

BORER'S CREEK SUBWATERSHED

STEWARDSHIP ACTION PLAN 2009

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BORER’S CREEK SUBWATERSHED CHARACTERIZATION

GEOGRAPHIC LOCATION

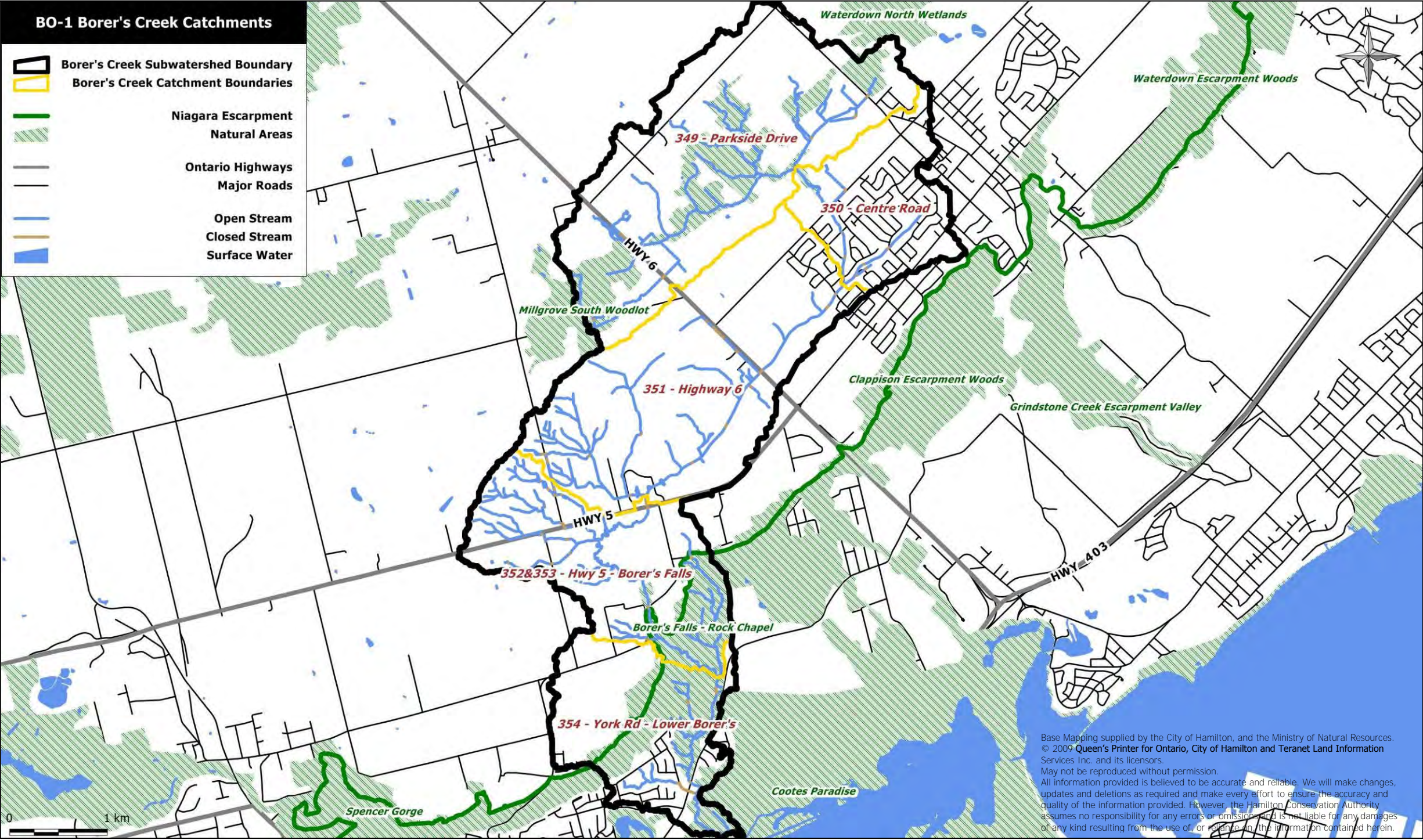
Borer’s Creek subwatershed is 19.5 km² in area and is comprised of five catchment basins. In descending order from the headwaters to the outlet these are: Parkside Drive, Centre Road, Highway 6, Highway 5 - Borer’s Falls and York Road - Lower Borer’s **(Map BO-1)**. This subwatershed spans the former municipal boundaries of Dundas and Flamborough, and also falls within two City of Hamilton Wards, specifically Wards 13 and 15.

The catchment boundaries for this subwatershed have been updated since the publication of the Spencer Creek Management Plan in 1997. As a result of the re-delineation, some of the catchments have been amalgamated. Those catchments are represented by a hyphenated name which incorporates both former catchment names. Also, for the purposes of the Borer’s Creek Subwatershed Plan, published in 2000, the catchments were identified by a numerical naming system. The former catchment number has also been incorporated into the catchment name in this document in order to remain consistent so that reference between previous reports is possible.

The headwaters of Borer’s Creek originate north of Concession 5 East between Millgrove Side Road in the west to Centre Road in Waterdown in the east. The subwatershed tapers as it flows south and over the Niagara Escarpment brow. Borer’s Creek passes over the Rock Chapel, Borer’s and Lower Borer’s Waterfalls as well as the Upper and Lower Hopkin’s Cascades. The southernmost extent of Borer’s Creek reaches Cootes Paradise Marsh, south of York Road.

Highways 5 and 6 pass through this subwatershed with the intersection of the two occurring immediately south of the subwatershed boundary. Major transportation routes found within this subwatershed are Millgrove Side Road, Highway 5 - Borer’s Falls Road, Parkside Drive and Centre Road.

The Niagara Escarpment passes through the Highway 5 - Borer’s Falls and York Road - Lower Borer’s catchments of this subwatershed. Additionally, four municipally designated Environmentally Significant Areas (ESAs) are located within this subwatershed: Millgrove South Woodlot, Waterdown North Wetlands, Borer’s Falls - Highway 5 - Borer’s Falls and Cootes Paradise. Although not designated as an ESA, the Parkside Drive North Woodlot has been included in the Hamilton Natural Areas Inventory as a large tract of natural cover. These natural areas act as major ecological corridors for terrestrial species as well as serve to maintain water quality and quantity within the stream reaches that pass through these areas, to the benefit of aquatic species.



HYDROLOGY

Borer's Creek subwatershed is in Flamborough and discharges to the north side of Cootes Paradise (WRIP Waterflow network, MNR). The headwaters area of Borer's Creek (locally often referred to as Rock Chapel Creek) subwatershed is above the Escarpment and is characterized by several small (intermittent) creeks that form a stream network. These small streams are located in East Flamborough between Concession Road 5 and Parkside Drive. These creeks combine into one creek that crosses Parkside Road. Two smaller tributaries meet Borer's Creek, one from the east, downstream of Parkside Road, and the other from the west near Highway 6 (GIS map, HCA). Borer's Creek drops over the Escarpment at Rock Chapel Falls near Sydenham Road and Highway 6. Hopkins Creek, a tributary of Borer's Creek, arises along the Escarpment east of Rock Chapel Falls, and joins the main creek above the York Road crossing. A few other minor creeks arise along the Escarpment. All of these creeks flow into Cootes Paradise (Dwyer et al., 2003).

Rock Chapel Falls is a 15 meter waterfall, which can be accessed from both HCA's Borer's Falls Conservation Area (base of the falls) and the Royal Botanical Garden's Rock Chapel Sanctuary (top of the falls). This waterfall powered the Rock Chapel village sawmill, run by the Borer family, for more than 100 years (www.hamrca.on.ca/parks/visit/waterfalls.asp).

The length of Borer's Creek is approximately 11.9 km from its headwaters to its confluence with Cootes Paradise, with the combined length of Borer's Creek and all of its tributaries being 61.5 km. The subwatershed has a total drainage area of approximately 20.2 km² (HRCA, Oct. 2000). The land use of Borer's Creek Subwatershed is predominately rural.

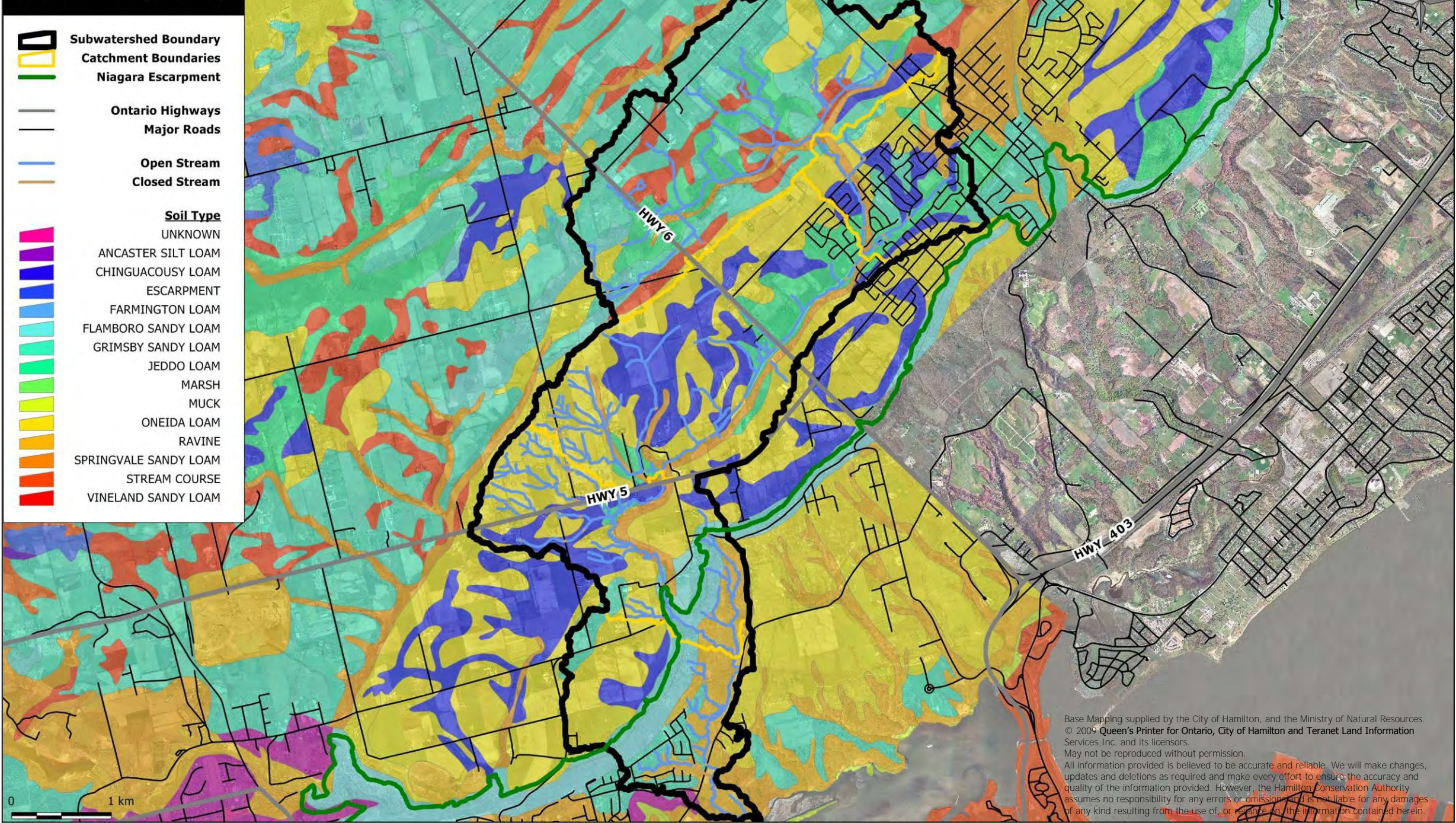
The Borer's Creek Subwatershed Plan outlines a comparison between the hydrologic characteristics of the subwatershed in pre and post development conditions, using current hydrologic characteristics and an estimation of the characteristics under full industrial, commercial and residential development. This assessment was completed by Totten Sims

Hubicki Associates in 1985 for the „Town of Flamborough Borer's Creek Drainage Design Phase II" Project. Their findings observed that in a pre-development setting, rainfall is absorbed by the surrounding vegetation, soil and ground cover but that in a developed setting, the water balance changes and a disproportionate amount of rainfall becomes surface runoff, changing the hydrology of the creek and contributing to erosion. The Subwatershed Plan notes that in anticipation of development in the Waterdown area, improvements were made to the creek channel to control post-development flows to pre-development levels. The Plan also cites erosion as being a significant problem in Borer's Creek, resulting from two factors: one being that the pre-development conditions are based on the hydrology of the creek after most of the vegetation had been cleared for farming and these conditions already resulted in erosion problems due to the increased runoff associated with agricultural land use, and two, being that although peak flows remain consistent with pre-development flows, the creek maintains a peak flow for longer intervals.

In addition to the movement of surface water, the Borer's Creek Subwatershed Plan also addresses the intensity of groundwater capture and the potential for groundwater contamination. According to the Ministry of the Environment Water Well Record data (assessed in June 2000), there are more than 175 drilled and dug wells within the Borer's Creek Subwatershed. Of those, 5% of those are believed to no longer be in use.

An estimation of the potential for groundwater contamination via well sites was completed in 2000 for the Subwatershed Plan. Using the depth of the water table and the permeability of soils, three main tracts of land with rapidly draining soils were identified as being at higher risk for groundwater contamination; the areas include: the lands above and adjacent to the Niagara Escarpment, the lands at Rock Chapel Road and Sydenham Road and the lands adjacent to the headwaters of Borer's Creek. It was then recommended that with regard to groundwater resources, the lands north of Parkside Drive require unique consideration in the planning process.

Map BO-2 Soil Type (1965)



SOILS

The soil characteristics of the Borer’s Creek subwatershed are shown on **Map BO-2**. Ten soils complexes have been identified within the Borer’s Creek subwatershed, as summarized in **Table BO-1**. The sandy and loamy soils of the subwatershed have relatively


large spaces between soil particles, and water percolates quickly through these openings. Soil characteristics vary throughout the subwatershed. The natural drainage of the soil ranges from poorly drained to well drained and the erosion potential ranges from very low to high (Canadian Department of Agriculture, et. al., 1965).


Table BO-1: Soil and Erosion Potential in the Borer’s Creek Subwatershed


Soil Type	Natural Drainage	Erosion Factor*	Topography (slope)	Erosion Potential
CI - Chinguacousy Loam	Imperfectly drained	3	2-5%	Low
FI - Farmington Loam	Well drained	1	2-5%	Moderate
Gi – Grimsby Sandy Loam	Well drained	4	6-9%	Moderate
Jl – Jeddo Loam	Poorly drained	2	0.5-2%	Very Low
OI – Oneida Loam	Well drained	2	6-9%	High
Vi – Vineland Sandy Loam	Imperfectly drained	4	2-5%	Very Low
Fo – Flamborough Sandy Loam	Poorly drained	4	0.5-2%	Very Low
Sp Springvale Sandy Loam	Well drained	4	6-9%	Moderate
Muck	Very poorly drained	N/A	N/A	Low
Grimsby-Ancaster Complex	Well drained	N/A	6-9%	Moderate


** Based on the Region of Hamilton-Wentworth Soil Summary Sheet*


Map BO-3 Historic vs. Current Wetlands


**Borer's Creek Subwatershed Boundary**


**Borer's Creek Catchments Boundaries**


**Niagara Escarpment**


**Current Wetlands**

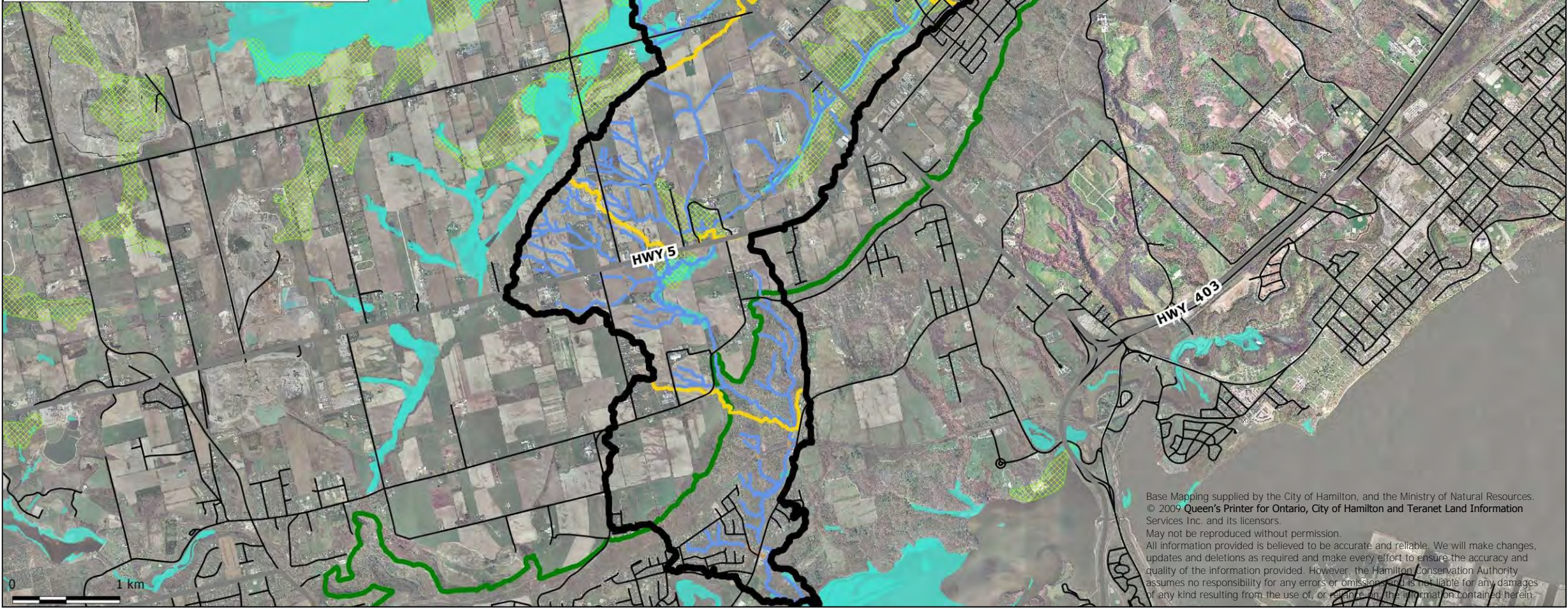
**Historic Wetlands**

**Ontario Highways**

**Major Roads**

**Open Stream**

**Closed Stream**



Base Mapping supplied by the City of Hamilton, and the Ministry of Natural Resources.
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NATURAL HISTORY & SIGNIFICANT SPECIES

Almost 80 percent of the Borer’s Creek subwatershed is located above the Niagara Escarpment. The subwatershed boundary has a maximum ground surface elevation of approximately 255 to 260 meters above sea level (masl). The elevation at the Niagara Escarpment edge (Borer’s Falls) is approximately 205 masl, and the Escarpment base is approximately 130 masl. The topography of the land above the Niagara Escarpment is relatively flat, with some occurrence of gently sloping terrain (HRCA, 2000).

Near the Borer’s Falls-Rock Chapel natural area, the steep upper Escarpment is 25 to 30 m high (about 175 to 205 masl). The Escarpment here has sub-vertical rock faces. The slope of the dissected lower section of the Escarpment varies from moderate to steep (3 to 10 percent) (Hamilton Naturalists’ Club, 2003). The ground surface elevation near the confluence of Borer’s Creek with Lower Spencer Creek is approximately 85 masl (DEM, Ministry of Northern Development and Mines).

Wetlands that existed within the Borer’s Creek subwatershed prior to the mid-1980’s as well as those wetlands that are still present today are displayed within **Map BO-3**. It is apparent that hydrological alterations have occurred within this subwatershed in order to accommodate agricultural practices, as well as urban development and recreation. Historically, wetlands followed much of the stream corridor until reaching the Niagara Escarpment.

There are only two remaining designated wetland complexes in the Borer’s Creek subwatershed. The Waterdown North Wetlands, east of Centre Road, and the Millgrove South Woodlot, West of Highway 6 and North of Concession 4. Small pockets of wetlands in the Parkside Drive catchment still remain along the stream corridor; however the majority of the wetlands in this watershed have been cleared and filled for agricultural purposes. Historically, wetland cover made up 2.28 km², or 11.7%, of the subwatershed area. Only 0.94 km² of wetland area remain, which is only 4.8% of the subwatershed area. Therefore, this subwatershed has lost 41% of its historical wetland cover.

The Waterdown North Wetlands is classified as a Provincially Significant Wetland by the Ontario Ministry of Natural Resources (OMNR). Ontario’s wetlands are evaluated through the OMNR Wetland Evaluation System (1993) for their biological, social, and hydrological components and special features. A wetland that is scored high in all four categories will receive a higher class ranking, with Class 1 being the highest.

Historical information was not recorded for forest or meadow cover, however current natural land cover statistics are noted within **Table BO-2**. Forest cover accounts for 14.6% of this subwatershed, while meadow cover is 3.4% of the land base. Based on the digital data provided for this analysis, stream length of Borer’s Creek and all its tributaries is 61.5 km.

Table BO- 2: Natural Land Cover Statistics

Forest Cover (km ²)	Wetland Cover (km ²)	Meadow Cover (km ²)	Stream Length (km)
2.85	0.94	0.67	61.5

NATURAL HISTORY & SIGNIFICANT SPECIES

The Borer’s Falls-Rock Chapel ESA (330ha) includes a southeast-facing, forested segment of the Niagara Escarpment along the boundary between the former municipalities of Flamborough and Dundas. The central feature in this natural area is in the escarpment valley created by Borer’s Creek as it descends the escarpment face. The Borer’s Creek escarpment valley and forested lower escarpment slopes are considered representative escarpment communities, consisting of sugar maple, white ash, and basswood (*Tilia Americana*) dominated talus slopes, old growth white cedar (*Thuja occidentalis*) stands, and mixed and deciduous slope forests. The escarpment rim, face, and slope forests in this area provide habitat for many significant species including the largest single population of red mulberry (*Morus rubra*) in Canada (Donald Kirk, personal communication, 2003). Open successional communities are present on the lower escarpment slopes in the eastern portion of this area (Dwyer et al., 2003).

Above the Niagara Escarpment, benthic fauna have been found to suggest stressed water quality conditions in Borer’s Creek, where both urban and agricultural land uses are

prevalent (Griffiths; 2000, 2001). A number of water quality impairments including nutrient and organic enrichment, high suspended solid loads, and variable water temperature and flows, have been identified as the cause of this impaired water quality through the abundance of midge, blackfly, oligochaete, and isopod taxa and the absence of sensitive mayfly and caddisfly species. Downstream of the escarpment, water quality conditions substantially improve with groundwater inputs and shade provided by the extensive woodlands around the stream, as implied by the presence of sensitive, stream dwelling stonefly and mayfly taxa.

Although the upper reaches of this subwatershed have been substantially impacted by urban and agricultural land uses, cooler water conditions have been documented in this watercourse in the vicinity of the Niagara Escarpment, where groundwater inputs are much greater (Griffiths,; 2000, 2001). Rainbow darter have been found in Borer’s Creek immediately below the escarpment as recently as 2000 (HRCA, 2000).

NATURAL HISTORY & SIGNIFICANT SPECIES

Significant species found within the natural areas of this subwatershed are noted within Appendix C. The majority of these species are rare or uncommon within the City of Hamilton and where a species has been designated as a species at risk by the OMNR it is indicated in the appendix. Certain species have been classified by the Committee on the Status of Species at Risk in Ontario (COSSARO) and listed by the Ontario Ministry of Natural Resources (MNR) as being at risk. Each species on the list is given a status depending on the degree of risk: Extinct, Extirpated, Endangered, Threatened and Special Concern. The species listed below have been designated by the OMNR under the Ontario Endangered Species Act and can be found within the Borer’s Creek subwatershed.

The Borer’s Creek Subwatershed Plan cites the ecological linkages in the subwatershed as being vulnerable due to the continual pressures urban growth and highway development. It also suggests that inappropriate land management may impair or destroy the functions of these ecological links. It will be important to create awareness and undertake habitat restoration activities related to preserving and restoring ecological linkage in order to support these species that have been designated by the OMNR, especially those species that are endangered (not regulated). Implementation of recommendations resulting from the Cootes to the Escarpment Land Management Strategy will be key to sustainably planning for ecological connectivity in this subwatershed.

Endangered (not regulated)

- American Chestnut
- Butternut

Endangered

- Prothonotary Warbler
- Bashful Bulrush
- Loggerhead Shrike
- Red Mulberry

Threatened

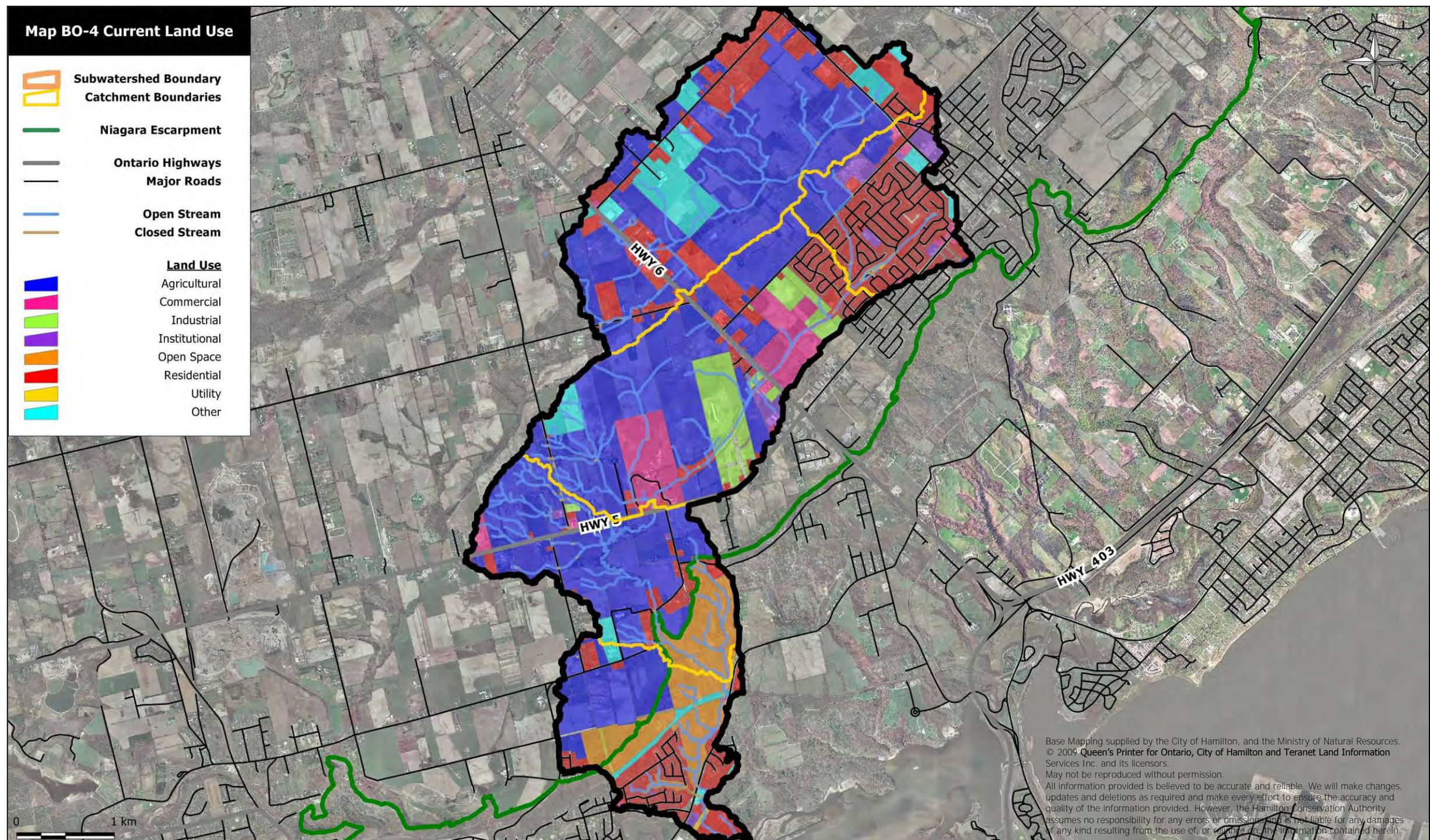
- Blanding’s Turtle
- Common Musk Turtle
- Eastern Spiny Softshell
- Hooded Warbler
- Jefferson Salamander
- Least Bittern
- White Wood Aster

Not at Risk

- American Coot
- Common Mudpuppy
- Four Toed Salamander
- Pickerel Frog
- Sedge Wren
- Western Chorus Frog
- Sharp Shinned Hawk
- Brown Snake
- Northern Leopard Frog
- Eastern Screech-Owl
- False Mermaid
- Red-tailed Hawk

Special Concern

- Eastern Milksnake
- Black Tern
- Monarch
- American Columbo
- Broad Beech Fern
- Cerulean Warbler
- Northern Map Turtle
- Northern Ribbon Snake
- Louisiana Waterthrush
- Woodland Vole
- Yellow-breasted Chat



BORER’S CREEK SUBWATERSHED CHARACTERIZATION

CULTURAL HISTORY

Settlement of the Dundas area began after the American War of Independence when Loyalists crossed the Niagara River and moved up Lake Ontario to its western end (Spencer Creek Conservation Authority, 1965). Because Dundas was accessible by flat bottom boats and because of its convenient location between the western farm productions and the only road that opened up access to the interior of the province, the village became the commercial and industrial center at the head of Lake Ontario in the early part of the 1800’s. (Spencer Creek Conservation Authority, 1965). For more than 100 years, Borer’s Creek powered a sawmill operated by the Borer family, for which the Creek was named. The mill was torn down in the 1940’s.

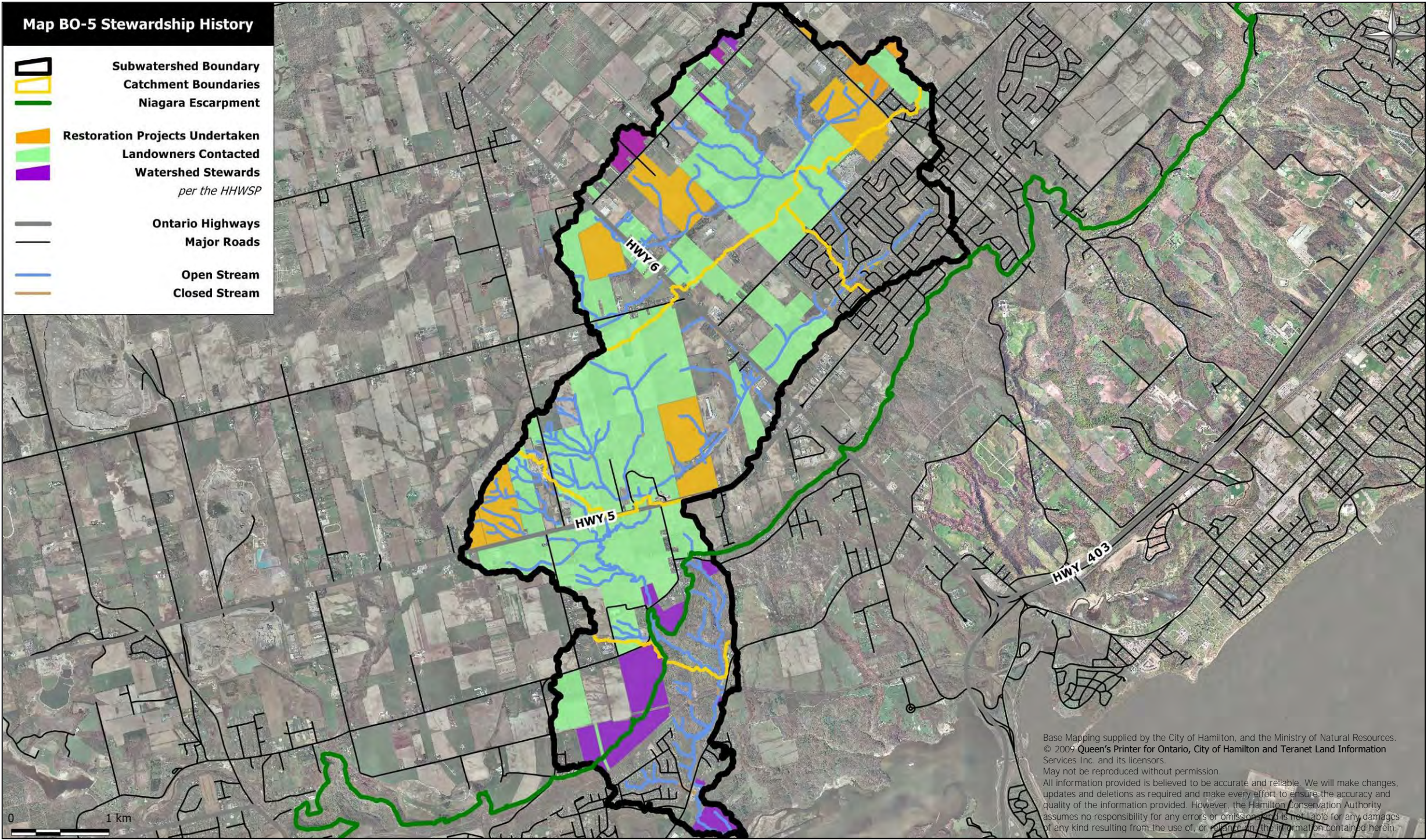
The approximate population of the Borer’s Creek subwatershed is 9000 persons with a population density of about 2265 persons per square kilometer in the urban areas and 25 persons per square kilometer in the rural areas.

Current land use within the Borer’s Creek subwatershed is predominantly agricultural/rural, with open space and residential being the secondary land uses (**Table BO-3**). Residential land use is largely limited to the portions of the subwatershed that fall within the boundaries of the former Towns of Dundas and Waterdown. Agricultural land use is prominent throughout the remainder of the subwatershed. There is significant open space in this subwatershed centering around the Borer’s Falls – Rock Chapel Environmentally Significant Area (**Map BO-4**).

Commercial and industrial land use is concentrated along major transportation routes, specifically Highway 5. Four utility corridors transect this subwatershed: one cutting across the Parkside Drive Catchment; one running along Millgrove Side Road and Sydenham Road; another coming down off of the Escarpment at crossing Martingrove Road and a double corridor passing through the Royal Botanical Gardens lands where the subwatershed tapers as it outlets to Cootes Paradise. Also of note, the area of impervious surfacing within this subwatershed exceeds Environment Canada standards recommended for healthy stream systems.

Table BO-3: Land Use Statistics

Area (km ²)	Agricultural (km ²)	Commercial (km ²)	Industrial (km ²)	Institutional (km ²)	Open Space (km ²)	Residential (km ²)	Utility (km ²)	Impervious Surfacing (%)
19.5	9.71	0.52	0.74	0.29	1.33	3.9	0.05	29.5



BORER’S CREEK SUBWATERSHED CHARACTERIZATION

STEWARDSHIP HISTORY

Although there are many properties that do not incorporate a portion of a natural feature, there are 454 properties that do contain forest, wetland, meadow or riparian / aquatic habitat (Table BO-4). Of these landowners, 75 (or 17%) have been contacted by the Hamilton-Halton Watershed Stewardship Program (HHWSP), and 14 (or 3%) of those have become Watershed Stewards (Table BO-4). Therefore, there is considerable potential to reach the remaining 83% of landowners with natural features to create awareness regarding Beneficial Management Practices (BMP’s) for natural areas and agricultural operations. Through this contact there is also great potential to engage more landowners in the Watershed Steward Program. Watershed Stewards are landowners who have agreed to protect and maintain the natural features that fall within their property. In addition to landowners who have natural features on their properties, landowners who do not have natural features on their properties can also act as Watershed Stewards as they can be advocates of stewardship messaging in other capacities. There is also a significant opportunity in this subwatershed to contact all landowners without natural areas to create awareness regarding urban BMP’s as they relate to urban wildlife, water conservation, storm water management practices, etc.

Currently, Watershed Stewards are predominantly located in both the York Road - Lower Borer’s, Highway 5 - Borer’s Falls and Parkside Drive catchments. However, the majority of the lands under agreement through the Watershed Steward Program in the York Road - Lower Borer’s and Highway 5 - Borer’s Falls catchments are owned by the Hamilton Conservation Authority and the Royal Botanical Gardens. There is a concentration of Watershed Stewards in the Parkside Drive catchment who could potentially be approached for stewardship activities. Landowner contact would be best focused in the Parkside Drive catchment where the greatest concentration of forest and wetland habitat occurs.

Table BO-4: Stewardship Statistics

Approximate Population	Population Density (persons / km ²)	Total # of Properties with Forest, Wetland, Meadow or Watercourse	# of Landowners with Forest, Wetland, Meadow or Watercourse & Contacted by HCA Stewardship	# of HCA Stewardship Watershed Stewards with Forest, Wetland, Meadow or Watercourse	Total # of Landowners in Subwatershed Contacted by HCA Stewardship	Total # HCA Stewardship Watershed Stewards in Subwatershed
9000	Rural - 25 Urban - 2265	454	75	14	97	19

Table BO-5: Environment Canada's How Much Habitat is Enough Guidelines

PARAMETER	% Wetlands	% Stream Naturally Vegetated	Total Suspended Sediments	% Impervious Surfacing	Fish communities	% Forest Cover	Size of largest Forest patch	% Forest Cover 100m & 200m from Forest edge
GUIDELINE	6	75% with 30m buffer on either side	Below 25 mg/L	< 10	Based on historical data / watershed characteristics	30	2km ² & min 500m wide	10% < 100m from forest edge
SUBWATERSHED STATUS	4.8	51.6%	n/a	29.5	Warm water fishery	15	1.45km ²	100m – 22% 200m – 5%

Environment Canada has provided guidelines for forest, wetland and riparian habitat for subwatersheds and in turn a preliminary analysis has been completed using the guidelines set out by this agency. Table BO-5 displays the status of the Borer’s Creek subwatershed when compared to these Federal guidelines.

Due to the urbanization of this subwatershed and the inevitable increase in impervious surfacing, BMP’s relating to storm water management must be encouraged and exemplified by partner agencies in an effort to prevent sedimentation and contamination within the system. This is especially important in the Parkside Drive, Centre Road and Mid-Borer’s catchments since much development is planned for this area of the subwatershed.

Although it appears as though this subwatershed has a large amount of forest cover it still does not meet Environment Canada's How Much Habitat is Enough Guidelines. Forest cover would need to be increased by about 3km² to meet this guideline, with an emphasis being placed on forest patch shape. Additionally, it should be determined whether or not the percentage of forest cover from the forest edge supports interior forest breeding birds.

In this subwatershed there is potential to naturalize an additional 5 hectares by enhancing utility corridors to serve as terrestrial habitat. It is important to work with our large landowners to restore terrestrial and aquatic habitat in the subwatershed. Additionally, it is equally important to work with our ward councilors to generate support for local stewardship initiatives with the public and private sectors as well as our development industry.

STRESSES & STEWARDSHIP ACTIONS

There are twenty seven *stresses* identified as negatively impacting the Borer’s Creek subwatershed. There are three dominant activities occurring throughout this subwatershed that many of the stresses can be attributed to. These activities and their associated stresses are listed in **Table BO-6**.

Table BO-8 outlines the *Stewardship Actions* that have been developed to mitigate the impacts of each of the stresses listed in **Table BO-6**. Specific locations where these stresses are occurring are mapped and inventoried in the subsequent catchment datasheets. Within the Borer’s Creek subwatershed, 85 specific locations where stresses are occurring have been identified; however, this inventory is not exhaustive and therefore implementation of *Stewardship Actions* should be undertaken on a subwatershed scale to ensure that all occurrences of stresses are mitigated.

An inventory count of the number of located stresses in each catchment basin of the subwatershed is listed in **Table BO- 7**. The three most prevalent stresses identified in the Borer’s Creek Subwatershed are: Stormsewer Outfalls, Habitat Fragmentation and On-line Ponds. These stresses are associated with Urban and Rural Living, Development and Agricultural Activities, respectively.

In summary, stormwater management in the urbanized catchments of this subwatershed is of primary concern. Stormwater management relates directly to the health of the local fishery as it increases the potential for erosion and contamination in the creek system. Also, present natural systems, both aquatic and terrestrial, are at risk in the Parkside Drive and Highway 6 catchments of this subwatershed. Land clearing associated with proposed development and agriculture in these catchments threaten the continuity and function of these natural systems. Also, insufficiently sized riparian buffers were a noted concern in this subwatershed. Therefore, large tracts of natural areas and corridors connecting them need to be protected and enhanced to ensure that these systems function optimally to support ecological biodiversity. Additionally, on-line ponds are a considerable concern in this subwatershed. Restoration efforts should be focused on retrofitting and decommissioning on-line ponds and their control structures.

Areas to highlight in this subwatershed Stewardship Action Plan are; the extensive natural areas in the Parkside Drive and York Road - Lower Borer’s catchments which include the Millgrove South Woodlot, Parkside Drive Woodlot, Waterdown North Wetlands and Borer’s Falls – Rock Chapel ESA. Also, there are many accessible waterfalls located within in this subwatershed that have the potential to serve as excellent education outreach venues using interpretive signage and guided trails. There is also a unique opportunity for trail development along the Parkside Drive Woodlot, so that upon completion of the proposed development, new homeowners will have guided access to the adjacent natural lands and

TABLE BO-6: Land Use Activities and their Associated Stresses

ACTIVITY	DEVELOPMENT	AGRICULTURE/NURSERY OPERATIONS	URBAN AND RURAL LIVING
ASSOCIATED STRESSES	Buried Streams	Channelization	Detachment From Nature
	Channelization	Dams	Encroachment
	Erosion	Erosion	Faulty Septic Systems
	Habitat Fragmentation	Habitat Fragmentation	Illegal Fill Placement
	Inadequate Stormwater Management	Invasive/Introduced Species	Inadequate Stormwater Management
	Increased Impervious Surfaces	Insufficient Riparian Buffer	Increased Impervious Surfacing
	Invasive/Introduced Species	Nutrient Loading	Invasive/Introduced Species
	Insufficient Riparian Buffer	On-line Ponds	Insufficient Riparian Buffer
	Litter	Pesticide Use	Litter
	Perched Culverts	Plowed Watercourses	Nutrient Loading
	Sediment Loading	Sediment Loading	Outdoor Recreation Related Degradation
	Site Clearing Prior to Development	Water Takings	Perched Culverts
	Transportation Corridor Expansion		Pesticide Use
			Runoff Contamination via Transportation Corridors
			Stormsewer Outfalls
			Wildlife Collisions

interpretative signage describing the ecological significance of those lands as well as how to care for and maintain those lands to support ecological function.

CATCHMENT SUMMARIES

This section of the plan identifies the occurrences of stresses within each catchment of Borer’s Creek subwatershed. A summary of these stresses and an indication of the stewardship actions available to mitigate the impacts of the stresses are outlined in the data

sheets following each catchment map. Ecological monitoring data for each catchment is also outlined following each catchment map. In total, 95 stresses were identified for the Borer’s Creek Subwatershed and inventory counts are presented in **Table BO-7**.

TABLE BO-7: Stresses Inventory by Catchment

STRESS	MAP CODE	NO. IN SUBWATERSHED	NO. IN EACH CATCHMENT				
			Parkside Drive	Centre Road	Highway 6	Highway 5 - Borer’s Falls	York Road - Lower Borer’s
Buried Streams	BS	1			1		
Channelization	CH	5	1		3	1	
Dams	DM	3		1		2	
Detachment from Nature	DT	3	2	1			
Encroachment	EN	2	1				1
Erosion	ER	3			1	1	1
Faulty Septic Systems	SS						
Habitat Fragmentation	HF	14	4	1	4	2	3
Illegal Fill Placement	FP						
Inadequate Stormwater Management	SW						
Increased Impervious Surfacing	IS	3		2	1		
Invasive/Introduced Species	IV	1		1			
Insufficient Riparian Buffer	RB	7	2	1	2	2	
Litter	LI	3	1	1			1
Nutrient Loading	NL	1					1
On-line Ponds	OP	9	4	1	2	2	
Outdoor Recreation Related Degradation	OR	7	1		1	5	
Perched Culverts	CP						
Pesticide Use	PS	3		1	1		1
Plowed Watercourses	PW	1			1		
Sediment Loading	SL						
Site Clearing Prior to Development	SC						
Stormsewer Outfalls	SO	22		14	2		6
Runoff Contamination via Transportation Corridors	TC	5	1	1	2		1
Transportation Corridor Expansion	TE	1	1				
Water Takings	WT						
Wildlife Collisions	WC						

* The stresses identified within this plan are not exhaustive and therefore there may be stresses occurring within this subwatershed that are not noted within this plan.

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Buried Streams Map Code: BS Definition: The structural alteration of a stream channel, involves piping the creek system underground, eliminating aquatic habitat.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the benefits of maintaining our creeks and streams in their natural state.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA / HWSC / HHWSP / RAP / WPN / DFO	HHWSP / HWSC	2010-2014
		Undertake a feasibility and prioritization study for “daylighting” buried streams in the study area.		Fisheries Act, Section 37	HCA / CITY / DFO / MNR / HHWSP / RAP	CITY	2010-2012
			Work with landowners to undertake daylighting projects as recommended by the feasibility and prioritization study.	City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HHWSP / HCA / DFO / CITY / HWSC	HHWSP	2012-2014
Channelization Map Code: CH  Definition: The structural alteration of a stream channel, usually involves straightening of meanders and increasing gradient which increases velocity and erosion potential.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the benefits of maintaining our creeks and streams in their natural state.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA / HWSC / HHWSP / RAP / WPN / CITY / RBG / FSRT	HHWSP / HWSC	2010-2014
		Undertake a feasibility and prioritization study for restoring channelized creeks to those with a natural design.		Fisheries Act, Section 37	HCA / CITY / DFO / MNR / HHWSP / RAP	CITY	2010-2012
			Work with landowners to undertake natural channel design projects as recommended by the feasibility and prioritization study.	City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HHWSP / HCA / DFO / CITY / HWSC	HHWSP	2012-2014
			Work with landowners downstream of channelized sites to rehabilitate the riparian zone to reduce flow velocities, erosion and sedimentation.		CITY / DFO / HHWSP / HCA / RBG / FSRT / HWSC /	HHWSP	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Dams Map Code: DM Definition: a barrier to obstruct the flow of water, usually one of earth or masonry, built across a stream or river.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the detrimental effects of dams as fish barriers and to promote the removal/retrofitting of dams.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107 MNR Fish Barrier Inventory	HCA / HWSC / HHWSP / MNR / DFO	HHWSP / HWSC	2010-2014
		Undertake a feasibility and prioritization study for the removal of dams inventoried.		HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA / HWSC / HHWSP / MNR	HCA / MNR / HWSC	2010-2012
			Work with landowners to remove/retrofit dams as recommended by the prioritization study.	Fisheries Act, Section 37	HCA / HWSC / HHWSP / MNR / LO's / DFO / CITY	HHWSP	2010-2014
Detachment from Nature Map Code: DT  Definition: The condition of people disassociating their existence from nature.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote BMP's and the ecological significance of natural features.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations PAA-2, PAA-3, EPI -1, EPI-2, EPI-5 Pages 129-138	BARC / CITY / FSRT / GV / HCA / HHWSP / HWSC / WPN / DU	HHWSP / HWSC	2010-2014
	Erect creek crossing & ecological corridor signage along roadways.				HCA / CITY / RAP / WPN / BARC	CITY / WPN	2010-2014
	Implement education outreach programs for school-aged children, including: Yellow Fish Road, Stream of Dreams, Mini Marsh, Envirothon, Children's Water Festival, Eco-House Tours, etc.				BARC / HCA / CITY / GV / RBG	BARC / GV / HCA / CITY / RBG	2010-2014
	Support the formation and activities of "Friends of" groups aimed at protecting and rehabilitating natural features.				HWSC / HHWSP / CITY / HCA / BARC / FSRT / DFO / BTC	HHWSP / HWSC / HCA / CITY	2010-2014
		Assess landowner willingness to participate in and/or support water quality improvement and habitat restoration projects.			HHWSP / CITY / HCA / HWSC	HHWSP	2010-2012
		Engage citizen groups to conduct local subwatershed monitoring & reporting projects, including: water quality, base flow, litter hot spots, etc.			HHWSP / CITY / HCA / GV / BARC/ HWSC / RBG / FSRT	HHWSP / CITY / HCA / GV / BARC/ HWSC / RBG / FSRT	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
			Work with schools to undertake school yard naturalization projects.		HHWSP / HCA / CITY / HWSC	HHWSP	2010-2014
			Work with citizen groups to undertake restoration projects on public and private lands, including “Friends of” work days, Adopt a Creek, Fishing Clubs, etc.		HHWSP / HCA / CITY / HWSC / BARC / RBG / FSRT /BTC	HHWSP	2010-2014
Encroachment Map Code: EN Definition: The act of undertaking practices on another person’s property, i.e. erecting structures, planting gardens, disposal of waste.	Utilize workshops, information sessions, literature, websites, public service announcements, signage & direct landowner contact to promote healthy creeks to create awareness regarding how encroachment negatively impacts habitat.			HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55, 60	CITY / HHWSP / HCA / BARC / GV / HWSC / RBG / BTC	CITY / HCA / HHWSP / RBG	2010-2014
		Engage citizen groups to monitor & report areas affected by encroachment that are in need of restoration.		City of Hamilton Draft Private Tree and Woodland Conservation By-law	CITY / HHWSP / HCA / BARC / RBG / GV / HWSC / BTC	HCA / CITY / RBG	2010-2014
			Work with citizen groups to remove encroaching material on public and private lands, including “Friends of” work days, Adopt a Creek, Fishing Clubs, etc.	City of Hamilton By-law No. 03-117 Illegal Dumping	HHWSP / HCA / CITY / HWSC / BARC / GV / RBG / HNC	CITY / HHWSP / RBG / HCA	2010-2014
Erosion Map Code: ER Definition: The process of soil being scoured or washed away by flowing water.	Host erosion and sediment control training sessions for City staff, developers, contractors and landscapers to create awareness regarding recommended E&SC methods.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-2, ULM-3, FW-4 Pages 69, 70, 107	CITY / HCA / HHWSP / HWSC / Landscape Ontario / HHHBA	HCA	2010-2014
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the importance of riparian buffers and agricultural BMP’s.			HCA Planning and Regulation Policies and Guidelines Pages 68-69 Fisheries Act, Section 35	CITY / DFO / HCA / HWSC / HHWSP / HHHBA / Landscape Ontario / OSCIA	HHWSP / HWSC	2010-2014
	Create demonstration sites on public lands that highlight streambank stabilization and natural channel design projects.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report	CITY / HCA / HHWSP / DFO / HWSC / RBG / OSCIA	HHWSP	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
		Select erosion sites as identified in the City of Hamilton GRIDS Plan for the upcoming Erosion and Sediment Control Pilot Project.		Pages 142, 159-160 Erosion and Sediment Control Guidelines for Urban Construction	HCA / CITY / HHHBA / DFO	HCA	2010-2014
			Work with landowners to undertake erosion rehabilitation projects as identified in the City of Hamilton GRIDS Plan.		HHWSP / HWSC / HCA / CITY / DFO /	CITY	2010-2014
			Utilize enforcement scheme to enforce appropriate erosion control measures on development sites, including: seeding, avoiding steep slopes, etc.		HCA / CITY / HHHBA / DFO	HCA	2010-2014
			Work with landowners to reduce erosion by implementing BMP projects; e.g. streambank stabilization, riparian buffers, natural channel design.		HHWSP / HWSC / HCA / BARC / DFO / OSCIA / FSRT	HHWSP	2010-2014
Faulty Septic Systems Map Code: SS Definition: Malfunctioning septic systems; including plugged distribution tiles, infrequent tank pumping, etc. lead to untreated sewage contaminating our ground and surface water.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote the proper maintenance of existing septic systems.				HCA / BARC / HHWSP / HWSC / CITY	HHWSP	2010-2014
	Create demonstration sites on public lands that highlight properly functioning septic systems.				CITY / HHWSP / HCA / HWSC	CITY / HCA	2010-2012
		Conduct an inventory to determine how many households in Old Dundas are serviced by on-site treatment systems.			CITY / RAP	CITY	2010-2011
		Analyze existing water quality data for high levels of bacteria, chlorides, nitrates and TKN to prioritize areas for education outreach and restoration.			CITY / HCA / RAP	CITY / HCA	2010-2011
		Undertake a risk analysis of the potential for old and/or degraded sewer lines to contaminate groundwater.			CITY / MOE / RAP	CITY	2010-2011
			Work with landowners to properly maintain their septic systems or upgrade faulty septic systems.		HHWSP / CITY / HCA / HWSC / GV	HHWSP	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Habitat Fragmentation Map Code: HF  Definition: Disruption of large continuous tracts of habitat.	Establish a Woodlot Owners Association for this area as recommended by Re-Leaf Hamilton			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-12 Page 123 HCA Planning and Regulation Policies and Guidelines Pages 53-59 City of Hamilton Draft Private Tree and Woodland Conservation By-law Cootes to Escarpment Conservation & Land Management Strategy	HHWSP / HCA / HWSC / RBG / HNC / MNR	HWSC	2010
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy ecosystems and the importance of habitat connectivity.				HHWSP / HCA / RBG / CITY / HWSC / DU / MNR / HNC / CC	HHWSP / HWSC	2010-2014
	Encourage landowners to complete management plans for the natural features of their properties and to sustainably manage those features through the implementation of BMP's.				HHWSP / HCA / HWSC / CITY / HNC	HHWSP	2010-2014
	Create demonstration sites on public lands that highlight various types of terrestrial and aquatic habitat restoration projects.				HHWSP / HCA / CITY / HWSC / RBG / DU / HNC / DFO / FSRT	HHWSP	2010-2014
		Develop How Much Habitat is Enough targets for each subwatershed.			HCA / CITY/ HHWSP / DU / CC / HWSC / RBG / MNR / DFO	HCA	2010-2014
			Work with landowners to undertake habitat creation and enhancement projects.		HHWSP / OSCIA / DU / HWSC / HCA / DFO / FSRT	HHWSP	2010-2014
Illegal Fill Placement Map Code: FP Definition: The act of dumping fill material into or adjacent to natural areas.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the adverse effects of "fill" on natural systems and promote compliance with the HCA Regulations and the City's Site Alteration By-law.			HCA Planning and Regulation Policies and Guidelines Pages 61-62 City of Hamilton By-law No. 03-117 Illegal Dumping	HHWSP / HWSC / HCA / CITY	HCA	2011
	Host a training session for HCA and City staff on how to identify illegal fill and how to report incidences.				HCA / CITY / DFO	HCA	2010
			Work with landowners to rehabilitate fill sites as recommended by the HCA Inventory.		HCA / CITY / HHWSP / DFO	HCA	2012-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Inadequate Stormwater Management Map Code: SWM  Definition: Inadequately managing stormwater to control water quality and flooding; often associated with the drainage of developed lands.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote stormwater management BMP's including: disconnected downspouts, roof gardens, rain barrels, biofilters, permeable pavement, rain gardens, etc.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -6, ULM-9, ULM-11 Pages, 72, 75, 77 HCA Planning and Regulation Policies and Guidelines Pages 74-77 Fisheries Act, Section 34 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 38-44, 93-97, 122-125, 158-162	GV / CITY / BARC	CITY	20102014
	Promote the use of constructed wetland technology and Low Impact Development in the design of stormwater management facilities.						
		Undertake a study to determine the percentage of landowners with connected downspouts.			CITY / GV / RAP / BARC	CITY	2010-2011
			Implement recommendations from the City of Hamilton Stormwater Master Plan.		CITY / HCA / RAP / BARC / GV	CITY	2010-2014
			Work with landowners to disconnect downspouts and install rain barrels.		CITY / HHWSP / BARC / GV	CITY	2010-2014
			Retrofit existing stormwater management ponds to wet ponds where beneficial to water quality, aquatic habitat and erosion control.		CITY / RAP / HCA	CITY	2010-2014
			Offer financial incentives to replace driveways and decks with permeable pavement, interlocking brick, etc.		CITY	CITY	2010-2011
Increased Impervious Surfacing Map Code: IS	Host training sessions for HCA and City staff, developers and consultants to promote the incorporation of development related BMP's into planning applications; e.g. permeable pavement, green roofs, on-site wastewater treatment, etc.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -5b, ULM-6 Page 71, 72 HCA Planning and Regulation Policies and Guidelines Pages 74-77 Fisheries Act, Section 34	HCA / CITY / HHHBA / Landscape Ontario	HCA / CITY	2010-2014
	Lobby the Provincial government to amend the building code to include and favour "green" technology; e.g. green roofs, multilevel parking, interlocking pavement, etc.				HCA / CITY / EH / HHHBA / GV / Landscape Ontario	CITY	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
 <p>Definition: The decreased potential for rainwater infiltration into the soil as a result of increased paved/impermeable surfacing.</p>	Create demonstration sites in subdivisions that highlight development related BMP's and new environmentally friendly technologies; e.g. permeable pavement, green roofs, on-site wastewater treatment, etc.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 38-44, 93-97, 122-125, 158-162	HCA / CITY / EH / HHHBA / GV / HHWSP / HWSC	HHHBA	2010-2014
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote the implementation of development related BMP's and new environmentally friendly technologies when undertaking home renovations.				HCA / CITY / GV / HHHBA / HHWSP	GV	2010-2014
<p>Invasive/Introduced Species</p> <p>Map Code: IV</p> <p>Definition: The establishment/proliferation of exotic species that have no natural control measures which compete with native species for resources and degrade the ecosystem.</p>	Host training sessions for City staff, landscapers, consultants and nurseries to create awareness regarding the detrimental effects of invasive species and to encourage the use of native species.			HCA Planning and Regulation Policies and Guidelines Pages 53-56, 70-71 Action Plan for Addressing Terrestrial Invasive Species within the Great Lakes Basin	HHWSP / HCA / HWSC / CITY / HNC / Landscape Ontario	HCA	2010-2011
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the importance of controlling invasive species and planting native species.				HHWSP / HCA / HWSC / CITY	HHWSP	2010-2014
		Develop an Invasive Species Management Program which includes monitoring sites and management for specific species.			HCA / HHWSP / MNR / HWSC / CITY / HNC / RBG / CC	HCA	2010-2013
			Work with landowners to control invasive species and plant native species.		HCA / CITY / HHWSP / RBG	HHWSP	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Insufficient Riparian Buffer Map Code: RB  Definition: Disruption of large continuous tracts of habitat along watercourses.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and the creation of larger riparian buffers.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-2 Page 69	DFO / HCA / HHWSP / BARC / HWSC / OSCIA / OMAFRA	HHWSP	2010-2014
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.			HCA Planning and Regulation Policies and Guidelines Pages 40, 55, 60	HCA / HHWSP / HWSC / OSCIA / OMAFRA	OSCIA	2010-2014
	Create demonstration sites that highlight riparian buffers.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 145-150, 162-163	DFO / HCA / HHWSP / BARC / HWSC / OSCIA / OMAFRA	HHWSP	2010-2012
			Work with landowners to naturalize and plant riparian buffers adhering to How Much Habitat is Enough guidelines of a 15m width adjacent to warm water streams and a 30m width adjacent to cold and cool water streams.	Cootes to Escarpment Conservation & Land Management Strategy	HCA / HHWSP / HWSC / OSCIA / FSRT / DFO	HHWSP / OSCIA	2010-2014
Litter Map Code: LI Definition: The act of illegally disposing of waste into public/natural areas.	Utilize literature, websites, public service announcements, & direct landowner contact to create awareness regarding the prevention and clean-up of litter.			City of Hamilton By-law No. 03-118 Litter, Yard Waste and Property Maintenance	HCA / RBG / CITY / GV	CITY	2010-2014
		Undertake an inventory of illegal dumping sites throughout the subwatershed. Prioritize sites for the installation of deterrent mechanisms and the implementation of the Keep Hamilton Clean Program.			HCA / CITY / RBG	CITY	2010-2014
			Participate in the Keep Hamilton Clean Program by working with citizen groups to host litter clean up events.		HCA / HHWSP / HWSC / RBG / CITY	CITY	2010-2014
Nutrient Loading Map Code: NL	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and BMP's related to nutrient management.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-9, RM-7. Pages 116, 158 Nutrient Management Act 2002, O. Reg 267/03	HCA / BARC / GV / RBG / OSCIA / MOE / OMAFRA / RAP	HCA	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
 Definition: Excessive nutrients being inputted into a watercourse; often resulting from the application of manure/fertilizer.	Create demonstration sites on public lands that highlight nutrient management BMP projects.			Fisheries Act, Section 34 HCA Planning and Regulation Policies and Guidelines Page 72	HCA / HHWSP / HWSC / OSICA / RAP	HHWSP	2010-2012
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.				DFO / HCA / OMAFRA / OSCIA / HHWSP / HWSC	OSCIA	2010-2014
		Establish a nutrient level monitoring program with strategic sampling sites that are land use dependent, to identify specific sources of nutrient loading.			HCA / CITY / BARC / RBG / MOE / OMAFRA / RAP	HCA	2010-2011
		Develop a plan to reduce nutrient levels as determined by the land use dependent nutrient level monitoring program.			HCA / CITY / BARC / RBG / DFO / OSCIA / HHWSP / HWSC / RAP	HCA	2012-2014
			Work with landowners to reduce nutrient loading by implementing agricultural and urban BMP's related to nutrient management.		HHWSP / OSCIA / HCA / CITY / OMAFRA / HWSC	HHWSP	2010-2014
On-line Ponds Map Code: OP Definition: An in-stream structure designed to impound stream flow; leads to increased in-stream temperatures downstream and is often a barrier to fish migration.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and pond retrofit options.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-1, FW-4 Page 104, 107 Fisheries Act, Section 37 HCA Planning and Regulation Policies and Guidelines Page 63	DFO / HCA / OSCIA / OMAFRA / HHWSP / CITY	HHWSP	2010-2014
			Work with landowners to restore or retrofit on-line ponds.		DFO / HCA / OSCIA / OMAFRA / HHWSP / CITY / HWSC	HHWSP	2010-2014
Outdoor Recreation Related Impacts	Support the formation and activities of "Friends of" groups aimed at protecting and rehabilitating natural features.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-8, PAA-1,	HWSC / HHWSP / CITY / HCA / BARC / FSRT / BTC	HHWSP / CITY / HCA / RBG	2010-2014

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STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Map Code: OR  Definition: Recreational activities occurring in natural areas that inadvertently degrade the natural features of the area.	Erect signage explaining the environmental significance of natural areas and promoting user “etiquette” for the area.			PAA-2, PAA-3 Pages 115, 126-130 The Conservation Lands of Ontario – Three Year Business Plan A Joint Outdoor Tourism Marketing Strategy Niagara Escarpment Access Enhancement Plan Dundas Valley 50 Year Vision Strategy Cootes to Escarpment Conservation & Land Management Strategy	HCA / CITY / RBG / HHWSP / HNC / BTC	HCA / RBG / CITY	2010-2014
	Add “tread lightly” messaging to our recreation oriented websites.				HCA / CITY / RBG / HNC / BTC	HCA / CITY / RBG / HNC / BTC	2010-2012
		When undertaking master planning exercises, design trails to meet guidelines as set in HCA’s Planning and Regulation Policies and Guidelines.			HCA / CITY / RBG	HCA / CITY / RBG	2010-2014
		Develop marketing strategies for sensitive lands that focus on sustainable use.			HCA / CITY / RBG	HCA / CITY / RBG	2010-2012
		Continue to monitor Category A and B waterfalls on public lands for signs of degradation.			HCA / CITY	HCA / CITY	2010-2014
		Refer to the Niagara Escarpment Access Enhancement Plan to design infrastructure for high traffic areas to guide users along approved trails.			HCA / CITY / RBG / BTC	HCA / CITY / RBG / BTC	2010-2014
			Host annual clean up days for natural areas identified as having excessive amounts of litter.		HCA / RBG / CITY / HHWSP / HWSC / HNC / BARC	CITY / HCA / RBG	2010-2014
			Increase the amount of poison ivy caution signage along trails and in areas known to be degraded by trespassing.		HCA / CITY / RBG / HNC / BTC	HCA / CITY / RBG	2010-2011
			When conducting maintenance of existing trails, seek guidance from the HCA Planning and Engineering Department with respect to materials and design.		HCA / CITY / HHWSP / RBG / HNC	HCA / CITY / RBG	2010-2014
Perched Culverts Map Code: CP	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and create awareness regarding the detrimental effects of perched and closed bottom culverts.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-1, FW-4 Pages 104, 107 Fisheries Act, Section 37	DFO / HCA / OSCIA / OMAFRA / HHWSP / CITY	HHWSP	2010-2014

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STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Definition: In-stream culverts that when improperly designed/installed, create barriers to water flow and fish migration.	Host training session for HCA and City staff to promote the proper installation of culverts.			HCA Planning and Regulation Policies and Guidelines Page 41	DFO / HCA / OSCIA / OMAFRA / HHWSP / CITY	CITY	2010-2014
		Undertake an inventory of perched and closed bottom culverts throughout the subwatershed. Prioritize culverts for mitigation or replacement.			DFO / HCA / OSCIA / OMAFRA / HHWSP / CITY	CITY	2010-2014
			Work with landowners to remove/retrofit perched and closed bottom culverts.		DFO / HCA / OSCIA / OMAFRA / HHWSP / CITY	HHWSP	2010-2014
Pesticide Use Map Code: PS 	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the detrimental effects of pesticides and herbicides and alternatives.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations TSSR-6, EPI-4 Pages 99, 137 Fisheries Act, Section 34 City of Hamilton By-Law No. 07-282	HCA / OSCIA / OMAFRA / HHWSP / CITY / GV / HCPI / Landscape Ontario	GV	2010-2014
	Host Audubon Cooperative Sanctuary Program information sessions for local golf course owners and managers.				HHWSP / Landscape Ontario / CITY / HWSC / HCPI / RCGA	HHWSP	2010-2011
	Promote Municipal and Provincial Pesticide By-Laws.				CITY / GV / HCPI / HWSC / HHWSP / OSCIA / OMAFRA	CITY / GV	2010-2014
	Create demonstration sites on public lands that highlight pesticide/herbicide free lawns, gardens, natural areas, crops, etc.				CITY / GV / HCPI / HWSC / HHWSP / OSCIA / OMAFRA	HHWSP	2010-2014
		Undertake a study to determine the current level of pesticide/herbicide use in the subwatershed and develop targets for reduction.			CITY / GV / HCPI / HWSC / HHWSP / OSCIA / OMAFRA	CITY	2010-2012
			Work with landowners to implement Integrated Pest Management practices as alternatives to pesticide use.		CITY / GV / HCPI / HWSC / HHWSP / OSCIA / OMAFRA	HHWSP	2010-2014

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STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Plowed Watercourses Map Code: PW Definition: Headwater swales or small watercourses that are worked for agricultural production.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote drainage related BMP's; e.g. Water and Sediment Control Basins and grassed waterways.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-4 Pages 70, 71, Fisheries Act, Section 37	DFO / HCA / OMAFRA / OSCIA / HHWSP / HWSC	HHWSP / OSCIA	2010-2014
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.				DFO / HCA / OMAFRA / OSCIA / HHWSP / HWSC	OSCIA	2010-2014
	Create demonstrations sites that highlight BMP's that promote good agricultural land drainage; e.g. grassed waterways, Water and Sediment Control Basins, etc.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 44, 145-150	DFO / HCA / OMAFRA / OSCIA / HHWSP / HWSC	HHWSP / OSCIA	2010-2012
			Work with landowners to install effective agricultural land drainage; e.g. grassed waterways, Water and Sediment Control Basins, etc.		DFO / HCA / OSCIA / HHWSP / HWSC	HHWSP / OSCIA	2010-2014
Sediment Loading Map Code: SL Definition: Organic and inorganic material that is entrained by the flow of water and is deposited in a creek system.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and BMP's related to preventing sedimentation.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-5, FW9 Pages 70, 71, 116 Fisheries Act, Sections 34 and 36	DFO / HCA / HHWSP / BARC / HWSC / RBG / FSRT / RAP	HCA	2010-2014
			Work with landowners to reduce sediment loading by implementing BMP projects; e.g. streambank stabilization, riparian buffers, natural channel design.		DFO / HCA / HHWSP / BARC / HWSC / OSCIA / FSRT / RAP	HHWSP	2010-2014
			Utilize an enforcement scheme to ensure the proper use of sediment control measures, including: silt fencing, etc.	Erosion and Sediment Control Guidelines for Urban Construction	DFO / HCA / HHHBA/ CITY		
			Work with contractors to ensure that site clearing prior to development is phased out as the project phases unfold to reduce the area and length of time bare soil is exposed.		CITY / HCA/ HHHBA / DFO	HCA	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS



STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
<div>Site Clearing Prior to Development</div> <div>Map Code: SC</div> <div></div> <div>Definition: The act of stripping or excavating the vegetation and topsoil from a site prior to construction works.</div>	Host training sessions for City staff, developers and consultants to promote City standards and guidelines related to site preparation prior to development.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-4 Page 71 HCA Planning and Regulation Policies and Guidelines Pages 50-62, 68-69 City of Hamilton Draft Private Tree and Woodland Conservation By-Law City of Hamilton By-Law No. 03-126 Site Alteration By-Law Erosion and Sediment Control Guidelines for Urban Construction	DFO / HCA / HHHBA / CITY / Landscape Ontario CITY / HCA / HHHBA / DFO	CITY HCA	2011-2012 2010-2014
<div>Stormsewer Outfalls</div> <div>Map Code: SO</div> <div></div> <div>Definition: The point where a sewer system discharges into a watercourse during a storm</div>	Implement the Stream of Dreams and Yellow Fish Road Programs with local schools, scouting and girl guide groups and other children’s groups, to create awareness regarding the impacts of stormwater on stream systems.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -6, ULM-9, ULM-11, RM-7 Pages, 72, 75, 77, 158 Fisheries Act, Section 34 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 138, 158-159	HCA / BARC / GV / CITY / HWSC / FSRT	BARC	2010-2014
	Promote the Municipal Sewer-Use By-law.				HCA / CITY / GV / FSRT / BARC	CITY	2010-2014
		Undertake a water quality study evaluating water quality and temperature at a representative sampling of storm sewers to prioritize sewersheds to target for education outreach and remediation.			HCA / BARC / RAP / CITY / GV	CITY	2010-2012
		Undertake a water temperature monitoring study at a representative sampling of storm sewers to determine the impact of storm flows on creek temperature.			HCA / CITY / DFO	HCA	2010-2012

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
event.			Work to implement the recommendations in the sewershed water quality study.		HCA / RAP / CITY / DFO	CITY	2012-2014
			Work with landowners to establish riparian buffers and/or erosion protection downstream of storm sewer outfalls; e.g. riverstone.		HCA / CITY / HHWSP / BARC / FSRT	HHWSP	2010-2014
			Work with landowners to disconnect downspouts and to install rain barrels.		HHWSP / GV / CITY BARC	GV	2010-2014
Runoff Contamination via Transportation Corridors Map Code: TC Definition: Contamination resulting from stormwater runoff from major arterial roadways; often associated with the application of salts for de-icing and the residual precipitate created by automobile exhaust.	Liaise with City staff to promote road salt alternatives, alternative application methods and recommended snow removal practices. E.g. City of Guelph liquid application prior to inclement weather.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-5b Page 71 Fisheries Act, Section 34	CITY / DFO / HCA / MTO	CITY / HCA	2010-2014
	Utilize literature, websites, public service announcements & direct landowner contact to promote the use of sidewalk salt alternatives.				CITY / DFO / HCA / MTO / GV / HWSC / HHWSP	GV	2010-2014
		Undertake a study to determine the most effective method of snow removal that will reduce contamination of watercourses.			CITY / DFO / HCA / MTO	CITY	2010-2012
			Implement improved snow removal methods as recommended by the study that will reduce contamination of watercourses.		CITY / MTO	CITY	2012-2014
			Install vegetated filter strips and riparian buffers along medians and roadsides.		CITY / HCA / MTO / DFO / RAP	CITY	2010-2014
Transportation Corridor Expansion Map Code: TE	Host training sessions for City staff, developers and consultants to promote BMP's and new environmental technologies relating to transportation corridors; e.g. permeable pavement, wildlife under/overpasses, vegetated filter medians and rights of way, light coloured aggregate in hot mix, etc.			HCA Planning and Regulation Policies and Guidelines Pages 50-62, 68-69 Ontario Provincial Standards for Roads and Public Works Erosion and Sediment	CITY / HCA / MTO / HHHBA	CITY	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS


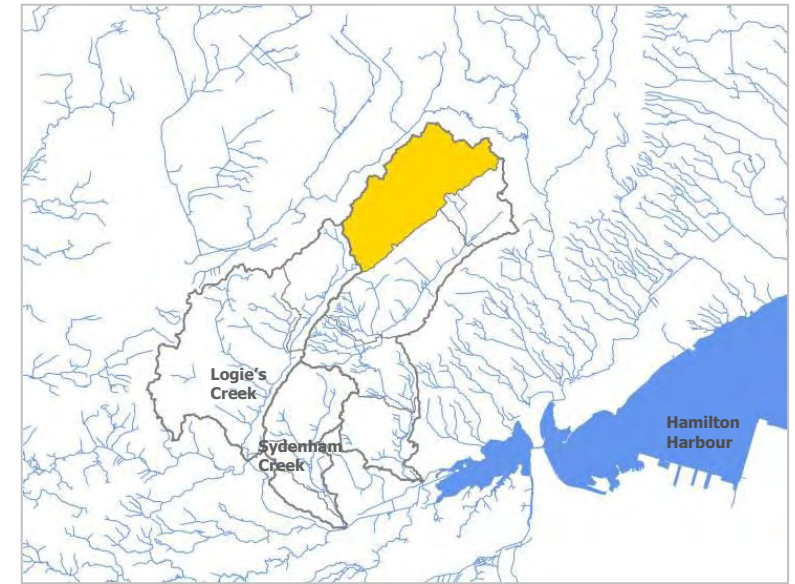
STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Definition: The process by which new roads are built or existing roads are widened.		When planning for major road works, design transportation corridors using new technologies for environmental solutions.		Control Guidelines for Urban Construction	CITY / HCA / MTO / HHHBA	CITY	2010-2014
			When repairing roads, utilize new technologies for road maintenance that are proven to have environmental benefits.		CITY / HCA / MTO / HHHBA	CITY	2010-2014
Water Takings Map Code: WT 	Host open houses when experiencing low water conditions to address landowner concerns and promote recommended reductions in rates and volumes of takings.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-12 Page 77 Ontario Water Resources Act O. Reg. 387/04	HCA / MOE / CITY	HCA	2010-2014
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote BMP's relating to water conservation technology.				HCA / MOE / CITY / OMAFRA / OSCIA / HHWSP / HWSC	HHWSP	2010-2014
	Encourage landowners with surface water takings to install groundwater systems.				HHWSP / OSCIA / MOE / OMAFRA	HHWSP	2010-2014
	Encourage landowners with water taking needs to establish an Irrigation Advisory Committee to schedule takings alternately.				HHWSP / OSCIA / MOE / OMAFRA	OMAFRA	2010-2014
		Upon receipt of new Permit to Take Water applications, evaluate the taking against active permits in the area to determine the potential stress level related to multiple users on a given system.			HCA / MOE / CITY	HCA	2010-2014
			Work with landowners to implement BMP's related to water conservation.		HCA / OSCIA / CITY / HWSC / HHWSP / OMAFRA	OSCIA	2010-2014
			Work with landowners to decommission unused wells.		HCA / HHWSP / OSCIA / CITY	HHWSP	2010-2014
Wildlife Collisions Map Code: WC	Utilize literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding managing human-wildlife conflicts.				CITY / MNR / HHWSP / HWSC / HCA	MNR	2010-2014

TABLE BO-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunity	Special Study Opportunity	Restoration Opportunity				
Definition: Incidences where animals are struck by vehicles or where animals collide with buildings, often occurring with buildings with large windows.	Erect additional wildlife caution signage that is species specific, along roadways at known points of frequent collisions.				CITY / HCA / RBG / MTO	CITY / MTO	2010-2014
		When planning major road works, consider the incorporation of wildlife over/underpasses, avoiding known migratory corridors and other wildlife accommodations in the design.			CITY / HCA / MTO	CITY	2010-2014
		Evaluate the effectiveness of the MTO roadside prairies and wildlife shrub corridors project in preventing wildlife collisions.			CITY / HCA / MTO	MTO	2010-2012
			Reduce the use of road salt or consider alternatives that do not attract wildlife.		CITY / HCA / MTO	CITY	2010-2011
			Produce and distribute window decals for large windows of homes and high rise buildings to prevent bird collisions.		CITY / HCA / HNC / GV	CITY	2010-2011

Partner Agency Acronyms

BARC	Bay Area Restoration Council	HHHBA	Hamilton-Halton Home Builders Association
BTC	Bruce Trail Conservancy	HHWSP	Hamilton-Halton Watershed Stewardship Program
CC	Carolinian Canada	HNC	Hamilton Naturalists Club
CITY	City of Hamilton	HWSC	Hamilton-Wentworth Stewardship Council
DFO	Department of Fisheries and Oceans	MOE	Ministry of the Environment
DU	Ducks Unlimited	MNR	Ministry of Natural Resources
EH	Environment Hamilton	MTO	Ministry of Transportation
FSRT	Field and Stream Rescue Team	OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
GV	Green Venture	OSCIA	Ontario Soil and Crop Improvement Association
HCA	Hamilton Conservation Authority	WPN	Watershed Planning Network
HCPI	Hamilton Coalition on Pesticide Issues		



PARKSIDE DRIVE CATCHMENT

DATA SHEETS

PARKSIDE DRIVE DATA SHEET

Table BO-9: Stresses Identified in the Parkside Drive Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
CH-6	Channelization	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
DT-19	Detachment From Nature	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
DT-20	Detachment From Nature	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
EN-4	Encroachment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
HF-8	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-7	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
HF-18	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
HF-19	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RB-4	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-9	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
LI-1	Litter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
OP-9	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-10	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-11	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-12	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OR-1	Outdoor Recreation Related Degradation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
TC-12	Runoff Contamination via Transportation Corridors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
TE-1	Transportation Corridor Expansion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

PARKSIDE DRIVE DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	DESCRIPTION
n/a		

BENTHICS ASSESSMENT

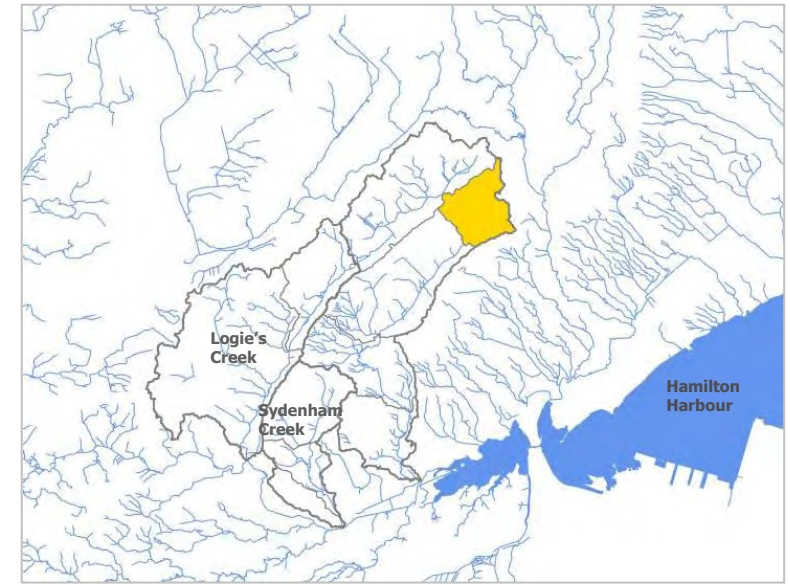
LOCATION	DATE	DESCRIPTION
n/a		

WATER QUALITY ASSESSMENT

LOCATION	DATE	DESCRIPTION
n/a		

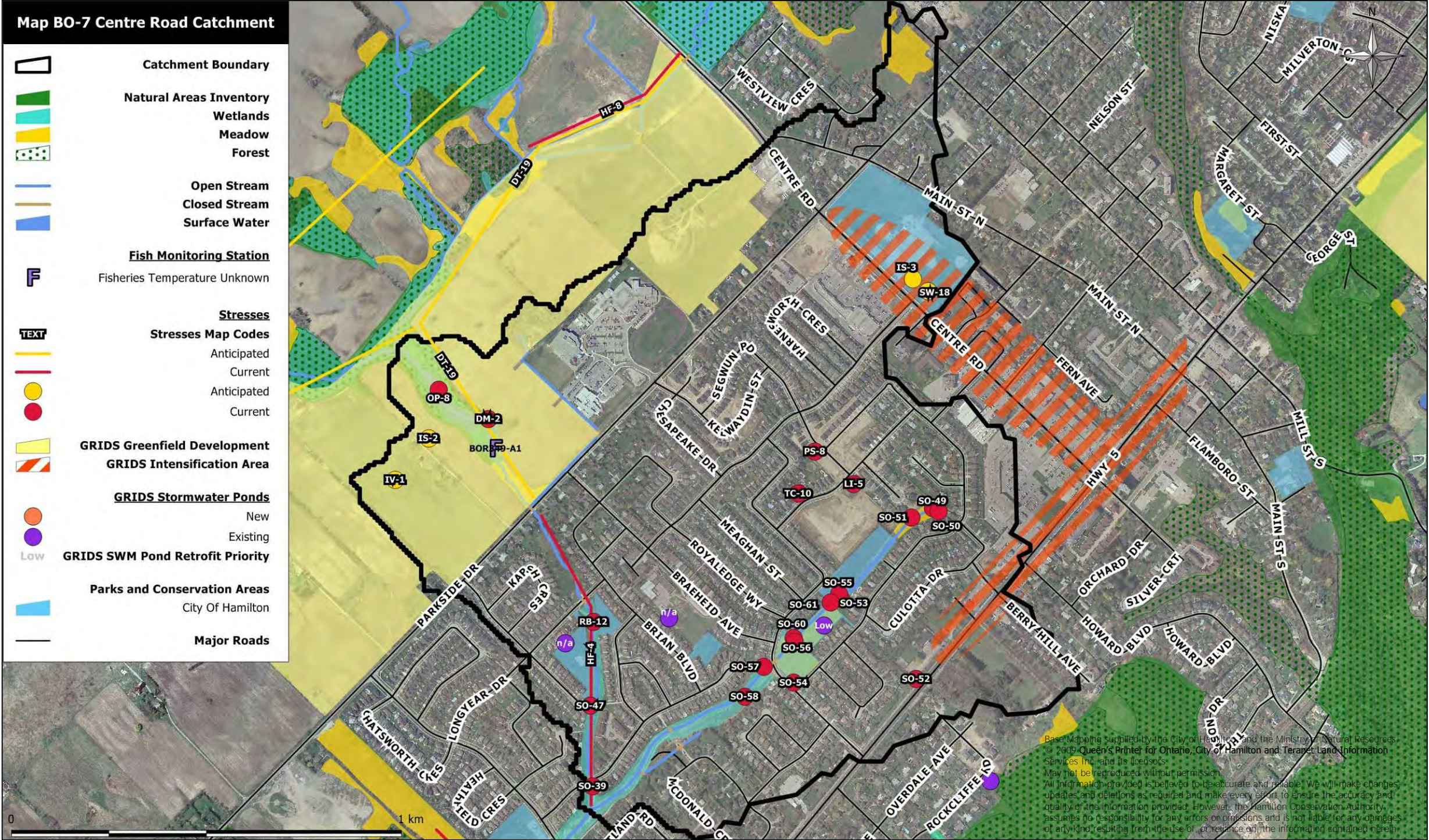
WATER FLOW ASSESSMENT

LOCATION	DATE	DESCRIPTION
n/a		



CENTRE ROAD CATCHMENT

DATA SHEETS



CENTRE ROAD DATA SHEET

Table BO-10: Stresses Identified in the Centre Road Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
DM-2	Dam	☑	☑	☑		☑	☑
DT-19	Detachment From Nature	☑	☑	☑		☑	
HF-4	Habitat Fragmentation	☑	☑	☑	☑	☑	
SW-18	Inadequate Stormwater Management	☑	☑	☑	☑	☑	
IS-2	Increased Impervious Surface	☑				☑	
IS-3	Increased Impervious Surface	☑			☑	☑	
IV-1	Invasive/Introduced Species	☑	☑	☑		☑	
RB-12	Insufficient Riparian Buffer	☑		☑	☑	☑	
LI-5	Litter	☑	☑	☑	☑	☑	
OP-8	On-line Pond	☑		☑		☑	☑
PS-8	Pesticide Use	☑	☑	☑		☑	
TC-10	Runoff Contamination via Transportation Corridors	☑	☑	☑	☑	☑	
SO-39	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-47	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-49	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-50	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-51	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-52	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-53	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-54	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-55	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-56	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-57	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-58	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-60	Stormsewer Outfall	☑	☑	☑	☑	☑	
SO-61	Stormsewer Outfall	☑	☑	☑	☑	☑	

CENTRE ROAD DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
BOR349-A1	17-Aug-99	Blacknose dace	4	8/5/2005 25.5	cool to warm
BOR349-A1	17-Aug-99	Central mudminnow	45	8/5/2005 25.5	cool to warm
BOR349-A1	17-Aug-99	Creek chub	26	8/5/2005 25.5	cool to warm
BOR349-A1	17-Aug-99	Largemouth bass	37	8/5/2005 25.5	cool to warm
BOR349-A1	17-Aug-99	Northern pike	1	8/5/2005 25.5	cool to warm
BOR349-A1	17-Aug-99	Pumpkinseed	46	8/5/2005 25.5	cool to warm
BOR349-A1	17-Aug-99	Sunfishes	64	8/5/2005 25.5	cool to warm
BOR349-A1	05-Aug-05	Brown bullhead	3		
BOR349-A1	05-Aug-05	Common carp	6		
BOR349-A1	05-Aug-05	Creek chub	10		
BOR349-A1	05-Aug-05	Largemouth bass	5		
BOR349-A1	05-Aug-05	Northern pike	1		
BOR349-B1	19-Jul-91	Largemouth bass	33	no temp taken	cool
BOR349-B1	19-Jul-91	Northern pike	1	no temp taken	cool
BOR349-B1	19-Jul-91	Pumpkinseed	44	no temp taken	cool
BOR349-B1	17-Aug-99	Blacknose dace	4		
BOR349-B1	17-Aug-99	Central mudminnow	1		
BOR349-B1	17-Aug-99	Creek chub	26		
BOR349-B1	17-Aug-99	Largemouth bass	4		
BOR349-B1	17-Aug-99	Pumpkinseed	2		
BOR349-B1	17-Aug-99	Sunfishes	69		

BENTHICS ASSESSMENT

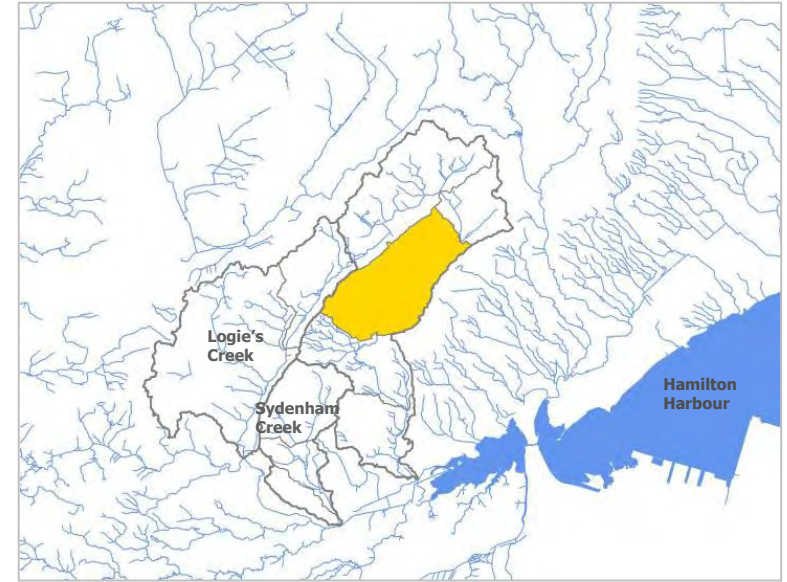
LOCATION	DATE	DESCRPTION
n/a		

WATER QUALITY ASSESSMENT

LOCATION	DATE	DESCRPTION
n/a		

WATER FLOW ASSESSMENT

LOCATION	DATE	DESCRPTION
n/a		



HIGHWAY 6 CATCHMENT

DATA SHEETS

HIGHWAY 6 DATA SHEET

Table BO-11: Stresses Identified in the Highway 6 Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
BS-3	Buried Stream	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CH-1	Channelization	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CH-7	Channelization	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CH-8	Channelization	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ER-23	Erosion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HF-6	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-9	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-2	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-5	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
IS-4	Increased Impervious Surface	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
RB-8	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-13	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
OP-7	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-13	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OR-2	Outdoor Recreation Related Degradation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
PW-4	Plowed Watercourse	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
TC-11	Runoff Contamination via Transportation Corridors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
TC-6	Runoff Contamination via Transportation Corridors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-40	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-41	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

HIGHWAY 6 DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	DESCRIPTION
n/a		

BENTHICS ASSESSMENT

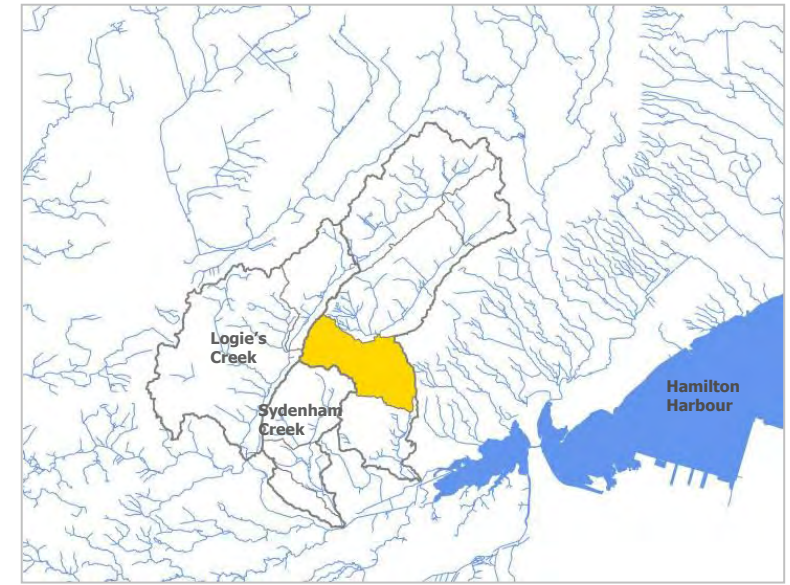
LOCATION	DATE	DESCRIPTION
BORE-4.63	2001	Impaired
BORE-5.4	2000	Impaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	DESCRIPTION
n/a		

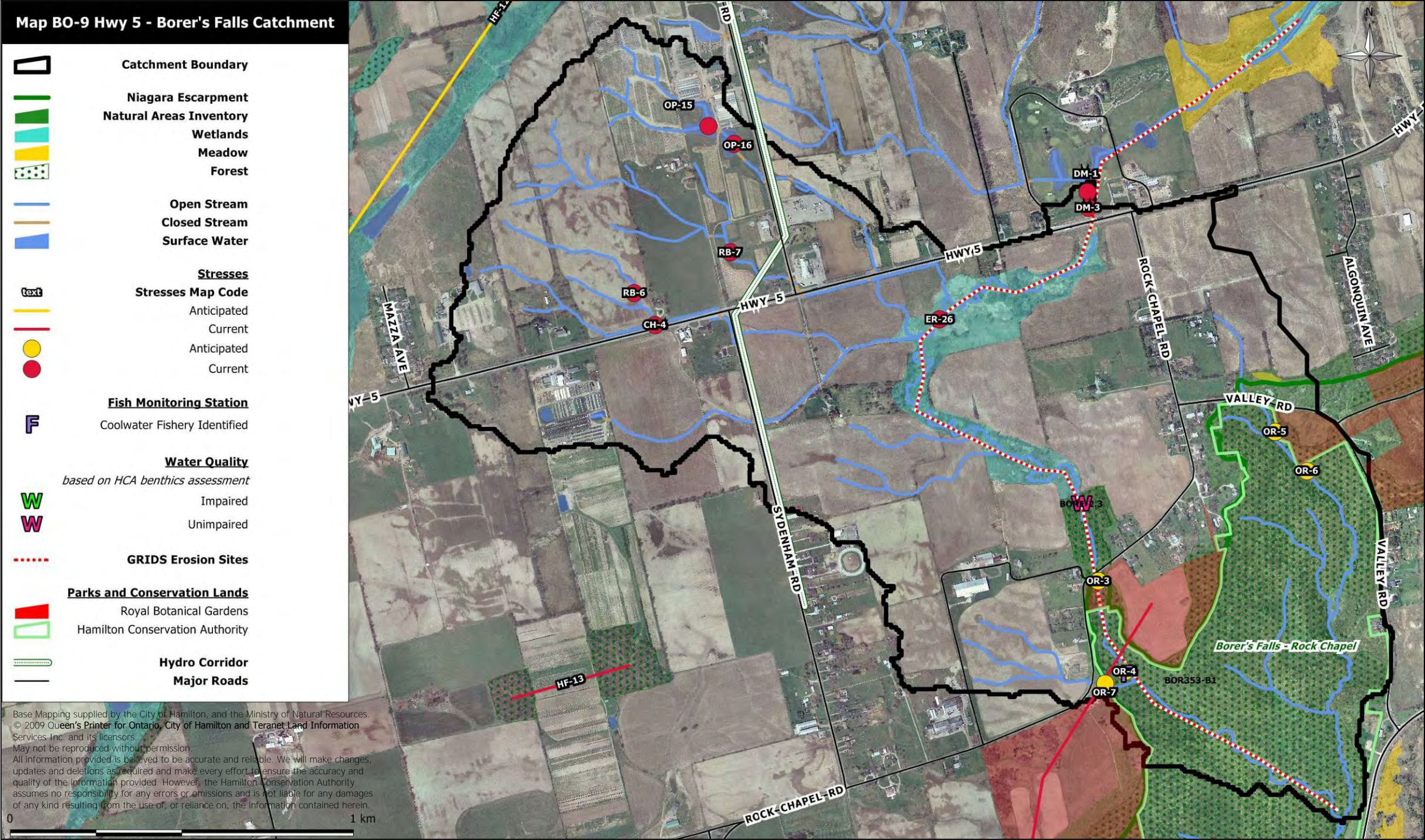
WATER FLOW ASSESSMENT

LOCATION	DATE	DESCRIPTION
n/a		



HIGHWAY 5 - BORER'S FALLS CATCHMENT

DATA SHEETS



HIGHWAY 5 - BORER’S FALLS DATA SHEET

Table BO-12: Stresses Identified in the Highway 5 - Borer’s Falls Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
CH-4	Channelization	☑	☑	☑		☑	☑
DM-1	Dam	☑	☑	☑		☑	☑
DM-3	Dam	☑	☑	☑		☑	☑
ER-26	Erosion	☑	☑	☑		☑	☑
HF-16	Habitat Fragmentation	☑		☑		☑	
HF-16	Habitat Fragmentation	☑		☑		☑	
RB-6	Insufficient Riparian Buffer	☑		☑	☑		
RB-7	Insufficient Riparian Buffer	☑		☑	☑		
OP-15	On-line Pond	☑		☑	☑		☑
OP-16	On-line Pond	☑		☑	☑	☑	☑
OR-3	Outdoor Recreation Related Degradation	☑	☑	☑	☑	☑	
OR-4	Outdoor Recreation Related Degradation	☑	☑	☑	☑	☑	
OR-5	Outdoor Recreation Related Degradation	☑	☑	☑	☑	☑	
OR-6	Outdoor Recreation Related Degradation	☑	☑	☑	☑	☑	
OR-7	Outdoor Recreation Related Degradation	☑	☑	☑	☑	☑	

HIGHWAY 5 - BORER’S FALLS DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
BOR353-B1	30-Jul-91	Creek chub	(+)	7/30/1991 20.0	cool
BOR353-B1	30-Jul-91	Largemouth bass	(+)	7/30/1991 20.0	cool

BENTHICS ASSESSMENT

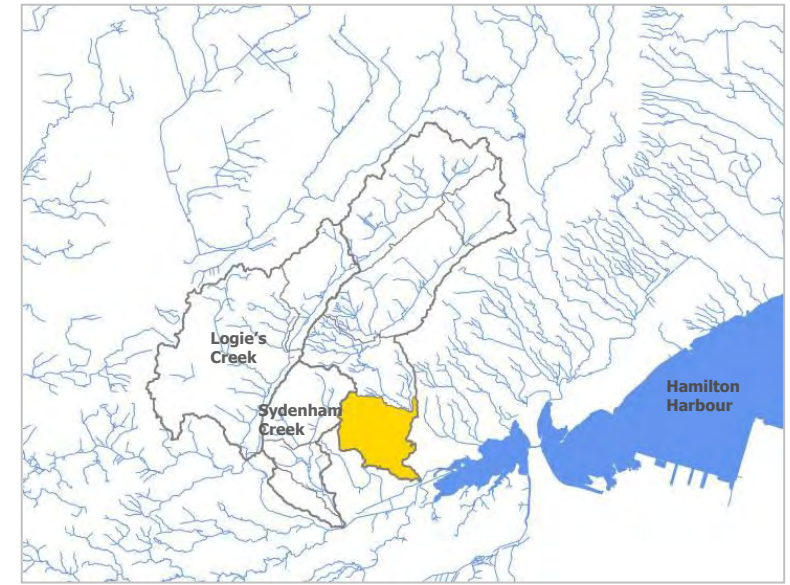
LOCATION	DATE	DESCRIPTION
BORE-2.3	2000	Unimpaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	DESCRPTION
n/a		

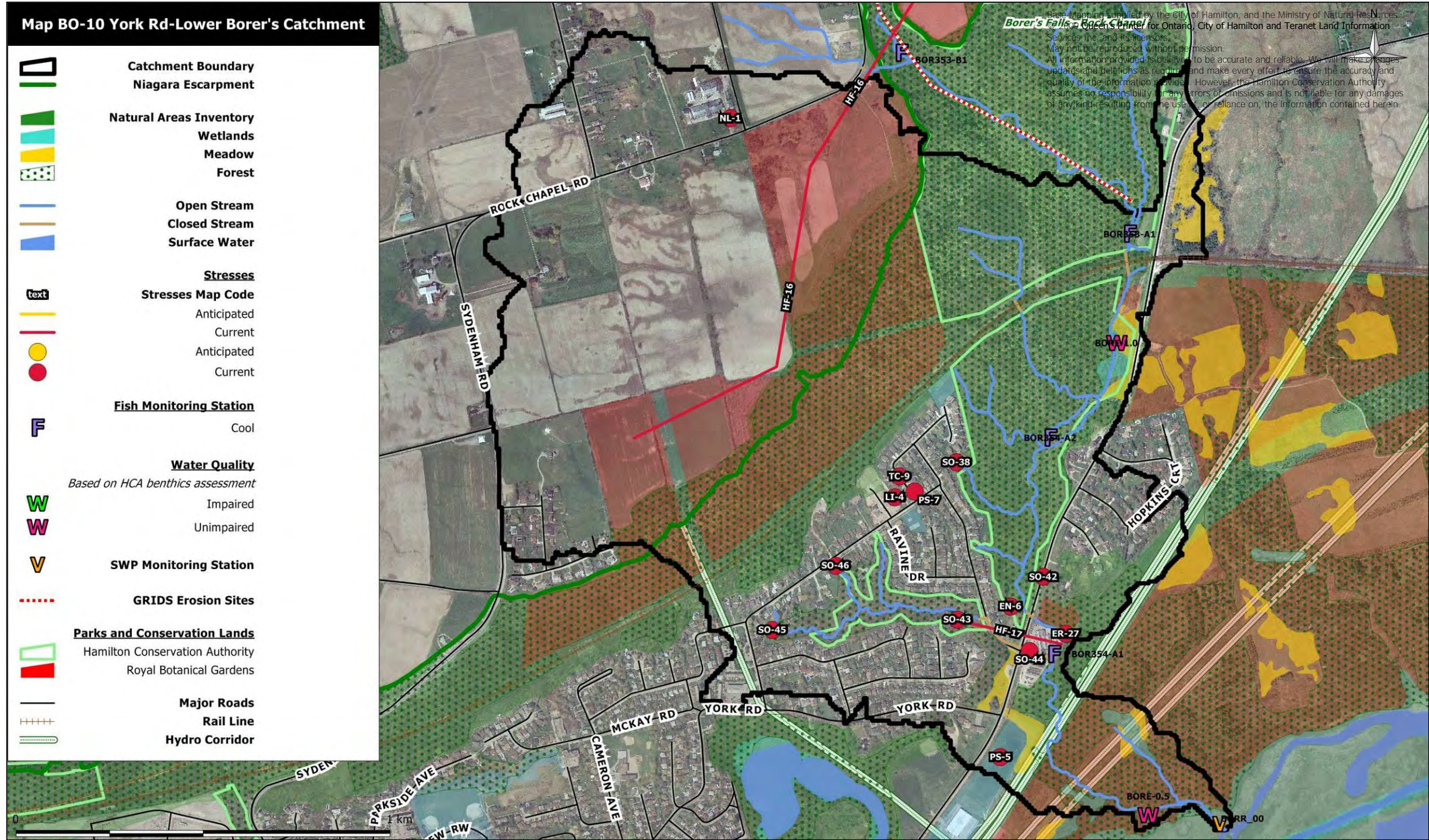
WATER FLOW ASSESSMENT

LOCATION	DATE	DESCRPTION
n/a		



YORK ROAD - LOWER BORER'S CATCHMENT

DATA SHEETS



YORK ROAD - LOWER BORER’S DATA SHEET

Table BO-13: Stresses Identified in York Road - Lower Borer’s Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
EN-6	Encroachment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
ER-27	Erosion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HF-16	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-16	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-17	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
LI-4	Litter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
NL-1	Nutrient Loading	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
PS-5	Pesticide Use	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
PS-7	Pesticide Use	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
TC-9	Runoff Contamination via Transportation Corridors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-38	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-42	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-43	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-44	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-45	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SO-46	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

YORK ROAD - LOWER BORER’S DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
BOR353-A1	19-Jul-00	Blacknose dace	36	7/19/2000 17.1	cool
BOR353-A1	19-Jul-00	Creek chub	6	7/19/2000 17.1	cool
BOR353-A1	19-Jul-00	Fathead minnow	7	7/19/2000 17.1	cool
BOR354-A2	19-Jul-00	Blacknose dace	36	7/19/2000 17.6	cool
BOR354-A2	19-Jul-00	Creek chub	5	7/19/2000 17.6	cool
BOR354-A2	19-Jul-00	White sucker	1	7/19/2000 17.6	cool
BOR354-A1	20-Jul-00	Blacknose dace	104	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Bluntnose minnow	25	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Brook stickleback	1	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Common shiner	1	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Creek chub	38	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Fathead minnow	3	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Johnny darter	15	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Longnose dace	12	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Pumpkinseed	1	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	Rainbow darter	4	7/20/2000 15.3	cool
BOR354-A1	20-Jul-00	White sucker	28	7/20/2000 15.3	cool
BOR354-A1	24-Jul-00	Blacknose dace	44		
BOR354-A1	24-Jul-00	Bluntnose minnow	6		
BOR354-A1	24-Jul-00	Creek chub	8		
BOR354-A1	24-Jul-00	Johnny darter	9		
BOR354-A1	24-Jul-00	Longnose dace	1		
BOR354-A1	24-Jul-00	Rainbow darter	3		
BOR354-A1	24-Jul-00	Rainbow trout	1		
BOR354-A1	24-Jul-00	White sucker	9		

BENTHICS ASSESSMENT

LOCATION	DATE	DESCRPTION
BORE-0.5	2000	Unimpaired
BORE-1.0	2000	Unimpaired

YORK ROAD - LOWER BORER’S DATA SHEET

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS
BORR_00	6/18/2007 16:20	pH	7.8	
BORR_00	6/18/2007 16:20	Temperature	22.9	°C
BORR_00	6/18/2007 16:20	Conductivity	1252	µs/cm
BORR_00	6/18/2007 16:20	Dissolved Oxygen	98	%
BORR_00	6/18/2007 16:20	Dissolved Oxygen mg/L	8.4	mg/L
BORR_00	6/18/2007 16:20	TDS	0.81	g/L
BORR_00	7/23/2007 16:21	pH	8.1	
BORR_00	7/23/2007 16:21	Temperature	20.6	°C
BORR_00	7/23/2007 16:21	Conductivity	791	µs/cm
BORR_00	7/23/2007 16:21	Dissolved Oxygen	138	%
BORR_00	7/23/2007 16:21	Dissolved Oxygen mg/L	12.3	mg/L
BORR_00	7/23/2007 16:21	TDS	0.54	g/L
BORR_00	10/15/2007 15:13	pH	8.09	
BORR_00	10/15/2007 15:13	Temperature	13.2	°C
BORR_00	10/15/2007 15:13	Conductivity	1032	µs/cm
BORR_00	10/15/2007 15:13	Dissolved Oxygen	122	%
BORR_00	10/15/2007 15:13	Dissolved Oxygen mg/L	12.8	mg/L
BORR_00	10/15/2007 15:13	TDS	0.67	g/L
BORR_00	9/21/2007 14:45	pH	8.09	
BORR_00	9/21/2007 14:45	Temperature	17.9	°C
BORR_00	9/21/2007 14:45	Conductivity	1283	µs/cm
BORR_00	9/21/2007 14:45	Dissolved Oxygen	86	%
BORR_00	9/21/2007 14:45	Dissolved Oxygen mg/L	8.13	mg/L
BORR_00	9/21/2007 14:45	TDS	0.83	g/L

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s
BORR_00	6/18/2007	0.01761
BORR_00	7/23/2007	0.01003
BORR_00	10/15/2007	0.01073
BORR_00	9/21/2007	0.00066

