

SPRING CREEK SUBWATERSHED
STEWARDSHIP ACTION PLAN 2010

TABLE OF CONTENTS

SPRING CREEK SUBWATERSHED CHARACTERIZATION.....SP-1

GEOGRAPHIC LOCATION..... SP-1

HYDROLOGY..... SP-3

SOILS AND PHYSIOGRAPHY..... SP-5

NATURAL HISTORY AND SIGNIFICANT SPECIES..... SP-7

CULTURAL HISTORY..... SP-11

STEWARDSHIP HISTORY..... SP-13

STRESSES AND STEWARDSHIP ACTIONS.....SP-14

CATCHMENT SUMMARIES.....SP-37

COPETOWN EAST DATA SHEETS.....SP-37

LOWER SPRING CREEK DATA SHEET.....SP-40

MIDDLE SPRING CREEK DATA SHEETS.....SP-43

SOUTHERN HEADWATERS DATA SHEETS.....SP-46

WEIR’S LANE DATA SHEETS.....SP-49

LIST OF MAPS

MAP SP-1: SPRING CREEK SUBWATERSHED AND CATCHMENTS.....SP-2

MAP SP-2: SOIL TYPE (1965) SP-4

MAP SP-3: NATURAL HISTORY..... SP-6

MAP SP-4: CURRENT LANDUSE..... SP-10

MAP SP-5: STEWARDSHIP HISTORY..... SP-12

MAP SP-6: COPETOWN EAST CATCHMENT.....SP-37

MAP SP-7: LOWER SPRING CREEK CATCHMENT.....SP-40

MAP SP-8: MIDDLE SPRING CREEK CATCHMENT..... SP-43

MAP SP-9: SOUTHERN HEADWATERS CATCHMENT.....SP -46

MAP SP-10: WEIR’S LANE CATCHMENT.....SP-49

TABLE OF CONTENTS

LIST OF TABLES

TABLE SP-1: SOIL AND EROSION POTENTIAL IN THE SPRING CREEK SUBWATERSHED.....SP-5

TABLE SP-2: NATURAL LAND COVER STATISTICS.....SP-7

TABLE SP-3: LAND USE STATISTICS.....SP-11

TABLE SP-4: STEWARDSHIP STATISTICS.....SP-13

TABLE SP-5: ENVIRONMENT CANADA HOW MUCH HABITAT IS ENOUGH GUIDELINES.....SP-13

TABLE SP-7: STRESSES INVENTORY BY CATCHMENT.....SP-15

TABLE SP-8: STRESSES AND THEIR ASSOCIATED STEWARDSHIP ACTIONS.....SP-16

TABLE SP-9: STRESSES IDENTIFIED IN THE COPETOWN EAST CATCHMENT.....SP-38

TABLE SP-10: STRESSES IDENTIFIED IN THE LOWER SPRING CREEK CATCHMENT.....SP-41

TABLE SP-11: STRESSES IDENTIFIED IN THE MIDDLE SPRING CREEK CATCHMENT.....SP-44

TABLE SP-12: STRESSES IDENTIFIED IN THE SOUTHERN HEADWATERS CATCHMENT.....SP-47

TABLE SP-13: STRESSES IDENTIFIED IN THE WEIR’S LANE CATCHMENT.....SP-50

SPRING CREEK SUBWATERSHED CHARACTERIZATION

GEOGRAPHIC LOCATION

Spring Creek subwatershed is 12.78 km² in area and is comprised of five catchment basins. In descending order from the headwaters to the outlet these are: Copetown East, Middle Spring Creek, Weir’s Lane, Southern Headwaters and Lower Spring Creek (**Map SP-1**). This subwatershed lies almost entirely within the former municipal boundaries of the Town of Dundas, Flamborough Township and the Town of Ancaster. The subwatershed also falls within three City of Hamilton Wards, specifically Wards 14, 13 and 12.

The boundaries of the Spring Creek subwatershed and its associated catchments have recently been updated through the Source Protection Planning process. The naming convention from the 1997 Spencer Creek Management Plan has been retained so that reference between previous reports is possible.

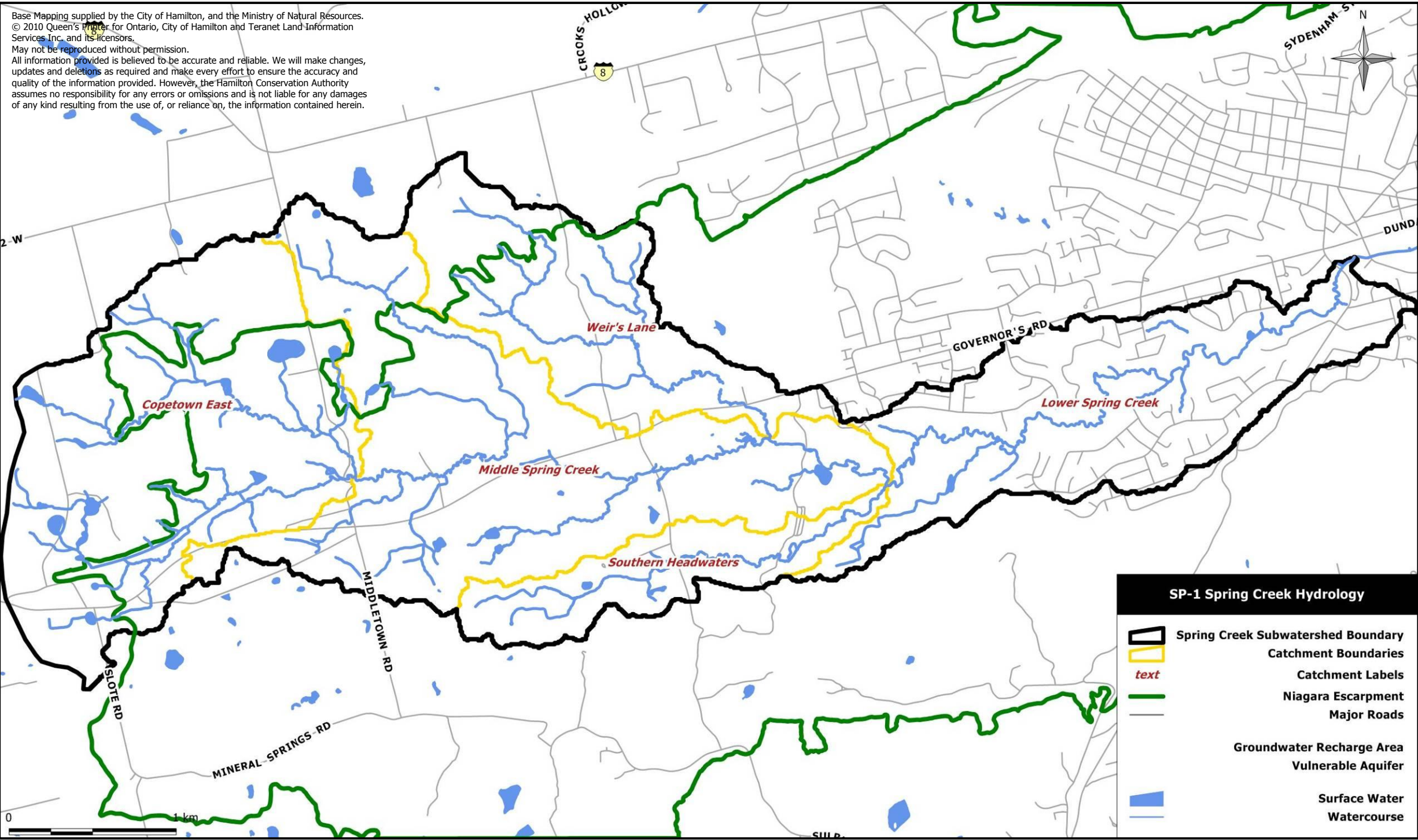
The western subwatershed boundary of Spring Creek occurs above the ridge of the Niagara Escarpment at Inksetter and Slote Roads, where it makes a u-shaped bend around the western end of Lake Ontario, forming the Dundas Valley. The northern boundary of the subwatershed also originates above the Niagara Escarpment, south of Highway 8, following the Dundas Valley topography. The southernmost point of the subwatershed occurs along the valley floor as it leads down toward the Town of Dundas. The subwatershed tapers between between Governor’s and Old Ancaster Roads as it moves eastward to join Lower Spencer Creek – the subsequent subwatershed in the Spencer Creek system. Spring Creek joins Lower Spencer Creek at Ogilvie Street, south of Governor’s Road.

The western subwatershed boundary incorporates a small portion of Copetown; a historic settlement in this area. However, the subwatershed boundary lies southwest of the historic Greenville settlement.

Governor’s Road, also known as Highway 99, bisects this subwatershed, predominately through the Middle Spring Creek catchment. Middletown Road and Weir’s Lane are frequently used transportation routes which also pass through this subwatershed. Sulphur Springs Road, although a gravel road, is also frequently used in this area as well.



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SPRING CREEK SUBWATERSHED CHARACTERIZATION

HYDROLOGY

Surface Water

Spring Creek is one of 13 subwatersheds of Spencer Creek that drain a 278 km² area into Cootes Paradise Marsh and ultimately Hamilton Harbour. Spring Creek subwatershed has a drainage area of 12.78 km². The length of Spring Creek is approximately 7.8 km from the headwaters to the confluence with Lower Spencer Creek; however, the combined length of the creek and all of its tributaries is 56.25 km.

Spring Creek is a coldwater creek that originates on the margins of the Dundas Valley where it drains east to its confluence with Lower Spencer Creek. (HHSWP, 2006) This stream is very steep with an average bed slope of 22.7 m/km. Consequently, these streams have high erosive forces, which lead to deep ravines, high ridges and dense surface drainage patterns. (Maclaren Plansearch, 1990).

The Dundas Valley’s significant natural cover serves an important hydrological function of maintaining surface water quality by limiting gullyng on the erosion-prone slopes and by providing in-stream cover (Hamilton Naturalists Club, 2003)

Cold to coolwater conditions occur in Spring Creek as below the escarpment, groundwater discharge from the fractured bedrock serve to moderate water temperatures. Temperature studies completed in Spring and Sulphur Creeks generally indicate that daily temperature maxima rarely exceed 20oC during the summer months, except in the reaches that have been impacted by residential development (HRCA, 1997; HCA, 2002).

A preliminary surface water model output generated in the Halton Hamilton Source Water Protection (HHSWP) 2008 Draft Tier 1 Water Budget Report identified a very small high volume recharge area in the headwaters of the Copetown East catchment above the escarpment. At the time of this report the surface water model and Tier 1 Water Budget Report are currently being updated.

The 2008 Draft Tier 1 Water Budget Report also assessed surface water stress levels. The assessments did not yield a significant or moderate stress result with respect to surface water quantity in the Spring Creek subwatershed. Therefore no Tier 2 report is recommended for this subwatershed. At the time of this report, the surface water model and Tier 1 Water Budget Report are currently being updated.

The land use in the lower reaches of the Spring Creek subwatershed is predominately. Stormwater runoff from dense residential developments in this area is captured by stormsewers and directed into the creek system. This input into the system contributes to the overall load on the system and should be considered when planning new or upgraded stormwater management infrastructure.

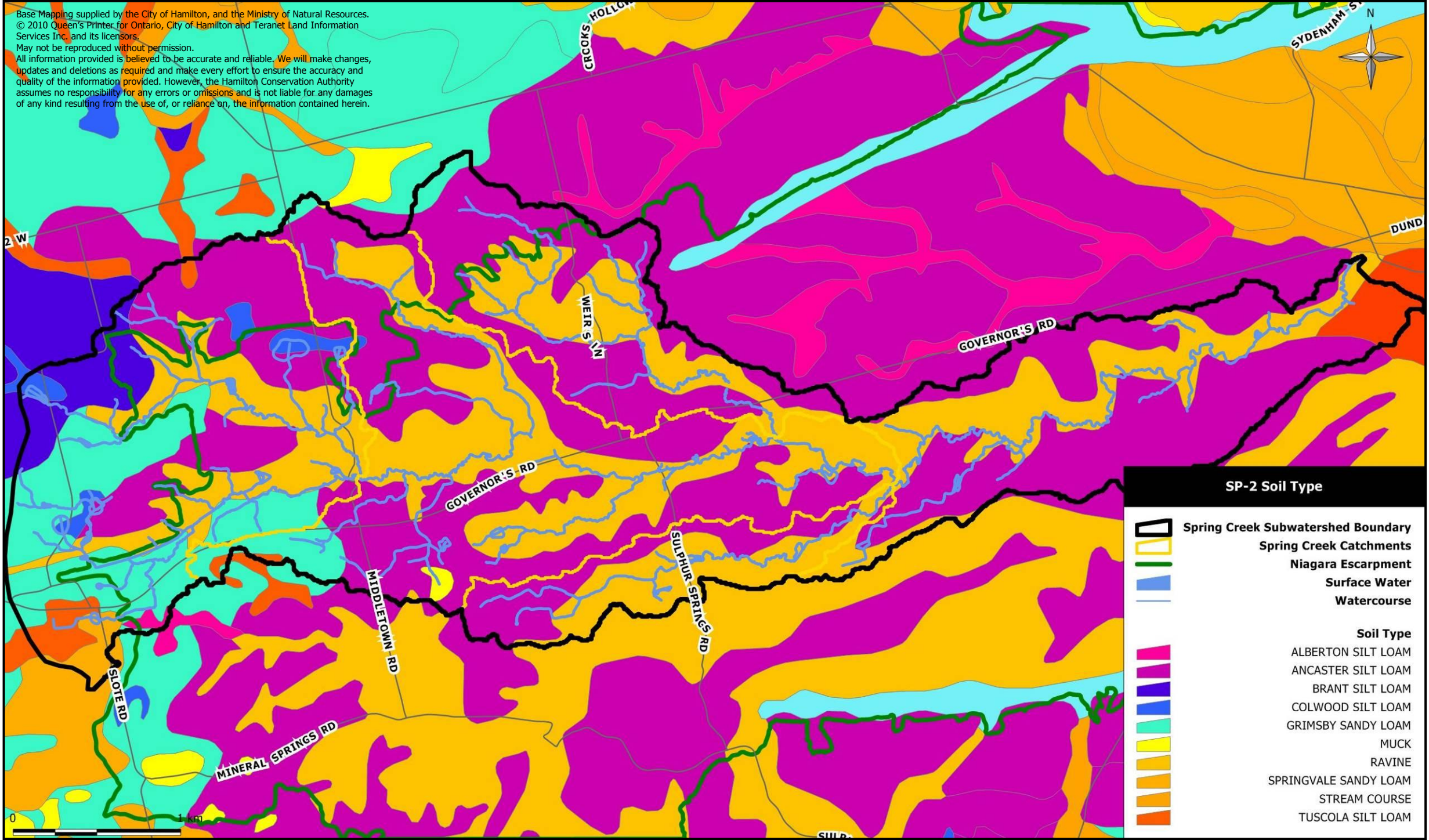
There are no Hamilton Conservation Authority water level gauge stations in the Spring Creek subwatershed; however, there is one Source Water Protection water flow gauge station within the subwatershed. Data collected between 2006 and 2008 at this station are included in the catchment datasheets throughout the remainder of this document.

Groundwater

The HHSWP 2008 Draft Tier 1 Water Budget Report identified significant ground water recharge areas and highly vulnerable aquifers in Spring Creek subwatershed, the majority of which are concentrated in the Lower Spring Creek catchment with smaller areas located in the Middle Spring and Copetown East catchments.

The 2008 Draft Tier 1 Water Budget Report also assessed the intensity of groundwater capture and the potential for groundwater contamination. Annual and monthly Water Quantity Stress Assessments did not yield a significant or moderate stress result with respect to groundwater quantity in the Spring Creek subwatershed. Again, therefore no Tier 2 report is recommended for this subwatershed. At the time of this report, the groundwater model and Tier 1 Water Budget Report are currently being updated.

There are no Provincial Groundwater Monitoring Network wells in the Sulphur Creek Subwatershed.



SPRING CREEK SUBWATERSHED CHARACTERIZATION

SOILS AND PHYSIOGRAPHY

The soil parent materials in the Spencer Creek subwatershed are thought to have predominately been deposited during the Wisconsin glaciation and are frequently related to underlying or adjacent bedrock formations (HHSWP, 2006).

The Niagara Escarpment is a prominent feature in the Spencer Creek Watershed. It extends in a westerly direction from Stoney Creek at the southeast end of Hamilton to a point west of Dundas from where it then runs east-northeast to Waterdown. The configuration of the Escarpment is greatly influenced by the Dundas Valley. The Dundas Valley is a major re-entrant bedrock valley in the Niagara Escarpment that extends inland for approximately 12km from the western end of Lake Ontario (SNC Lavalin et al., 2004). It is believed that the Dundas Valley was formed through erosion of the escarpment by an ancient pre-glacial river that flowed into the area from the northwest.

The east-west trending Dundas Valley is approximately 12km long, 4km wide and over 200m deep. The Dundas bedrock valley is a deep narrow central bedrock gorge within the re-entrant valley that runs west to east from Brantford through Dundas and to Lake Ontario. It is largely filled with glacial and post glacial deposits. The bedrock valley narrows west of the Lower Spencer Creek subwatershed but widens in Dundas following the trend of the escarpment (Hamilton Naturalists Club, 2003).

Along the flanks of the valley, the ground surface elevation decreases from approximately 190 masl on the north slope and 120 masl on the south slope toward the centre of the valley to the shoreline (SNC Lavalin et al., 2004). Lacustrine deposits of the Iroquois Plain are found along the Lake Ontario Shoreline. As the Ontario Lobe of the glacier receded from the Lake Ontario Basin, Lake Iroquois was formed.

Along the axis of the Dundas Valley, the ground surface slopes easterly from approximately 260 masl through Dundas to about 75 masl at the Lake Ontario Shoreline. A small number of creeks are incised into the slope of the valley.

Lake Iroquois occupied an area significantly larger than the current shores of Lake Ontario. In Hamilton the Iroquois Plain is a relatively narrow plain located between the shore of Lake Ontario and the Niagara Escarpment. Sand and gravel bars such as the one that separates Hamilton Harbour from Lake Ontario are also present. Alluvial fan gravels are observed at the outlet of the Dundas Valley (Chapman and Putnam, 1984).

In the Dundas Valley, soil development in the extensive active ravines is limited. Other than the active ravines area of the valley, the dominant soil is well drained Ancaster silt loam (Hamilton Naturalists Club, 2003).

The soil characteristics of the Spring Creek subwatershed are shown on **Map SP-2**. Seven soils complexes have been identified within this subwatershed, as summarized in **Table SP-1**. 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 low to moderate.

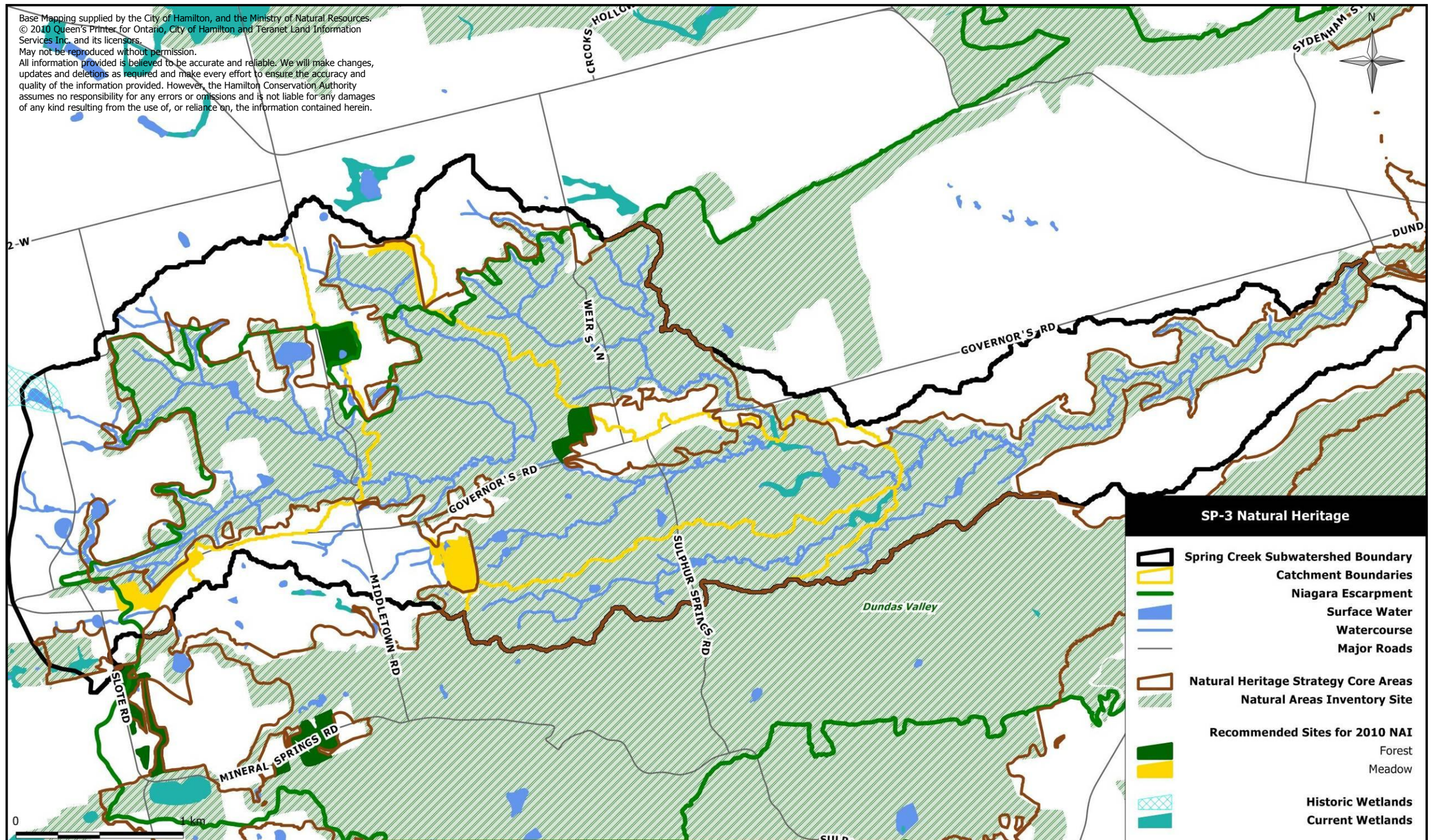
Table SP-1: Soil and Erosion Potential in the Spring Creek Subwatershed

Soil Type	Natural Drainage	Erosion Factor*	Topography (slope)	Erosion Potential
Gi – Grimsby Sandy Loam	Well drained	4	6-9%	Moderate
Sp – Springvale Sandy Loam	Well drained	4	6-9%	Moderate
Al – Alberton Silt Loam	Variable	N/A	1%	Low
An – Ancaster Silt Loam	Well drained	2	38%	Moderate
Bt – Brant Silt Loam	Well drained	1	7.5%	Low
Co – Colwood Silt Loam	Poor	2	1%	Low
Tu – Tuscola Silt Loam	Imperfect	2	3-5%	Low

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

** Based on the Ontario Environmental Farm Plan Workbook, Ontario Farm Environmental Coalition

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SPRING CREEK SUBWATERSHED CHARACTERIZATION

NATURAL HISTORY & SIGNIFICANT SPECIES

The Niagara Escarpment, a UNESCO World Biosphere Reserve, is a prominent feature of this subwatershed; it allows for the unique natural history of the Dundas Valley ESA. Additionally, this subwatershed reaches into the Copetown Ball Park Woodlot, another municipally designated environmentally significant area (ESA). These natural areas are critical habitat and migratory corridors for terrestrial and aquatic species. Biophysical attributes of these areas were assessed in the Hamilton Natural Areas Inventory Nature Counts Project, Dwyer et al., 2003).

Natural vegetation covers 5.78 km² or 45% of the Spring Creek subwatershed. The Hamilton Conservation Authority owns many of these natural areas as they own 3.2 km² or 38% of the lands within the subwatershed. The current natural land cover statistics for the area are noted within **Table SP-2**. Based on the digital data provided for this analysis, forest cover accounts for 41% of this subwatershed, while meadow cover is 4% of the land base. Stream length of Spring Creek and all its tributaries is 56.25 km. Map**SP-3** illustrates that natural heritage of the Spring Creek subwatershed.

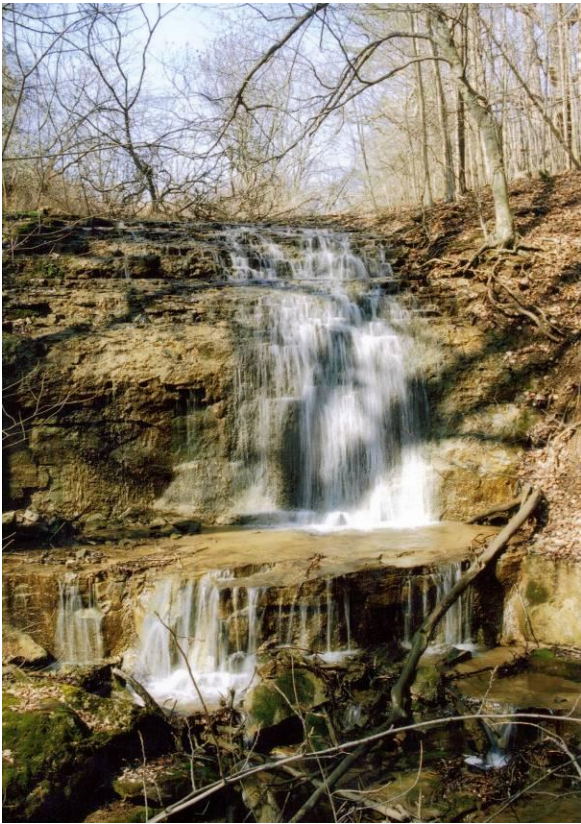
Less than 1% of the current landscape is wetland. Historically, this subwatershed had very little wetland cover. Historical wetlands mapping identifies that prior to 1967 only a 0.04 km² area of wetland had been lost from this subwatershed in the Copetown East catchment. Historical information was not recorded for forest or meadow cover. It is known that land use throughout the 20th century altered the natural heritage systems within this southern Ontario and that 90% of the original upland woodlands were converted to non-forest land uses by 1920 (Larsen et al., 1999). However over the past eighty years many natural areas have regenerated. The Dundas Valley and Niagara Escarpment corridor are the predominant regenerated natural upland habitats.

Table SP- 2: Natural Land Cover Statistics

Forest Cover (km ²)	Wetland Cover (km ²)	Meadow Cover (km ²)	Stream Length (km)
5.23	0.05	0.50	56.25

Spring Creek occurs in a unique region where the Great Lakes - St. Lawrence and Deciduous forest regions interface. As a result the flora and fauna communities are very diverse and include many species that are at or near the northern or southern extent of their geographic range. (Rowe, 1972)

The Dundas Valley ESA is located in the western end of the re-entrant valley extending into the former Town of Ancaster and the Spring Creek subwatershed. The core of this area consists of varied, relatively undisturbed, broadleaf and mixed upland woods consisting mainly of beech, maple, oak and hickory. The periphery consists of a patchwork of natural, successional and disturbed habitats that occur within the valley and along the outer valley slopes. This large natural area serves an important hydrological function of maintaining surface water quality in valley streams by limiting gullyng on the erosion prone slopes and by providing in-stream cover (Dwyer, 2003).



SPRING CREEK SUBWATERSHED CHARACTERIZATION

NATURAL HISTORY & SIGNIFICANT SPECIES

Numerous fisheries and benthic macroinvertebrates monitoring stations have been sampled in Spring Creek between 1970 and 2009. Prior to the introduction of the HCA Aquatic Resources Monitoring Program (ARMP) in 2004, the data collected was sporadic. The ARMP now provides for routine monitoring of fish, fish habitat and benthic macroinvertebrates throughout the HCA watersheds. The parameters monitored allow for an assessment of ecological health.

The ARMP now provides that two ecological monitoring stations in the Spring Creek subwatershed will be monitored in Year 2 of a three year cycle. The monitoring stations are in the Middle Spring and Lower Spring Creek catchments. The first year of fisheries data from the three year cycle are listed in the catchment datasheets in the remainder of this document. The first year of benthic data is not currently available due to the incomplete status of the Ontario Benthos Biomonitoring Network on-line database. However, all other available data for these and other historic monitoring stations are included in Appendix B.

Although the ARMP includes a number of annual monitoring stations throughout HCA’s watersheds, there are no annual stations in the Spring Creek subwatershed. The 2009 ARMP Report recommends the inclusion of an annual monitoring station in each subwatershed of Spencer Creek to build a more comprehensive dataset.

Cold to coolwater conditions occur in Spring Creek as below the escarpment, groundwater discharge from the fractured bedrock serve to moderate water temperatures. Temperature studies completed in Spring and Sulphur Creeks generally indicate that daily temperature maxima rarely exceed 20oC during the summer months, except in the reaches that have been impacted by residential development (HRCA, 1997; HCA, 2002). Extensive forest cover through the Dundas Valley likely accounts for the maintenance of coldwater conditions in these reaches (Griffiths: 2000, 2002, 2003).

The main channel of Spring Creek was historically considered to provide coldwater habitat able to support trout populations (Department of Commerce and Development, 1960), and relatively unimpaired water quality conditions prevail throughout. Although some residential development has occurred throughout the subwatershed, this activity has not compromised water quality conditions in the creek (HHSWP, 2006).

Along the main channel of this watercourse, high abundances of pollution-sensitive mayflies, caddisflies, stoneflies, and true flies within the benthic collections are indicative of coldwater conditions throughout the year (Griffiths; 2001, 2003). In the vicinity of Sulphur Springs Road, however, some impairment has been detected, as indicated by the presence of tubificid worm species tolerant of silt and organic matter accumulations (Griffiths, 2003). These impairments may be attributed to adjacent land uses including a nearby water taking and parking lot, as well as an upstream pond located adjacent to the watercourse.

Given the coldwater characteristics of portions of this subwatershed, sensitive fish species that have been documented, both recently and historically, include rainbow darter, fantail darter, brassy minnow, finescale dace, pearl dace and northern redbelly dace (C. Portt and Associates, 1002: HRCA; 1997, 2000; HCA: 2002, 2005).

SPRING CREEK SUBWATERSHED CHARACTERIZATION

NATURAL HISTORY & SIGNIFICANT SPECIES

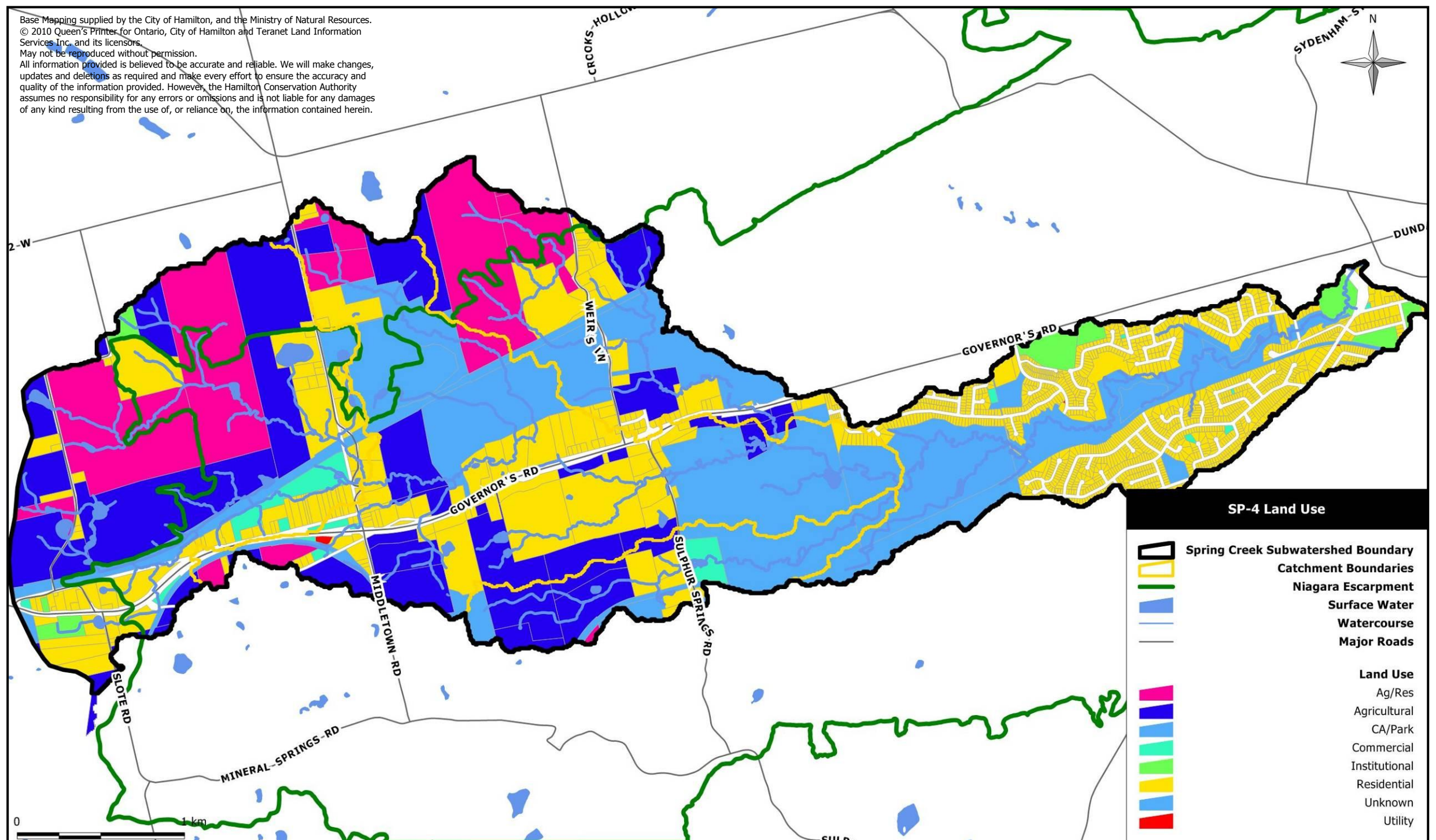
Significant species found within the natural areas of this subwatershed are noted within Appendix C. The majority of these species are rare or uncommon within the City of Hamilton and where a species has been designated as a species at risk by the OMNR it is indicated in the appendix.

Certain species have been classified by COSEWIC, the Committee on the Status of Endangered Wildlife in Canada and COSSARO the Committee on the Status of Species at Risk in Ontario 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 COSEWIC under the Species at Risk Act and COSSARO under the Ontario Endangered Species Act and can be found within the Sulphur Creek subwatershed. The COSEWIC and COSSARO statuses don't always coincide for each species, therefore some species will be on more than one list.

It will be important to create awareness and undertake habitat restoration activities related to preserving and restoring ecological linkages in order to support these at risk species. Many of these species have recovery strategies in place or in development. Species with recovery strategies and the status of those strategies are listed below. A Conservation Action Plan centered upon the management of resources to aid in the recovery of species at risk in this area is currently being developed by Carolinian Canada and local partners agencies.

				Species with Recovery Strategies	
Not at Risk	Special Concern	Threatened	Endangered	Species	Recovery Strategy Status
<ul style="list-style-type: none">▪ Pickerel Frog▪ Western Chorus Frog▪ Sharp Shinned Hawk▪ Brown Snake▪ Eastern Screech-Owl▪ False Mermaid▪ Red-tailed Hawk▪ Double-crested Cormorant▪ Cooper's Hawk▪ Eastern Bluebird▪ Northern Harrier	<ul style="list-style-type: none">▪ Eastern Milksnake▪ Monarch▪ Broad Beech Fern▪ Cerulean Warbler▪ Ribbon Snake▪ Louisiana Waterthrush▪ Snapping Turtle	<ul style="list-style-type: none">▪ Chimney Swift▪ Golden-winged Warbler▪ Hooded Warbler▪ Jefferson Salamander	<ul style="list-style-type: none">▪ American Chestnut▪ Butternut▪ Ginseng▪ Acadian Flycatcher▪ Flowering Dogwood	American Chestnut	Completed and available
				American Ginseng	Drafted not available
				Butternut	Completed and available
				Eastern Flowering Dogwood	Not available
				Acadian Flycatcher	Completed and available
				Hooded Warbler	Complete and available

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SPRING CREEK SUBWATERSHED CHARACTERIZATION

CULTURAL HISTORY

The permanent phase in the settlement of the Spencer Creek Watershed began following the American War of Independence. Loyalists, largely from the Hudson-Mohawk and Pennsylvania districts crossed the Niagara River, and while many of them settled close to the river, others moved up Lake Ontario to its western end. Because of the high well-drained land, and because of good spring water and streams for power, and because the site was on the early road from Niagara to the western part of the province, settlers came into the Ancaster area as early as 1790. Jean Baptiste Rousseaux from Lower Canada and James Wilson from Pennsylvania were the founders of the village (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. The proximity of West Flamborough to earlier settlements, was adjacent to a water highway at Cootes Paradise, and had arable soil, settlers were attracted to this area (Spencer Creek Conservation Authority, 1965).

From the coming of the first settlers, the water power of Spencer Creek was a magnet that attracted men with the knowledge and desire to harness it and convert its energy into a modest source of wealth. Modest because Spencer Creek is not a large stream, and because the mills near its source could be only small ones. However, as the various tributaries added their flow to the Spencer the amount of water increased and the mills could be made larger. Consequently, those in Dundas were quite a respectable size. The largest mills on Spencer Creek were built in Dundas. In fact, had it not been for the creek it is doubtful that Dundas would have developed as a town (Spencer Creek Conservation Authority, 1965).

Table SP-3: Land Use Statistics

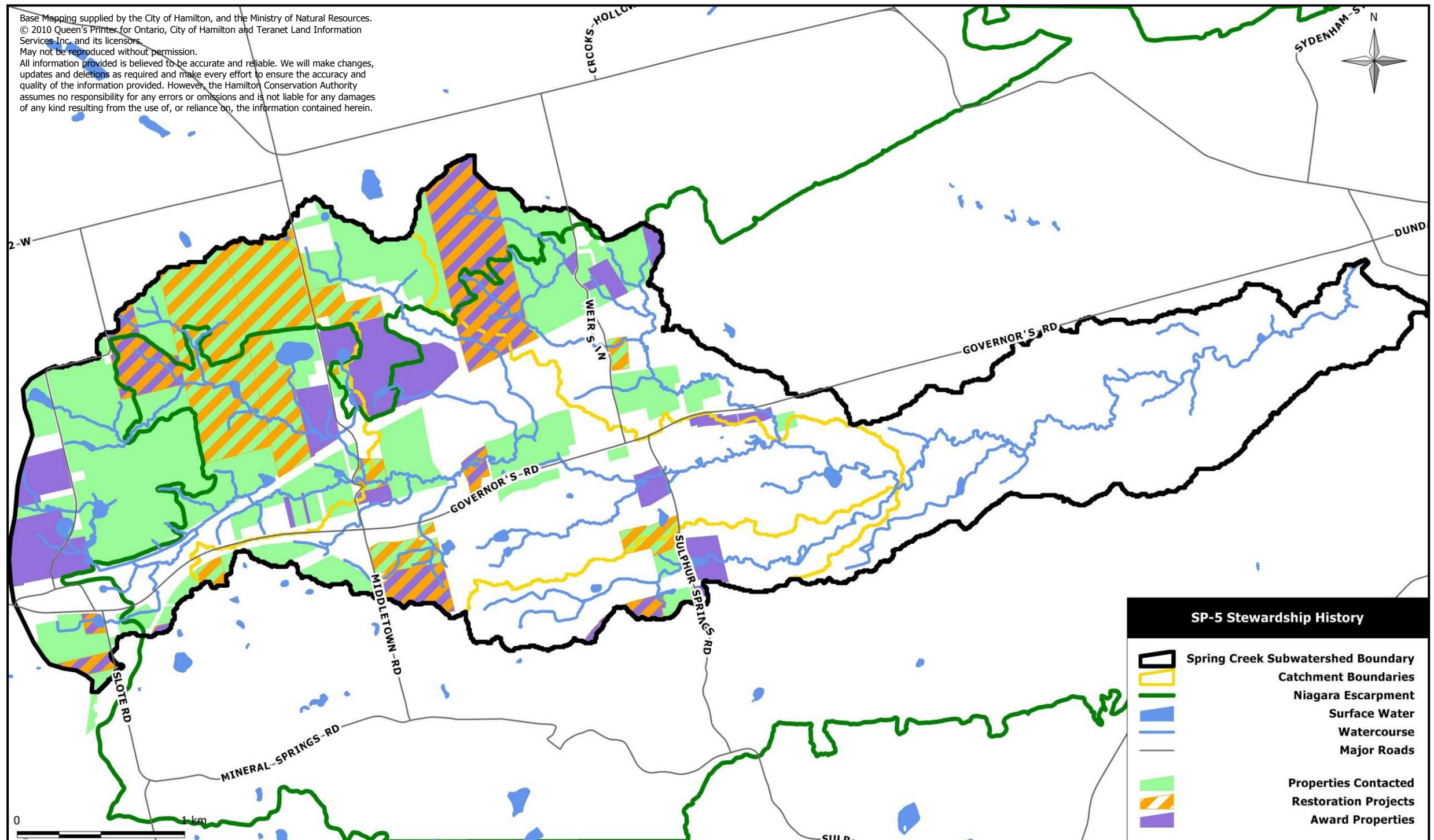
Area (km ²)	Agricultural (km ²)	Commercial (km ²)	Industrial (km ²)	Institutional (km ²)	Open Space (km ²)	Residential (km ²)	Utility (km ²)	Impervious Surfacing (%) 1997 Study	1997 Study Projected Increase (%)	Current Estimation Based on Urban Boundary
12.78	4.5	0.19	n/a	0.22	2.07	3.47	0.004	7	8	21

The approximate population of the Spring Creek subwatershed is 5100 persons with a population density of approximately 399 people per square kilometer.

Current land use within the Spring Creek subwatershed is predominantly agricultural with residential being the secondary land use (Table SP-3). There is significant open space in this subwatershed centering around the 1500 hectare Dundas Valley Conservation Area (Map SP-4). Residential land use is largely limited to the portions of the subwatershed that fall within the boundaries of the former Town of Dundas with the exception of large rural non-farm estates scattered throughout the Dundas Valley. Agricultural land use is prominent in the rural areas of the subwatershed.

Commercial and industrial land use is concentrated within business parks along the major transportation corridors, specifically along Governor’s Road and in the lower reaches in the Town of Dundas. It is of note that when last evaluated, the area of impervious surfacing within this subwatershed did not exceed the Environment Canada standards recommended for healthy stream systems. Given the protected nature of these natural areas, it is unlikely that the area of impervious surfacing in this subwatershed will ever exceed Environment Canada’s standards.

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SPRING CREEK SUBWATERSHED CHARACTERIZATION

STEWARDSHIP HISTORY

There are numerous significant properties within this subwatershed that incorporate large tracts of natural features. There are 404 properties that contain forest, wetland, meadow or riparian / aquatic habitat (Table SP-4). Of these landowners, 89 (or 22%) have been contacted by the Hamilton-Halton Watershed Stewardship Program (HHWSP), and 26 (or 6%) of those have become Watershed Stewards (Table SP-4). Therefore, there is considerable potential to reach the remaining 78% 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 the Copetown East, Weir's Lane and Southern Headwaters catchments. The Hamilton Conservation Authority is a major land holder in the subwatershed with the exception of the headwaters Copetown East catchment. Therefore landowner contact should be focused in the remaining areas of all catchments,

especially where the properties include natural features. Given that a small number of landowners own the majority of significant properties in the remaining areas of the subwatershed, efforts to include these landowners in the Watershed Steward Program should be a priority.

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 SP-5 displays the status of the Spring Creek subwatershed when compared to these Federal guidelines.

Due to the residential development of this subwatershed and subsequent increase in impervious surfacing, BMP's relating to storm water management must be promoted and exemplified by partner agencies in an effort to prevent erosion, sedimentation and contamination within the system. This is especially important in the lower reaches of the subwatershed since much of the development has occurred in these areas.

This subwatershed exceeds Environment Canada's How Much Habitat is Enough Guidelines for forest cover. Efforts to retain this percentage of forest cover and to preserve biodiversity and core habitat within the area should be undertaken to support interior forest breeding birds and other wildlife populations.

Table SP-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
5100	399	404	89	26	120	27

Table SP-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	0.39	58	n/a	8	Cold to coolwater	41	4.86	100m – 10% 200m – 2.5%

STRESSES & STEWARDSHIP ACTIONS

There are thirty six types of *stresses* identified as negatively impacting the Spring Creek subwatershed. An inventory count of the number of each type of stress observed in each catchment basin of the subwatershed is listed in **Table SP- 7**. The most prevalent stresses identified in the Spring Creek Subwatershed are Stormsewer Outfalls, Abandoned Groundwater Wells, On-line Ponds and Increased Impervious Surfacing. **Table SP-8** outlines *Stewardship Actions* that have been developed to mitigate the impacts of these and the remaining stresses listed in **Table SP-7**.

Specific locations where these stresses are occurring are mapped and inventoried in the subsequent catchment datasheets. Within the Spring Creek subwatershed, 60 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.

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. The Bay Area Restoration Council offers the Yellow Fish Road program in an effort to raise awareness about stormsewer systems and the potential for stormwater runoff contamination. An effort to implement the recommendations in the City of Hamilton Stormwater Master Plan should be made to mitigate the impacts of stormwater on the creek system.

Abandoned groundwater wells are direct conduits to groundwater aquifers and have the potential to introduce contaminants into the groundwater supply. Derelict well caps and casing are also safety hazards to people and wildlife. Efforts to promote the City of Hamilton Well Decommissioning Program should be taken.

Anecdotal reports and ecological monitoring have identified sediment loading and subsequent nutrient loading as a concern in this subwatershed. The Hamilton-Harbour Remedial Action Plan 2009 draft document, Identifying Non Point Sediment Sources, identifies two sites of active erosion; one on the east side of Weir's Lane and the other on the north side of Governor's Road; for priority remediation; both are on private property. It is believed that the former is caused by alterations that have been made to the creek channel to accommodate an adjacent pond. The latter is believed to be the result of a massive failure of the creek bank, intense scouring and sedimentation upstream. Assessments of stormwater impacts on these sites and remediation plans for these sites should be developed by the Spencer Creek Stewardship Action Plans Implementation Team.

Habitat Fragmentation has been identified in two locations within this subwatershed. Strategic acquisitions and management of lands in these area can enhance core habitat and ecological function in this the Spring Creek system. The Cootes to Escarpment Park System and Dundas Valley 50 Year Vision documents both recommend actions to preserve and enhance ecological connectivity in this area. The Spencer Creek Stewardship Action Plans Implementation Team should support and assist with the implementation of recommendations in these documents. There are numerous on-line ponds and dams in this subwatershed which fragment aquatic habitat by creating physical and thermal barriers to migration. Aquatic wildlife are unable to negotiate these barriers and therefore restoration is necessary to open up additional habitat upstream. Removal or retrofit of pond retention structures or the installation of by-pass channels and fish ladders are recommended mitigation concepts.

According to the City of Hamilton Draft Stages of Development Plan for 2010-2012, Dundas, there is only one significant pending development application in this subwatershed; the first phase of the Grandview Estates development at Governor's Road and Pirie Drive.

This subwatershed is experiencing an ecosystem imbalance. A survey conducted by the Hamilton Conservation Authority and the Ministry of Natural Resources in 2007 has identified an overpopulation of white-tailed deer in this area. Evidence of excessive browsing inhibiting regeneration of woodland flora triggered the conservation authority to undertake a deer exclosure pilot project in 2008; the results of the exclosure experiment further supports the survey findings by demonstrating that the area is beyond its carrying capacity for this species. The Hamilton Conservation Authority is currently working with the Ministry of Natural Resources to develop regionally specific management strategies for this situation, guided by the MNR Strategy for Preventing and Managing Human-Deer Conflicts in Southern Ontario document which was developed through a multi stakeholder facilitated process to ensure that all sector groups interests were considered.

Local residents have voiced concerns regarding wildlife disturbances and water quality degradation resulting from pet waste in the Warren Park area of this subwatershed. Warren Park is a municipally owned park located between two Hamilton Conservation Authority properties and is currently a leash-free area for dogs. A petition has been put forward requesting that the City re-designate the park as a leash-required area citing the fact that the park is within an Environmentally Significant Area which is contrary to City policy regarding the designation of leash-free areas. Staff from the City and Hamilton Conservation Authority are working together to develop and put forward recommendations regarding this petition in an effort to remediate the current degradation and to prevent further stresses from impacting the significant natural features within the park.

CATCHMENT SUMMARIES

This section of the plan identifies the occurrences of stresses within each catchment of Spring 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, 60 stresses were identified for the Spring Creek Subwatershed and inventory counts are presented in **Table SP-7**.

TABLE SP-7: Stresses Inventory by Catchment

STRESS	MAP CODE	NO. IN SUBWATERSHED	NO. IN EACH CATCHMENT				
			Copetown East	Lower Spring Creek	Middle Spring Creek	Southern Headwaters	Weir's Lane
Abandoned Groundwater Wells	GW	10	6		2		2
Buried Stream	BS						
Channelization	CH						
Combined Sewer Overflow	CSO						
Dam (Weir)	DM	1	1				
Debris Jam	DJ	1			1		
Detachment from Nature	DT						
Development	DV	1	1				
Encroachment	EN	4		3	1		
Erosion	ER	2		1	1		
Faulty Septic System	SS						
Fluctuating Water Level	WL						
Habitat Fragmentation	HF	2	1	1			
Illegal Fill Placement	FP						
Inadequate Stormwater Management	SW						
Increased Impervious Surface	IS	6					
Insufficient Riparian Buffer	RB		5		1		
Invasive/Introduced Species	IV						
Landfill Leachate	LL						
Land Maintenance Practices	LM	2		1			1
Litter	LI						
Migration Barrier	MB						
Nutrient Loading	NL	1	1				
Online Pond	OP	6	3		2	1	
Outdoor Recreation Related Impacts	OR	2		1		1	
Perched Culvert	CP	2	1		1		
Pesticide Use	PS						
Plowed Watercourse	PW	3					3
Runoff Contamination via Transportation Corridors	TC	1			1		
Sediment Loading	SL						
Site Clearing Prior to Development	SC						
Stormsewer Outfall	SO	15		15			
Transportation Corridor Expansion	TE						
Water Taking	WT						
Watercourse Enclosure	WE	1	1				
Wildlife Collision	WC						
Wildlife Overpopulation	WO						

* 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 SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Abandoned Groundwater Wells Map Code: GW Definition: Groundwater wells that are no longer in use, often are in a state of disrepair and can be direct conduits for contaminants into groundwater aquifers.	Conduct a direct mailing to all property owners identified in the HCA OGS Groundwater Study database as having abandoned groundwater wells on-site promoting the City of Hamilton Well Decommissioning Program.			Agriculture and Agri-Food Canada - Water Wells, Best Management Practices Pg 52	CITY / HCA / GV	HHWSP	2011-2015
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact promote the importance of decommissioning abandoned groundwater wells to protect drinking water and prevent human and wildlife injury.			Ontario Water Resources Act Regulation 903: Water Wells OMAFRA Best Management Practices Series – Water Wells	CITY / HCA / GV	HHWSP	2011-2015
			Work with landowners to decommission abandoned groundwater wells.		CITY / HCA / GV	HHWSP	2011-2015
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 Fisheries Act, Section 37	HCA / HWSC / HHWSP / RAP / WPN / DFO	HHWSP / HWSC	2011-2015
		Consider adopting principles from the TRCA and CVC Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines into HCA policies to address ambiguity in the DFO Risk Management Framework		City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HCA / HHHBA / DFO	HCA (Ecology)	2011-2012
		Undertake a feasibility and prioritization study for “daylighting” buried streams in the study area.			HCA / CITY / DFO / MNR / HHWSP / RAP	CITY	2011-2012
			Work with landowners to undertake daylighting projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study.	Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines	HHWSP / HCA / DFO / CITY / HWSC	HHWSP	2013-2015
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 /	HHWSP / HWSC	2011-2015
		Undertake a feasibility and prioritization study for restoring channelized creeks to those with a natural design.			HCA / CITY / DFO / MNR / HHWSP / RAP	CITY	2011-2012

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with landowners to undertake natural channel design projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study.	Fisheries Act, Section 37 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HHWSP / HCA / DFO / CITY / HWSC	HHWSP	2013-2015
			Work with landowners downstream of channelized sites to rehabilitate the riparian zone to reduce flow velocities, erosion and sedimentation.		CITY / DFO / HHWSP / HCA / RBG / HWSC /	HHWSP	2011-2015
Combined Sewer Overflows Map Code: CSO Definition: a sewer system that collects sanitary sewage and stormwater runoff in a single pipe system.			Reduce stormwater load to meet the MOE volumetric target of a 90% overflow capture rate.	Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation WQ-1c Page 39	CITY / BARC / RAP/ HCA	CITY	2011-2015
			Work toward achieving the final net loading targets for CSO's outlined in the RAP.		CITY / BARC / RAP/ HCA	CITY	2011-2015
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. (*Also includes weirs formerly map code WR)	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	HCA / HWSC / HHWSP / MNR / DFO	HHWSP / HWSC	2011-2015
	Conduct a direct mailing to property owners with dams identified in the CA Dam Inventory Project to offer financial and technical assistance for the retrofitting or removal of dams.			HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA / HWSC / DFO / MNR	HHWSP	2011-2012
			Implement the watershed management recommendations for Spencer Creek as outlined in the Hamilton Harbour Fisheries Management Plan to restore migration corridors to meet Fish Management Objectives for coldwater and warmwater systems	Fisheries Act, Section 37 Hamilton Conservation Authority Dam Inventory Project In-stream Barrier Assessment for the Hamilton Harbour AOC. Hamilton Harbour Fisheries Management Plan	HCA / HWSC / HHWSP / MNR / DFO / CITY	HCA (Ecology) / DFO	2011-2015
			Work to remove or retrofit water control structures on public lands.		HCA / HWSC / HHWSP / MNR / DFO / CITY	HCA (Ecology) / MNR	2011-2015
			Work with landowners to remove/retrofit dams as prioritized in the Barrier Mitigation Plan of the In-stream Barrier Assessment for the Hamilton Harbour AOC.		HCA / HWSC / HHWSP / MNR / DFO / CITY	HHWSP	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Debris Jams Map Code: DJ	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding proper debris jam removal so as to not disrupt aquatic habitat.			In-stream Barrier Assessment for the Hamilton Harbour AOC.	HHWSP /HCA/ HWSC / CITY / MNR / DFO / BARC	HHWSP / HWSC	2011-2015
			Work with landowners to remove debris jams using proper sediment and erosion control practices.	Hamilton Harbour Fisheries Management Plan	HHWSP /HCA/ HWSC / CITY / MNR / DFO / BARC	HHWSP / HWSC	2011-2015
			Incorporate debris jam removal into the City of Hamilton Extreme Park Makeover Program.		HHWSP /HCA/ HWSC / CITY / MNR / DFO / BARC	CITY	2011-2015
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 / GV / HCA / HHWSP / HWSC / WPN / DU	HHWSP / HWSC / BARC	2011-2015
	Erect creek crossing & ecological corridor signage along roadways.				HCA / CITY / RAP / WPN / BARC	CITY / WPN	2011-2015
	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.			Royal Botanical Gardens Back to Nature: Towards a Ontario Strategy for Bringing Children and Nature Together - Event and Workshop Report	BARC / HCA / CITY / GV / RBG	BARC / GV / HCA / CITY / RBG	2011-2015
	Support the formation and activities of "Friends of" groups aimed at protecting and rehabilitating natural features.				BARC / DFO / HWSC / BTC	HHWSP / HCA / CITY	2011-2015
	Encourage municipalities and trail managers to coordinate trail plans that improve access between urban centres and provide links to parks and rural areas			Evergreen Schoolground Greening Resources: Getting Started	HHWSP / HWSC	HCA / CITY / RBG	2011-2012
		Assess landowner willingness to participate in and/or support water quality improvement and habitat restoration projects.			CITY / HCA / HWSC	HHWSP	2011-2012
		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	HHWSP / CITY / HCA / GV / BARC/ HWSC / RBG /	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with schools and School Boards to undertake implement the School Grounds Naturally Program; undertaking school yard naturalization projects.		HHWSP / HCA / CITY / HWSC	HHWSP	2011-2015
			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 / /BTC	HHWSP / BARC	2011-2015
Development Map Code: DV Definition: The process of developing populated settlements: including housing and supporting infrastructure.	Host annual training sessions for City staff & developers to create awareness regarding the incorporation of Low Impact Development practices into planning applications (i.e. pervious pavement, green rooftops, storm water management, road-salt alternatives, snow-piling, erosion & sediment control measures, compliance & enforcement, etc.)			Credit Valley Conservation and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Manual	DFO / Green Venture / MTO / HHHBA	HCA (P&E) / CITY	2011-2015
	Apply Yellow Fish Road to all catchbasins on streets and in parking areas to educate private landowners post-development.				CITY / HCA / HWSC / HHWSP	BARC	2011-2015
		Revise conflicting municipal by-laws regarding development practices and guidelines to facilitate increased use of Low Impact Development technologies.			CITY / GV / HHHBA / DFO	CITY / HCA	2011-2012
		Continue to review planning and development applications to ensure minimal impacts to aquatic and terrestrial habitat.			CITY / DFO / MNR	HCA (P&E)	2011-2015
			Work to undertake in-stream rehabilitation projects on sites identified in the Stewardship Action Plans as suitable for the DFO Habitat compensation Program.		CITY / DFO / MNR / HHHBA	HCA	2011-2015
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	HHWSP / HHHBA / HWSC	HCA / RBG / CITY	2011-2015
	Comment on the re-drafting of the City of Hamilton Litter, Yard Waste and Property Maintenance by-law No. 03-118 to include language regarding preventing encroachment into natural areas.			City of Hamilton Draft Private Tree and Woodland Conservation By-law City of Hamilton	CITY / HHWSP / HCA / BARC / RBG / GV / HWSC / BTC	HCA / CITY / RBG	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
	Host erosion and sediment control training sessions for City staff, developers, contractors and landscapers to create awareness regarding recommended E&SC methods.			By-law No. 03-117 Illegal Dumping	CITY / HCA / HHWSP / HWSC / LO / HHHBA	HCA (P&E)	2011-2015
	Conduct a direct mailing of an encroachment education brochure to landowners adjacent to Conservation Authority, RBG and City natural areas.				HWSC	HCA / RBG / HHWSP / CITY	2011-2015
	Install property demarcation posts (with agency logos) at regular intervals along property boundaries to prevent encroachment into natural areas.				HHWSP	HCA / RBG / CITY	2011-2015
		Engage citizen groups to monitor & report areas affected by encroachment that are in need of restoration.			CITY / HHWSP / HCA / BARC / RBG / GV / HWSC / BTC	HCA / CITY / RBG	2011-2015
			Work with citizen groups to remove encroaching material on public and private lands, including "Friends of" work days, Adopt a Creek, Fishing Clubs, etc.		HHWSP / HCA / CITY / HWSC / BARC / GV / RBG / HNC	CITY / HHWSP / RBG / HCA	2011-2015
Erosion Map Code: ER Definition: The process of soil being scoured or washed away by flowing water.	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.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-2, ULM-3, FW-4 Pages 69, 70, 107	CITY / DFO / HCA / HHHBA / OSCIA	HHWSP / HWSC	2011-2015
	Create demonstration sites on public lands that highlight streambank stabilization and natural channel design projects.			HCA Planning and Regulation Policies and Guidelines Pages 68-69	CITY / HCA / DFO / HWSC / RBG / OSCIA	HHWSP	2011-2015
	Conduct a direct mailing to landowners where erosion has been identified through the City of Hamilton GRIDS Plan.			Fisheries Act, Section 35	HCA / CITY / OSCIA / HWSC	HHWSP	2011-2015
		Select erosion sites as identified in the City of Hamilton GRIDS Plan for the upcoming HCA Erosion and Sediment Control Pilot Project.		City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142, 159-160	HHWSP / HWSC / CITY / DFO	HCA	2011-2012
		Expand the City of Hamilton Erosion Hot Spots identification project into rural areas			HCA / DFO / MNR	CITY	2011-2015
			Work with landowners to undertake bank stabilization and erosion rehabilitation projects using bioengineering design principles.	Erosion and Sediment Control Guidelines for Urban Construction	HWSC / HCA / DFO / OSCIA /	HHWSP	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Utilize enforcement scheme to enforce appropriate erosion control measures on development sites, including: seeding, avoiding steep slopes, etc.	OMAFRA Best Management Practices Series – No-Till Making It Work	CITY / DFO	HCA	2011-2015
			Work with City staff to install permeable conveyance systems (french drains) along roadsides as an alternative to the ditch system.		HCA / MTO / DFO	CITY	2011-2015
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.			Ontario New Home Warranty Program – A New Homeowner's Guide to Septic Systems	CITY / RAP / HCA	HHWSP / HWSC	2011-2015
	Create demonstration sites on public lands that highlight properly functioning septic systems.				HHWSP / GV / HHHBA	CITY / HCA	2011-2012
		Conduct an inventory to determine how many households in the Spencer Creek watershed are serviced by on-site treatment systems.			HHWSP / HCA / RAP / GV	CITY	2011-2012
		Analyze existing water quality data for high levels of bacteria, chlorides, nitrates and TKN to prioritize areas for education outreach and restoration.			HCA / MOE / RAP	CITY	2011-2012
		Undertake a risk analysis of the potential for old and/or degraded sewer lines to contaminate groundwater.			HCA / MOE / RAP	CITY	2011-2012
			Work with landowners to properly maintain their septic systems or upgrade faulty septic systems.		CITY / HCA / HWSC / GV	HHWSP	2011-2015
Fluctuating Water Levels Map Code: WL Definition: Irregular occurrences of high and low water levels in the creek system.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to explain the purpose and operation of Christie and Valens dams.				HHWSP / CITY / MNR	HCA	2011-2015
		Work to determine the cause of water level fluctuations and develop recommendations for altering practices to reduce or eliminate fluctuations.			HHWSP / CITY / MNR / DFO	HCA	2011-2012
			Work to implement alternative practices as per recommendation resulting from the inquiry into the cause of water level fluctuations in the system.		HHWSP / CITY / MNR / DFO	HCA	2012-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Habitat Fragmentation Map Code: HF Definition: Disruption of large continuous tracts of habitat.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy ecosystems and the importance of habitat connectivity.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-12 Page 123	HCA / RBG / HNC / MNR / CITY / CC / DU	HHWSP / HWSC	2011-2015
	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.			HCA Planning and Regulation Policies and Guidelines Pages 53-59	HCA / RBG / HNC / MNR / CITY / CC / DU	HHWSP / HWSC	2011-2015
	Create demonstration sites on public lands that highlight various types of terrestrial and aquatic habitat restoration projects.			City of Hamilton Draft Private Tree and Woodland Conservation By-law	HCA / RBG / HNC / MNR / CITY / CC / DU	HHWSP	2011-2015
	Comment on the re-drafting of the City of Hamilton Litter, Yard Waste and Property Maintenance by-law No. 03-118 to include language allowing naturalization of lawn space.			Cootes to Escarpment Park System – A Conservation and Land Management Strategy	HCA / RBG / HNC / HWSC / CITY	HHWSP	2011-2012
	Work to establish a Woodlot Owners Association for this area.			Nature Counts – City of Hamilton Natural Areas inventory	HCA / RBG / HNC / HWSC / CITY / MNR / TO	HWSC	2011-2012
		Protect and enhance natural corridors through parks and public lands master planning		City of Hamilton Natural Heritage Strategy	HHWSP / HWSC / MNR / HNC	HCA / CITY / RBG	2011-2015
		Map fisheries information throughout each subwatershed to identify areas at risk and prioritize areas for remediation.		City of Hamilton Natural Areas Acquisition Fund Strategy	HHWSP / HWSC / HCA / CITY / MNR	HCA	2011-2012
		Develop How Much Habitat is Enough targets for each subwatershed.		Dundas Valley 50 Year Vision	CITY / MNR / HHWSP / HWSC / RAP / RBG	HCA	2011-2012
		Continue to complete ecological surveys (using the Ecological Land Classification system) to ensure species at risk habitat or rare ecological areas are not disrupted.		Hamilton Harbour Fisheries Management Plan	HCA / MNR / HHWSP / HWSC / RAP / RBG	CITY	2011-2015
			Work with utility companies to implement integrated vegetation management practices along utility corridors as developed by Ontario Hydro.	OMAFRA Best Management Practices Series – Farm Forestry and Habitat Management	MNR / HHWSP / HWSC / RBG / HNC	HCA / CITY	2011-2015
			Work to secure Core and Linkage Areas identified in the Natural Heritage System using the Natural Heritage Acquisition Fund.	OMAFRA Best Management Practices Series – Fish and Wildlife Habitat Management	HCA / RBG / HHWSP / HNC / HWSC	CITY	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Protect and enhance natural corridors through parks and public lands by ensuring that naturalization and habitat creation are incorporated into the City's Extreme Park Makeover Program		HCA / BARC / RBG / HWSC / HHWSP / MNR	CITY	2011-2015
			Work with landowners to undertake habitat creation and enhancement projects which enhance core habitat by infilling areas within or linking existing forested areas		HCA / MNR / HWSC / BARC / CITY	HHWSP	2011-2015
			Actively manage public lands for wildlife habitat, including plantation plantings and rented agricultural lands.		CITY / HHWSP / MNR / TO	HCA	2012-2015
			Implement the actions outlined in the Dundas Valley 50 Year Vision, Cootes to Escarpment and City of Hamilton Natural Heritage Strategies relating to preserving and enhancing natural heritage systems.		CITY / RBG / HHWSP / HWSC / BARC	HCA	2011-2015
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	CITY / HHWSP / DFO	HCA	2011-2015
			Work with landowners to rehabilitate fill sites as recommended by the HCA Inventory.		HCA / CITY / DFO / MNR	HHWSP	2011-2015
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	HHWSP / HCA / DFO / BARC / RAP / HHHBA	CITY / GV	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
	Promote City of Hamilton and Green Venture Programs to prevent the overloading of stormwater infrastructure; including the Wise Water Use Program, Protective Plumbing Program – Downspout Disconnection Program, Annual One-Day Rain Barrel Sale, Catch the Rain Rainbarrel Pilot Project, High Household Water Consumption Program, and EnerGuide for Low Income Households Program.			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	HHWSP / HCA / DFO / BARC / RAP / HHHBA	CITY / GV	2011-2015
		Work with developers to develop a premium ‘Efficiency Package’ for new homes that include LEED principles, LID technologies, Energy Star appliances, water conservation fixtures, etc. per the results of the Durham Region Pilot Project.			HHWSP / HCA / DFO / BARC / RAP / HHHBA	HCA	2011-2015
		Undertake a study to determine the percentage of landowners with connected downspouts.			CITY / HHWSP / BARC / GV	CITY	2011-2015
			Implement recommendations from the City of Hamilton Stormwater Master Plan.		HCA / RAP / BARC / HHWSP	CITY	2011-2015
			Work with landowners to disconnect downspouts and install rain barrels.		GV / HHHBA	CITY	2011-2015
			Retrofit existing stormwater management ponds to wet ponds where beneficial to water quality, aquatic habitat and erosion control.		HCA / RAP / DFO	CITY	2011-2015
			Offer financial incentives to replace driveways and decks with permeable pavement, interlocking brick, etc.		HCA / RAP / BARC / HHWSP / GV	CITY	2011-2015
			Retrofit outlet structures to decrease the velocity of stormwater as it flows into the creek system.		HCA / RAP / HHWSP / HWSC	CITY	2011-2015
Increased Impervious Surfacing Map Code: IS Definition: The decreased potential for rainwater infiltration into the soil as a result of increased paved/impermeable surfacing.	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.			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	CITY / GV / HHWSP / HWSC / HHHBA	HCA	2011-2015
	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.				CITY / HCA / HHWSP / HWSC / HHHBA	GV	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
	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.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 38-44, 93-97, 122-125, 158-162	CITY / GV / HHWSP / HWSC / HHHBA	HCA	2011-2015
	Lobby the Provincial government to amend the building code to include and favour "green" technology; e.g. green roofs, multilevel parking, interlocking pavement, etc.				HHWSP / RAP / BARC / GV	CITY / HCA	2011-2015
		Measure impervious surfacing of commercial and industrial lands.			HCA / RAP	CITY	2011-2012
		Incorporate an impervious surfacing fee for large commercial/industrial lands to offset the cost of stormwater infrastructure and compensate rehabilitation efforts associated with stormwater infrastructure.			HCA / RAP	CITY	2012-2015
			Enhance groundwater recharge by ensuring that 70% of all land, post construction must remain pervious as a condition for development application approval		CITY / GV / HHWSP / HWSC / HHHBA	HCA	2011-2015
Invasive/Introduced Species Map Code: IV Definition: The establishment/proliferation of exotic species that have no natural control measures which compete with native species for resources and degrade the ecosystem.	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.			HCA Planning and Regulation Policies and Guidelines Pages 53-56, 70-71	HHWSP / HCA / HWSC / CITY	HHWSP	2011-2015
	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.			Action Plan for Addressing Terrestrial Invasive Species within the Great Lakes Basin	HHWSP / HCA / HWSC / CITY / HNC / LO	HCA	2011-2015
		Develop an Invasive Species Management Program which includes monitoring sites and management for specific species.		Invasive Alien Plant Species Found in the Carolinian Zone – Inventory and Management Options for <i>rare Charitable Research Reserve</i>	HCA / HHWSP / MNR / HWSC / CITY / HNC / RBG / CC	HCA	2011-2012
		Comment on the re-drafting of the City of Hamilton Litter, Yard Waste and Property Maintenance by-law No. 03-118 to include language regarding the prevention of the introduction of non native and invasive species.		Mistaken Identity – Invasive Plants and their native look-alikes. City of Hamilton Natural Heritage Strategy	HCA / HWSC / RBG / HHWSP / GV / LO	CITY	2011-2012

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
		Work with nurseries to develop a promotional program highlighting native species substitutable for commonly used non-native ornamental species.		Dundas Valley 50 Year Vision	CITY / HWSC / RBG / HCA / GV	HHWSP	2011-2013
			Ensure that native landscape design principles are incorporated into any development near an ESA or significant natural area.	Cootes to Escarpment Park System – A Conservation and Land Management Strategy	CITY / HHHBA / HHWSP	HCA	2011-2015
			Work with landowners to control invasive species and plant native species.		HCA / HWSC / CITY / GV	HHWSP	2011-2015
			Implement the actions in the Dundas Valley 50 Year Vision, Cootes to Escarpment and City of Hamilton Natural Heritage Strategies relating to preserving and enhancing biodiversity.		HHWSP / HWSC / CITY / RBG / BARC	HCA	2011-2015
Insufficient Riparian Buffer Map Code: RB Definition: Disruption of large continuous tracts of habitat along watercourses.	Create demonstration sites in high traffic locations that highlight riparian buffers. i.e. golf courses, municipal parks, etc.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-2 Page 69	HCA / HWSC / CITY	HHWSP	2011-2015
	Conduct a direct mailing to property owners identified as having insufficient riparian buffers, promoting funding and technical assistance available for establishing riparian buffers				HCA / HWSC / CITY / OSCIA	HHWSP	2011-2015
	Host workshops promoting the environmental and economic benefits of riparian buffers. i.e., preventing soil loss, preventing drifting snow, habitat creation, etc.			HCA Planning and Regulation Policies and Guidelines Pages 40, 55, 60	HCA / HWSC / CITY / OSCIA	HHWSP	2011-2015
	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.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 145-150,162-163	HCA / HWSC / CITY / OSCIA	HHWSP	2011-2015
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.			City of Hamilton Natural Heritage Strategy	HCA / HWSC / CITY / OSCIA	HHWSP	2011-2015
		Work with City of Hamilton staff to amend the by-law requiring urban landowners to maintain low vegetation growth.		Dundas Valley 50 Year Vision	HCA / HWSC / HHWSP	CITY	2011-2015
		Update the riparian buffer mapping for Spencer Creek to assist with prioritization for direct mailings.		Cootes to Escarpment Park System – A Conservation and Land Management Strategy	CITY / HWSC / HHWSP	HCA	2011-2012

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with landowners to naturalize and plant riparian buffers adhering to How Much Habitat is Enough guidelines of a15m width adjacent to warm water streams and a 30m width adjacent to cold and cool water streams.		HCA / HWSC / CITY / OSCIA	HHWSP	2011-2015
Landfill Leachate Map Code: LL Definition: rainwater filtering down through the landfill materials with the potential to contaminate groundwater aquifers.		Develop a groundwater sampling program to determine if groundwater contamination is occurring as a result of landfill leachate.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-12 Page 77 HCA Planning and Regulation Policies and Guidelines Page 60	CITY / RAP / MOE	HCA	2011-2012
Land Maintenance Practices Map Code: LM Definition: Errant or excessive land maintenance practice which unnecessarily degrade wildlife habitat.		Work with utility companies to develop protocols for recommended low impact land maintenance practices to be implemented throughout utility corridors.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-2, FW-4 and Pages 106-107	CITY / HHWSP / HWSC / RBG	HCA	2011-2012
			Work to naturalize infrequently used areas of municipal parks and Conservation areas.		HHWSP / HWSC / HNC	CITY / HCA	2011-2015
			Work with the City to ensure roadside maintenance is not done in excess of access standards.		HCA / HHWSP / HWSC / GV / HNC	CITY	2011-2015
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	HHWSP / HWSC / GV / BARC	CITY / HCA / RBG	2011-2015
	Promote the City of Hamilton's Team Up to Clean Up, Adopt a Park. Adopt a Road and Extreme Park Makeover Programs to assist community minded residents to undertake litter clean up projects.				HCA / RBG / GV / HWSC / HHWSP / BARC	CITY	2011-2015
		Undertake an inventory of illegal dumping sites throughout the subwatershed. Prioritize sites for the installation of deterrent mechanisms and the implementation of City litter related programs and Conservation Authority maintenance programs.			RBG	HCA / CITY	2011-2012
		Work to develop an Adopt a Park / Friends of Program for Conservation Authority lands.			CITY / HHWSP / HWSC	HCA	2011-2012

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work to replace all current recycle bins with ones that have lids.		GV	CITY	2011-2015
			Implement the ‘Pack it in – Pack it out” waste disposal policy at strategic city parks, Conservation Areas and RBG lands.		HHWSP	CITY / RBG / HCA	2011-2015
			Work with local residents to host litter clean up events on public lands; including City parks, Conservation Areas and RBG lands.		HHWSP / HWSC / BARC / GV	HCA / CITY / RBG	2011-2015
Migration Barrier Map Code: MB	Erect wildlife crossing signage where known migration corridors cross roadways and trails.			In-stream Barrier Assessment for the Hamilton Harbour AOC.	HHWSP / HNC / BARC / HWSC / WPN / RAP	HCA / CITY / RBG	2011-2015
			Work to retrofit any infrastructure that precludes the passage of wildlife into upstream habitat or the upper reaches of natural corridors. Possible retrofit options include: underpasses, fish ladders, by-pass channels etc.	Hamilton Harbour Fisheries Management Plan	HHWSP / HNC / BARC / HWSC / WPN / RAP	HCA / CITY / RBG	2011-2015
Nutrient Loading Map Code: NL Definition: Excessive nutrients being inputted into a watercourse; often resulting from the application of manure/fertilizer. (* Also includes Phosphorous Loading formerly map code PL)	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-9, RM-7. Pages 116, 158	DFO / HCA / OMAFRA / OSCIA / HWSC	HHWSP	2011-2015
	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.				HCA / BARC / GV / RBG / OSCIA / MOE / OMAFRA / RAP	HHSWP	2011-2015
	Create demonstration sites on public lands that highlight nutrient management BMP projects.			Nutrient Management Act 2002, O. Reg 267/03	HCA / HWSC / OSICA / RAP	HHWSP	2011-2013
	Host a training workshop for local golf course practitioners to discuss BMP’s for golf course management, including Audubon Cooperative Sanctuary Program certification standards.			Fisheries Act, Section 34	HCA / HWSC / RAP / RCGA	HHWSP	2011-2013
		Establish a nutrient level monitoring program with strategic sampling sites that are land use dependent, to identify specific sources of nutrient loading.		HCA Planning and Regulation Policies and Guidelines Page 72	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG	HCA	2011-2013
		Develop a plan to reduce nutrient levels to meet Provincial Water Quality Objectives as determined by the land use dependent nutrient level monitoring program.		Ministry of the Environment Water Management Policies and Guidelines – Provincial Water Quality Objectives Appendix A	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG	HCA	2011-2013
				OMAFRA Best Management Practices Series – Nutrient Management Planning			

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
		Develop a total phosphorous target based on the PWQO recommendation of 30µg/L for control of excessive plant growth, 20µg/L for control of Nuisance concentrations of algae or 10µg/L for high level of protection against aesthetic deterioration.		OMAFRA Best Management Practices Series – Manure Management	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG	HCA	2011-2012
		Develop a fertilizer use by-law under the Fertilizer Act, limiting the use of fertilizer for non essential purposes.			HCA / BARC / RAP / HHWSP / RBG	CITY	2011-2013
			Work with landowners to reduce nutrient loading by implementing agricultural and urban BMP's related to nutrient management.		CITY / OSCIA / OMAFRA / BARC / RAP / RBG / HCA	HHWSP	2011-2015
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	DFO / HCA / OSCIA / OMAFRA / CITY	HHWSP	2011-2015
			Work with landowners to restore or retrofit on-line ponds.	Fisheries Act, Section 37 HCA Planning and Regulation Policies and Guidelines Page 63 In-stream Barrier Assessment for the Hamilton Harbour AOC	DFO / HCA / OSCIA / OMAFRA / CITY / HWSC	HHWSP	2011-2015
Outdoor Recreation Related Impacts Map Code: OR Definition: Recreational activities occurring in natural areas that inadvertently degrade the natural features of the area.	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, PAA-2, PAA-3 Pages 115, 126-130	HWSC / BARC / BTC	HHWSP / CITY / HCA / RBG	2011-2015
	Add “tread lightly” messaging to partner recreation oriented websites.				NHC	HCA / CITY / RBG / HNC / BTC	2011-2013
	Promote the City of Hamilton Adopt-a-Park and Extreme Park Makeover Programs.			The Conservation Lands of Ontario – Three Year Business Plan	HCA / RBG / HHWSP / HNC / BTC	CITY	2011-2015
	Install no trespassing signage on off trail areas.				HNC / BTC	HCA / RBG / CITY	2011-2015
	Erect signage explaining the environmental significance of natural areas, ownership of the lands and promoting user “etiquette” for the area.			A Joint Outdoor Tourism Marketing Strategy	HNC	HCA / CITY / RBG / BTC	2011-2013

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
		When undertaking master planning exercises, design trails to meet guidelines as set in HCA's Planning and Regulation Policies and Guidelines.		Niagara Escarpment Access Enhancement Plan Dundas Valley 50 Year Vision Strategy Cootes to Escarpment Conservation & Land Management Strategy	HCA / CITY / RBG	HCA / CITY / RBG	2011-2015
		Develop marketing strategies for sensitive lands that focus on sustainable use.			BTC / HNC	HCA / CITY / RBG	2011-2013
		Continue to monitor Category A and B waterfalls on public lands for signs of degradation.			HCA / CITY	HCA / CITY	2011-2015
		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	2011-2015
		Consider designating days/areas for ATV and snowmobile use.			HHWSP / HNC	HCA / CITY / RBG	2011-2015
			Rotationally restrict access to degraded areas to allow for the regeneration of vegetation.		HNC / BTC	HCA / CITY / RBG	2011-2012
			Host annual clean up days for natural areas identified as having excessive amounts of litter.		HHWSP / HWSC / HNC / BARC / BTC	CITY / HCA / RBG	2011-2015
			Increase the amount of poison ivy caution signage along trails and in areas known to be degraded by trespassing.		HNC / BTC	HCA / CITY / RBG	2011-2015
			When conducting maintenance of existing trails, seek guidance from the HCA Planning and Engineering Department with respect to materials and design.		HHWSP / HNC / BTC	HCA / CITY / RBG	2011-2015
Perched Culverts Map Code: CP Definition: In-stream culverts that when improperly designed/installed, create barriers to water flow and fish migration.	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	DFO / HCA / CITY / MNR	HHWSP	2010-2014
	Host training sessions for HCA Lands and City staff to promote the proper design and installation of culverts.			Fisheries Act, Section 37	DFO / HHWSP / MNR	CITY / HCA	2010-2014
		Undertake an inventory of perched and closed bottom culverts throughout the subwatershed. Prioritize culverts for mitigation or replacement.		HCA Planning and Regulation Policies and Guidelines Page 41	DFO / HCA / HHWSP / MNR	CITY	2010-2014

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with landowners to remove/retrofit perched and closed bottom culverts; begin with those prioritized in the Barrier Mitigation Plan of the In-stream Barrier Assessment for the Hamilton Harbour AOC.	In-stream Barrier Assessment for the Hamilton Harbour AOC	DFO / HCA / OSCIA / OMAFRA / CITY	HHWSP	2010-2014
Pesticide Use Map Code: PS Definition: The application of pesticides to control perceived pests.	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 to promote alternatives to traditional methods.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations TSSR-6, EPI-4 Pages 99, 137	HCA / OSCIA / OMAFRA / HHWSP / CITY / HCPI / LO	GV	2011-2015
	Host a training workshop for local golf course practitioners to discuss BMP's for golf course management, including Audubon Cooperative Sanctuary Program certification standards and the Ministry of the Environment Gold Course IPM Accreditation.			Fisheries Act, Section 34 City of Hamilton By -Law No. 07-282	LO / CITY / HWSC / HCPI / RCGA	HHWSP	2011-2012
	Promote the Municipal Pesticide Use By-law and Provincial Pesticide Ban.			Pesticides Act Ontario Regulation 63/09	HCPI / HWSC / HHWSP / OSCIA / OMAFRA	CITY / GV	2011-2015
	Create demonstration sites on public lands that highlight pesticide/herbicide free lawns, gardens, natural areas, crops, etc.			OMAFRA Best Management Practices Series – integrated Pest Management	CITY / GV / HCPI / HWSC / OSCIA / OMAFRA	HHWSP	2011-2015
	Promote the City of Hamilton's Turf King Hamilton Program which includes Integrated Pest Management principles, Natural Tips for Healthy Lawns and Gardens and alternative turf management techniques.			OMAFRA Best Management Practices Series – Pesticide Storage, Handling and Application	GV / HCPI / HWSC / HHWSP / OSCIA / OMAFRA	CITY	2011-2012
	Promote the Ministry of the Environment 'Add It Up Program – Going Pesticide Free' Program				CITY / HHWSP / HCPI / HWSC /	GV	2011-2015
		Undertake a study to determine the current level of pesticide/herbicide use in the subwatershed and develop targets for reduction.			GV / HCPI / HWSC / HHWSP / OSCIA / OMAFRA	CITY	2011-2012
			Work with landowners to implement Integrated Pest Management practices as alternatives to pesticide use.		CITY / HHWSP / HCPI / HWSC	GV	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
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	DFO / HCA / OMAFRA / OSCIA / HWSC	HHWSP	2011-2015
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.			Fisheries Act, Section 37	DFO / HCA / OMAFRA / OSCIA / HWSC	HHWSP	2011-2015
	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 / HWSC	HHWSP	2011-2013
	Conduct a direct mailing to landowners where plowed watercourses have been identified to promote technical and financial assistance available for BMP projects related to agricultural drainage.			OMAFRA Best Management Practices Series – Soil Management	DFO / HCA / OSCIA / HWSC	HHWSP	2011-2015
			Work with landowners to install effective agricultural land drainage; e.g. grassed waterways, Water and Sediment Control Basins, etc.		DFO / HCA / HWSC / RBG / RAP	HHWSP	2011-2015
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.	Utilize literature, websites, public service announcements & direct landowner contact to promote the use of sidewalk salt alternatives.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-5b Page 71	CITY / DFO / HCA / MTO / GV	CITY	2011-2015
	Host training sessions for City Staff and Contractors using the Ministry of the Environment Snow Disposal and De-icing Operations in Ontario Guidelines.			Fisheries Act, Section 34	CITY / MTO	CITY	2011-2015
		Support planning for alternative and sustainable transportation strategies including Rapid Transit.		City of Hamilton 2003 Road Salt Management Plan	HCA / MTO / HHHBA / RAP	CITY	2011-2015
		Undertake a study to determine the most effective method of snow removal that will reduce contamination of watercourses.		Municipalities of Wellington County – 2005 Salt Management Plan	CITY / DFO / HCA / MTO	CITY	2011-2012
			Implement improved snow removal methods as recommended by the study to determine effective methods of snow removal which also reduce contamination of watercourses.		MTO	CITY	2012-2015
			Install vegetated filter strips and riparian buffers along medians and roadsides.		MTO / HCA	CITY	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
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	DFO / HWSC / HCA / MNR / OSCIA / OMAFRA / RAP	HHWSP	2011-2015
		Develop a total suspended solids target based on the PWQO turbidity recommendation of between 5-50 FTU (Formazin Turbidity Units)		Fisheries Act, Sections 34 and 36	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP	HCA	2011-2012
			Work to achieve and maintain the total suspended solids target developed based on the PWQO turbidity recommendation of between 5-50 FTU (Formazin Turbidity Units)	Erosion and Sediment Control Guidelines for Urban Construction	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP	HCA	2012-2015
			Monitor and enforce the proper installation and maintenance of sediment and erosion control measure on construction sites.	City of Hamilton By-law for Prohibiting and Regulating the Alteration of Property Grades, the Placing or Dumping of Fill, and the Removal of Topsoil	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP	HCA	2011-2015
			Work with landowners to reduce sediment loading by implementing BMP projects; e.g. streambank stabilization, riparian buffers, natural channel design.	OMAFRA Best Management Practices Series – No-Till Making it Work	DFO / HWSC / HCA / MNR / OSCIA / OMAFRA	HHWSP	2011-2015
			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.	Ministry of the Environment Stormwater Management Design Guidelines	DFO / HWSC / MNR / OSCIA / OMAFRA / RAP / HHHBA	HCA	2011-2015
Site Clearing Prior to Development Map Code: SC Definition: The act of stripping or excavating the vegetation and topsoil from a site prior to construction works.	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	DFO / MNR / RAP / HHHBA / CITY / HWSC/ HHWSP	HCA	2011-2013
	Promote the City of Hamilton By-law for Prohibiting and Regulating the Alteration of Property Grades, the Placing or Dumping of Fill, and the Removal of Topsoil			HCA Planning and Regulation Policies and Guidelines Pages 50-62, 68-69	DFO / MNR / RAP / HHHBA / CITY / HWSC/ HHWSP	CITY	2011-2015
			Work with contractors to ensure that only necessary areas of development sites are cleared prior to development to eliminate the unnecessary destruction of habitat.	City of Hamilton Draft Private Tree and Woodland Conservation By-Law	DFO / MNR / HHHBA / CITY	HCA	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work to mitigate non point sediment sources identified in the Watershed Planning Network Priority Remediation Report.	City of Hamilton By -Law No. 03-126 Site Alteration By-Law Erosion and Sediment Control Guidelines for Urban Construction City of Hamilton By-law for Prohibiting and Regulating the Alteration of Property Grades, the Placing or Dumping of Fill, and the Removal of Topsoil	DFO / MNR / CITY / HWSP / HHWSP	HCA	2011-2015
Stormsewer Outfalls Map Code: SO Definition: The point where a sewer system discharges into a watercourse during a storm event.	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 / RBG / GV / HWSC / HHWSP / CITY	BARC	2011-2015
	Promote the Municipal Sewer-Use By-law No. 06-228.				HCA / RBG / GV / HWSC / HHWSP	CITY	2011-2015
	Promote the City of Hamilton Public Works Stormwater Pollution Solutions for Urban and Rural Residents Outreach Program				HCA / RBG / GV / HWSC / HHWSP	CITY	2011-2015
		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 / MOE	CITY	2011-2013
		Undertake a water temperature monitoring study at a representative sampling of storm sewers to determine the impact of storm flows on creek temperature.			CITY / BARC / RAP / MOE	HCA	2011-2013
		Work with Green Venture to develop a Stormwater Mitigation Program.			HCA / RAP / BARC / CITY	GV	2011-2013
			Work with City Staff to retrofit outfalls to incorporate erosion control measures such as plunge pools, rip rap, tree planting etc.		HCA / RAP / BARC / HWSC / DFO / HHWSP	CITY	2011-2015
			Work to implement the recommendations in the sewershed water quality study.		HCA / RAP / BARC / HWSC / DFO / HHWSP	CITY	2011-2015

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with landowners to establish riparian buffers and/or erosion protection downstream of storm sewer outfalls; e.g. riverstone.		HCA / RAP / BARC / HWSC / DFO / CITY	HHWSP	2011-2015
			Work with landowners to disconnect downspouts and to install rain barrels.		HCA / RAP / BARC / HWSC / HHWSP	CITY	2011-2015
Transportation Corridor Expansion Map Code: TE Definition: The process by which new roads are built or existing roads are widened.	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 Control Guidelines for Urban Construction	HCA / MTO / HHHBA	CITY	2011-2015
		When planning for major road works, design transportation corridors using new technologies for environmental solutions.			HCA / MTO / HHHBA	CITY	2011-2015
			When repairing roads, utilize new technologies for road maintenance that are proven to have environmental benefits.		HCA / MTO / HHHBA	CITY	2011-2015
Water Takings Map Code: WT Definition: The process by which surface and groundwater are pumped out of the natural system; for the purposes of irrigation, aggregate extraction, etc.	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 OMAFRA Best Management Practices Series – Irrigation Management	HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote BMP's relating to water conservation technology.				HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
	Encourage landowners with surface water takings to install groundwater systems.				HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
	Encourage landowners with water taking needs to establish an Irrigation Advisory Committee to schedule takings alternately.				HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
		Develop monitoring program to assess impacts of surface water takings on creek systems and aquatic wildlife during periods of low water, include recommendations for reducing impacts.			MNR / MOE	HCA	2011-2013

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

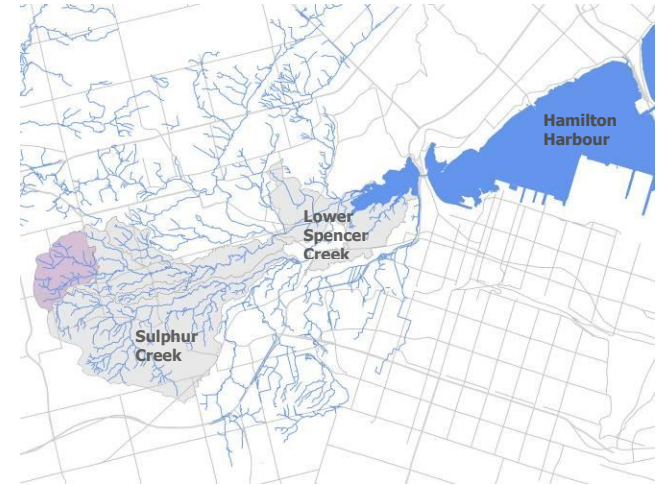
STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
		Upon receipt of new Permit to Take Water applications, evaluate the taking against active permits in the area to determine the potential stress level related to multiple users on a given system.			MOE	HCA	2011-2015
			Work with landowners to implement BMP's related to water conservation.		HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
Wildlife Collisions Map Code: WC Definition: Incidences where animals are struck by vehicles or where animals collide with buildings, often occurring with buildings with large windows.	Utilize literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding managing human-wildlife conflicts.			British Columbia Wildlife Collision Prevention Program Report	MNR / HCA / MTO / RBG / HWSC / HHWSP	CITY	2011-2015
	Erect additional wildlife caution signage that is species specific, along roadways at known points of frequent collisions.			City of Ottawa Wildlife/Vehicle Collision Prevention Program	MNR / HCA / MTO / RBG	CITY	2011-2013
		When planning major road works, consider the incorporation of wildlife over/underpasses, avoiding known migratory corridors and other wildlife accommodations in the design.			MNR / HCA / MTO / RBG	CITY	2011-2015
		Evaluate the effectiveness of the MTO roadside prairies and wildlife shrub corridors project in preventing wildlife collisions.			MNR / HCA / MTO	CITY	2011-2015
			Reduce the use of road salt or consider alternatives that do not attract wildlife.		MNR / HCA / MTO	CITY	2011-2013
			Produce and distribute window decals for large windows of homes and high rise buildings to prevent bird collisions.		CITY / HHWSP / HWSC / RBG	HCA	2011-2015
			Erect fencing and alternative nesting mounds at known sites for turtle nesting.		MNR / HCA / MTO / RBG	CITY	2011-2013
			Conduct temporary road closures at known wildlife crossings and nesting sites during peak migration and nesting times.		MNR / HCA / MTO / RBG	CITY	2011-2015
Wildlife Overpopulation Map Code: WO Definition: When a species population	Conduct a direct mailing to landowners adjacent to natural areas densely populated with deer to create awareness regarding reasons not to feed or intentionally attract wildlife.			Strategy for Preventing and Managing Human-Deer Conflicts in Southern Ontario			

TABLE SP-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
exceeds the carrying capacity of its habitat.			Work to implement the recommendations for sustainable populations in the HCA/MNR Deer Management Strategy.				

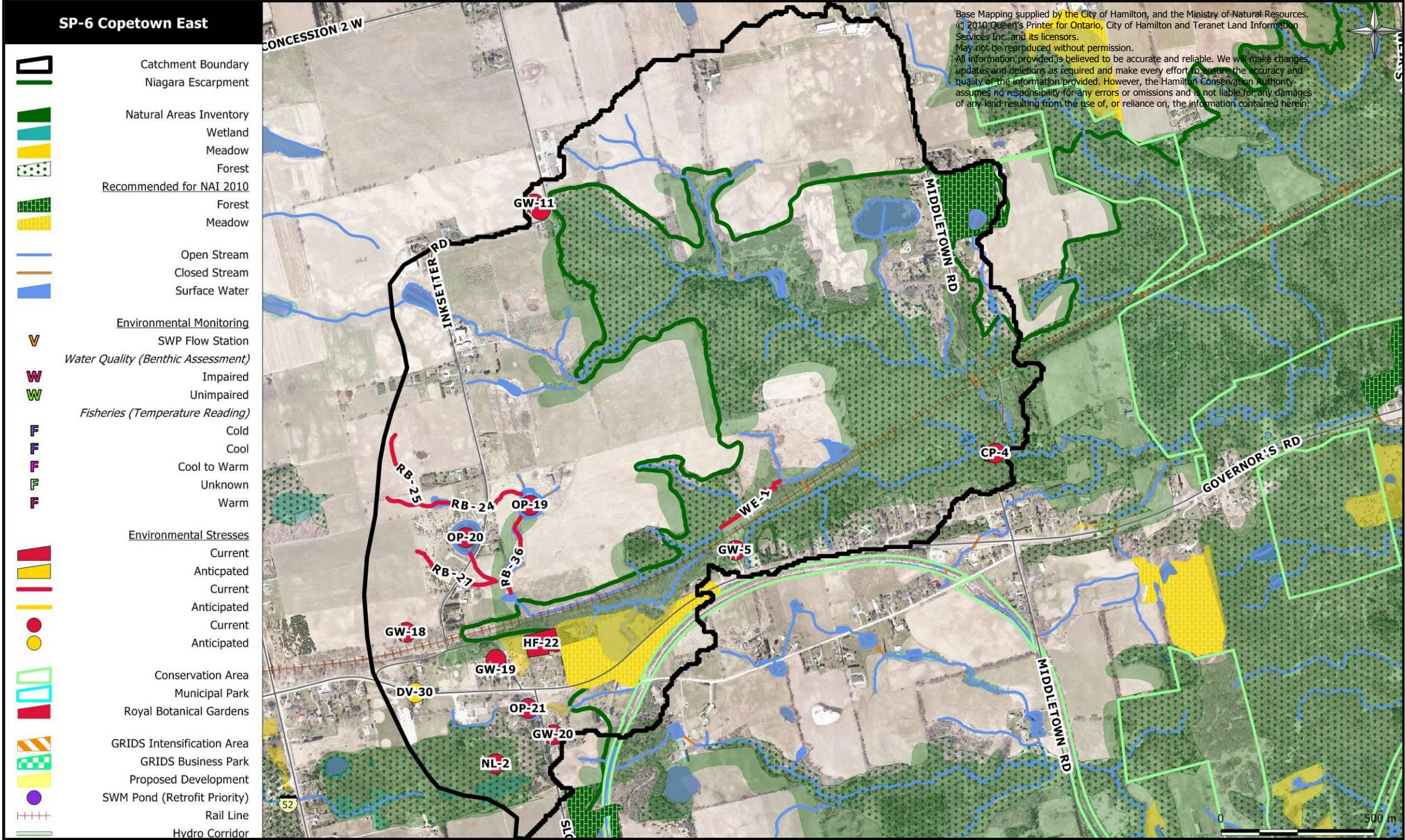
Partner Agency Acronyms

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		



COPETOWN EAST CATCHMENT

DATA SHEETS



COPETOWN EAST DATA SHEET

Table SP-9: Stresses Identified in the Copetown East Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
CP-4	Perched Culvert	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DV-30	Development	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GW-11	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-12	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-18	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-19	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-20	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-5	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
HF-22	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
NL-2	Nutrient Loading	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
OP-19	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-20	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-21	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RB-24	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RB-25	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RB-26	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RB-27	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RB-36	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RB-36	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
WE-1	Watercourse Enclosure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

COPETOWN EAST DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION

BENTHICS ASSESSMENT

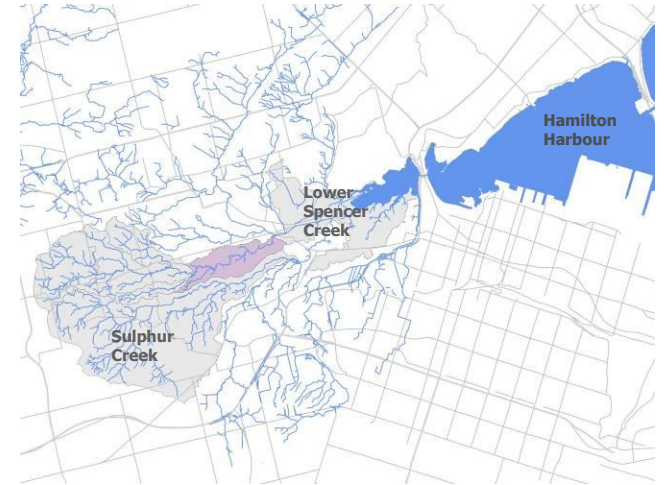
LOCATION	DATE	DESCRIPTION
SPRI-4.76	2001	Unimpaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

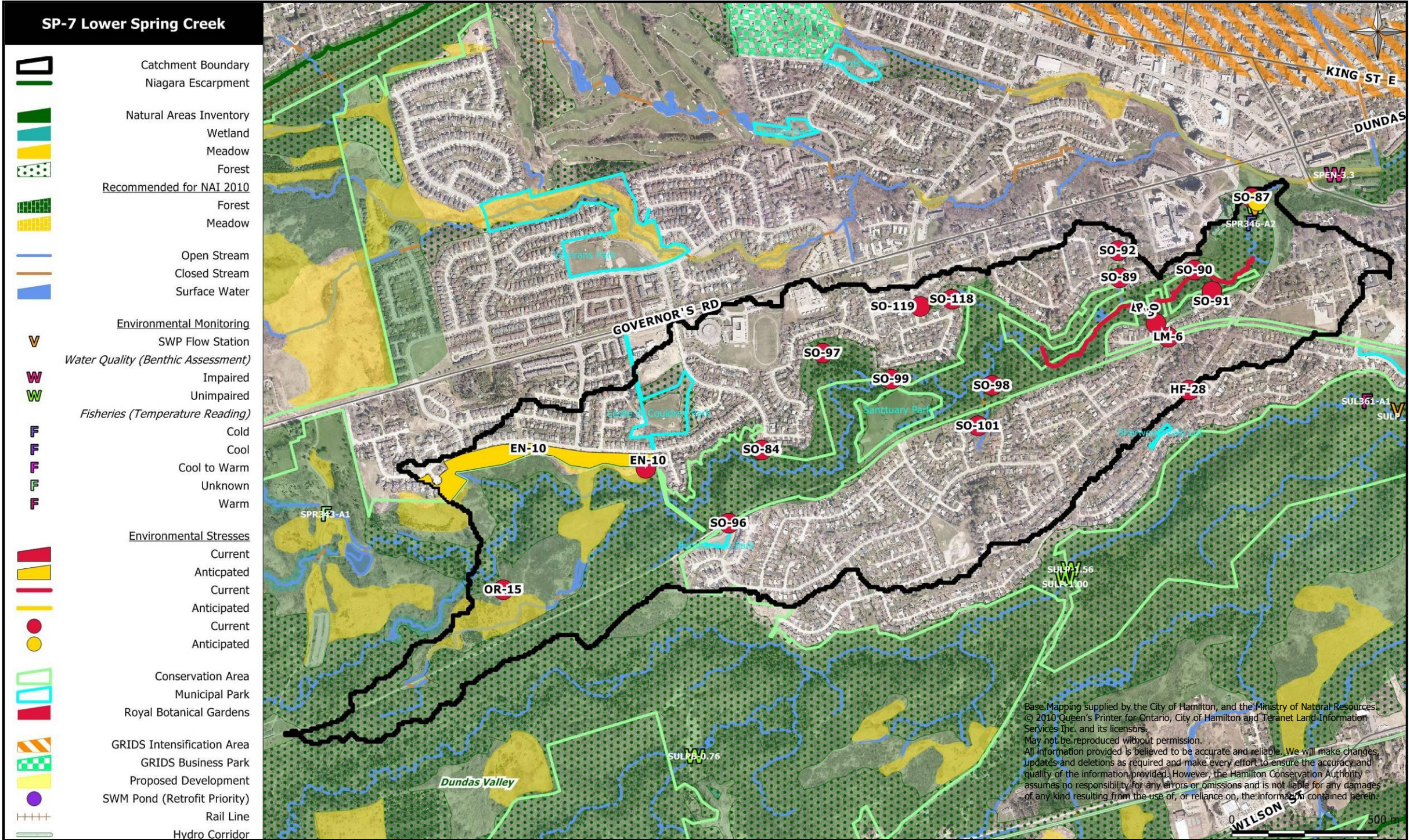
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s



LOWER SPRING CREEK CATCHMENT

DATA SHEETS



LOWER SPRING CREEK DATA SHEET

Table SP-10: Stresses Identified in the Lower Spring Creek Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
EN-10	Encroachment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EN-10	Encroachment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
EN-13	Encroachment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
ER-30	Erosion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
HF-28	Habitat Fragmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
LM-6	Land Maintenance Practices		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
OR-15	Outdoor Recreation Related Impacts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
SO-101	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-102	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-118	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
SO-119	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
SO-84	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-85	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-87	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
SO-89	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-90	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-91	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-92	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
SO-96	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-97	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-98	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-99	Stormsewer Outfall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

LOWER SPRING CREEK DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
SPR346-A2	11-Sep-08	White sucker	12	9/11/2008 14.2	cold
SPR346-A2	11-Sep-08	Creek chub	23		
SPR346-A2	11-Sep-08	Fathead minnow	2		
SPR346-A2	11-Sep-08	Fantail darter	14		
SPR346-A2	11-Sep-08	Blacknose dace	5		
SPR346-A2	11-Sep-08	Longnose dace	5		
SPR346-A2	11-Sep-08	Rainbow darter	1		

BENTHICS ASSESSMENT

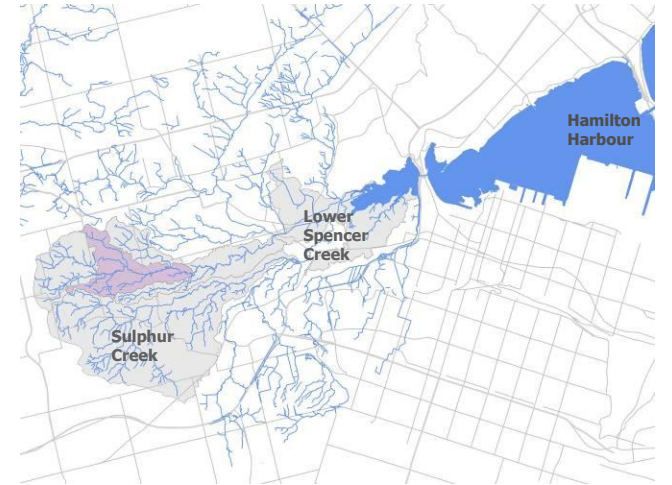
LOCATION	DATE	DESCRPTION
SPRI-0.2	2001	Unimpaired
SPR346-A2	2008	Potentially Impaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS
SPRG_02	10/23/2008	Escherichia coli in Water	160	CFU/100mL
SPRG_02	10/12/2006	Total Phosphorous	0.07	mg/L
SPRG_02	10/23/2008	Total Suspended Solids	10	mg/L
SPRG_02	10/23/2008	Dissolved Phosphorous	0.014	mg/L
SPRG_02	10/23/2008	Dissolved Oxygen mg/L	15.33	mg/L
SPRG_02	10/23/2008	Dissolved Oxygen %	127.9	%
SPRG_02	10/23/2008	Conductivity	834	µs/cm
SPRG_02	10/23/2008	Temperature	7.4	°C
SPRG_02	10/23/2008	pH	8.21	no units
SPRG_02	10/23/2008	TDS	0.542	g/L
SPRG_02	10/12/2006	Total Coliforms (MF)	23100	CFU/100ml
SPRG_02	10/23/2008	Total Kjeldahl Nitrogen	0.2	mg/L

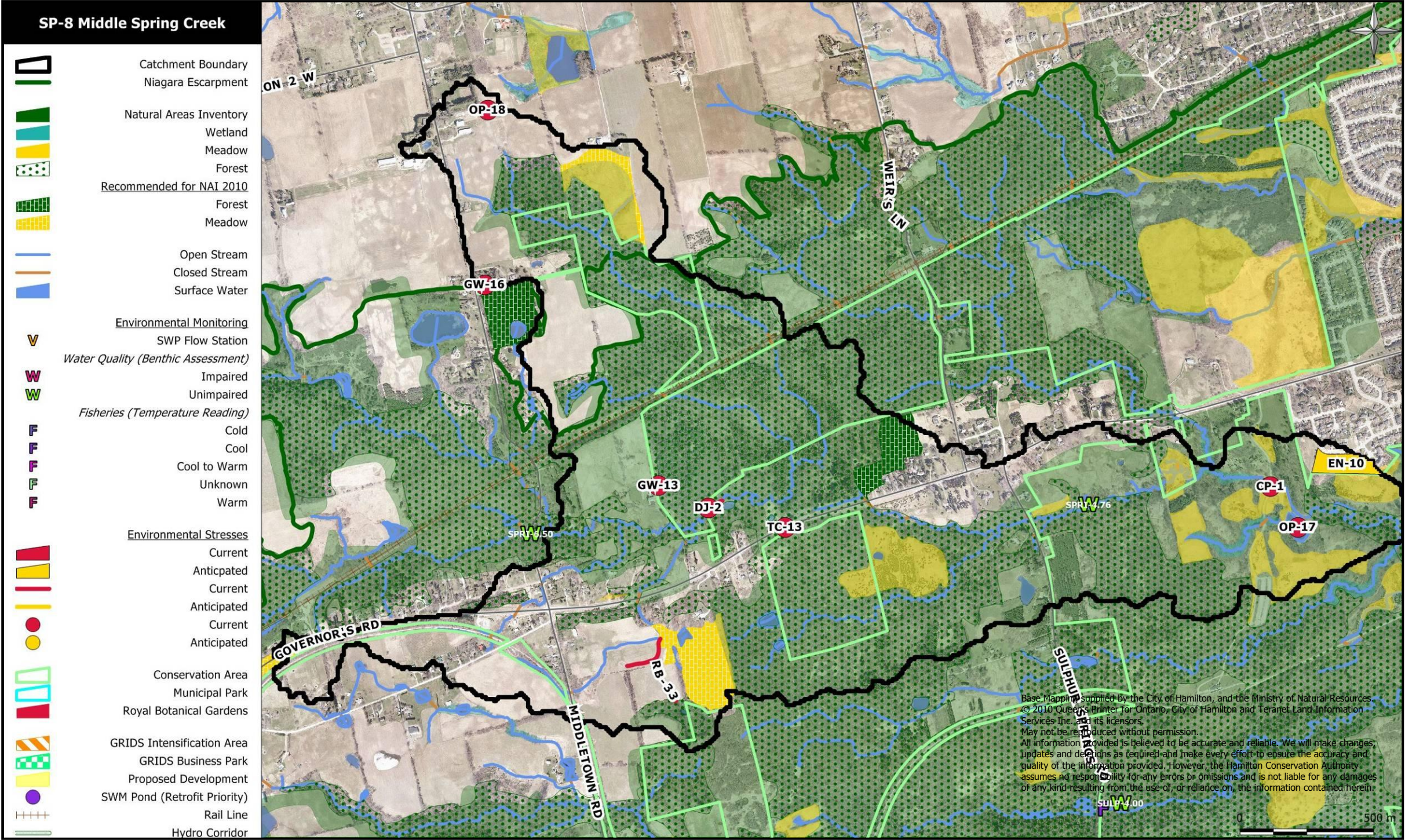
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s
SPRG_02	10/23/2008	0.04426



MIDDLE SPRING CREEK CATCHMENT

DATA SHEETS



MIDDLE SPRING CREEK DATA SHEET

Table SP-11: Stresses Identified in the Middle Spring Creek Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
CP-1	Perched Culvert	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
DJ-2	Debris Jam	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
EN-10	Encroachment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
ER-31	Erosion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
GW-13	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
GW-16	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
OP-17	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
OP-18	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-33	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
RB-33	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
RB-33	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
TC-13	Runoff Contamination via Transportation Corridor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

MIDDLE SPRING CREEK DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
SPR343-A1	18-Aug-08	Creek chub	10		
SPR343-A1	18-Aug-08	Longnose dace	3		
SPR343-A1	18-Aug-08	White sucker	3		

BENTHICS ASSESSMENT

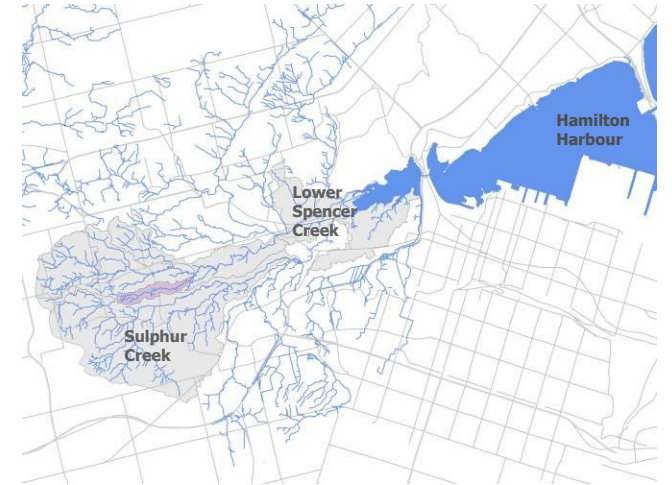
LOCATION	DATE	DESCRIPTION
SPRI-4.76	2001	Unimpaired
SPR343-A1	2008	Potentially Impaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

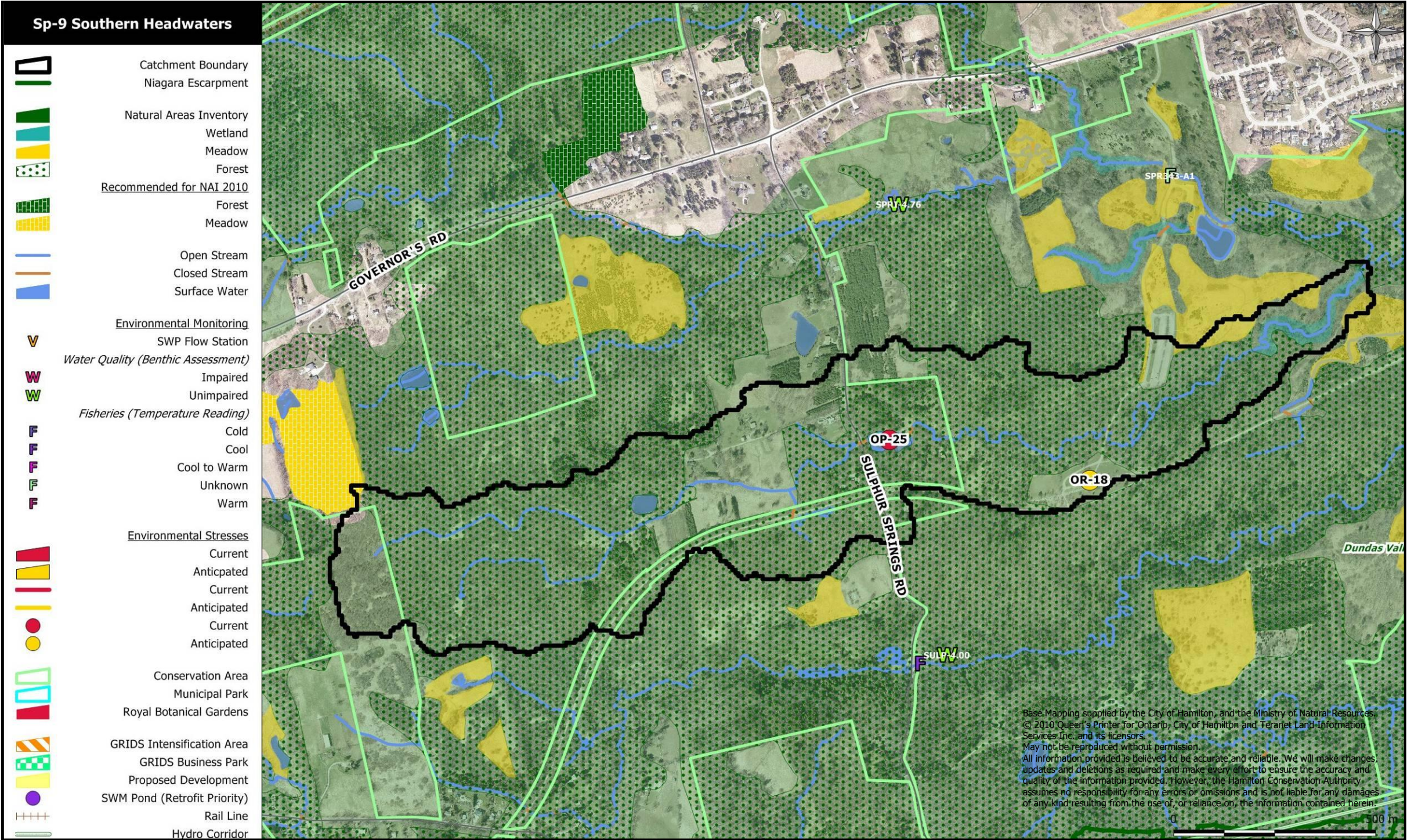
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s



SOUTHERN HEADWATERS CATCHMENT

DATA SHEETS



SOUTHERN HEADWATERS DATA SHEET

Table SP-12: Stresses Identified in the Southern Headwaters Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
OP-25	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OR-18	Outdoor Recreation Related Impacts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

SOUTHERN HEADWATERS DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION

BENTHICS ASSESSMENT

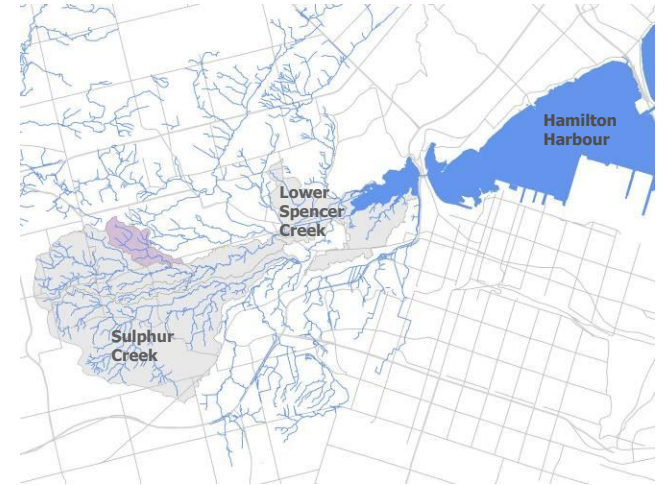
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

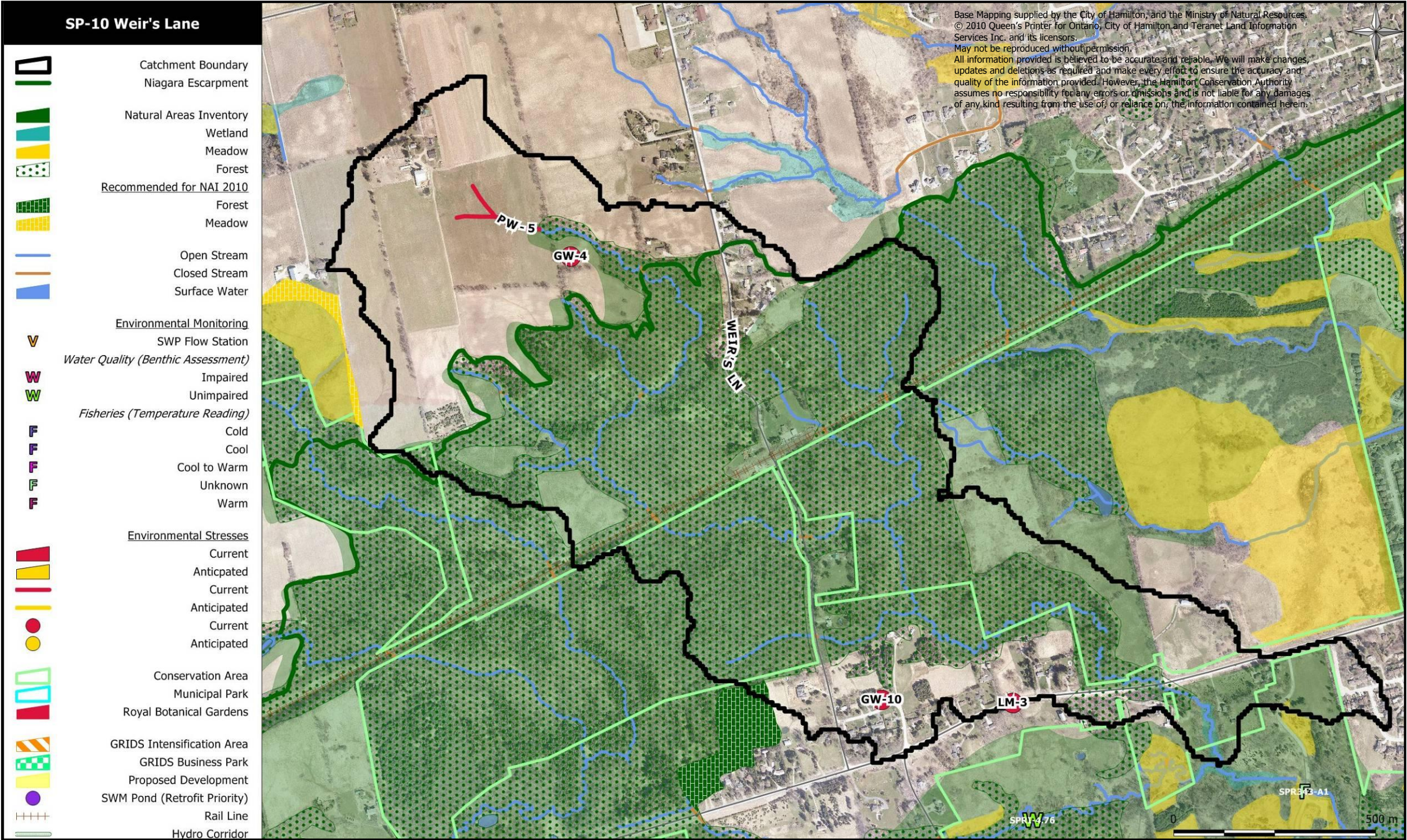
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s



WEIR'S LANE CATCHMENT

DATA SHEETS



WEIR’S LANE DATA SHEET

Table SP-13: Stresses Identified in the Weir’s Lane Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
GW-10	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-4	Abandoned Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
LM-3	Land Maintenance Practices		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
PW-5	Plowed Watercourse	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
PW-5	Plowed Watercourse	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
PW-5	Plowed Watercourse	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

WEIR’S LANE DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION

BENTHICS ASSESSMENT

LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s

