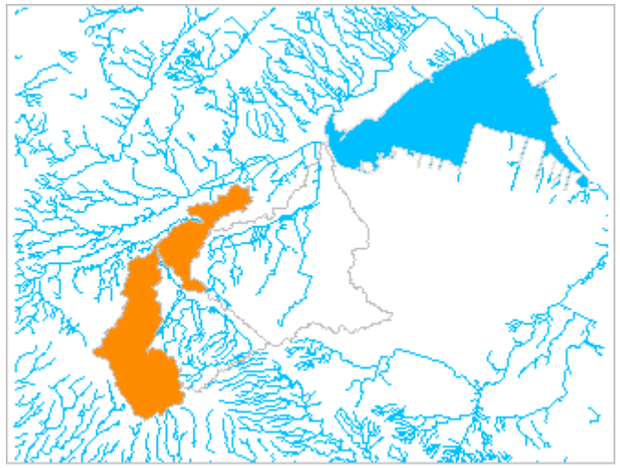

ANCASTER CREEK SUBWATERSHED

STEWARDSHIP ACTION PLAN

Hamilton Conservation Authority

1958 • Celebrating 50 Years of Conservation • 2008

Endorsed by the Hamilton Conservation Authority
Board of Directors April 3, 2008

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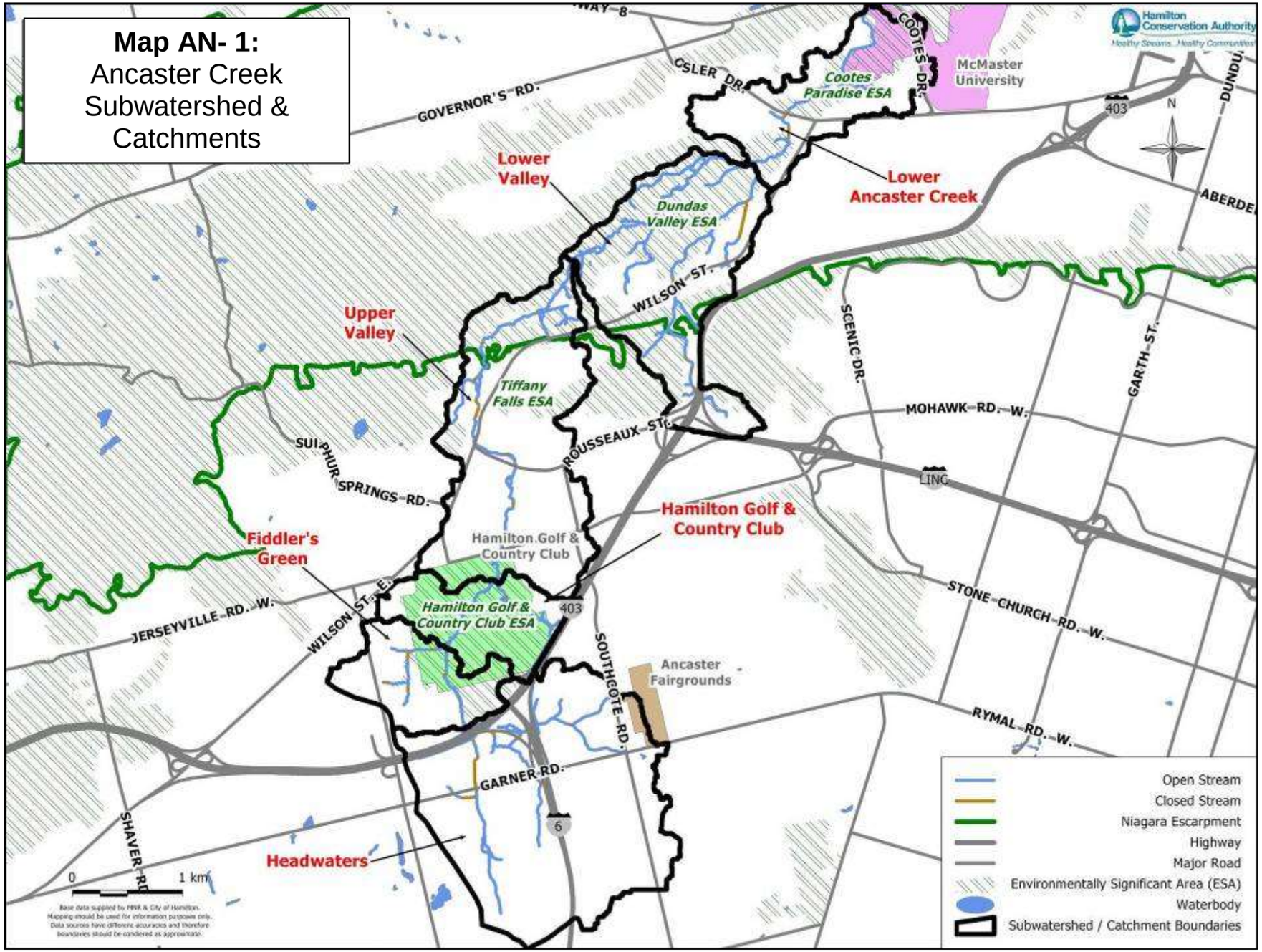
GEOGRAPHICAL LOCATION

Ancaster Creek subwatershed is 13.7 km^2 in area and is comprised of six catchment basins. In descending order from the headwaters to the outlet these are: Headwaters, Fiddler's Green, Hamilton Golf & Country Club, Upper Valley, Lower Valley, and Lower Ancaster Creek **(Map AN- 1).** This subwatershed spans the former municipal boundaries of Ancaster, Dundas and Hamilton, and is also located within three City of Hamilton wards; 1, 12 and 13. The boundaries of this subwatershed range from Fiddler's Green Road in the west to Southcote Road in the east; the southern extent is located between Garner Road and Book Road East. The subwatershed bends to the east, just north of Wilson Street, as the creek makes its way over the Niagara Escarpment until it reaches its outlet into the main branch of Spencer Creek within the Lower Spencer Creek subwatershed upstream of Cootes Drive. Highway 403 passes through this subwatershed and two interchanges are present: Rousseaux Street and Highway 6 South. Major transportation routes found within this subwatershed are Fiddler's Green Road, Southcote Road, Garner Road, Golf Links Road, Rousseaux Street, Wilson Street, Osler Drive, and Cootes Drive.

Ancaster Creek is the only cold water system of the three subwatersheds in this Stewardship Action Plan. The headwaters are located on the tablelands south of Ancaster village and flow north descending the south wall of the Dundas Valley as waterfalls before proceeding east down the valley (Source Water Protection Halton-Hamilton Region, January 2006). In some cases Ancaster Creek meanders through a valley approximately 20 m deep (R.V. Anderson, 1990 as cited in Source Water Protection Halton-Hamilton Region, January 2006). Although Ancaster Creek has remained in the most part natural, stream system alterations have occurred in order to accommodate for development, and recreational needs of the local communities. The following locations are where major alterations to the natural stream channel have occurred: north and south of Garner Road, at Highway 6 South, west of and within the Hamilton Golf & Country Club, north and south of Rousseaux Street, west of Wilson Street, north and south of Osler Drive, and where Highway 403 intersects with the creek channel.

The Niagara Escarpment is present within both the Upper and Lower Valley catchments of this subwatershed. Additionally, four municipally designated Environmentally Significant Areas (ESAs) are located within this subwatershed: Hamilton Golf & Country Club, Tiffany Falls, Dundas Valley, and Cootes Paradise. These natural areas act as major ecological corridors for terrestrial species as well as serve to maintain water quality and quantity within the stream reaches that pass through these areas, to the benefit of aquatic species.


Map AN- 1:
Ancaster Creek Subwatershed & Catchments
Hamilton Conservation Authority
Healthy Streams. Healthy Communities
Lower Valley
Lower Ancaster Creek
Upper Valley
Fiddler's Green
Hamilton Golf & Country Club
Headwaters
Cootes Paradise ESA
Dundas Valley ESA
Tiffany Falls ESA
Hamilton Golf & Country Club ESA
McMaster University
Ancaster Fairgrounds
GOVERNOR'S RD.
OSLER DR.
COOTES DR.
WILSON ST.
SCENIC DR.
GARTH ST.
MOHAWK RD. W.
ROUSSEAUX ST.
SULPHUR SPRINGS RD.
JERSEYVILLE RD. W.
WILSON ST. E.
SOUTHCOTE RD.
STONE CHURCH RD. W.
RYMAL RD. W.
GARNER RD.
SHAVER RD.
DUNDU
ABERDE
403
LINC
6
N
0
1 km
Base data supplied by HNR & City of Hamilton.
Mapping should be used for information purposes only.
Data sources have different accuracies and therefore
boundaries should be considered as approximate.
Open Stream
Closed Stream
Niagara Escarpment
Highway
Major Road
Environmentally Significant Area (ESA)
Waterbody
Subwatershed / Catchment Boundaries

NATURAL HISTORY & SIGNIFICANT SPECIES

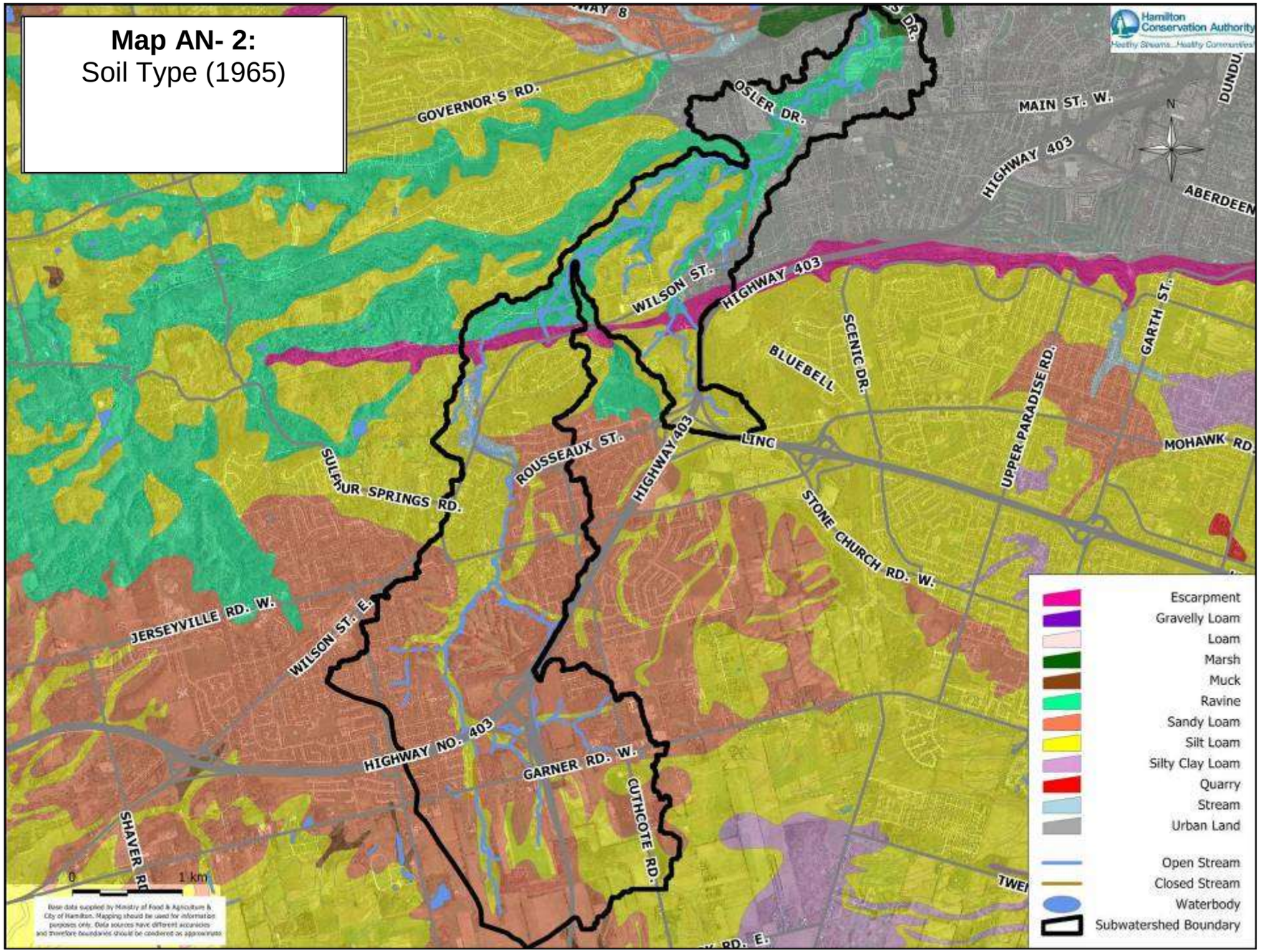
The maximum and minimum elevation in the Ancaster Creek subwatershed are approximately 250 masl and 80 masl, respectively (Source Water Protection Halton-Hamilton Region, January 2006). In the headwaters the soil type is predominantly sandy loam with silt loam following the stream corridor. At Golf Links Road the distribution of soil type changes to predominantly silt loam with a pocket of sandy loam near the Rousseaux and McNiven area, west of the stream corridor. After Ancaster Creek flows over the escarpment it flows through ravine soils typical of the Dundas Valley with silt loam soils present at the top of these ravines. With the exception of ravine soils following the stream corridor in the Lower Ancaster Creek catchment, all soils are characteristic of an urbanized landscape (**Map AN- 2**).

Wetlands that existed within the Ancaster Creek subwatershed prior to the mid-1980's as well as those wetlands that are still present today are displayed within **Map AN- 3**. It is apparent that hydrological alterations have occurred within this subwatershed in order to accommodate urban development, as well as recreational and agricultural practices. Historically, wetlands followed much of the stream corridor until it met with present day Rousseaux Street. There remain two wetland areas within this subwatershed. One is located where historical wetlands once existed. This area is classified as a swamp and is situated south-west of the Highway 403 and Highway 6 South interchange following the stream corridor. The second area is an area where wetlands did not exist prior to the mid-1980's. This area is classified as a marsh and is an eastern extension of the swamp area noted. This area crosses Highway 6 South following the stream corridor. Neither of these areas are designated as Provincially Significant Wetlands by the Ontario Ministry of Natural Resources (OMNR). Ontario's wetlands are evaluated through the OMNR Wetland Evaluation System (1993) for their biological, social, and hydrological components and special features. A wetland that is scored high in all four categories will receive a higher class ranking, with Class 1 being the highest. Historically, wetland cover made up 1.1 km^2, or 8%, of the subwatershed area. Only 0.04 km^2 of wetland area remain, which is only 0.3% of the subwatershed area. Therefore, this subwatershed has lost 96.4% of its historical wetland cover.

Historical information was not recorded for forest or meadow cover, however current natural land cover statistics are noted within **Table AN- 1**. Forest cover accounts for 28.5% of this subwatershed, while meadow cover is 1.6% of the land base. Based on the digital data provided for this analysis, stream length of the Ancaster Creek and all its tributaries is 34 km.

Table AN- 1: Natural Land Cover Statistics

Forest Cover (km^2)	Wetland Cover (km^2)	Meadow Cover (km^2)	Stream Length (km)
3.9	0.04	0.2	34


Map AN- 2:
Soil Type (1965)
Hamilton Conservation Authority
Healthy Streams...Healthy Communities
GOVERNOR'S RD.
OSLER DR.
MAIN ST. W.
HIGHWAY 403
ABERDEEN
WILSON ST.
HIGHWAY 403
BLUEBELL
SCENIC DR.
GARTH ST.
UPPER PARADISE RD.
MOHAWK RD.
LINC
ROUSSEAUX ST.
HIGHWAY 403
SULPHUR SPRINGS RD.
STONE CHURCH RD. W.
JERSEYVILLE RD. W.
WILSON ST. E.
HIGHWAY NO. 403
GARNER RD. W.
CUTHCOTE RD.
SHAVER RD.
0
1 km
Escarpment
Gravelly Loam
Loam
Marsh
Muck
Ravine
Sandy Loam
Silt Loam
Silty Clay Loam
Quarry
Stream
Urban Land
Open Stream
Closed Stream
Waterbody
Subwatershed Boundary

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 specie at risk by the OMNR it is indicated in the appendix. species that have been classified by the Committee on the Status of Species at Risk in Ontario (COSSARO) and listed by the Ontario Ministry of Natural Resources (MNR) as being at risk. Each species on the list is given a status depending on the degree of risk: *Extinct, Extirpated, Endangered, Threatened* and *Special Concern*. The following are species that are designated by the OMNR under the Ontario Endangered Species Act and can be found within this subwatershed:

Endangered
- Bashful Bulrush
- Prothonotary Warbler
- Red Mulberry

Endangered (not regulated)
- Acadian Flycatcher
- American Chestnut
- Eastern Milksnake
- Butternut
- American Ginseng

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

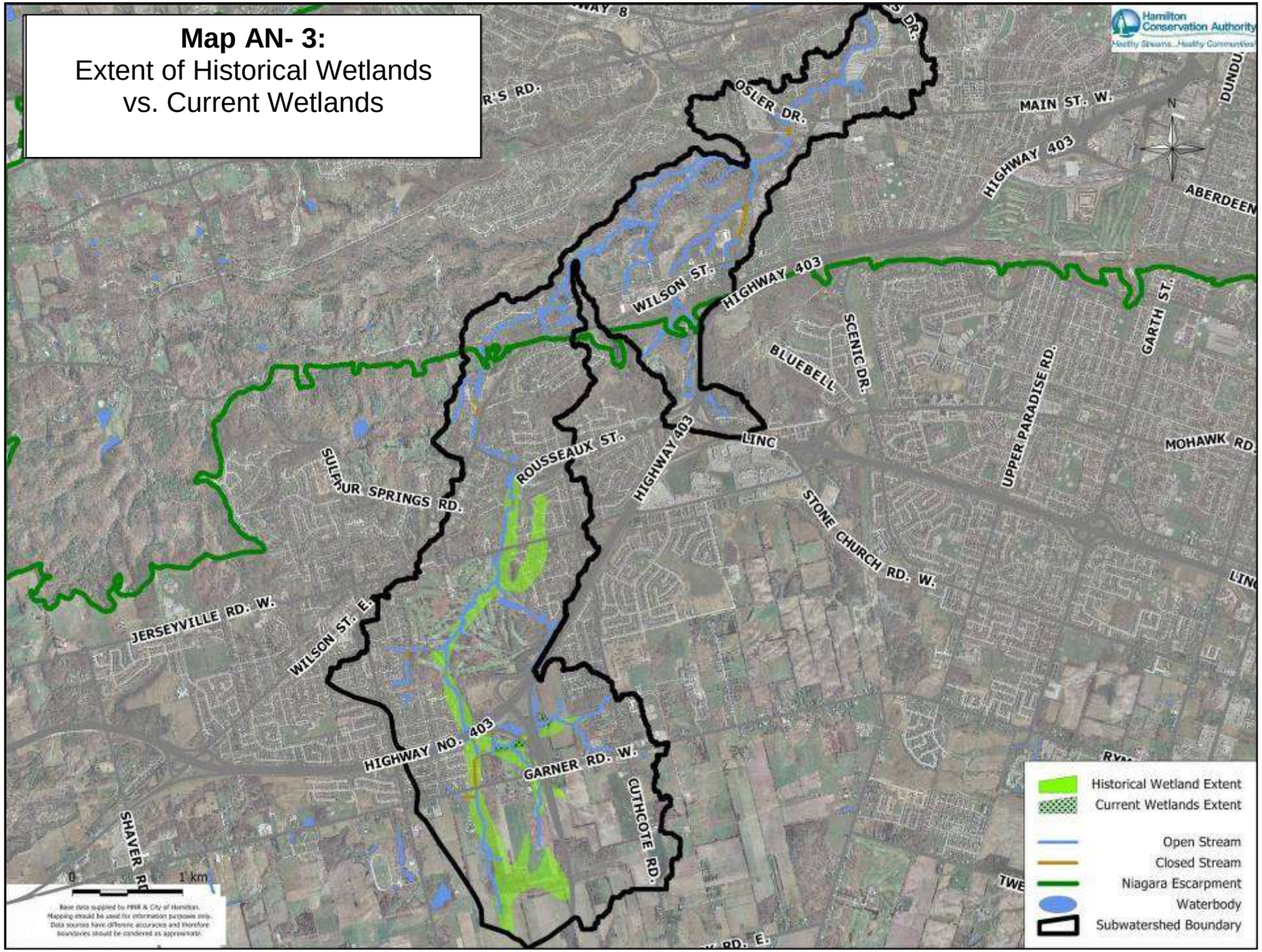
Special Concern
- Bigmouth Buffalo
- Black Tern
- Broad Beech Fern
- Cerulean Warbler
- Louisiana Waterthrush
- Monarch
- Northern Map Turtle
- Northern Ribbon Snake
- Woodland Vole

Not at Risk
- American Coot
- Common Mudpuppy
- Cooper's Hawk
- Longear Sunfish
- Northern Harrier
- Pickerel Frog
- Quillback
- Sharp-shinned Hawk

It will be important to create awareness and undertake habitat restoration activities related to these species designated by the OMNR, especially those species that are endangered (not regulated).

Due to the erosivity of the soils in this subwatershed, headwater wetlands must be restored to meet the How Much Habitat is Enough Guidelines as set by Environment Canada, to reduce sediment loading in Spencer Creek and ultimately Cootes Paradise. This may be achieved through the approval of development applications and resultant compensation projects for the proposed development within the Headwaters catchment, with an opportunity for an eco-industrial park.

For more information regarding the natural history of this subwatershed please refer to the Preliminary Watershed Description Report: Hamilton Conservation Watersheds (Source Water Protection Halton-Hamilton Region, January 2006) and the Nature Counts: Hamilton Natural Areas Inventory (Dwyer, J. et al., 2003)


Map AN- 3:
Extent of Historical Wetlands
vs. Current Wetlands
Hamilton Conservation Authority
Healthy Streams...Healthy Communities
OSLER DR.
MAIN ST. W.
HIGHWAY 403
ABERDEEN
WILSON ST.
HIGHWAY 403
SCENIC DR.
BLUEBELL
GARTH ST.
UPPER PARADISE RD.
MOHAWK RD.
LINC
ROUSSEAUX ST.
HIGHWAY 403
SULPHUR SPRINGS RD.
STONE CHURCH RD. W.
JERSEYVILLE RD. W.
WILSON ST. E.
HIGHWAY NO. 403
GARNER RD. W.
CUTHCOTE RD.
SHAVER RD.
0
1 km
Historical Wetland Extent
Current Wetlands Extent
Open Stream
Closed Stream
Niagara Escarpment
Waterbody
Subwatershed Boundary

CULTURAL & STEWARDSHIP HISTORY

Settlers came to the Ancaster area as early as 1790 due to the high well-drained land, good spring water and streams for water power, and because the site was on the early road from Niagara to the western part of the province (Spencer Creek Conservation Authority, 1965). Although the village was founded by Jean Baptiste Rousseaux from Lower Canada and James Wilson from Pennsylvania, Governor Simcoe gave it its name, after the hamlet in Lincolnshire in England (Spencer Creek Conservation Authority, 1965). Hence, Ancaster Creek is named after the village in which it flows.

The approximate population of the Ancaster Creek subwatershed is 5000 persons with a population density of about 365 persons per square kilometre. Current land use within the Ancaster Creek subwatershed is predominantly residential, with open space and agricultural lands being the secondary land use **(Table AN- 2)**. Agricultural land use is prominent south of Garner Road with open space mainly consisting on the Hamilton Golf & Country Club property in the south and valleylands in the north of this subwatershed **(Map AN- 4)**. Commercial land use is evident along major transportation routes with institutional lands strategically placed among residential areas. Industrial land use is also spread out among the many properties of this subwatershed; however all lie within close proximity, if not along, the stream corridor. Two major utility corridors exist, one in the Headwaters catchment and another in the Lower Ancaster Creek catchment. Impervious surfacing within this subwatershed exceeds standards recommended for healthy stream systems.

In this subwatershed there is potential to naturalize an additional 400 m^2 by enhancing utility corridors to serve as terrestrial habitat. Therefore, it is important to work with our large landowners to restore terrestrial and aquatic habitat in the subwatershed. Additionally, it is equally important to work with our ward councilors to generate support for local stewardship initiatives with the public and private sectors as well as our development industry.

Although there are many properties that do not have natural features present, there are 596 properties that do accommodate forest, wetland, meadow or riparian / aquatic habitat **(Table AN- 3)**. Of these landowners, 76 (or 13%) have been contacted by the Hamilton-Halton Watershed Stewardship Program (HHWSP), and 23 (or 30%) have become Watershed Stewards **(Map AN- 5)**. This analysis includes rural and urban, public and private landowners by individual property, not landowner name. Therefore there is much potential within this subwatershed for landowner contact and in turn the establishment of Watershed Stewards. In addition to those landowners who have natural features on their properties, those landowners who do not have natural features on their properties can also act as Watershed Stewards since everyone is affected by what one person does on their property. There is also great opportunity to contact those landowners and create awareness regarding BMPs in an urban environment as they relate to local significant species and storm water management practices.

Currently, Watershed Stewards are predominantly located in both the Upper and Lower Valley catchments, therefore these would be good catchments in which to start community greening projects and Friends of Ancaster groups. There is great opportunity for landowner contact within the Headwaters catchment; properties surrounding the Hamilton Golf & Country Club, along the stream corridor and surrounding the Tiffany Falls ESA in the Upper Valley catchment, as well as along the stream corridor in the Lower Ancaster Creek catchment.

Environment Canada has provided guidelines for forest, wetland and riparian habitat for subwatershed areas and in turn a preliminary analysis has been completed using the guidelines set out by this agency. **Table AN- 4** displays the status of the Ancaster Creek subwatershed when compared to these Federal guidelines.

Due to the high percentage of impervious surfacing and because this subwatershed is a historically cold water system, proper BMPs regarding storm water management must be enforced and must encourage groundwater infiltration in order to maintain or enhance cold water fisheries. This is especially important in the Headwaters catchment since much development is planned for this area of the subwatershed.

Although it appears as though this subwatershed has a large amount of forest cover it still does not meet Environment Canada's How Much Habitat is Enough Guidelines. Forest cover would need to be increased by about 0.2km^2 to meet this guideline, with an emphasis being placed on forest patch shape. Additionally it should be determined whether or not the percentage of forest cover from the forest edge supports interior forest breeding birds.

Table AN- 2: Land Use Statistics

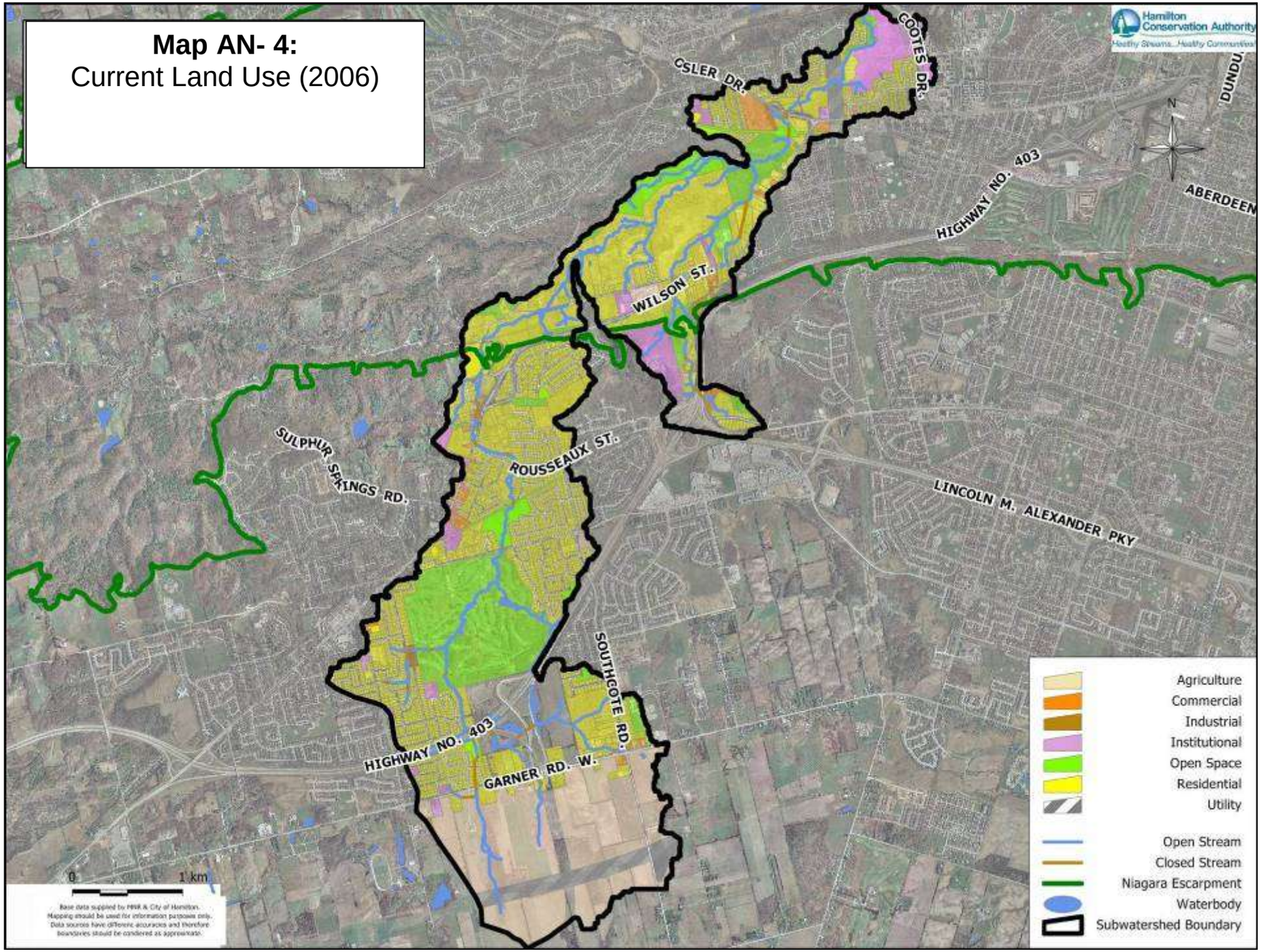
Area (km^2)	Agricultural (km^2)	Commercial (km^2)	Industrial (km^2)	Institutional (km^2)	Open Space (km^2)	Residential (km^2)	Transportation (km^2)	Utility (km^2)	Impervious Surfacing (%)
13.7	2.2	0.3	0.04	1.0	2.3	5.6	1.86	0.4	36

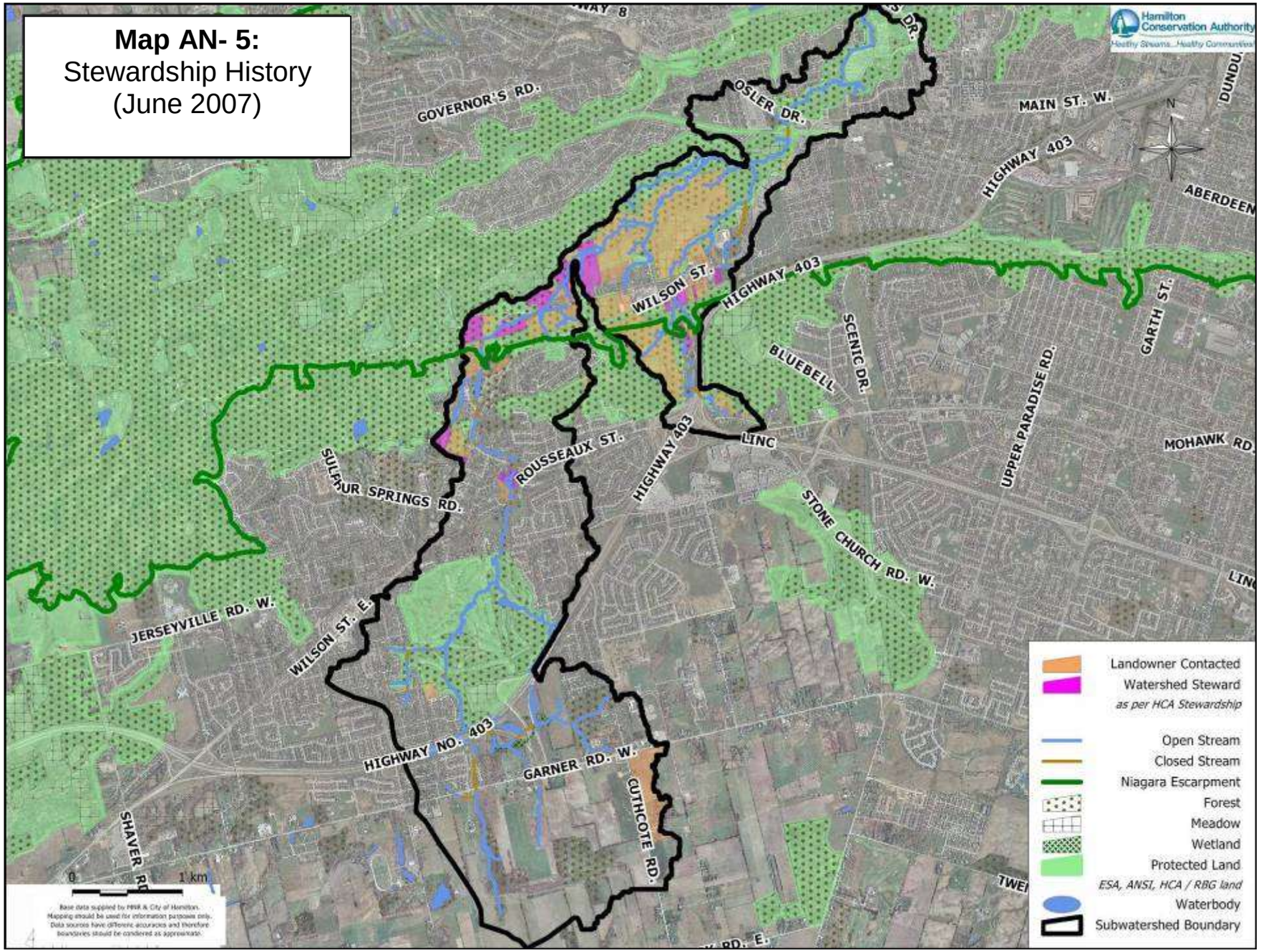
Table AN- 3: Stewardship Statistics

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
5000	365	596	76	23	81	25

Table AN- 4: Environment Canada's How Much Habitat is Enough Guidelines

PARAMETER	% Wetlands	% Stream Naturally Vegetated	Total Suspended Sediments	% Impervious Surfacing	Fish communities	% Forest Cover	Size of largest Forest patch	% Forest Cover 100m & 200m from Forest edge
GUIDELINE	6	75% with 30m buffer on either side	Below 25 mg/L	< 10	Based on historical data / watershed characteristics	30	$2km^2$ & min 500m wide	10% < 100m from forest edge
SUBWATERSHED STATUS	0.3	n/a	2006-2007 period – 1 reading above 25 mg/L	36	Historically cold – now cool to warm	28.5	$1.8km^2$ & sections are 500m wide	n/a


Map AN- 4:
Current Land Use (2006)
Hamilton Conservation Authority
Healthy Streams...Healthy Communities
CSLER DR.
COOTES DR.
DUNDU
N
HIGHWAY NO. 403
ABERDEEN
WILSON ST.
SULPHUR SPRINGS RD.
ROUSSEAUX ST.
LINCOLN M. ALEXANDER PKY
SOUTHCOTE RD.
HIGHWAY NO. 403
GARNER RD. W.
0
1 km
Base data supplied by MNR & City of Hamilton.
Mapping should be used for information purposes only.
Data sources have different accuracies and therefore
boundaries should be considered as approximate.
Agriculture
Commercial
Industrial
Institutional
Open Space
Residential
Utility
Open Stream
Closed Stream
Niagara Escarpment
Waterbody
Subwatershed Boundary


Map AN- 5:
Stewardship History
(June 2007)
Hamilton Conservation Authority
Healthy Streams...Healthy Communities
GOVERNOR'S RD.
OSLER DR.
MAIN ST. W.
HIGHWAY 403
ABERDEEN
WILSON ST.
HIGHWAY 403
SCENIC DR.
BLUEBELL
GARTH ST.
UPPER PARADISE RD.
MOHAWK RD.
LINC
ROUSSEAUX ST.
HIGHWAY 403
SULFUR SPRINGS RD.
STONE CHURCH RD. W.
JERSEYVILLE RD. W.
WILSON ST. E.
HIGHWAY NO. 403
GARNER RD. W.
CUTHCOTE RD.
SHAVER RD.
0
1 km
Base data supplied by MNR & City of Hamilton.
Mapping should be used for information purposes only.
Data sources have different accuracies and therefore
boundaries should be considered as approximate.
Landowner Contacted
Watershed Steward
as per HCA Stewardship
Open Stream
Closed Stream
Niagara Escarpment
Forest
Meadow
Wetland
Protected Land
ESA, ANSI, HCA / RBG land
Waterbody
Subwatershed Boundary

SUBWATERSHED STRESSES & STEWARDSHIP ACTIONS

There are fifteen Subwatershed-wide Stresses identified within the Ancaster Creek subwatershed. Three of these are considered Dominant Stresses while the others are considered Associated Stresses as they directly relate to the Dominant Stresses. These stresses and their relationships to one another are listed in **Table AN- 5.**

Table AN- 6 outlines the Stewardship Actions and measurable targets for each of the Subwatershed-wide Stresses listed in **Table AN-5**; the Dominant Stresses are highlighted in yellow for quick reference. Additionally, each Dominant and Associated Stress has Site-level Stresses identified on the catchment maps, the details of which are within the corresponding catchment datasheets. Within the Ancaster Creek subwatershed, 75 Site-level Stresses have been identified. Inventories and the location of the Site-level stresses found in each of the catchments are listed under the Stress description in **Table AN-6**.

Erosion stresses have been noted within both the Development and Habitat Degradation Dominant Stress categories and all Storm water Mismanagement Stresses have been noted under both the Development and Detachment from Nature Dominant Stress categories as the Stewardship Actions directly relate to both of these Dominant Stresses.

In summary, future development in the headwaters of this subwatershed is of primary concern to the fisheries potential as it increases the potential for erosion downstream. Present natural systems (aquatic & terrestrial) must remain intact and preserved in order to keep the integrity of this historically coldwater system. In order to maintain or enhance the water quality of this subwatershed, contamination as a result of salt application on major arterial roadways must be reduced. Wetland and forest restoration in the headwaters may also be of benefit to mitigate existing erosion resulting from past development. Additionally, phosphorus loading and pesticide use are of great concern in this area as are often used in lawn care practices.

Areas to highlight in this subwatershed Stewardship Action Plan are; the extensive natural areas surrounding the Ancaster Creek valley in the lower portion, as well as the potential for establishing a Friends of Ancaster group surrounding Old Dundas Road. Also, there are many accessible waterfalls located within in this subwatershed that have the potential to serve as excellent awareness opportunities through interpretive signage & trail opportunities. These eco-tourism sites can be incorporated into the enhancement of noted ecological linkages, ensuring connectivity for terrestrial species to reach Cootes Paradise Marsh through this urban environment.

DOMINANT STRESS	ASSOCIATED STRESS
Development (DV)	Erosion (ER)
	Storm Water Mismanagement (SW)
	Water Contamination through Transportation Corridors (TC)
Detachment from Nature (DT)	Eco-tourism Related Degradation (ET)
	Storm Sewer Outfalls (SO)
	Storm Water Mismanagement (SW)
Terrestrial Habitat Degradation & Lack of Riparian Buffer (HR)	Channelized / Buried Streams (CB)
	Debris Jams (DJ)
	Encroachment (EN)
	Erosion (ER)
	On-line Ponds / Culverts (PC)
	Phosphorus Loading (PL)
	Pesticide Use (PS)
	Plowed Watercourses (PW)

Table AN- 5: Dominant & Associated Subwatershed-wide Stresses

Table AN- 6: Stewardship Actions & Inventories of Site-level Stresses

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Channelization / Buried Streams **Map Code: CB** **Definition:** The structural alteration of a stream channel, usually involves straightening of meanders and increasing gradient which increases velocity and erosion potential. **Inventory of Sites Identified** = 2 **Catchment Locations:** Headwaters (1) Fiddler's Green (1) **Audience:** CITY / HHHBA / developers / private & public landowners	**2008-2012:** Utilize workshops, information sessions, literature, webpages, interpretive signage & direct landowner contact to create awareness regarding the detrimental effects of channelized and buried streams; ▪ **Partners:** DFO / HCA / MNR / Ont. Stewardship Council / HHWSP	**By 2010:** Identify sites for undertaking buried stream "daylighting" projects in the subwatershed; • **Partners:** HCA / CITY / MNR / post-sec. schools / HHWSP **By 2010:** Assess landowner motivation for contributing to natural channel design; • **Partners:** HCA / MNR / post-sec. schools / HHWSP **By 2012:** Inventory illegal sewer hookups by building on the Cross Connections of Sanitary Services into Storm Sewers study undertaken in 2003; ▪ **Partners:** HCA / MNR / post-sec. schools	**2011-2012:** Focus riparian zone rehabilitation to areas downstream of channelized sites, to reduce flow velocities, erosion and sedimentation, with a goal of two projects per year; ▪ **Partners:** CITY / DFO / FSRT / HCA / Ont. Stewardship Council / landowners & citizens / HHWSP ▪ **By 2012:** Work with private landowners to undertake one "daylighting" / natural channel design project; ▪ **Partners:** CITY / DFO / FSRT / HCA / Ont. Stewardship Council / landowners & citizens / HHWSP
Debris Jams **Map Code: DJ** **Definition:** The accumulation of large woody debris across a stream channel which impedes flow and prevents fish migration. **Inventory of Sites Identified** = 0 **Audience:** CITY / private & public landowners	**2008-2012:** Utilize workshops, information sessions, literature, webpages, interpretive signage & direct landowner contact to create awareness regarding the environmental impacts of debris jams as fish barriers & flooding hazards; ▪ **Partners:** HCA / MNR / Ont. Stewardship Council / HHWSP	**By 2010:** Complete an assessment of creek/in-stream flow barriers that are prone to debris jams and cause barriers to fish migration, including the prioritization of barriers to be removed; ▪ **Partners:** HCA / MNR / post-sec. schools / HHWSP **By 2010:** Assess landowner motivation for contributing to barrier removal projects; ▪ **Partners:** HCA / MNR / post-sec. schools / HHWSP	**2011-2012:** Remove debris jams based on the barrier removal project recommendations; ▪ **Partners:** CITY / DFO / FSRT / HCA / Ont. Stewardship Council / landowners & citizens / HHWSP

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Detachment from Nature **Map Code: DT** **Definition:** The condition of people disassociating their existence from nature. **Inventory of Sites Identified** = 5 **Catchment Locations:** Headwaters (2) Fiddler's Green (1) Upper Valley (2) **Audience:** private & public landowners	**2008-2012:** Initiate a community greening project with watershed partners to deliver messaging to targeted audiences. Utilize workshops, information sessions, literature, webpages & direct landowner contact to create awareness regarding urban BMPs and the ecological significance of natural features; ▪ **Partners:** BARC / CITY / FSRT / Green Venture / HCA / Ont. Stewardship Council **2008-2012:** Erect creek crossing & ecological corridor signage along roadways; ▪ **Partners:** BARC / CITY / FSRT / Green Venture / HCA / Ont. Stewardship Council / WPN **2008-2012:** Implement Adopt-a-Creek projects in communities where Friends of groups are possible; ▪ **Partners:** BARC / Environment Hamilton / HCA / school boards / landowners & citizens / HHWSP **2008-2012:** Continue to implement the Watershed Steward Award Program; ▪ **Partners:** BARC / Environment Hamilton / HCA / school boards / landowners & citizens / HHWSP	**By 2011:** Utilize citizen groups to conduct local watershed monitoring & reporting projects (including water quality, naturalization projects & litter hotspots); ▪ **Partners:** BARC / Environment Hamilton / HCA / school boards / landowners & citizens	**By 2010:** Initiate a minimum of one volunteer-based program to complete restoration projects on private & public lands with local landowners including schoolyard naturalization, litter clean up, removal of encroaching material, etc.; ▪ **Partners:** FSRT / HCA / Ont. Stewardship Council / school boards landowners & citizens / HHWSP

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Development **Map Code: DV** **Definition:** The process of developing populated settlements; including housing and supporting infrastructure. **Inventory of Sites Identified** = 9 **Catchment Locations:** Headwaters (4) Upper Valley (2) Lower Ancaster Creek (3) **Audience:** CITY / HHHBA / developers / private landowners	**2008-2012:** Host annual training sessions for City staff & developers to create awareness regarding the incorporation of development related BMPs into planning applications (i.e. pervious pavement, green rooftops, storm water management, road-salt alternatives, snow-piling, erosion &s sediment control measures, compliance & enforcement, etc.); ▪ **Partners:** BARC / CITY / DFO / FSRT / Green Venture / HCA / MTO **2008-2012:** Apply Yellow Fish Road to all catchbasins on streets and in parking areas to educate private landowners post-development; ▪ **Partners:** BARC / CITY / DFO / FSRT / Green Venture / HCA / MTO	**2008-2012:** Continue to complete ecological surveys (using the Ecological Land Classification system) to ensure species at risk habitat or rare ecological areas are not disrupted; • **Partners:** CITY / HCA / post-sec. schools **2008-2012:** Continue to incorporate downstream assessments of creek conditions, with recommendations for improvement, as part of the subwatershed-wide subwatershed studies conducted as part of new Greenfield development planning; • **Partners:** CITY / HCA / post-sec. schools **2008-2012:** HCA staff to develop an internal mechanism to ensure that BMP's and Stewardship Actions to preserve and enhance habitat are addressed in development application prior to construction; • **Partners:** BARC / CITY / DFO / FSRT / Green Venture / HCA / MTO	**2008-2012:** Use the terrestrial habitat and ecological linkages identified in this plan to preserve & rehabilitate these areas as part of new Greenfield developments in the subwatershed; ▪ **Partners**: HCA / CITY **2008-2012:** Enhance groundwater recharge by ensuring that 70% of all land, post construction must remain pervious as a condition for development application approval; ▪ **Partners:** HCA / CITY **2008-2012:** 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); ▪ **Partners:** HCA / CITY

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Encroachment **Map Code: EN** **Definition:** The act of undertaking practices on another person's property, i.e. erecting structures, planting gardens, disposal of waste. **Inventory of Sites Identified** = 0 **Audience:** private & public landowners	**2008-2012:** Utilize workshops, information sessions, literature, webpages, signage & direct landowner contact to create awareness regarding encroachment impacts to terrestrial habitat as well as the ecological significance of riparian buffers & natural areas (public lands); ▪ **Partners:** CITY / HCA / Ont. Stewardship Council / RBG / local nurseries & landscaping co.'s / HHWSP **2008-2012:** Utilize workshops, information sessions, literature, webpages, interpretive signage & direct landowner contact to create awareness regarding encroachment impacts to terrestrial habitat as well as the ecological significance of riparian buffers & natural areas (private lands); ▪ **Partners:** CITY / HCA / Ont. Stewardship Council / RBG / local nurseries & landscaping co.'s / HHWSP **By 2010:** Work with local nurseries & landscaping co.'s to educate / encourage landowners to use native plants; • **Partners:** CITY / HCA / Ont. Stewardship Council / RBG / Green Venture / local nurseries & landscaping co.'s / HHWSP	**2009-2012:** Utilize citizen groups to monitor restored sites on an annual basis to ensure mitigation of encroachment on public lands remains effective & to encourage neighbour-to-neighbour mentoring; ▪ **Partners:** HCA / landowners & citizens / HHWSP / CITY / RBG	**2008-2012:** Continue to work with neighbours to encourage community events to remove existing encroachments on public lands; ▪ **Partners:** FSRT / HCA / Ont. Stewardship Council / landowners & citizens / HHWSP/ RBG / CITY

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Erosion **Map Code: ER** **Definition:** The process of eroding or the condition of being eroded; commonly occurs as scouring or slumping. **Inventory of Sites Identified** = 10 **Catchment Locations:** Headwaters (1) Fiddler's Green (1) Hamilton Golf & C'ntry Club (1) Upper Valley (4) Lower Valley (1) Lower Ancaster Creek (2) **Audience:** CITY / HHHBA / developers / private & public landowners	**2008-2012:** Host training sessions for City staff and developers to create awareness regarding BMPs & importance of properly maintained erosion / sediment control measures & enforcement**;** • **Partners:** CITY / DFO / HCA / Ont. Stewardship **2008-2012:** Utilize workshops, information sessions, literature, webpages, interpretive signage & direct private & public landowner contact to create awareness regarding the importance of riparian buffers & proper land management practices; ▪ **Partners:** CITY / DFO / HCA / Ont. Stewardship Council / HHWSP	**By 2010:** Complete field study of stream morphology, determining erosion hotspots & associated causes; ▪ **Partners:** CITY / HCA / post-sec. schools	**2008-2012:** Utilize enforcement scheme to enforce maintenance of erosion / sediment control measures on new development sites; ▪ **Partners:** DFO / CITY / HCA / Ont. Stewardship Council / landowners & citizens **2008-2012:** Reduce erosion and promote awareness through the completion of a streambank stabilization / natural channel design demonstration project; ▪ **Partners:** DFO / CITY / HCA / Ont. Stewardship Council / landowners & citizens / HHWSP **2008-2012:** Undertake a minimum of one riparian buffer project on private & public lands to reduce erosion. Promote no mow zones a minimum of **3m from top of bank on public and private lands;** ▪ **Partners:** DFO / CITY / HCA / Ont. Stewardship Council / landowners & citizens / HHWSP

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Eco-Tourism Related Degradation Map Code: ET **Definition:** Recreational activities occurring in natural areas that inadvertently degrade the natural features of the area. **Inventory of Sites Identified** = 7 **Catchment Locations:** Upper Valley (6) Lower Valley (1) **Audience:** visitors to natural areas	**2008-2012:** Provide signage noting the environmental significance of natural areas & BMPs for eco-tourists; ▪ **Partners:** CITY / HCA / Ont. Stewardship Council / RBG	**2009-2012:** When undertaking master planning exercises, consider developing trails along ecological linkages noted in study area; ▪ **Partners:** BTA / CITY / HCA / RBG	**2010-2012:** Develop trails to meet guidelines set in HCA's Planning & Regulation Policies & Guidelines; ▪ **Partners:** BTA / CITY / HCA / RBG

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Terrestrial Habitat Fragmentation & Lack of Riparian Buffers **Map Code: HR** **Definition:** Disruption of large continuous tracts of habitat; often occurring along watercourses. **Inventory of Sites Identified** = 11 **Catchment Locations:** Headwaters (3) Fiddler's Green (1) Hamilton Golf & C'ntry Club (1) Upper Valley (2) Lower Valley (3) Lower Ancaster Creek (1) **Audience:** private & public landowners (CITY / golf courses / HCA / HYDRO ONE / MTO / RBG / school boards)	**2008-2012:** Meet with public landowners to create working relationship for land stewardship on public lands; • **Partners:** HCA / Ont. Stewardship Council / HHWSP **2008-2012:** Utilize workshops, information sessions, literature, webpages, interpretive signage & direct private landowner contact to create awareness regarding the importance of riparian buffers & natural areas; • **Partners:** HCA / Ont. Stewardship Council / HHWSP **2009-2012:** Create demonstration sites on public lands that focus on varying types of terrestrial and aquatic restoration projects; ▪ **Partners:** CITY / FSRT / HCA / Ont. Stewardship Council / school boards / landowners & citizens / HHWSP	**2008-2009:** Develop How Much Habitat is Enough targets & potential restoration sites for each subwatershed, as well as specific areas to connect using eco-link recommendations in catchment summaries & determine specific species habitat to target; ▪ **Partners:** CITY / HCA / post-sec. schools / HHWSP **2008-2009:** Assess landowner motivation for increasing forest, wetland, riparian & meadow / prairie habitat; ▪ **Partners:** CITY / HCA / post-sec. schools / HHWSP	**2008-2012:** Contact all landowners of natural areas and watercourses. A minimum of one Watershed Steward Award Recipient and one rehabilitation project to be completed; ▪ **Partners:** CITY / FSRT / HCA / Ont. Stewardship Council / school boards / landowners & citizens / HHWSP **2009-2012:** Undertake a minimum of one restoration project per year on public lands, with an emphasis on utility corridors, for connectivity and demonstration sites; ▪ **Partners:** CITY / FSRT / HCA / Ont. Stewardship Council / school boards / landowners & citizens / HHWSP

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
On-line Ponds and Culverts **Map Code: PC** **Definition:** In-stream structures that when improperly designed, inadvertently create barriers to water flow and fish migration. **Inventory of Sites Identified** = 7 **Catchment Locations:** Headwaters (1) Fiddler's Green (1) Hamilton Golf & C'ntry Club (1) Upper Valley (3) Lower Valley (1) **Audience:** CITY / private & public landowners	**2008-2012:** Utilize workshops, information sessions, literature & webpage, interpretive signage & direct landowner contact to create awareness regarding environmental effects of on-line ponds; ▪ **Partners:** DFO / HCA / MNR / Ont. Stewardship Council / HHWSP **2008-2011:** Utilize workshops, information sessions, literature & webpages, interpretive signage & direct landowner contact to create awareness regarding environmental effects of perched & closed bottom culverts; ▪ **Partners:** DFO / HCA / MNR / Ont. Stewardship Council / HHWSP	**By 2010:** Assess landowner motivation for removing/retrofitting existing on-line ponds; • **Partners:** HCA / MNR / post-sec. schools / local eng. co.'s / HHWSP **2008-2012:** Use local colleges / universities or volunteer consultants to complete studies & design for rehabilitation projects ▪ **Partners:** HCA / MNR / post-sec. schools / local eng. co.'s / HHWSP **2010:** Assess landowner motivation for removing/retrofitting existing perched and/or closed bottom culverts; ▪ **Partners:** HCA / MNR / post-sec. schools / local eng. co.'s / HHWSP **2008-2012:** Use local colleges / universities or volunteer consultants to complete studies & designs for rehabilitation projects; ▪ **Partners:** HCA / MNR / post-sec. schools / local eng. co.'s / HHWSP	**2008-2012:** Rehabilitate/retrofit a minimum of one on-line pond; ▪ **Partners:** DFO / CITY / HCA / post-sec. schools / local eng. co.'s / HHWSP **2008-2012:** Rehabilitate/retrofit a minimum of one perched & closed bottom culvert; ▪ **Partners:** DFO / CITY / HCA / post-sec. schools / local eng. co.'s / HHWSP

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Phosphorous Loading **Map Code: PL** **Definition:** Excessive phosphorous being inputted into a watercourse; often resulting from the application of fertilizer. **Inventory of Sites Identified** = 1 **Catchment Locations:** Hamilton Golf & C'ntry Club (1) **Audience:** private & public landowners	**2008-2012:** Utilize workshops, information sessions, literature & webpages, interpretive signage & direct landowner contact to create awareness regarding environmental impacts of phosphorus loading & alternatives to lawn fertilization; ▪ **Partners:** HCA / RBG / HHWSP / Green Venture	**In 2009:** Develop reduction in phosphorus loading targets & identify potential mitigation sites for each subwatershed; ▪ **Partners:** HCA / RBG / post-sec. schools / HHWSP **2009:** Assess landowner motivation for reducing lawn fertilization; ▪ **Partners:** HCA / RBG / post-sec. schools / HHWSP / Green Venture **In 2008:** Model phosphorus loading in the subwatersheds and compare against RAP objectives; ▪ **Partners:** HCA / RBG / post-sec. schools / RAP	**2009-2012:** Work toward an 80% reduction in phosphorus loading by encouraging citizens to conduct a reduction in lawn fertilization (20% reduction/yr through the promotion of over-seeding, mulching & BMPs); ▪ **Partners:** CITY / HCA / Ont. Stewardship Council / HHWSP / Green Venture
Pesticide Use **Map Code: PS** **Definition:** The application of pesticides to control perceived pests. **Inventory of Sites Identified** = 2 **Catchment Locations:** Fiddler's Green (1) Hamilton Golf & C'ntry Club (1) **Audience:** private & public landowners	**2008-2009:** Utilize workshops, information sessions, literature & webpages, interpretive signage & direct landowner contact to create awareness regarding environmental impacts of pesticide / herbicide use & alternatives to pesticide / herbicide use; ▪ **Partners:** Green Venture / Hamilton Coalition on Pesticide Issues / OMAFRA **2008-2012:** Support the City's Pesticide By-law; ▪ **Partners:** Green Venture / Hamilton Coalition on Pesticide Issues / OMAFRA	**In 2008:** Determine percentage of pesticide / herbicide use in each subwatershed; ▪ **Partners:** Green Venture / HCPI / OMAFRA **In 2009:** Develop reduction in pesticide / herbicide use targets & potential mitigation sites for each subwatershed; ▪ **Partners:** Green Venture / HCPI / OMAFRA **In 2009:** Assess landowner motivation for reducing pesticide use; ▪ **Partners:** Green Venture / HCPI / OMAFRA	**By 2011:** Work toward decreasing pesticide use by 50% and by 75% **in 2012** using integrated pest management, lawn naturalization, over-seeding, mulching, BMPs, etc.; ▪ **Partners:** Green Venture / HCA / Hamilton Coalition on Pesticide Issues / Ont. Stewardship Council / OMAFRA

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Plowed Watercourse Map Code: PW **Definition:** Headwater swales or small watercourses that are worked for agricultural production. **Inventory of Sites Identified** = 2 **Catchment Locations:** Headwaters (2) **Audience:** private agricultural landowners	**2008-2012:** Utilize workshops, information sessions, literature & webpages & direct private landowner contact to create awareness regarding environmental effects of plowed watercourses; ▪ **Partners:** DFO / HCA / OMAFRA / Ont. Stewardship Council / HHWSP / OSCIA **2008-2012:** Promote the Environmental Farm Plan program and associated Cost Sharing Programs for the implementation of Beneficial Management Practices projects; ▪ **Partners:** Stewardship Council / HHWSP / OSCIA	**2010:** Assess landowner motivation for installing grassed waterways and riparian buffers; ▪ **Partners:** HCA / OMAFRA / HHWSP / OSCIA /HWSCIA	**2008-2012:** Reduce sedimentation through the creation of a minimum of one riparian buffer on private lands, target 15m from top of bank for warm water systems and 30m from top of bank for coldwater systems; ▪ **Partners:** HCA / landowner / HHWSP

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Stormsewer Outfalls / CSO's **Map Code: SO** **Definition:** The point where a combined sewer overflow system discharges into a watercourse during a storm event. **Inventory of Sites Identified** = 13 **Catchment Locations:** Fiddler's Green (1) Hamilton Golf & C'ntry Club (1) Upper Valley (6) Lower Valley (1) Lower Ancaster Creek (4) **Audience:** children & private landowners (residential / commercial / industrial)	**2008-2012:** 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; • **Partners:** BARC / CITY / FSRT / HCA **2008-2012:** Support Sewer-Use Bylaw enforcement (City of Hamilton By-law No. 04-150); ▪ **Partners:** BARC / CITY / FSRT / HCA	**2008-2012:** Conduct water quality testing at storm sewer outfalls to support a study on illegal sewer hookups, Sewer Use Bylaw enforcement, & restoration efforts; ▪ **Partners:** CITY / HCA / post-sec. schools **2008-2012:** Conduction water quality testing at CSO outfalls pre and post mitigation to support mitigation measures; ▪ **Partners:** CITY / HCA / post-sec. schools	**2008-2010:** Reduce flows & sedimentation through riparian buffer establishment downstream of CSO outfalls (public lands); ▪ **Partners:** CITY / FSRT / Green Venture / HCA / Ont. Stewardship Council / landowners & citizens **By 2012:** 80% of connected downspouts to be disconnected & rain barrels to be utilized as an alternative; ▪ **Partners:** CITY / FSRT / Green Venture / HCA / Ont. Stewardship Council / landowners & citizens

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Stormwater Mismanagement Map Code: SWM **Definition:** Inadequately managing stormwater to control flooding and protect property; often associated with the drainage of developed lands. **Inventory of Sites Identified** = 5 **Catchment Locations:** Headwaters (1) Hamilton Golf & C'ntry Club (1) Upper Valley (2) Lower Ancaster Creek (1) **Audience:** HHHBA / developers / private & public landowners (residential / commercial / industrial	**2008-2012:** Continue to promote Best Management Practices as per HCA Planning and Regulations Policy and Guidelines and new provincial directives for new developments; ▪ **Partners:** CITY / Green Venture / HCA **2008-2012:** Utilize workshops, information sessions, literature, webpages & direct landowner contact to create awareness regarding BMPs for storm water source control measures (i.e. disconnected downspouts, roof gardens, rain barrels, biofilters, trees, pervious pavement, rain gardens); ▪ **Partners:** CITY / Green Venture / HCA	**By 2010:** Determine percentage of landowners with connected downspouts; ▪ **Partners:** CITY / Green Venture / HCA **By 2010:** Assess landowner motivation for disconnection & implementing source control measures; ▪ **Partners:** CITY / Green Venture / HCA	**By 2012:** 80% of connected downspouts to be disconnected & rain barrels to be utilized as an alternative; ▪ **Partners:** CITY / Green Venture / HCA / landowners **2008-2012:** Retro-fit a minimum of one existing storm water management pond to a wet pond based on water quality, aquatic habitat & erosion control benefits; ▪ **Partners:** CITY / Green Venture / HCA / landowners

SUBWATERSHED-WIDE STRESS	STEWARDSHIP ACTIONS		
	Awareness Opportunity	**Special Study Opportunity**	**Restoration Opportunity**
Water Contamination through 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. **Inventory of Sites Identified** = 1 **Catchment Locations:** Headwaters (1) **Audience:** CITY / MTO	**2008-2012:** Host training sessions for City staff to create awareness & encourage environmentally friendly road salt alternatives & proper snow removal practices; ▪ **Partners:** CITY / DFO / HCA / MTO / Ont. Stewardship Council	**By 2010:** Determine the best method to mitigate contamination from transportation corridors into watercourses by studying alternatives to road salt for de-icing & incorporating into a road salt management plan; ▪ **Partner:** CITY / HCA / MTO / post-sec. schools	**2010-2012:** Implement road salt management plans & reduce use of salt for de-icing by 15% over 5yrs; Increase use of vacuum street sweepers; Increase vegetated filter strips / grassed swales along medians & roadsides, where ditches are present incorporate non-invasive native vegetation; ▪ **Partners:** CITY / MTO

Agencies identified as partners in order to carry out these Stewardship Actions are listed below in alphabetical order, with target audiences also noted. This information will be valuable in forming an Implementation Team, sub-committees and in knowing which audiences Stewardship Actions are to be directed.

PARTNER AGENCIES:

- Bay Area Restoration Council (BARC)
- Bruce Trail Association (BTA)
- City of Hamilton (CITY)
- Environment Hamilton (EH)
- Field and Stream Rescue Team (FSRT)
- Fisheries & Oceans Ca nada (DFO)
- Green Venture (GV)
- Hamilton Coalition on Pesticide Issues (HCPI)
- Hamilton Conservation Authority (HCA)
- Hamilton Conserver Society (HCS)
- Hamilton Naturalists Club (HNC)
- Landowners & citizens (LO)
- Local nurseries & landscaping companies (Nursery)
- Local engineering companies (local eng. co.'s)
- Ministry of Agriculture, Food & Rural Affairs (OMAFRA)
- Ministry of Natural Resources (MNR)
- Ministry of Transportation (MTO)
- Ontario Stewardship Council (Ont. Stewardship Council)
- Post-secondary schools (post-sec. schools)
- Royal Botanical Gardens (RBG)
- School boards (Sch. Brds)
- Watershed Planning Network (WPN)

TARGET AUDIENCES:

- Children
- City of Hamilton (CITY)
- Developers
- Golf courses
- Hamilton Halton Home Builders Association (HHHBA)
- Hydro One (HYDRO ONE)
- Landowners & citizens (residential, commercial, industrial)
- Ministry of Transportation (MTO)
- Out of town visitors
- School boards