muck	rock bass goldfish
Tributary to Sixteen Mile Creek	AC	04/17/02	n/a	Riffle, Pool Vegetation Woody Debris	167	50	Silt, Muck Detritus	No Fish Sampled
West Morrison Creek	W - 1	04/23/02	5.5	Riffle, Pool Vegetation Undercut Bank	182	50	Muck	No Fish Sampled
West Morrison Creek	W - 2	04/23/02	n/a	Riffle, Pool	180	35	Sand, Gravel	No Fish Sampled

Electrofishing Results

Stream	Site ID	Date	Water Temp (°C)	Habitat Sampled	Shocking Seconds	Length Sampled	Substrate	Species
				Vegetation			Muck	
East Morrison Creek	E - 1	04/23/02	7.5	Riffle, Pool Undercut Bank	331	50	Sand, Muck	creek chub blacknose dace brook stickleback
East Morrison Creek	E - 2	04/23/02	7.5	Sandy Riffle, Pool Undercut Bank	467	50	Sand, Gravel Rubble, Muck	creek chub blacknose dace brook stickleback
East Morrison Creek	E - 3	04/23/02	9.5	Sandy Riffle Small Pools	110	40	Sand, Muck	brook stickleback
Joshua Creek	J - 1	04/17/02	n/a	Small Pools Vegetation	30	20	Muck	No Fish Sampled
Joshua Creek	J - 2	04/17/02	n/a	Pool Vegetation	46	25	Muck	No Fish Sampled
Joshua Creek	J - 3	04/17/02	n/a	Pool, Vegetation Woody Debris	138	30	Muck	No Fish Sampled
Joshua Creek	J - 4	04/17/02	n/a	Small Riffles Small Pools Vegetation	45	30	Sand, Gravel Muck	No Fish Sampled
Joshua Creek	J - 5	04/17/02	n/a	Flats Vernal Pool Vegetation	152	50	Muck	No Fish Sampled



NORTH OAKVILLE CREEKS SUBWATERSHED STUDY



0
|
Meters

Legend

- Road
- Watercourse
- West Study Area
- Electrofishing Station
- Macro Invertebrate Sampling Station
- Reach Break
- Reaches not included in Aquatic Survey

Fisheries Sampling Sites

- Fourteen Mile Creek MNR Fisheries Sampling Site (2002/2003)
- Sixteen Mile Creek MNR Fisheries Sampling Site (2002/2003)

West Study Area

Aquatic Survey Map

Figure 4W.9.3



August 2006

Free to Dave S
Ray-T

UPDATED WITH
ALL
FISH RECORDS
FROM OTHER SOURCES

**NORTH OAKVILLE VICINITY -
ADDITIONAL FISH RECORDS BY WATERSHED
ONTARIO MINISTRY OF NATURAL RESOURCES AURORA DISTRICT
JULY 22, 2003**

**NORTH OAKVILLE VICINITY-ADDITIONAL FISH RECORDS BY
WATERSHED ONTARIO MINISTRY OF NATURAL RESOURCES,
AURORA DISTRICT
22/07/2003**

Table 2. Additional Fish Records by Watershed in North Oakville

Fourteen Mile Creek Watershed		
Fish Dot	Date	Species Present
2F	4/29/03	No fish found
4F	9/25/02	Blacknose Dace, Brook Stickleback, Brown Bullhead, Creek Chub, Fathead Minnow, White Sucker Redside Dace (2, total length 65, 70 mm)
5F	9/25/02	Blacknose Dace, Creek Chub, White Sucker
6F	1972	Bluntnose Minnow, Brook Stickleback, Creek Chub, Common Shiner, Fathead Minnow, Threespine Stickleback, White Sucker
8F	5/1/03	Blacknose Dace, Brook Stickleback, Creek Chub, Common Shiner, Fathead Minnow, White Sucker
8F	6/12/03	Blacknose Dace, Brook Stickleback, Common Shiner, Creek Chub, Fathead Minnow, Largemouth Bass, White Sucker Redside Dace (3 green females - total lengths 67, 80, 77mm; 1 male - total length 86 mm)
9F	1972	Bluntnose minnow, Creek Chub, Common Shiner, Fantail Darter, Fathead Minnow, Largemouth Bass, Redbelly Dace, White Sucker
14F	6/12/03	Blacknose Dace, Creek Chub
14F	5/1/03	Blacknose Dace, Creek Chub, Fathead Minnow
15F	6/12/03	Blacknose Dace, Brook Stickleback, Brown Bullhead, Creek Chub, Fantail Darter, Fathead Minnow, Goldfish, White Sucker Redside Dace (1 green female - total length 72mm; 1 male - total length 80mm)
18F	6/5/03	Creek Chub, Fathead Minnow
25F	4/29/03	Creek Chub
25F	6/20/03	Fathead Minnow
26F	5/1/03	Blacknose Dace, Brook Stickleback, Creek Chub, Fathead Minnow, White Sucker
26F	5/5/03	Brook Stickleback, Brown Bullhead, Creek Chub, Fathead Minnow
27F	5/1/03	No fish found
27F	6/5/03	Blacknose Dace, Creek Chub, Fathead Minnow, White Sucker
28F	1972	Bluntnose Minnow, Brassy Minnow, Brook Stickleback, Creek Chub, Fathead Minnow, Redbelly Dace, Redside Dace , White Sucker
42F	9/25/02	Largemouth Bass
43F	6/20/03	Brook Stickleback, Fathead Minnow
44F	6/20/03	Blacknose Dace, Brook Stickleback, Brown Bullhead, Creek Chub, Fathead Minnow, White Sucker
44F	9/25/02	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brown Bullhead, Creek Chub, Fathead Minnow, White Sucker
45F	6/20/03	Unknown fish fry
46F	6/20/03	Largemouth Bass
47F	6/5/03	No fish found

Fourteen Mile Creek Watershed

47F	6/20/03	Fathead Minnow, Unknown fish fry
48F	6/5/03	No fish found
49F	9/25/02	Bluntnose Minnow, Brown Bullhead
50F	9/25/02	Fathead Minnow
51F	9/25/02	No fish found
52F	11/99	No fish found
52F	7/30/02	Fathead Minnow
53F	7/31/02	Fathead Minnow
54F	6/99	No fish found
54F	11/99	No fish found

Table 2. Additional Fish Records by Watershed in North Oakville

Taplow Creek (McCraney) Watershed		
Fish Dot	Date	Species Present
7T	6/12/03	Blacknose Dace
8T	6/12/03	Creek Chub
9T	6/5/03	No fish found
9T	6/20/03	No fish found
10T	6/20/03	No fish found

Table 2. Additional Fish Records by Watershed in North Oakville

Sixteen Mile Creek Watershed - Smaller Tributaries		
Fish Dot	Date	Species Present
1S	5/19/99	Minnow larvae, Rainbow Trout, River Chub, Smallmouth Bass
1S	6/17/99	Bluntnose Minnow, Creek Chub, Falntail Darter, Longnose Dace, Northern Hog Sucker, Rainbow Darter, Rainbow Trout, Creek Chub, Rock Bass, Smallmouth Bass, Stonecat, White Sucker
115S	9/14/93	Brown Bullhead, Creek Chub, Longnose Dace, Northern Hog Sucker, Rainbow Darter, Smallmouth Bass
272S	6/20/03	No fish found
273S	6/5/03	No fish found
274S	6/5/03	No fish found
275S	5/19/99	Minnow larvae, Rainbow Trout, River Chub, Smallmouth Bass

Sixteen Mile Creek Watershed - Morrison Creek Subwatershed		
Fish Dot	Date	Species Present
7S	8/31/00	Blacknose Dace, Brook Stickleback, Creek Chub, Redside Dace (2 individuals)
7S	4/29/03	Blacknose Dace, Brook Stickleback, Creek Chub
10S	6/14/00	Blacknose Dace, Creek Chub
10S	4/29/03	Blacknose Dace, Brook Stickleback, Creek Chub
13S	4/29/03	Blacknose Dace, Brook Stickleback, Creek Chub
14S	8/29/01	Creek Chub
14S	4/29/03	Creek Chub
20S*	1958	Creek Chub
20S*	6/14/00	Blacknose Dace, Brook Stickleback, Creek Chub
20S*	08/01	Creek Chub
20S*	08/31/00	Blacknose Dace, Brook Stickleback, Creek Chub
20S*	08/00	Blacknose Dace, Brook Stickleback, Creek Chub
54S	4/29/03	Creek Chub
56S	8/31/00	Blacknose Dace, Creek Chub
57S	4/29/03	No fish found
59S	8/25/03	Blacknose Dace, Brook Stickleback, Creek Chub
60S	6/25/03	Blacknose Dace, Creek Chub, Fathead Minnow
61S	6/25/03	No fish found

Note that 20S was formerly known as 14S on North Oakville & Vicinity Fisheries Sampling Sites Map, May 2003 and Table 2 Fish Records, May 2003

Table 2. Additional Fish Records by Watershed in North Oakville

Joshua Creek Watershed		
Fish Dot	Date	Species Present
11J	5/1/03	Blacknose Dace, Common Shiner, Creek Chub, White Sucker
25J	5/1/03	Creek Chub, Fathead Minnow, White Sucker
26J	5/1/03	No fish found
27J	5/1/03	No fish found
27J	6/25/03	No fish found
28J	5/1/03	No fish found
30J	5/1/03	No fish found
30J	6/25/03	Brook Stickleback
36J	6/25/03	Blacknose Dace, Brook Stickleback, Creek Chub Fathead Minnow, Fish Fry
37J	7/9/03	Unknown fish fry

Legend

- Redside Dace** Provincially Threatened Species
- F** Fourteen Mile Creek Watershed
- T** Taplow Creek (McCraney) Watershed
- S** Sixteen Mile Creek Watershed
- J** Joshua Creek Watershed

North Oakville Aquatic Evaluation

Date: _____ Waterbody/Drainage: _____ Reach ID: _____

Category	Rating Criteria	Findings	Comments
1. Flow	1. Flowing water in Channel 2. Channel Dry 3. Evidence of Ground Water Linkage	_____ _____ _____	
2. Seasonal Habitat Use	1. Evidence of spring spawning 2. Vernal pools present	_____ _____	
3. Vegetated Riparian Zone	1. Absent 2. Present + Less than 5m wide 3. Present + Greater than 5m wide	_____ _____ _____	
4. Canopy Cover	1. Absent 2. Present and <50% 3. Present and >50%	_____ _____ _____	
5. Channel Modifications and Disturbance	1. Channelized 2. Plowed Through 3. Channel Appears Natural	_____ _____ _____	
6. Separation from Agricultural Impact	1. Immediately adjacent (no buffer) 2. Immediately adjacent (with buffer) 3. Separated by >100m	_____ _____ _____	
7. Habitat Features	1. Riffle 2. Pool 3. Woody Debris 4. Boulder 5. Backwater 6. Undercut Banks 7. Vegetation	_____ _____ _____ _____ _____ _____ _____	
8. Channel Substrate	1. Silt 2. Clay 3. Muck 4. Sand 5. Gravel 6. Cobble 7. Boulder	_____ _____ _____ _____ _____ _____ _____	

9. Other Observations (i.e., water colour or turbidity, fish observed (species), water or air temperature if taken, barriers to fish passage,...etc.).

10. Photos Taken (upstream and downstream view): Y/N

<u>Photo #</u>	<u>Description</u>

Field Staff: _____



PROJECT NAME:		PROJECT NUMBER:	
WATERBODY:			
DRAINAGE SYSTEM:		APPR. REACH LENGTH (m):	
STATION NO.:	REPLICATE NO./TYPE:		
STATION LOCATION:		GPS CO-ORDINATES:	
DISTRICT/TOWNSHIP:			
SURVEY DATE:		TIME STARTED:	TIME FINISHED:
WATER TEMP. (°C):		AIR TEMP. (°C):	TIME TAKEN:
STREAM MORPHOLOGY (approx. % of reach sampled):			
Channel Depth (range (m)):		Channel Width (range (m)):	
Riffles:	Pools:	Runs:	Flats:
PLANT TYPE (approx. % of reach sampled):			
Submergent:	Floating:	Emergent:	None:
STREAM CANOPY (approx. % of stream shaded for reach sampled):			
Dense:	Moderate:	Open:	
INSTREAM COVER (approx. % of reach sampled):			
Dense:	Moderate:	Open:	
SUBSTRATE TYPE (approx. % of bottom type for reach sampled):			
Rock:	Boulder:	Cobble:	Gravel:
Silt:	Clay:	Muck:	Marl:
			Sand:
			Detritus:
LANDUSE (approx. % adjacent to station within 10-30m):			
Woodlot:	Meadow:	Crop:	Pasture:
Other:			
CURRENT (circle):			
Still	Slow	Moderate	Fast
WATER COLOUR (circle):			
Colorless	Blue/Green	Yellow/Brown	Turbid
BENTHIC HABITAT TYPES SAMPLED - QUALITATIVE (check off):			
Boulder:	Cobbles/Gravels:	Riffle:	Pool:
Backwater:	Woody Debris:	Margins:	Undercut Banks:
Instream Vegetation:	Overhanging Vegetative Areas:		
Other:			
SAMPLING METHODOLOGY:			
Preservative:			
PHOTOS TAKEN: Y/N			
<u>Photo #</u>	i.e.	<u>Description</u>	
		upstream view	
		downstream view	
		substrate view	
FIELD STAFF:			

STATION / SITE DRAWING:

(include: watercourse and name, station # and replicates, flow direction, adjacent landuse, riffle/pool/run habitat, roads and locality of station, approximate length of reach (m), side tributaries, north arrow, bridges, culverts, etc....)

GENERAL NOTES AND OBSERVATIONS:

(i.e. water quality sample taken at this station and proximate distance from benthic station, differences from previous years of monitoring, unusual conditions, reach have cattle access or is plowed through, fish observed, weather conditions, etc.....)





MNR Office Use:
Watershed: _____
Waterbody Name: _____
Fish Dot No.: _____

**Licence to Collect Fish for Scientific Purposes
Field Collection Record**

Licence No:		Licencee Name:			
Business Name:		Telephone:		Fax:	
Mailing Address:		Town/City		Postal Code:	
Waterbody Name:		Township/Municipality:			
General Description of Sampling Site Location/Access:					
Collection Site No. <input type="checkbox"/> of <input type="checkbox"/>		Site UTM Coordinates: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> E <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> N			
Collection Date:		Start Time:	End Time:	Duration (hrs)	
Electrofisher Seconds:		Length of Station (m)	Water Temp. (C)	Air Temp. (C)	
Stream Type: <input type="checkbox"/> Intermittent <input type="checkbox"/> Permanent		Watercress Present: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Waterbody Type: <input type="checkbox"/> Spring <input type="checkbox"/> Canal <input type="checkbox"/> Stream/River <input type="checkbox"/> River/Lake Junction <input type="checkbox"/> Flooded Area <input type="checkbox"/> Pool <input type="checkbox"/> Pond <input type="checkbox"/> Lake <input type="checkbox"/> Reservoir <input type="checkbox"/> Muskeg/Bog <input type="checkbox"/> Other (Describe) _____					
Bottom Type by Percent: (Total = 100%)	Rock	Boulder	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other (Description) _____				
Current: <input type="checkbox"/> Still <input type="checkbox"/> Slow <input type="checkbox"/> Medium <input type="checkbox"/> Fast <input type="checkbox"/> Quantitative (m/s) _____					
Water Colour/Clarity: <input type="checkbox"/> Colourless <input type="checkbox"/> Yellow/Brown <input type="checkbox"/> Blue/Green <input type="checkbox"/> Turbid <input type="checkbox"/> Other _____ Secchi Depth: (m) _____					
Aquatic Vegetation: <input type="checkbox"/> Submergent <input type="checkbox"/> Floating <input type="checkbox"/> Emergent <input type="checkbox"/> None					
Cover (Shore): <input type="checkbox"/> None <input type="checkbox"/> Sparse <input type="checkbox"/> Moderate <input type="checkbox"/> Dense <input type="checkbox"/> Other _____					
Cover (In Water): <input type="checkbox"/> None <input type="checkbox"/> Sparse <input type="checkbox"/> Moderate <input type="checkbox"/> Dense <input type="checkbox"/> Other _____					
Gear: <input type="checkbox"/> Seine <input type="checkbox"/> Gill Net <input type="checkbox"/> Dip Net <input type="checkbox"/> Angled <input type="checkbox"/> Trawl <input type="checkbox"/> Minnow Trap <input type="checkbox"/> Piscicide <input type="checkbox"/> Trap Net <input type="checkbox"/> Electrofisher <input type="checkbox"/> Surber <input type="checkbox"/> Other _____					
Size of Net (Gill or Seine Net)		Size of Net or Mouth		Mesh Size (cm)	
Length (m):		(Trap, Hoop or Trawl) (m):		Smallest:	Largest:
Selectivity of Sample: <input type="checkbox"/> All Kept <input type="checkbox"/> None Kept* <input type="checkbox"/> Some Kept* <input type="checkbox"/> No Catch * Record released fish on back.					
Date: Day <input type="checkbox"/> <input type="checkbox"/> Month <input type="checkbox"/> <input type="checkbox"/> Year <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
Collectors:					
Additional Data: (Pollution, Condition of Fish, Habitat Conditions)					

Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Identified By:				Date:

Station Diagram

include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught *must* also be included.

Benthic Invertebrate Sampling Methodology

Benthic invertebrate samples were collected on June 6th and June 7th, 2002 from West Morrison Creek, East Morrison Creek (West and East Branch) and Joshua Creek (at a downstream and upstream location). Sampling did not occur on Shannon's and Munn's Creek due to lack of stream flow. The locations of the five stations are shown on **Figure 4.9.2**.

Two replicates of quantitative samples were collected from each station according to the BioMAP methodology (MMHA 1998) using a Surber sampler (300 μ m mesh). The sampler was placed in the streambed and a standard area of sediment (0.09m²) was disturbed in front of the Surber sampler. As the sediment was disturbed, the stream flow carried the disturbed material into the net where anything larger than 300 μ m in size was trapped. For each sample, the sediment was disturbed for approximately 20 minutes.

In addition, a qualitative sample was collected from each station using the "travelling kick and sweep" sampling protocol method adopted from Protocols for Measuring Biodiversity – Benthic Macroinvertebrates in Fresh Waters (Rosenberg et al. 1997). The collection was done for a period of 3 to 5 minutes and incorporated all of the different habitats selected. Qualitative samples included all the different microhabitats present in order to gain a representative sample of the benthic invertebrates present at a given station. Great attempt was made to include: riffle, run and pool areas; woody debris; shoreline vegetation; large rocks and boulders; backwater pool areas; marsh; weeded pool; weeded run; and canopy cover. By collecting from a maximum number of these microhabitats, there is a greater chance of collecting the majority of the benthic invertebrate species present.

Once the sample was collected it was field sorted to remove large debris such as stones and detritus. Hard material was scrubbed and soft material was visually inspected to ensure that no benthic macroinvertebrates remained on the material before discarding.

All benthic macroinvertebrate samples were preserved in 10 percent buffered formalin and submitted to Invertebrate Taxonomic Service of Guelph, Ontario for identification and enumeration. At a minimum, benthic macroinvertebrates were identified to genus and where possible identified to species. A list of references used for the identification of the benthic invertebrate sampled is provided in Appendix XIV.

Jennifer Wright
Natural Resource Solutions Inc.
279 Weber Street North
Waterloo, Ontario
N2J 3H8

August 10, 2002

Dear Jennifer,

Re: North Oakville Subwatershed Study Invertebrate Identifications

We have finished the 27 North Oakville subwatershed study invertebrate samples. A copy of the results, list of taxonomic references used for the identifications are attached to this letter. You should have already received copies of these files by email.

Processing of these samples followed a simple routine that has been successful for other projects. A small amount of rose bengal stain was added prior to sorting to help improve sorting efficiency. To facilitate the sorting of large sized organic debris we used a multiple screen sorting procedure. Three (3) sieves in a series, 4 mm, 1 mm and 0.425 mm were used to help separate the different sized material and hopefully speeding the sorting process. The sample was then placed into the top sieve and rinsed with tap water to remove excess stain and field preservative. We then sorted all the material on each of the screen. The material in the two larger screen sizes we sorted by eye and that on the smallest mesh screen with the aid of a microscope. Small amounts of sediments from the smallest mesh sieve were placed into a petri dish and the invertebrates picked out with the assistance of a dissecting microscope, 6-10x. For taxa with very high numbers of individuals (e.g. 200+ specimens), excluding the worms and chironomids, we chose to pick the first 30 -50 specimens and only count the remainder. This saved considerable time and helped us to sort more of each sample. Using these procedures we completely sorted all the sediments from the surber samples and analysed 200 specimens from the Kick and sweep samples. Kick and sweep samples that did not contain 200 organisms were completely sorted.

Once sorted specimens were identified to the lowest practical level, species whenever possible, and enumerated. Oligochaeta and Chironomidae usually require some slide preparation to help identification (CMCP-9 mountant used). Chironomid were sorted into like groups and representatives slide mounted to confirm identification. Once identified the specimens were placed into labelled shell vials and preserved with 75% ethanol. The resulting data was compiled in a computer spreadsheet, EXCEL, and a list of taxonomic references used for our identifications is attached.

Your North Oakville samples contained only 59 taxa groups yet had a healthy number of specimens. The consistency in the invertebrate community between the samples was very interesting to me and suggests uniformity in habitat in this sub-watershed.

Best of luck with your report. Should you have any questions or find any problems feel free to call at any time. Thanks for this opportunity to work together and we look forward to doing so again in the near future.

Regards,

W. B. Morton (Bill)

William B. Morton
3 Woodridge Drive
Guelph, Ontario
N1H 7E3
(519) 763-4396

**Taxonomic References Used for the Identification
of North Oakville Subwatershed Study, Aquatic Invertebrates**

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2002.08.05

WBM

**AQUATIC HABITAT ASSESSMENT
BENTHIC INVERTEBRATE MONITORING**

PROJECT NAME:		PROJECT NUMBER:
WATERBODY:	STATION NO.:	REPLICATE NO./TYPE:
DRAINAGE SYSTEM:		APPR. REACH LENGTH (m):
STATION LOCATION:		COUNTY:
DISTRICT/TOWNSHIP:		

DATE:	TIME STARTED:	TIME FINISHED:
WATER TEMPERATURE (C):	AIR TEMPERATURE (C):	

STREAM MORPHOLOGY (approx. % of reach sampled):

Riffles:	Pools:	Runs:	Flats:
----------	--------	-------	--------

PLANT TYPE (approx. % of reach sampled):

Submergent:	Floating:	Emergent:	None:
-------------	-----------	-----------	-------

STREAM CANOPY (approx. % of stream shaded for reach sampled):

Dense:	Moderate:	Open:
--------	-----------	-------

INSTREAM COVER (approx. % of reach sampled):

Dense:	Moderate:	Open:
--------	-----------	-------

SUBSTRATE TYPE (approx. % of bottom type for reach sampled):

Rock:	Boulder:	Cobble:	Gravel:	Sand:	
Silt:	Clay:	Muck:	Marl:	Detritus:	

LANDUSE (approx. % adjacent to station within 10-30m):

Woodlot:	Meadow:	Crop:	Pasture:		
Other:					

CURRENT (circle): Still Slow Moderate Fast

WATER COLOUR (circle): Colorless Blue/Green Yellow/Brown Turbid

BENTHIC HABITAT TYPES SAMPLED - QUALITATIVE (check off):

Boulder:	Cobbles/Gravels:	Riffle:	Pool:
Backwater:	Woody Debris:	Margins:	Undercut Banks:
Instream Vegetation:		Overhanging Vegetative Areas:	

SAMPLING METHODOLOGY:

Preservative: _____

PHOTOS TAKEN: Y/N

<u>Photo #</u>	<u>Description</u>
	i.e. <i>upstream view</i> <i>downstream view</i> <i>substrate view</i>

FIELD COLLECTORS: _____

STATION / SITE DRAWING:

(include: watercourse and name, station # and replicates, flow direction, adjacent landuse, riffle/pool/run habitat, roads and locality of station, approximate length of reach (m), side tributaries, north arrow, bridges, culverts, etc....)

GENERAL NOTES AND OBSERVATIONS:

(i.e. water quality sample taken at this station and proximate distance from benthic station, differences from previous years of monitoring, unusual conditions, reach have cattle access or is plowed through, fish observed, weather conditions, etc.....)

BioMAP Water Quality Indices

The BioMAP (d) water quality index as described in MMHA (1998) is used to quantitatively indicate the degree of water quality impairment present in the stream. This water quality index is calculated by applying the following formula to the data:

$$WQ (d) = \left[\sum_{i=1}^n e^{sv_i} * \ln (x_i + 1) \right] \div \left[\sum_{i=1}^n \ln (x_i + 1) \right]$$

Where: sv_i is the sensitivity value of the i th taxon;
 x_i is the density of the i th taxon;
 n is the number of taxa in the sample;
 \ln is the natural logarithm; and
 e is an exponential constant = 2.718282.

A WQ (d) calculated value of 12 or greater would indicate that a stream was unimpaired, while a value of 10 or less would indicate an impaired system (MMHA 1998).

The BioMAP (q) water quality index is a qualitative approach used to estimate water quality (MMHA 1998). This index is based entirely on the taxa present at a given sample station.

The following is the formula used to calculate this index:

$$WQ (q) = \left[\sum_{i=1}^k sv_i \right], \text{ with } k = \text{integer } (n/4)$$

Where: sv_i is the sensitivity value of the i th ranked taxon ranked highest to lowest); and
 n is the total number of taxa at the sample station.

All the taxa from both the quantitative (surber sampler) and qualitative (kick net) samples are pooled into a single list and then ranked highest to lowest, based on their BioMAP sensitivity values. A minimum of four taxa must be present to apply this index. The BioMAP (q) index is then calculated by taking the average sensitivity value from the top $\frac{1}{4}$ (quartile) of the taxa list for that sample station. A value of 2.6 or less indicates impaired water quality where a value of 3.0 or greater suggests no impairment of water quality (MMHA 1998).

There is a “grey” zone that occurs between the values of 10 and 12 for BioMAP (d), and between the values 2.6 and 3.0 for BioMAP (q). This “grey” zone was established to deal with uncertainty among experts in classifying water quality (MMHA 1998). Any calculated value that falls within this “grey” area is therefore inconclusive in terms of water quality assessment.

The water quality classifications for creeks (< 4m bankfull width) are:

BioMAP (d)	>16 is unimpaired	<14 is impaired
BioMAP (q)	>3.4 is unimpaired	<3.2 is impaired

Percent Model Affinity (PMA) Index

The PMA methodology was developed as a means of measuring benthic macroinvertebrate community composition and relating it to aquatic ecosystem health. The development of this method involved the collection of 300 benthic invertebrate samples from 46 non-degraded streams in New York State. From these samples, an “ideal” community was described by grouping the taxa into seven major groups. The seven groups are:

- Ephemeroptera;
- Plecoptera;
- Trichoptera;
- Coleoptera;
- Chironomidae;
- Oligochaeta; and
- Other¹.

Of the seven groups forming the index: Ephemeroptera, Plecoptera, Trichoptera, and Coleoptera are considered to be the most sensitive organisms to water quality impairment or pollution, and the groups: Chironomidae, Oligochaeta, and Other are the most tolerant organisms (Novak and Bode 1992).

Based on the results of the non-degraded stream samples, Novak and Bode (1992) determined what percentage of the total invertebrates sampled should fall into each of the above mentioned categories, if the stream being sampled was not degraded. This then was termed the “model invertebrate community”. Once the model community was established, invertebrate communities collected at sample locations could be compared to the model community to determine the percent similarity of the sampled location to the model community. The equation used to determine the percent similarity of community (PSC) is as follows:

$$PSC = 100 - 0.5 \sum |a - b|$$

Where: a is the model community value for a taxonomic group; and
 b is the number of individuals of that taxonomic group in a 100-organism subsample from the sample location.

The index is calculated by summing the absolute difference between the model and the sample for the seven groups, multiplying the sum by 0.5 and subtracting this number from 100.

The detection criteria based on “kick and sweep” samples are:

- >64 non-impacted;
- 50-64 slightly impacted;
- 35-49 moderately impacted; and
- <35 severely impacted.

¹ This group includes Gammaridae and Hyalellidae (Amphipoda); Cambaridae (Decapoda); Asellidae (Isopoda); Ostracoda; Chaoboridae, Dixidae, Ephyridae, Sciomyzidae, Simuliidae, Stratiomyidae, and Tipulidae (Diptera); Corixidae, Gerridae (Hemiptera); Aeshnidae, Lestidae (Odonata); Sphaeriidae (Bivalvia); Lymnaeidae, Physidae and Planorbidae (Gastropoda); Nematoda; and Planariidae (Platyhelminthes).

Species Richness

Species Richness is the total number of species (taxa) present in a sample.

The detection criteria are:

>26 non-impacted;
19-26 slightly impacted;
11-18 moderately impacted; and
0-10 severely impacted.

EPT (Ephemeroptera, Plecoptera and Trichoptera) Index

EPT denotes the total number of species of mayflies (Ephemeroptera), stoneflies (Plecoptera) and caddisflies (Trichoptera) found in an average organism sample. These species are considered to be mostly clean-water organisms, and their presence generally is correlated with good water quality.

The detection criteria based on “kick and sweep” samples are:

>10 non-impacted;
6-10 slightly impacted;
2-5 moderately impacted; and
0-1 severely impacted.

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ EAST

SITE	W.Morris	W.Morris	W.Morris	E.Morr.W	E.Morr.W	E.Morr.W	E. Morr E.	E. Morr E.	E. Morr E.	Josh up	Josh up	Josh up	Josh down	Josh down	Josh down	
STATION	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	
REP *	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s	
DATE	02.06.06	02.06.06	02.06.06	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	
% Subsampled	100	100		100	100		100	100		100	100	100	100	100		
TAXA LIST																
ANNELIDA:HIRUDINEA																
ERPOBDELLIDAE:																
Juveniles																
<i>Erpobdella punctata</i>		1							1							
HIRUDINIDAE:																
<i>Haemopsis grandis</i>													1			
ANNELIDA:OLIGOCHAETA																
ENCHYTRAEIDAE:																
	3				1					3	15	13	2	6	1	
LUMBRICIDAE:(undetermined)																
<i>Eiseniella tetraedra</i>	29	1	8	7	1	2	3	4				9	6	119	155	51
LUMBRICULIDAE:																
<i>Lumbriculus variegatus</i>			1													
TUBIFICIDAE:																
Immature With Hairs	24			3			41	209	49	3	2	6	2		8	
Immature Without Hairs		14					1		1	2					2	
<i>Potamothrix moldaviensis</i>																
ACARINA																
CRUSTACEA:																
AMPHIPODA:																
CRANGONYCTIDAE:																
<i>Crangonyx sp.</i>	1	9	12								3	23	1		5	
GAMMARIDAE:																
<i>Gammarus pseudolimnaeus</i>				163	23	95	9	17	12							
HYALELLIDAE:																
<i>Hyaella azteca</i>										1						
DECAPODA:																
CAMBARIDAE:																
<i>Cambarus diogenes</i>															1	
<i>Orconectes "Juveniles"</i>																
<i>Orconectes propinquus</i>																

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ EAST

SITE	W.Morris	W.Morris	W.Morris	E.Morr.W	E.Morr.W	E.Morr.W	E. Morr E.	E. Morr E.	E. Morr E.	Josh up	Josh up	Josh up	Josh down	Josh down	Josh down
STATION	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9
REP *	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s
DATE	02.06.06	02.06.06	02.06.06	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07
% Subsampled	100	100		100	100		100	100		100	100	100	100	100	
TAXA LIST															
ISOPODA:															
ASELLIDAE:															
<i>Caecidotea</i>	650	512	100	74	23	49	289	326	87	2	2	1	2	9	39
INSECTA:															
COLEOPTERA:															
DRYOPIDAE:															
<i>Helichus lithophilus</i>															2
DYTISCIDAE:															
<i>Agabus</i>	2	5	6	4	3	4	20	14		4	4	35	6	9	11
<i>Hydroporus</i>		1	2	1		1	1				1	7	1	2	5
ELMIDAE:															
<i>Dubiraphia</i>							1	1							1
<i>Stenelmis</i>														3	2
HALIPLIDAE:															
<i>Haliphus</i>															
<i>Peltodytes sp.</i>															2
HYDROPHILIDAE:															
<i>Berosus</i>												2			
<i>Helophorus sp.</i>			1												
<i>Paracymus</i>												1			
DIPTERA:															
CERATOPOGONIDAE:															
												1			
CHIRONOMIDAE:															
CHIRONOMINAE															
<i>Chironomus</i>				1		1	3	22	18	4					1
<i>Tanytarsus</i>			2	1	1	2	3	3	3	3	4	3		2	9
DIAMESINAE:															
<i>Diamesa</i>							1			1	2	24		7	9
ORTHOCLADIINAE:															

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ EAST

SITE	W.Morris	W.Morris	W.Morris	E.Morr.W	E.Morr.W	E.Morr.W	E. Morr E.	E. Morr E.	E. Morr E.	Josh up	Josh up	Josh up	Josh down	Josh down	Josh down
STATION	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9
REP *	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s
DATE	02.06.06	02.06.06	02.06.06	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07
% Subsampled	100	100		100	100		100	100		100	100	100	100	100	
TAXA LIST															
<i>Corynoneura</i>															9
<i>Cricotopus sp.</i>							53	11					1	4	10
<i>Parametricnemus</i>				1							1				
TANYPODINAE:															
<i>Ablabesmyia</i>										1		8			1
<i>Conchapelopia</i>					2	1	1				1	1			
<i>Procladius</i>															1
CULICIDAE:															
MUSCIDAE:															
SIMULIIDAE:															
<i>Simulium</i>	20		1						1				3	6	5
STRATIOMYIDAE:															
<i>Nemotaulius</i>														1	
TIPULIDAE:															
<i>Hexatoma</i>												1			
<i>Limnophila</i>	1										1	1			1
<i>Tipula</i>			1												6
EPHEMEROPTERA:															
BAETIDAE:															
<i>Baetis propinquus</i>															
<i>Callibaetis</i>												2			
HEPTAGENIIDAE:															
<i>Heptagenia</i>												1			
LEPTOPHLEBIIDAE:															
<i>Paraleptophlebia</i>	2	108	34	3		35						24			5
PLECOPTERA:															
NEMOURIDAE:															
<i>Amphinemoura delosa</i>															
PERLODIDAE:															

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ EAST

SITE	W.Morris	W.Morris	W.Morris	E.Morr.W	E.Morr.W	E.Morr.W	E. Morr E.	E. Morr E.	E. Morr E.	Josh up	Josh up	Josh up	Josh down	Josh down	Josh down
STATION	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9
REP *	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s
DATE	02.06.06	02.06.06	02.06.06	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07	02.06.07
% Subsampled	100	100		100	100		100	100		100	100	100	100	100	
TAXA LIST															
<i>Perlesta placida</i>															3
PERLODIDAE:															
<i>Isoperla</i>				4	12	8							3	2	3
MOLLUSCA:BIVALVIA															
SPHAERIIDAE:															
<i>Musculium partumeium</i>															
<i>Pisidium</i>							1	3	28		1				
<i>Sphaerium striatinum</i>															
MOLLUSCA:GASTROPODA:															
LYMNAEIDAE															
<i>Fossaria exigua</i>						1									
<i>Pseudosuccinea columella</i>															1
PHYSIDAE:															
<i>Physella gyrina</i>	2	11	9	1		1									1
PLANORBIDAE:															
<i>Gyraulus circumstriatus</i>		12	8	1						1		6			
NEMATODA:															
PLATYHELMINTHES:															
PLANARIIDAE:															
<i>Cura foremanii</i>	35	3	15								1	3			5
TOTAL NUMBERS	769	677	200	264	66	200	427	611	200	25	48	168	142	206	200
TOTAL TAXA	11	11	14	13	8	12	14	11	9	11	15	20	12	12	29
* k + s represents the qualitative kick and sweep sample.															

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ WEST

SITE	14 Mile W	14 Mile W	14 Mile W	14 mile E	14 mile E	14 mile E	14 trib	14 trib	14 trib	16 trib	16 trib	16 trib
STATION	1	1	1	2	2	2	3	3	3	4	4	4
REP *	1	2	k + s	1	2	k + s	1	2	k + s	1	2	k + s
DATE	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06	02.06.06
% Subsampled	100	100		100	100		100	100		100	100	100
TAXA LIST												
ANNELIDA:HIRUDINEA												
ERPOBDELLIDAE:												
Juveniles				1		2						
<i>Erpobdella punctata</i>												
HIRUDINIDAE:												
<i>Haemopsis grandis</i>												
ANNELIDA:OLIGOCHAETA												
ENCHYTRAEIDAE:		1	2						1	5	2	25
LUMBRICIDAE:(undetermined)												
<i>Eiseniella tetraedra</i>	8	39	8	7	15	1	8	6	8	51	32	21
LUMBRICULIDAE:												
<i>Lumbriculus variegatus</i>												
TUBIFICIDAE:												
Immature With Hairs	46	27	3	16	3		14	127	12		1	1
Immature Without Hairs												
<i>Potamothrix moldaviensis</i>							35	60				
ACARINA												
CRUSTACEA:												
AMPHIPODA:												
CRANGONYCTIDAE:												
<i>Crangonyx sp.</i>			4			2	1		9	2	1	3
GAMMARIDAE:												
<i>Gammarus pseudolimnaeus</i>												
HYALELLIDAE:												
<i>Hyaella azteca</i>									3			
DECAPODA:												
CAMBARIDAE:												

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ WEST

<i>Cambarus diogenes</i>												
<i>Orconectes "Juveniles"</i>					1	2						
<i>Orconectes propinquus</i>						1						
ISOPODA:												
ASELLIDAE:												
<i>Caecidotea</i>	604	442	154	15	64	126	245	115	131	16	3	21
INSECTA:												
COLEOPTERA:												
DRYOPTIDAE:												
<i>Helichus lithophilus</i>												
DYTISCIDAE:												
<i>Agabus</i>	2	4	4	1	1	4	2	6	8	1		9
<i>Hydroporus</i>			2	1	2	1				2		2
ELMIDAE:												
<i>Dubiraphia</i>												
<i>Stenelmis</i>												
HALIPLIDAE:												
<i>Haliphus</i>									1			
<i>Pelodytes sp.</i>			1									
HYDROPHILIDAE:												
<i>Berosus</i>												
<i>Helophorus sp.</i>	1											1
<i>Paracymus</i>												
DIPTERA:												
CERATOPOGONIDAE:												
CHIRONOMIDAE:												
CHIRONOMINAE												
<i>Chironomus</i>												
<i>Tanytarsus</i>			1			1	3	2	12	4	1	10
DIAMESINAE:												
<i>Diamesa</i>	1	1										
ORTHOCLADIINAE:												
<i>Corynoneura</i>						1						
<i>Cricotopus sp.</i>			1		1			1				

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ WEST

<i>Parametriocnemus</i>			1									
TANYPODINAE:												
<i>Ablabesmyia</i>						1						
<i>Conchapelopia</i>		2		1								
<i>Procladius</i>												
CULICIDAE:												6
MUSCIDAE:												
SIMULIIDAE:												
<i>Simulium</i>	12	6	6									
STRATIOMYIDAE:												
<i>Nemotaulius</i>												1
TIPULIDAE:												
<i>Hexatoma</i>												
<i>Limnophila</i>						2	2	1	1			21
<i>Tipula</i>												
EPHEMEROPTERA:												
BAETIDAE:												
<i>Baetis propinquus</i>						1						
<i>Callibaetis</i>			1				1		1			
HEPTAGENIIDAE:												
<i>Heptagenia</i>	1	2		12	3	10	1					
LEPTOPHLEBIIDAE:												
<i>Paraleptophlebia</i>			6	5		31			4			11
PLECOPTERA:												
NEMOURIDAE:												
<i>Amphinemoura delosa</i>						1						
PERLODIDAE:												
<i>Perlesta placida</i>	2	2										
PERLODIDAE:												
<i>Isoperla</i>					1	1						
MOLLUSCA:BIVALVIA												
SPHAERIIDAE:												
<i>Musculium partumeium</i>						2						

North Oakville Subwatershed Study, Benthic Invertebrate Sample Identifications.

:RAW DATA _ WEST

<i>Pisidium</i>				1		1						
<i>Sphaerium striatinum</i>					1							
MOLLUSCA:GASTROPODA:												
LYMNAEIDAE												
<i>Fossaria exigua</i>			3			1			1			
<i>Pseudosuccinea columella</i>									3			
PHYSIDAE:												
<i>Physella gyrina</i>	3	3		1	3	4	3	1	2			
PLANORBIDAE:												
<i>Gyraulus circumstriatus</i>		1	1		2	3	1		3			
NEMATODA:						1						
PLATYHELMINTHES:												
PLANARIIDAE:												
<i>Cura foremanii</i>	4		3				1	1				1
TOTAL NUMBERS	684	530	201	61	97	200	317	320	200	81	40	133
TOTAL TAXA	11	12	17	11	12	23	13	10	16	7	6	14
* k + s represents the qualitative kick and sweep sample.												

**Water Sampling Results East of Sixteen Mile Creek
Background Coliform (CFU/100mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (CFU/100 mL)	Sample Date	
						26-Nov-02	20-Dec-02
				none	1	Dry CFU/100mL	Wet CFU/100mL
JC1	Joshua Creek	Joshua Creek			1	2200	>20000
JC2	Joshua Creek	Joshua Creek			1	5400	>20000
EM	East Morrison Creek	Morrison Creek			1	8200	>20000
WM	West Morrison Creek	Morrison Creek			1	6300	>20000
SH	Shannon's Creek	Shannon's Creek			1	Creek was Dry at time of Sampling	>20000

**Water Sampling Results East of Sixteen Mile Creek
Fecal Coliform (CFU/100mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (CFU/100 mL)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	1	Dry CFU/100mL	Wet CFU/100mL	Wet CFU/100mL	Dry (5 TMPN/ 100 mL)
JC1	Joshua Creek	Joshua Creek			1	<100	>20000	400	240
JC2	Joshua Creek	Joshua Creek			1	<100	>20000	660	130
EM	East Morrison Creek	Morrison Creek			1	<100	>20000	1300	>1600
WM	West Morrison Creek	Morrison Creek			1	<100	<100	840	350
SH	Shannon's Creek	Shannon's Creek			1	Creek was Dry at time of Sampling	<100	530	33

**Water Sampling Results East of Sixteen Mile Creek
Coliform (CFU/100mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (CFU/100 mL)	Sample Date		
						26-Nov-02	20-Dec-02	13-Aug-03
				none	1	Dry CFU/100mL	Wet CFU/100mL	Dry (5 TMPN/ 100 mL)
JC1	Joshua Creek	Joshua Creek			1	2300	>20000	>1600
JC2	Joshua Creek	Joshua Creek			1	1800	>20000	>1600
EM	East Morrison Creek	Morrison Creek			1	2300	>20000	>1600
WM	West Morrison Creek	Morrison Creek			1	1800	9700	>1600
SH	Shannon's Creek	Shannon's Creek			1	Creek was Dry at time of Sampling	2600	>1600

**Water Sampling Results East of Sixteen Mile Creek
E-Coli (CFU/100mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (CFU/100 mL)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				CFU/100 mL	1	Dry CFU/100mL	Wet CFU/100mL	Wet CFU/100mL	Dry (5 TMPN/ 100mL)
JC1	Joshua Creek	Joshua Creek		100	1	<100	>20000	370	240
JC2	Joshua Creek	Joshua Creek		100	1	<100	>20000	510	130
EM	East Morrison Creek	Morrison Creek		100	1	<100	>20000	310	>1600
WM	West Morrison Creek	Morrison Creek		100	1	<100	<100	740	350
SC	Shannon's Creek	Shannon's Creek		100	1	Creek was Dry at time of Sampling	<100	330	33

**Water Sampling Results East of Sixteen Mile Creek
Dissolved Nitrate mg/L**

Name	Creek	Tributary to	Location	PWQO*	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
					0.1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek		2.93	0.1	0.6	1.6	3.2	ND
JC2	Joshua Creek	Joshua Creek		2.93	0.1	0.6	1.1	3.8	1.7
EM	East Morrison Creek	Morrison Creek		2.93	0.1	6.6	2.3	1.0	5.5
WM	West Morrison Creek	Morrison Creek		2.93	0.1	1.5	2.2	1.7	0.1
SH	Shannon's Creek	Shannon's Creek		2.93	0.1	Creek was Dry at time of Sampling	0.4	4.1	ND

* Canadian Water Quality Guideline

**Water Sampling Results East of Sixteen Mile Creek
Total Suspended Solids (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek			1	ND	5	24	5
JC2	Joshua Creek	Joshua Creek			1	ND	3	25	ND
EM	East Morrison Creek	Morrison Creek			1	3	5	6	295
WM	West Morrison Creek	Morrison Creek			1	15	612	16	25
SH	Shannon's Creek	Shannon's Creek			1	Creek was Dry at time of Sampling	1210	31	7

**Water Sampling Results East of Sixteen Mile Creek
Total Phosphorus (P) mg/L**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				(mg/L)	0.02	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek		0.03	0.02	0.04	0.13	0.12	0.08
JC2	Joshua Creek	Joshua Creek		0.03	0.02	0.06	0.64	0.28	0.11
EM	East Morrison Creek	Morrison Creek		0.03	0.02	0.06	0.13	0.09	0.44
WM	West Morrison Creek	Morrison Creek		0.03	0.02	0.06	0.49	0.13	0.38
SH	Shannon's Creek	Shannon's Creek		0.03	0.02	Creek was Dry at time of Sampling	1.62	0.29	0.10

**Water Sampling Results East of Sixteen Mile Creek
Dissolved Nitrite mg/L**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	0.1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek			0.1	ND	ND	ND	ND
JC2	Joshua Creek	Joshua Creek			0.1	ND	ND	ND	ND
EM	East Morrison Creek	Morrison Creek			0.1	ND	ND	ND	ND
WM	West Morrison Creek	Morrison Creek			0.1	0.1	ND	ND	ND
SH	Shannon's Creek	Shannon's Creek			0.1	Creek was Dry at time of Sampling	ND	ND	ND

**Water Sampling Results East of Sixteen Mile Creek
TKN (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	0.1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek			0.1	0.4	1.2	1.9	1.0
JC2	Joshua Creek	Joshua Creek			0.1	0.8	3.0	2.0	1.1
EM	East Morrison Creek	Morrison Creek			0.1	0.4	1.1	1.0	2.0
WM	West Morrison Creek	Morrison Creek			0.1	0.5	1.0	1.7	1.2
SH	Shannon's Creek	Shannon's Creek			0.1	Creek was Dry at time of Sampling	3.6	2.9	0.7

**Water Sampling Results East of Sixteen Mile Creek
BOD₅ (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Sample Date			
					26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek			ND (3)	ND (4)	ND (4)	ND (3)
JC2	Joshua Creek	Joshua Creek			ND (3)	ND (4)	ND (4)	ND (3)
EM	East Morrison Creek	Morrison Creek			ND (3)	ND (4)	ND (4)	ND (3)
WM	West Morrison Creek	Morrison Creek			ND (3)	ND (4)	ND (4)	ND (3)
SH	Shannon's Creek	Shannon's Creek			Creek was Dry at time of Sampling	7	ND (4)	ND (3)

ND (4) Non detect at the laboratory detection limit of 4 mg/L

ND (3) Non detect at the laboratory detection limit of 3 mg/L

**Water Sampling Results East of Sixteen Mile Creek
Ammonia (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	0.5	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
JC1	Joshua Creek	Joshua Creek			0.5	ND	0.07	0.15	ND
JC2	Joshua Creek	Joshua Creek			0.5	ND	0.85	0.19	ND
EM	East Morrison Creek	Morrison Creek			0.5	ND	0.17	ND	0.05
WM	West Morrison Creek	Morrison Creek			0.5	ND	0.05	ND	0.07
SH	Shannon's Creek	Shannon's Creek			0.5	Creek was Dry at time of Sampling	0.06	ND	ND

ND(0.05) Non-detect at the laboratory detection limit of 0.05 mg/L

**Water Sampling Results West of Sixteen Mile Creek
Background (CFU/100 mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit	Sample Date	
						26-Nov-02	20-Dec-02
				none	(CFU/100 mL)	Dry (CFU/100 mL)	Wet (CFU/100 mL)
SM1	16 Mile Creek	16 Mile Creek			1	>2000	>20000
SM2	16 Mile Creek	16 Mile Creek			1	>20000	>20000
TC	Taplow Creek	Taplow Creek			1	>20000	>20000
MC	McCraney Creek	McCraney Creek			1	8400	>20000
FM1	14 Mile Creek	14 Mile Creek			1	12000	>20000
FM2	14 Mile Creek	14 Mile Creek			1	2900	>20000
FM3	14 Mile Creek	14 Mile Creek			1	11000	>20000
FM4	14 Mile Creek	14 Mile Creek			1	18000	>20000

**Water Sampling Results West of Sixteen Mile Creek
Fecal Coliform (CFU/100 mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	(CFU/100 mL)	Dry (CFU/100 mL)	Wet (CFU/100 mL)	Wet (CFU/100 mL)	Dry (5 TMPN/100 mL)
SM1	16 Mile Creek	16 Mile Creek			1	50	<100	17000	130
SM2	16 Mile Creek	16 Mile Creek			1	<100	<100	1100	creek was dry
TC	Taplow Creek	Taplow Creek			1	700	<100	1100	920
MC	McCraney Creek	McCraney Creek			1	<100	<100	880	>1600
FM1	14 Mile Creek	14 Mile Creek			1	<100	>20000	1000	280
FM2	14 Mile Creek	14 Mile Creek			1	<100	>20000	no sample taken	540
FM3	14 Mile Creek	14 Mile Creek			1	400	1800	>2000	creek was dry
FM4	14 Mile Creek	14 Mile Creek			1	2500	880	1300	130
FM5	14 Mile Creek	14 Mile Creek			1			5700	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Coliform (CFU/100 mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit	Sample Date	
						26-Nov-02	20-Dec-02
				none	(CFU/100 mL)	Dry (CFU/100 mL)	Wet (CFU/100 mL)
SM1	16 Mile Creek	16 Mile Creek			1	230	3100
SM2	16 Mile Creek	16 Mile Creek			1	>20000	4200
TC	Taplow Creek	Taplow Creek			1	3500	3300
MC	McCraney Creek	McCraney Creek			1	1800	3500
FM1	14 Mile Creek	14 Mile Creek			1	3500	>20000
FM2	14 Mile Creek	14 Mile Creek			1	2000	>20000
FM3	14 Mile Creek	14 Mile Creek			1	2000	4500
FM4	14 Mile Creek	14 Mile Creek			1	3100	4400

**Water Sampling Results West of Sixteen Mile Creek
E-Coli (CFU/100 mL)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				cfu/100 ml	(CFU/100 mL)	Dry (CFU/100 mL)	Wet (CFU/100 mL)	Wet (CFU/100 mL)	Dry (5 TMPN/100 mL)
SM1	16 Mile Creek	16 Mile Creek		100	1	50	<100	13000	130
SM2	16 Mile Creek	16 Mile Creek		100	1	<100	<100	920	creek was dry
TC	Taplow Creek	Taplow Creek		100	1	700	<100	830	920
MC	McCraney Creek	McCraney Creek		100	1	<100	<100	610	>1600
FM1	14 Mile Creek	14 Mile Creek		100	1	<100	<100	850	280
FM2	14 Mile Creek	14 Mile Creek		100	1	<100	>20000	no sample taken	540
FM3	14 Mile Creek	14 Mile Creek		100	1	400	1800	>20000	creek was dry
FM4	14 Mile Creek	14 Mile Creek		100	1	2500	880	1200	130
FM5	14 Mile Creek	14 Mile Creek		100	1			3600	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Dissolved Nitrate (mg/L)**

Name	Creek	Tributary to	Location	PWQO*	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
					0.1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek		2.93	0.1	0.7	0.2	3.3	7.2
SM2	16 Mile Creek	16 Mile Creek		2.93	0.1	ND	ND	ND(2.5)	creek was dry
TC	Taplow Creek	Taplow Creek		2.93	0.1	0.2	ND	11.3	1.3
MC	McCraney Creek	McCraney Creek		2.93	0.1	ND	c	19.3	1.9
FM1	14 Mile Creek	14 Mile Creek		2.93	0.1	4.9	1.3	3.4	
FM2	14 Mile Creek	14 Mile Creek		2.93	0.1	0.1	0.2	no sample taken	0.3
FM3	14 Mile Creek	14 Mile Creek		2.93	0.1	0.1	0.1	0.6	creek was dry
FM4	14 Mile Creek	14 Mile Creek		2.93	0.1	0.5	0.3	4.1	2
FM5	14 Mile Creek	14 Mile Creek		2.93	0.1			2.1	no sample taken

ND(0.1) Non-detect at the laboratory detection limit of 0.1 mg/L.

* Canadian Water Quality Guideline

**Water Sampling Results West of Sixteen Mile Creek
Dissolved Chloride (Cl) (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	3.8	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			3.8	2740	2930	491.0	497
SM2	16 Mile Creek	16 Mile Creek			3.8	1140	1720	401.0	creek was dry
TC	Taplow Creek	Taplow Creek			3.8	1240	1020	18.7	233
MC	McCraney Creek	McCraney Creek			3.8	1070	1280	15.7	612
FM1	14 Mile Creek	14 Mile Creek			3.8	1400	410	156.0	461
FM2	14 Mile Creek	14 Mile Creek			3.8	574	1330	no sample taken	1350
FM3	14 Mile Creek	14 Mile Creek			3.8	557	1280	232.0	creek was dry
FM4	14 Mile Creek	14 Mile Creek			3.8	303	449	120.0	768
FM5	14 Mile Creek	14 Mile Creek			3.8			290.0	no sample taken
Average						1128.00	1302.38	215.55	653.50

Guideline

250

**Water Sampling Results West of Sixteen Mile Creek
Total Suspended Solids (TSS) (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			1	16.0	1140	36.0	ND
SM2	16 Mile Creek	16 Mile Creek			1	19.0	50.0	24.0	creek was dry
TC	Taplow Creek	Taplow Creek			1	220	34.0	48.0	79
MC	McCraney Creek	McCraney Creek			1	1	160	49.0	178
FM1	14 Mile Creek	14 Mile Creek			1	46.0	45.0	67.0	17
FM2	14 Mile Creek	14 Mile Creek			1	61.0	4	no sample taken	27
FM3	14 Mile Creek	14 Mile Creek			1	2	4	24.0	creek was dry
FM4	14 Mile Creek	14 Mile Creek			1	540	11.0	81.0	135
FM5	14 Mile Creek	14 Mile Creek			1			69.0	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Total Phosphorus (P) (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				(mg/L)	0.02	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek		0.03	0.02	0.11	0.87	0.38	ND
SM2	16 Mile Creek	16 Mile Creek		0.03	0.02	0.06	0.19	0.18	creek was dry
TC	Taplow Creek	Taplow Creek		0.03	0.02	0.46	0.28	0.26	0.3
MC	McCraney Creek	McCraney Creek		0.03	0.02	0.07	0.19	0.31	0.6
FM1	14 Mile Creek	14 Mile Creek		0.03	0.02	0.10	0.53	0.11	0.11
FM2	14 Mile Creek	14 Mile Creek		0.03	0.02	0.07	0.11	no sample taken	0.25
FM3	14 Mile Creek	14 Mile Creek		0.03	0.02	0.05	0.19	0.85	creek was dry
FM4	14 Mile Creek	14 Mile Creek		0.03	0.02	0.24	0.02	0.25	1.91
FM5	14 Mile Creek	14 Mile Creek		0.03	0.02	no sample taken	no sample taken	0.21	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Dissolved Nitrite (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	0.1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			0.1	ND	ND	ND	ND
SM2	16 Mile Creek	16 Mile Creek			0.1	ND	ND	ND	creek was dry
TC	Taplow Creek	Taplow Creek			0.1	ND	ND	ND	ND
MC	McCraney Creek	McCraney Creek			0.1	ND	ND	ND	ND
FM1	14 Mile Creek	14 Mile Creek			0.1	0.10	0.1	ND	ND
FM2	14 Mile Creek	14 Mile Creek			0.1	ND	ND	no sample taken	ND
FM3	14 Mile Creek	14 Mile Creek			0.1	ND	ND	ND	creek was dry
FM4	14 Mile Creek	14 Mile Creek			0.1	ND	ND	ND	ND
FM5	14 Mile Creek	14 Mile Creek			0.1			ND	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Total Kjeldahl Nitrogen (TKN) (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	0.1	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			0.1	0.8	2.6	2.2	1
SM2	16 Mile Creek	16 Mile Creek			0.1	0.6	0.9	1.3	creek was dry
TC	Taplow Creek	Taplow Creek			0.1	2.9	1.3	2.2	2.4
MC	McCraney Creek	McCraney Creek			0.1	0.9	1.0	2.3	2.7
FM1	14 Mile Creek	14 Mile Creek			0.1	0.8	2.9	2.4	0.9
FM2	14 Mile Creek	14 Mile Creek			0.1	0.3	0.9	no sample taken	1.7
FM3	14 Mile Creek	14 Mile Creek			0.1	0.3	1.0	4.0	creek was dry
FM4	14 Mile Creek	14 Mile Creek			0.1	0.9	1.0	3.2	1.8
FM5	14 Mile Creek	14 Mile Creek						2.0	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Total COD (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	4	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			4	52.7	16.2	67.0	49.6
SM2	16 Mile Creek	16 Mile Creek			4	45.2	62.6	44.0	creek was dry
TC	Taplow Creek	Taplow Creek			4	76.3	40.4	50.0	88.4
MC	McCraney Creek	McCraney Creek			4	33.8	28.6	33.0	109
FM1	14 Mile Creek	14 Mile Creek			4	22.4	43.1	37.0	63.8
FM2	14 Mile Creek	14 Mile Creek			4	54.7	24.0	no sample taken	67
FM3	14 Mile Creek	14 Mile Creek			4	12.9	28.3	79.0	creek was dry
FM4	14 Mile Creek	14 Mile Creek			4	97.7	18.0	34.0	783
FM5	14 Mile Creek	14 Mile Creek						49.0	no sample taken

**Water Sampling Results West of Sixteen Mile Creek
Total BOD5 (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Sample Date			
					26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			ND(3)	8	ND(4)	ND(3)
SM2	16 Mile Creek	16 Mile Creek			ND(3)	9	ND(4)	creek was dry
TC	Taplow Creek	Taplow Creek			ND(6)	ND(4)	ND(4)	ND(3)
MC	McCraney Creek	McCraney Creek			ND(3)	ND(4)	ND(4)	ND(3)
FM1	14 Mile Creek	14 Mile Creek			ND(3)	8	ND(4)	ND(3)
FM2	14 Mile Creek	14 Mile Creek			ND(3)	ND(4)	no sample taken	6
FM3	14 Mile Creek	14 Mile Creek			ND(3)	ND(4)	4	creek was dry
FM4	14 Mile Creek	14 Mile Creek			ND(3)	ND(4)	ND(4)	ND(3)
FM5	14 Mile Creek	14 Mile Creek					ND(4)	no sample taken

ND(3) Non-detect at the laboratory detection limit of 3 mg/L

ND(4) Non-detect at the laboratory detection limit of 4 mg/L

**Water Sampling Results West of Sixteen Mile Creek
Ammonia (mg/L)**

Name	Creek	Tributary to	Location	PWQO	Detection Limit (mg/L)	Sample Date			
						26-Nov-02	20-Dec-02	2-May-03	13-Aug-03
				none	0.05	Dry (mg/L)	Wet (mg/L)	Wet (mg/L)	Dry (mg/L)
SM1	16 Mile Creek	16 Mile Creek			0.05	0.21	0.14	ND	ND
SM2	16 Mile Creek	16 Mile Creek			0.05	ND	0.06	ND	creek was dry
TC	Taplow Creek	Taplow Creek			0.05	0.40	0.08	ND	0.07
MC	McCraney Creek	McCraney Creek			0.05	0.09	0.08	ND	0.10
FM1	14 Mile Creek	14 Mile Creek			0.05	ND	0.66	0.47	0.07
FM2	14 Mile Creek	14 Mile Creek			0.05	ND	ND	no sample taken	0.07
FM3	14 Mile Creek	14 Mile Creek			0.05	ND	0.07	0.88	creek was dry
FM4	14 Mile Creek	14 Mile Creek			0.05	ND	0.25	1.37	0.05
FM5	14 Mile Creek	14 Mile Creek			0.05			ND	no sample taken

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
JOSHUA'S CREEK	JOSHUA'S CREEK							
JC15	JC-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC10/ JC15	JC-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC10	JC-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC10/ JC9	JC-4	Habitat is very common within the study area	Moderately sensitive to development	Habitat is important but not critical in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC9	JC-5	Habitat is rare within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	Groundwater discharge observed	Has not been modified or degraded (stream in natural state)	Not known to support VTE species or species of concern	Habitat is known to support cold water species
JC9	JC-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC9	JC-7	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC9	JC-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC7/ JC9	JC-9	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC7	JC-10	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC7	JC-10A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC8/ JC9	JC-11	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC6/ JC9	JC-12	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC6	JC-13	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC5/ JC6	JC-14	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC1/ JC2/ JC3/ JC5	JC-15	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC10/ JC8B/ JC9	JC-19	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC8B	JC-20	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
JC7B	JC-20A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC15	JC-22	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC17	JC-27	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC17	JC-27A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC17	JC-28	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC17	JC-29	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC15/ JC16	JC-30	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC16	JC-31	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
JC16	JC-31A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC16	JC-32	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
JC17	JC-36	Habitat is common within the study area	Low sensitivity to development	Habitat plays Important role in sustaining fisheries	Groundwater discharge observed	Has not been modified or degraded (stream in natural state)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
EAST MORRISON	EAST MORRISON							
EM1/ EM4	MOC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
EM1	MOC-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
EM1	MOC-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
EM1	MOC-5A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
EM2/ EM3/ EM4	MOC-6	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
WEST MORRISON	WEST MORRISON							
WM1/ WM2	MOC-W1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
WM1	MOC-W2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
WM1	MOC-W3	Habitat is very common within the study area	Low sensitivity to development	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
WM1	MOC-W5	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
14 MILE CREEK	14 MILE CREEK							
FM1109	14W-1	Habitat is common within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1109	14W-1A	Habitat is common within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1107/ FM1108	14W-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1108	14W-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1108	14W-4	Habitat is very common within the study area	Moderately sensitive to activities	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1108	14W-9	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1108	14W-9A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1006/ FM1108	14W-10	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1107	14W-11	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1107	14W-11A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1104/ FM1105	14W-12	Habitat is rare within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1105	14W-13	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
FM1105	14W-14	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1105	14W-14A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1104	14W-16	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1104	14W-17	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species

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SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
FM1108	14W-18	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat

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SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
FM1109	14W-20							
FM1111	14E-1	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111	14E-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111	14E-2A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111	14E-3	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111	14E-3A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111/ MC1012	14E-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
FM1111	14E-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111	14E-7	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1111	14E-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
FM1110.1	14E-9	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
FM1110.1	14E-10	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
McCRANEY CREEK	McCRANEY CREEK							
MC1114	MC-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
MC1114	MC-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
MC1114	MC-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
MC1114	MC-4A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
TAPLOW CREEK	TAPLOW CREEK							
TC1115	TC-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
TC1115	TC-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
TC1115	TC-2A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat

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SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
GLEN OAKS CREEK	GLEN OAKS CREEK							
GO1116	GO-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SHANNON'S CREEK	SHANNON'S CREEK							
SC1	SHC-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SC1	SHC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SC1	SHC-3	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
16 MILE CREEK	16 MILE CREEK							
ES5/ ES9	SMA-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES5/ ES8	SMA-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES8	SMA-3	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES7/ ES8	SMA-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES7	SMA-5	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES6/ ES7	SMA-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES5	SMA-7	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES5	SMA-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES5	SMA-9	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
ES4	SMB-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
ES4	SMB-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species

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SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
ES4	SMB-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES4	SMB-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES3	SMC-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES2/ ES3	SMC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES2	SMC-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
ES2	SMC-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
ES2	SMC-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16W-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SM1117	16W-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SM1117	16W-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SM1117	16W-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SM1117	16WA-1A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
SM1117	16WA-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-3	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-6	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-7	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-8	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
SM1117	16WA-8A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
MUNN'S CREEK	MUNN'S CREEK							
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat
MC2	MUN-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
MC1	MUN-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species
MC1	MUN-3							

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
JOSHUA'S CREEK	JOSHUA'S CREEK								
JC15	JC-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC10/ JC15	JC-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC10	JC-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC10/ JC9	JC-4	Habitat is very common within the study area	Moderately sensitive to development	Habitat is important but not critical in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC9	JC-5	Habitat is rare within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	Groundwater discharge observed	Has not been modified or degraded (stream in natural state)	Not known to support VTE species or species of concern	Habitat is known to support cold water species	Critical Habitat
JC9	JC-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC9	JC-7	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC9	JC-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC7/ JC9	JC-9	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC7	JC-10	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC7	JC-10A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC8/ JC9	JC-11	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC6/ JC9	JC-12	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC6	JC-13	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC5/ JC6	JC-14	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC1/ JC2/ JC3/ JC5	JC-15	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC10/ JC8B/ JC9	JC-19	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
JC8B	JC-20	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
JC7B	JC-20A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC15	JC-22	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC17	JC-27	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC17	JC-27A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC17	JC-28	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC17	JC-29	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC15/ JC16	JC-30	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC16	JC-31	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
JC16	JC-31A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC16	JC-32	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
JC17	JC-36	Habitat is common within the study area	Low sensitivity to development	Habitat plays Important role in sustaining fisheries	Groundwater discharge observed	Has not been modified or degraded (stream in natural state)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
EAST MORRISON	EAST MORRISON								
EM1/ EM4	MOC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
EM1	MOC-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
EM1	MOC-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
EM1	MOC-5A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
EM2/ EM3/ EM4	MOC-6	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
WEST MORRISON	WEST MORRISON								
WM1/ WM2	MOC-W1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
WM1	MOC-W2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
WM1	MOC-W3	Habitat is very common within the study area	Low sensitivity to development	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
WM1	MOC-W5	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
14 MILE CREEK	14 MILE CREEK								
FM1109	14W-1	Habitat is common within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
FM1109	14W-1A	Habitat is common within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
FM1107/ FM1108	14W-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-4	Habitat is very common within the study area	Moderately sensitive to activities	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-9	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1108	14W-9A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1006/ FM1108	14W-10	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1107	14W-11	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1107	14W-11A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1104/ FM1105	14W-12	Habitat is rare within the study area	Highly sensitive	Habitat plays critical role in sustaining fisheries	No groundwater discharge observed	Has not been modified or degraded (stream in natural state)	known to support VTE species or species of concern	Habitat is not known to support coldwater species	Critical Habitat
FM1105	14W-13	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1105	14W-14	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1105	14W-14A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1104	14W-16	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1104	14W-17	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat

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SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
FM1108	14W-18	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat

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SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1109	14W-20	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-2A	Habitat is very common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-3A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111/ MC1012	14E-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1111	14E-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-7	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
FM1111	14E-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
FM1110.1	14E-9	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
FM1110.1	14E-10	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
McCRANEY CREEK	McCRANEY CREEK								
MC1114	MC-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
MC1114	MC-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MC1114	MC-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MC1114	MC-4A	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
TAPLOW CREEK	TAPLOW CREEK								
TC1115	TC-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
TC1115	TC-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
TC1115	TC-2A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
GLEN OAKS CREEK	GLEN OAKS CREEK								
GO1116	GO-1	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SHANNON'S CREEK	SHANNON'S CREEK								
SC1	SHC-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
SC1	SHC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
SC1	SHC-3	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
16 MILE CREEK	16 MILE CREEK								
ES5/ ES9	SMA-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Has been somewhat modified or degraded but habitat features remain	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES5/ ES8	SMA-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES8	SMA-3	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES7/ ES8	SMA-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES7	SMA-5	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES6/ ES7	SMA-6	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES5	SMA-7	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES5	SMA-8	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES5	SMA-9	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
ES4	SMB-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
ES4	SMB-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
ES4	SMB-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES4	SMB-4	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES3	SMC-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES2/ ES3	SMC-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
ES2	SMC-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
ES2	SMC-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
ES2	SMC-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16W-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16W-2	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16W-3	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16W-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-1	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16WA-1A	Habitat is common within the study area	Moderately sensitive to activities	Habitat plays Important role in sustaining fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Important Habitat
SM1117	16WA-2	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-3	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-4	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-5	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-6	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-7	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat

APPENDIX X - AQUATIC HABITAT CATEGORIZATION

SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	RARITY OF HABITAT	SENSITIVITY TO DEVELOPMENT	FUNCTION OF HABITAT IN SUSTAINING FISHERIES	GROUNDWATER DISCHARGE	EXISTING LEVEL OF HABITAT DEGRADATION AND MODIFICATION	HABITAT SUPPORTS VTE SPECIES OR SPECIES OF CONCERN	COOL VS WARM WATER STATUS	AQUATIC HABITAT CATEGORIZATION
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-8	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
SM1117	16WA-8A	No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MUNN'S CREEK	MUNN'S CREEK								
		No habitat	No sensitivity to development	No habitat	No groundwater discharge observed	No habitat	No habitat	No habitat	No habitat
MC2	MUN-1	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
MC1	MUN-2	Habitat is very common within the study area	Low sensitivity to development	Habitat does not currently contribute to fisheries	No groundwater discharge observed	Highly modified or degraded (no buffer, channelized, or plowed through)	Not known to support VTE species or species of concern	Habitat is not known to support coldwater species	Marginal Habitat
MC1	MUN-3								

APPENDIX X - PHYSICAL STREAM CHARACTERISTICS

Fluvial Geomorphology												Hydrology/Hydraulic & Water Quality					Hydrogeology					
SUB-CATCHMENT AREA	STREAM REACH/ HABITAT UNIT (HU)	STREAM BED TYPE	BANK CONDITIONS	BED MORPHOLOGY	PRESENCE/ABSENCE OF BARRIERS	CONSTRAINTS & OPPORTUNITIES	SEDIMENT SUPPLY/TRANSPORT	CHANNEL DISTURBANCE	STREAM SENSITIVITY	REHABILITATION POTENTIAL	OVERALL GEOMORPHOLOGY CLASSIFICATION	ABILITY TO PROVIDE WATER QUALITY IMPROVEMENT	VALLEY PRESENT	HYDRAULIC CONVEYANCE CONDITION (ABILITY TO DETAIN/STORE STREAMFLOW)	LINKAGE TO HEADWATER FUNCTIONS	RELATIVE HYDROLOGIC FUNCTION	FLOW TYPE (FLOWING OR NOT FLOWING)	GROUNDWATER DISCHARGE OBSERVATIONS	INTERPRETED GROUNDWATER CONTRIBUTION TO STREAMFLOW		HYDROGEOLOGIC CONTRIBUTION TO STREAM HEALTH (FISHERIES, WETLANDS, ETC.)	
																				Perennial Flows	Seasonal Event-Based Flows	
JOSHUA'S CREEK	JOSHUA'S CREEK																					
JC15	JC-1	Cobble to clay/ exposed till	Some evidence of widening/ >50% basal scour	Well-developed channel morphology deep/wide pools	3 knickpoints	Medium High	Degradation: suspended armour layer, exposed till, scour pool d/s of culvert	Water pipes/ ad hoc bank armouring/ manicured lawns	High	Medium High	HIGH	Good	Well defined valley	Sig valley storage (Riparian)	Main Channel Conveyance, storage	HIGH	flowing (June 25, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC15	JC-1A	Gravel cobble riffles/ gravel sand pools/ Exposed till	Substantial bank erosion / some evidence of widening	Variable / meandering to riffle pool	none	Medium High	Aggradation: medial bar, siltation in pools, overbank deposition	Little riparian vegetation in golf course	High	Medium High	HIGH	Good	Well defined valley	Significant valley storage (Riparian)	Main Channel Conveyance, storage	HIGH	flowing (June 25, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC10/ JC15	JC-2	Shale (bedrock) cobbles pool / cobble and gravel riffles	Substantial bank erosion / evidence of widening	Variable / multiple channels	none	Medium High	Aggradation: medial bar, siltation in pools, overbank deposition	Grazing / trampled banks	High	Medium High	HIGH	Good	Well defined valley	Significant valley storage (Riparian)	Main Channel Conveyance, storage	HIGH	flowing (June 25, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC10	JC-3	Exposed till pools / gravel riffles	Some evidence of bank erosion	Meandering long pools short riffles	none	Potential Medium	Aggradation: riffles embedded, siltation in pools, overbank deposition	None	High	Medium High	HIGH	Good	Well defined valley	Significant valley storage (Riparian)	Main Channel Conveyance, storage	HIGH	flowing (June 25, 2002)	No groundwater discharge observed	Moderate	Low - Moderate	LOW	
JC10/ JC9	JC-4	Bedrock cobble and gravel	Bank erosion	Short riffles, long pools	none	Medium High	Aggradation: accretion on point bars, siltation in pools	None	Moderate High	Medium High	HIGH	Good	Well defined valley	Significant valley storage (Riparian)	Main Channel Conveyance, storage	HIGH	flowing (May 22, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC9	JC-5	Silt to sand	Substantial bank slumping	Poorly defined riffle-pool sequence	none	Potential Medium	Aggradation: riffles embedded, siltation in pools	None	Moderate	Medium	MEDIUM	Good	Defined valley-narrow	Valley Storage Conveyance	Main Tributary Conveyance Storage	HIGH	flowing (May 22, 2002)	Groundwater discharge observed	Moderate	Moderate	MODERATE	
JC9	JC-6	Silt to sand	Some bank slumping / poor due to grazing and trampling	Poorly defined riffle-pool sequence	Culvert	Potential Medium	Aggradation: riffles embedded, siltation in pools, overbank deposition	Likely straightened / grazing	High	Medium	MEDIUM	Moderate	Defined valley-narrow	Valley Storage Conveyance	Main Tributary Conveyance Storage	HIGH	flowing (May 22, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC9	JC-7	Silt to sand	Vegetated stable low banks	Poorly developed channel morphology	Dense vegetation in channel	Potential Medium	Aggradation: siltation in pools, overbank deposition	Likely straightened / agricultural	Moderate	Medium	MEDIUM	Low	No defined valley	Conveyance- Link to Sig Floodplain	Link to Headwaters	MEDIUM	flowing (May 22, 2002)	No groundwater discharge observed	Low	Low - Moderate	LOW	
JC9	JC-8	Silt to sand	Vegetated stable low banks	No channel morphology	Dense vegetation in channel	Potential Medium	Aggradation: siltation in pools, overbank deposition	Likely straightened / agricultural	Moderate	Medium	MEDIUM	Low	No defined valley	Major Floodplain Storage	Headwater Stream	MEDIUM	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC7/ JC9	JC-9	Silt clay sand	Vegetated	Straight / Poor channel morphology / Several channels / agricultural drainage	none	Potential Medium	Aggradation: overbank deposition	Straightened for drainage	Moderate	Medium	MEDIUM	Low	No defined valley	Major Floodplain Storage	Link to Headwaters	MEDIUM	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC7	JC-10	Silt to sand	Grazing / grassed	Vegetated channel / Poor channel morphology	On-line pond	Potential Low Medium	Aggradation: siltation in pools, overbank deposition	Likely straightened / grazing / on-line pond	Moderate	Medium High	MEDIUM	Low	No defined valley	Conveyance System	Headwater Stream, Minor Storage at Upstream end	MEDIUM	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC7	JC-10A	Silt to sand	Grazing / grassed	Vegetated channel / Poor channel morphology	On-line pond	Potential Low Medium	Aggradation: siltation in pools, overbank deposition	Likely straightened / grazing / on-line pond	Moderate	Medium High	MEDIUM	Low	No defined valley	Conveyance System	Headwater Stream, Minor Storage at	MEDIUM	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC8/ JC9	JC-11	Silt to sand	Wetland	Vegetated channel / no channel morphology	Cattails in channel	Potential Low Medium	Aggradation	none	High	Low Medium	MEDIUM	Moderate	No defined valley	Conveyance System	Headwater Stream	MEDIUM	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC6/ JC9	JC-12	Silt sand pool / some gravel in riffles	Little evidence of bank erosion	Single to multiple channel / chutes	Dense vegetation in channel	Potential Low Medium	Aggradation: riffles embedded, siltation in pools, overbank deposition	Tractor crossing	Moderate	Medium	MEDIUM	Moderate	Defined valley-narrow	Valley Storage Conveyance	Link to Headwaters	HIGH	flowing (May 22, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC6	JC-13	Silt sand pool / some gravel riffles	Dense vegetation in channel / slumping banks	Straight channel with little morphology	Tractor crossing	Potential Medium	Aggradation: siltation in pools, overbank deposition	Straightened / tractor crossing	Moderate	Medium	MEDIUM	Moderate	Defined valley-narrow	Valley Storage Conveyance	Link to Headwaters	HIGH	flowing (May 22, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC5/ JC6	JC-14	Swale	No banks	Swale	None	Potential Medium			Low Moderate	Low	LOW	Moderate	No defined valley	Conveyance System	Linkage to Headwater and Headwater Storage	MEDIUM	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC1/ JC2/ JC3/ JC5	JC-15	Silt - clay pool / sand - gravel riffle	Low banks	Riffle-pool with uniform width	None	Potential Low Medium	Aggradation: medial bar, riffles embedded, siltation in pools	None	Moderate	Medium	MEDIUM	Moderate	No defined valley	Conveyance System	Linkage to Headwater and Headwater Storage	MEDIUM	not flowing (May 22, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC10/ JC8B/ JC9	JC-19	Sand and silt	Grasses trees	No channel morphology	Dense vegetation in channel	Potential Medium	Aggradation: siltation in pools, overbank deposition	Likely straightened	Moderate	Medium	MEDIUM	Moderate	Defined valley-narrow	Valley Storage Conveyance	Link to Headwaters - Sig headwater storage	HIGH	flowing (May 22, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC7B/ JC8B	JC-20	Gravel to silt	Slumping	Meandering riffle-pool sequence	Culverts		Aggradation: lobate bar, medial bar, siltation in pools, overbank deposition	Culverts	High	Medium	MEDIUM	Moderate	Defined valley-narrow	Valley Storage Conveyance	Link to Headwaters - Sig headwater storage	HIGH	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC7B	JC-20A	Gravel to silt	Slumping	Meandering riffle-pool sequence	Culverts		Aggradation: lobate bar, medial bar, siltation in pools, overbank deposition	Culverts	High	Medium	MEDIUM	Moderate	Defined valley-narrow	Valley Storage Conveyance	Link to Headwaters - Sig headwater storage	HIGH	flowing (May 16, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC15	JC-22	Gravel shale Broken shale	Trees, shrubs	Riffle-pool morphology	Woody debris, Knickpoint		Aggradation: medial bar, siltation in pools, riffles embedded	None	High	Medium	MEDIUM	Good	Defined valley	Good ability to detain flows	Link to Headwater	HIGH	flowing (June 25, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC17	JC-27	Fine materials	Grass channel/ cattails	Poorly defined	Cattails in channel			Agricultural drain	Moderate	Medium	MEDIUM	Low	No defined valley	Conveyance System	Link to Headwater	LOW	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW	
JC18	JC-27A	Fine materials	Grass/Scrub	Poorly defined	None		Aggradation: siltation in pools	Agricultural drain	Moderate	Medium	MEDIUM	Low	No defined valley	Conveyance System	Link to Headwater	LOW	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW	
JC17	JC-28	Silt, fine sand	Poor bank definition	Poorly defined	None			Agricultural drain	Moderate	Medium	MEDIUM	Moderate	No defined valley	Connects to Sig's storage	Link to Headwater	MEDIUM	not flowing (July 18, 2003)	No groundwater discharge observed	Low	Low	LOW	
JC17	JC - 29	Fine sand and silt	Short grasses	Riffle-pool with fine materials	Culverts		Aggradation: siltation in pools, overbank deposition	Bridge and culverts	Moderate	Medium	MEDIUM	Low	No defined valley	Connects to Sig's storage	Link to Headwater	MEDIUM						
JC15/ JC16	JC-30	Fine materials with some cobble and gravel	Clay banks	Poor morphology	None		Aggradation	Agricultural drain	Moderate	Medium	MEDIUM	Low	Valley (minor)	Conveyance System	Link to Headwater	MEDIUM	not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW	
JC16/ JC17	JC-31	Clay, silt, gravel and some cobble	Bank slumping	Riffle-pool	Knickpoint, pond		Aggradation: medial bar, riffles embedded, siltation in pools	On-line pond	Moderate	Medium	MEDIUM	Moderate- Poor	No defined valley	Some Storage	Link to Headwater Stream	MEDIUM	not surveyed for groundwater	not surveyed for groundwater				
JC16/ JC17	JC-31A	Swale	No defined banks	Swale					Low Moderate	Low	LOW	Good	No	Good	Headwater Stream	LOW	not surveyed for groundwater	not surveyed for groundwater				
JC16/ JC10	JC-32	Silt, cobble and gravel	Short grasses/herbs	Riffle-pool	None		Aggradation: medial bar, riffles embedded, accretion on point bar	None	Moderate	Medium	MEDIUM	Good	No defined valley	Good ability to detain flows	Linkage to Headwater	HIGH	not surveyed for groundwater	not surveyed for groundwater				
JC17	JC-36											Good	No defined valley	Storage	Headwater Stream	MEDIUM	flowing (Dec 8, 2003)	Groundwater discharge observed	Moderate to High	Moderate	HIGH	

APPENDIX X - PHYSICAL STREAM CHARACTERISTICS

Fluvial Geomorphology												Hydrology/Hydraulic & Water Quality					Hydrogeology				
SUB-CATCHMENT AREA	STREAM REACH/HABITAT UNIT (HU)	STREAM BED TYPE	BANK CONDITIONS	BED MORPHOLOGY	PRESENCE/ABSENCE OF BARRIERS	CONSTRAINTS & OPPORTUNITIES	SEDIMENT SUPPLY/TRANSPORT	CHANNEL DISTURBANCE	STREAM SENSITIVITY	REHABILITATION POTENTIAL	OVERALL GEOMORPHOLOGY CLASSIFICATION	ABILITY TO PROVIDE WATER QUALITY IMPROVEMENT	VALLEY PRESENT	HYDRAULIC CONVEYANCE CONDITION (ABILITY TO DETAIN/STORE STREAMFLOW)	LINKAGE TO HEADWATER FUNCTIONS	RELATIVE HYDROLOGIC FUNCTION	FLOW TYPE (FLOWING OR NOT FLOWING)	GROUNDWATER DISCHARGE OBSERVATIONS	INTERPRETED GROUNDWATER CONTRIBUTION TO STREAMFLOW	HYDROGEOLOGIC CONTRIBUTION TO STREAM HEALTH (FISHERIES, WETLANDS, ETC.)	
EAST MORRISON	EAST MORRISON																				
EM1/ EM4	MOC-2	Silt, sand some cobble	grasses and herbs	Poor morphology	Constructed channel		Aggradation: siltation in pools, overbank deposition	Channel constructed along road	Moderate	Medium	MEDIUM	Poor	No	Storage Present	Link to Headwaters	HIGH	not flowing (June 26, 2002)	No groundwater discharge observed	Low	Low	LOW
EM1	MOC-4	Silt, clay some gravel	Cattails, some eroded banks	No definition, wetland area	Culverts		Aggradation: siltation in pools, overbank deposition	Culverts	Moderate	Medium	MEDIUM	Good	Yes	Good	Link to Headwaters	HIGH	flowing (June 25, 2002)	No groundwater discharge observed	Low	Low - Moderate	LOW
EM1	MOC-5	Swale	No defined banks	Swale					Low Moderate	Low	LOW	Good	No	Good	Part of Headwater Storage Provided	HIGH	not flowing (June 26, 2002)	No groundwater discharge observed	Low	Low	LOW
EM1	MOC-5A	Swale	No defined banks	Swale					Low Moderate	Medium	LOW	Good	No	Good	Part of Headwater Storage Provided	HIGH	not flowing (June 26, 2002)	No groundwater discharge observed	Low	Low	LOW
EM2/ EM3/ EM4	MOC-6	No Information									NO INFORMATION	Good	No	Conveyance	Link to Headwater Storage	MEDIUM	not flowing (June 26, 2002)	No groundwater discharge observed	Low	Low	LOW
WEST MORRISON	WEST MORRISON																				
WM1/ WM2	MOC-W1	Silt and fine sand	Tall grasses and herbs	Poor morphology	Pond		Aggradation: siltation in pools	Straightened	Moderate	Medium	MEDIUM	Poor	Minor	Moderate	Linkage	MEDIUM	Flowing (June 25, 2002)	No groundwater discharge observed	Low	Low	LOW
WM1	MOC-W2	No Information									NO INFORMATION	Poor	No	Connects to sig storage	Headwater	MEDIUM	Not Flowing (June 25, 2003)	No groundwater discharge observed	Low	Low	LOW
WM1	MOC-W3	Silt and fine sand	Vertical banks with toe erosion - evidence of widening	Poor morphology	Agricultural Drain		Aggradation: poor longitudinal sorting of bed materials, siltation in pools	Channel straightened and constructed along road.	Moderate	Medium	MEDIUM	Poor	No	Some storage	Linkage	HIGH	Flowing (July 18, 2002)	No groundwater discharge observed	Low	Low	LOW
WM1	MOC-W5	No Information		No information							NO INFORMATION	Poor	No	Some storage	Headwater	LOW	not surveyed for groundwater	not surveyed for groundwater			LOW
14 MILE CREEK	14 MILE CREEK																				
FM1109	14W-1	Sands and gravel with shale frags	Some erosion & slumping, well vegetated	Well defined riffle-pool with vegetative control	Culvert	Good form Maintain High	Degradation: channel worn into undisturbed bedrock	Culvert	High	High	HIGH	Moderate	Yes- Good Storage Function	Storage Present	Linkage	HIGH	Flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1107/ FM1109	14W-1A	Silt, sand, shale	Eroded banks	Riffle-pool	None		Degradation: cut face on bar forms, channel worn into undisturbed bedrock	None	High	High	HIGH	Moderate	Yes- Good Storage Function	Storage Present	Linkage	HIGH	Flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1107/ FM1108	14W-2	Sand, gravel, cobble, shale	Some slumping and evidence of widening	Riffle-pool	None	Some erosion Maintain enhance Medium	Aggradation: siltation in pools, riffles embedded	Minor pedestrian crossing	High	High	HIGH	Good	Yes- Good Storage Function	Storage Present	Linkage	MEDIUM	14W-1	No groundwater discharge observed	Low	Low	LOW
FM1108	14W-3	Mainly shale fragments with clay and gravel	Excessive erosion, valley wall contact, undercut banks	Riffle-pool	Woody Debris	Erosion - improve Medium	Degradation: suspended armour layer, channel worn into undisturbed bedrock	None	High	High	HIGH	Good	Yes- Good Storage Function	Storage Present	Linkage	MEDIUM	Flowing (May 7, 2002)	No groundwater discharge observed	Low	Low - Moderate	MODERATE
FM1108	14W-4	Shale riffles with clay, silt and sand in pools	Slumping, grassy vegetation, hummocky	Moderately defined	Three culverts at 407	Enhance Medium	Aggradation: riffles embedded	407 crossing, valley wall contact		Enhance Medium	MEDIUM	Good	Yes- Good Storage Function	Storage Present	Linkage	MEDIUM	Flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1108	14W-9	Clay, silt and sand mixed with shale fragments	Well defined, major bank erosion and undercutting	Generally well defined pool -riffle	None	Erosion - improve Medium	Degradation: suspended armour layer, channel worn into undisturbed bedrock	Several pedestrian crossings & top of bank trails	Moderate	Medium	MEDIUM	Good	Minor	Some Storage	Linkage	MEDIUM	not flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1108	14W-9A	Clay, silt and sand mixed with shale frags.	Eroded banks	Generally riffle-pool	None		Degradation: suspended armour layer, channel worn into undisturbed bedrock	None	Moderate	Medium	MEDIUM	Good	Minor	Some Storage	Linkage	MEDIUM	not flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1006/ FM1108	14W-10	Silt, clay and sand with vegetation	Moderately defined to poorly defined, grassy vegetation	Typically poor definition	Highway 407	Degraded Medium	Aggradation: siltation in pools, riffles embedded, poor longitudinal sorting of bed materials	Agricultural influences	Moderate	Medium	MEDIUM	Moderate- Poor	No	Conveyance Minor Storage	Linkage	MEDIUM	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1107	14W-11	Swale - Sands, silts and clay	Moderately defined banks with variable vegetation	Variable, typically moderately defined	None	Degraded Medium	N/A	Some agricultural influence	Moderate	Medium	MEDIUM	Good	Moderate valley	Storage provided	Linkage	MEDIUM	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1107	14W-11A	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Moderate	No	Storage provided	Linkage	HIGH	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1104/ FM1105	14W-12	Some shale, sands/silt and clay	Defined, some erosion and slumping	Variable, some areas of pool-riffle, some poor definition	Culvert and livestock access	Defined maintain Medium	Aggradation: accretion on point bars, siltation in pools, riffles embedded	Concrete revetments, farm crossing, Dundas Street	Moderate	Medium	MEDIUM	Moderate- Poor	Yes- Good Storage Function	Some storage Provided	Linkage	HIGH	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1105	14W-13	Swale - Silt, clay and sands/ vegetated	Poorly defined, grassy	Swale		Degraded Medium		Agricultural influences	Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1105	14W-14	Swale - Silt, clay and sands/ vegetated	Poorly defined, grass/herb	Swale		Degraded Medium		Agricultural influences	Moderate	Medium	MEDIUM	Moderate- Poor	No	Some storage provided	Linkage	MEDIUM	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1105	14W-14A	Pond	Pond	Pond	Pond			Pond	Moderate	Medium	MEDIUM	Poor- online pond	No	Storage	Linkage	MEDIUM	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1104	14W-16	Swale -sand, silt and clay, some vegetation	Moderately to poorly defined, grassy	Poorly Defined		Degraded Medium	N/A	Agricultural influences	Moderate	Medium	MEDIUM	Moderate- Poor	No	Some storage provided	Linkage	MEDIUM	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1104	14W-17	Swale-Silt, sand, clay with vegetation	Poorly defined with some definition in places	Poorly defined		Degraded Medium		407 crossing	Low Moderate	Low	LOW	Moderate- Poor	No	Some storage provided	Linkage	MEDIUM	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1108	14W-18	Swale - silt, clay and sand	Minor definition, generally poor	Poorly Defined		Degraded Medium	N/A	407 crossing	Moderate	Medium	MEDIUM	Moderate	No	Conveyance	Linkage	LOW	flowing (May 7, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1109	14W-20	No information									NO INFORMATION	Moderate	Moderate valley	Some storage	Headwater	HIGH	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW
FM1111	14E-1	Pond	Pond	Pond	Pond			Pond	Moderate	Medium	MEDIUM	Poor- online pond	No	Storage	Linkage	MEDIUM	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111	14E-2	Swale - sands	Poorly defined	Poorly defined		Degraded Medium			Moderate	Medium	MEDIUM	Good	No	Some storage	Linkage	HIGH	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111	14E-2A	Swale	Poorly defined	Poorly defined					Moderate	Medium	MEDIUM	Good	No	Some storage	Linkage	HIGH	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111	14E-3	No information									NO INFORMATION	Moderate	No	Some storage	Linkage	MEDIUM	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW

APPENDIX X - PHYSICAL STREAM CHARACTERISTICS

Fluvial Geomorphology												Hydrology/Hydraulic & Water Quality					Hydrogeology				
SUB-CATCHMENT AREA	STREAM REACH/HABITAT UNIT (HU)	STREAM BED TYPE	BANK CONDITIONS	BED MORPHOLOGY	PRESENCE/ABSENCE OF BARRIERS	CONSTRAINTS & OPPORTUNITIES	SEDIMENT SUPPLY/TRANSPORT	CHANNEL DISTURBANCE	STREAM SENSITIVITY	REHABILITATION POTENTIAL	OVERALL GEOMORPHOLOGY CLASSIFICATION	ABILITY TO PROVIDE WATER QUALITY IMPROVEMENT	VALLEY PRESENT	HYDRAULIC CONVEYANCE CONDITION (ABILITY TO DETAIN/STORE STREAMFLOW)	LINKAGE TO HEADWATER FUNCTIONS	RELATIVE HYDROLOGIC FUNCTION	FLOW TYPE (FLOWING OR NOT FLOWING)	GROUNDWATER DISCHARGE OBSERVATIONS	INTERPRETED GROUNDWATER CONTRIBUTION TO STREAMFLOW	HYDROGEOLOGIC CONTRIBUTION TO STREAM HEALTH (FISHERIES, WETLANDS, ETC.)	
FM1111	14E-3A	No information									NO INFORMATION	Poor	No	Conveyance	Linkage	LOW	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111/ MC1012	14E-4	Swale - Sand/si/cl	Poorly defined	Swale		Degraded Medium		407 crossing, agricultural influences	Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111	14E-6	Swale - sands	Poorly defined	Poorly defined					Moderate	Medium	MEDIUM	Good	No	Some storage	Linkage	MEDIUM	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111	14E-7	Swale - Sand/si/cl	Both banks eroded	Poorly defined				Straightened	Moderate	Medium	MEDIUM	Good	No	Some storage	Linkage	MEDIUM	not flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1111	14E-8	Swale - Sand/si/cl	Variable, usually poor definition	Poorly defined, some wetland areas below highway				407 crossing, straightened along road	Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	flowing (May 23, 2002)	No groundwater discharge observed	Low	Low	LOW
FM1110.1	14E-9	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor- online pond	No	Some storage	Linkage	MEDIUM	not surveyed for groundwater	not surveyed for groundwater	Low	Low	
FM1110/ FM1110.1	14E-10	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor- online pond	No	Some storage	Headwater	LOW	not surveyed for groundwater	not surveyed for groundwater	Low	Low	
McCRANEY CREEK	McCRANEY CREEK																				
MC1114	MC-1	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Moderate- Poor	No	Some storage	Linkage	MEDIUM	Flowing (May 6, 2002)	No groundwater discharge observed	Low	Low	LOW
MC1114	MC-2	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	Not Flowing (May 6, 2002)	No groundwater discharge observed	Low	Low	LOW
MC1114	MC-4	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Some Storage	Headwater	LOW	Not Flowing (May 6, 2002)	No groundwater discharge observed	Low	Low	LOW
MC1114	MC-4A	Swale - silt	Eroded	Poorly defined	Woody Debris	Degraded Medium			Low Moderate	Low	LOW	Moderate- Poor	No	Some Storage	Linkage	MEDIUM	Not Flowing (May 6, 2002)	No groundwater discharge observed	Low	Low	LOW
TAPLOW CREEK	TAPLOW CREEK																				
TC1115	TC-1	Sand, silt, pebble	Eroded and slumping banks	Dry, vegetated channel	None		Aggradation: siltation in pools	None	Moderate	Medium	MEDIUM	Moderate	Minor	Some storage	Linkage	MEDIUM	Flowing (April 30, 2002)	No groundwater discharge observed	Low	Low	LOW
TC1115	TC-2	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Moderate-Poor	No	Conveyance	Linkage	LOW	Flowing (April 30, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117/ TC1115	TC-2A	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Headwaters	LOW	Flowing (April 30, 2002)	No groundwater discharge observed	Low	Low	LOW
GLEN OAK CREEK	GLEN OAK CREEK																				
GO1116	GO-10	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Link to some headwater storage	MEDIUM	not flowing (May 6, 2002)	No groundwater discharge observed	Low	Low	LOW
SHANNON'S CREEK	SHANNON'S CREEK																				
SC1	SHC-1	Silt, clay	Grass	Ditched, riffle-pool	Culvert		Aggradation	Culvert	Moderate	Medium	MEDIUM	Poor	No	Conveyance	Linkage	LOW	Flowing (May 10, 2002)	No groundwater discharge observed	Low	Low-Moderate (south end)	LOW
SC1	SHC-2	Silt, clay	Grass	Ditched, riffle-pool	Ponds, cattle access		Aggradation: riffles embedded, poor longitudinal sorting of bed materials	2 Ponds, Cattle access, ditched in areas	Moderate	Medium	MEDIUM	Poor	No	Some ability to detain flows	Linkage	MEDIUM	Flowing (May 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SC1	SHC-3	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Some ability to detain flows	Headwaters	MEDIUM	Flowing (May 10, 2002)	No groundwater discharge observed	Low	Low	LOW
16 MILE CREEK	16 MILE CREEK																				
ES5/ ES9	SMA-1	Shale, gravel	Valley wall slope failure	Riffle-pool	Woody Debris		Degradation: knick point migration, cut face on bar forms	None	High	High	HIGH	Good	Yes	Conveyance	Linkage	MEDIUM	Flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES5/ ES8	SMA-2	Shale, gravel	Bedrock and clay/silt	Riffle-pool	Culvert		Degradation: knick point migration, channel worn into undisturbed bedrock	Culvert at cemetery crossing	High	High	HIGH	Good	Yes	Conveyance	Linkage	MEDIUM	Flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES8	SMA-3	Sand, silt, clay, gravel	Clay/silt/sand with scrub vegetation	Riffle-pool	None		Aggradation: riffles embedded	Channel straightened along landfill	Moderate	Medium	MEDIUM	Good	No	Conveyance	Linkage	MEDIUM	Flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES7/ ES8	SMA-4	Silt, sand, clay, gravel and some bedrock	Mixed forest, evidence of widening	Riffle-pool	Culvert		Aggradation: lobate bar, siltation in pools, riffles embedded	Culvert at Neyagawa Road	Moderate	Medium	MEDIUM	Good	No	Some storage	Linkage	MEDIUM	Flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES7	SMA-5	Clay, silt, sand and gravel	Low banks	Upstream section is wetland, downstream moderately defined	None		Aggradation: siltation in pools, poor longitudinal sorting of bed materials	Wetland area	Moderate	Medium	MEDIUM	Good	No	Some storage	Headwaters	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES6/ ES7	SMA-6	Silt, clay and sand	Bank erosion, evidence of widening	Poor morphology	None		Aggradation: lobate bar, siltation in pools, riffles embedded	None	Moderate	Medium	MEDIUM	Good	No	Some storage	Headwaters	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES5	SMA-7	Shale, gravel	Valley wall slope failure, evidence of widening	Riffle-pool	Knickpoints		Degradation: knick point migration, cut face on bar forms	None	High	High	HIGH	Good	Yes	Conveyance	Linkage	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES5	SMA-8	Sand, silt and gravel	Silt and clay with scrub vegetation	Cattails in channel, fairly well defined	None		Aggradation: lobate bar, medial bar, siltation in pools	Channel straightened along landfill roadway	Moderate	Medium	MEDIUM	Good	No	Some storage	Headwaters	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES5	SMA-9	Sand, silt, clay	Low banks	Poorly defined, braided at confluence	None		Aggradation: siltation in pools, poor longitudinal sorting of bed materials	Historically straightened	Moderate	Medium	MEDIUM	Good	No	Some storage	Headwaters	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES4	SMB-1	Bedrock, gravel	Bedrock exposure at toe, evidence of widening	Riffle-pool	Woody Debris		Degradation: cut face on bar forms, channel worn into undisturbed bedrock	None	High	High	HIGH	Good	Yes	Conveyance	Linkage	MEDIUM	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW
ES4	SMB-2	Bedrock, cobble	Bedrock exposure at toe (evidence of widening)	Step-pool morphology with knickpoints	Knickpoints and woody debris		Degradation: cut face on bar forms, channel worn into undisturbed bedrock	None	High	High	HIGH	Good	Yes	Conveyance	Linkage	MEDIUM	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW
ES4	SMB-3	Clay, pebble and gravel with shale fragments	Low, eroded banks (evidence of widening)	Riffle-pool	None		Degradation: suspended armour layer, channel worn into undisturbed bedrock	None	Moderate	Medium	MEDIUM	Good	Yes	Some storage	Headwaters	MEDIUM	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW
ES4	SMB-4	Shale	Deep ravine with bedrock exposure, evidence of widening	Step-pool morphology with knickpoints	Knickpoints and woody debris		Degradation: knick point migration, channel worn into undisturbed bedrock	None	High	High	HIGH	Good	Yes	Some storage	Headwaters	MEDIUM	not surveyed for groundwater	not surveyed for groundwater	Low	Low	LOW
ES3	SMC-1	Shale, gravel	Valley wall slope failure, evidence of widening	Step-pool morphology with knickpoints	Knickpoints, woody debris jams and failed bank debris		Degradation: cut face on bar forms, channel worn into undisturbed bedrock	None	High	High	HIGH	Good	Yes	Conveyance	Linkage	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES2/ ES3	SMC-2	Shale	Bedrock, evidence of widening	Riffle-pool	Pond and berm		Degradation: terrace cut through old bar material, channel worn into undisturbed bedrock	Large berm at pond just downstream of Burnhamthorpe Road	High	High	HIGH	Poor-online storage	No	Some storage	Linkage	MEDIUM	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES2	SMC-3	Silt and sand	Actively farmed	Poor morphology	Pond		Aggradation: siltation in pools, poor longitudinal sorting of bed materials	Pond and agricultural land use	Moderate	Medium	MEDIUM	Poor	No	Conveyance	Headwaters	LOW	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
ES2	SMC-4	Silt and sand	Actively farmed	Poor morphology	Agricultural Influence		Aggradation: riffles embedded, poor longitudinal sorting of bed materials	Agricultural influence	Moderate	Medium	MEDIUM	Poor	No	Conveyance	Headwaters	LOW	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW

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Fluvial Geomorphology												Hydrology/Hydraulic & Water Quality					Hydrogeology				
SUB-CATCHMENT AREA	STREAM REACH/HABITAT UNIT (HU)	STREAM BED TYPE	BANK CONDITIONS	BED MORPHOLOGY	PRESENCE/ABSENCE OF BARRIERS	CONSTRAINTS & OPPORTUNITIES	SEDIMENT SUPPLY/TRANSPORT	CHANNEL DISTURBANCE	STREAM SENSITIVITY	REHABILITATION POTENTIAL	OVERALL GEOMORPHOLOGY CLASSIFICATION	ABILITY TO PROVIDE WATER QUALITY IMPROVEMENT	VALLEY PRESENT	HYDRAULIC CONVEYANCE CONDITION (ABILITY TO DETAIN/STORE STREAMFLOW)	LINKAGE TO HEADWATER FUNCTIONS	RELATIVE HYDROLOGIC FUNCTION	FLOW TYPE (FLOWING OR NOT FLOWING)	GROUNDWATER DISCHARGE OBSERVATIONS	INTERPRETED GROUNDWATER CONTRIBUTION TO STREAMFLOW	HYDROGEOLOGIC CONTRIBUTION TO STREAM HEALTH (FISHERIES, WETLANDS, ETC.)	
ES2	SMC-5	Silt, sand and clay	Actively farmed	Poor morphology	Agricultural Influence		Aggradation: riffles embedded, poor longitudinal sorting of bed materials	Agricultural influence	Moderate	Medium	MEDIUM	Poor	No	Conveyance	Headwaters	LOW	Not flowing (July 12, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1020	16W-1	No Information									NO INFORMATION	Good	Yes	Conveyance	Linkage	MEDIUM			Low	Low	
SM1020	16W-2	No Information									NO INFORMATION	Good	Yes	Conveyance	Linkage	MEDIUM			Low	Low	
SM1020	16W-3	No Information									NO INFORMATION	Good	No	Some storage	Linkage	MEDIUM			Low	Low	
SM1020	16W-4	No Information									NO INFORMATION	Good	No	Some storage	Linkage	LOW			Low	Low	
SM1117	16WA-1	Sand and gravel with shale fragments	Eroded and slumping banks	Riffle-pool	Culvert		Evidence of Widening	Armour stone around culvert	Moderate	Medium	MEDIUM	Good	Yes	Some storage	Linkage	HIGH	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-1A	Cobble, sand, shale	Eroded and slumping banks	Riffle-pool	None		Evidence of Widening	None	Moderate	Medium	MEDIUM	Good	No	Some storage	Linkage	MEDIUM	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-2	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	MEDIUM	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-3	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-4	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Good	No	Some storage	Headwaters	MEDIUM	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-5	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-6	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-7	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Linkage	LOW	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-8	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Good	No	Some storage	Headwaters	MEDIUM	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
SM1117	16WA-8A	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Headwaters	LOW	not flowing (July 10, 2002)	No groundwater discharge observed	Low	Low	LOW
MUNN'S CREEK	MUNN'S CREEK																				
MC2	MUN-1	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Conveyance	Headwater - some storage	MEDIUM	not flowing (May 10, 2002)	No groundwater discharge observed	Low	Low	LOW
MC1	MUN-2	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Link to some storage	Linkage	MEDIUM	flowing (May 10, 2002)	No groundwater discharge observed	Low	Low	LOW
MC1	MUN-3	Swale	Poorly defined	Swale					Low Moderate	Low	LOW	Poor	No	Link to some storage	Headwater- some storage	MEDIUM	Flowing (May 10, 2002)	No groundwater discharge observed	Low	Low	LOW

A. HYDRAULIC MODELLING

Hydraulic modelling was developed for the selected reaches of watercourse within the subwatersheds. HEC-RAS was applied to develop floodlines. The approach and information used in modelling includes:

- Stream reaches were selected based upon stream characteristics (not using ½ sq. mile limit as upper bound) for use in stream and riparian corridor classification;
- Topographic mapping supplied by the Town of Oakville was used to develop cross-sections, augmented by field data to include low flow cross-section. (1 m contours with .5m interpolation);
- Culverts were surveyed for inclusion in the model;
- No calibration was carried out;
- Flood elevations were developed for the full range of design flows (1:2 to Regional);
- Roughness and expansion/contraction coefficients were taken from standard hydraulic references.

The model input and output is included in the enclosed disc.

B. HYDROLOGIC STREAM CHARACTERIZATION

Hydrologic characterization of the stream reaches was developed considering the streams role in:

- Providing flow attenuation (storage);
- Providing conveyance;
- Connectivity to storage (on-line, off-line); and
- Part of headwater.

The role in flow attenuation through storage was evaluated on a relative basis through the hydraulic modelling. This was developed through the calculated storage on a reach basis through the HEC-RAS model. The storage was considered for a range of events (1:2 yr., 1:25 yr., Regional) to identify any differences.

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