

UPPER SPENCER CREEK SUBWATERSHED

STEWARDSHIP ACTION PLAN 2012

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UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

GEOGRAPHIC LOCATION

Upper Spencer Creek subwatershed is 35.64 km² in area and is comprised of seven catchment basins. In descending order from the headwaters to the outlet these are: Gore Road, Concession 10, Valens, Highway 97, Beverly Swamp, Concession 8 and Concession 7 (**Map US-1**). These catchments are 3.46km², 7.48km², 2.24km², 2.04km², 8.44km², 2.67km² and 8.24km² in size, respectively.

This subwatershed falls within the former municipal boundary of the Town of Flamborough in the City of Hamilton and in the Township of Puslinch of the greater County of Wellington. A large portion of the subwatershed is within City of Hamilton Ward 14, with the remaining portion in Ward 7 of Wellington County. The majority of the subwatershed is within Beverly Township, with smaller portions in Puslinch and West Flamborough townships.

The boundaries of the Upper Spencer Creek subwatershed and its associated catchments have recently been updated, however, only slight changes to the subwatershed boundaries have occurred as a result of more accurate mapping. The naming convention from the 1997 Spencer Creek Management Plan has been retained so that reference between previous reports is possible.

The northernmost point of the Upper Spencer Creek subwatershed originates immediately south of Concession 1 in Puslinch, between Wellington Road 35 and Puslinch Side Road No. 25. The westernmost boundary of the subwatershed originates at Wellington Road 35 where the boundary then follows a southeastern direction to Concession 6 West at Westover Road. The southernmost point of the subwatershed is half way between Concessions 6 and 5 West, just west of Middletown Road. From the southernmost point, the subwatershed boundary moves northeast to its easternmost point, just west of Brock Road between Concession 8 West and Safari Road, where the boundary then follows a northwest direction back to Concession 1 and Puslinch Side Road No. 25.

Upper Spencer Creek joins Flamborough Creek at the southeast corner of Concession 6 West and Middletown Road. Fletcher Creek flows into Upper Spencer Creek halfway between Regional Road 97 and Concession 8 West in the middle of the Beverly Swamp.

The rural settlement areas of Beverly Hills and Valens fall within this subwatershed. Regional Road 97 passes through this subwatershed. Other frequently traveled roads include Gore and Safari Roads and Concessions 6 and 8 West.



UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

HYDROLOGY

Surface Water

Upper Spencer Creek is one of 15 subwatersheds of Spencer Creek that drain a 278 km² area into Cootes Paradise Marsh and ultimately Hamilton Harbour. Upper Spencer Creek subwatershed has a drainage area of 35.64 km². The length of Upper Spencer Creek is approximately 23km from the headwaters to the confluence with Flamborough Creek; however, the combined length of the creek and all of its tributaries is 56.5 km.

Upper Spencer drains the Galt Moraine and the wetlands that exist on the limestone plain. The two main headwater tributaries flow through the Valens Conservation Area operated by HCA. Within this Conservation Area, the tributaries are part of the Valens Reservoir and Provincially Significant Wetland; they empty into the reservoir (Halton-Hamilton Source Water Protection, 2010).

The Valens Reservoir was built in 1966, located near the community of Valens in Upper Spencer Creek. The area of this reservoir is about 0.76km² and the maximum depth is 4.6m. The reservoir level is controlled by a dam that is monitored daily (Halton-Hamilton Source Water Protection, 2008). Water discharge amounts are determined according to the Valens Dam Operation, Maintenance and Surveillance Manual. The primary uses of the reservoir are for flood control, low flow augmentation, outdoor recreation and water storage. Normal summer recreation levels occur during June, July, August and September unless drought or flood conditions dictate a change in reservoir levels (Halton-Hamilton Source Water Protection, 2008).

In the Valens Reservoir, average water surface elevation in the winter is 273 masl and in the summer for recreational purposes, it is 275 masl. During winter and summer, the water storage volume is 260,000m³ and 1,209,000m³ respectively. The maximum storage capacity for the reservoir is approximately 2,035,000m³. Valens Reservoir receives drainage water from an area of about 10.9 km² (Halton-Hamilton Source Water Protection, 2008).

Above the reservoir, the headwaters are classified as being cold water conditions; however, water leaving the reservoir is warm (Halton-Hamilton Source Water Protection, 2008). Data collected at the Safari Road monitoring station within the lower reach of the Upper Spencer Creek subwatershed indicated that warmwater habitat also exists at this location (HCA; 2009, 2011).

The creek flows into the Beverly Swamp Complex where it is joined by Fletcher Creek. The southern portion of the subwatershed includes another drumlin field and an online pond. Small tributaries drain between the drumlins adding to the stream flow of the main channel. Upper Spencer Creek is joined by Flamborough Creek before becoming Middle Spencer Creek (Halton-Hamilton Source Water Protection, 2010).

The forested wetland of Beverly Swamp serves a highly significant hydrological function as a natural storage reservoir, which moderates stream flow within and across the headwaters of the Spencer Creek

system and attenuates flood peaks during high runoff periods. Standing waters are present in the swamp from spring to middle to late summer. The swamp helps to augment the flow downstream during low flow periods and provides groundwater recharge. The headwaters of the Spencer Creek system include high quality cold water fish habitat. The forested cover and baseflow contribution provided by this swamp maintain downstream water quality (Hamilton Naturalists" Club, 2003).

For a more detailed description of the hydrology of Upper 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 Upper Spencer Creek as having an excellent surface water quality score at the Safari Road monitoring station and a good surface water quality score at the next station downstream. The Assessment Report also identified the Upper Spencer Creek subwatershed as having a low surface water stress 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 is one flow and precipitation monitoring station for the HCA hydrometeorological network in the Upper Spencer Creek subwatershed. This is also a surface water quality sampling station. There is also one flow and water quality monitoring station for the Halton Hamilton Source Protection Region is this subwatershed.

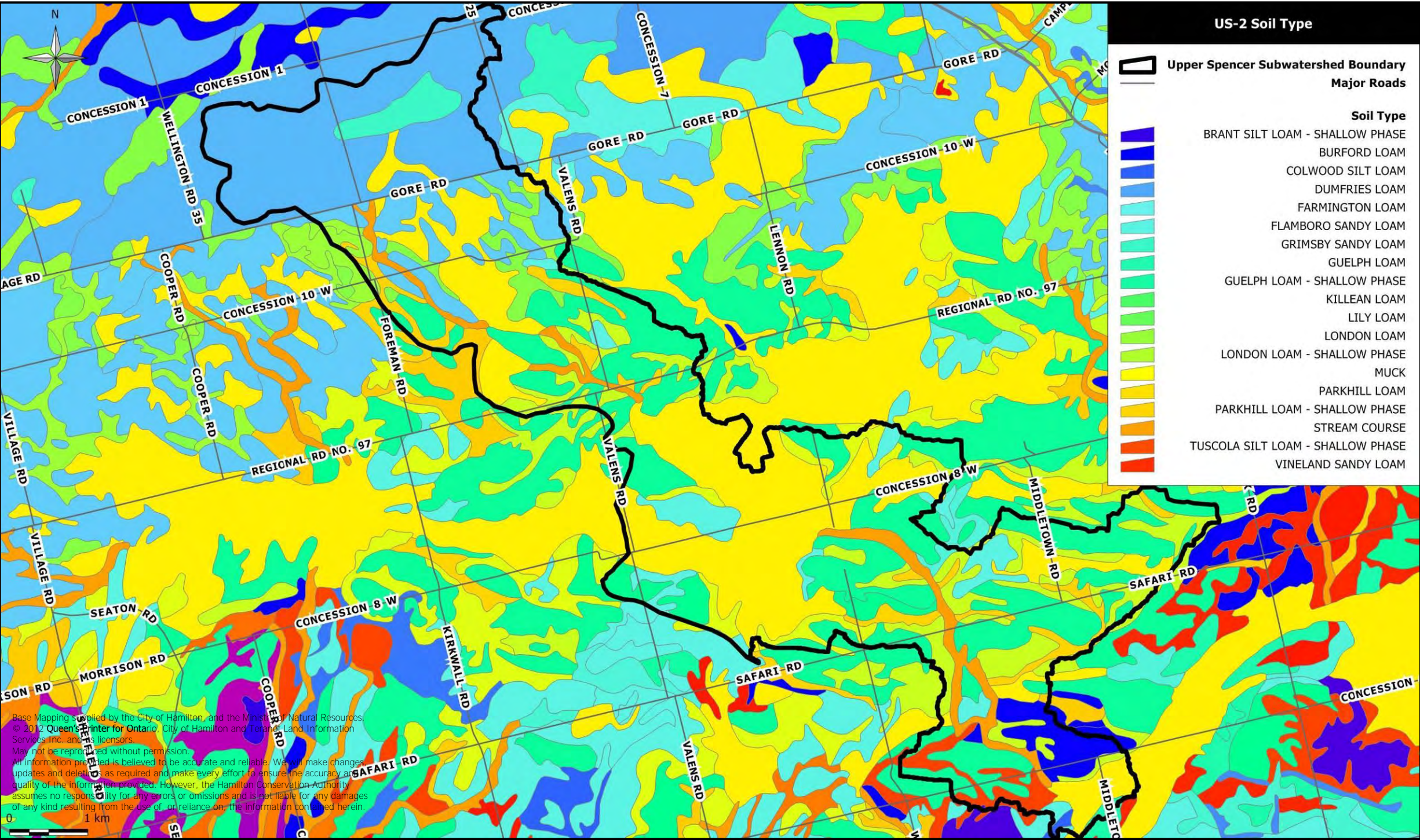
Groundwater

The headwaters of Upper Spencer Creek receive significant groundwater discharge from the Beverly Swamp and Westover Lowland Forest. The Strabane and Westover Drumlin fields are partially within this subwatershed, and these are groundwater recharge areas. A portion of the Sheffield-Rockton Wetland Complex is also situated within the subwatershed. There are over 900ha of wetlands within the Upper Spencer Creek subwatershed, representing 27.4% of its area (Halton-Hamilton Source Water Protection, 2008).

The HHSWP 2010 Draft Proposed Assessment Report identified small areas around the Valens Reservoir to be significant groundwater recharge areas. The majority of the subwatershed, excluding the northernmost portion and a small area east of Westover, has also been identified as a highly vulnerable aquifer. At the time of this report, the Draft Proposed Assessment Report is currently being reviewed.

The 2010 Draft Proposed Assessment Report also assessed the intensity of groundwater capture and the potential for groundwater contamination. Annual and monthly Water Quantity Stress Assessments did not yield a significant or moderate stress result with respect to groundwater quantity in the Upper Spencer Creek subwatershed. Therefore no Tier 2 report is recommended for this subwatershed.

There is one Provincial Groundwater Monitoring Network well within the Upper Spencer Creek subwatershed. Data collected through this network is included in Appendices D & E of this document.



SOILS AND PHYSIOGRAPHY

The soil parent material 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, 2008). The Hamilton Watershed is situated adjacent to the Horseshoe Moraines physiographic region as defined by Chapman and Putnam (1984). Within the study area, the eastern limb of the Horseshoe Moraines physiographic region is characterized by northeast-southwest trending bands of hummocky terrain contacting three distinct end Moraines, from northwest to southeast: the Paris, Galt and Moffat Moraines, as defined by Karrow (1987). The position of each of these moraines represents a pause in the recession of the Ontario glacial lobe. The moraines are comprised of relatively thick accumulations of sandy till with a high boulder and pebble content, consisting of Paleozoic clasts and Precambrian glacial erractics, overlying dolostone bedrock. The topographically elevated lands of the Galt Moraine form the major surface drainage divide along the northwest boundary of the Watershed.

In some areas the moraines are hummocky with local relief of 30m or more, steep irregular slopes and basins of closed drainage, as characterized by frequent small ponds and marshy areas. The moraines are associated with broad and extensive terraced deposits of glacial outwash and kame sand and gravel deposits. Extensive wetland areas are generally found associated with the glacial outwash deposits within these lower lying areas. Series of northwest-southeast trending drumlins are situated to the north and south of the moraines (Karrow, 1987).

The orientation of the Paris, Galt and Moffat end moraines, drumlins, and glacial striae in the area suggest a northwestward movement of ice from the Lake Ontario basin (Karrow, 1987). The moraines likely represent a series of recessional end moraines with Paris Moraine being formed first followed by the Galt and Moffat Moraines, respectively. The outwash plain situated between the Paris and Galt Moraines was likely formed primarily by glacial meltwater associated with the formation of the Galt Moraine during a temporary halt in the ice retreat.

In the northern portion of the Spencer Creek watershed, the Guelph drumlins rest on dolostones of the Amabel and Guelph Formations. The till in these drumlins is loamy and calcareous, and was derived mostly from dolostone of the Amabel Formation, exposed along the Niagara Escarpment (Chapman and Putnam, 1984). The till throughout is stony with large surface boulders being more numerous is some localities than others. The drumlins create local relief in an otherwise relatively flat landscape and influence surface water drainage patterns.

The majority 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 Flamborough Plain is drained primarily by the Beverly Swamp/Spencer Creek complex. The wetlands and gravels of this upland plain provide baseflow to these streams (HRCA, 1983). 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 Beverly Swamp is an important hydrologic feature of the Spencer Creek Watershed and is located in the northwestern part of the Flamborough Plain. The basin at the headwaters of the Beverly Swamp has very little topographic relief, ranging between approximately 265 and 270masl. Small round hills formed within the swamp by a few metres have highly resistant bedrock ridges. Drumlins (to 305 masl elevation) and end moraines (285 to 309 masl elevation) exist in the upland areas bordering the Beverly Swamp (Hamilton Naturalists" Club, 2003). One to two metres of organic soils have accumulated in the swamp and some peat extraction has occurred (HHSWP, 2010).

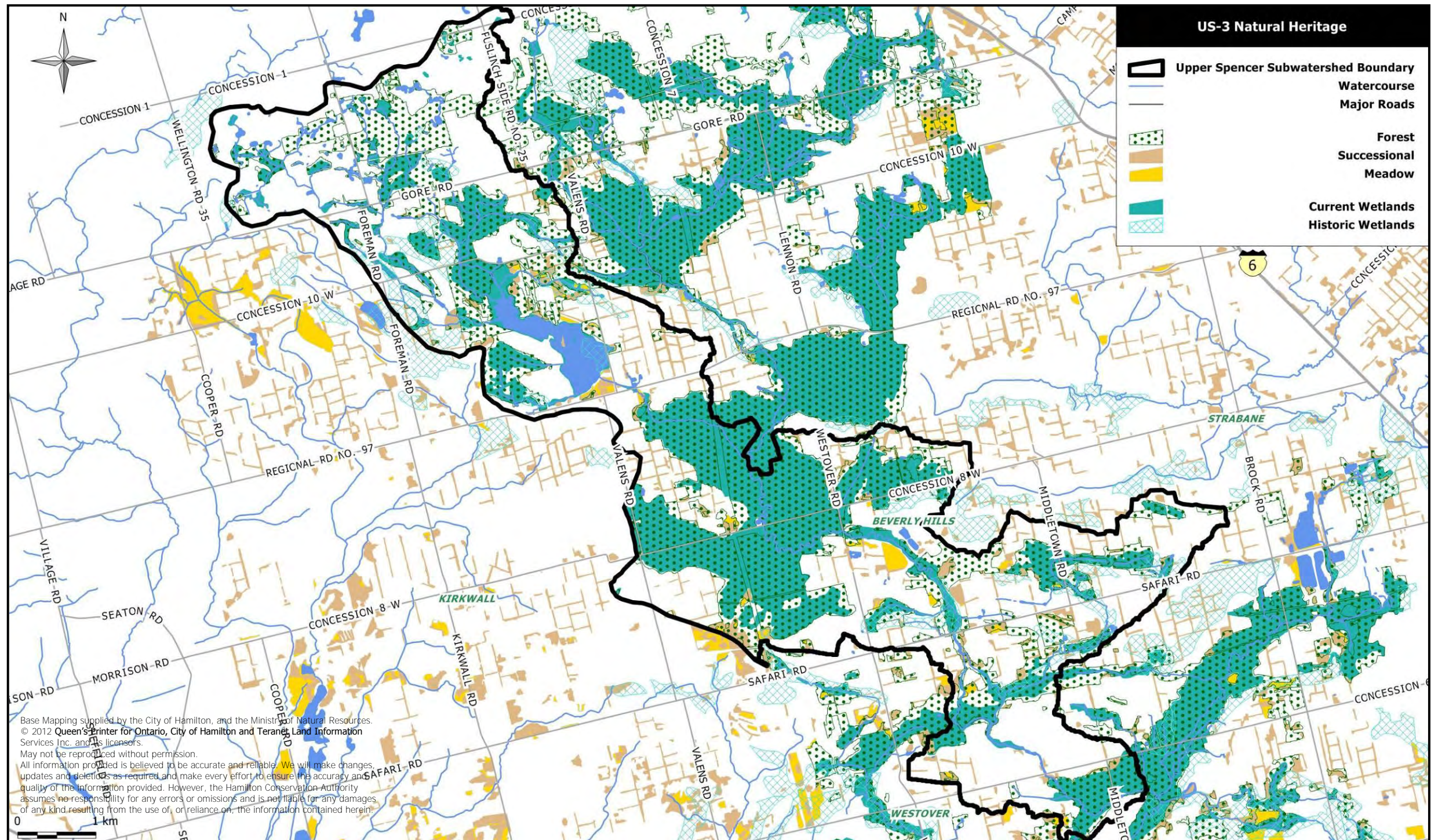
There are several types of soils within the Spencer Creek Watershed. In the Fletcher Creek, Upper Spencer Creek and Flamborough Creek tributary systems of the Spencer Creek Watershed, soil classes are dominated by sandy loam, loam and organic soils. Soils are sandy loams in the northern areas of the Fletcher Creek and Upper Spencer Creek subwatersheds. In the middle and lower area of these subwatersheds, soils are loamy and organic. Throughout the extensive Beverly Swamp area in the watershed, organic deposits have accumulated. On the periphery of the continuous wetland in the swamp area, small patches of other soils are locally present. These soils are well-drained Farmington loam on bedrock ridges and imperfectly to poorly drained loams of the London, Killean, Parkhill and Lily series (Hamilton Naturalists" Club, 2003).

The soil characteristics of the Upper Spencer Creek subwatershed are shown on **Map US-2**. Eighteen soils complexes have been identified within the Upper Spencer Creek subwatershed, as summarized in **Table US-1**.

Table US-1: Soil and Erosion Potential in the Upper Spencer Creek Subwatershed

| Soil Type | Natural Drainage | Erosion Factor* | Topography (slope)** | Erosion Potential |
|--|---------------------|-----------------|----------------------|-------------------|
| Br – Brant Silt Loam – Shallow Phase | Well drained | 2 | 3.5 | Moderate |
| Bu – Burford Loam | Well drained | 4 | 10.8 | Very Low |
| Co – Colwood Silt Loam | Poorly drained | 2 | 0.2 | Very Low |
| DI – Dumfries Loam | Well drained | 4 | 15.9 | Moderate |
| FI – Farmington Loam | Well drained | 1 | 4.3 | Moderate |
| Fo – Flamborough sandy loam | Poor | 4 | 1.2 | Very Low |
| Gi – Grimsby Sandy Loam | Well drained | 4 | 3.5 | Very Low |
| GI – Guelph Loam | Well drained | n/a | 10.9 | n/a |
| Gs – Guelph Loam – Shallow Phase | Well drained | 1 | 3.5 | Moderate |
| KI – Killean Loam | Imperfectly drained | 2 | 3.5 | Moderate |
| Li – Lily Loam | Poorly drained | 3 | 1.2 | Very Low |
| LI – London Loam | Imperfectly drained | 2 | 3.1 | Moderate |
| Ls – London Loam – Shallow Phase | Imperfectly drained | 2 | 2.1 | Moderate |
| M – Muck | n/a | n/a | n/a | n/a |
| PI – Parkhill Loam | Poorly drained | 2 | 1.2 | Very Low |
| Ps – Parkhill Loam – Shallow Phase | Poorly drained | 3 | 1.2 | Very Low |
| Stream Course | n/a | n/a | n/a | n/a |
| Tu – Tuscola Silt Loam – Shallow Phase | Imperfectly drained | 2 | 3.5 | Moderate |
| Vi – Vineland Sandy Loam | Imperfectly drained | 4 | 1.2 | Very Low |

* Based on the Region of Hamilton-Wentworth Soil Summary Sheet
** Based on the Ontario Environmental Farm Plan Workbook, Ontario Farm Environmental Coalition
***Percentage based on the average slope throughout the subwatershed



UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

NATURAL HISTORY & SIGNIFICANT SPECIES

This subwatershed reaches into the Beverly Swamp, Valens Conservation Area and Strabane Southwest Drumlin Environmentally Significant Areas (ESA's). The subwatershed also contains portions of the Westover Lowland Forest, Westover Drumlin Field and Hayesland Swamp ESA's.

Beverly Swamp has been designated as Life Science Area of Natural or Scientific Interest (ANSI) by the Ministry of Natural Resources (MNR).The Westover Drumlin Field is also designated as an Earth Sciences ANSI by the MNR. 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).

The Beverly Swamp is one of the largest remaining tracts of intact, lowland swamp forest in Southern Ontario, and is the best example of swamp forest within the Ontario Carolinian Zone. Because of its size and uniqueness, the Beverly Swamp serves many important functions for the City of Hamilton (Dwyer *et al.*, 2003).

There are also many important plant communities within the area. Because many of these communities no longer exist in the surrounding areas due to development and other changes to the natural landscape, the Beverly Swamp serves as a botanical reservoir. These plant communities also help to maintain significant faunal populations of mammals, birds, reptiles, and amphibians. In addition, the area's size and continuity, rare to the Hamilton area, support species that require interior forest habitat. Unfortunately, the area has been fragmented by utility corridors and roads (Dwyer *et al.*, 2003).

Natural vegetation covers 15.45 km² or 43.4% of Upper Spencer Creek subwatershed. The Hamilton Conservation Authority owns a significant portion of this natural area as they own 7.35 km² or 20.6% of the lands within the subwatershed.

Table US- 2: Natural Land Cover Statistics

| Forest Cover (km ²) | Wetland Cover (km ²) | Meadow Cover (km ²) | Stream Length (km) |
|---------------------------------|----------------------------------|---------------------------------|--------------------|
| 13.59 | 10.03 | 1.3 | 56.5 |

The current natural land cover statistics for the area are noted within **Table US-2**. Based on the digital data provided for this analysis, forest cover accounts for 38.13% of this subwatershed, while meadow cover is 3.6% of the land base. Stream length of Upper Spencer Creek and all its tributaries is 56.5 km. Map **US-3** illustrates the natural heritage of the Upper Spencer Creek subwatershed.

28.14% of the landscape is wetland. 88.7% or 8.9 km² of those 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 shows that 2.4 km² of wetlands in this subwatershed were lost before 1967 or between 1967 and 1982. Historical information was not recorded for forest or meadow cover. It is known that land use throughout the 20th century altered the natural heritage systems within this southern Ontario and that 90% of the original upland woodlands were converted to non-forest land uses by 1920 (Larsen *et al.*, 1999).



UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

NATURAL HISTORY & SIGNIFICANT SPECIES

Numerous fisheries and benthic macroinvertebrates monitoring stations have been sampled in Upper Spencer Creek between 1970 and 2011. 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 one ecological monitoring station in the Upper Spencer Creek subwatershed will be monitored annually and three other sites will be monitored in Year 1 of a three year cycle. The monitoring stations are in the Gore Road, Concession 8 and Concession 7 catchments. The most recent year of fisheries data from the three year cycle are listed in the corresponding catchment datasheet in the remainder of this document. All other available data for these and other historic monitoring stations are included in Appendix B.

In the headwater tributaries of Spencer Creek (Fletcher, Upper Spencer, Flamborough, Upper West Spencer), daily maximum temperatures during the summer months typically range from 10°C to 21°C, occasionally exceeding this range up to 25°C. Overall, coldwater conditions are maintained throughout these upper reaches due to groundwater discharge which occurs in these areas. However, immediately below Valens Reservoir, temperatures have been documented to rarely go below 20°C, reaching temperatures up to 26°C (HRCA, 1993). Temperatures gradually decrease passing through Beverly Swamp, receiving coldwater inputs from Fletcher Creek (HHSWP, 2008).

Since the benthic monitoring program began at HCA in 1999, water quality conditions in the Fletcher Creek and Upper Spencer Creek (or Vanderbrug Creek) subwatersheds have changed little in that time, and have remained virtually unchanged for over 40 years (Department of Commerce and Development, 1960). The composition of stream invertebrates at several stations across these subwatersheds indicates that water quality conditions are largely unimpaired, having consistently low proportions of pollution-tolerant organisms and higher densities of mayfly, stonefly and caddisfly species indicative of permanent, clear, cold-water conditions. The habitat conditions at these sites thus are ideal for brook trout (Griffiths; 1999, 2003).

The Upper Spencer Creek, Fletcher Creek and Flamborough Creek subwatersheds have all been historically characterized as coldwater fish habitat (Department of Commerce and Development, 1960). The watercourses in these subwatersheds maintain coldwater conditions throughout the year largely due to the presence of substantial groundwater discharge, extensive

intact riparian forest cover, and negligible amounts of impervious cover (Dwyer *et al.*, 2003; HCA, 2005a). As a result, reproducing brook trout populations still persist in these subwatersheds (HCA; 1993, 1995, 1998, 2000, 2005c). Endemic to North America, brook trout (*Salvelinus fontinalis*) occur in clear, cool, well-oxygenated streams and lakes that are heavily fed by groundwater and maintain temperatures below 20°C (Scott and Crossman, 1973).

Other cold to coolwater indicator species, including mottled sculpin (*Cottus bairdi*), northern redbelly dace (*Phoxinus eos*), finescale dace (*Phoxinus neogaeus*) and pearl dace (*Margariscus margarita*) have been recorded in these subwatersheds in various studies (HCA; 1993, 1995, 1998, 2000, 2005c). Mottled sculpin occurs in cool streams and lakes across Canada, and are most associated with habitats containing brook trout (Scott and Crossman, 1973). Pearl, finescale and northern redbelly dace are commonly found together and are typically associated with coolwater habitats in bogs, creeks and lakes throughout Ontario (Scott and Crossman, 1973).

Annual monitoring of the fish population downstream of Safari Road shows that the site has been relatively stable since 2005, receiving an Index of Biotic Integrity score of „fair“. There was a slight decline in 2006 possibly due to a decrease in the number of fish caught but it remained „fair“ as other years (HCA, 2009). The historic Redside Dace (*Clinostomus elongates*) and Brook Trout (*Salvelinus fontinalis*) populations in this system provide that the health of this system is a priority.

Redside dace (*Clinostomus elongatus*) was historically documented in these subwatersheds as recently as 1998, but has not been observed since that time (Holm *et al.*, 1998). The redside dace is a colourful minnow species that prefers clear, cool, flowing water with gravel or stoney substrates, with an acute sensitivity to turbidity (Scott and Crossman, 1973). This species has a limited distribution in North America, and is found only in clear streams flowing into western Lake Ontario within Canada. Within the Hamilton Watershed, redside dace were historically documented in the Fletcher Creek, Flamborough Creek, Upper Spencer Creek, and Westover Creek Subwatersheds, but recent studies have indicated that their distribution in this region has been substantially reduced, with one individual most recently observed in Upper Spencer Creek in 1998 (HCA, 2005b). The redside dace is considered to be a species of “Special Concern” by COSEWIC, “Threatened” by COSSARO, and is currently on Schedule 3 of SARA (Environment Canada, 2005). The main factors which have adversely affected redside dace populations are destruction and degradation of habitat through siltation, removal of bank cover, and water quality deterioration (HHSWP, 2008).

UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

NATURAL HISTORY & SIGNIFICANT SPECIES

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

Certain species have been classified by COSEWIC, the Committee on the Status of Endangered Wildlife in Canada and COSSARO the Committee on the Status of Species at Risk in Ontario as being at risk. Each species on the list is given a status depending on the degree of risk: Extinct, Extirpated, Endangered, Threatened and Special Concern. The species listed below have been designated by COSEWIC under the Species at Risk Act and COSSARO under the Ontario Endangered Species Act and can be found within the Upper Spencer Creek subwatershed. The COSEWIC and COSSARO statuses don't always coincide for each species, therefore some species will be on more than one list.

It will be important to create awareness and undertake habitat restoration activities related to preserving and restoring ecological linkages in order to support these at risk species. Many of these species have recovery strategies in place or in development. Species with recovery strategies and the status of those strategies are listed below.

Species with Recovery Strategies

| Species | Recovery Strategy Status |
|--------------------|--------------------------|
| Butternut | Completed and available |
| Acadian Flycatcher | Completed and available |

Extirpated

- Passenger Pigeon

Endangered

- Acadian Flycatcher
- Butternut
- Cerulean Warbler
- Henslow's Sparrow

Special Concern

- Canada Warbler
- Eastern Milksnake
- Golden-winged Warbler
- Louisiana Waterthrush
- Monarch
- Red-headed Woodpecker
- Ribbon Snake
- Snapping Turtle

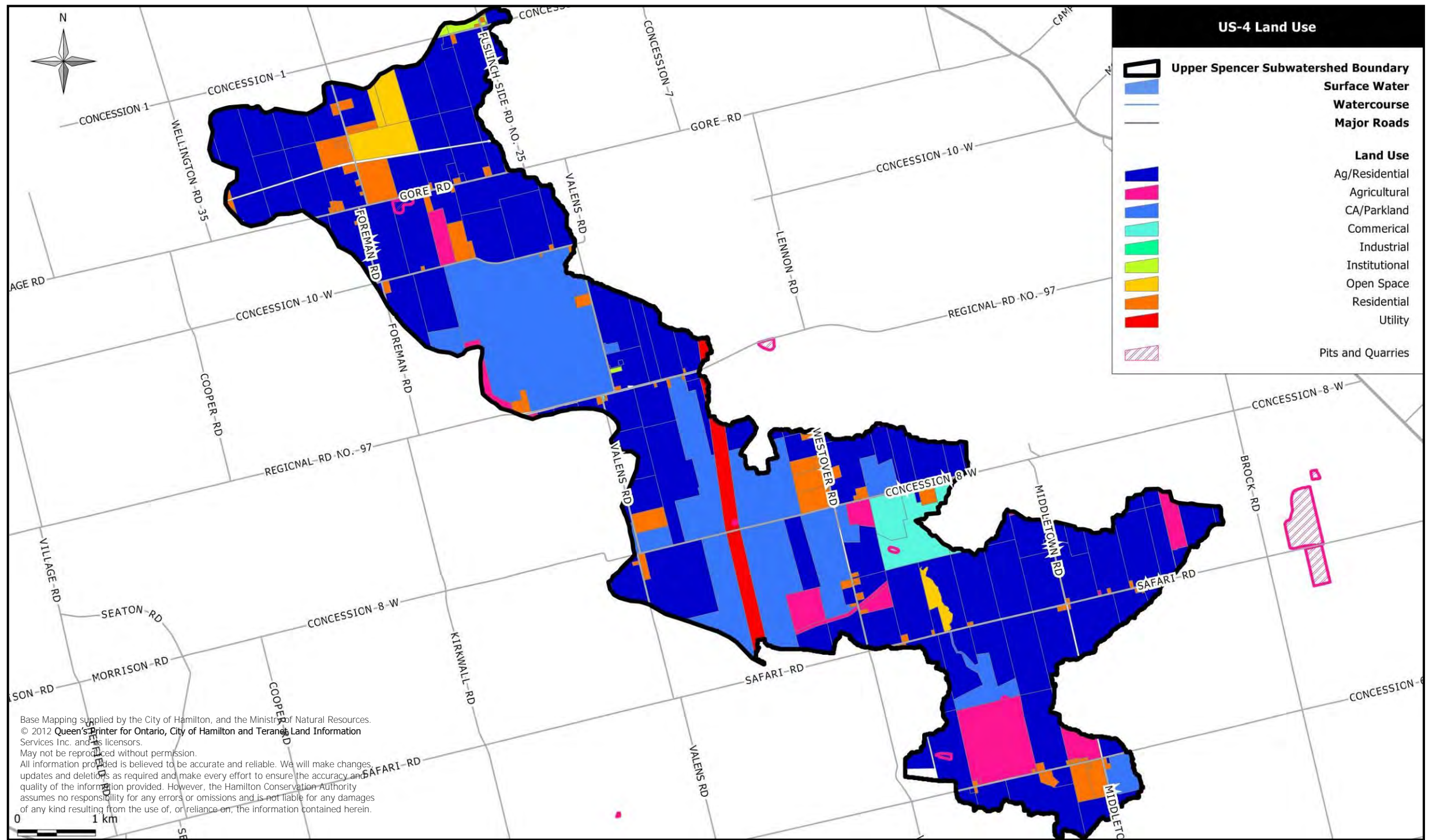
Threatened

- Barn Swallow
- Blanding's Turtle
- Bobolink
- Canada Warbler
- Cerulean Warbler
- Eastern Meadowlark
- Golden-winged Warbler
- Least Bittern
- Red-headed Woodpecker
- Whip-poor-will

Not at Risk

- American Coot
- Brown Snake
- Caspian Tern
- Cooper"s Hawk
- Eastern Bluebird
- Northern Harrier
- Northern Leopard Frog
- Pickerel Frog
- Red-tailed Hawk
- Sharp Shinned Hawk
- Western Chorus Frog





UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

CULTURAL HISTORY

The first recorded visit to the area by Europeans was on September 24, 1669, when the French explorers La Salle and Joliet met near Tinawatawa, now Westover (Wikipedia, 2011). Established in 1792, the Township of Flamborough was named after a prominent geographical formation, the Flamborough Head, and the Town of Flamborough in East Yorkshire, England (Hamilton Public Library Board, 2011).

Surveying of the townships of Ancaster, Beverly and Flamborough started in 1793 and the two Flamboroughs were created 5 years later (Spencer Creek Conservation Authority, 1965). In 1816, Flamborough Township became a part of the newly formed Halton County. With the massive reorganization of the county system completed in 1854, Flamborough was divided into two separate townships, East and West Flamborough, each with their own reeve, township hall, etc. (Hamilton Public Library Board, 2011). Wentworth arose in its present form in 1855.

Historically, few actual settlers came into Beverly Township before 1810 and those who came thereafter were mostly immigrants from the British Isles. 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 was undesirable because it was swampy or it had rock lying close to the surface (Spencer Creek Conservation Authority, 1965).

Because West Flamborough was closer to the earlier settlements, was adjacent to a water highway at Cootes Paradise, and had arable soil, settlers were attracted into the area before they went into Beverly. The names of some of the earlier settlers in Beverly area preserved in the place names about the township. George Cook, Sr. came from Ireland with his family and settled about 1835 on lot 35, concession 8. Here he built the log cabin that Spencer Creek Conservation Authority secured in 1962 (Spencer Creek Conservation Authority, 1965). The cabin was moved to the Valens Conservation Area where it has been preserved as a pioneer home.

Another name well known in Beverly is that of Harbottle. John Harbottle came from Northumberland about 1836 and his son Robert bought the north half of the lot immediately north of the John Valen’s homestead (Spencer Creek Conservation Authority, 1965). In 1965 when the Spencer Creek Conservation Authority wrote the Spencer Story, Robert’s son Percy still lived on this property and part of the farm was to be included in the Valens Conservation Area.

The first saw mill in Beverly on the Spencer Creek watershed was built in 1832 by George William Mann one mile east of Westover. Lindsay Creek, a branch of the Spencer, was named after John Lindsay, Sr., who came from Scotland in 1833. He rebuilt an old mill on Concession 6 and operated it until 1833 when it burned. His son George rebuilt it and ran it until 1890. George’s son Robert was the last to have a mill on the site but due to lack of timber this saw mill was torn down in 1914 (Spencer Creek Conservation Authority, 1965).

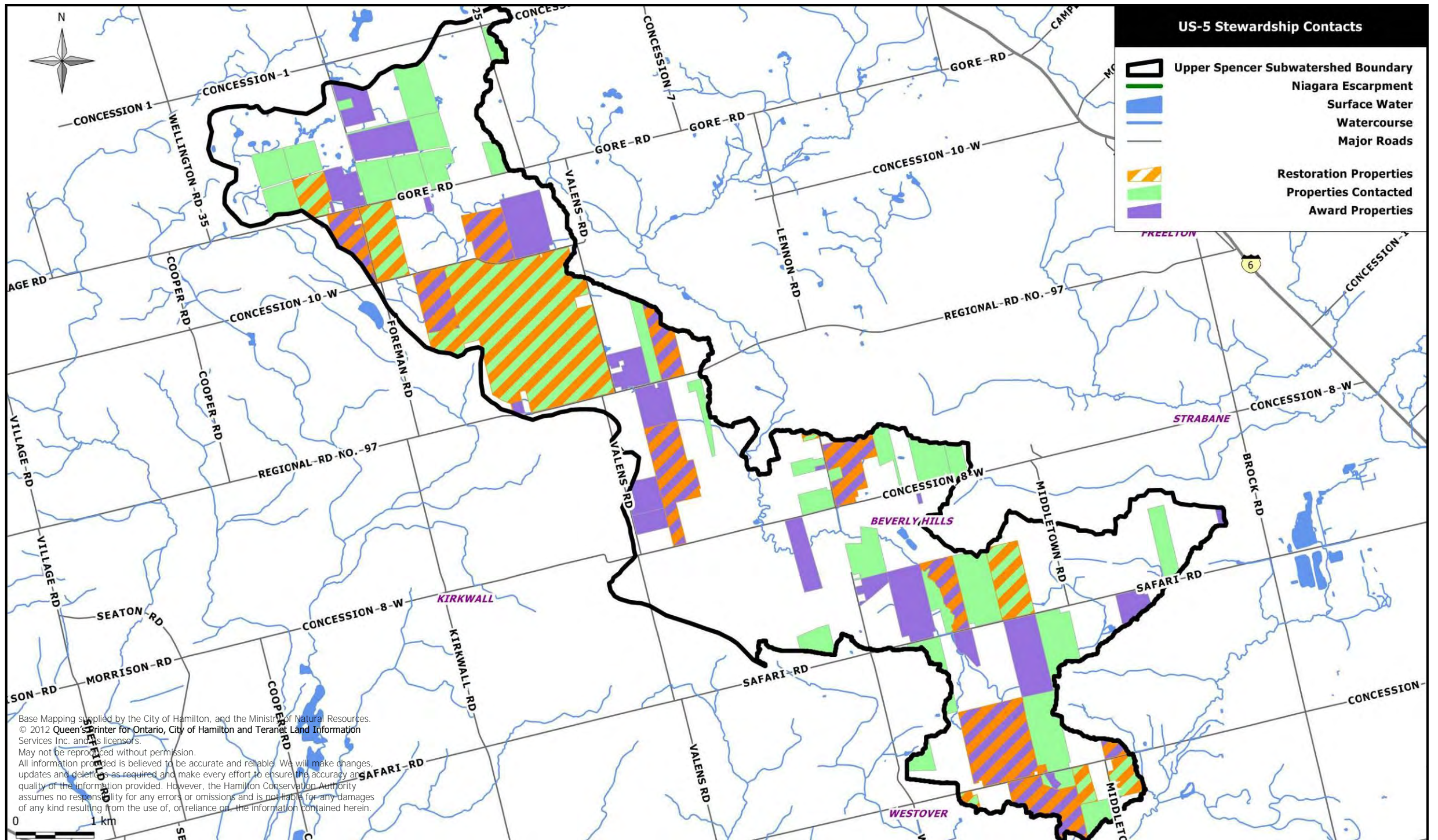
The community of Valens and the Valens Conservation Area got their name from John Valens who claimed to be the first pioneer to settle north of the Beverly Swamp. He came from near Edinburgh, Scotland, in 1832 and worked for two years on Dundurn Castle as a carpenter before settling in Beverly. He built the first saw mill in the area about 1850 on Spencer Creek in front of his home, and later added a small chopping mill. His son John A. and his nephew William Robson operated the mills until 1885. They were destroyed by fire on April 19th, 1890, which event ended the milling industry at Valens. The homestead was purchased by Frank McNeilly in 1912 and was bought by Spencer Creek Conservation Authority in 1961. The Authority’s dam was built in 1965. William Robson came to Canada in 1832 and settled on the lot to the south of the Valens property. Two years later he married Jane Valens, a sister of John’s. The Authority secured the Robson land in 1962 from the then owner, Walter Ferguson, and it too will be part of the Conservation Area (Spencer Creek Conservation Authority, 1965).

Currently, the approximate population of the Upper Spencer Creek subwatershed is approximately 1183 persons with a population density of approximately 33 persons per square kilometer, less than that of the more urbanized subwatersheds within Spencer Creek.

Current land use within the Upper Spencer Creek subwatershed is predominantly agricultural and conservation lands, with residential being the secondary land use (**Table US-3**). Residential land use is largely concentrated at intersections of major transportation routes and in Beverly Hills settlement area. There is a small amount of institutional and commercial lands distributed throughout the subwatershed to support local residents and the agriculture industry. (**Map US-4**).

Table US-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 Data | Impervious Surfacing (%) 1997 Study Predicted Increase |
|-------------------------|---------------------------------|-------------------------------|-------------------------------|----------------------------------|-------------------------------|--------------------------------|----------------------------|--|--|
| 35.64 | 22.6 | 0.7 | 0.0008 | 0.07 | 8.0 | 1.8 | 0.6 | 0.01 | 0 |



UPPER SPENCER CREEK SUBWATERSHED CHARACTERIZATION

STEWARDSHIP HISTORY

There are numerous significant properties within this subwatershed that incorporate large tracts of natural features. There are 127 non Conservation Authority properties that contain forest, wetland, meadow or riparian / aquatic habitat (**Table US-4**). Of these landowners, 62 (or 49%) have been contacted by the Hamilton-Halton Watershed Stewardship Program (HHWSP), and 29 (or 23%) have become Watershed Stewards (**Table US-4**). Therefore, there is considerable potential to reach the remaining 51% 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.

Currently, Watershed Stewards are located throughout all catchments within the subwatershed. Also, the Hamilton Conservation Authority is a major land holder in the subwatershed, predominately in the Concession 10, Valens and Beverly Swamp catchments. Therefore, landowner contact should be focused to the remaining properties throughout the subwatershed where there are natural features on the property but the properties are not currently engaged in the Watershed Steward Program.

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

This subwatershed exceeds Environment Canada’s 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.

This subwatershed also exceeds the habitat guidelines for forest cover. Efforts should be made to work with landowners and public agencies to protect these forests, 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 does not meet the How Much Habitat is Enough guidelines for percentage of stream naturally vegetated. An additional 56.4 kilometers of either side of the stream would have to be buffered with 30m wide buffers, in order to meet this target. Efforts should be made to establish riparian buffers along the watercourses to meet this habitat guideline and prevent erosion, sedimentation and runoff contamination within the system.

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.

Table US-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 |
|------------------------|---|---|--|---|--|--|
| 1183 | 33 | 127 | 62 | 29 | 82 | 35 |

Table US-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 | 28.14 | 41.2 | | 0.01 | Coldwater to coolwater | 38.13 | 4.6 | 100m – 9.5% 200m – 2.55% |

STRESSES & STEWARDSHIP ACTIONS

There are thirty eight types of stresses identified as negatively impacting the Spencer Creek Watershed. Many of the stresses currently affect the Upper Spencer Creek subwatershed. Those stresses that are not applicable to Upper Spencer Creek have also been included in this Action Plan to illustrate the cumulative stresses on the Spencer Creek Watershed.

An inventory count of the number of each type of stress observed in each catchment basin of the subwatershed is listed in **Table US- 7**. The most prevalent stresses identified in the Upper Spencer Creek Subwatershed are insufficient riparian buffers, on-line ponds, dams and water takings. **Table US-8** outlines *Stewardship Actions* that have been developed to mitigate the impacts of these and the remaining stresses listed in **Table US-7**.

Specific locations where these stresses are occurring are mapped and inventoried in the subsequent catchment datasheets. Within the Upper Spencer Creek subwatershed, 440 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. The specific occurrences of many stresses were identified using geographic information systems analyses, using the best available data; however they should be groundtruthed for accuracy before planning for the implementation of related stewardship actions.

It should be noted that the high number of insufficient riparian buffer stresses identified in these subwatersheds, 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 and wetland boundaries 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 should be a primary focus. 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 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.

There are five active permits to take water on Upper Spencer Creek. 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. The Environmental Farm Plan and associated cost-sharing programs that provide technical and financial assistance for water conservation equipment should be promoted throughout this subwatershed.

There are numerous residences, one campground and one rural estate in this subwatershed. The maintenance and care of household and communal septic and wastewater systems and groundwater wells should be a focus of

education and outreach programming to preserve the quality and quantity of drinking water as well as aquatic habitat in this area.

Land acquisition and regulatory protection of wetlands should continue in this subwatershed to enhance connectivity and improve wetland function. Wetlands filter water, prevent flooding by providing storage for rain water and snow melt, and release water in low water conditions. A special study should be undertaken to better understand the hydrology of Beverly Swamp.

Encroachment into natural areas should be prevented through education and outreach and regulatory enforcement. Where possible, encroachment should be remediated through community volunteer events.

There is a significant tract of natural area in the Gore Road and Concession 10 catchments which is not protected through a municipal designation as an Environmentally Significant Area. The municipalities should consider this area for ESA status and the Watershed Stewardship Program should consider this area for future outreach initiatives.

Publicly owned lands in this subwatershed should be managed for the benefit of the surrounding natural areas. ATV access should also be limited. Education and outreach including signage and news items on the HCA website should outline rules and etiquette to observe when using public lands. Contraventions of HCA policies related to property use should be reported to the Conservation Authority.

Regular operation and maintenance of the Valens Dam according to the Operation, Maintenance and Surveillance manual will continue to ensure that the bottom draw outlet is in good repair and flow through the bottom draw is maximized, minimizing the thermal impacts of the reservoir, while still providing the flood control, low flow augmentation, recreational and habitat functions for which it was built. Education and outreach related to the design, operation and maintenance of the dam should be available to visitors to Valens Conservation Area and local residents.

There is a memorandum of understanding between Conservation Ontario (and its 36 member Conservation Authorities) and Hydro One. It is a protocol that is used when Hydro One undertakes maintenance or new service installation work on lands regulated under the Conservation Authorities Act as well as on CA owned-lands. There is a communication process to be followed for both planned and emergency work to allow CA staff to provide early guidance regarding protection of environmentally significant lands. There is also a best management practices section that provides guidelines for Hydro One activities in natural hazard and/or environmentally sensitive lands to minimize any negative impacts to these areas. The protocol is implemented on hydro corridors throughout the subwatershed.

The City of Hamilton, HWSC and several other organizations have begun to develop a comprehensive plan for controlling *Phragmites australis* (European common weed), an invasive species found throughout this, and other subwatersheds in Hamilton. Students from the University of Guelph are collecting and analyzing data to inventory all sites where phragmites occurs on roadsides adjacent to the Beverly Swamp. The data will be used to update the City of Hamilton's Phragmites Inventory that was completed in 2010. The Healthy Hamilton Watersheds Action Plan Implementation Team should continue to assist with the development and implementation of this plan.

This subwatershed is within the study area for the Niagara GTA Corridor, formerly known as the Mid Peninsula Highway. As a result of the findings of the *Niagara to GTA Corridor Planning and Environmental Assessment Study, Phase 1*, the Province is currently studying the option of a new highway corridor that would run through this subwatershed from Hwy. 403 to Hwy. 401. Members of the implementation team have been, and will continue to provide comment to this study as it progresses in an effort to minimize environmental impacts to the greatest extent possible.

CATCHMENT SUMMARIES

This section of the plan identifies the occurrences of stresses within each catchment of Upper 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, 440 stresses were identified for the Upper Spencer Creek Subwatershed and inventory counts are presented in **Table US-7**.

TABLE US-7: Stresses Inventory by Catchment

| STRESS | MAP CODE | NO. IN SUBWATERSHED | NO. IN EACH CATCHMENT | | | | | | |
|---|----------|---------------------|-----------------------|--------|-----------|---------------|--------------|--------------|------------|
| | | | Concession 10 | Valens | Gore Road | Beverly Swamp | Concession 8 | Concession 7 | Highway 97 |
| Abandoned Groundwater Wells | GW | 2 | | 1 | 1 | | | | |
| Buried Stream | BS | | | | | | | | |
| Channelization | CH | | | | | | | | |
| Combined Sewer Overflow | CSO | | | | | | | | |
| Dam (Weir) | DM | 8 | 6 | 1 | | | 1 | | |
| Debris Jam | DJ | | | | | | | | |
| Detachment from Nature | DT | | | | | | | | |
| Development | DV | | | | | | | | |
| Encroachment | EN | | | | | | | | |
| Erosion | ER | | | | | | | | |
| Faulty Septic System | SS | | | | | | | | |
| Fluctuating Water Level | WL | 1 | | | | 1 | | | |
| Habitat Fragmentation | HF | | | | | | | | |
| Illegal Fill Placement | FP | | | | | | | | |
| Inadequate Stormwater Management | SW | | | | | | | | |
| Increased Impervious Surface | IS | | | | | | | | |
| Insufficient Riparian Buffer | RB | 359 | 79 | 23 | 72 | 83 | 29 | 62 | 11 |
| Invasive/Introduced Species | IV | | | | | | | | |
| Landfill Leachate | LL | | | | | | | | |
| Land Maintenance Practices | LM | | | | | | | | |
| Litter | LI | | | | | | | | |
| Migration Barrier | MB | 1 | | 1 | | | | | |
| Nutrient Loading | NL | | | | | | | | |
| Online Pond | OP | 63 | 22 | 1 | 24 | 2 | 2 | 11 | 1 |
| Outdoor Recreation Related Impacts | OR | | | | | | | | |
| Perched Culvert | CP | 1 | | | | | 1 | | |
| Pesticide Use | PS | | | | | | | | |
| Plowed Watercourse | PW | | | | | | | | |
| Runoff Contamination via Transportation Corridors | TC | | | | | | | | |
| Sediment Loading | SL | | | | | | | | |
| Site Clearing Prior to Development | SC | | | | | | | | |
| Stormsewer Outfall | SO | | | | | | | | |
| Transportation Corridor Expansion | TE | | | | | | | | |
| Utility Pipeline | UP | | | | | | | | |
| Water Taking | WT | 5 | | 1 | | 3 | 1 | | |
| 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.

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|---|--|--|--|---|-------------------|-------------------------------------|
| 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 / GV / HCA |
| | 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. | | | | CITY E&SI / HHWSP | 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 / GV / HCA |
| | | | Work with landowners to decommission abandoned groundwater wells. | | HHWSP | CITY / GV / HCA |
| Buried Streams Map Code: BS Definition: The structural alteration of a stream channel, involves piping the creek system underground, eliminating aquatic habitat. | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the benefits of maintaining our creeks and streams in their natural state. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-4, F-11, F-12, PAA-2 and ULM-2 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55 Fisheries Act, Section 37 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158 Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines | HHWSP / HWSC | DFO / HCA / MTO / RAP / WPN |
| | | Undertake a feasibility and prioritization study for “daylighting” buried streams in the study area. | | | CITY E&SI | DFO / HCA / HHWSP / MNR / MTO / RAP |
| | | | Work with landowners to undertake daylighting projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study. | | HHWSP | CITY / DFO / HCA / HWSC |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|--|---|---|--|--------------------|---------------------------------------|
| Channelization Map Code: CH Definition: The structural alteration of a stream channel, usually involves straightening of meanders and increasing gradient which increases velocity and erosion potential. | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the benefits of maintaining our creeks and streams in their natural state. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-4, F-11, F-12, PAA-2 and ULM-2 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55 Fisheries Act, Section 37 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158 | HHWSP / HWSC | CITY / FSRT / HCA / RAP / RBG / WPN |
| | | Undertake a feasibility and prioritization study for restoring channelized creeks to those with a natural design. | | | CITY E&SI | DFO / HCA / HHWSP / MNR / RAP |
| | | | Work with landowners downstream of channelized sites to rehabilitate the riparian zone to reduce flow velocities, erosion and sedimentation. | | HHWSP | CITY / DFO / HCA / HWSC / RBG |
| | | | 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 | CITY / DFO / HCA / 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: Recommendations FW-4, F-11 and PAA-2 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55 Fisheries Act, Section 37 Hamilton Conservation Authority Dam Inventory Project In-stream Barrier Assessment for the Hamilton Harbour AOC. | HHWSP | DFO / HCA / HWSC / MNR |
| | 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. | | | | HHWSP / HWSC | DFO / HCA / MNR |
| | | Undertake a feasibility and prioritization study for the removal of dams inventoried. | | | HCA Eng. / MNR | HHWSP / HWSC |
| | | | Work with landowners to remove/retrofit dams as prioritized in the Barrier Mitigation Plan associated with the Hamilton Harbour Fisheries Management Plan. | Hamilton Harbour Fisheries Management Plan | HHWSP | CITY / DFO / HCA / HWSC / MNR |
| Debris Jams Map Code: DJ | Incorporate debris jam removal into the City of Hamilton Adopt a Park and Neighbourhood Clean Team. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-4, F-11 and PAA-2 | CITY Op. & W. Man. | BARC / DFO / HCA / HHWSP / HWSC / MNR |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|--|---|---|---|--|------------------------------|
| Definition: The accumulation of debris within a watercourse that prevents the flow of water. | 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. | | | Hamilton Harbour Fisheries Management Plan In-stream Barrier Assessment for the Hamilton Harbour AOC. | 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. | CITY / MNR |
| | | | Work with landowners to remove debris jams using proper sediment and erosion control practices. | | HHWSP | CITY / DFO / HCA / HWSC |
| | | 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. | | | HCA Eng. | HHWSP / MNR |
| 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 EPI -1, EPI-2, EPI-3, EPI-5, EPI-6, PAA-1, PAA-2, PAA-3, ULM-7 and ULM-14 Royal Botanical Gardens Back to Nature: Towards a Ontario Strategy for Bringing Children and Nature Together - Event and Workshop Report Evergreen Schoolground Greening Resources: Getting Started | HHWSP | CITY / GV / HWSC |
| | Continue to implement the Watershed Steward Award Program. | | | | HHWSP | BARC / HCA |
| | 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. | | | | BARC / CITY E&SI / CITY Op. & W. Man. (Outreach) / HCA Ecol. / HHWSP | 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. | | | | BARC / GV / HCA / HWSC / RBG | CITY |
| | Erect creek crossing & ecological corridor signage along roadways. | | | | CITY Planning | 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 / CITY E&SI / GV / HCA Lands / RBG | HHWSP / HWSC |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|---|---|---|---|--|--|-----------------------------------|
| | Support the formation and activities of “Friends of” groups aimed at protecting and rehabilitating natural features. | | | | CITY Op. & W. Man. (Outreach) / HCA Lands / HHWSP / HWSC | BARC / BTC / DFO |
| | 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 / DU / GV / HCA / WPN |
| | | Assess landowner willingness to participate in and/or support water quality improvement and habitat restoration projects. | | | HHWSP | CITY / HCA / HWSC |
| | | Encourage municipalities and trail managers to coordinate trail plans that improve access between urban centres and provide links to parks and rural areas. | | | CITY Planning / HCA Lands / RBG | HHWSP / HWSC |
| | | | Work with citizen groups to undertake restoration projects on public and private lands, including “Friends of” work days, Adopt a Creek, Fishing Clubs, etc. | | BARC / CITY Op. & W. Man. / HCA Ecol. / HHWSP | BTC / HWSC / RBG |
| | | | Work with schools and School Boards to implement the School Grounds Naturally Program; undertaking school yard naturalization projects. | | HHWSP | CITY / HCA / HWSC |
| Development Map Code: DV Definition: The process of developing populated settlements: including housing and supporting infrastructure. | | | Work to undertake in-stream rehabilitation projects on sites identified in the Stewardship Action Plans as suitable for the DFO Habitat compensation Program. | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-12, ULM-2, ULM-3, ULM-8, ULM-13 and ULM-14 Credit Valley Conservation and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Manual HCA Planning and Regulation Policies and Guidelines | HCA Ecol. / HCA Eng. | CITY / DFO / HHHBA / MNR |
| | Host annual training sessions for City staff & development industry 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 |
| | | Encourage 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 Planning / HCA Eng. | GV / HHHBA |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|--|---|------------------------|--|--------------------------------------|--------------------------------|
| | | Encourage 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 Planning | HCA / HHHBA |
| | | Implement stewardship and management recommendations resulting from the HCA development permit application review process. | | | HCA Plan. | CITY / HHWSP / HWSC |
| | | 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 |
| | | Revise conflicting municipal by-laws regarding development practices and guidelines to facilitate increased use of Low Impact Development technologies. | | | CITY Planning / HCA Plan. | DFO / GV / HHHBA |
| | | Work with development industry to initiate a Water Management Task Force to assist in implementing stewardship actions and recommendations from the Stormwater Master Plan. | | | HCA Eng. | CITY / HHHBA / RAP |
| | | 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. | | | CITY E&SI | HCA |
| Encroachment Map Code: EN Definition: The act of undertaking practices on another person's property, i.e. erecting structures, planting gardens, disposal of waste. | Engage citizen groups to monitor & report areas affected by encroachment that are in need of restoration or that have been restored, to ensure mitigation of encroachment on public lands remains effective & to encourage neighbour-to-neighbour mentoring. | | | 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 | CITY Op. & W. Man. / HCA Lands / RBG | BARC / BTC / GV / HHWSP / HWSC |
| | Install property demarcation posts (with agency logos) at regular intervals along property boundaries to prevent encroachment into natural areas. | | | | CITY Op. & W. Man. / HCA Lands / RBG | HHWSP |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|---|--|--|--|--|---------------------------------------|
| | 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. & W. Man. / HCA Lands / HHWSP / RBG | BARC / BTC / GV / HWSC |
| | Work with local nurseries & landscaping co.'s to educate / encourage landowners to use native plants. | | | | HHWSP | CITY / GV / HCA / HWSC / RBG |
| | | | 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. & W. Man. / HCA Lands / HHWSP / RBG | BARC / GV / HNC / HWSC |
| | Conduct a direct mailing of an encroachment education brochure to landowners adjacent to Conservation Authority, RBG and City natural areas. | | | | CITY Op. & W. Man. / HCA Lands / HHWSP / RBG | HWSC |
| Erosion Map Code: ER Definition: The process of soil being scoured or washed away by flowing water. | Conduct a direct mailing to landowners where erosion has been identified through the City of Hamilton GRIDS Plan. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-4, ULM-2 and ULM-3 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 | HHWSP | CITY / HCA / HWSC / OSCIA |
| | Create demonstration sites on public lands that highlight streambank stabilization and natural channel design projects. | | | | HHWSP | CITY / DFO / HCA / HWSC / OSCIA / RBG |
| | Host training sessions for City staff and development industry to create awareness regarding BMPs & importance of properly maintained erosion / sediment control measures & enforcement. | | | | HCA Eng. | CITY / DFO / HWSC |
| | Utilize enforcement scheme to enforce appropriate erosion control measures on development sites, including: seeding, avoiding steep slopes, etc. | | | | HCA Plan. | CITY / DFO / MNR |
| | 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 |
| | | Expand the City of Hamilton Erosion Hot Spots identification project into rural areas | | | CITY E&SI | HCA |
| | | Select erosion sites as identified in the City of Hamilton GRIDS Plan for the upcoming HCA Erosion and Sediment Control Pilot Project. | | | HCA Plan. | CITY / DFO / HHWSP / HWSC |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
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| | | | Work with City staff to install permeable conveyance systems (infiltration trenches) along roadsides as an alternative to the conventional ditch system. | | CITY Op. & W. Man. | DFO / HCA / MTO |
| | | | Work with landowners to undertake bank stabilization and erosion rehabilitation projects using bioengineering design principles. | | HHWSP | BARC / DFO / FSRT / HCA / HWSC / OSCIA |
| | | | Work with landowners to undertake erosion rehabilitation projects as identified in the City of Hamilton GRIDS Plan. | | CITY E&SI | DFO / HCA / HHWSP / HWSC |
| | | Complete field study of stream morphology, determining erosion hotspots & associated causes | | | HCA Eng. | CITY |
| 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. | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation WQ-d1 City of Hamilton's Greensville Community Subwatershed Study | CITY E&SI / HCA Eng. | RAP |
| | Create demonstration sites on public lands that highlight properly functioning septic systems. | | | Ontario New Home Warranty Program – A New Homeowner's Guide to Septic Systems | CITY Bldg. Serv. / CITY Op. & W. Man. / HCA Lands | HHWSP / HWSC |
| | 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 | BARC / CITY / HCA |
| | | Conduct an inventory to determine how many households in the Spencer Creek watershed are serviced by on-site treatment systems. | | | CITY Bldg. Serv. | RAP |
| | | Develop a tax reduction incentive or grant program for upgrading faulty septic systems | | | CITY Planning | HHWSP / MOE |
| | | Undertake a risk analysis of the potential for old and/or degraded sewer lines to contaminate groundwater. | | | CITY E&SI | MOE / RAP |
| | | | Work with landowners to properly maintain their septic systems or upgrade or decommission faulty or unused septic systems. | | HHWSP | CITY / GV / HCA / HWSC |
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| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
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| 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 &/or direct landowner contact to explain the purpose, operation and maintenance of HCA flood control structures. | | | | HCA Eng. | CITY / HHWSP / MNR |
| | | Work to determine the cause of water level fluctuations and develop recommendations for altering practices to reduce or eliminate fluctuations. | | | HCA Eng. | CITY / DFO / HHWSP / MNR |
| | | | Work to implement alternative practices as per recommendations resulting from the inquiry into the cause of water level fluctuations in the system. | | HCA Eng. | CITY / DFO / HHWSP / MNR |
| Habitat Fragmentation | | Map fisheries information throughout each subwatershed to identify areas at risk and prioritize areas for remediation. | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-2, FW-4, FW-12, PAA-1 and ULM-2 | HCA Ecol. | CITY / HCA / HHWSP / HWSC / MNR |
| | | | Manage public lands for wildlife habitat, including plantation plantings and rented agricultural lands. | HCA Planning and Regulation Policies and Guidelines Pages 53-59 | HCA Lands | CITY / HHWSP / MNR |
| | | | Implement the actions outlined in the Dundas Valley 50 Year Vision, Cootes to Escarpment and City of Hamilton Natural Heritage Strategies relating to preserving and enhancing natural heritage systems. | City of Hamilton Draft Private Tree and Woodland Conservation By-law Cootes to Escarpment Park System – A Conservation and Land Management Strategy | CITY / HCA Lands / RBG | BARC / HHWSP / HWSC |
| | Create demonstration sites on public lands that highlight various types of terrestrial and aquatic habitat restoration projects. | | | Nature Counts – City of Hamilton Natural Areas inventory | HHWSP | CITY / DFO / DU / HCA / HNC / HWSC / RBG |
| | 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. | | | City of Hamilton Natural Heritage Strategy City of Hamilton Natural Areas Acquisition Fund Strategy | HHWSP | CITY / HCA / HNC / HWSC |
| | Encourage urban reforestation practices in private properties and reduction of lawn areas. | | | Dundas Valley 50 Year Vision | CITY Op. & W. Man. | HCA / HHWSP / HNC / HWSC |
| | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy ecosystems and the importance of habitat connectivity. | | | Hamilton Harbour Fisheries Management Plan OMAFRA Best Management Practices Series – Farm Forestry and Habitat Management | HHWSP / HWSC | CITY / CCC / DU / HCA / HNC / MNR / RBG |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
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| | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote the importance of preserving wetland ecosystems. | | | OMAFRA Best Management Practices Series – Fish and Wildlife Habitat Management | | |
| | | Continue to complete ecological surveys (using the Ecological Land Classification system) to ensure species at risk habitat or rare ecological areas are not disrupted. | | | CITY Planning / HCA Ecol. | HHWSP / HWSC / MNR / RAP / RBG |
| | | Develop How Much Habitat is Enough targets for each subwatershed. | | | HCA Ecol. | CITY / CCC / DFO / DU / HHWSP / HWSC / MNR / RBG |
| | | Establish a Woodlot Owners Association for this area as recommended by Re-Leaf Hamilton | | | HWSC | HCA / HHWSP / HNC / MNR / RBG |
| | | Protect and enhance natural corridors through parks and public lands by ensuring that naturalization and habitat creation are incorporated into master planning. | | | CITY Planning / HCA Lands / RBG | HHWSP / HNC / HWSC / MNR |
| | | Work to acquire lands that enhance and further the continuity of the natural heritage system. | | | HHWSP / HNC | HCA / HHWSP / HNC / HWSC / RBG |
| | | Work with the aggregate industry when planning new/expanded pit and quarry operations to minimize impacts on the adjacent natural features. | | | HCA Ecol. | CITY / MNR |
| | | | Work with landowners to undertake habitat creation and enhancement projects which enhance core habitat by infilling areas within or linking existing forested areas | | HHWSP | DFO / DU / HCA / HWSC / OSCIA |
| | | | Work with the aggregate industry to restore decommissioned pits and quarries into natural habitat through the Management of Abandoned Aggregate Properties Program. | | HCA Ecol. | CITY / MNR |
| Illegal Fill Placement Map Code: FP Definition: The act of dumping fill material into or adjacent to natural areas. | 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 Pages 61-62 City of Hamilton By-law No. 03-117 Illegal Dumping | HCA Plan. | CITY / DFO |
| | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the adverse effects of “fill” on natural systems and promote compliance with the HCA Regulations and the City’s Site Alteration By-law. | | | | HCA Plan. | CITY / HHWSP / HWSC |

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| | | | Work with landowners to rehabilitate fill sites where identified | | HCA Plan. / HHWSP | 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 the Stream of Dreams and Yellow Fish Road Programs with local schools, scout, girl guides and other children"s groups, to create awareness regarding stormwater input & the impacts of CSO outfalls on stream systems. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM - 6, ULM-9, ULM-11 and ULM-14 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 | BARC | |
| | Support Sewer-Use Bylaw enforcement (By-law No. 04-150 as amended by By-Law No. 06-228). | | | | CITY E&SI | |
| | | Conduct water quality testing at CSO outfalls pre and post mitigation to support mitigation measures | | | CITY E&SI | |
| | 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 E&SI / GV | BARC / DFO / HCA / HHHBA / HHWSP / RAP |
| | Promote the use of constructed wetland technology and Low Impact Development in the design of stormwater management facilities. | | | | CITY E&SI / HCA Eng. | HHHBA |
| | 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 E&SI / GV | BARC / DFO / HCA / HHHBA / HHWSP / RAP |
| | | Implement recommendations from the City of Hamilton Stormwater Master Plan. | | | CITY E&SI | BARC / GV / HCA / RAP |
| | | Offer financial incentives to replace driveways and decks with permeable pavement, interlocking brick, etc. | | | CITY Planning | HCA |
| | | Undertake a study to determine the percentage of landowners with connected downspouts. | | | CITY E&SI | BARC / GV / RAP |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
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| | | Work with development industry 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. | BARC / DFO / HHHBA / HHWSP / RAP |
| | | | Retrofit existing dry stormwater management ponds to wet ponds where beneficial to water quality, aquatic habitat and erosion control. | | CITY E&SI | HCA / RAP |
| | | | Retrofit outlet structures to decrease the velocity of stormwater as it flows into the creek system. | | CITY E&SI | HCA / HHWSP / HWSC / RAP |
| | | | Work with landowners to disconnect downspouts and install rain barrels. | | CITY E&SI | BARC / GV / HHWSP |
| 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 EPI-6, FW-4 and ULM-2 HCA Planning and Regulation Policies and Guidelines Pages 40, 55, 60 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 145-150,162-163 City of Hamilton Natural Heritage Strategy | HCA Plan. | CITY / GV / HHHBA / HHWSP / HWSC |
| | Host training sessions for HCA and City staff, development industry 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 Planning / HCA Plan. | HHHBA |
| | 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. | | | Dundas Valley 50 Year Vision Cootes to Escarpment Park System – A Conservation and Land Management Strategy | GV | CITY / HCA / HHHBA / HHWSP |
| | | 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 Planning | HCA / RAP |
| | | Measure impervious surfacing of commercial and industrial lands. | | | CITY Planning | HCA / RAP |
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| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
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| | | | 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 Eng. | CITY / GV / HHHBA |
| 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: Recommendations EPI-6, FW-4 and ULM-2 | HHWSP / HWSC | CITY / HCA / 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 | CITY / HCA / HWSC |
| | 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 City of Hamilton Natural Heritage Strategy | HHWSP | CITY / HCA / HWSC / OSCIA |
| | Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects. | | | Dundas Valley 50 Year Vision | HHWSP | CITY / HCA / HWSC / 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. | | | Cootes to Escarpment Park System – A Conservation and Land Management Strategy | HHWSP | CITY / HCA / HWSC / 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. | | HHWSP | CITY / HCA / HWSC / OSCIA |
| | | | | | | |
| Invasive/Introduced Species Map Code: IV Definition: The establishment/proliferation of exotic species that have no natural control measures which compete with native species for resources and degrade the ecosystem. | | Comment on the re-drafting of the City of Hamilton Litter, Yard Waste and Property Maintenance by-law No. 03-118 to include language regarding the prevention of the introduction of non native and invasive species. | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-5 Action Plan for Addressing Terrestrial Invasive Species within the Great Lakes Basin | CITY Op. & W. Man. | GV / HCA / HHWSP / HWSC / RBG |
| | Host training sessions for City staff, landscapers, consultants and nurseries to create awareness regarding the detrimental effects of invasive species and to encourage the use of native species. | | | HCA Planning and Regulation Policies and Guidelines Pages 53-56, 70-71 Invasive Alien Plant Species Found in the | HCA Ecol. | CITY / HHWSP / HNC / HWSC |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
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| | 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. | | | Carolinian Zone – Inventory and Management Options for rare Charitable Research Reserve | HHWSP | CITY / HCA / HWSC |
| | Work with nurseries to develop a promotional program highlighting native species alternatives for commonly used non-native ornamental species. | | | Mistaken Identity – Invasive Plants and their native look-alikes. | | |
| | | | | City of Hamilton Natural Heritage Strategy | HHWSP | CITY / GV / HCA / HWSC / RBG |
| | | Develop an Invasive Species Management Program which includes monitoring sites and management for specific species. | | Dundas Valley 50 Year Vision | | |
| | | 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. | | Cootes to Escarpment Park System – A Conservation and Land Management Strategy | HCA Ecol. | CCC / CITY / HHWSP / HNC / HWSC / MNR / RBG |
| | | | Work with landowners to control invasive species and to plant native species. | | HCA Ecol. | BARC / CITY / HHWSP / HWSC / RBG |
| | | | | | HHWSP | CITY / GV / HCA / HWSC |
| Land Maintenance Practices Map Code: LM Definition: Errant or excessive land maintenance practice which unnecessarily degrade wildlife habitat. | | Implement the Hydro One Integrated Land Management protocol on utility corridors that pass through HCA lands and continue to work with utility companies to develop low impact land maintenance practices policies to be implemented throughout utility corridors. | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-2, FW-4 and TSSR-6 | HCA Plan. | CITY / HHWSP / HWSC / RBG |
| | | Incorporate the installation of alternative roadside vegetation, such as MTO roadside prairie and wildlife shrub corridors, into existing maintenance plans. | | | CITY Op. & W. Man. | HCA |
| | | Work with the City to develop guidelines for using native plant species for revegetation projects along roadsides. | | | CITY Op. & W. Man. | HCA |
| | | | Work to naturalize infrequently used areas of municipal parks (Adopt a Park) and Conservation Areas. | | CITY Op. & W. Man. / HCA Lands | HHWSP / HNC / HWSC |
| | | | Work with the City to ensure roadside maintenance is not done in excess of access standards. | | CITY Op. & W. Man. | GV / HCA / HHWSP / HNC / HWSC |

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| 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 HCA Planning and Regulation Policies and Guidelines Page 60 | HCA Eng. | CITY / MOE / RAP |
| 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. & W. Man. / HCA Lands / RBG | HHWSP |
| | Promote the City of Hamilton’s Team Up to Clean Up, Adopt a Park, and Neighbourhood Clean Team programs to assist community minded residents to undertake litter clean up projects. | | | | CITY Op. & W. Man. (Outreach) | BARC / GV / HCA / HHWSP / HWSC / RBG |
| | Utilize literature, websites, public service announcements, & direct landowner contact to create awareness regarding the prevention and clean-up of litter. | | | | CITY Op. & W. Man. / HCA Lands / RBG | BARC / GV / HHWSP / HWSC |
| | 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. & W. Man. / HCA Lands / RBG | GV |
| | | Undertake an inventory of illegal dumping sites throughout the subwatershed. Prioritize sites for the installation of deterrent mechanisms and the implementation of the Clean City Strategy Components. | | | CITY Op. & W. Man. / HCA Lands | RBG |
| | | | Work with local residents to host litter clean up events, such as the Great Canadian Shoreline Clean Up, on public lands; including City parks, Conservation Areas and RBG lands. | | CITY Op. & W. Man. / HCA Lands / RBG | BARC / GV / HHWSP / HWSC |
| | | | | | | |
| 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. Hamilton Harbour Fisheries Management Plan | CITY Planning / HCA Ecol. / RBG | BARC / HHWSP / HNC / HWSC / RAP / WPN |
| | | | 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. | | CITY Planning / HCA Ecol. / RBG | BARC / HHWSP / HNC / HWSC / RAP / WPN |

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| 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: Recommendations EPI-6, FW-9, RM-4, RM-7, WQ-1d and ULM-2 | HHWSP | HCA / HWSC / OSICA / RAP |
| | Host a training workshop for local golf course practitioners to discuss BMP"s for golf course management, including Audubon Cooperative Sanctuary Program certification standards. | | | Nutrient Management Act 2002, O. Reg 267/03 | HHWSP | HCA / HWSC / RAP / RCGA |
| | Promote software associated with the Nutrient Management Plan, to agricultural operators to ensure precise fertility programs. | | | Fisheries Act, Section 34 | HHWSP | HWSC / OMAFRA / OSCIA |
| | Promote the City of Hamilton Only Rain Down the Drain awareness campaign. | | | HCA Planning and Regulation Policies and Guidelines Page 72 | CITY E&SI | BARC / GV / HHWSP / 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. | | | Ministry of the Environment Water Management Policies and Guidelines – Provincial Water Quality Objectives Appendix A | HCA Eng. / HHWSP | BARC / GV / MOE / OMAFRA / OSCIA / RAP / RBG |
| | | Develop a fertilizer use by-law under the Fertilizer Act, limiting the use of fertilizer for non essential purposes. | | OMAFRA Best Management Practices Series – Nutrient Management Planning | | |
| | | Develop a plan to reduce nutrient levels to meet Provincial Water Quality Objectives as determined by the land use dependent nutrient level monitoring program. | | OMAFRA Best Management Practices Series – Manure Management | CITY Planning | BARC / HCA / HHWSP / RAP / 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. | BARC / CITY / HHWSP / OMAFRA / OSCIA / RAP / 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. | BARC / CITY / HHWSP / OMAFRA / OSCIA / RAP / RBG |
| | | 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 Ecol. / HCA Eng. | MOE / OMAFRA / OSICA / RAP |
| | | Encourage the provincial government to develop a policy to ban the use of phosphorous in fertilizer for cosmetic use. | | | HCA Ecol. / HCA Eng. | CITY / MOE / RAP |
| | | | | | GV | CITY / HCA / MOE |

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| | | Establish a nutrient level monitoring program with strategic sampling sites that are land use dependent, to identify specific sources of nutrient loading. | | | HCA Eng. | BARC / CITY / HHWSP / OMAFRA / OSCIA / RAP / RBG |
| | | Model phosphorus loading in the subwatersheds and compare against RAP objectives | | | HCA Eng. | |
| | | | Work with landowners to reduce nutrient loading by implementing agricultural and urban BMP"s related to nutrient management. | | HHWSP | CITY / HCA / HWSC / OMAFRA / OSCIA |
| On-line Ponds Map Code: OP Definition: An in-stream structure designed to impound stream flow; leads to increased in-stream temperatures downstream and is often a barrier to fish migration. | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and pond retrofit options. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-1, FW-4 and ULM-2 Fisheries Act, Section 37 | HHWSP / HWSC | CITY / DFO / HCA / OSCIA / OMAFRA |
| | | | Work with landowners to restore or retrofit on-line ponds. | HCA Planning and Regulation Policies and Guidelines Page 63 In-stream Barrier Assessment for the Hamilton Harbour AOC | HCA Eng. / HCA Plan. / HHWSP | CITY / DFO / HCA / HWSC / OMAFRA / OSCIA |
| 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 and PAA-3 The Conservation Lands of Ontario – Three Year Business Plan A Joint Outdoor Tourism Marketing Strategy | CITY Op. & W. Man. / HCA Lands / RBG | BTC / NHC |
| | Erect signage explaining the environmental significance of natural areas and promoting user “etiquette” for the area. | | | | CITY Op. & W. Man. / HCA Lands / RBG | BTC / HHWSP / HNC |
| | Install deterrent mechanisms along trails and in off trail areas known to be degraded by trespassing; such as no trespassing signage. | | | | CITY Op. & W. Man. / HCA Lands / RBG | BTC / HNC |
| | Promote the City of Hamilton Adopt-a-Park and Neighbourhood Clean Team Programs. | | | Niagara Escarpment Access Enhancement Plan | CITY Op. & W. Man. | BTC / HCA / HHWSP / HNC / RBG |
| | Support the formation and activities of “Friends of” groups aimed at protecting and rehabilitating natural features. | | | Dundas Valley 50 Year Vision Strategy Cootes to Escarpment Conservation & Land Management Strategy | CITY Op. & W. Man. / HCA Lands / HHWSP / RBG | BARC / BTC / HWSC |
| | | Consider designating days/areas for ATV and snowmobile use as a deterrent to use in prohibited areas. | | | CITY Op. & W. Man. / HCA Lands / RBG | HHWSP / HNC |
| | | Continue to monitor Category A and B waterfalls on public lands for signs of overuse. | | | CITY Op. & W. Man. / HCA Lands | BTC |
| | | Develop marketing strategies for sensitive lands that focus on sustainable use. | | | CITY Op. & W. Man. / HCA Lands / RBG | BTC / HNC |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|---|---|---|---|--------------------------------------|-----------------------------------|
| | | Refer to the Niagara Escarpment Access Enhancement Plan to design infrastructure for high traffic areas to guide users along approved trails. | | | CITY Op. & W. Man. / HCA Lands / RBG | BTC |
| | | When undertaking master planning exercises, refer to the Ontario Trails Guidelines and Best Practices for the Design, Construction and Maintenance of Sustainable Trails. | | | CITY E&SI (L.A.S.) / HCA Lands / RBG | |
| | | | Host annual clean up days for natural areas identified as having excessive amounts of litter. | | CITY Op. & W. Man. / HCA Lands / RBG | BARC / BTC / HHWSP / HNC / HWSC |
| | | | Rotationally restrict access to degraded areas to allow for the regeneration of vegetation. | | CITY Op. & W. Man. / HCA Lands / RBG | BTC / HNC |
| | | | When conducting maintenance of existing trails, refer to the Ontario Trails Guidelines and Best Practices for the Design, Construction and Maintenance of Sustainable Trails. | | CITY Op. & W. Man. / HCA Lands / RBG | BTC / HHWSP / HNC |
| 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 and City staff to promote the proper design and installation of culverts. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW-1 and FW-4 Fisheries Act, Section 37 HCA Planning and Regulation Policies and Guidelines Page 41 In-stream Barrier Assessment for the Hamilton Harbour AOC | CITY Op. & W. Man. / HCA Eng. | DFO / 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 | CITY / DFO / HCA / MNR |
| | | Undertake an inventory of perched and closed bottom culverts throughout the subwatershed. Prioritize culverts for mitigation or replacement. | | | CITY Op. & W. Man. | DFO / HCA / HHWSP / 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. | | HCA Eng. / HCA Plan. / HHWSP | CITY / DFO / HCA / OMAFRA / OSCIA |
| Pesticide Use Map Code: PS Definition: The application of | 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 EPI-4, EPI-6, TSSR-6 and ULM-2 | HHWSP | CITY / GV / HWSC / OMAFRA / OSCIA |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|---|--|--|--|-------------------------|-------------------------------------|
| 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. | | | Fisheries Act, Section 34 City of Hamilton By -Law No. 07-282 Pesticides Act Ontario Regulation 63/09 OMAFRA Best Management Practices Series – integrated Pest Management OMAFRA Best Management Practices Series – Pesticide Storage, Handling and Application | HHWSP | CITY / HWSC / RCGA |
| | Promote Municipal and Provincial Pesticide By-Laws. | | | | CITY Op. & W. Man. / GV | HHWSP / HWSC / OMAFRA / OSCIA |
| | Promote Integrated Pest Management principles, Natural Tips for Healthy Lawns and Gardens and alternative turf management techniques. | | | | CITY Op. & W. Man. | GV / HHWSP / HWSC / OMAFRA / OSCIA |
| | Promote the Ministry of the Environment „Add It Up Program – Going Pesticide Free“ Program | | | | GV | CITY / HHWSP / HWSC |
| | 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 | CITY / HCA / HHWSP / OMAFRA / OSCIA |
| | | Undertake a study to determine the current level of pesticide/herbicide use in the subwatershed and develop targets for reduction. | | | CITY Op. & W. Man. | GV / HHWSP / HWSC / OMAFRA / OSCIA |
| | | | Work with landowners to implement alternatives to pesticide use. | | GV / HHWSP | CITY / HWSC / OMAFRA / OSCIA |
| Plowed Watercourse Map Code: PW Definition: Headwater swales or small watercourses that are worked for agricultural production. | 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 EPI-6, ULM-2, ULM-3 and ULM-4 Fisheries Act, Section 37 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 44, 145-150 OMAFRA Best Management Practices Series – Soil Management | HHWSP | DFO / HCA / HWSC / OSCIA |
| | 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. | | | | HHWSP | DFO / HCA / HWSC / OMAFRA / OSCIA |
| | Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects. | | | | HHWSP | DFO / HCA / HWSC / OMAFRA / OSCIA |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|---|---|---|--|---------------------------------------|---|
| | 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. | | | | 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 / RAP / RBG |
| 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 Fisheries Act, Section 34 City of Hamilton 2003 Road Salt Management Plan Municipalities of Wellington County – 2005 Salt Management Plan | CITY Op. & W. Man. (Roads) | MTO |
| | 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. & W. Man. (Roads) / HCA Eng. | DFO / MTO |
| | Utilize literature, websites, public service announcements & direct landowner contact to promote the use of sidewalk salt alternatives. | | | | CITY Op. & W. Man. / 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. | | | CITY Op. & W. Man. | MTO |
| | | Support planning for alternative and sustainable transportation strategies including Rapid Transit. | | | CITY Planning | HCA / HHHBA / MTO / RAP |
| | | Undertake a study to determine the most effective method of snow removal that will reduce contamination of watercourses. | | | CITY Op. & W. Man. | DFO / HCA / MTO |
| | | | Implement improved snow removal methods as recommended by the study to determine effective methods of snow removal which also reduce contamination of watercourses. | | CITY Op. & W. Man. | MTO |
| | | | Install vegetated filter strips and riparian buffers along medians and roadsides. | | CITY Op. & W. Man. | HCA / MTO |
| | | | | | | |
| Sediment Loading Map Code: SL Definition: Organic and inorganic | | Develop a total suspended solids target based on the PWQO turbidity recommendation of between 5-50 FTU (Formazin Turbidity Units) | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, FW9, RM-4, ULM-2, ULM-3, ULM-5 and WQ-1d | HCA Eng. | DFO / HHWSP / HWSC / MNR / OSCIA / OMAFRA / RAP |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|--|--|--|---|---|---------------------------|---|
| material that is entrained by the flow of water and is deposited in a creek system. | Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and BMP"s related to preventing sedimentation. | | | Fisheries Act, Sections 34 and 36 | HCA Eng. / HHWSP | DFO / HWSC / MNR / OMAFRA / OSCIA / RAP |
| | | | Monitor and enforce the proper installation and maintenance of sediment and erosion control measure on construction sites. | Erosion and Sediment Control Guidelines for Urban Construction | HCA Plan. | CITY / DFO / HHHBA |
| | | | 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) | 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 Eng. | DFO / HHWSP / HWSC / MNR / OMAFRA / OSCIA / RAP |
| | | | Work to mitigate non point sediment sources identified in the Watershed Planning Network Priority Remediation Report. | OMAFRA Best Management Practices Series – No-Till Making it Work | HCA Eng. | CITY / DFO / HHWSP / HWSC / MNR |
| | | | 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. | Ministry of the Environment Stormwater Management Design Guidelines | HCA Plan. | CITY / DFO / HHHBA |
| | | | Work with landowners to reduce sediment loading by implementing BMP projects; e.g. streambank stabilization, riparian buffers, natural channel design. | | HHWSP | DFO / HCA / HWSC / MNR / OMAFRA / OSCIA |
| Site Clearing Prior to Development Map Code: SC Definition: The act of stripping or excavating the vegetation and topsoil from a site prior to construction works. | Host training sessions for City staff, development industry and consultants to promote City standards and guidelines related to site preparation prior to development. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-4 | CITY Planning / 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 Planning | DFO / HHHBA / HHWSP / HWSC / MNR / RAP |
| | | Develop a municipal by-law to serve as a guideline for the management of tree species. | | City of Hamilton Draft Private Tree and Woodland Conservation By-Law | City Planning | HCA / HWSC / MNR |
| | | | 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 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 | HCA Plan. | CITY / DFO / HHHBA |

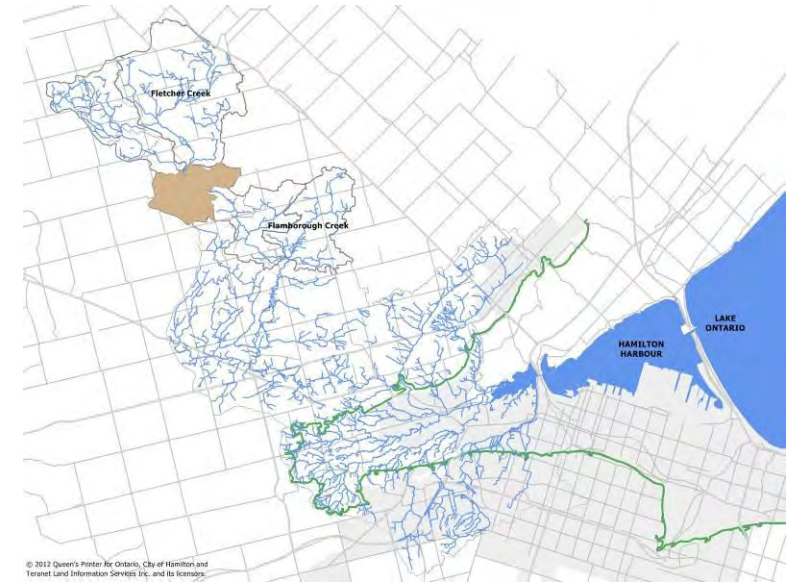
| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|---|---|--|---|---|----------------------|---------------------------------------|
| | | | | the Removal of Topsoil | | |
| Storm Sewer Outfalls Map Code: SO 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 RM-4, RM-7 ULM -6, ULM-9 and ULM-11 Fisheries Act, Section 34 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 138, 158-159 | BARC | CITY / GV / HCA / HHWSP / HWSC / RBG |
| | Promote the City of Hamilton Public Works Stormwater Pollution Solutions for Urban and Rural Residents Outreach Program | | | | CITY E&SI | GV / HCA / HHWSP / HWSC / RBG |
| | Promote the Municipal Sewer-Use By-law No. 04-150 as amended by By-Law No. 06-228. | | | | CITY E&SI | GV / HCA / HHWSP / HWSC / RBG |
| | | Reduce stormwater load to meet the MOE volumetric target of a 90% overflow capture rate for combined sewer systems | | | CITY E&SI | BARC / GV / HCA / RAP |
| | | 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 E&SI / HCA Eng. | BARC / MOE / RAP |
| | | Work toward achieving the final net loading targets for CSO's outlined in the RAP. | | | CITY E&SI | BARC / GV / HCA / RAP |
| | | Work with Green Venture to develop a Stormwater Mitigation Program. | | | GV | BARC / CITY / HCA / RAP |
| | | | Work to implement the recommendations in the sewershed water quality study. | | CITY E&SI / HCA Eng. | BARC / DFO / HHWSP / HWSC / RAP |
| | | | Work with City Staff to retrofit outfalls to incorporate erosion control measures such as plunge pools, rip rap, tree planting etc. | | CITY E&SI | BARC / DFO / HCA / HHWSP / HWSC / RAP |
| | | | Work with landowners to disconnect downspouts and to install rain barrels. | | CITY E&SI / GV | BARC / HHWSP |
| | | | Work with landowners to establish riparian buffers and/or erosion protection downstream of storm sewer outfalls; e.g. river stone. | | HHWSP | BARC / CITY / DFO / HCA / HWSC / RAP |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|---|---|--|---|--|--------------------|-----------------------------------|
| 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, development industry and consultants to promote BMP's and new environmental technologies relating to transportation corridors; e.g. permeable pavement, wildlife under/overpasses, vegetated filter medians and rights of way, light coloured aggregate in hot mix, etc. | | | HCA Planning and Regulation Policies and Guidelines Pages 50-62, 68-69 Ontario Provincial Standards for Roads and Public Works Erosion and Sediment Control Guidelines for Urban Construction | CITY E&SI | HCA / HHHBA / MTO |
| | | When planning for major road works, design transportation corridors using new technologies for environmental solutions. | | | CITY E&SI | HCA / HHHBA / MTO |
| | | | When repairing roads, utilize new technologies for road maintenance that are proven to have environmental benefits. | | CITY Op. & W. Man. | HCA / HHHBA / MTO |
| Utility Pipeline | | 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. | Encourage landowners with surface water takings to install groundwater systems. | | | Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations EPI-6, ULM-2 and ULM-12 Ontario Water Resources Act O. Reg. 387/04 OMAFRA Best Management Practices Series – Irrigation Management | HHWSP | HCA / HWSC / MOE / OMAFRA / OSCIA |
| | Encourage landowners with water taking needs to establish an Irrigation Advisory Committee to schedule takings alternately. | | | | HHWSP | HCA / HWSC / MOE / OMAFRA / OSCIA |
| | Host open houses when experiencing Level 1 low water conditions to address landowner concerns and promote recommended reductions in rates and volumes of takings. | | | | HCA Eng. / HHWSP | HCA / HWSC / MOE / OMAFRA / OSCIA |
| | 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 / HWSC / MOE / OMAFRA / OSCIA |
| | | 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. | | | HCA Eng. | MNR / MOE |

| STRESSES | STEWARDSHIP ACTIONS AO | STEWARDSHIP ACTIONS SSO | STEWARDSHIP ACTIONS RO | RELATED DOCUMENTS | LEAD AGENCY | PARTNER AGENCIES |
|---|---|--|---|---|--|-----------------------------------|
| | | 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 Eng. | MOE |
| | | | Work with landowners to implement BMP"s related to water conservation. | | HHWSP | HCA / HWSC / MOE / OMAFRA / OSCIA |
| | | | Work with landowners who have groundwater taking systems to decommission unused wells in accordance with the Ontario Water Resources Act. | | HHWSP | CITY / HCA / OSCIA |
| 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. | Erect additional wildlife caution signage that is species specific, along roadways at known points of frequent collisions. | | | British Columbia Wildlife Collision Prevention Program Report City of Ottawa Wildlife/Vehicle Collision Prevention Program | CITY Op. & W. Man. (Roads) | HCA / MNR / MTO / RBG |
| | Utilize literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding managing human-wildlife conflicts. | | | | CITY Op. & W. Man. (Roads) / HCA Ecol. | HHWSP / HWSC / MNR / MTO / RBG |
| | | Evaluate the effectiveness of the MTO roadside prairie and wildlife shrub corridor projects in preventing wildlife collisions. | | | CITY Op. & W. Man. | HCA / MNR / MTO |
| | | When planning major road works, consider the incorporation of wildlife over/underpasses, avoiding known migratory corridors and other wildlife accommodations in the design. | | | CITY E&SI | HCA / MNR / MTO / RBG |
| | | | Conduct temporary road closures at known wildlife crossings and nesting sites during peak migration and nesting times. | | CITY Op. & W. Man. (Roads) | HCA / MNR / MTO / RBG |
| | | | Erect fencing and alternative nesting mounds at known sites for turtle nesting. | | CITY Op. & W. Man. (Roads) | HCA / MNR / MTO / RBG |
| | | | Produce and distribute window decals for large windows of homes and high rise buildings to prevent bird collisions. | | CITY Bldg. Serv. / HCA Ecol. | HHWSP / HWSC / RBG |
| | | | Reduce the use of road salt or consider alternatives that do not attract wildlife. | | CITY Op. & W. Man. (Roads) | HCA / MNR / MTO |
| | | | | | | |
| 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 | CITY Op. & W. Man. / HCA Ecol. | HHWSP / MNR |
| | | | Work to implement the recommendations for sustainable populations in the HCA/MNR Deer Management Strategy. | | CITY Planning / HCA Ecol. | HHWSP / MNR |

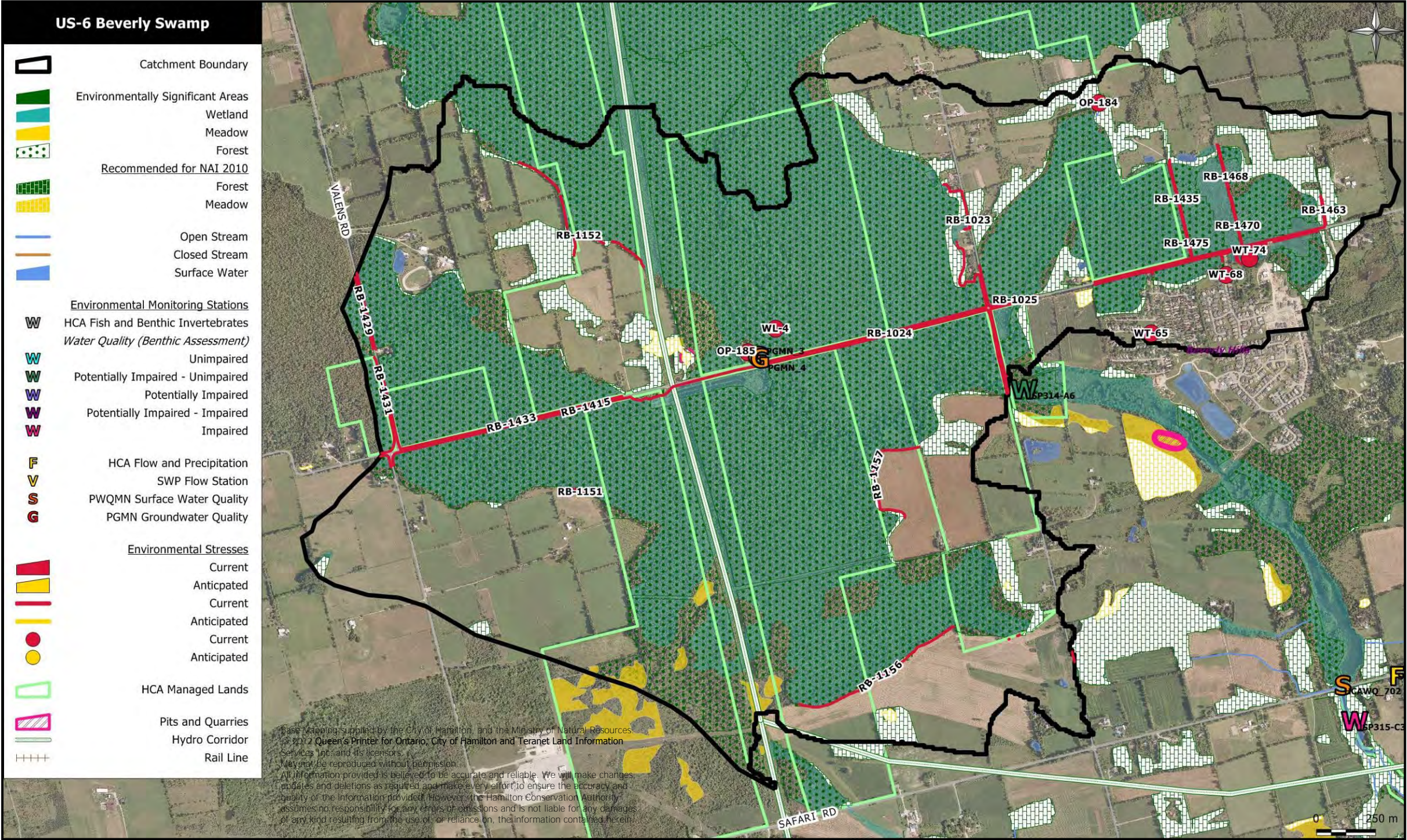
Partner Agency Acronyms

| | | | |
|------|--|--------|---|
| 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 | | |



BEVERLY SWAMP CATCHMENT

DATA SHEETS



BEVERLY SWAMP DATA SHEET

Table US-9: Stresses Identified in the Beverly Swamp Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|---------------------------|------------------------------|--------------------------|------------------------------|----------------------------|-------------|--------------|----------------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| WL-4 | Fluctuating Water Levels | ☑ | ☑ | ☑ | ☑ | | |
| RB-Various (See Appendix) | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | ☑ | |
| OP-184 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-185 | Online Pond | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| WT-65 | Water Taking | ☑ | ☑ | ☑ | | ☑ | |
| WT-68 | Water Taking | ☑ | ☑ | ☑ | | ☑ | |
| WT-74 | Water Taking | ☑ | ☑ | ☑ | | ☑ | |

BEVERLY SWAMP DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

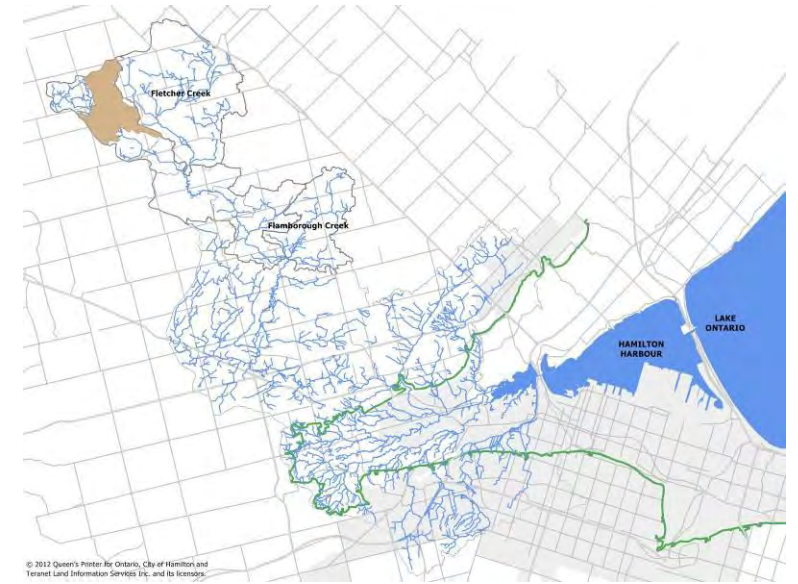
| LOCATION | DATE | DESCRIPTION |
|----------|------|-------------|
| | | |

WATER QUALITY ASSESSMENT

| LOCATION | DATE | PARAMETER | SAMPLE RESULTS | UNITS |
|----------|------|-----------|----------------|-------|
| | | | | |

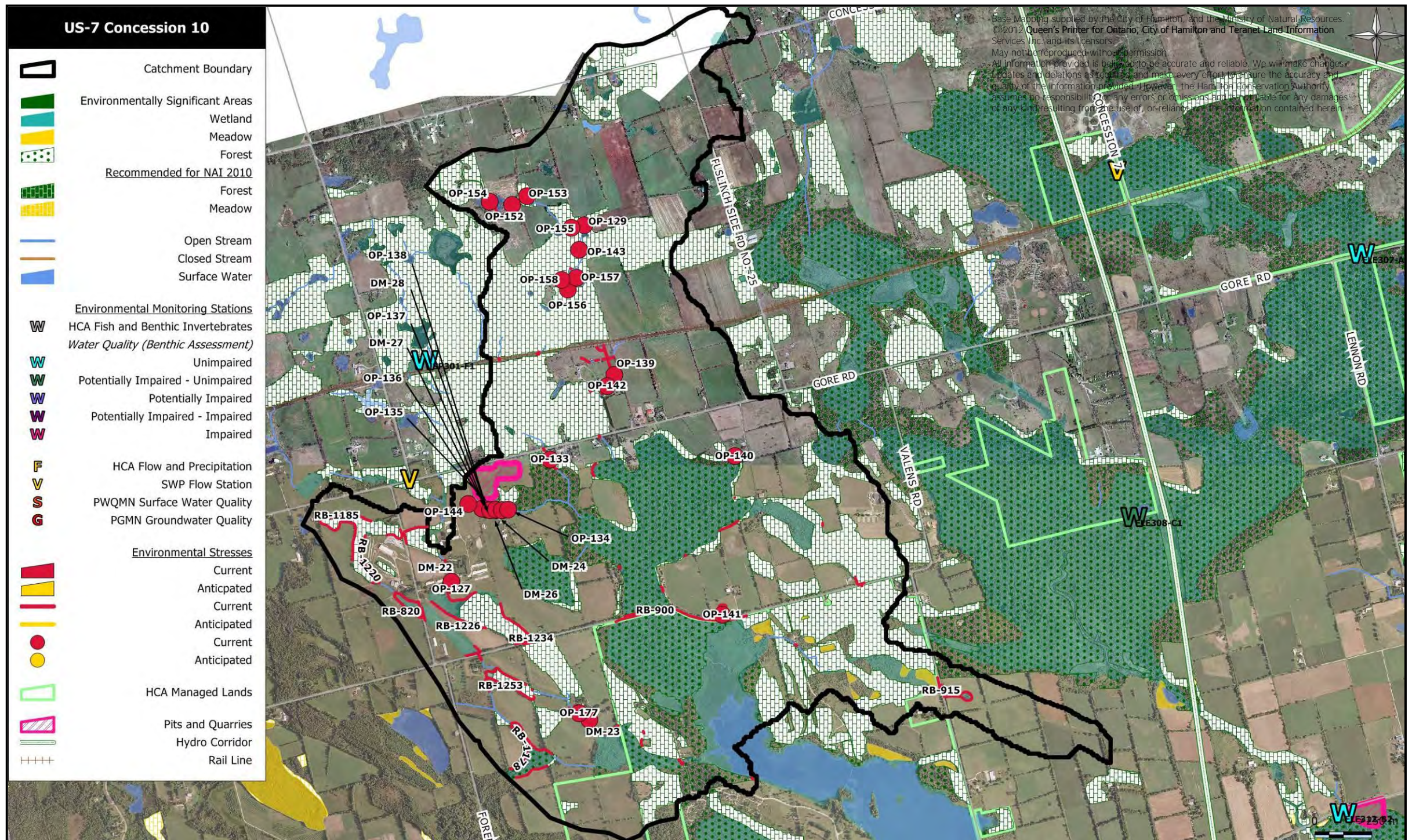
WATER FLOW ASSESSMENT

| LOCATION | DATE | FLOW m³/s |
|----------|------|-----------|
| | | |



CONCESSION 10 CATCHMENT

DATA SHEETS



CONCESSION 10 DATA SHEET

Table US-10: Stresses Identified in the Concession 10 Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|---------------------------|------------------------------|--------------------------|------------------------------|----------------------------|-------------|--------------|----------------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| DM-22 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| DM-23 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| DM-24 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| DM-26 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| DM-27 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| DM-28 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| RB-Various (See Appendix) | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | ☑ | |
| OP-127 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-129 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-133 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-134 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-135 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-136 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-137 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-138 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-139 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-140 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-141 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-142 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-143 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-144 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-152 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-153 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-154 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-155 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-156 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-157 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-158 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-177 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |

CONCESSION 10 DATA SHEET

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

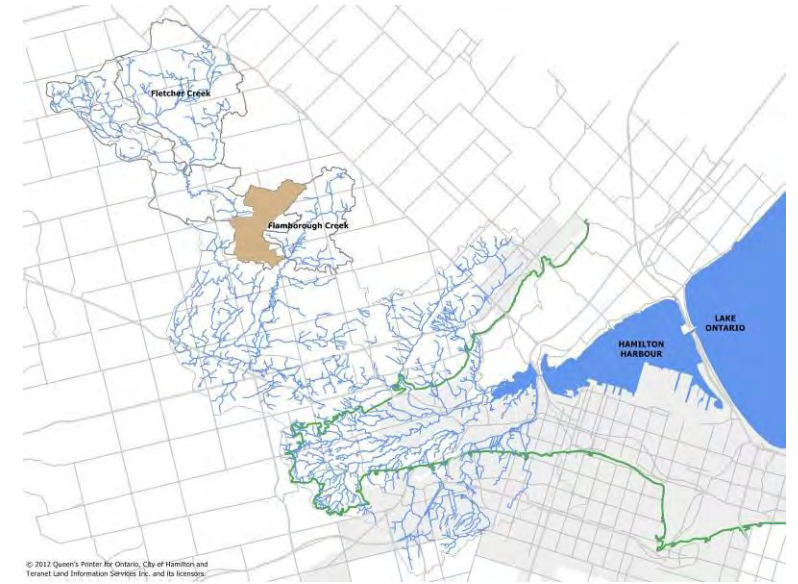
| LOCATION | DATE | DESCRPTION |
|----------|------|------------|
| | | |

WATER QUALITY ASSESSMENT

| LOCATION | DATE | PARAMETER | SAMPLE RESULTS | UNITS |
|----------|------|-----------|----------------|-------|
| | | | | |

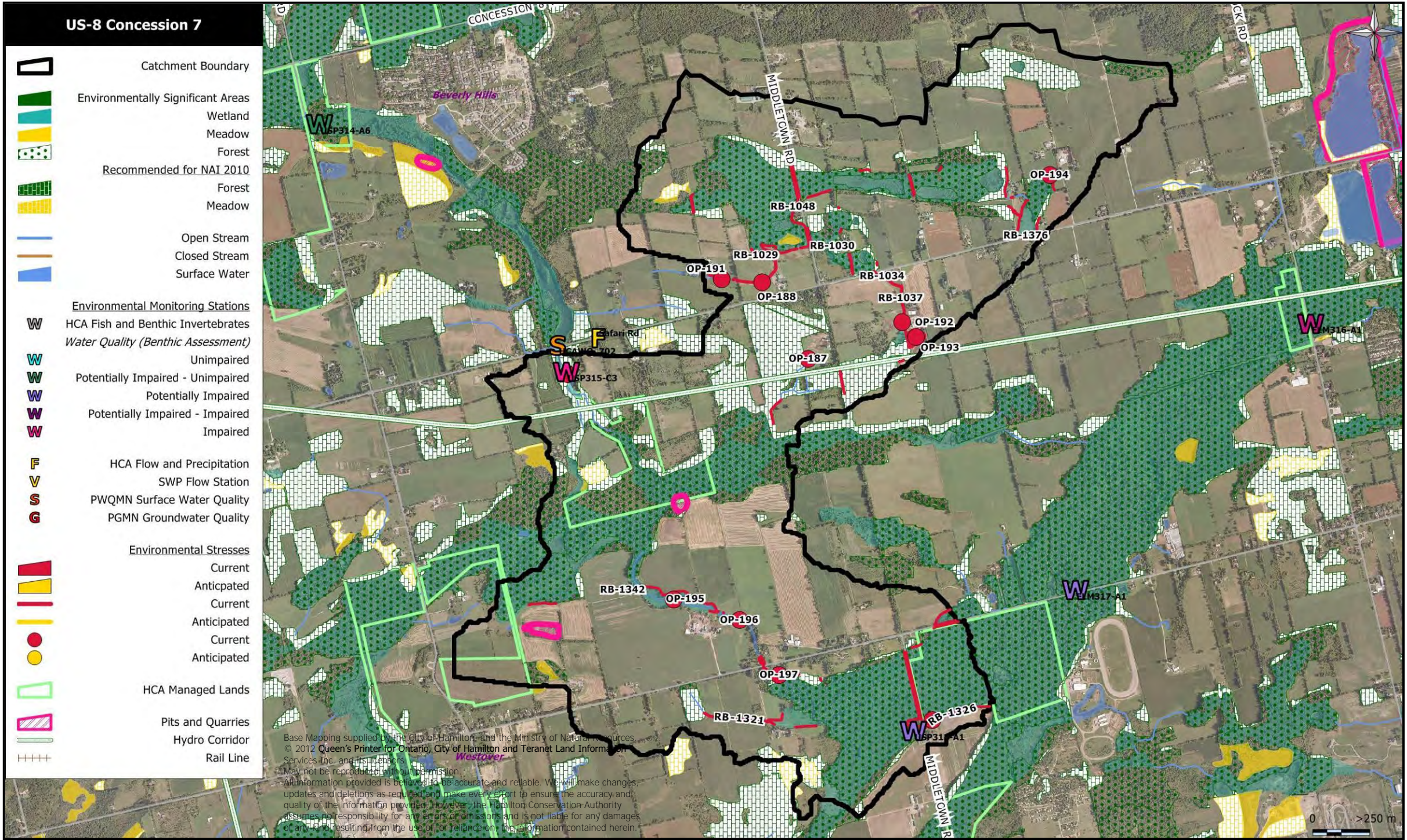
WATER FLOW ASSESSMENT

| LOCATION | DATE | FLOW m ³ /s |
|----------|------|------------------------|
| | | |



CONCESSION 7 CATCHMENT

DATA SHEETS



CONCESSION 7 DATA SHEET

Table US-10: Stresses Identified in the Concession 7 Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|---------------------------|------------------------------|--------------------------|------------------------------|----------------------------|-------------|--------------|----------------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| RB-Various (See Appendix) | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | ☑ | |
| OP-186 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-187 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-188 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-191 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-192 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-193 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-194 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-195 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-196 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-197 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-198 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |

FISHERIES ASSESSMENT

| LOCATION | DATE | COMMON NAME | NO. IDENTIFIED | IN-STREAM TEMPERATURE | TEMPERATURE CLASSIFICATION |
|-----------|-----------|-------------------|----------------|-----------------------|----------------------------|
| USP315-A1 | 09-Aug-04 | Central mudminnow | 1 | | |
| USP315-A1 | 09-Aug-04 | Johnny darter | 7 | | |
| USP315-A1 | 09-Aug-04 | Mottled sculpin | 7 | | |
| USP315-A1 | 09-Aug-04 | White sucker | 1 | | |
| USP315-C3 | 19-Jul-11 | Brown bullhead | 4 | | |
| USP315-C3 | 19-Jul-11 | Central mudminnow | 3 | | |
| USP315-C3 | 19-Jul-11 | Johnny darter | 3 | | |
| USP315-C3 | 19-Jul-11 | Northern pike | 7 | | |
| USP315-C3 | 19-Jul-11 | Pumpkinseed | 2 | | |
| USP315-C3 | 19-Jul-11 | Rock bass | 14 | | |
| USP315-C3 | 19-Jul-11 | White sucker | 1 | | |

BENTHICS ASSESSMENT

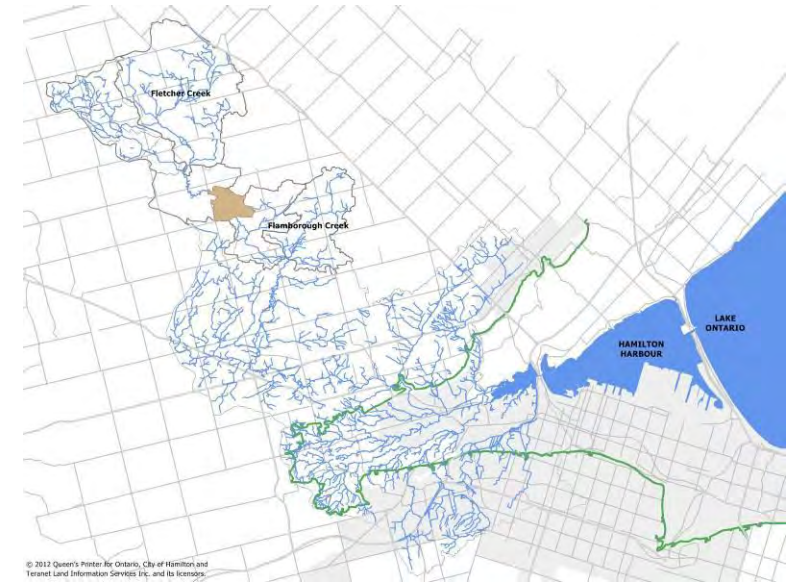
| LOCATION | DATE | DESCRPTION |
|-----------|------|-----------------------------------|
| USP315-A1 | 2010 | Potentially Impaired |
| USP315-A1 | 2007 | Unimpaired |
| USP315-C3 | 2011 | Impaired |
| USP315-C3 | 2010 | Impaired |
| USP315-C3 | 2009 | Impaired |
| USP315-C3 | 2007 | Potentially Impaired - Unimpaired |

WATER QUALITY ASSESSMENT

| LOCATION | DATE | PARAMETER | SAMPLE RESULTS | UNITS |
|----------|------|-----------|----------------|-------|
| | | | | |

WATER FLOW ASSESSMENT

| LOCATION | DATE | FLOW m ³ /s |
|----------|------|------------------------|
| | | |



CONCESSION 8 CATCHMENT

DATA SHEETS

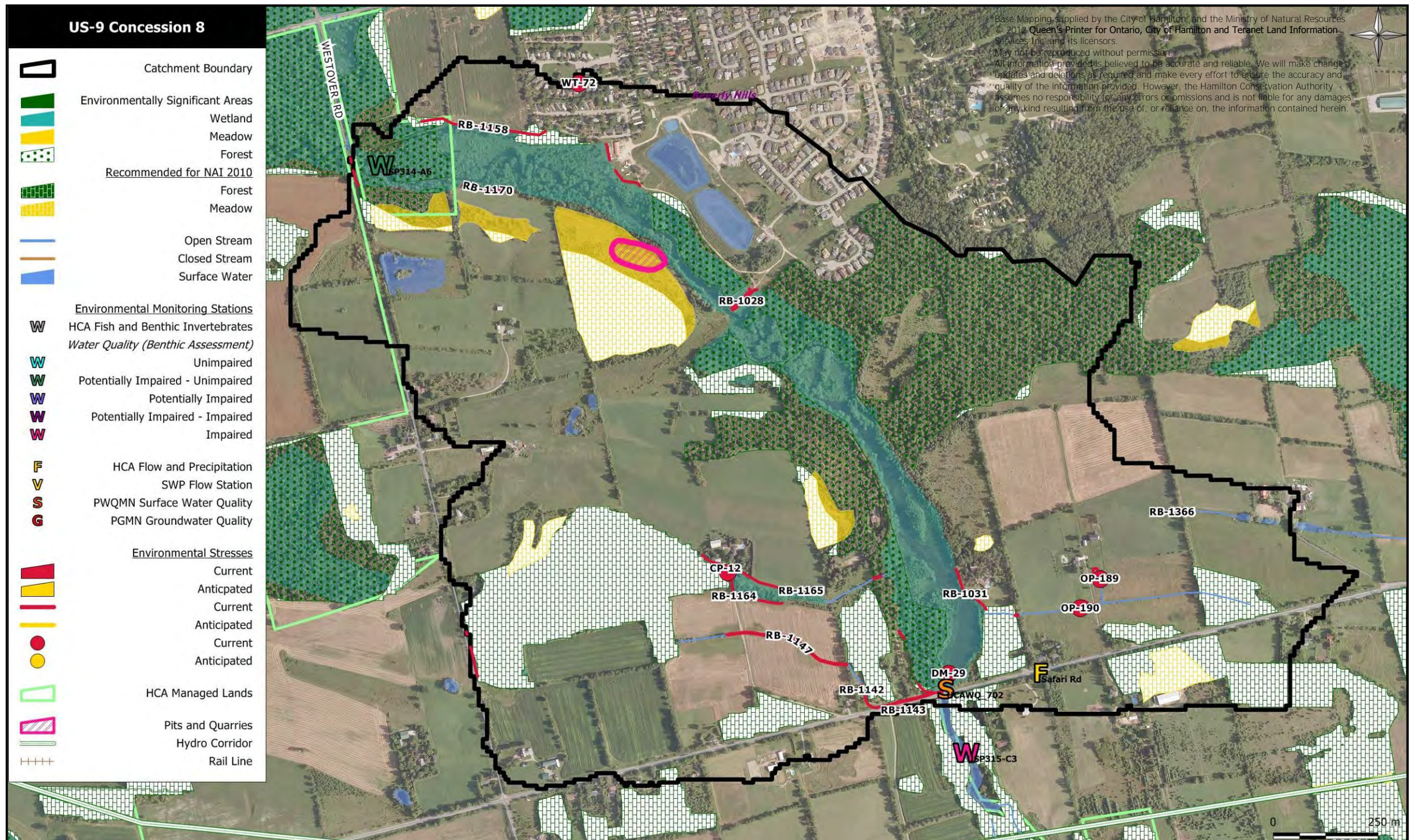


Table US-10: Stresses Identified in the Concession 8 Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|---------------------------|------------------------------|--------------------------|------------------------------|----------------------------|-------------|--------------|----------------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| DM-29 | Dam | ☑ | ☑ | ☑ | | ☑ | ☑ |
| RB-Various (See Appendix) | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | ☑ | |
| OP-189 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-190 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| CP-12 | Perched Culvert | ☑ | ☑ | ☑ | | ☑ | ☑ |
| WT-72 | Water Taking | ☑ | ☑ | ☑ | | ☑ | |

FISHERIES ASSESSMENT

| LOCATION | DATE | COMMON NAME | NO. IDENTIFIED | IN-STREAM TEMPERATURE | TEMPERATURE CLASSIFICATION |
|-----------|-----------|-------------------|----------------|-----------------------|----------------------------|
| USP314-A6 | 22-Jul-10 | Bluntnose minnow | 14 | | |
| USP314-A6 | 22-Jul-10 | Brook stickleback | 2 | | |
| USP314-A6 | 22-Jul-10 | Central mudminnow | 65 | | |
| USP314-A6 | 22-Jul-10 | Johnny darter | 12 | | |
| USP314-A6 | 22-Jul-10 | Mottled sculpin | 7 | | |
| USP314-A6 | 22-Jul-10 | White sucker | 3 | | |

BENTHICS ASSESSMENT

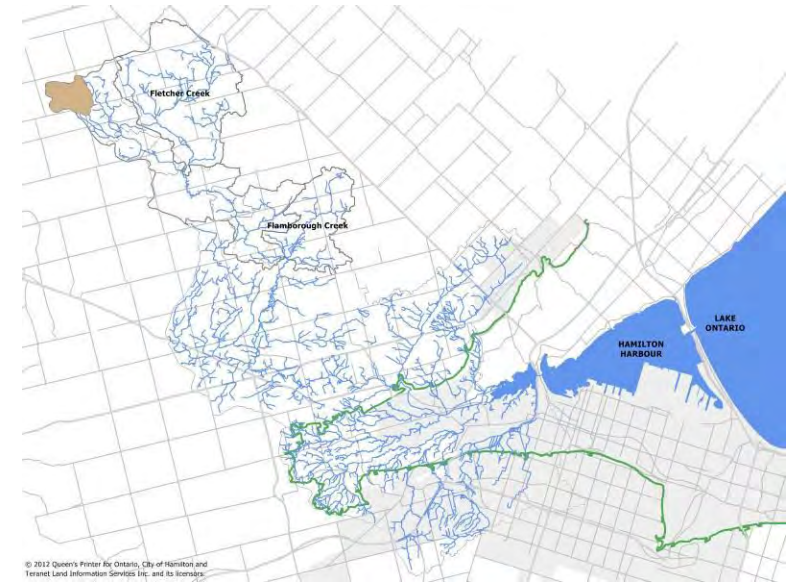
| LOCATION | DATE | DESCRIPTION |
|-----------|------|-----------------------------------|
| USP314-A6 | 2010 | Potentially Impaired - Unimpaired |
| USP314-A6 | 2007 | Potentially Impaired - Unimpaired |

WATER QUALITY ASSESSMENT

| LOCATION | DATE | PARAMETER | SAMPLE RESULTS | UNITS |
|-------------------------|------|-----------|----------------|-------|
| HCAWQ_702 (Safari Road) | | | | |
| See appendix | | | | |

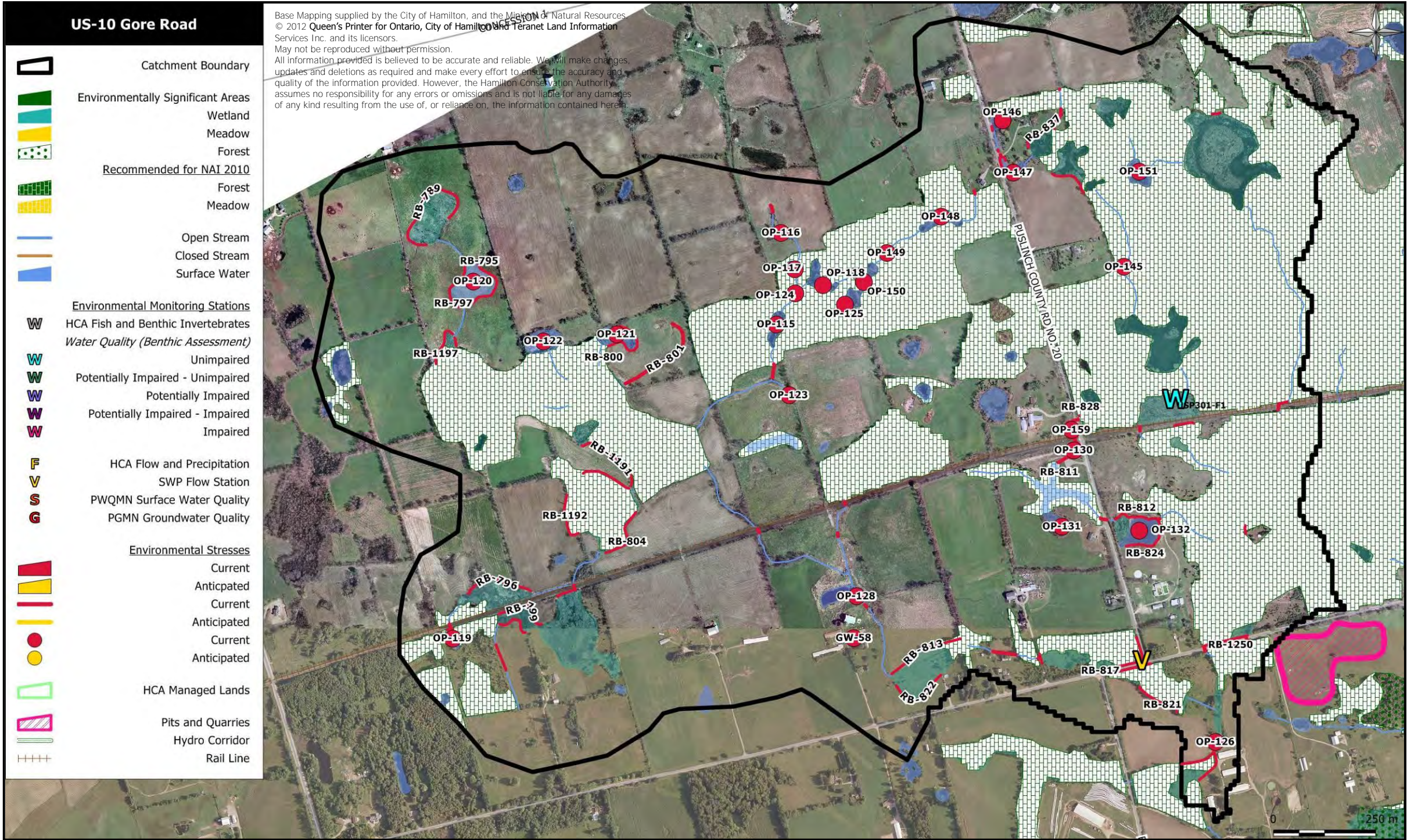
WATER FLOW ASSESSMENT

| LOCATION | DATE | FLOW m³/s |
|-------------------------|-----------|-----------|
| HCAWQ_702 (Safari Road) | 12-Apr-11 | 1.914 |
| HCAWQ_702 (Safari Road) | 24-May-11 | 1.566 |
| HCAWQ_702 (Safari Road) | 21-Jun-11 | 0.382 |
| HCAWQ_702 (Safari Road) | 20-Jul-11 | 0.093 |
| HCAWQ_702 (Safari Road) | 17-Aug-11 | 0.1 |
| HCAWQ_702 (Safari Road) | 20-Sep-11 | 0.349 |
| HCAWQ_702 (Safari Road) | 26-Oct-11 | 1.194 |



GORE ROAD CATCHMENT

DATA SHEETS



GORE ROAD DATA SHEET

Table US-10: Stresses Identified in the Gore Road Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|---------------------------|------------------------------|--------------------------|------------------------------|----------------------------|-------------|--------------|----------------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| GW-58 | Abandoned Groundwater Well | ☑ | ☑ | ☑ | | ☑ | |
| RB-Various (See Appendix) | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| OP-115 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-116 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-117 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-118 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-119 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-120 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-121 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-122 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-123 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-124 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-125 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-126 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-128 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-130 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-131 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-132 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-145 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-146 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-147 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-148 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-149 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-150 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-151 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| OP-159 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

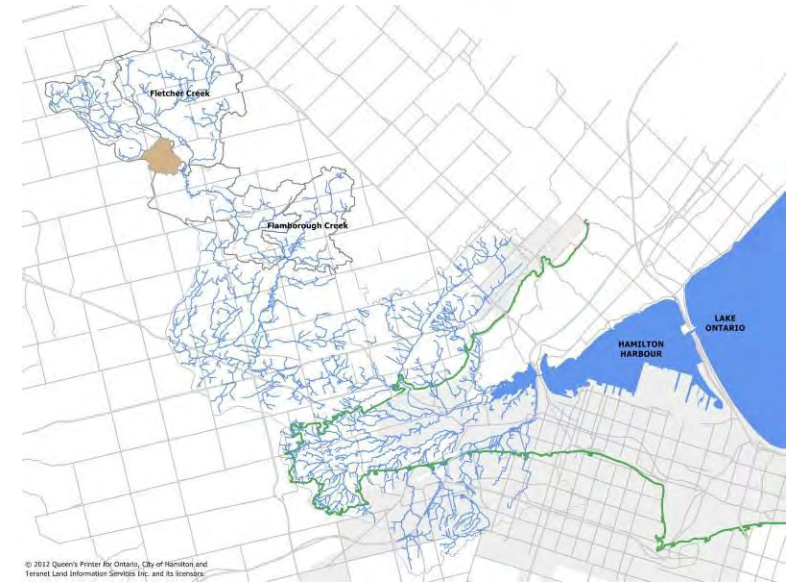
| LOCATION | DATE | DESCRIPTION |
|-----------|------|-------------|
| USP301-H1 | 2010 | Unimpaired |

WATER QUALITY ASSESSMENT

| LOCATION | DATE | PARAMETER | SAMPLE RESULTS | UNITS |
|----------|------|-----------|----------------|-------|
| | | | | |

WATER FLOW ASSESSMENT
























| LOCATION | DATE | FLOW m ³ /s |
|----------|------|------------------------|
| | | |



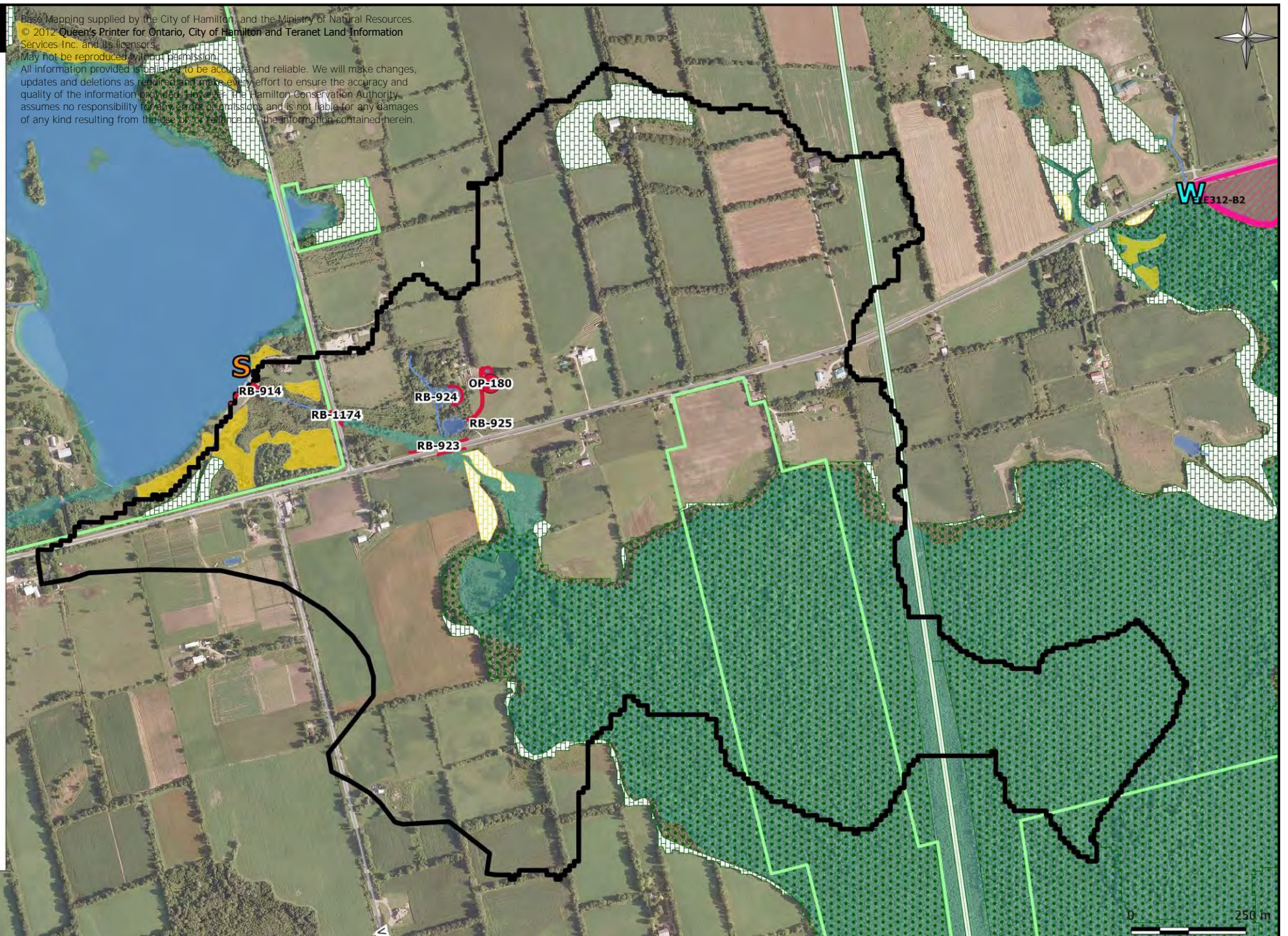
HIGHWAY 97 CATCHMENT

DATA SHEETS

US-11 Highway 97

-  Catchment Boundary
- Environmentally Significant Areas**
 -  Wetland
 -  Meadow
 -  Forest
- Recommended for NAI 2010**
 -  Forest
 -  Meadow
- Open Stream** 
- Closed Stream** 
- Surface Water** 
- Environmental Monitoring Stations**
 - W** HCA Fish and Benthic Invertebrates
Water Quality (Benthic Assessment)
 -  Unimpaired
 -  Potentially Impaired - Unimpaired
 -  Potentially Impaired
 -  Potentially Impaired - Impaired
 -  Impaired
 - F** HCA Flow and Precipitation
 - V** SWP Flow Station
 - S** PWQMN Surface Water Quality
 - G** PGMN Groundwater Quality
- Environmental Stresses**
 -  Current
 -  Anticipated
 -  Current
 -  Anticipated
 -  Current
 -  Anticipated
- HCA Managed Lands** 
- Pits and Quarries** 
- Hydro Corridor** 
- Rail Line** 

Base Mapping supplied by the City of Hamilton, and the Ministry of Natural Resources.
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HIGHWAY 97 DATA SHEET

Table US-10: Stresses Identified in the Highway 97 Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|------------------|------------------------------|-----------------------|---------------------------|-------------------------|-------------|--------------|----------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| RB-904 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-906 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-908 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-910 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-914 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-922 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-923 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-924 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-925 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-926 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-1174 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| OP-180 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |

FISHERIES ASSESSMENT

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

BENTHICS ASSESSMENT

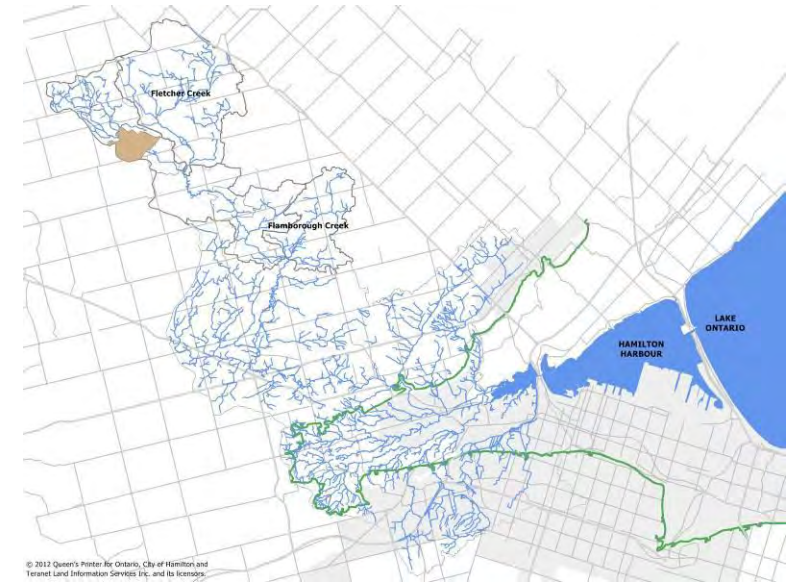
| LOCATION | DATE | DESCRPTION |
|----------|------|------------|
| | | |

WATER QUALITY ASSESSMENT

| LOCATION | DATE | PARAMETER | SAMPLE RESULTS | UNITS |
|----------|------|-----------|----------------|-------|
| | | | | |

WATER FLOW ASSESSMENT

| LOCATION | DATE | FLOW m³/s |
|----------|------|-----------|
| | | |



VALENS CATCHMENT

DATA SHEETS

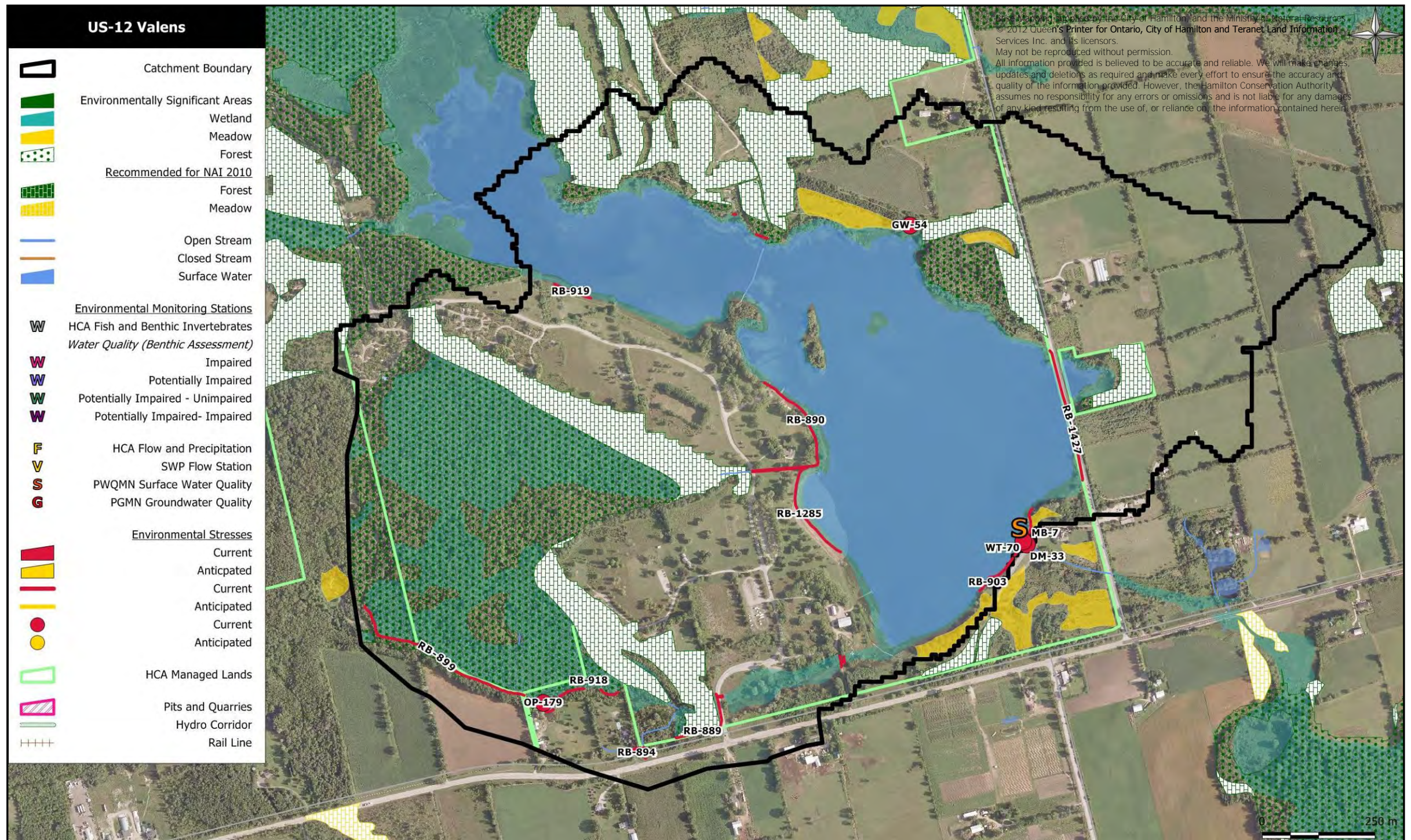


Table US-10: Stresses Identified in the Valens Catchment

| CURRENT STRESSES | DESCRIPTION | STEWARDSHIP ACTIONS | | | PUBLIC LAND | PRIVATE LAND | DFO COMP PROJECT POTENTIAL |
|------------------|------------------------------|-----------------------|---------------------------|-------------------------|-------------|--------------|----------------------------|
| | | AWARENESS OPPORTUNITY | SPECIAL STUDY OPPORTUNITY | RESTORATION OPPORTUNITY | | | |
| GW-54 | Abandoned Groundwater Well | ☑ | ☑ | ☑ | ☑ | | |
| DM-33 | Dam | ☑ | ☑ | ☑ | ☑ | | ☑ |
| RB-889 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-890 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-894 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-895 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-896 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-899 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | ☑ | |
| RB-902 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-903 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-905 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-907 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-909 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-913 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-917 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-918 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-919 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-1175 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-1209 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-1212 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-1283 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-1284 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-1285 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | ☑ | | |
| RB-1426 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| RB-1427 | Insufficient Riparian Buffer | ☑ | ☑ | ☑ | | ☑ | |
| MB-7 | Migration Barrier | ☑ | ☑ | ☑ | ☑ | | |
| OP-179 | Online Pond | ☑ | ☑ | ☑ | | ☑ | ☑ |
| WT-70 | Water Taking | ☑ | ☑ | ☑ | ☑ | | |

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 |
|----------|------|-----------|
| | | |