

MIDDLE SPENCER CREEK SUBWATERSHED

STEWARDSHIP ACTION PLAN 2011

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MIDDLE SPENCER CREEK SUBWATERSHED CHARACTERIZATION

GEOGRAPHIC LOCATION

Middle Spencer Creek subwatershed is 49.36 km² in area. It is the largest subwatershed in the Spencer Creek system. It is comprised of 13 catchment basins. In descending order from the headwaters to the outlet these are: Concession 5, Concession 4, Century Pines, Peter's Corner's, Christie Upper Reservoir, Christie Lower Reservoir, Christie Lower Reservoir/Crooks' Hollow, Weir's Lane/Highway 8, Governor's Road Conservation Area, Webster's Falls, Governor's Lane Estates, Dundas Valley Golf & Country Club and King Street. **(Map MS-1)**. This subwatershed falls within the former municipal boundaries of the Towns of Flamborough and Dundas. The subwatershed also falls within three City of Hamilton Wards, specifically Wards 13 and 14, with a very small portion in ward 15.

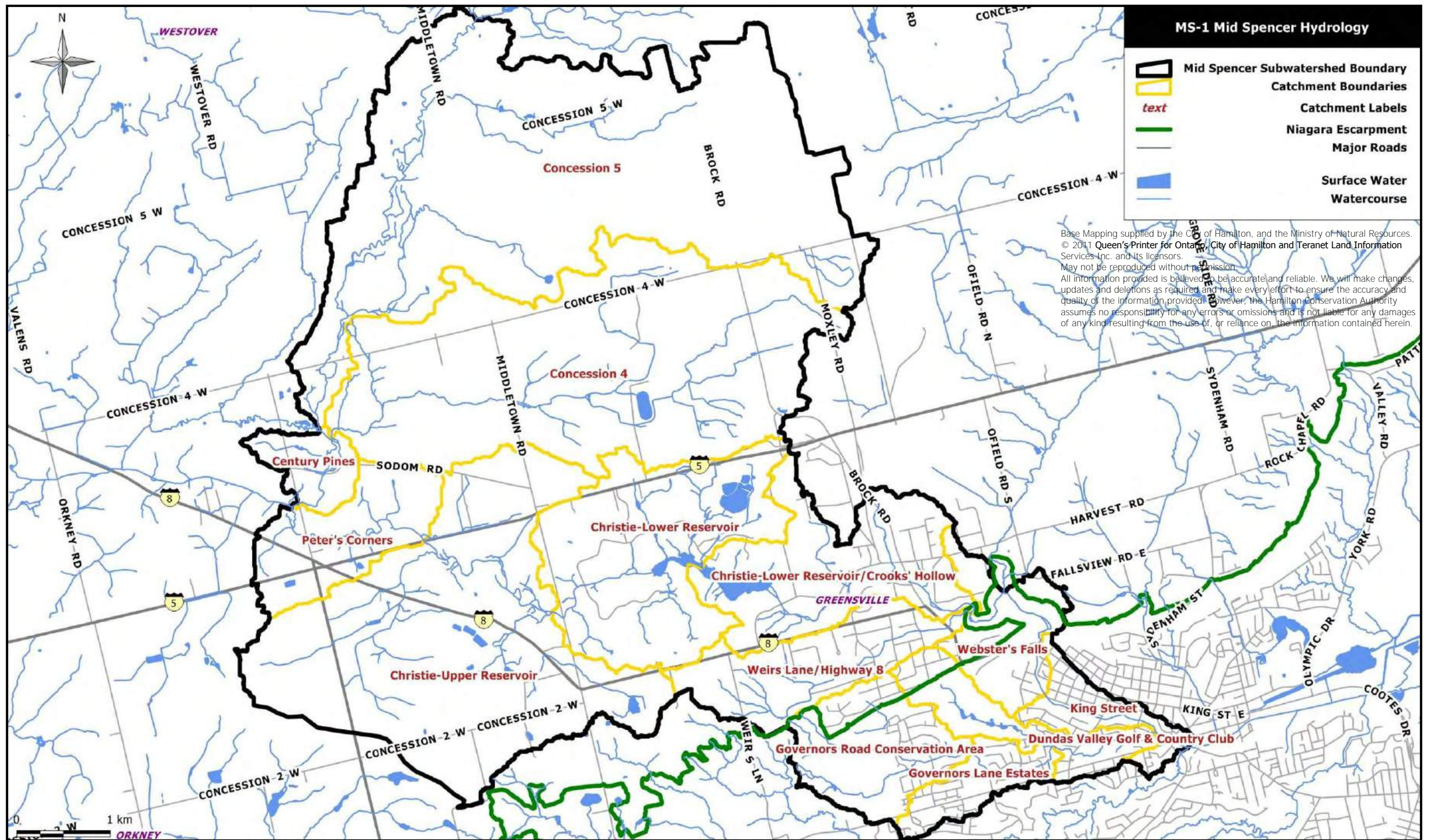
The boundaries of the Middle Spencer Creek subwatershed and its associated catchments have recently been updated through the Source Protection Planning process. As a result, some catchments that are referred to in the 1997 Spencer Creek Management Plan have been amalgamated into other catchments. Where possible, efforts to retain the naming convention from the 1997 Plan has been made so that reference between previous reports is possible. Specifically, Concession 6 has been amalgamated into Concession 5 and is now called Concession 5 only; a portion of the Christie Lower Reservoir catchment has been amalgamated with the Crooks' Hollow catchment into a new catchment called Christie Lower Reservoir/Crooks/Hollow; and the Weir's Lane and Highway 8 catchments have been amalgamated into one catchment, now called Weir's Lane/Highway 8.

The westernmost position of the subwatershed boundary occurs west of Highway 52, north of Concession 2 where it then tapers northeastward to its northern most point at the intersection of Concession 6 West and Brock Road. The subwatershed boundary tapers southeastward down the Niagara Escarpment and into the Town of Dundas. The southern boundary follows Governor's Road west until it tapers to the northwest and then follows Highway 8 and Concession 2 West to the westernmost position again.

The watershed includes the historic settlement areas of Greensville, Crooks' Hollow, Peter's Corners and a portion of the former Town of Dundas.

Highways 8 and 5 bisect this subwatershed, predominately through the southern half of the subwatershed. Middletown and Brock Roads are also frequently used transportation routes which also pass through this subwatershed.





MIDDLE SPENCER SUBWATERSHED CHARACTERIZATION *(Contains excerpts from the Preliminary Conceptual Water Budget Report, Halton-Hamilton Source Water Protection, 2008)*

HYDROLOGY

Surface Water

Middle Spencer Creek is one of 15 subwatersheds of Spencer Creek that drain a 278 km² area into Cootes Paradise Marsh and ultimately Hamilton Harbour. Middle Spencer Creek subwatershed has a drainage area of 49.36 km². The length of Middle Spencer Creek is approximately 20 km from the headwaters to the confluence with Lower Spencer Creek; however, the combined length of the creek and all of its tributaries is 111.44 km.

Middle Spencer Creek originates on the table lands of the Niagara Escarpment where it drains southeast to its confluence with Lower Spencer Creek. Before the confluence with Lower Spencer Creek, Westover, Spring, Flamborough and Logie’s Creeks all merge into Middle Spencer Creek. Westover Creek flows into Middle Spencer Creek west of Westover Road and south of Concession Road 4, at the Century Pines Golf & Country Club. The confluence of Logie’s Creek tributary with Middle Spencer Creek is occurs after Logie’s Creek descends over Tew’s Falls and enters the former Town of Dundas. The confluence of Flamborough Creek with Middle Spencer Creek is upstream of Middletown Road and Spring Creek converges with Middle Spencer Creek immediately upstream of the confluence with Lower Spencer Creek.

The Middle Spencer Creek subwatershed receives some groundwater discharge from wetlands, but is mostly surface-water driven. A short reach of it is classified as coolwater habitat, but most of the main channel is warmwater habitat. Almost all of the small tributaries are intermittent. (HHSWP, 2006).

The Hayesland-Christie Wetland Complex Provincially Significant Wetland traverses the Donald Farm Complex, Hayesland Swamp and Christie Stream Valley ESA’s in the headwaters of this subwatershed. This complex and the Hayesland Complex ESA are large wetland complexes that moderate streamflow and maintain water quality in this subwatershed.

The main trunk of Middle Spencer Creek is in the Christie Stream Valley ESA. The Christie Stream Valley is located north of Highway 8 and traverses the entire subwatershed. A moderately-developed meandering stream channel and floodplain exist in the upstream area of this valley. (Hamilton Naturalists” Club, 2003).

HCA constructed the Christie Dam and Reservoir in 1971, as a major flood control structure. The Dam is on the main channel of Middle Spencer Creek within the Christie Stream Valley ESA. It’s primary purpose is to reduce flooding within the former Town of Dundas. (MacLaren Plansearch, 1990). Seasonal flooding and drawdown in the reservoir created above the Christie Dam affect the stream flow in the central portion of this stretch of Spencer Creek. Water flowing into the reservoir is classified as cool and is warm when it leaves Christie Dam and Reservoir. (Hamilton Naturalists” Club, 2003).

There are five waterfalls in the lower reaches of Middle Spencer Creek. The most notable is Webster’s Falls. Middle Spencer Creek flows over the escarpment at Webster’s Falls where it descends twenty two metres into Spencer Gorge.

For a more detailed description of the hydrology of Middle Spencer Creek refer to the Halton Hamilton Source Protection Region Preliminary Draft Watershed Characterization Report for the Hamilton Conservation Authority Watershed, 2008 and any subsequent updates thereof.

The 2010 Halton-Hamilton Source Water Protection (HHSWP) Draft Proposed Assessment Report identified Middle Spencer Creek as having a good surface water quality score. However, the Assessment Report identified the Middle Spencer Creek subwatershed as having a moderate monthly surface water threat based on monthly demand on the water supply. At the time of this report, the Draft Proposed Assessment Report is currently being reviewed.

There are three flow and precipitation monitoring stations for the HCA hydrometeorological network in the Middle Spencer Creek subwatershed. There are also two surface water quality sampling stations within this subwatershed. There are also three flow and water quality monitoring station for the Halton Hamilton Source Protection Region is this subwatershed. Data collected at these station are included in the catchment datasheets throughout the remainder of this document and in Appendices D and E.

Groundwater

There is one municipal public supply well the Middle Spencer Creek subwatershed. This well provides services to the community of Greensville. It is the only area serviced by a municipal groundwater well supply in the Spencer Creek Watershed. There are also permitted water takings for pit and quarry dewatering in this subwatershed.

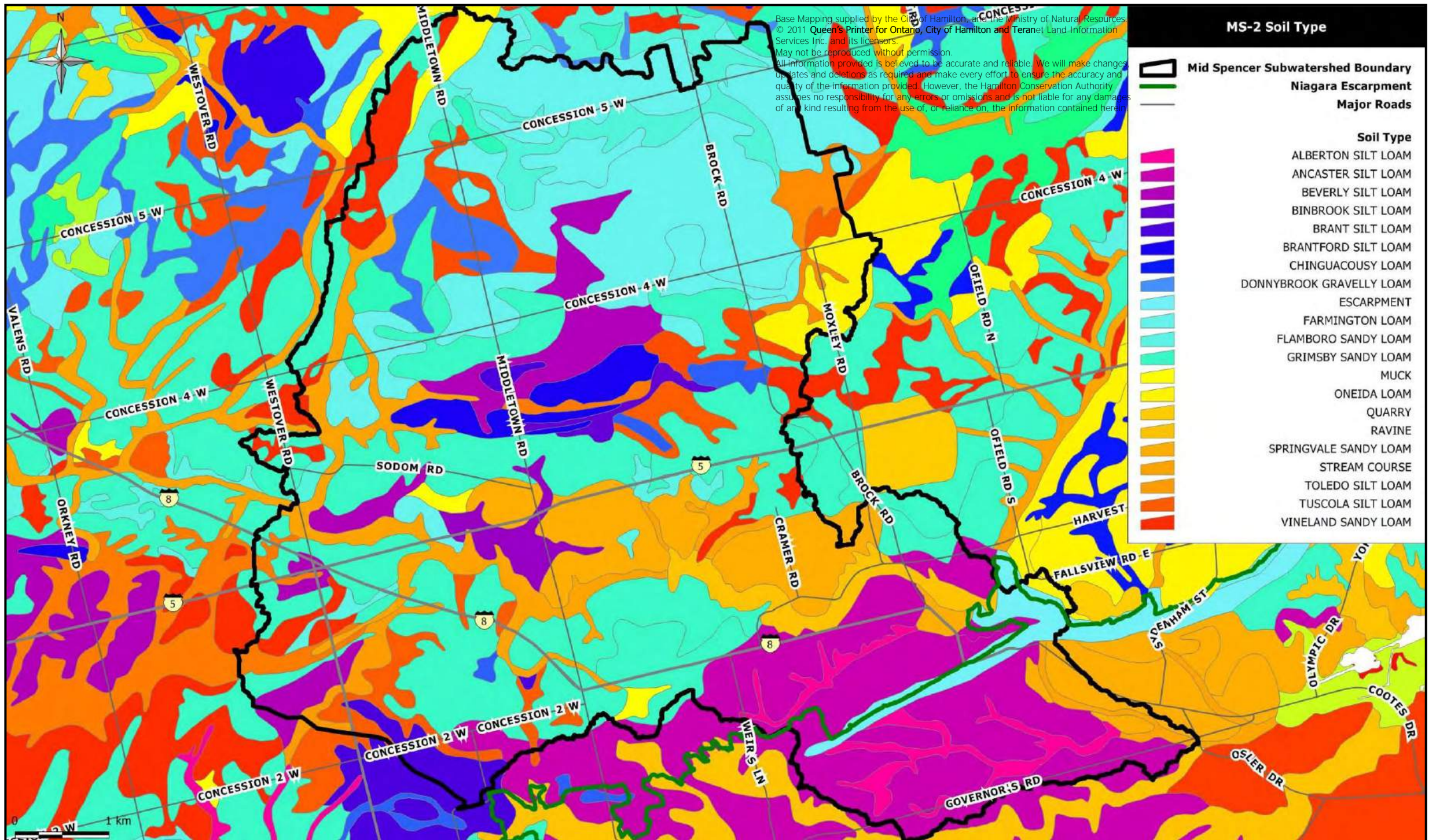
There is one Provincial Groundwater Monitoring Network well in the Middle Spencer Creek subwatershed. Data collected at this station is included in Appendices D and E.

The HHSWP 2010 Draft Proposed Assessment Report identified the area upstream of the escarpment in this subwatershed to be a significant ground water recharge area. The areas upstream of Highway 5 and below the escarpment have also been identified as highly vulnerable aquifers. These conditions can be attributed to the geologic and soils characteristics in this subwatershed.

The 2010 Draft Proposed Assessment Report also assessed the intensity of groundwater capture and the potential for groundwater contamination. This assessment yielded that there is a current stress on groundwater quantity within this subwatershed. The stress was assessed on an annual timeframe and is considered to be at a moderate level. Aggregate dewatering is believed to be contributing to the stress.

Because the municipal water supply for the Greensville community is in this subwatershed, this water quantity stress prompted a Tier 2 assessment according to the guidelines for the Source Protection Planning initiative. The results of the Tier 2 assessment indicated that the water demand stresses continued and therefore a Tier 3 assessment report is required.

For more details of the source protection planning process refer to the Halton Hamilton Source Protection Region Draft Proposed Assessment Report. (HHSWP, 2010).



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).

There are a number of major physiographic regions which characterize the topography and influence the drainage and land use patterns of the Hamilton Watershed. These features include the Niagara Escarpment/Dundas Valley, Glacial Moraine Complexes, Flamborough Plain, Haldimand Clay Plain, Norfolk Sand Plain, and the Iroquois Plain/Lake Ontario Shoreline (Chapman and Putnam, 1984). As discussed previously, these landforms are the result of glacial activity during the Wisconsinan period, on a bedrock surface that had already undergone significant erosion, resulting in the formation of the Niagara Escarpment. Much of the physiographic information discussed below is derived from Chapman and Putnam (1984) and SNC Lavalin, *et al.* (2006).Many of the above-mentioned physiographic regions traverse the Middle Spencer Creek subwatershed.

The northern portion of the subwatershed falls within the Flamborough Plain. It is an area of shallow glacial drift and exposed bedrock (Chapman and Putnam, 1984). There are a number of northeast-southwest oriented drumlins found scattered across the plain and wetland areas are common. The plain slopes to the south from about 365 to 275 masl (meters above sea level). The limited overburden, apart from the drumlins, consists of either bouldery glacial till or sand and gravel.

The middle portion of the subwatershed falls within the Norfolk Sand Plain. The Norfolk Sand Plain is the area to the west of the Dundas Valley, adjacent to the Flamborough Plain. (Chapman and Putnam, 1984). It is believed that the sands and silts of this region were deposited as a delta in glacial lakes Whittlesley and Warren (Chapman and Putnam, 1984).

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. 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. There is also an extensive kame moraine at the head of the valley which is covered with a veneer of glaciolacustrine clay sediments.

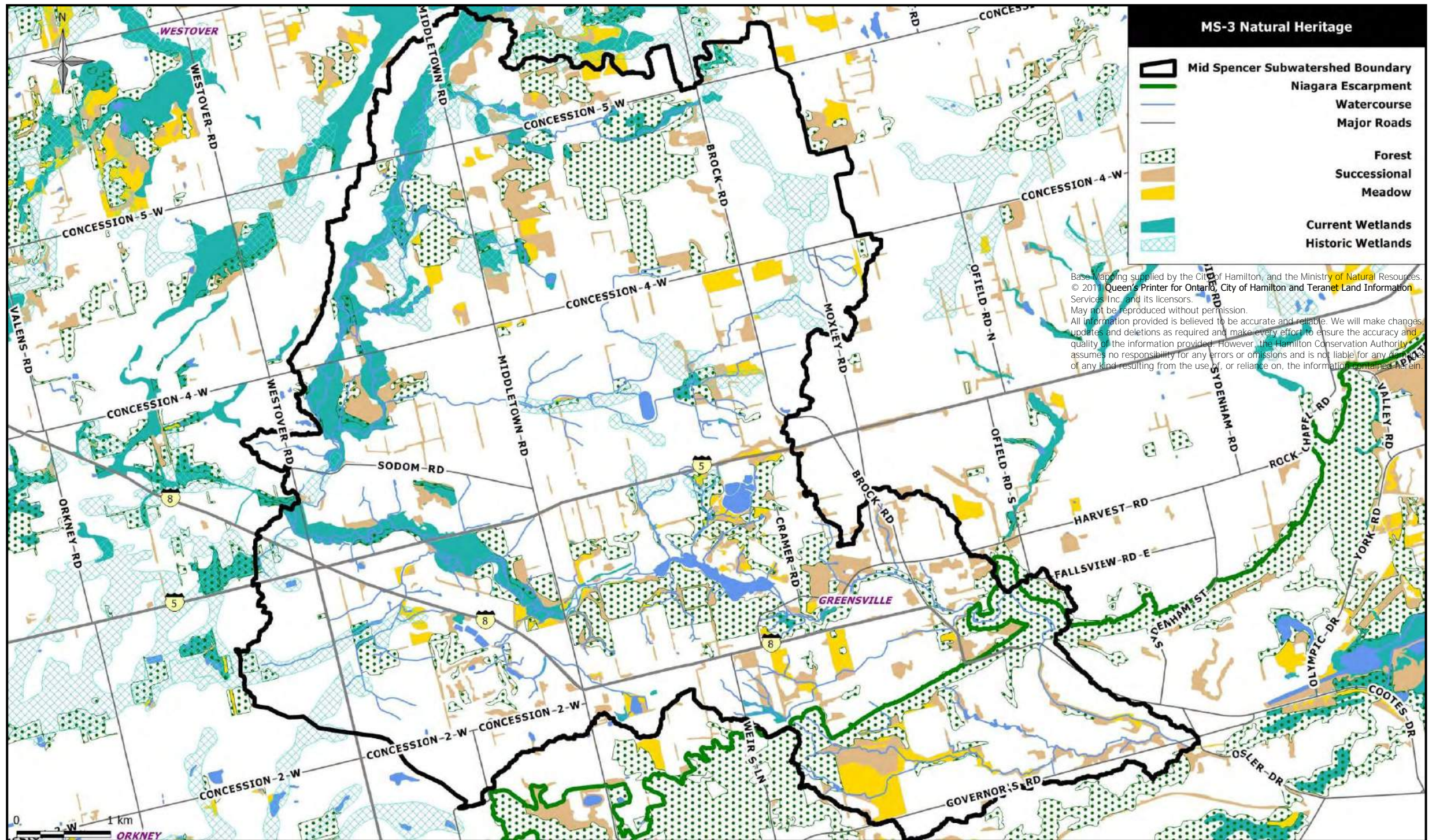
A shallowly-incised bedrock valley exists downstream of Christie Dam and Reservoir. The course of Spencer Creek runs through the valley with high velocity because of the steep slopes near the dam. The reservoir is located at the edge of upland areas. The areas are comprised of thick sand deposits rising to an elevation of approximately 265 masl on the south side and 250 masl on the north side. The south side of the reservoir has rolling topography with moderate to steep slopes. The north side of the area has gentle slopes except in the northeastern portion (Hamilton Naturalists" Club, 2003).

The soil characteristics of the Middle Spencer Creek subwatershed are shown on **Map MS-2**. Nineteen soils complexes have been identified within this subwatershed, as summarized in **Table MS-1**. Soil characteristics vary throughout the subwatershed. The natural drainage of the soil ranges from poorly drained to well drained but is generally well drained to imperfectly drained. The erosion potential ranges from very low to high. In the middle and lower areas of these subwatersheds, soils are loamy and organic. Seasonal flooding and deposition of alluvium affected soil development in the floodplain and reservoir of the Christie Reservoir stream valley. On the south side of the stream valley, except for a small area of Ancaster in the southeast corner, the Grimsby sandy loam – Brant silt loam complex soils occur, which have well-drained characteristics. On the north side of the reservoir, the dominant soil type is Springvale sandy loam. However, small patches of imperfectly to poorly drained Vineland sandy loam, Flamborough sandy loam and Beverly silt loam are also present on this side of the reservoir. This area has small patches of shallow bedrock where Farmington loam and muck soils are present (Hamilton Naturalists" Club, 2003).

Table MS-1: Soil and Erosion Potential in the Middle Spencer Creek Subwatershed

Soil Type	Natural Drainage	Erosion	Topography	Erosion
Al - Alberton Silt Loam	Variable	n/a	1.2	n/a
An - Ancaster Silt Loam	Well drained	2	24.2	High
Bi - Binbrook Silt Loam	Imperfectly drained	3	1.2	Very Low
Bl - Beverly Silt Loam	Imperfectly drained	2	2.1	Moderate
Br - Brantford Silt Loam	Well drained	2	7.5	High
Bt - Brant Silt Loam	Well drained	1	7.5	High
Cl - Chinguaqousy Loam	Imperfectly drained	3	3.5	Low
Dk - Donnybrook Gravelly Loam	Well drained	4	12.5	Moderate
Fl - Farmington Loam	Well drained	1	5.0	Moderate
Fo - Flamboro Sandy Loam	Poorly drained	4	1.1	Very Low
Gi - Grimsby Sandy Loam	Well drained	4	6.7	Moderate
M - Muck	Very poorly drained	n/a	n/a	n/a
Ol - Oneida Loam	Well drained	2	13.6	High
Sp - Springvale Sandy Loam	Well drained	4	9.9	Moderate
Ti - Toledo Silt Loam	Imperfectly drained	2	1.2	Very Low
To - Toledo Silty Clay Loam	Poorly drained	3	1.2	Very Low
Tu - Tuscola Silt Loam	Imperfectly drained	2	3.3	Moderate
Vi - Vineland Sandy Loam	Imperfectly drained	4	2.5	Very Low

* Based on the Region of Hamilton-Wentworth Soil Summary Sheet
** Based on the Ontario Environmental Farm Plan Workbook, Ontario Farm Environmental Coalition
***Based on average topography in the subwatershed



NATURAL HISTORY & SIGNIFICANT SPECIES

This subwatershed reaches into six municipally designated environmentally significant areas (ESA's): Dundas Valley, Spencer Gorge, Christie Stream Valley, Donald Farm Complex, Hayesland Complex and Hayesland Swamp. The Dundas Valley and Spencer Gorge are both Areas of Natural and Scientific Interest for both Earth and Life Science as designated by the Ministry of Natural Resources. Hayesland Complex is also known as the Hayesland Alvar; a unique habitat found on areas of exposed limestone or where there are very thin soils, as a result of the soil characteristics, vegetation is sparse. However, unique species that thrive in these conditions establish in these areas. All of 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 10.5 km² or 21% of the Middle Spencer Creek subwatershed. The Hamilton Conservation Authority owns a significant portion of this natural area as they own 5.6 km² or 11% of the lands within the subwatershed. The current natural land cover statistics for the area are noted within **Table MS-2**. Based on the digital data provided for this analysis, forest cover accounts for 12.6% of this subwatershed, while meadow cover is 2.3% of the land base. The total stream length of Middle Spencer Creek and all of its tributaries is 111.44 km. Map **MS-3** illustrates the natural heritage of the Middle Spencer Creek subwatershed.

Currently, wetlands cover 3.14 km² or 6.4% of the Middle Spencer Creek subwatershed. 29% or 0.95 km² of these wetlands are designated as Provincially Significant by the OMNR. Ontario's wetlands are evaluated through the OMNR Wetland Evaluation System (1993) for their biological, social, and hydrological components and special features. A wetland that is scored high in all four categories will receive a higher class ranking, with Class 1 being the highest.

Historical wetlands mapping showed 3.6km² of wetlands in this subwatershed were lost before 1967 or between 1967 and 1982. Historical information was not recorded for forest or meadow cover. Although, 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.

Table MS- 2: Natural Land Cover Statistics

Forest Cover (km ²)	Wetland Cover (km ²)	Meadow Cover (km ²)	Stream Length (km)
6.21	3.14	1.15	111.44

The Spencer Gorge ESA (147 ha) encompasses a south-facing segment of the Niagara Escarpment overlooking the town of Dundas. This natural area includes a relatively mature and undisturbed array of Escarpment-associated plant communities, developed on slopes of diverse aspect and soil moisture regime within an incised Escarpment valley. Escarpment-associated communities include dolostone cliffs, extensive talus slopes, scree valley slopes, and dry rim forests. Red oak (*Quercus rubra*) and white oak (*Quercus alba*) dominate the mature Escarpment rim community, with common associates like red maple (*Acer rubrum*), sugar maple (*Acer saccharum* ssp. *saccharum*), and black cherry (*Prunus serotina*). Below the rim forest, Spencer Gorge exposes dry to moist dolostone cliffs with occasional seepage zones. Stunted white cedars dominate the exposed cliff faces. A red cedar (*Juniperus virginiana*) cliff community occurs around Dundas Peak (Dwyer, et al., 2003).



The Dundas Valley ESA is located in the western end of the re-entrant valley extending into the former Town of Dundas and the Middle Spencer 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).

NATURAL HISTORY & SIGNIFICANT SPECIES

Numerous fisheries and benthic macroinvertebrates monitoring stations have been sampled in Middle Spencer 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 four ecological monitoring stations in the Middle Spencer Creek subwatershed. The monitoring stations are in the Century Pines, Concession 5, Christie Upper Reservoir and King Street catchments. The Century Pines and Concession 5 stations will be monitored in Year 1 of a three year cycle. The King Street and Christie Upper Reservoir stations will be monitored annually. 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.

In the central concessions of Flamborough, a transition from a cold to a cool or warmwater thermal regime occurs in Spencer Creek, as groundwater discharge is not as pronounced in the Middle Spencer Creek subwatershed as in the upper watersheds (City of Hamilton, 2005).

The fishery in these subwatersheds is quite diverse, including a variety of cold, cool, and warmwater fishes inhabiting an assortment of habitat niches available throughout its reaches. Several temperature sensitive species have been observed including mottled sculpin, rainbow darter (*Etheostoma caeruleum*), fantail darter (*E. flabellare*), finescale dace, pearl dace, northern redbelly dace, and brassy minnow (*Hybognathus hankinsoni*) (ESP, 1997; HCA 1993, 1995, 1998, 2000). Rainbow and fantail darters are inhabitants of cool, clean gravelly streams in Ontario, and are of great value as sensitive indicators of chemical pollution and siltation (Scott and Crossman, 1973). Brassy minnow prefer cool streams, creeks, and dark bog ponds, and are often found in association with pearl, finescale, and northern redbelly dace (Scott and Crossman, 1973).

Brook trout historically inhabited the coldwater reaches of the Middle Spencer Creek subwatershed (Department of Commerce and Development, 1960), but land use changes in recent decades have likely restricted this sensitive species to the upper portions of the Spencer Creek Watershed.

Throughout the Middle Spencer Creek subwatershed, water quality conditions have been shown to substantially fluctuate in response to both natural habitat conditions and land use management. Several impoundments and online ponds have existed along these reaches of Spencer Creek, and surrounding land use has remained largely agricultural throughout. The creek throughout the subwatershed is quite wide with slower velocities, approaching unlimited bankfull widths in some reaches that cross through swamps. Benthic fauna in the upper portion of this subwatershed have suggested impaired water quality, with an abundance of species, like tubificid worms, that imply organic and nutrient enrichment. Flowing through extensive swamps in the lower Flamborough concessions, water quality has historically improved approaching Highway 5, displaying higher invertebrate densities and species richness. Downstream of the Highway 5 bridge, impaired water quality conditions have been suggested by abundances of midges, snails, and crustaceans, and the rarity of sensitive caddisfly and mayfly taxa commonly found in watercourses such as this (Griffiths; 1999, 2001, 2003).

Immediately downstream of Christie Reservoir, the benthic fauna have consistently suggested impaired water quality conditions. Abundances of sludge worm, burrowing mayfly, and isopod taxa are suggestive of silt and organic accumulations that originate from the reservoir. The presence of a few individuals of various cool and cold-water mayfly, beetle, caddisfly, and true fly taxa indicates that some groundwater seeps into this reach although not enough to greatly augment the flow of the stream. Low or highly variable flows resulting from the operations of Christie Dam may also be the cause of impaired water quality conditions. This is suggested by the absence of baetid mayflies and scarcity of hydropsychid caddisflies, heptagenid mayflies and riffle beetles, and the common occurrence of abundant filamentous algae covering the substrate, and subsequent high abundance of midges which inhabit this algal covering (Griffiths; 2002, 2003). Several hundred metres downstream of Christie Dam, immediately upstream of Webster's Falls, water quality conditions improve due to groundwater inputs supplied to the watercourse by the Escarpment. However, the benthic fauna are suggestive of an abundance of organic debris and a lack of shading in this reach (Griffiths, 2001).

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 Middle Spencer Creek subwatershed.

The COSEWIC and COSSARO statuses do not always coincide for each species, therefore some species will be on more than one list.

Not at Risk

- 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
- Northern Leopard Frog
- Caspian Tern
- Southern Flying Squirrel

Special Concern

- Eastern Milksnake
- Monarch
- Broad Beech Fern
- Cerulean Warbler
- Ribbon Snake
- Louisiana Waterthrush
- Snapping Turtle
- Green Dragon
- Golden-winged Warbler
- Hooded Warbler
- Canada Warbler

Threatened

- Chimney Swift
- Golden-winged Warbler
- Hooded Warbler
- Jefferson Salamander
- Bobolink
- Canada Warbler
- Least Bittern

Endangered

- American Chestnut
- Butternut
- Red Mulberry
- Ginseng
- Acadian Flycatcher
- Flowering Dogwood
- Cerulean Warbler
- Jefferson Salamander

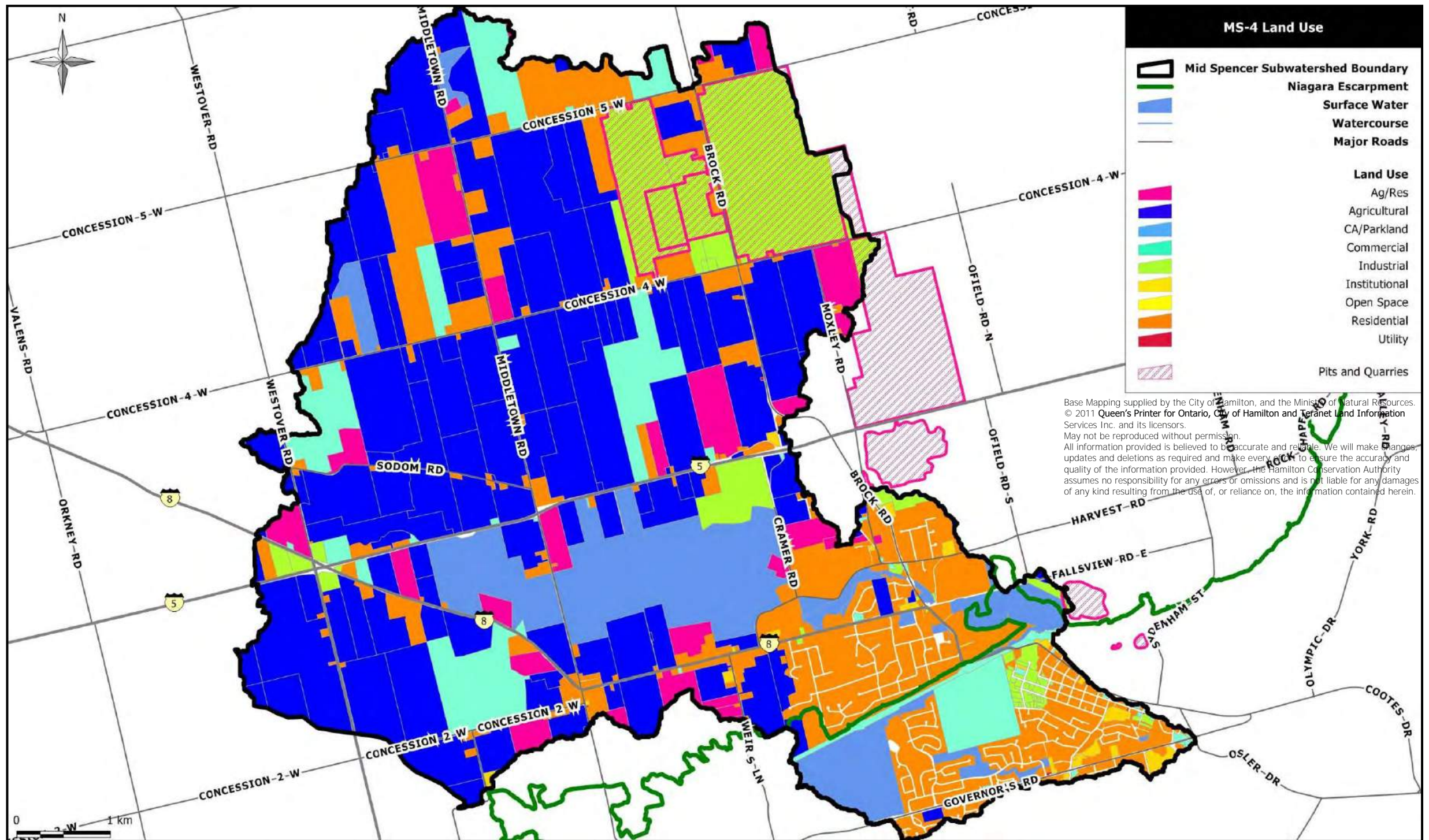
It will be important to create awareness and undertake habitat restoration activities related to preserving and restoring ecological linkages in order to support these at risk species.

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 implemented by Carolinian Canada and local partners agencies.

Species with Recovery Strategies

Species	Recovery Strategy Status
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





MIDDLE SPENCER CREEK SUBWATERSHED CHARACTERIZATION

CULTURAL HISTORY

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).

Greensville derives its name from William Green who bought 129 acres in 1799. In 1840 he subdivided part of his farm into town lots. Bullock’s Corners were named for William Bullock, who came into West Flamborough in 1833. He built the British Hotel at the corners. Peter’s corners was named after John Peters who had general store there in the 1860-1870 era. James Crooks was a Scot who left Edinburgh in 1791 and after working at Fort Niagara with is brother and later on the Canadian side of the river in their own business, came into the local area when he purchased a mill site on the Spencer, together with 400 acres of land. (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).

In the three twisting miles of Spencer Creek’s course from the Beverly boundary to Webster’s Falls, the creek drops nearly one hundred feet, which accounts for the fact that there have been eight dam sites in this short stretch. At first there was abundant water all year round, but as the forests were cut down, spring floods became more frequent and less water was held back for the dry summer months. Even heavy rains caused flash floods that washed out mill dams and flooded Dundas basements, sometimes carving out a new creek bed and on at least two occasions sending a cascade of water flooding down King Street in the town. (Spencer Creek Conservation Authority, 1965).

In the 1860’s, the mills began to add steam power to supplement the low water during the summer months. Thereafter steam power gradually replaced the power of the stream until the last water-operated mill, Clark’s Blanket Factory at Bullock’s Corners, ceased operations forever when it was partially washed away by the flood of February 5th, 1938. Today, no wheels are turned by Spencer Creek’s waters – waters which as we have seen meant so much in the industrial life of the Greensville and Dundas section of the watershed particularly. For an in-depth history of the historic mills on Middle Spencer Creek please refer to the Spencer Creek Story. (Spencer Creek Conservation Authority, 1965).

Historically, few actual settlers came into Beverly Township before 1810 and those who came thereafter were mostly immigrants from the British Isles. Wentworth arose in its present form in 1855. (Spencer Creek Conservation Authority, 1965). Surveying of the townships of Ancaster, Beverly and Flamborough started in 1793 and the two Flamboroughs were created 5 years later. Although Beverly Township, with its nearly 70,000 acres, is more than double the size of any other township in the watershed, settlement was slower than in the other parts. Due to its lack of early roads and its remoteness from any water highway, its land was not as accessible as in the other townships. Furthermore, much of its lands as undesirable because it was swampy or it had rock lying close to the surface. (Spencer Creek Conservation Authority, 1965). This is still somewhat true today.

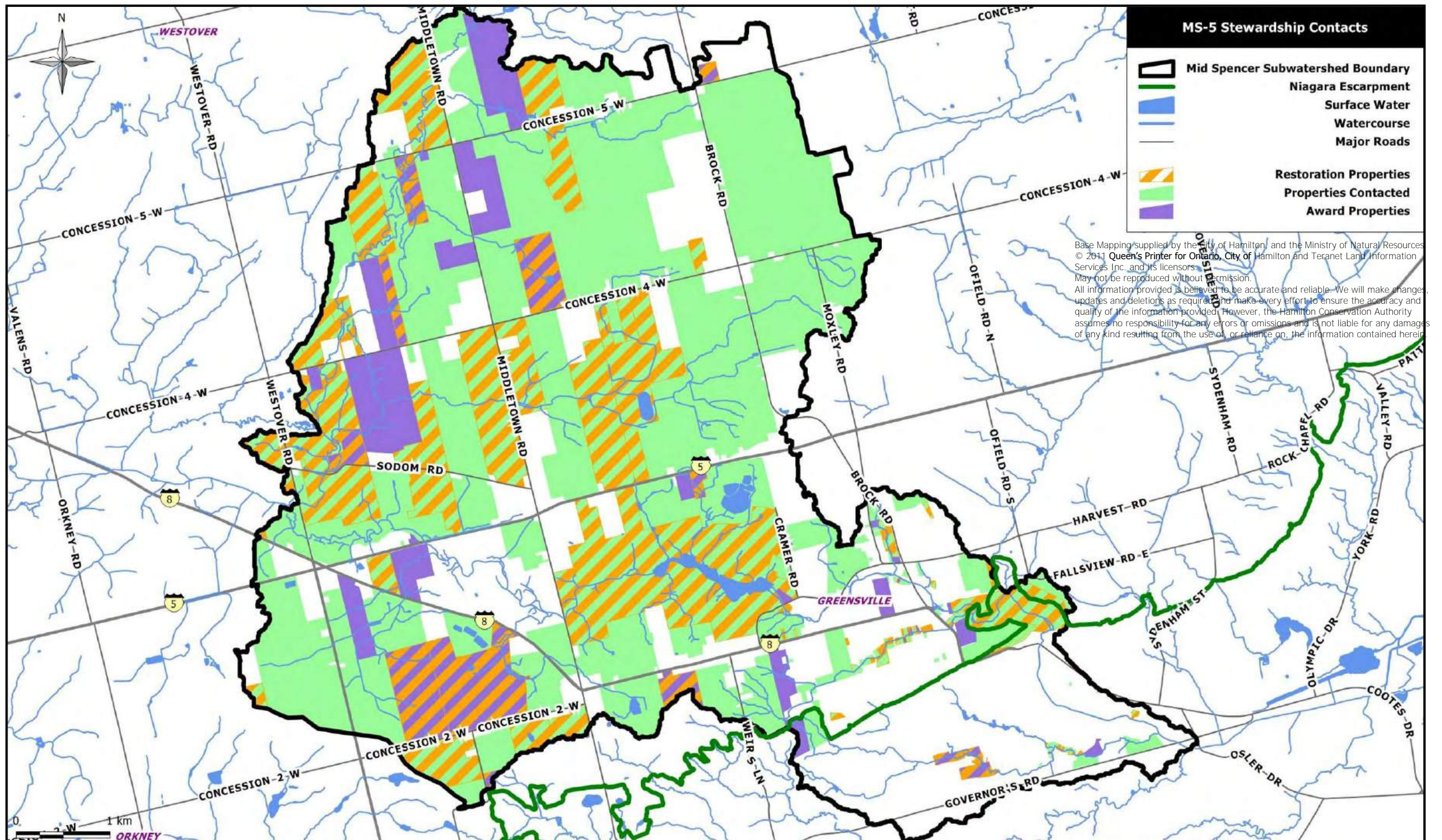
The approximate population of the Middle Spencer Creek subwatershed is 9378 persons with a population density of approximately 190 people per square kilometer.

Current land use within the Middle Spencer Creek subwatershed is predominantly agricultural with residential being the secondary land use (**Table MS-3**). Agricultural land use is prominent in the rural areas of the subwatershed whereas residential land use is largely limited to the portions of the subwatershed that fall within the boundaries of the former Town of Dundas and the historic settlement areas of Greensville and Crook’s Hollow.

There are significant commercial and industrial land uses within this subwatershed, centred upon the aggregate industry, golf courses and Flamboro Downs Raceway. Commercial and industrial land use is generally concentrated along the major transportation corridors, specifically along Highway 5, Highway 8 and Brock Road. There is also significant open space in this subwatershed which can be largely attributed to the Christie Lake Conservation Area and other Conservation Authority owned lands. (**Map MS-4**)

Table MS-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 (%)
9.36	23.54	3.91	4.75	0.3	5.6	8.96	0.004	3.5	5.1



MIDDLE SPENCER CREEK SUBWATERSHED CHARACTERIZATION

STEWARDSHIP HISTORY

There are numerous significant properties within this subwatershed that incorporate large tracts of natural features. There are 732 properties that contain forest, wetland, meadow or riparian / aquatic habitat (**Table MS-4**). Of these landowners, 269 (or 37%) have been contacted by the Hamilton-Halton Watershed Stewardship Program (HHWMS), and 38 (or 14%) of those have become Watershed Stewards (**Table MS-4**). Therefore, there is considerable potential to reach the remaining 63% of landowners with natural features to create awareness regarding environmental stewardship of natural areas. 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., especially in the settlement areas.

Currently, Watershed Stewards are predominantly located in the northwestern portions of the Concession 4 and Concession 5 catchments as well as in Century Pines, Peter’s Corners and Christie Upper Reservoir catchments. Also, the Hamilton Conservation Authority is a major land holder in the subwatershed, specifically in the Webster’s Falls, Christie Upper and Lower Reservoir and Christie/Crooks Hollow catchments. Therefore, landowner contact should be focused in the Northeast areas of the Concession 4 and 5 catchments as well as in the southern catchments, including: Weir’s Lane/Highway 8, Governor’s Road Conservation Area, Governor’s Lane Estates and King Street, especially where the properties include natural features.

Table MS-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
9378	190	732	269	38	360	43

Table MS-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	6.36	38.84	16.40 mg/L (June 2010)	3.5	Coolwater to warmwater	12.58	1.28	100m – 14% 200m – 1.8%

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 MS-5** displays the status of the Middle Spencer Creek subwatershed when compared to these Federal guidelines.

This subwatershed does not meet the criteria outlined in Environment Canada’s How Much Habitat is Enough Guidelines for forest cover. Forest cover would need to be increased by 8.6km² to meet this guideline, with an emphasis being placed on forest patch shape and size. These efforts will work toward meeting targets related to percentages of core forest cover to support interior forest breeding birds and other wildlife populations.

This subwatershed also does not meet the Environment Canada guideline for percentage of stream naturally vegetated. An additional 40.3km of watercourse would need to be buffered on either side by 30 metres to meet the standard. Efforts should be made to establish riparian buffers along the watercourses to meet this habitat guideline and prevent sedimentation and runoff contamination within the system.

This subwatershed slightly exceeds the How Much Habitat is Enough Guidelines for wetland cover. Efforts should be made to work with landowners and public agencies to protect these wetlands, both provincially and locally significant, to maintain this status.

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. However, in the residential areas of this subwatershed.

STRESSES & STEWARDSHIP ACTIONS

There are thirty eight types of *stresses* identified as negatively impacting the Middle Spencer 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 MS- 7**. The most prevalent stresses identified in the Middle Spencer Creek subwatershed are Insufficient Riparian Buffers, Water Takings, Stormsewer Outfalls, On-line Ponds and Abandoned Groundwater Wells. **Table MS-8** outlines *Stewardship Actions* that have been developed to mitigate the impacts of these and the remaining stresses listed in **Table MS-7**.

Specific locations where these stresses are occurring are mapped and inventoried in the subsequent catchment datasheets. Within the Middle Spencer Creek subwatershed, 646 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.

It should be noted that the high number of insufficient riparian buffer stresses identified in this subwatershed, compared with previous Stewardship Action Plans developed for other subwatersheds within Spencer Creek, can be attributed to improved riparian buffer mapping which now allows for all segments of creek where insufficient riparian buffers exist to be identified.

Although, buffers categorized as ranging from no buffer to 29.99 meter widths do not meet the How Much Habitat is Enough guidelines as outlined by Environment Canada, they were not included as insufficient in this report as the standard for minimum buffer width (3 meters) as defined by the Environmental Farm Plan was used as the criterion for the GIS analysis.

In summary, the establishment of riparian buffers throughout this subwatershed is of primary concern. The absence or insufficient width of riparian buffers directly relate to the health of the local aquatic ecosystem as it increases the potential for runoff contamination and bank erosion in the creek system. The Hamilton-Halton Watershed Stewardship Program, Ontario Soil and Crop Improvement Association and Hamilton-Wentworth Stewardship Council deliver technical and financial assistance programs for the establishment of riparian buffers along watercourses.

Also, there are forty-four active permits to take water in the Middle Spencer Creek subwatershed. Efforts to coordinate and reduce these water takings, especially surface water takings, should be taken during low water conditions. The Conservation Authority staff should continue to review permit applications, both new and renewal, focusing on assessing the cumulative impacts of multiple takings on one system. Conservation Authority staff should also recommend to the Ministry of the Environment (MOE) that ecological impacts of water takings should also be considered by the MOE when reviewing permit to take water applications.

There are forty stormsewer outfalls in this subwatershed. Therefore, stormwater management in the urbanized catchments of this subwatershed is a priority. Stormwater management relates directly to the health of the local fishery as it increases the potential for erosion, sedimentation 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. The City of Hamilton’s Greensville Community Subwatershed Study, once completed, will also be used to guide the sustainable servicing of this residential area.

There are numerous on-line ponds 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. Stewardship actions related to these stresses should be implemented to mitigate the thermographic effects of on-line ponds and to eliminate barriers to fish passage. Removal or retrofit of pond retention structures or the installation of by-pass channels and fish ladders are recommended mitigation concepts.

Abandoned groundwater wells are also identified in this subwatershed. 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 for priority remediation; one site of active erosion behind the properties along Newton Avenue and the potential for the release of sediment when the Crooks Hollow dam is removed; both sites are on public property.

It is believed that the former is caused by significant flows within the creek system. An assessment of stormwater impacts on this site and a remediation plan should be developed by the Spencer Creek Stewardship Action Plans Implementation Team. The potential for sedimentation associated with the removal of the Crooks Hollow dam has been addressed through the Crooks Hollow Site Remediation Project. The site remediation project will be implemented when the dam is removed in 2011.

CATCHMENT SUMMARIES

This section of the plan identifies the occurrences of stresses within each catchment of Middle Spencer 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, 646 stresses were identified for the Middle Spencer Creek Subwatershed and inventory counts are presented in **Table MS-7**.

TABLE MS-7: Stresses Inventory by Catchment

STRESS	MAP CODE	NO. IN SUBWATERSHED	NO. IN EACH CATCHMENT												
			Century Pines	Christie Low Res	Christie Crooks	Christie Up Res	Conc. 4	Conc. 5	DV G&C	Govnr's Estates	Govnr's Rd CA	King Street	Peter's Corners	Webster's Falls	Weir's Hwy 8
Abandoned Groundwater Wells	GW	28		1	5	3	2	2	1				1	4	9
Buried Stream	BS														
Channelization	CH	1										1			
Combined Sewer Overflow	CSO														
Dam (Weir)	DM	7	3	2	2										
Debris Jam	DJ														
Detachment from Nature	DT														
Development	DV														
Encroachment	EN														
Erosion	ER														
Faulty Septic System	SS														
Fluctuating Water Level	WL	2		1				1							
Habitat Fragmentation	HF	13					6	7							
Illegal Fill Placement	FP														
Inadequate Stormwater Management	SW	1													1
Increased Impervious Surface	IS														
Insufficient Riparian Buffer	RB	448	22	52	37	66	59	84	19	4	19	11	26	7	42
Invasive/Introduced Species	IV														
Landfill Leachate	LL														
Land Maintenance Practices	LM	6		2		2	1		1						
Litter	LI														
Migration Barrier	MB	5							1			4			
Nutrient Loading	NL	2				1	1								
Online Pond	OP	38		7	4	6	10	7	1		1		2		
Outdoor Recreation Related Impacts	OR	6			3									2	1
Perched Culvert	CP	1						1							
Pesticide Use	PS														
Plowed Watercourse	PW														
Runoff Contamination via Transportation Corridors	TC														
Sediment Loading	SL	2			1						1				
Site Clearing Prior to Development	SC														
Stormsewer Outfall	SO	40			1				9	8	3	16		3	
Transportation Corridor Expansion	TE	1											1		
Utility Pipeline	UP	1				1									
Water Taking	WT	44	1	8	2	12	6	6	1				8		
Watercourse Enclosure	WE														
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 MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	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 legislation related to decommissioning and/or upgrading groundwater wells and the City of Hamilton Well Decommissioning Program.			Agriculture and Agri-Food Canada - Water Wells, Best Management Practices Pg 52 Ontario Water Resources Act Regulation 903: Water Wells OMAFRA Best Management Practices Series – Water Wells	HHWSP	CITY / HCA / GV
	Conduct a direct mailing to all property owners identified in the HCA OGS Groundwater Study database as having abandoned groundwater wells on-site, that are also within Source Water Protection Areas, to promote funding available for decommissioning and upgrading groundwater wells through the Ontario Drinking Water Stewardship Program.				HHWSP / CITY Op. & Main.	HCA / HWSC
	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.				HHWSP	CITY / HCA / GV
			Work with landowners to decommission abandoned groundwater wells.		HHWSP	CITY / HCA / GV
Buried Streams Map Code: BS Definition: The structural alteration of a stream channel, involves piping the creek system underground, eliminating aquatic habitat.		Undertake a feasibility and prioritization study for “daylighting” buried streams in the study area.		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	CITY Cap. Plan.	HCA / DFO / MNR / HHWSP / RAP
	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.				HHWSP / HWSC	HCA / RAP / WPN / DFO
			Work with landowners to undertake daylighting projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study.	City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HHWSP	HCA / DFO / CITY / HWSC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
				Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines		
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.		Undertake a feasibility and prioritization study for restoring channelized creeks to those with a natural design.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107	CITY Cap. Plan.	HCA / DFO / MNR / HHWSP / RAP
	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.			HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55 Fisheries Act, Section 37	HHWSP / HWSC	HCA / RAP / WPN / CITY / RBG / FSRT
			Work with landowners downstream of channelized sites to rehabilitate the riparian zone to reduce flow velocities, erosion and sedimentation.	City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HHWSP	CITY / DFO / HCA / RBG / HWSC /
			Work with landowners to undertake natural channel design projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study.		HHWSP	HCA / DFO / CITY / HWSC
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)	Conduct a direct mailing to property owners with dams identified in the MNR Dam Inventory Project to offer financial and technical assistance for the retrofitting or removal of dams.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107	HHWSP	HCA / HWSC / DFO / MNR
		Undertake a feasibility and prioritization study for the removal of dams inventoried.		HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA Eng./ MNR	HWSC / HHWSP
	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.			Fisheries Act, Section 37 Hamilton Conservation Authority Dam Inventory Project In-stream Barrier Assessment	HHWSP / HWSC	HCA / MNR / DFO

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
			Work with landowners to remove/retrofit dams as prioritized in the Barrier Mitigation Plan associated with the Hamilton Harbour Fisheries Management Plan.	for the Hamilton Harbour AOC. Hamilton Harbour Fisheries Management Plan	HHWSP	HCA / HWSC / MNR / DFO / CITY
Debris Jams Map Code: DJ Definition: The accumulation of debris within a watercourse that prevents the flow of water.		Complete an assessment of creek/in-stream flow barriers that are prone to debris/ice jams and cause barriers to fish migration, including the prioritization of barriers to be removed.		In-stream Barrier Assessment for the Hamilton Harbour AOC. Hamilton Harbour Fisheries Management Plan	HCA Eng.	MNR / HHWSP
	Incorporate debris jam removal into the City of Hamilton Extreme Park Makeover Program.				CITY Op. & Main.	HHWSP /HCA/ HWSC / MNR / DFO / BARC
	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.				HHWSP / HWSC	HCA / MNR
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the importance of debris jam management in flood prevention.				HCA Eng.	MNR / CITY
			Work with landowners to remove debris jams using proper sediment and erosion control practices.		HHWSP	CITY / DFO / HCA / HWSC
Detachment from Nature Map Code: DT Definition: The condition of people disassociating their existence from nature.		Assess barriers to participation in environmental programs to improve program design.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations PAA-2, PAA-3, EPI -1, EPI-2, EPI-5 Pages 129-138 Royal Botanical Gardens Back to Nature: Towards a Ontario Strategy for Bringing Children and Nature Together - Event	HHWSP	HWSC /CITY / GV
		Assess landowner willingness to participate in and/or support water quality improvement and habitat restoration projects.			HHWSP	CITY / HCA / HWSC
	Continue to implement the Watershed Steward Award Program.				HHWSP	BARC / HCA

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
		Encourage municipalities and trail managers to coordinate trail plans that improve access between urban centres and provide links to parks and rural areas		and Workshop Report Evergreen Schoolground Greening Resources: Getting Started	HCA Lands / CITY Cap. Plan. / RBG	HHWSP / HWSC
	Engage citizen groups to conduct local subwatershed monitoring & reporting projects, including: water quality, base flow, litter hot spots, Ecological Monitoring Assessment Network, Frog Watch, Ice Watch, etc.				HHWSP / HCA Ecol. / CITY Nat. Her. / BARC	GV / HWSC / RBG
	Engage high school students in volunteer opportunities related to environmental programming in order to meet community volunteer hours required for secondary school completion.				HCA / HWSC / BARC / RBG / GV	CITY
	Erect creek crossing & ecological corridor signage along roadways.				CITY Nat. Her.	BARC / GV / HCA / HWSC / WPN
	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, HNC Junior Naturalists, HCA Junior Conservationists, etc.				BARC / GV / HCA Lands / CITY Nat. Her. / RBG	
	Support the formation and activities of "Friends of" groups aimed at protecting and rehabilitating natural features.				HHWSP / HWSC / HCA Lands / CITY Nat. Her.	BARC / DFO / BTC
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote watersheds, watershed characteristics and the ecological significance of natural features.				HHWSP / HWSC	BARC / CITY / GV / HCA / WPN / DU
			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 Ecol. / CITY Op. & Main. / BARC	HWSC / RBG / BTC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
			Work with schools and School Boards to implement the School Grounds Naturally Program; undertaking school yard naturalization projects.		HHWSP	HCA / CITY / HWSC
Development Map Code: DV Definition: The process of developing populated settlements: including housing and supporting infrastructure.		Continue to incorporate downstream assessments of creek conditions, with recommendations for improvement, as part of the overall subwatershed studies conducted as part of new Greenfield development planning.		Credit Valley Conservation and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Manual	CITY Cap. Plan.	HCA
	Host annual training sessions for City staff & developers to create awareness regarding the incorporation of development related BMPs into planning applications (i.e. pervious pavement, low maintenance lawns, green rooftops, storm water management, road-salt alternatives, snow-piling, erosion & sediment control measures, compliance & enforcement, etc.).				HCA Plan.	BARC / CITY / DFO / GV / MTO
		Implement the fish habitat buffer requirements for warm and coldwater streams as outlined in the HCA Planning and Regulations Policy and Guidelines document (30m setback for coldwater systems and 15m setback for warmwater systems).			HCA Ecol.	CITY
		implement stewardship and management recommendations resulting from the HCA development permit application review process.			HCA Plan.	CITY / HHWSP / HWSC
		Lobby the provincial government to amend the building code to include and favour Low Impact Development technologies; e.g. green roofs, multilevel parking, interlocking pavement, etc.			CITY Op. & Main. / HCA Eng.	HHHBA / GV

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
		Lobby the provincial government to support property tax-based loans for local development charges to assist in funding development and retrofits using low impact development technologies.			CITY Cap. Plan.	HHHBA / HCA Plan.
		Revise conflicting municipal by-laws regarding development practices and guidelines to facilitate increased use of Low Impact Development technologies.			CITY Cap. Plan. / HCA Plan.	GV / HHHBA / DFO
		Work with developers to initiate a Water Management Task Force to assist in implementing stewardship actions and recommendations from the Stormwater Master Plan.			HCA Eng.	CITY / RAP / HHHBA
Encroachment Map Code: EN Definition: The act of undertaking practices on another person's property, i.e. erecting structures, planting gardens, disposal of waste.	Conduct a direct mailing of an encroachment education brochure to landowners adjacent to Conservation Authority, RBG and City natural areas.			HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55, 60 City of Hamilton Draft Private Tree and Woodland Conservation By-law City of Hamilton By-law No. 03-117 Illegal Dumping	HCA Lands / RBG / HHWSP / CITY Op. & Main.	HWSC
	Engage citizen groups to monitor & report areas affected by encroachment that are in need of restoration.				HCA Plan. / CITY Op. & Main. / RBG	HHWSP / BARC / GV / HWSC / BTC
	Install property demarcation posts (with agency logos) at regular intervals along property boundaries to prevent encroachment into natural areas.				HCA Lands / RBG / CITY Op. & Main.	HHWSP
	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.				CITY Op. & Main. / HCA Lands / HHWSP / RBG	BARC / GV / HWSC / BTC
			Work with citizen groups to remove encroaching material on public and private lands, including "Friends of" work days, Adopt a Creek, Fishing Clubs, Stewardship Rangers, etc.		CITY Op. & Main. / HHWSP / RBG / HCA Lands	HHWSP / HCA / CITY / HWSC / BARC / GV / RBG / HNC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
	Work with local nurseries & landscaping co.'s to educate / encourage landowners to use native plants.				HHWSP	CITY / HCA / HWSC / RBG / GV
Erosion Map Code: ER Definition: The process of soil being scoured or washed away by flowing water.		Complete field study of stream morphology, determining erosion hotspots & associated causes		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-2, ULM-3, FW-4 Pages 69, 70, 107 HCA Planning and Regulation Policies and Guidelines Pages 68-69 Fisheries Act, Section 35 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142, 159-160 Erosion and Sediment Control Guidelines for Urban Construction OMAFRA Best Management Practices Series – No-Till Making It Work	HCA Eng.	CITY Cap. Plan.
	Conduct a direct mailing to landowners where erosion has been identified through the City of Hamilton GRIDS Plan.				HHWSP	HCA / CITY / OSCIA / HWSC
	Create demonstration sites on public lands that highlight streambank stabilization and natural channel design projects.				HHWSP	CITY / HCA / DFO / HWSC / RBG / OSCIA
		Expand the City of Hamilton Erosion Hot Spots identification project into rural areas			CITY Cap. Plan.	HCA
	Host training sessions for City staff and developers to create awareness regarding BMPs & importance of properly maintained erosion / sediment control measures & enforcement.				HCA Eng.	CITY / DFO / HWSC
		Select erosion sites as identified in the City of Hamilton GRIDS Plan for the upcoming HCA Erosion and Sediment Control Pilot Project.			HCA Plan.	HHWSP / HWSC / CITY / DFO
	Utilize enforcement scheme to enforce appropriate erosion control measures on development sites, including: seeding, avoiding steep slopes, etc.				HCA Plan.	DFO / MNR / CITY
	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.				HHWSP / HWSC	CITY / DFO / HCA / HHHBA / OSCIA
			Work with City staff to install permeable conveyance systems (infiltration trenches) along roadsides as an alternative to the conventional ditch system.		CITY Op. & Main.	HCA / MTO / DFO

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
			Work with landowners to undertake bank stabilization and erosion rehabilitation projects using bioengineering design principles.		HHWSP	HWSC / HCA / BARC / DFO / OSCIA / FSRT
			Work with landowners to undertake erosion rehabilitation projects as identified in the City of Hamilton GRIDS Plan.		CITY Cap. Plan.	HHWSP / HWSC / HCA / DFO
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.		Analyze existing water quality data for high levels of bacteria, chlorides, phosphorous, nitrates and TKN and cross reference the results against land use data to prioritize areas for education outreach and restoration.		Ontario New Home Warranty Program – A New Homeowner’s Guide to Septic Systems City of Hamilton’s Greensville Community Subwatershed Study	CITY Bldg. Serv. / HCA Eng.	RAP
		Conduct an inventory to determine how many households in the Spencer Creek watershed are serviced by on-site treatment systems.			CITY Bldg. Serv.	RAP
	Create demonstration sites on public lands that highlight properly functioning septic systems.				CITY Bldg. Serv. / HCA Lands / CITY Op. & Main.	HHWSP / HWSC
		Develop a tax reduction incentive or grant program for upgrading faulty septic systems			City Cap. Plan.	MOE / HHWSP
		Undertake a risk analysis of the potential for old and/or degraded sewer lines to contaminate groundwater.			CITY Bldg. Serv.	MOE / RAP
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote the proper maintenance of existing septic systems.				HHWSP / HWSC	HCA / BARC / CITY
			Work with landowners to properly maintain their septic systems or upgrade or decommission faulty or unused septic systems.		HHWSP	CITY / HCA / HWSC / GV

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
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.				HCA Eng.	HHWSP / CITY / MNR
		Work to determine the cause of water level fluctuations and develop recommendations for altering practices to reduce or eliminate fluctuations.			HCA Eng.	HHWSP / CITY / MNR / DFO
			Work to implement alternative practices as per recommendations resulting from the inquiry into the cause of water level fluctuations in the system.		HCA Eng.	HHWSP / CITY / MNR / DFO
Habitat Fragmentation Map Code: HF Definition: Disruption of large continuous tracts of habitat.		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 Remedial Action Plan Stage 2 Update: Recommendation FW-12 Page 123 HCA Planning and Regulation Policies and Guidelines Pages 53-59	CITY Nat. Her. / HCA Ecol.	MNR / HHWSP / HWSC / RAP / RBG
	Create demonstration sites on public lands that highlight various types of terrestrial and aquatic habitat restoration projects.				HHWSP	HCA / CITY / HWSC / RBG / DU / HNC / DFO
		Develop How Much Habitat is Enough targets for each subwatershed.		City of Hamilton Draft Private Tree and Woodland Conservation By-law	HCA Ecol.	CITY/ HHWSP / DU / CCC / HWSC / RBG / MNR / DFO
	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.			Cootes to Escarpment Park System – A Conservation and Land Management Strategy	HHWSP	HHWSP / HCA / HWSC / CITY / HNC
	Encourage urban reforestation practices in private properties and reduction of lawn areas.			Nature Counts – City of Hamilton Natural Areas inventory	CITY	HHWSP / HCA / HWSC / HNC
		Establish a Woodlot Owners Association for this area as recommended by Re-Leaf Hamilton		City of Hamilton Natural Heritage Strategy City of Hamilton Natural Areas Acquisition Fund Strategy	HWSC	HHWSP / HCA / HWSC / RBG / HNC / MNR

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	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 master planning.		Dundas Valley 50 Year Vision Hamilton Harbour Fisheries Management Plan	HCA Lands / CITY Op. & Main. / RBG	HHWSP / HWSC / MNR / HNC
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy ecosystems and the importance of habitat connectivity.			OMAFRA Best Management Practices Series – Farm Forestry and Habitat Management OMAFRA Best Management Practices Series – Fish and Wildlife Habitat Management	HHWSP / HWSC	HCA / RBG / CITY / DU / MNR / HNC / CC
		Work to secure Core and Linkage Areas identified in the Natural Heritage System using the Natural Heritage Acquisition Fund.		Aggregate Resources Act	CITY Nat. Her.	HCA / RBG / HHWSP / HNC / HWSC
			Work with landowners to undertake habitat creation and enhancement projects which enhance core habitat by infilling areas within or linking existing forested areas		HHWSP	OSCIA / DU / HWSC / HCA / DFO
			Work with utility companies to implement integrated vegetation management practices along utility corridors.		HCA Plan. / CITY Nat. Her.	MNR / HHWSP / HWSC / RBG / HNC
			Work with the aggregate industry to restore decommissioned pits and quarries into natural habitat through the Management of Abandoned Aggregate Properties Program.		HCA Ecol.	HCA / CITY / MNR
		Work with the aggregate industry when planning new/expanded pit and quarry operations to minimize impacts on the adjacent natural features.			HCA Ecol.	HCA / CITY / MNR
	Illegal Fill Placement Map Code: FP	Host a training session for HCA and City staff on how to identify illegal fill and how to report incidences.		HCA Planning and Regulation Policies and Guidelines	HCA Plan.	CITY / DFO

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
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.			Pages 61-62 City of Hamilton By-law No. 03-117 Illegal Dumping	HCA Plan.	HHWSP / HWSC / CITY
			Work with landowners to rehabilitate fill sites where identified		HHWSP / HCA Plan.	CITY / DFO
Inadequate Stormwater Management Map Code: SWM Definition: Inadequately managing stormwater to control water quality and flooding; often associated with the drainage of developed lands.		Implement recommendations from the City of Hamilton Stormwater Master Plan.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -6, ULM-9, ULM-11 Pages, 72, 75, 77 HCA Planning and Regulation Policies and Guidelines Pages 74-77 Fisheries Act, Section 34 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 38-44, 93-97, 122-125, 158-162	CITY Cap. Plan.	HCA / RAP / BARC / GV
		Offer financial incentives to replace driveways and decks with permeable pavement, interlocking brick, etc.			CITY Cap. Plan.	
	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 Rain barrel Pilot Project, High Household Water Consumption Program, and EnerGuide for Low Income Households Program.				CITY Cap. Plan. / GV	HHWSP / HCA / DFO / BARC / RAP / HHHBA
	Promote the use of constructed wetland technology and Low Impact Development in the design of stormwater management facilities.				CITY / HCA Eng.	
			Retrofit existing dry stormwater management ponds to wet ponds where beneficial to water quality, aquatic habitat and erosion control.		CITY Cap. Plan.	RAP / HCA
			Retrofit outlet structures to decrease the velocity of stormwater as it flows into the creek system.		CITY Op. & Main.	HCA / RAP / HHWSP / HWSC
		Undertake a study to determine the percentage of landowners with connected downspouts.			CITY Cap. Plan.	GV / RAP / BARC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
	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.				CITY Cap. Plan. / GV	HHWSP / HCA / DFO / BARC / RAP / HHHBA
		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.			HCA Plan.	HHWSP / DFO / BARC / RAP / HHHBA
			Work with landowners to disconnect downspouts and install rain barrels.		CITY Cap. Plan.	HHWSP / BARC / GV
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 that highlight development related BMP"s and Low Impact Development 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 Plan.	CITY / HHHBA / GV / HHWSP / HWSC
			Enhance groundwater recharge by ensuring that enough land, post construction remains pervious, so as to maintain water balance, as a condition for development application approval.	HCA Planning and Regulation Policies and Guidelines Pages 74-77 Fisheries Act, Section 34	HCA Eng.	CITY / GV / HHHBA
	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	HCA Plan. / CITY Op. & Main.	HHHBA
		Incorporate a proportionally-based impervious surfacing fee for large commercial/industrial lands to offset the cost of stormwater infrastructure and compensate rehabilitation efforts associated with stormwater infrastructure.			CITY Cap. Plan.	HCA / RAP

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
		Measure impervious surfacing of commercial and industrial lands.			CITY Cap. Plan.	HCA / RAP
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote the implementation of development related BMP's and Low Impact Development technologies when undertaking home renovations.				GV	HCA / CITY / HHHBA / HHWSP
Insufficient Riparian Buffer Map Code: RB Definition: Disruption of large continuous tracts of habitat along watercourses.	Conduct a direct mailing to property owners identified as having insufficient riparian buffers, promoting funding and technical assistance available for establishing riparian buffers			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-2 Page 69	HHWSP / HWSC	HCA / CITY / OSCIA
	Create demonstration sites in high traffic locations that highlight riparian buffers. i.e. golf courses, municipal parks, etc.			HCA Planning and Regulation Policies and Guidelines Pages 40, 55, 60	HHWSP	HCA / HWSC / CITY
	Host workshops promoting the environmental and economic benefits of riparian buffers. i.e., preventing soil loss, preventing drifting snow, habitat creation, etc.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 145-150,162-163	HHWSP	HCA / HWSC / CITY / OSCIA
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.			City of Hamilton Natural Heritage Strategy	HHWSP	HCA / HWSC / CITY / OSCIA
	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.			Dundas Valley 50 Year Vision	HHWSP	HCA / HWSC / CITY / OSCIA
			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.	Cootes to Escarpment Park System – A Conservation and Land Management Strategy	HHWSP	HCA / HWSC / CITY / OSCIA
Invasive/Introduced Species Map Code: IV Definition: The		Develop an Invasive Species Management Program which includes monitoring sites and management for specific species.		HCA Planning and Regulation Policies and Guidelines Pages 53-56, 70-71	HCA Ecol.	HHWSP / MNR / HWSC / CITY / HNC / RBG / CCC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
establishment/proliferation of exotic species that have no natural control measures which compete with native species for resources and degrade the ecosystem.	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	HCA Ecol.	HHWSP / HWSC / CITY / HNC
		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.		Invasive Alien Plant Species Found in the Carolinian Zone – Inventory and Management Options for rare Charitable Research Reserve	HCA Ecol.	HHWSP / HWSC / CITY / RBG / BARC
	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.			Mistaken Identity – Invasive Plants and their native look-alikes. City of Hamilton Natural Heritage Strategy Dundas Valley 50 Year Vision	HHWSP	HCA / HWSC / CITY
			Work with landowners to control invasive species and to plant native species.	Cootes to Escarpment Park System – A Conservation and Land Management Strategy	HHWSP	HCA / HWSC / CITY / GV
	Work with nurseries to develop a promotional program highlighting native species alternatives for commonly used non-native ornamental species.				HHWSP	CITY / HWSC / RBG / HCA / GV
Land Maintenance Practices Map Code: LM Definition: Errant or excessive land maintenance practice which unnecessarily degrade wildlife habitat.		Incorporate the installation of alternative roadside vegetation, such as MTO roadside prairie and wildlife shrub corridors, into existing maintenance plans.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-2, FW-4 and Pages 106-107	City Op. & Main.	HCA / CITY
			Work to naturalize infrequently used areas of municipal parks and Conservation Areas.		CITY Op. & Main. / HCA Lands	HHWSP / HWSC / HNC
		Work with the City to develop guidelines for using native plant species for revegetation projects along roadsides			City Op. & Main.	HCA Ecol.
			Work with the City to ensure roadside maintenance is not done in excess of access standards.		CITY Op. & Main.	HCA / HHWSP / HWSC / GV / HNC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
		Work with utility companies to develop protocols for recommended low impact land maintenance practices to be implemented throughout utility corridors.			HCA Plan.	CITY / HHWSP / HWSC / RBG
Landfill Leachate Map Code: LL Definition: rainwater filtering down through the landfill materials with the potential to contaminate groundwater aquifers.		Monitor existing groundwater sampling programs to ensure that groundwater contamination is not 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	HCA Eng.	CITY / RAP / MOE
Litter Map Code: LI Definition: The act of illegally disposing of waste into public/natural areas.	Implement the „Pack it in – Pack it out” waste disposal policy at strategic city parks, Conservation Areas and RBG lands.			City of Hamilton By-law No. 03-118 Litter, Yard Waste and Property Maintenance	CITY Op. & Main. / RBG / HCA Lands	HHWSP
	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.				CITY Op. & Main.	HCA / RBG / GV / HWSC / HHWSP / BARC
		Undertake an inventory of illegal dumping sites throughout the subwatershed. Prioritize sites for the installation of deterrent mechanisms and the implementation of the Keep Hamilton Clean and Green Strategy Components.			HCA Lands / CITY Op. & Main.	RBG
	Utilize literature, websites, public service announcements, & direct landowner contact to create awareness regarding the prevention and clean-up of litter.				CITY Op. & Main. / HCA Lands / RBG	HHWSP / HWSC / GV / BARC
	Work to develop an Adopt a Park / Friends of Program for Conservation Authority lands.				HCA Lands	CITY / HHWSP / HWSC
	Work to replace all current recycle bins in public areas with ones that have lids.				CITY Op. & Main. / RBG / HCA Lands	GV

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STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
			Work with local residents to host litter clean up events on public lands; including City parks, Conservation Areas and RBG lands.		CITY Op. & Main. / RBG / HCA Lands	HHWSP / HWSC / BARC / GV
Migration Barrier Map Code: MB Definition: Any infrastructure that precludes the passage of wildlife into upstream habitat or the upper reaches of natural corridors.	Erect wildlife crossing signage where known migration corridors cross roadways and trails.			In-stream Barrier Assessment for the Hamilton Harbour AOC.	HCA Ecol. / CITY Nat. Her. / RBG	HHWSP / HNC / BARC / HWSC / WPN / RAP
			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	HCA Ecol. / CITY Nat. Her. / RBG	HHWSP / HNC / BARC / HWSC / WPN / RAP
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)	Create demonstration sites on public lands that highlight nutrient management BMP projects.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-9, RM-7. Pages 116, 158 Nutrient Management Act 2002, O. Reg 267/03 Fisheries Act, Section 34 HCA Planning and Regulation Policies and Guidelines Page 72 Ministry of the Environment Water Management Policies and Guidelines – Provincial Water Quality Objectives Appendix A OMAFRA Best Management Practices Series – Nutrient Management Planning OMAFRA Best Management Practices Series – Manure Management	HHWSP	HCA / HWSC / OSICA / RAP
		Develop a fertilizer use by-law under the Fertilizer Act, limiting the use of fertilizer for non essential purposes.			CITY Cap. Plan.	HCA / BARC / RAP / HHWSP / RBG
		Develop a plan to reduce nutrient levels to meet Provincial Water Quality Objectives as determined by the land use dependent nutrient level monitoring program.			HCA Eng.	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG
		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.			HCA Eng.	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG
		Encourage the Ministry of the Environment to develop a nutrient monitoring and reduction program for non agricultural nutrient generating land uses; including nurseries, hobby farms and equine facilities.			HCA Eng. / HCA Ecol.	OMAFRA / OSICA / MNR / RAP

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STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
		Encourage the Ministry of the Environment to require that biosolid users submit soil sampling results, post application, as a monitoring condition of the Certificate of Approval process.			HCA Eng. / HCA Ecol.	MOE / CITY / RAP
		Establish a nutrient level monitoring program with strategic sampling sites that are land use dependent, to identify specific sources of nutrient loading.			HCA Eng.	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG
	Host a training workshop for local golf course practitioners to discuss BMP's for golf course management, including Audubon Cooperative Sanctuary Program certification standards.				HHWSP	HCA / HWSC / RAP / RCGA
		Lobby the provincial government to develop a policy to ban the use of phosphorous in fertilizer for cosmetic use.			GV	CITY / HCA / MOE
	Promote software associated with the Nutrient Management Plan, to agricultural operators to ensure precise fertility programs.				HHWSP	OSCIA / OMAFRA / HWSC
	Promote the City of Hamilton Only Rain Down the Drain awareness campaign.				City Op. & Main.	HHWSP / GV / BARC / RAP
	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.				HHWSP / HCA Eng.	BARC / GV / RBG / OSCIA / MOE / OMAFRA / RAP
			Work with landowners to reduce nutrient loading by implementing agricultural and urban BMP"s related to nutrient management.		HHWSP	OSCIA / HCA / CITY / OMAFRA / HWSC
On-line Ponds Map Code: OP Definition: An in-stream structure designed to impound stream flow; leads	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	HHWSP / HWSC	DFO / HCA / OSCIA / OMAFRA / CITY

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
to increased in-stream temperatures downstream and is often a barrier to fish migration.			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	HHWSP / HCA Plan. / HCA Eng.	DFO / HCA / OSCIA / OMAFRA / CITY / HWSC
Outdoor Recreation Related Impacts Map Code: OR Definition: Recreational activities occurring in natural areas that inadvertently degrade the natural features of the area.	Add “tread lightly” messaging to partner recreation oriented websites.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-8, PAA-1, PAA-2, PAA-3 Pages 115, 126-130 The Conservation Lands of Ontario – Three Year Business Plan A Joint Outdoor Tourism Marketing Strategy Niagara Escarpment Access Enhancement Plan Dundas Valley 50 Year Vision Strategy Cootes to Escarpment Conservation & Land Management Strategy	HCA Lands / CITY Op. & Main. / RBG	NHC / BTC
		Consider designating days/areas for ATV and snowmobile use.			HCA Lands / RBG / CITY Op. & Main.	HHWSP / HNC
		Continue to monitor Category A and B waterfalls on public lands for signs of degradation.			HCA Lands / CITY Op. & Main.	
		Develop marketing strategies for sensitive lands that focus on sustainable use.			HCA Lands / RBG / CITY Op. & Main	BTC / HNC
	Erect signage explaining the environmental significance of natural areas and promoting user “etiquette” for the area.				HCA Lands / RBG / CITY Op. & Main.	HHWSP / HNC / BTC
			Host annual clean up days for natural areas identified as having excessive amounts of litter.		HCA Lands / RBG / CITY Op. & Main.	HHWSP / HWSC / HNC / BARC / BTC
	Install deterrent mechanisms along trails and in off trail areas known to be degraded by trespassing; such as no trespassing signage.				HCA Lands / RBG / CITY Op. & Main.	HNC / BTC
	Promote the City of Hamilton Adopt-a-Park and Extreme Park Makeover Programs.				CITY Op. & Main.	HCA / RBG / HHWSP / HNC / BTC
		Refer to the Niagara Escarpment Access Enhancement Plan to design infrastructure for high traffic areas to guide users along approved trails.			HCA Lands / CITY Op. & Main. / RBG	BTC

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STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
			Rotationally restrict access to degraded areas to allow for the regeneration of vegetation.		HCA Lands / RBG / CITY Op. & Main.	HNC / BTC
	Support the formation and activities of “Friends of” groups aimed at protecting and rehabilitating natural features.				HHWSP / CITY Op. & Main. / HCA Lands / RBG	HWSC / BARC / BTC
			When conducting maintenance of existing trails, seek guidance from the HCA Planning and Engineering Department with respect to materials and design.		HCA Lands / RBG / CITY Op. & Main.	HHWSP / HNC / BTC
		When undertaking master planning exercises, design trails to meet guidelines as set in HCA's Planning and Regulation Policies and Guidelines.			HCA Lands / RBG / CITY Op. & Main.	
Perched Culverts Map Code: CP Definition: In-stream culverts that when improperly designed/installed, create barriers to water flow and fish migration.	Host training sessions for HCA Lands and City staff to promote the proper design and installation of culverts.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-1, FW-4 Pages 104, 107 Fisheries Act, Section 37 HCA Planning and Regulation Policies and Guidelines Page 41 In-stream Barrier Assessment for the Hamilton Harbour AOC	CITY Op. & Main / HCA Eng.	DFO / HHWSP / MNR
		Undertake an inventory of perched and closed bottom culverts throughout the subwatershed. Prioritize culverts for mitigation or replacement.			CITY Op. & Main.	DFO / HCA / HHWSP / MNR
	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.				HHWSP / HWSC	DFO / HCA / CITY / MNR
			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.		HHWSP / HCA Plan. / HCA Eng.	DFO / HCA / OSCIA / OMAFRA / CITY
Pesticide Use Map Code: PS	Create demonstration sites on public lands that highlight pesticide/herbicide free lawns, gardens, natural areas, crops, etc.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations	HHWSP	CITY / GV / HWSC / OSCIA / OMAFRA

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
Definition: The application of pesticides to control perceived pests.	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.			TSSR-6, EPI-4 Pages 99, 137 Fisheries Act, Section 34 City of Hamilton By -Law No. 07-282	HHWSP	CITY / HWSC / RCGA
	Promote Municipal and Provincial Pesticide By-Laws.			Pesticides Act Ontario Regulation 63/09	CITY Op. & Main. / GV	HWSC / HHWSP / OSCIA / OMAFRA
	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 – integrated Pest Management OMAFRA Best Management Practices Series – Pesticide Storage, Handling and Application	CITY Op. & Main.	GV / HWSC / HHWSP / OSCIA / OMAFRA
	Promote the Ministry of the Environment „Add It Up Program – Going Pesticide Free“ Program				GV	CITY / HHWSP / HWSC
		Undertake a study to determine the current level of pesticide/herbicide use in the subwatershed and develop targets for reduction.			CITY Op. & Main.	GV / HWSC / HHWSP / OSCIA / OMAFRA
	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.				GV	HCA / OSCIA / OMAFRA / HHWSP / CITY
			Work with landowners to implement alternatives to pesticide use.		HHWSP / GV	CITY / HWSC / OSCIA / OMAFRA
Plowed Watercourse Map Code: PW Definition: Headwater swales or small watercourses that are worked for agricultural	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.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-4 Pages 70, 71 Fisheries Act, Section 37	HHWSP	DFO / HCA / OSCIA / HWSC

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
production.	Create and link to existing OMAFRA demonstration 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	HHWSP	DFO / HCA / OMAFRA / OSCIA / HWSC
	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.			OMAFRA Best Management Practices Series – Soil Management	HHWSP / HWSC	DFO / HCA / OMAFRA / OSCIA
			Work with landowners to install effective agricultural land drainage; e.g. grassed waterways, Water and Sediment Control Basins, etc.		HHWSP	DFO / HCA / HWSC / RBG / RAP
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.	Host training sessions for City Staff and Contractors using the Ministry of the Environment Snow Disposal and De-icing Operations in Ontario Guidelines.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-5b Page 71	CITY Op. & Main.	MTO
			Implement improved snow removal methods as recommended by the study to determine effective methods of snow removal which also reduce contamination of watercourses.	Fisheries Act, Section 34 City of Hamilton 2003 Road Salt Management Plan Municipalities of Wellington County – 2005 Salt Management Plan	CITY Op. & Main.	MTO
			Install vegetated filter strips and riparian buffers along medians and roadsides.		CITY Op. & Main.	MTO / HCA
	Liaise with City staff to promote road salt alternatives, alternative application methods and recommended snow removal practices. E.g. City of Guelph liquid application prior to inclement weather.				CITY Op. & Main. / HCA Eng.	DFO / MTO
		Support planning for alternative and sustainable transportation strategies including Rapid Transit.			CITY Op. & Main.	HCA / MTO / HHHBA / RAP
		Undertake a study to determine the most effective method of snow removal that will reduce contamination of watercourses.			CITY Op. & Main.	DFO / HCA / MTO

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
	Utilize literature, websites, public service announcements & direct landowner contact to promote the use of sidewalk salt alternatives.				CITY Op. & Main. / GV	DFO / HCA / MTO
		Investigate using the Region of Waterloo Smart About Salt Council as a model to develop a Smart About Salt Program in Hamilton.				
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.			Monitor and enforce the proper installation and maintenance of sediment and erosion control measure on construction sites.	Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-5, FW9 Pages 70, 71, 116 Fisheries Act, Sections 34 and 36 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 OMAFRA Best Management Practices Series – No-Till Making it Work Ministry of the Environment Stormwater Management Design Guidelines	HCA Plan.	DFO / HHHBA / CITY
	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.				HHWSP / HCA Eng.	DFO / HWSC / MNR / OSCIA / OMAFRA / RAP
			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)		HCA Eng.	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP
			Work to mitigate non point sediment sources identified in the Watershed Planning Network Priority Remediation Report.		HCA Eng.	DFO / MNR / CITY / HWSP / HHWSP
			Work with contractors to ensure that site clearing prior to development is phased as the project progresses to reduce the area and length of time bare soil is exposed.		HCA Plan.	CITY / HHHBA / DFO
			Work with landowners to reduce sediment loading by implementing BMP projects; e.g. streambank stabilization, riparian buffers, natural channel design.		HHWSP	DFO / HWSC / HCA / MNR / OSCIA / OMAFRA
Site Clearing Prior to Development Map Code: SC		Develop a municipal by-law to serve as a guideline for the management of tree species.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-4	City Nat. Her.	HCA / HWSC / MNR

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
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.			Page 71	CITY Bldg. Serv. / HCA Plan.	DFO / HHHBA
	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	CITY Nat. Her.	DFO / MNR / RAP / HHHBA / HWSC / HHWSP
	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 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	HCA Plan.	CITY / HHHBA / DFO
Storm Sewer 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	BARC	HCA / RBG / GV / HWSC / HHWSP / CITY
	Promote the City of Hamilton Public Works Stormwater Pollution Solutions for Urban and Rural Residents Outreach Program			Fisheries Act, Section 34	CITY Op. & Main.	HCA / RBG / GV / HWSC / HHWSP
	Promote the Municipal Sewer-Use By-law No. 06-228.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 138, 158-159	CITY Op. & Main.	HCA / RBG / GV / HWSC / HHWSP
		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.			CITY Op. & Main. / HCA Eng.	BARC / RAP / MOE

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
			Work to implement the recommendations in the sewershed water quality study.		CITY Op. & Main. / HCA Eng.	RAP / BARC / HWSC / DFO / HHWSP
			Work with City Staff to retrofit outfalls to incorporate erosion control measures such as plunge pools, rip rap, tree planting etc.		CITY Op. & Main.	HCA / RAP / BARC / HWSC / DFO / HHWSP
		Work with Green Venture to develop a Stormwater Mitigation Program.			GV	HCA / RAP / BARC / CITY
			Work with landowners to disconnect downspouts and to install rain barrels.		GV / CITY Op. & Main.	HHWSP / BARC
			Work with landowners to establish riparian buffers and/or erosion protection downstream of storm sewer outfalls; e.g. river stone.		HHWSP	HCA / RAP / BARC / HWSC / DFO / CITY
		Reduce stormwater load to meet the MOE volumetric target of a 90% overflow capture rate for combined sewer systems			CITY Op. & Main.	BARC / RAP/ HCA / GV
		Work toward achieving the final net loading targets for CSO's outlined in the RAP.			CITY Op. & Main.	BARC / RAP/ HCA / GV
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	CITY Op. & Main.	HCA / MTO / HHHBA
		When planning for major road works, design transportation corridors using new technologies for environmental solutions.		Erosion and Sediment Control Guidelines for Urban Construction	CITY Op. & Main.	HCA / MTO / HHHBA
			When repairing roads, utilize new technologies for road maintenance that are proven to have environmental benefits.		CITY Op. & Main.	HCA / MTO / HHHBA

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

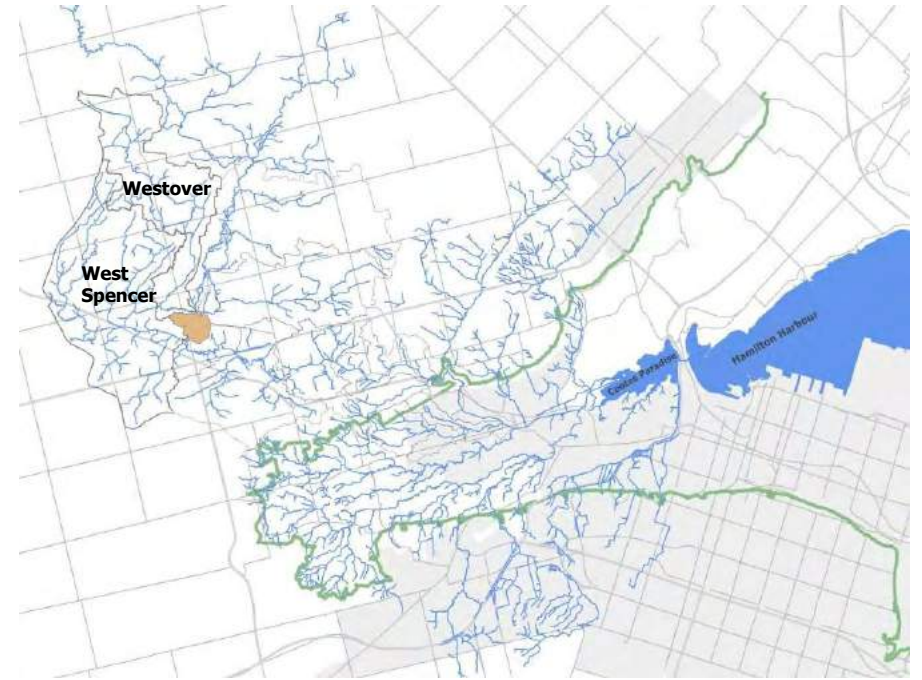
STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
Utility Pipeline Map Code: UP Definition: Oil and gas conveyance systems.		Review individual utility company emergency protocols for identification of issues, reporting protocols and emergency contacts.			HCA Eng.	CITY / MOE
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.		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.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-12 Page 77	HCA Eng.	MNR / MOE
	Encourage landowners with surface water takings to install groundwater systems.			Ontario Water Resources Act O. Reg. 387/04	HHWSP	HCA / OSCIA / MOE / HWSC / OMAFRA
	Encourage landowners with water taking needs to establish an Irrigation Advisory Committee to schedule takings alternately.			OMAFRA Best Management Practices Series – Irrigation Management	HHWSP	HCA / OSCIA / MOE / HWSC / OMAFRA
	Host open houses when experiencing Level 1 low water conditions to address landowner concerns and promote recommended reductions in rates and volumes of takings.			Information to Support a Level III Declaration and Implementation Strategy for the Hamilton Conservation Authority Watershed	HHWSP / HCA Eng.	HCA / OSCIA / MOE / HWSC / OMAFRA
		Upon receipt of new Permit to Take Water applications, evaluate the taking against active permits in the area to determine the potential stress level related to multiple users on a given system.		HCA Protocol Memorandum Ontario Low Water Response Hamilton Conservation Authority Watershed	HCA Eng.	MOE
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote BMP's relating to water conservation technology.				HHWSP	HCA / OSCIA / MOE / HWSC / OMAFRA
			Work with landowners to implement BMP's related to water conservation.		HHWSP	HCA / OSCIA / MOE / HWSC / OMAFRA
			Work with landowners who have groundwater taking systems to decommission unused wells in accordance with the Ontario Water Resources Act.		HHWSP	HCA / OSCIA / CITY

TABLE MS-8: STRESSES AND STEWARDSHIP ACTIONS

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	LEAD AGENCY	PARTNER AGENCIES
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities			
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.			Conduct temporary road closures at known wildlife crossings and nesting sites during peak migration and nesting times.	British Columbia Wildlife Collision Prevention Program Report	CITY Nat. Her.	MNR / HCA / MTO / RBG
	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	CITY Nat. Her.	MNR / HCA / MTO / RBG
			Erect fencing and alternative nesting mounds at known sites for turtle nesting.		CITY Nat. Her.	MNR / HCA / MTO / RBG
		Evaluate the effectiveness of the MTO roadside prairie and wildlife shrub corridor projects in preventing wildlife collisions.			CITY Nat. Her.	MNR / HCA / MTO
			Produce and distribute window decals for large windows of homes and high rise buildings to prevent bird collisions.		HCA Ecol. / CITY Nat. Her.	HHWSP / HWSC / RBG
			Reduce the use of road salt or consider alternatives that do not attract wildlife.		CITY Nat. Her.	MNR / HCA / MTO
	Utilize literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding managing human-wildlife conflicts.				CITY Nat. Her. / HCA Ecol.	MNR / MTO / RBG / HWSC / HHWSP
		When planning major road works, consider the incorporation of wildlife over/underpasses, avoiding known migratory corridors and other wildlife accommodations in the design.			CITY Nat. Her.	MNR / HCA / MTO / RBG
Wildlife Overpopulation Map Code: WO Definition: When a species population exceeds the carrying capacity of its habitat.	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	HCA Ecol. / CITY Nat. Her.	HHWSP / MNR
			Work to implement the recommendations for sustainable populations in the HCA/MNR Deer Management Strategy.		HCA Ecol. / CITY Nat. Her.	HHWSP / MNR

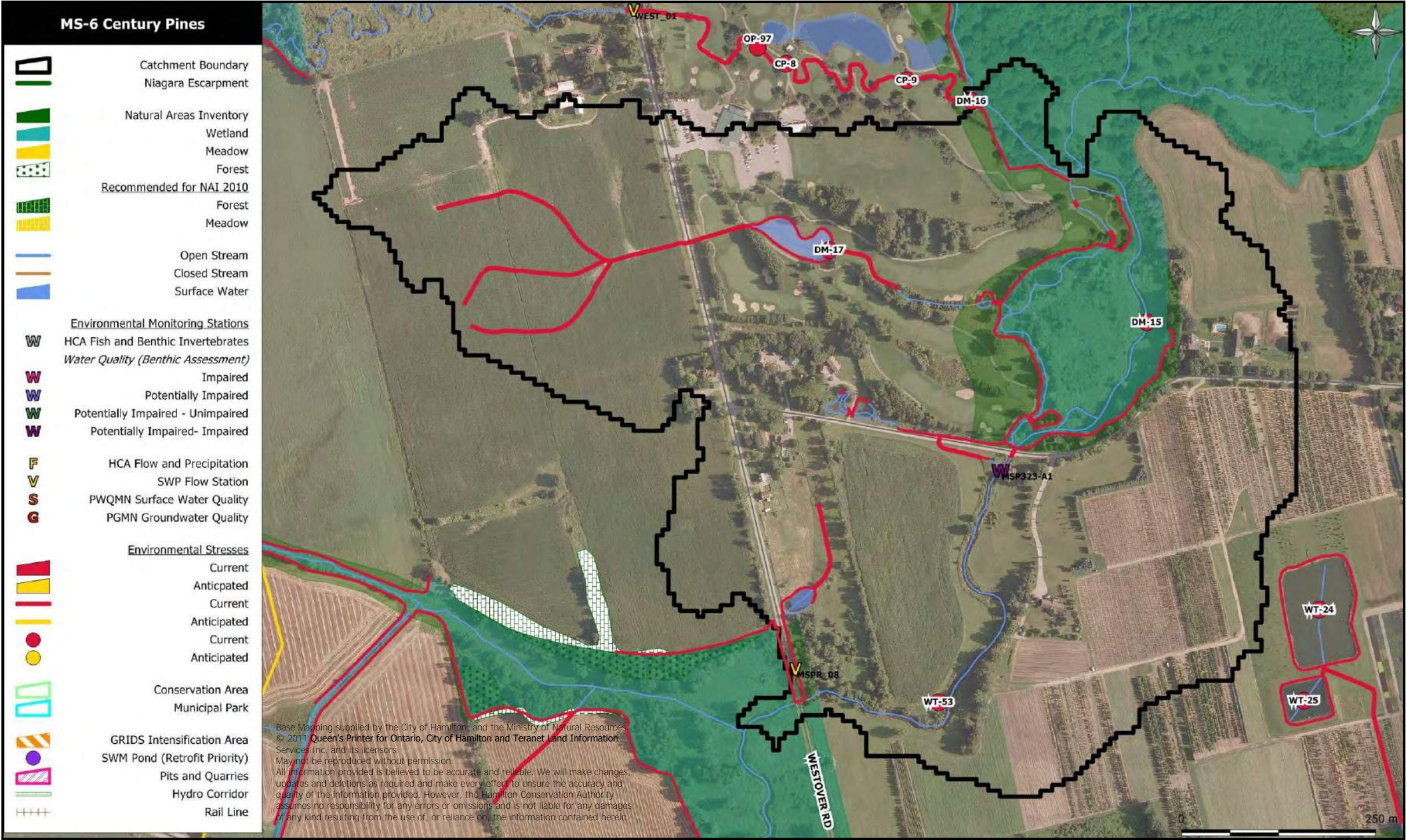
Partner Agency Acronyms

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		



CENTURY PINES CATCHMENT

DATA SHEETS



CENTURY PINES DATA SHEET

Table MS-9: Stresses Identified in the Century Pines Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
DM-15	Dam	☑	☑	☑		☑	☑
DM-16	Dam	☑	☑	☑		☑	☑
DM-17	Dam	☑	☑	☑		☑	☑
WT-53	Water Taking	☑	☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

CENTURY PINES DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
MSP323-A1	16/08/2010	Blackside darter	11	n/a	Cool
MSP323-A1	16/08/2010	Central Mudminnow	2	n/a	Cool
MSP323-A1	16/08/2010	Common carp	7	n/a	Cool
MSP323-A1	16/08/2010	Largemouth bass	5	n/a	Cool
MSP323-A1	16/08/2010	Northern Pike	2	n/a	Cool
MSP323-A1	16/08/2010	Rainbow darter	2	n/a	Cool
MSP323-A1	16/08/2010	Spottail shiner	2	n/a	Cool
MSP323-A1	16/08/2010	White sucker	33	n/a	Cool

BENTHICS ASSESSMENT

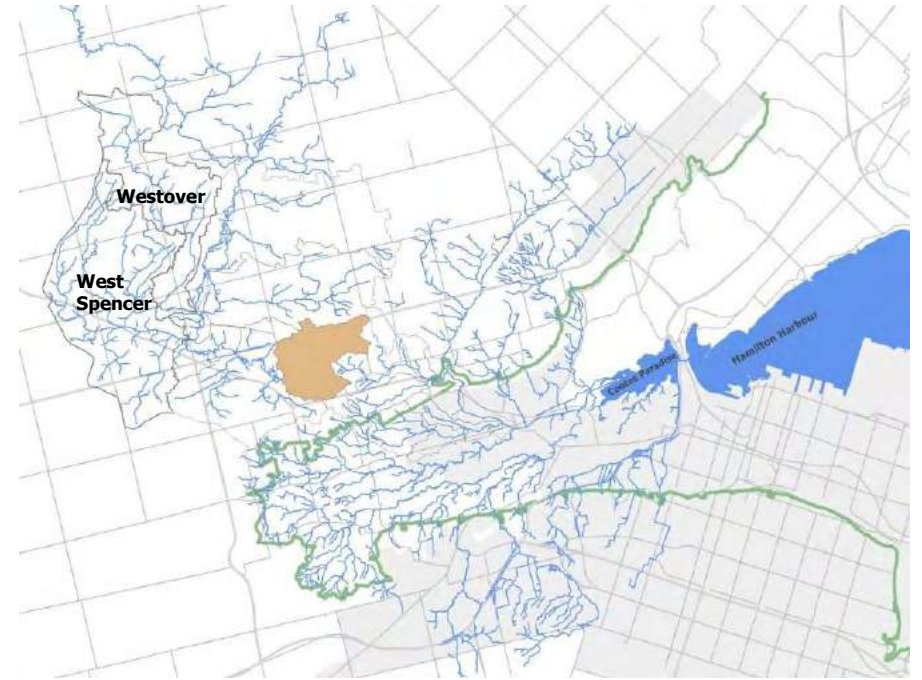
LOCATION	DATE	DESCRIPTION
MSP323-A1	2010	Potentially Impaired - Impaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s
MSPR_08	5/27/2008	0.55145
MSPR_08	7/2/2008	0.59702
MSPR_08	8/5/2008	0.78766
MSPR_08	10/15/2008	0.82173



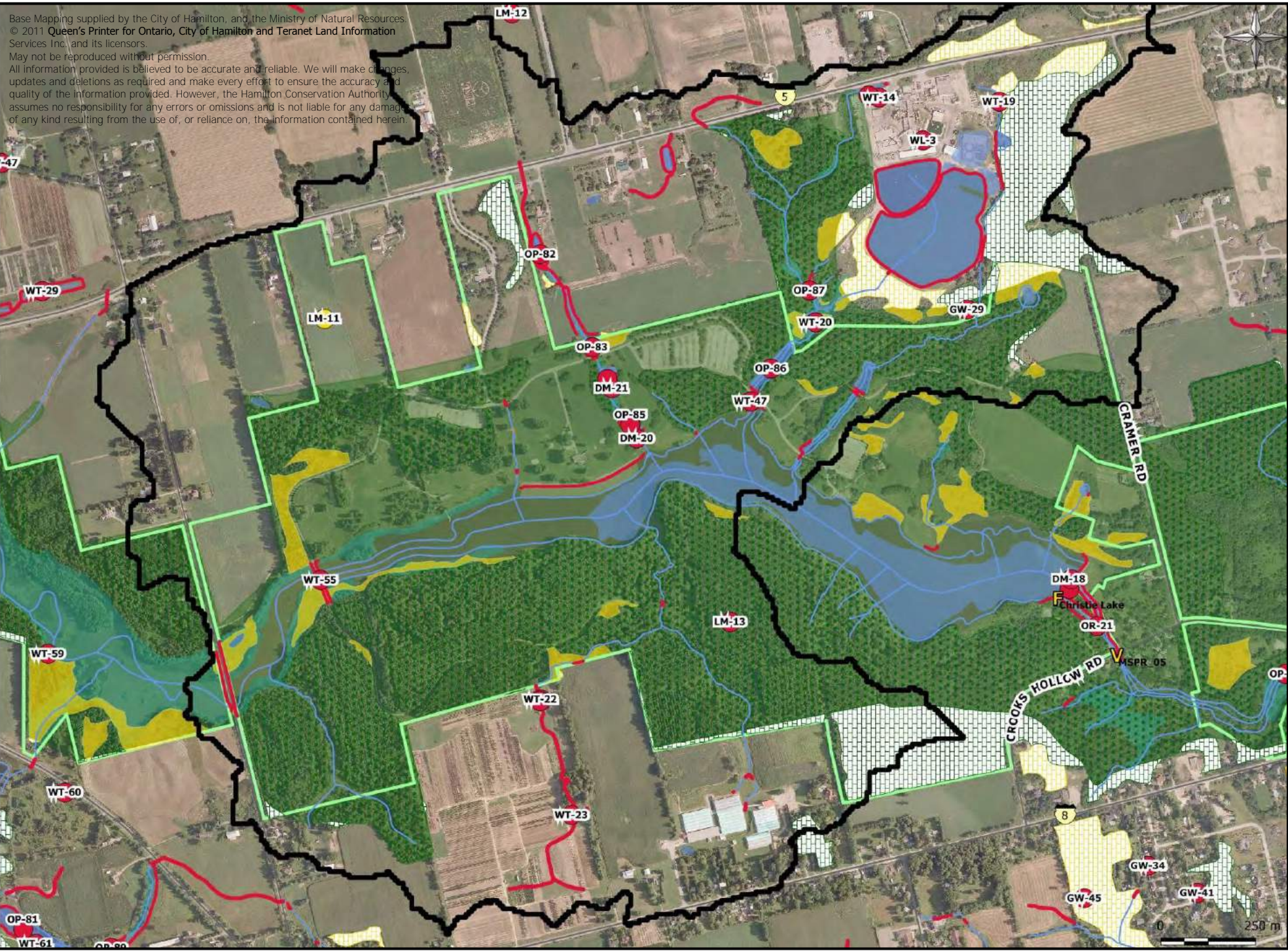
CHRISTIE LOWER RESERVOIR CATCHMENT

DATA SHEETS

MS-7 Christie Lower Reservoir

Base Mapping supplied by the City of Hamilton, and the Ministry of Natural Resources.
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 All information provided is believed to be accurate and reliable. We will make changes, updates and deletions as required and make every effort to ensure the accuracy and quality of the information provided. However, the Hamilton Conservation Authority assumes no responsibility for any errors or omissions and is not liable for any damages of any kind resulting from the use of, or reliance on, the information contained herein.

- Catchment Boundary
- Niagara Escarpment
- Natural Areas Inventory**
 - Wetland
 - Meadow
 - Forest
- Recommended for NAI 2010**
 - Forest
 - Meadow
- Open Stream
- Closed Stream
- Surface Water
- Environmental Monitoring Stations**
 - HCA Fish and Benthic Invertebrates
 - Water Quality (Benthic Assessment)*
 - Impaired
 - Potentially Impaired
 - Potentially Impaired - Unimpaired
 - Potentially Impaired- Impaired
 - HCA Flow and Precipitation
 - SWP Flow Station
 - PWQMN Surface Water Quality
 - PGMN Groundwater Quality
- Environmental Stresses**
 - Current
 - Anticipated
 - Current
 - Anticipated
 - Conservation Area
 - Municipal Park
- GRIDS Intensification Area**
 - SWM Pond (Retrofit Priority)
 - Pits and Quarries
 - Hydro Corridor
 - Rail Line



CHRISTIE LOWER RESERVOIR DATA SHEET

Table MS-10: Stresses Identified in the Christie Lower Reservoir Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
DM-20	Dam	☑	☑	☑	☑		☑
DM-21	Dam	☑	☑	☑	☑		☑
GW-29	Abandoned Groundwater Well	☑		☑		☑	
WT-14	Water Taking	☑	☑	☑		☑	
WT-17	Water Taking	☑	☑	☑		☑	
WT-19	Water Taking	☑	☑	☑		☑	
WT-20	Water Taking	☑	☑	☑		☑	
WT-22	Water Taking	☑	☑	☑		☑	
WT-23	Water Taking	☑	☑	☑		☑	
WT-47	Water Taking	☑	☑	☑	☑		
WT-55	Water Taking	☑	☑	☑	☑		
OP-82	On-line Pond	☑		☑		☑	☑
OP-83	On-line Pond	☑		☑	☑		☑
OP-84	On-line Pond	☑		☑	☑		☑
OP-85	On-line Pond	☑		☑	☑		☑
OP-86	On-line Pond	☑		☑	☑		☑
OP-87	On-line Pond	☑		☑		☑	☑
OP-88	On-line Pond	☑		☑		☑	☑
LM-11	Land Maintenance Practices		☑	☑	☑		
LM-13	Land Maintenance Practices		☑	☑	☑		
WL-3	Fluctuating Water Levels	☑	☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

CHRISTIE LOWER RESERVOIR DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

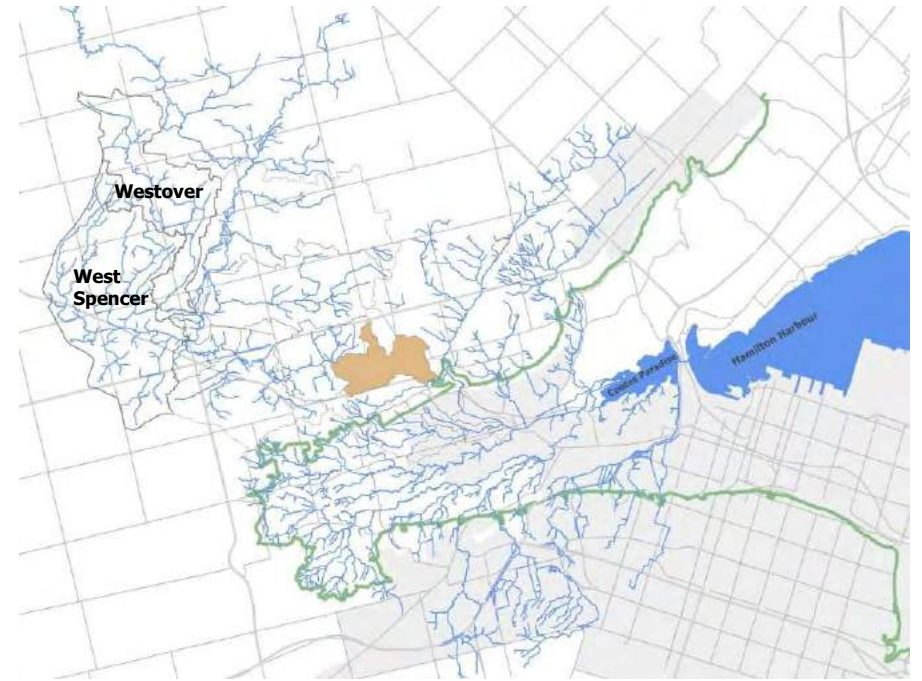
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s

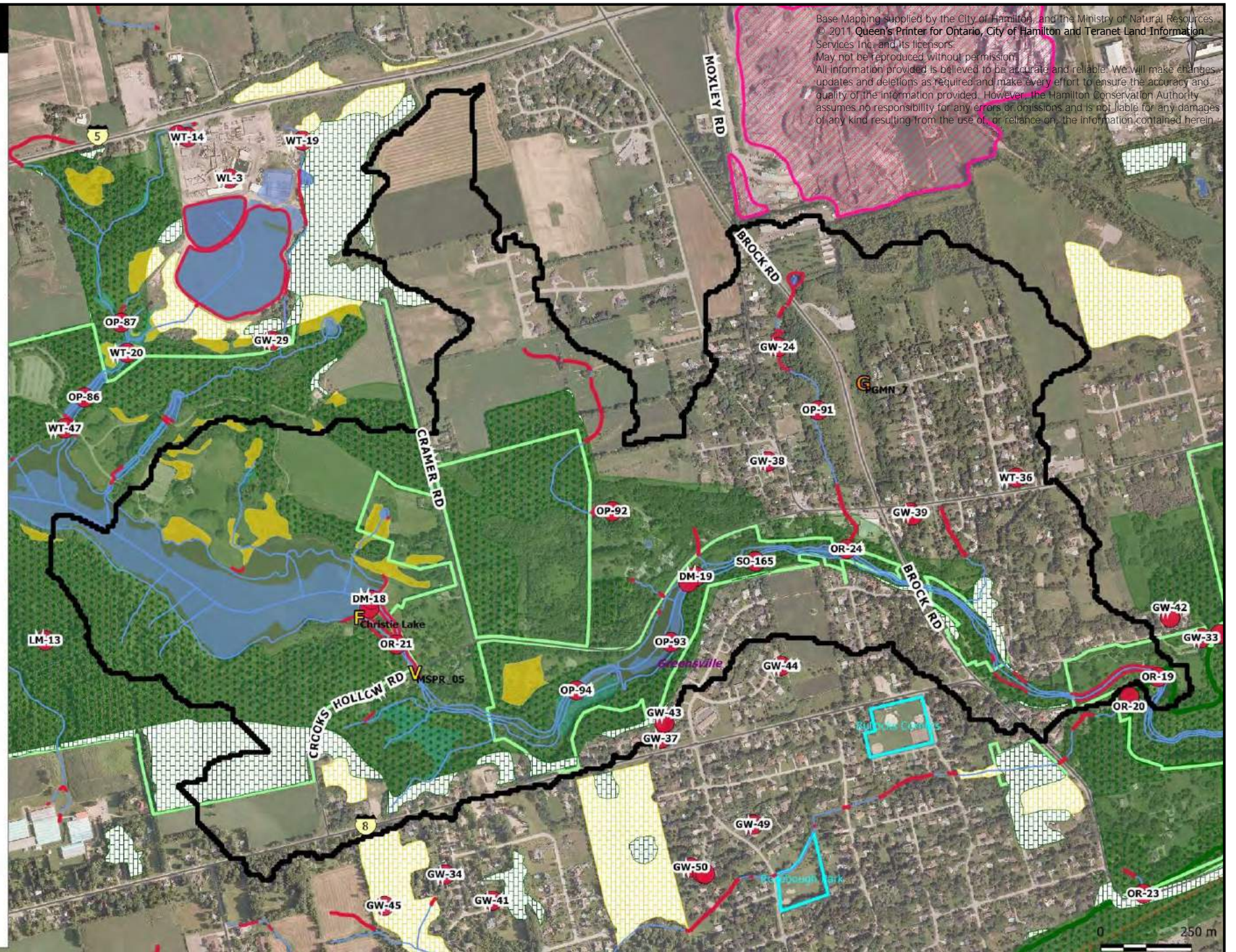


CHRISTIE LOWER RESERVOIR/CROOKS' HOLLOW CATCHMENT

DATA SHEETS

MS-8 Christie Lower Res/Crooks' Hollow

-  Catchment Boundary
-  Niagara Escarpment
-  Natural Areas Inventory
-  Wetland
-  Meadow
-  Forest
-  Recommended for NAI 2010
-  Forest
-  Meadow
-  Open Stream
-  Closed Stream
-  Surface Water
-  Environmental Monitoring Stations
-  HCA Fish and Benthic Invertebrates
-  Water Quality (Benthic Assessment)
-  Impaired
-  Potentially Impaired
-  Potentially Impaired - Unimpaired
-  Potentially Impaired- Impaired
-  HCA Flow and Precipitation
-  SWP Flow Station
-  PWQMN Surface Water Quality
-  PGMN Groundwater Quality
-  Environmental Stresses
-  Current
-  Anticipated
-  Current
-  Anticipated
-  Current
-  Anticipated
-  Conservation Area
-  Municipal Park
-  GRIDS Intensification Area
-  SWM Pond (Retrofit Priority)
-  Pits and Quarries
-  Hydro Corridor
-  Rail Line



CHRISTIE LOWER RESERVOIR/CROOKS’ HOLLOW DATA SHEET

Table MS-11: Stresses Identified in the Christie Lower Reservoir/Crooks” Hollow Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
DM-18	Dam	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
DM-19	Dam	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
GW-24	Abandoned Groundwater Well	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-38	Abandoned Groundwater Well	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-39	Abandoned Groundwater Well	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-40	Abandoned Groundwater Well	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-43	Abandoned Groundwater Well	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
WT-36	Water Taking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
WT-43	Water Taking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
OP-91	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-92	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OP-93	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
OP-94	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SL-5	Sediment Loading	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
SO-165	Stormsewer Outfalls	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
OR-19	Outdoor Recreation Related Impacts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
OR-21	Outdoor Recreation Related Impacts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
OR-24	Outdoor Recreation Related Impacts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
RB (various-see appendix)	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

CHRISTIE LOWER RESERVOIR/CROOKS’ HOLLOW DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

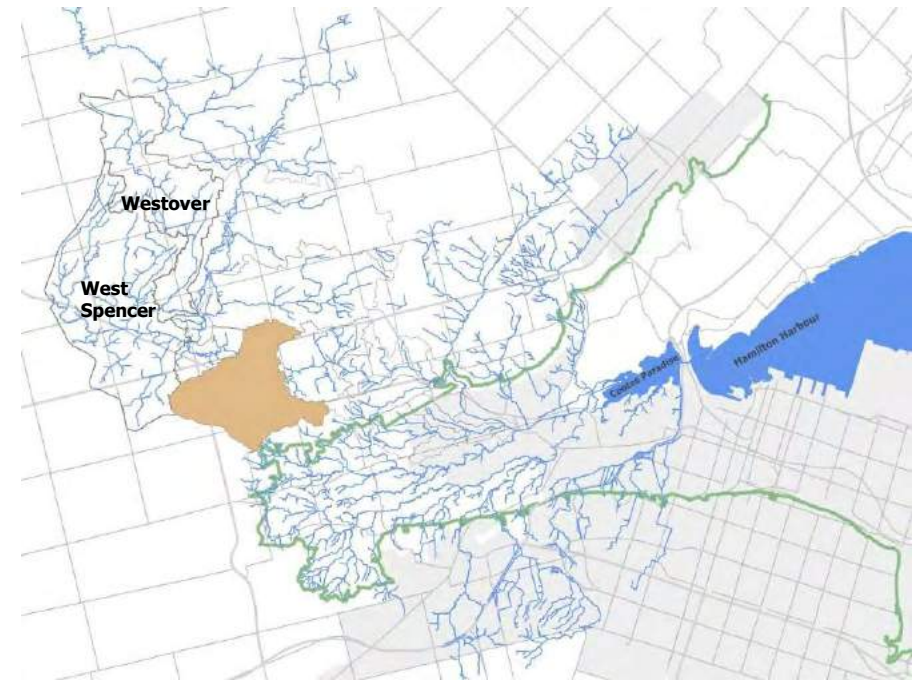
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s
Christie	14-Apr-10	2.2614
Christie	10-May-10	1.1774
Christie	8-Jun-10	3.9648
MSPR_05	5/27/2008	0.40269
MSPR_05	7/2/2008	0.71577
MSPR_05	8/5/2008	0.77832
MSPR_05	8/27/2008	1.17686
MSPR_05	9/23/2008	1.19594
MSPR_05	10/15/2008	1.27332
MSPR_05	10/23/2008	1.09252



CHRISTIE UPPER RESERVOIR CATCHMENT

DATA SHEETS

CHRISTIE UPPER RESERVOIR DATA SHEET

Table MS-12: Stresses Identified in the Christie Upper Reservoir Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
GW-31	Abandoned Groundwater Well	☑	☑	☑		☑	
GW-32	Abandoned Groundwater Well	☑	☑	☑		☑	
GW-47	Abandoned Groundwater Well	☑	☑	☑		☑	
WT-8	Water Taking	☑	☑	☑		☑	
WT-10	Water Taking	☑	☑	☑		☑	
WT-21	Water Taking	☑	☑	☑		☑	
WT-27	Water Taking	☑	☑	☑		☑	
WT-28	Water Taking	☑	☑	☑		☑	
WT-29	Water Taking	☑	☑	☑		☑	
WT-42	Water Taking	☑	☑	☑		☑	
WT-44	Water Taking	☑	☑	☑	☑		
WT-56	Water Taking	☑	☑	☑		☑	
WT-59	Water Taking	☑	☑	☑	☑		
WT-60	Water Taking	☑	☑	☑		☑	
WT-61	Water Taking	☑	☑	☑		☑	
OP-78	On-line Pond	☑		☑		☑	☑
OP-79	On-line Pond	☑		☑		☑	☑
OP-80	On-line Pond	☑		☑		☑	☑
OP-81	On-line Pond	☑		☑		☑	☑
OP-89	On-line Pond	☑		☑		☑	☑
OP-90	On-line Pond	☑		☑		☑	☑
LM-10	Land Maintenance Practices		☑	☑	☑		
LM-14	Land Maintenance Practices		☑	☑		☑	
NL-6	Nutrient Loading	☑	☑	☑		☑	
UP-1	Utility Pipeline		☑			☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

CHRISTIE UPPER RESERVOIR DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
MSP330-A1	29-Jun-10	Blackside darter	11	n/a	Cool
MSP330-A1	29-Jun-10	Bluntnose minnow	3	n/a	Cool
MSP330-A1	29-Jun-10	Common carp	14	n/a	Cool
MSP330-A1	29-Jun-10	Creek chub	13	n/a	Cool
MSP330-A1	29-Jun-10	Johnny darter	43	n/a	Cool

BENTHICS ASSESSMENT

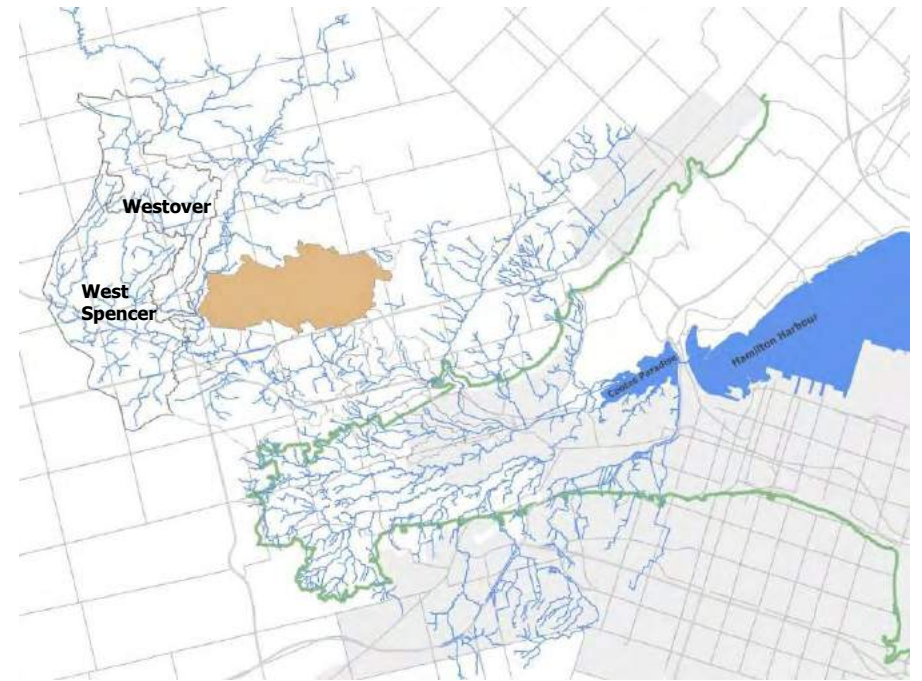
LOCATION	DATE	DESCRIPTION
MSP330-A1	2010	Potentially Impaired – Unimpaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS
HCA WQ_602	8-Jun-10	Chloride	33.70	mg/l
HCA WQ_602	8-Jun-10	Nitrate-N	0.56	mg/l
HCA WQ_602	8-Jun-10	TKN	0.93	mg/l
HCA WQ_602	8-Jun-10	PH (Field)	7.49	
HCA WQ_602	8-Jun-10	Soluble Phosphorus	26.60	µg/l
HCA WQ_602	8-Jun-10	Total Phosphorus	77.00	µg/l
HCA WQ_602	8-Jun-10	Total Suspended Solids	16.40	mg/l

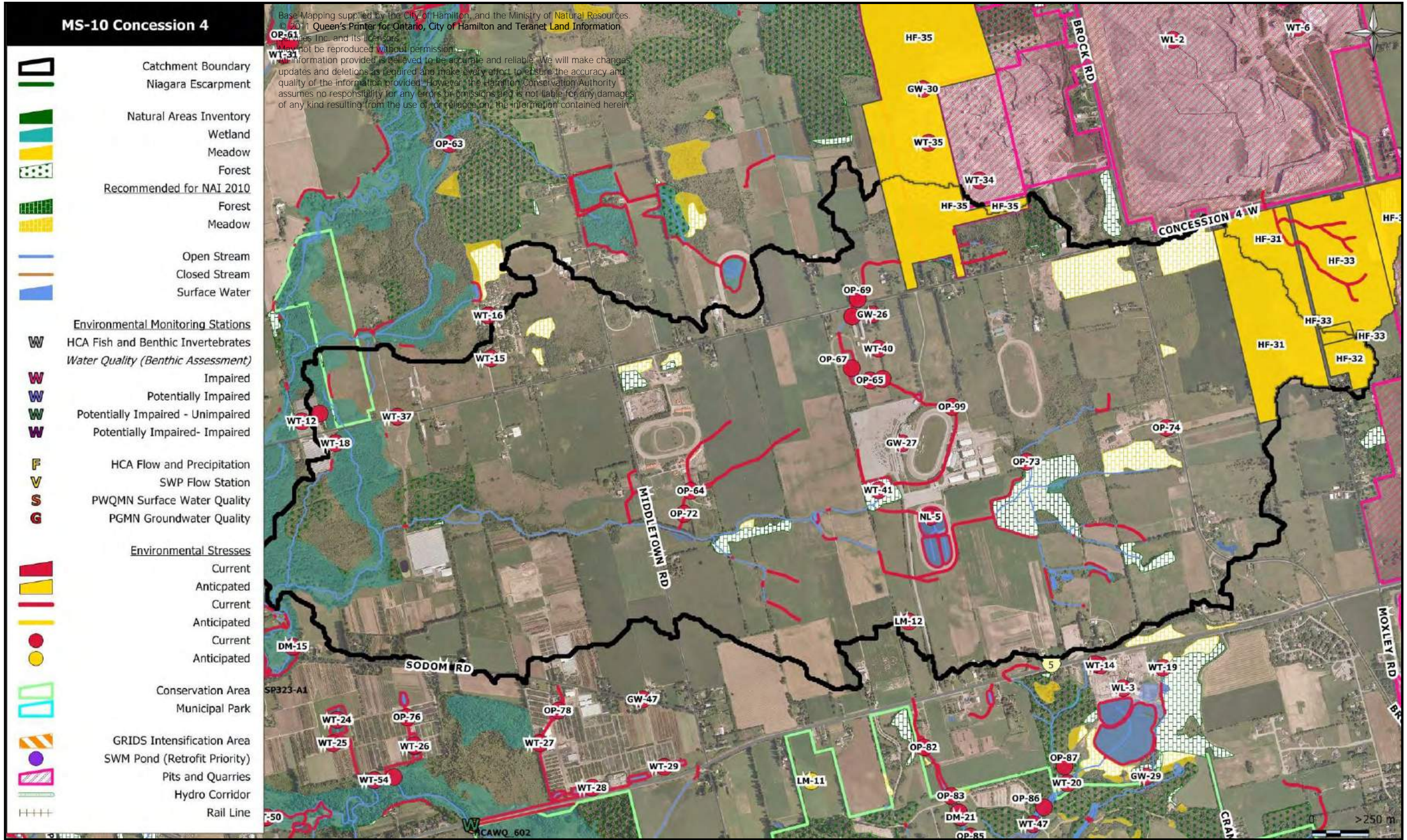
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s



CONCESSION 4 CATCHMENT

DATA SHEETS



CONCESSION 4 DATA SHEET

Table MS-13: Stresses Identified in the Concession 4 Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
HF-31	Habitat Fragmentation	☑	☑	☑			
HF-32	Habitat Fragmentation	☑	☑	☑			
HF-33	Habitat Fragmentation	☑	☑	☑			
HF-33	Habitat Fragmentation	☑	☑	☑			
HF-34	Habitat Fragmentation	☑	☑	☑			
HF-35	Habitat Fragmentation	☑	☑	☑			
GW-26	Abandoned Groundwater Well	☑	☑	☑		☑	
GW-27	Abandoned Groundwater Well	☑	☑	☑		☑	
WT-13	Water Taking	☑	☑	☑		☑	
WT-15	Water Taking	☑	☑	☑		☑	
WT-18	Water Taking	☑	☑	☑		☑	
WT-37	Water Taking	☑	☑	☑		☑	
WT-40	Water Taking	☑	☑	☑		☑	
WT-41	Water Taking	☑	☑	☑		☑	
OP-64	On-line Pond	☑		☑		☑	☑
OP-65	On-line Pond	☑		☑		☑	☑
OP-66	On-line Pond	☑		☑		☑	☑
OP-67	On-line Pond	☑		☑		☑	☑
OP-68	On-line Pond	☑		☑		☑	☑
OP-69	On-line Pond	☑		☑		☑	☑
OP-72	On-line Pond	☑		☑		☑	☑
OP-73	On-line Pond	☑		☑		☑	☑
OP-74	On-line Pond	☑		☑		☑	☑
OP-99	On-line Pond	☑		☑		☑	☑
LM-12	Land Maintenance Practices		☑	☑		☑	
NL-5	Nutrient Loading	☑	☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

CONCESSION 4 DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

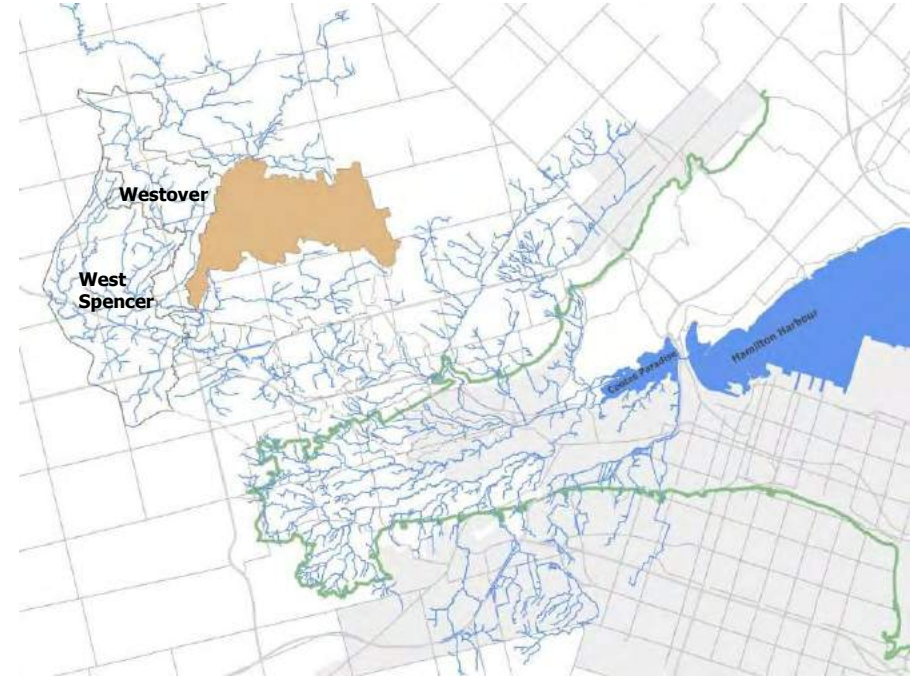
LOCATION	DATE	DESCRPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

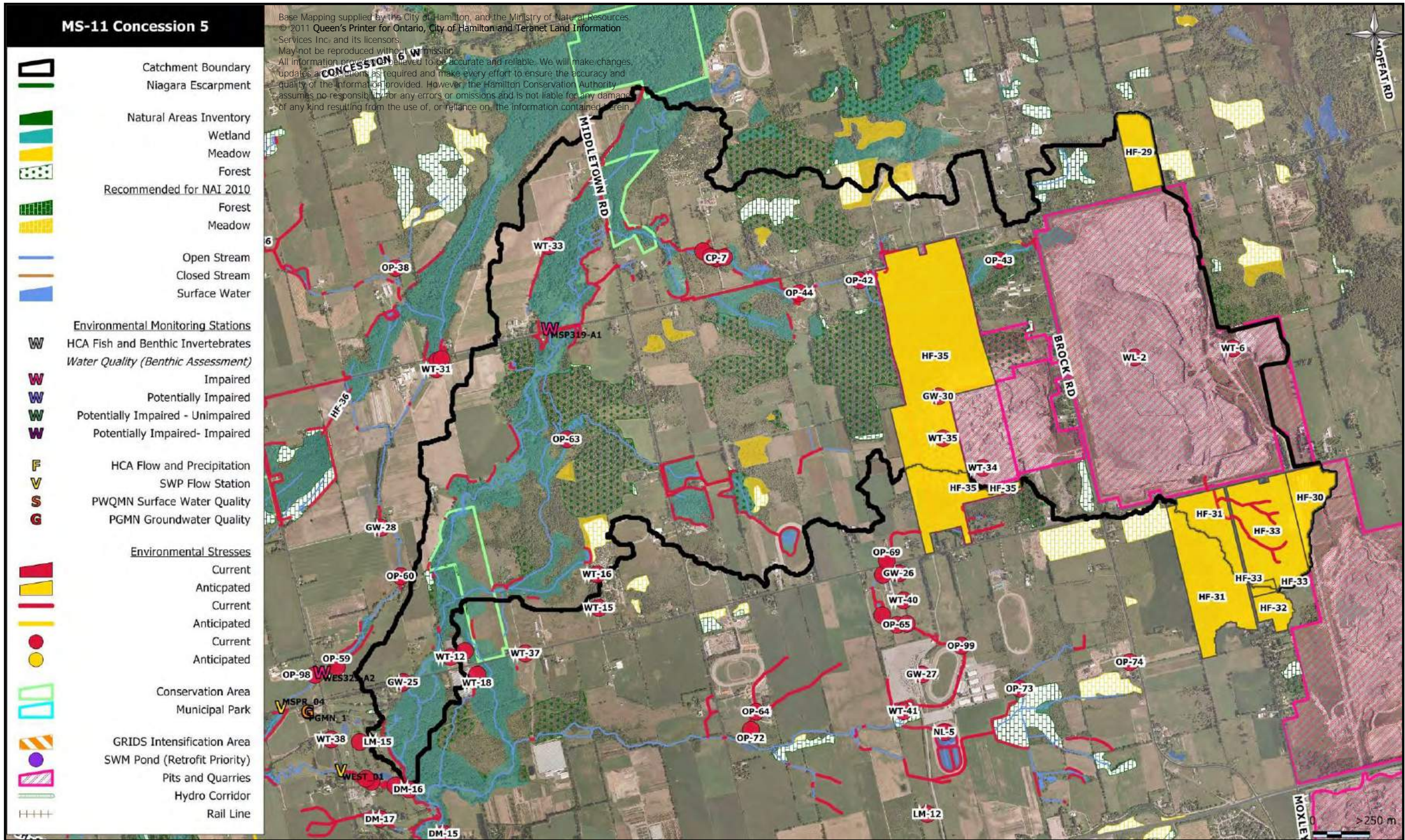
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s



CONCESSION 5 CATCHMENT

DATA SHEETS



CONCESSION 5 DATA SHEET

Table MS-14: Stresses Identified in the Concession 5 Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
HF-29	Habitat Fragmentation	☑	☑	☑			
HF-30	Habitat Fragmentation	☑	☑	☑			
HF-31	Habitat Fragmentation	☑	☑	☑			
HF-33	Habitat Fragmentation	☑	☑	☑			
HF-34	Habitat Fragmentation	☑	☑	☑			
HF-35	Habitat Fragmentation	☑	☑	☑			
HF-35	Habitat Fragmentation	☑	☑	☑			
CP-7	Perched Culvert	☑	☑	☑		☑	☑
GW-25	Abandoned Groundwater Well	☑	☑	☑		☑	
GW-30	Abandoned Groundwater Well	☑	☑	☑		☑	
WT-6	Water Taking	☑	☑	☑		☑	
WT-12	Water Taking	☑	☑	☑		☑	
WT-16	Water Taking	☑	☑	☑		☑	
WT-33	Water Taking	☑	☑	☑		☑	
WT-34	Water Taking	☑	☑	☑		☑	
WT-35	Water Taking	☑	☑	☑		☑	
OP-39	On-line Pond	☑		☑		☑	☑
OP-40	On-line Pond	☑		☑		☑	☑
OP-41	On-line Pond	☑		☑		☑	☑
OP-42	On-line Pond	☑		☑		☑	☑
OP-43	On-line Pond	☑		☑		☑	☑
OP-44	On-line Pond	☑		☑		☑	☑
OP-63	On-line Pond	☑		☑		☑	☑
WL-2	Fluctuating Water Levels	☑	☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

CONCESSION 5 DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
MSP319-A1	6/8/2010	Blackside darter	1	n/a	Cool
MSP319-A1	6/8/2010	Central Mudminnow	1	n/a	Cool
MSP319-A1	6/8/2010	Golden shiner	172	n/a	Cool
MSP319-A1	6/8/2010	Johnny darter	19	n/a	Cool
MSP319-A1	6/8/2010	Largemouth bass	1	n/a	Cool
MSP319-A1	6/8/2010	Northern pike	4	n/a	Cool
MSP319-A1	6/8/2010	Pumpkinseed	9	n/a	Cool

BENTHICS ASSESSMENT

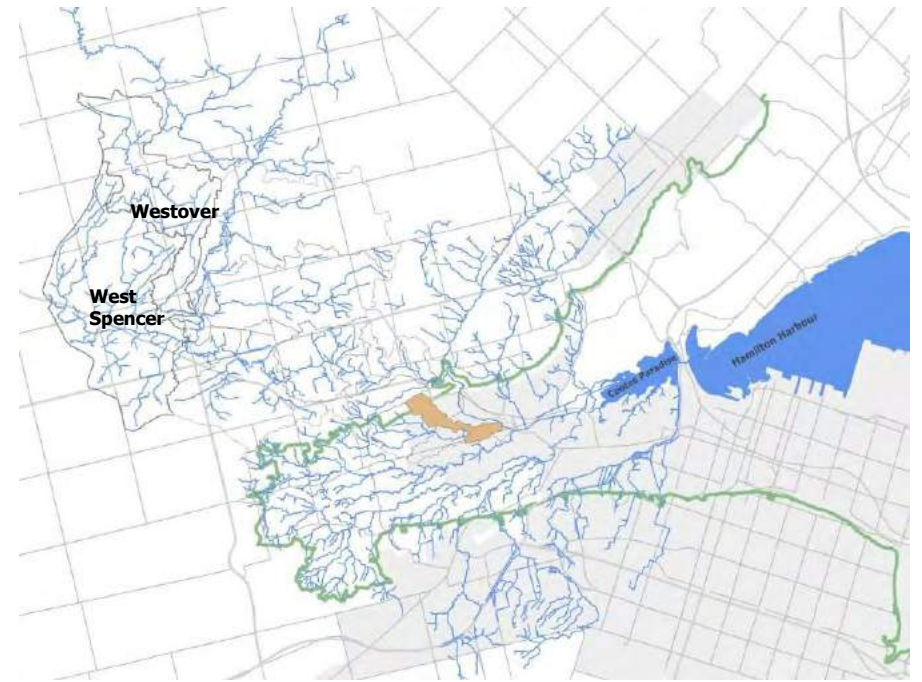
LOCATION	DATE	DESCRPTION
MSP319-A1	2010	Impaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

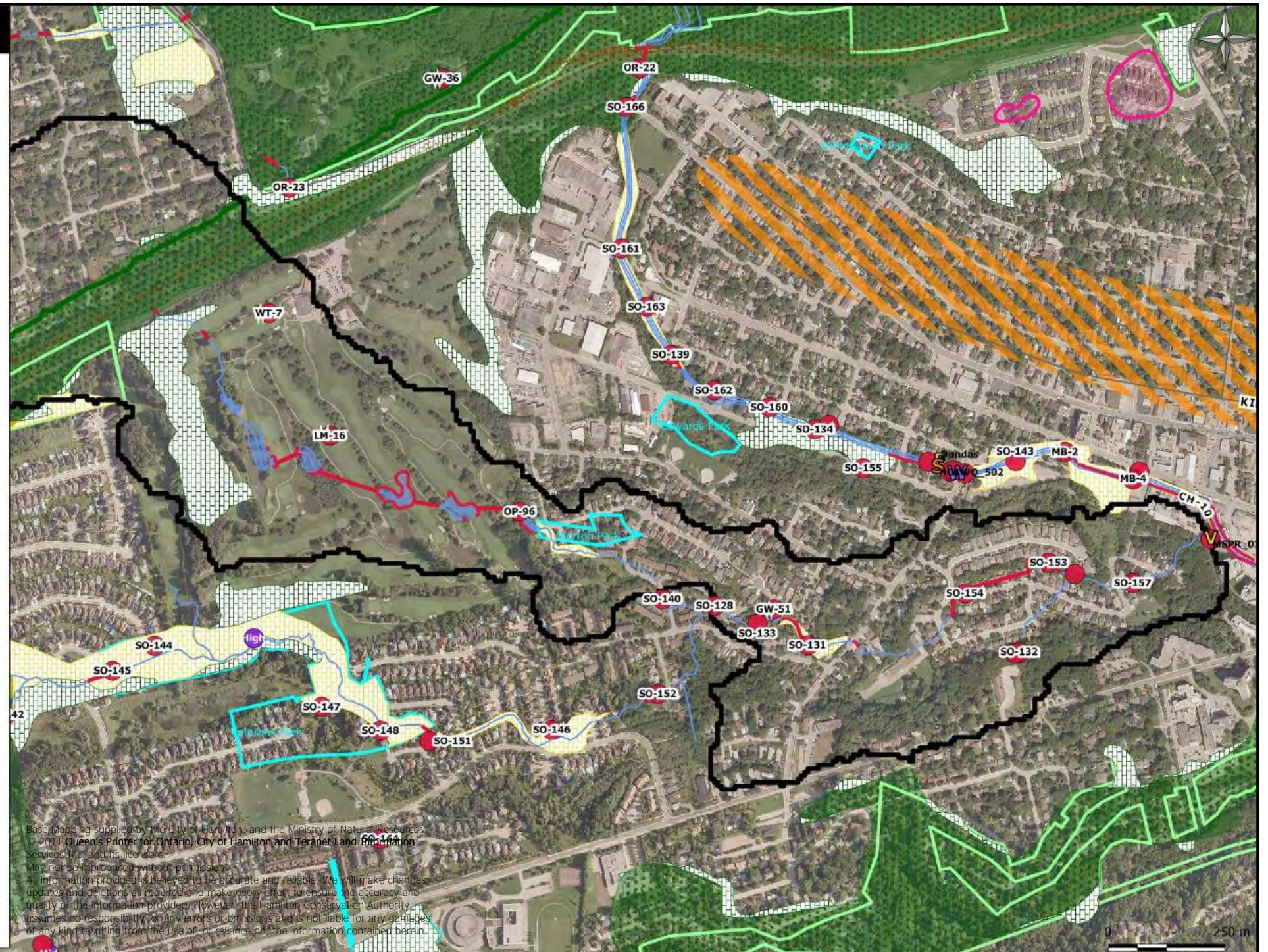
LOCATION	DATE	FLOW m ³ /s



DUNDAS VALLEY GOLF & COUNTRY CLUB CATCHMENT

DATA SHEETS

	Catchment Boundary
	Niagara Escarpment
	Natural Areas Inventory
	Wetland
	Meadow
	Forest
<u>Recommended for NAI 2010</u>	
	Forest
	Meadow
	Open Stream
	Closed Stream
	Surface Water
<u>Environmental Monitoring Stations</u>	
	HCA Fish and Benthic Invertebrates
<i>Water Quality (Benthic Assessment)</i>	
	Impaired
	Potentially Impaired
	Potentially Impaired - Unimpaired
	Potentially Impaired- Impaired
	HCA Flow and Precipitation
	SWP Flow Station
	PWQMN Surface Water Quality
	PGMN Groundwater Quality
<u>Environmental Stresses</u>	
	Current
	Anticipated
	Current
	Anticipated
	Current
	Anticipated
	Conservation Area
	Municipal Park
	GRIDS Intensification Area
	SWM Pond (Retrofit Priority)
	Pits and Quarries
	Hydro Corridor
	Rail Line



DUNDAS VALLEY GOLF & COUNTRY CLUB DATA SHEET

Table MS-15: Stresses Identified in the Dundas Valley Golf & Country Club Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
MB-5	Migration Barrier	☑		☑		☑	
GW-51	Abandoned Groundwater Well	☑		☑		☑	
WT-7	Water Taking	☑	☑	☑		☑	
OP-96	On-line Pond	☑		☑		☑	☑
SO-128	Stormsewer Outfalls	☑	☑	☑		☑	
SO-131	Stormsewer Outfalls	☑	☑	☑		☑	
SO-132	Stormsewer Outfalls	☑	☑	☑		☑	
SO-133	Stormsewer Outfalls	☑	☑	☑		☑	
SO-135	Stormsewer Outfalls	☑	☑	☑		☑	
SO-153	Stormsewer Outfalls	☑	☑	☑		☑	
SO-154	Stormsewer Outfalls	☑	☑	☑		☑	
SO-156	Stormsewer Outfalls	☑	☑	☑		☑	
SO-157	Stormsewer Outfalls	☑	☑	☑		☑	
LM-16	Land Maintenance Practices		☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

DUNDAS VALLEY GOLF & COUNTRY CLUB DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

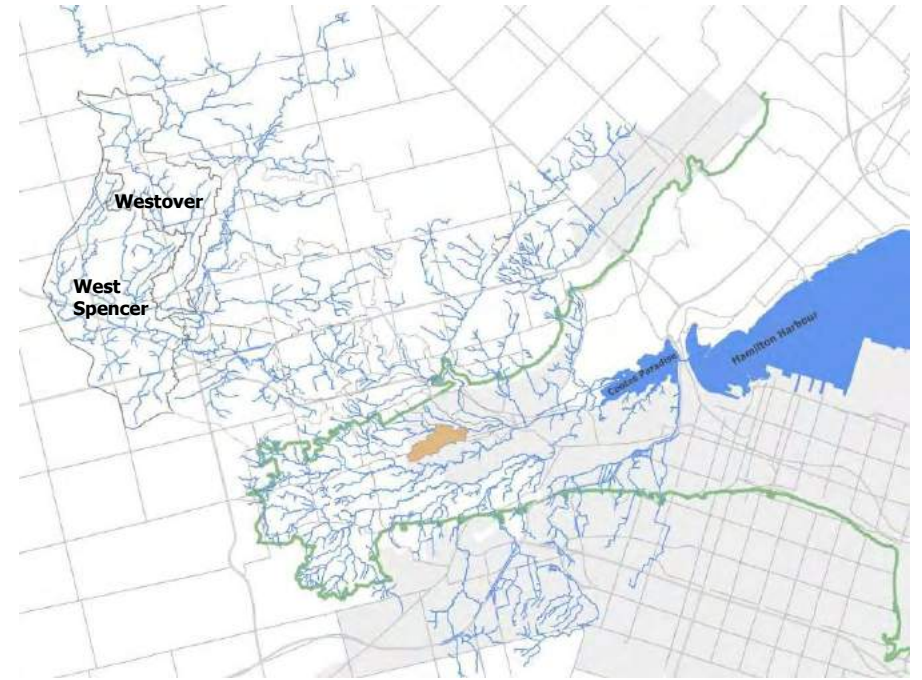
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m ³ /s



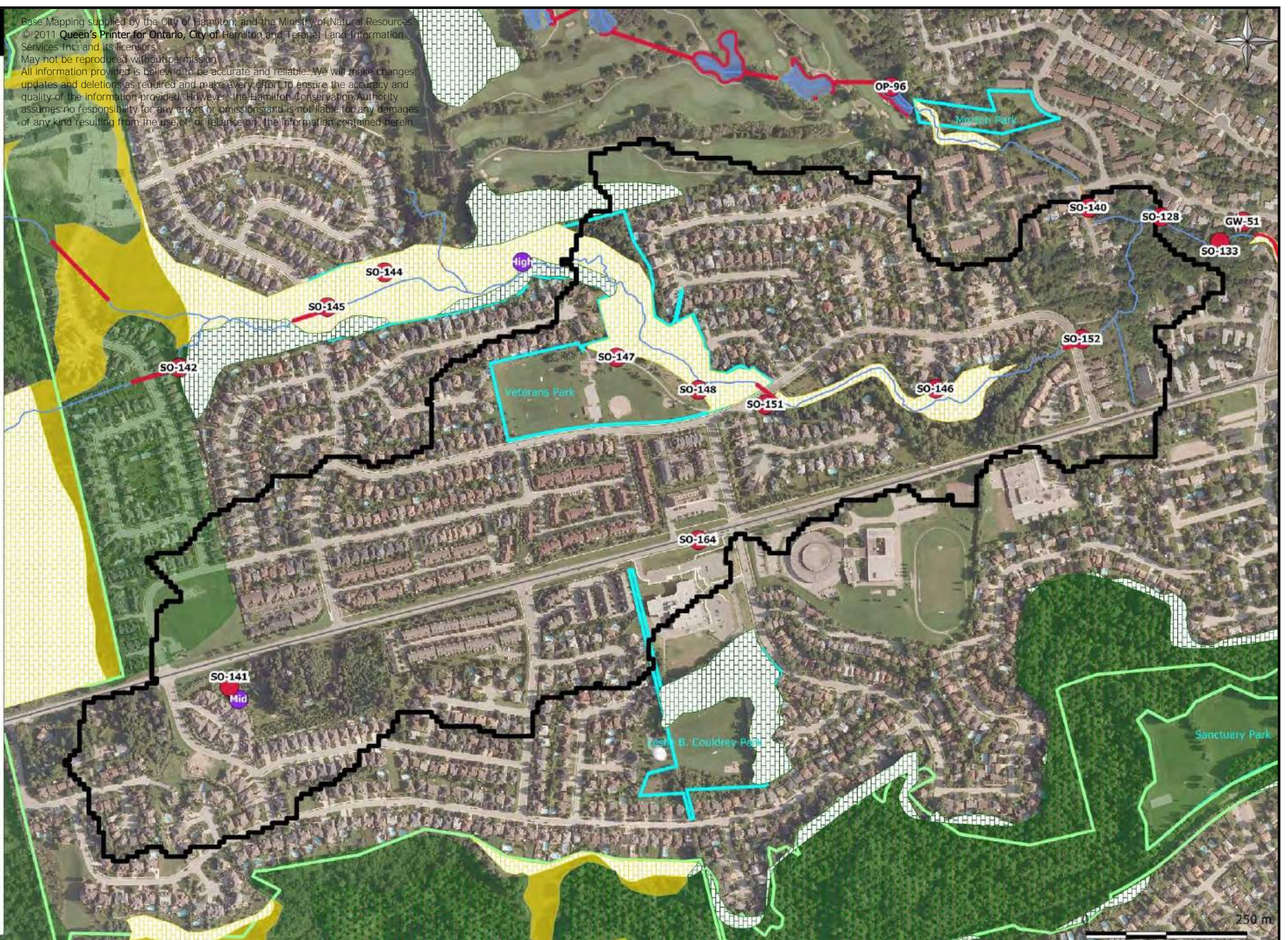
GOVERNORS LANE ESTATES CATCHMENT

DATA SHEETS

MS-13 Governors Lane Estates

-  Catchment Boundary
-  Niagara Escarpment
- Natural Areas Inventory**
 -  Wetland
 -  Meadow
 -  Forest
- Recommended for NAI 2010**
 -  Forest
 -  Meadow
- Open Stream** 
- Closed Stream** 
- Surface Water** 
- Environmental Monitoring Stations**
 -  HCA Fish and Benthic Invertebrates
 - Water Quality (Benthic Assessment)*
 -  Impaired
 -  Potentially Impaired
 -  Potentially Impaired - Unimpaired
 -  Potentially Impaired- Impaired
 -  HCA Flow and Precipitation
 -  SWP Flow Station
 -  PWQMN Surface Water Quality
 -  PGMN Groundwater Quality
- Environmental Stresses**
 -  Current
 -  Anticipated
 -  Current
 -  Anticipated
 -  Current
 -  Anticipated
- Conservation Area** 
- Municipal Park** 
- GRIDS Intensification Area** 
- SWM Pond (Retrofit Priority)** 
- Pits and Quarries** 
- Hydro Corridor** 
- Rail Line**

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GOVERNORS LANE ESTATES DATA SHEET

Table MS-16: Stresses Identified in the Governors Lane Estates Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
SO-140	Stormsewer Outfalls	☑	☑	☑		☑	
SO-141	Stormsewer Outfalls	☑	☑	☑		☑	
SO-146	Stormsewer Outfalls	☑	☑	☑		☑	
SO-147	Stormsewer Outfalls	☑	☑	☑	☑		
SO-148	Stormsewer Outfalls	☑	☑	☑	☑		
SO-151	Stormsewer Outfalls	☑	☑	☑		☑	
SO-152	Stormsewer Outfalls	☑	☑	☑		☑	
SO-164	Stormsewer Outfalls	☑	☑	☑		☑	
RB-533	Insufficient Riparian Buffer	☑		☑		☑	
RB-534	Insufficient Riparian Buffer	☑		☑		☑	
RB-540	Insufficient Riparian Buffer	☑		☑		☑	
RB-543	Insufficient Riparian Buffer	☑		☑		☑	

GOVERNORS LANE ESTATES DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

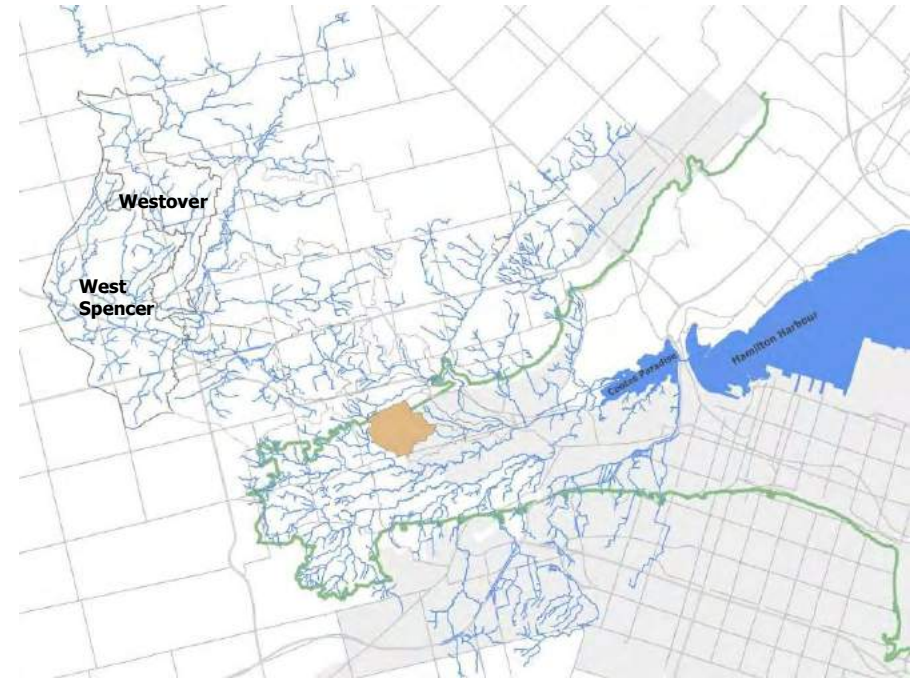
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

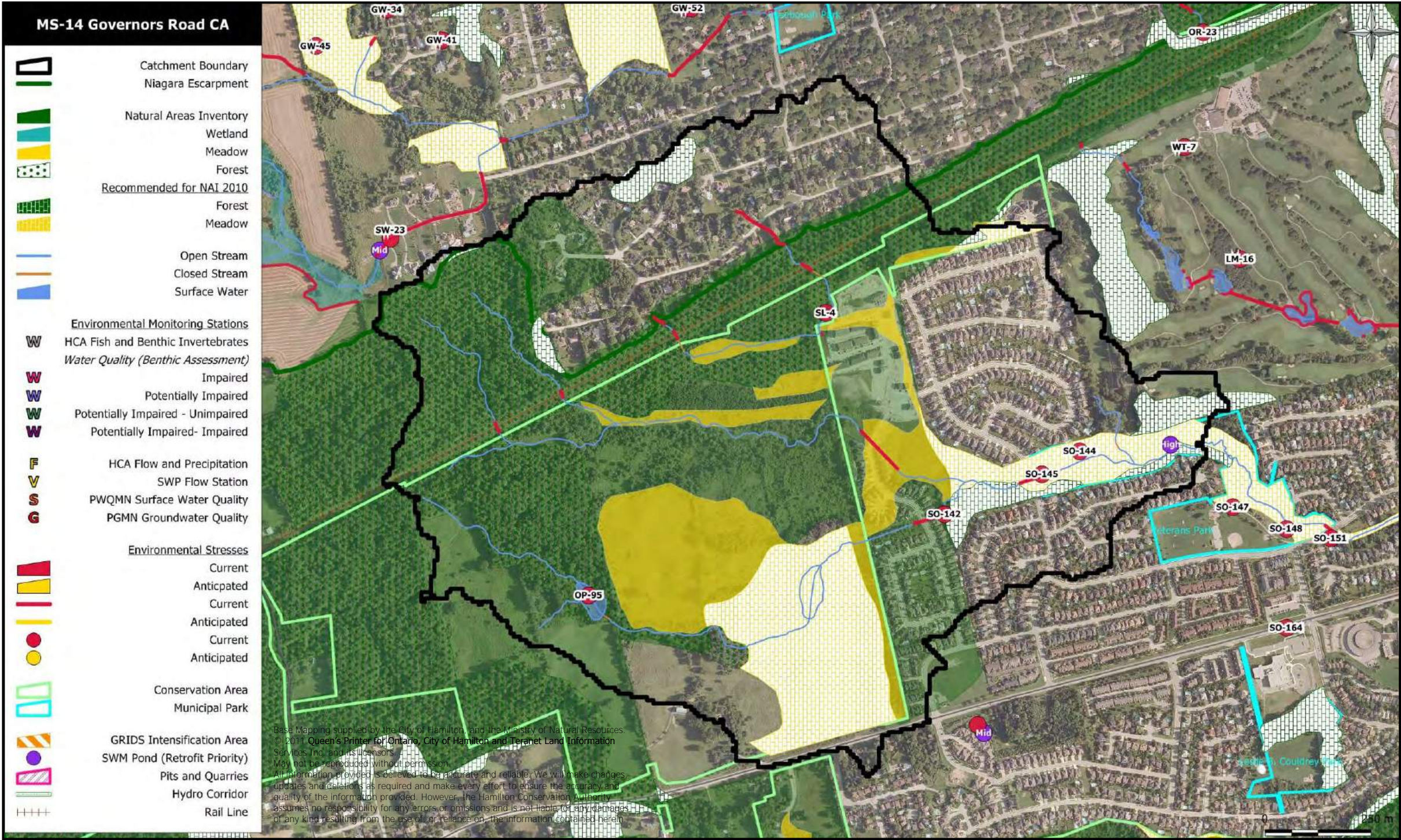
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s



GOVERNORS ROAD CONSERVATION AREA CATCHMENT

DATA SHEETS



GOVERNORS ROAD CONSERVATION AREA DATA SHEET

Table MS-17: Stresses Identified in the Governors Road Conservation Area Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
OP-95	On-line Pond	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SO-142	Stormsewer Outfalls	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
SO-144	Stormsewer Outfalls	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
SO-145	Stormsewer Outfalls	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
SL-4	Sediment Loading	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
RB-620	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-621	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-627	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-633	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-666	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-667	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-669	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-670	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-674	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-675	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-744	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-745	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-746	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-747	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-748	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-749	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-750	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-751	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB-752	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

GOVERNORS ROAD CONSERVATION AREA DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

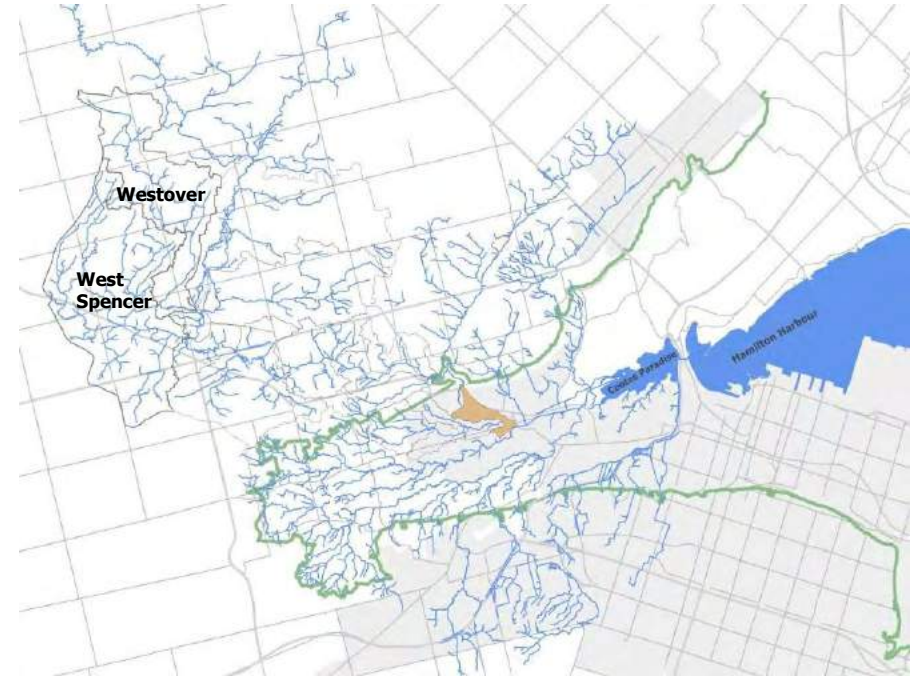
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

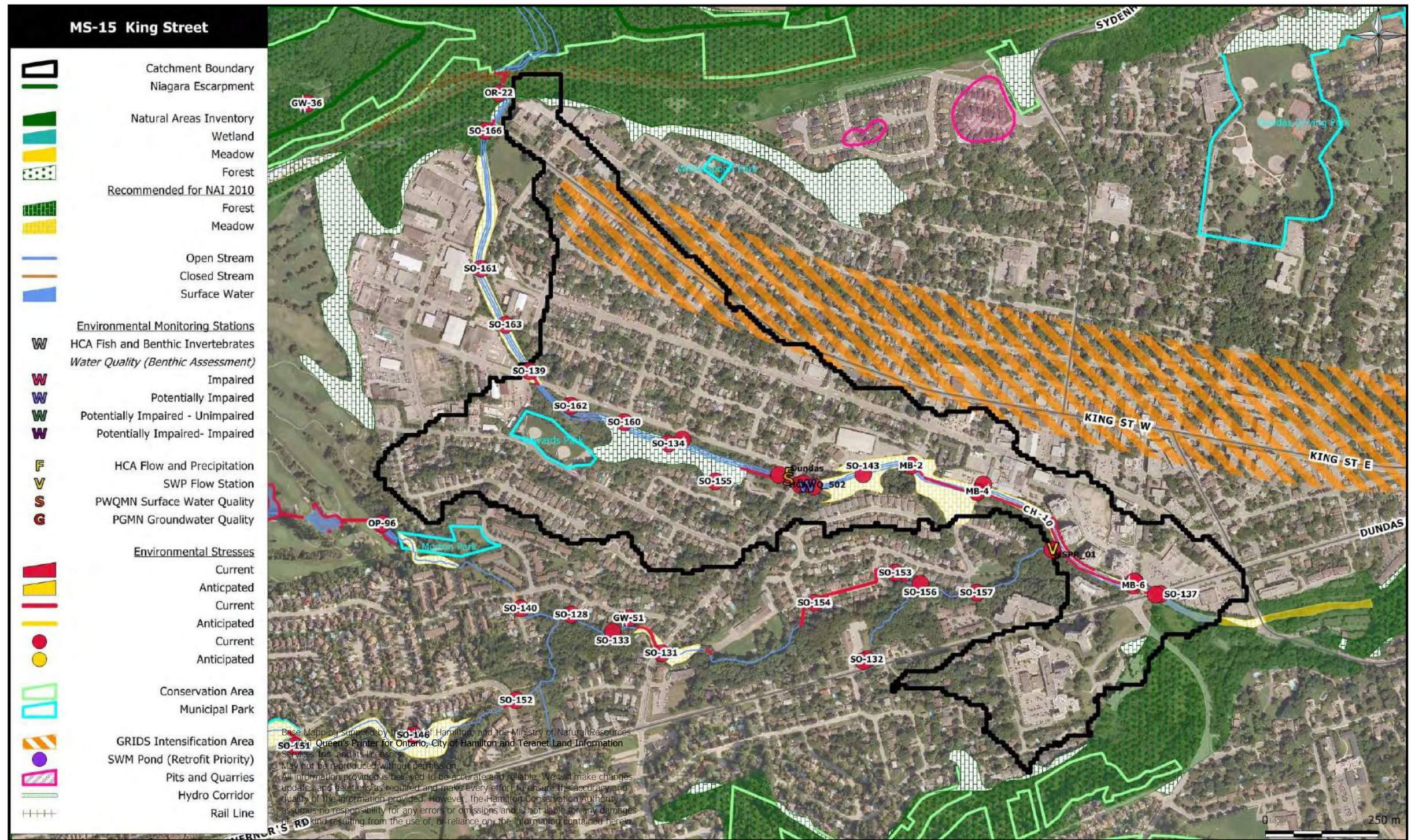
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s



KING STREET CATCHMENT

DATA SHEETS



KING STREET DATA SHEET

Table MS-18: Stresses Identified in the King Street Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
MB-2	Migration Barrier	☑		☑		☑	
MB-3	Migration Barrier	☑		☑		☑	
MB-4	Migration Barrier	☑		☑		☑	
MB-6	Migration Barrier	☑		☑		☑	
SO-129	Stormsewer Outfalls	☑	☑	☑		☑	
SO-130	Stormsewer Outfalls	☑	☑	☑		☑	
SO-134	Stormsewer Outfalls	☑	☑	☑		☑	
SO-136	Stormsewer Outfalls	☑	☑	☑		☑	
SO-137	Stormsewer Outfalls	☑	☑	☑		☑	
SO-138	Stormsewer Outfalls	☑	☑	☑		☑	
SO-139	Stormsewer Outfalls	☑	☑	☑		☑	
SO-143	Stormsewer Outfalls	☑	☑	☑		☑	
SO-149	Stormsewer Outfalls	☑	☑	☑		☑	
SO-150	Stormsewer Outfalls	☑	☑	☑		☑	
SO-155	Stormsewer Outfalls	☑	☑	☑		☑	
SO-158	Stormsewer Outfalls	☑	☑	☑		☑	
SO-159	Stormsewer Outfalls	☑	☑	☑		☑	
SO-160	Stormsewer Outfalls	☑	☑	☑		☑	
SO-162	Stormsewer Outfalls	☑	☑	☑		☑	
SO-167	Stormsewer Outfalls	☑	☑	☑		☑	
CH-10	Channelization	☑	☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

KING STREET DATA SHEET

FISHERIES ASSESSMENT

LOCATION	DATE	COMMON NAME	NO. IDENTIFIED	IN-STREAM TEMPERATURE	TEMPERATURE CLASSIFICATION
MSP339-A1	15-Jul-10	Blacknose dace	2	n/a	warmwater/coolwater
MSP339-A1	15-Jul-10	Brown bullhead	2	n/a	warmwater/coolwater
MSP339-A1	15-Jul-10	Creek chub	5	n/a	warmwater/coolwater
MSP339-A1	15-Jul-10	Largemouth bass	1	n/a	warmwater/coolwater
MSP339-A1	15-Jul-10	Longnose dace	134	n/a	warmwater/coolwater
MSP339-A1	15-Jul-10	Northern hog sucker	2	n/a	warmwater/coolwater
MSP339-A1	15-Jul-10	Rainbow darter	2	n/a	warmwater/coolwater

BENTHICS ASSESSMENT

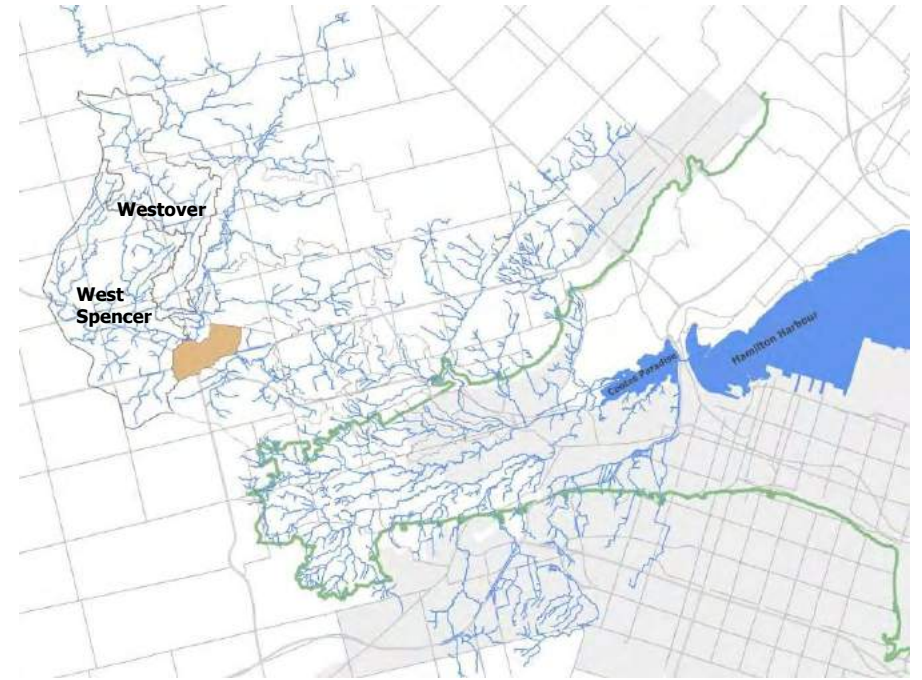
LOCATION	DATE	DESCRPTION
MSP399-A1	2010	Potentially Impaired

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS
HCAWQ_502	n/a	n/a	n/a	n/a

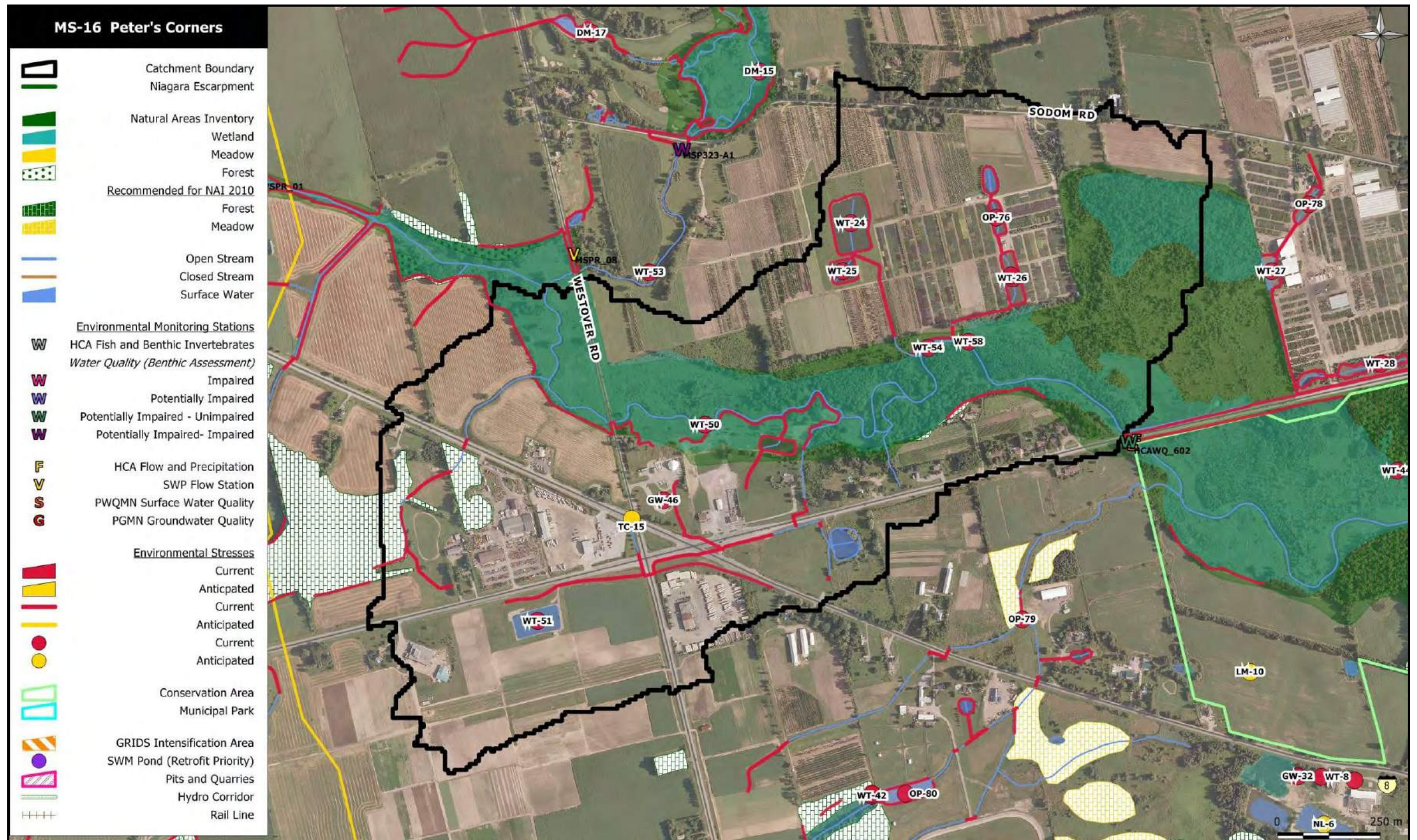
WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s
Dundas	n/a	n/a
MSPR_01	11/24/2006	3.11655
MSPR_01	6/18/2007	0.41907
MSPR_01	8/15/2007	0.12785
MSPR_01	9/21/2007	0.19171
MSPR_01	10/15/2007	0.14966
MSPR_01	5/28/2008	0.57806
MSPR_01	7/7/2008	0.37032



PETER'S CORNERS CATCHMENT

DATA SHEETS



PETER’S CORNERS DATA SHEET

Table MS-19: Stresses Identified in the Peter’s Corners Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
GW-46	Abandoned Groundwater Well	☑		☑		☑	
WT-24	Water Taking	☑	☑	☑		☑	
WT-25	Water Taking	☑	☑	☑		☑	
WT-26	Water Taking	☑	☑	☑		☑	
WT-50	Water Taking	☑	☑	☑		☑	
WT-51	Water Taking	☑	☑	☑		☑	
WT-52	Water Taking	☑	☑	☑		☑	
WT-54	Water Taking	☑	☑	☑		☑	
WT-58	Water Taking	☑	☑	☑		☑	
OP-76	On-line Pond	☑		☑		☑	☑
OP-77	On-line Pond	☑		☑		☑	☑
TE-2	Transportation Corridor Expansion	☑	☑	☑		☑	
RB (various-see appendix)	Insufficient Riparian Buffer	☑		☑		☑	

PETER’S CORNERS DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

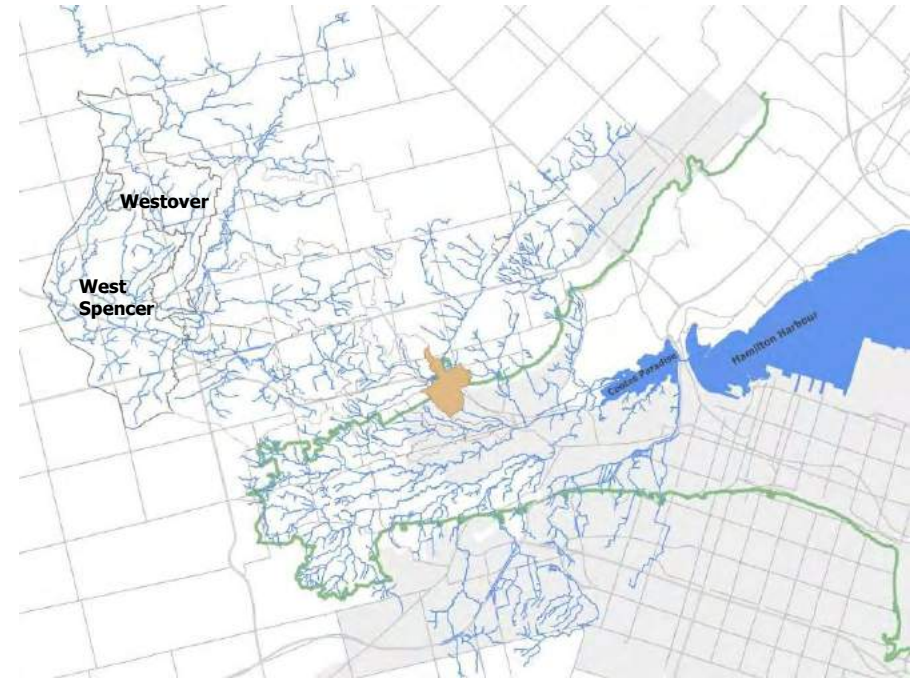
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s



WEBSTER'S FALLS CATCHMENT

DATA SHEETS

WEBSTER’S FALLS DATA SHEET

Table MS-20: Stresses Identified in the Webster’s Falls Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
GW-33	Abandoned Groundwater Well	☑		☑	☑		
GW-35	Abandoned Groundwater Well	☑		☑	☑		
GW-36	Abandoned Groundwater Well	☑		☑		☑	
GW-42	Abandoned Groundwater Well	☑		☑		☑	
SO-161	Stormsewer Outfalls	☑	☑	☑		☑	
SO-163	Stormsewer Outfalls	☑	☑	☑		☑	
SO-166	Stormsewer Outfalls	☑	☑	☑		☑	
OR-22	Outdoor Recreation Related Impacts	☑	☑	☑		☑	
OR-23	Outdoor Recreation Related Impacts	☑	☑	☑		☑	
RB-529	Insufficient Riparian Buffer	☑		☑		☑	
RB-530	Insufficient Riparian Buffer	☑		☑		☑	
RB-531	Insufficient Riparian Buffer	☑		☑		☑	
RB-535	Insufficient Riparian Buffer	☑		☑		☑	
RB-766	Insufficient Riparian Buffer	☑		☑		☑	
RB-767	Insufficient Riparian Buffer	☑		☑		☑	
RB-768	Insufficient Riparian Buffer	☑		☑		☑	

WEBSTER’S FALLS DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

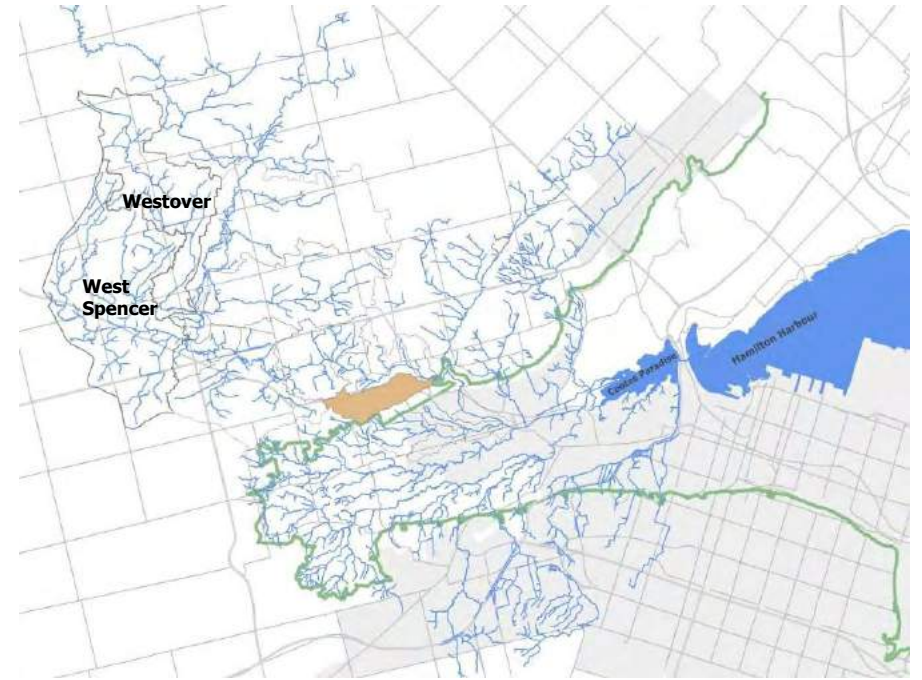
LOCATION	DATE	DESCRIPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s



WEIR'S LANE/HIGHWAY 8 CATCHMENT

DATA SHEETS

WEIR’S LANE/HIGHWAY 8 DATA SHEET

Table MS-21: Stresses Identified in the Weir’s Lane/Highway 8 Catchment

CURRENT STRESSES	DESCRIPTION	STEWARDSHIP ACTIONS			PUBLIC LAND	PRIVATE LAND	DFO COMP PROJECT POTENTIAL
		AWARENESS OPPORTUNITY	SPECIAL STUDY OPPORTUNITY	RESTORATION OPPORTUNITY			
GW-34	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-37	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-41	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-44	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-45	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-49	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-50	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-52	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
GW-53	Abandoned Groundwater Well	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
OR-20	Outdoor Recreation Related Impacts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
SW-23	Inadequate Stormwater Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
RB (various-see appendix)	Insufficient Riparian Buffer	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

WEIR’S LANE/HIGHWAY 8 DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

LOCATION	DATE	DESCRPTION

WATER QUALITY ASSESSMENT

LOCATION	DATE	PARAMETER	SAMPLE RESULTS	UNITS

WATER FLOW ASSESSMENT

LOCATION	DATE	FLOW m³/s

