

SPRING, SULPHUR AND LOWER SPENCER CREEKS STEWARDSHIP ACTION PLANS

Part of the Spencer Creek Stewardship Action Plans 2010



Healthy Streams...Healthy Communities!

Endorsed by the HCA Board of Directors March 2010

STEWARDSHIP ACTION PLANS: Spring, Sulphur and Lower Spencer Creeks
Part of the Spencer Creek Stewardship Action Plans
Final March 2010

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SPRING, SULPHUR AND LOWER SPENCER CREEKS STAKEHOLDERS ADVISORY COMMITTEE MEMBERS

Name	Representation	Position (if applicable)
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Kathryn Gold	Green Venture	Wise Water Use Coordinator
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Patrick Ragaz	Hamilton Conservation Authority, Engineering	Water Resources Engineer
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Without the support and continued commitment to the Spencer Creek watershed from the above-noted individuals and organizations, these plans would not be possible and the implementation of these plans would not become a reality.

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EXECUTIVE SUMMARY

Environmental organizations in the subwatersheds of Spencer Creek have a growing need for a clear direction and a coordinated effort among all stakeholders to implement stewardship activities. Stewardship is the act of managing our natural environment in a sustainable manner, to maintain it in a healthy state for today and for future generations.

Numerous organizations have been working diligently within these watersheds for decades without complementary workplans, measurable targets or a coordinated implementation effort. In the absence of a coordinated effort, each of the organizations will continue working without capitalizing on their collective potential to effect positive environmental change on the landscape.

Local stakeholders have jointly developed comprehensive Stewardship Action Plans for the Spring, Sulphur and Lower Spencer Creek subwatersheds of Spencer Creek. These plans will serve as a guide for local partners in the implementation of stewardship actions, capitalizing on the strengths of existing partner agencies. The coordinated effort to develop and to implement these plans will ensure efficient and effective action on the part of all organizations involved.

The Plans include detailed:

- characterizations of each subwatershed,
- descriptions of environmental stresses and associated Stewardship Actions,
- subwatershed maps depicting the specific locations of stresses, and
- ecological and water quality monitoring data for each catchment.

Stakeholder input and Geographic Information Systems (GIS) analysis yielded the identification of environmental stresses, both natural and human-induced, within the study area.

- 36 types of stresses were identified as impacting our natural environment on a subwatershed scale.
- 183 specific occurrences of stresses were identified at locations throughout the subwatersheds, 60 are in Spring Creek, 72 in Sulphur Creek and 51 in Lower Spencer Creek.
- Inventories of these occurrences are outlined in Tables 1 through 3 on pages ii and iii of this summary. Refer to these Stress Inventory Tables for statistics on the types and numbers of each stress identified within each subwatershed.
- The stresses are listed in descending order from the most prevalent to the least prevalent. Stormsewer outfalls, abandoned groundwater wells, on-line ponds, dams and habitat fragmentation are commonly ranked as the most prevalent stresses in all three subwatersheds.
- 209 Stewardship Actions have been identified to mitigate the impacts of these stresses, including education and outreach opportunities, special study opportunities and restoration opportunities. Refer to the Stewardship Actions for Spring, Sulphur and Lower Spencer Creeks Subwatersheds Summary Table on pages iv – xxv for detailed descriptions of each Stewardship Action.

Partners identified in the Spring, Sulphur and Lower Spencer Creeks Stewardship Action Plans are encouraged to join the Spencer Creek Stewardship Action Plans Implementation Team where they will use new and existing programs to undertake the Stewardship Actions identified in the plans. The Implementation Team will be an ongoing coordinating body for the implementation of the Stewardship Action Plans for the entire Spencer Creek watershed as they are completed on a subwatershed basis over a five year period. Local businesses and residents are encouraged to work with the Implementation Team to undertake stewardship projects within their communities.

EXECUTIVE SUMMARY – STRESS INVENTORY TABLES

TABLE 1 SPRING CREEK SUBWATERSHED
60 STRESSES IDENTIFIED

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

TABLE 2 SULPHUR CREEK SUBWATERSHED
72 STRESSES IDENTIFIED

STRESS	MAP CODE	NO. IN SUBWATERSHED
Stormsewer Outfall	SO	16
Abandoned Groundwater Wells	GW	13
Dam	DM	8
Online Pond	OP	7
Habitat Fragmentation	HF	4
Insufficient Riparian Buffer	RB	4
Encroachment	EN	3
Development	DV	2
Inadequate Stormwater Management	SW	2
Perched Culvert	CP	2
Wildlife Overpopulation	WO	2
Illegal Fill Placement	FP	1
Invasive/Introduced Species	IV	1
Land Maintenance Practices	LM	1
Litter	LI	1
Outdoor Recreation Related Impacts	OR	1
Plowed Watercourse	PW	1
Runoff Contamination via Transportation Corridors	TC	1
Sediment Loading	SL	1
Wildlife Collision	WC	1
Buried Stream	BS	
Channelization	CH	
Combined Sewer Overflow	CSO	
Debris Jam	DJ	
Detachment from Nature	DT	
Erosion	ER	
Faulty Septic System	SS	
Fluctuating Water Level	WL	
Increased Impervious Surface	IS	
Landfill Leachate	LL	
Migration Barrier	MB	
Nutrient Loading	NL	
Pesticide Use	PS	
Site Clearing Prior to Development	SC	
Transportation Corridor Expansion	TE	
Water Taking	WT	
Watercourse Enclosure	WE	
Weir	WR	

EXECUTIVE SUMMARY – STRESS INVENTORY TABLES

**TABLE 3 LOWER SPENCER CREEK SUBWATERSHED
51 STRESSES IDENTIFIED**

STRESS	MAP CODE	NO. IN SUBWATERSHED
Stormsewer Outfall	SO	29
Habitat Fragmentation	HF	3
Debris Jam	DJ	2
Encroachment	EN	2
Invasive/Introduced Species	IV	2
Land Maintenance Practices	LM	2
Nutrient Loading	NL	2
Outdoor Recreation Related Impacts	OR	2
Channelization	CH	1
Dam	DM	1
Erosion	ER	1
Fluctuating Water Level	WL	1
Landfill Leachate	LL	1
Litter	LI	1
Migration Barrier	MB	1
Abandoned Groundwater Wells	GW	
Buried Stream	BS	
Combined Sewer Overflow	CSO	
Detachment from Nature	DT	
Development	DV	
Faulty Septic System	SS	
Illegal Fill Placement	FP	
Inadequate Stormwater Management	SW	
Increased Impervious Surface	IS	
Insufficient Riparian Buffer	RB	
Online Pond	OP	
Perched Culvert	CP	
Pesticide Use	PS	
Plowed Watercourse	PW	
Runoff Contamination via Transportation Corridors	TC	
Sediment Loading	SL	
Site Clearing Prior to Development	SC	
Transportation Corridor Expansion	TE	
Water Taking	WT	
Watercourse Enclosure	WE	
Weir	WR	
Wildlife Collision	WC	
Wildlife Overpopulation	WO	

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Abandoned Groundwater Wells Map Code: GW Definition: Groundwater wells that are no longer in use, often are in a state of disrepair and can be direct conduits for contaminants into groundwater aquifers.	Conduct a direct mailing to all property owners identified in the HCA OGS Groundwater Study database as having abandoned groundwater wells on-site promoting the City of Hamilton Well Decommissioning Program.			Agriculture and Agri-Food Canada - Water Wells, Best Management Practices Pg 52	CITY / HCA / GV	HHWSP	2011-2015
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact promote the importance of decommissioning abandoned groundwater wells to protect drinking water and prevent human and wildlife injury.			Ontario Water Resources Act Regulation 903: Water Wells OMAFRA Best Management Practices Series – Water Wells	CITY / HCA / GV	HHWSP	2011-2015
			Work with landowners to decommission abandoned groundwater wells.		CITY / HCA / GV	HHWSP	2011-2015
Buried Streams Map Code: BS Definition: The structural alteration of a stream channel, involves piping the creek system underground, eliminating aquatic habitat.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the benefits of maintaining our creeks and streams in their natural state.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55 Fisheries Act, Section 37 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HCA / HWSC / HHWSP / RAP / WPN / DFO	HHWSP / HWSC	2011-2015
		Consider adopting principles from the TRCA and CVC Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines into HCA policies to address ambiguity in the DFO Risk Management Framework			HCA / HHHBA / DFO	HCA (Ecology)	2011-2012
		Undertake a feasibility and prioritization study for “daylighting” buried streams in the study area.			HCA / CITY / DFO / MNR / HHWSP / RAP	CITY	2011-2012
			Work with landowners to undertake daylighting projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study.	Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines	HHWSP / HCA / DFO / CITY / HWSC	HHWSP	2013-2015
Channelization Map Code: CH Definition: The structural alteration of a stream channel, usually involves straightening of meanders and increasing gradient which increases velocity and erosion potential.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy creeks and the benefits of maintaining our creeks and streams in their natural state.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107 HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA / HWSC / HHWSP / RAP / WPN / CITY / RBG /	HHWSP / HWSC	2011-2015
		Undertake a feasibility and prioritization study for restoring channelized creeks to those with a natural design.			HCA / CITY / DFO / MNR / HHWSP / RAP	CITY	2011-2012

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with landowners to undertake natural channel design projects using bioengineering and natural channel design principles, as recommended by the feasibility and prioritization study.	Fisheries Act, Section 37 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 142-158	HHWSP / HCA / DFO / CITY / HWSC	HHWSP	2013-2015
			Work with landowners downstream of channelized sites to rehabilitate the riparian zone to reduce flow velocities, erosion and sedimentation.		CITY / DFO / HHWSP / HCA / RBG / HWSC /	HHWSP	2011-2015
Combined Sewer Overflows Map Code: CSO Definition: a sewer system that collects sanitary sewage and stormwater runoff in a single pipe system.			Reduce stormwater load to meet the MOE volumetric target of a 90% overflow capture rate.	Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation WQ-1c Page 39	CITY / BARC / RAP/ HCA / GV	CITY	2011-2015
			Work toward achieving the final net loading targets for CSO's outlined in the RAP.		CITY / BARC / RAP/ HCA / GV	CITY	2011-2015
Dams Map Code: DM Definition: a barrier to obstruct the flow of water, usually one of earth or masonry, built across a stream or river. <i>(*Also includes weirs formerly map code WR)</i>	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the detrimental effects of dams as fish barriers and to promote the removal/retrofitting of dams.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation FW-4 Page 107	HCA / HWSC / HHWSP / MNR / DFO	HHWSP / HWSC	2011-2015
	Conduct a direct mailing to property owners with dams identified in the CA Dam Inventory Project to offer financial and technical assistance for the retrofitting or removal of dams.			HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55	HCA / HWSC / DFO / MNR	HHWSP	2011-2012
			Implement the watershed management recommendations for Spencer Creek as outlined in the Hamilton Harbour Fisheries Management Plan to restore migration corridors to meet Fish Management Objectives for coldwater and warmwater systems	Fisheries Act, Section 37 Hamilton Conservation Authority Dam Inventory Project	HCA / HWSC / HHWSP / MNR / DFO / CITY	HCA (Ecology) / DFO	2011-2015
			Work to remove or retrofit water control structures on public lands.	In-stream Barrier Assessment for the Hamilton Harbour AOC.	HCA / HWSC / HHWSP / MNR / DFO / CITY	HCA (Ecology) / MNR	2011-2015
			Work with landowners to remove/retrofit dams as prioritized in the Barrier Mitigation Plan of the In-stream Barrier Assessment for the Hamilton Harbour AOC.	Hamilton Harbour Fisheries Management Plan	HCA / HWSC / HHWSP / MNR / DFO / CITY	HHWSP	2011-2015

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Debris Jams Map Code: DJ	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding proper debris jam removal so as to not disrupt aquatic habitat.			In-stream Barrier Assessment for the Hamilton Harbour AOC.	HHWSP /HCA/ HWSC / CITY / MNR / DFO / BARC	HHWSP / HWSC	2011-2015
			Work with landowners to remove debris jams using proper sediment and erosion control practices.	Hamilton Harbour Fisheries Management Plan	HHWSP /HCA/ HWSC / CITY / MNR / DFO / BARC	HHWSP / HWSC	2011-2015
			Incorporate debris jam removal into the City of Hamilton Extreme Park Makeover Program.		HHWSP /HCA/ HWSC / CITY / MNR / DFO / BARC	CITY	2011-2015
Detachment from Nature Map Code: DT Definition: The condition of people disassociating their existence from nature.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote BMP's and the ecological significance of natural features.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations PAA-2, PAA-3, EPI -1, EPI-2, EPI-5 Pages 129-138	BARC / CITY / GV / HCA / HHWSP / HWSC / WPN / DU	HHWSP / HWSC / BARC / RBG	2011-2015
	Erect creek crossing & ecological corridor signage along roadways.				HCA / CITY / RAP / WPN / BARC	CITY / WPN	2011-2015
	Implement education outreach programs for school-aged children, including: Yellow Fish Road, Stream of Dreams, Mini Marsh, Envirothon, Children's Water Festival, Eco-House Tours, etc.			Royal Botanical Gardens Back to Nature: Towards a Ontario Strategy for Bringing Children and Nature Together - Event and Workshop Report	BARC / HCA / CITY / GV / RBG	BARC / GV / HCA / CITY / RBG	2011-2015
	Support the formation and activities of "Friends of" groups aimed at protecting and rehabilitating natural features.				BARC / DFO / HWSC / BTC	HHWSP / HCA / CITY	2011-2015
	Encourage municipalities and trail managers to coordinate trail plans that improve access between urban centres and provide links to parks and rural areas			Evergreen Schoolground Greening Resources: Getting Started	HHWSP / HWSC	HCA / CITY / RBG	2011-2012
		Assess landowner willingness to participate in and/or support water quality improvement and habitat restoration projects.			CITY / HCA / HWSC	HHWSP	2011-2012
		Engage citizen groups to conduct local subwatershed monitoring & reporting projects, including: water quality, base flow, litter hot spots, etc.			HHWSP / CITY / HCA / GV / BARC/ HWSC / RBG	HHWSP / CITY / HCA / GV / BARC/ HWSC / RBG /	2011-2015

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with schools and School Boards to undertake implement the School Grounds Naturally Program; undertaking school yard naturalization projects.		HHWSP / HCA / CITY / HWSC	HHWSP	2011-2015
			Work with citizen groups to undertake restoration projects on public and private lands, including "Friends of" work days, Adopt a Creek, Fishing Clubs, etc.		HHWSP / HCA / CITY / HWSC / BARC / RBG / /BTC	HHWSP / BARC	2011-2015
Development Map Code: DV Definition: The process of developing populated settlements: including housing and supporting infrastructure.	Host annual training sessions for City staff & developers to create awareness regarding the incorporation of Low Impact Development practices into planning applications (i.e. pervious pavement, green rooftops, storm water management, road-salt alternatives, snow-piling, erosion & sediment control measures, compliance & enforcement, etc.)			Credit Valley Conservation and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Manual	DFO / Green Venture / MTO / HHHBA	HCA (P&E) / CITY	2011-2015
	Apply Yellow Fish Road to all catchbasins on streets and in parking areas to educate private landowners post-development.				CITY / HCA / HWSC / HHWSP	BARC	2011-2015
		Revise conflicting municipal by-laws regarding development practices and guidelines to facilitate increased use of Low Impact Development technologies.			CITY / GV / HHHBA / DFO	CITY / HCA	2011-2012
		Continue to review planning and development applications to ensure minimal impacts to aquatic and terrestrial habitat.			CITY / DFO / MNR	HCA (P&E)	2011-2015
			Work to undertake in-stream rehabilitation projects on sites identified in the Stewardship Action Plans as suitable for the DFO Habitat compensation Program.		CITY / DFO / MNR / HHHBA	HCA	2011-2015
Encroachment Map Code: EN Definition: The act of undertaking practices on another person's property, i.e. erecting structures, planting gardens, disposal of waste.	Utilize workshops, information sessions, literature, websites, public service announcements, signage & direct landowner contact to promote healthy creeks to create awareness regarding how encroachment negatively impacts habitat.			HCA Planning and Regulation Policies and Guidelines Pages 36-41, 55, 60	HHWSP / HHHBA / HWSC	HCA / RBG / CITY	2011-2015
	Comment on the re-drafting of the City of Hamilton Litter, Yard Waste and Property Maintenance by-law No. 03-118 to include language regarding preventing encroachment into natural areas.			City of Hamilton Draft Private Tree and Woodland Conservation By-law City of Hamilton	CITY / HHWSP / HCA / BARC / RBG / GV / HWSC / BTC	HCA / CITY / RBG	2011-2015

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

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

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

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Protect and enhance natural corridors through parks and public lands by ensuring that naturalization and habitat creation are incorporated into the City's Extreme Park Makeover Program		HCA / BARC / RBG / HWSC / HHWSP / MNR	CITY	2011-2015
			Work with landowners to undertake habitat creation and enhancement projects which enhance core habitat by infilling areas within or linking existing forested areas		HCA / MNR / HWSC / BARC / CITY	HHWSP	2011-2015
			Actively manage public lands for wildlife habitat, including plantation plantings and rented agricultural lands.		CITY / HHWSP / MNR / TO	HCA	2012-2015
			Implement the actions outlined in the Dundas Valley 50 Year Vision, Cootes to Escarpment and City of Hamilton Natural Heritage Strategies relating to preserving and enhancing natural heritage systems.		CITY / RBG / HHWSP / HWSC / BARC	HCA	2011-2015
Illegal Fill Placement Map Code: FP Definition: The act of dumping fill material into or adjacent to natural areas.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to create awareness regarding the adverse effects of "fill" on natural systems and promote compliance with the HCA Regulations and the City's Site Alteration By-law.			HCA Planning and Regulation Policies and Guidelines Pages 61-62 City of Hamilton By-law No. 03-117 Illegal Dumping	CITY / HHWSP / DFO	HCA	2011-2015
			Work with landowners to rehabilitate fill sites as recommended by the HCA Inventory.		HCA / CITY / DFO / MNR	HHWSP	2011-2015
Inadequate Stormwater Management Map Code: SWM Definition: Inadequately managing stormwater to control water quality and flooding; often associated with the drainage of developed lands.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote stormwater management BMP's including: disconnected downspouts, roof gardens, rain barrels, biofilters, permeable pavement, rain gardens, etc.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -6, ULM-9, ULM-11 Pages, 72, 75, 77 HCA Planning and	HHWSP / HCA / DFO / BARC / RAP / HHHBA	CITY / GV	2011-2015

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
	Promote City of Hamilton and Green Venture Programs to prevent the overloading of stormwater infrastructure; including the Wise Water Use Program, Protective Plumbing Program – Downspout Disconnection Program, Annual One-Day Rain Barrel Sale, Catch the Rain Rainbarrel Pilot Project, High Household Water Consumption Program, and EnerGuide for Low Income Households Program.			Regulation Policies and Guidelines Pages 74-77 Fisheries Act, Section 34 City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 38-44, 93-97, 122-125, 158-162	HHWSP / HCA / DFO / BARC / RAP / HHHBA	CITY / GV	2011-2015
		Work with developers to develop a premium ‘Efficiency Package’ for new homes that include LEED principles, LID technologies, Energy Star appliances, water conservation fixtures, etc. per the results of the Durham Region Pilot Project.			HHWSP / HCA / DFO / BARC / RAP / HHHBA	HCA	2011-2015
		Undertake a study to determine the percentage of landowners with connected downspouts.			CITY / HHWSP / BARC / GV	CITY	2011-2015
			Implement recommendations from the City of Hamilton Stormwater Master Plan.		HCA / RAP / BARC / HHWSP	CITY	2011-2015
			Work with landowners to disconnect downspouts and install rain barrels.		GV / HHHBA	CITY	2011-2015
			Retrofit existing stormwater management ponds to wet ponds where beneficial to water quality, aquatic habitat and erosion control.		HCA / RAP / DFO	CITY	2011-2015
			Offer financial incentives to replace driveways and decks with permeable pavement, interlocking brick, etc.		HCA / RAP / BARC / HHWSP / GV	CITY	2011-2015
			Retrofit outlet structures to decrease the velocity of stormwater as it flows into the creek system.		HCA / RAP / HHWSP / HWSC	CITY	2011-2015
Increased Impervious Surfacing Map Code: IS Definition: The decreased potential for rainwater infiltration into the soil as a result of increased paved/impermeable surfacing.	Create demonstration sites in subdivisions that highlight development related BMP’s and new environmentally friendly technologies; e.g. permeable pavement, green roofs, on-site wastewater treatment, etc.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -5b, ULM-6 Page 71, 72 HCA Planning and Regulation Policies and Guidelines Pages 74-77 Fisheries Act, Section 34	CITY / GV / HHWSP / HWSC / HHHBA	HCA	2011-2015
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote the implementation of development related BMP’s and new environmentally friendly technologies when undertaking home renovations.				CITY / HCA / HHWSP / HWSC / HHHBA	GV	2011-2015

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

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

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work with landowners to naturalize and plant riparian buffers adhering to How Much Habitat is Enough guidelines of a 15m width adjacent to warm water streams and a 30m width adjacent to cold and cool water streams.		HCA / HWSC / CITY / OSCIA	HHWSP	2011-2015
Landfill Leachate Map Code: LL Definition: rainwater filtering down through the landfill materials with the potential to contaminate groundwater aquifers.		Develop a groundwater sampling program to determine if groundwater contamination is occurring as a result of landfill leachate.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-12 Page 77 HCA Planning and Regulation Policies and Guidelines Page 60	CITY / RAP / MOE	HCA	2011-2012
Land Maintenance Practices Map Code: LM Definition: Errant or excessive land maintenance practice which unnecessarily degrade wildlife habitat.		Work with utility companies to develop protocols for recommended low impact land maintenance practices to be implemented throughout utility corridors.		Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-2, FW-4 and Pages 106-107	CITY / HHWSP / HWSC / RBG	HCA	2011-2012
			Work to naturalize infrequently used areas of municipal parks and Conservation areas.		HHWSP / HWSC / HNC	CITY / HCA	2011-2015
			Work with the City to ensure roadside maintenance is not done in excess of access standards.		HCA / HHWSP / HWSC / GV / HNC	CITY	2011-2015
Litter Map Code: LI Definition: The act of illegally disposing of waste into public/natural areas.	Utilize literature, websites, public service announcements, & direct landowner contact to create awareness regarding the prevention and clean-up of litter.			City of Hamilton By-law No. 03-118 Litter, Yard Waste and Property Maintenance	HHWSP / HWSC / GV / BARC	CITY / HCA / RBG	2011-2015
	Promote the City of Hamilton's Team Up to Clean Up, Adopt a Park. Adopt a Road and Extreme Park Makeover Programs to assist community minded residents to undertake litter clean up projects.				HCA / RBG / GV / HWSC / HHWSP / BARC	CITY	2011-2015
		Undertake an inventory of illegal dumping sites throughout the subwatershed. Prioritize sites for the installation of deterrent mechanisms and the implementation of City litter related programs and Conservation Authority maintenance programs.			RBG	HCA / CITY	2011-2012
		Work to develop an Adopt a Park / Friends of Program for Conservation Authority lands.			CITY / HHWSP / HWSC	HCA	2011-2012

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

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
		Develop a total phosphorous target based on the PWQO recommendation of 30µg/L for control of excessive plant growth, 20µg/L for control of Nuisance concentrations of algae or 10µg/L for high level of protection against aesthetic deterioration.		OMAFRA Best Management Practices Series – Manure Management	CITY / OSCIA / OMAFRA / BARC / RAP / HHWSP / RBG	HCA	2011-2012
		Develop a fertilizer use by-law under the Fertilizer Act, limiting the use of fertilizer for non essential purposes.			HCA / BARC / RAP / HHWSP / RBG	CITY	2011-2013
			Work with landowners to reduce nutrient loading by implementing agricultural and urban BMP's related to nutrient management.		CITY / OSCIA / OMAFRA / BARC / RAP / RBG / HCA	HHWSP	2011-2015
On-line Ponds Map Code: OP Definition: An in-stream structure designed to impound stream flow; leads to increased in-stream temperatures downstream and is often a barrier to fish migration.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and pond retrofit options.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-1, FW-4 Page 104, 107	DFO / HCA / OSCIA / OMAFRA / CITY	HHWSP	2011-2015
			Work with landowners to restore or retrofit on-line ponds.	Fisheries Act, Section 37 HCA Planning and Regulation Policies and Guidelines Page 63 In-stream Barrier Assessment for the Hamilton Harbour AOC	DFO / HCA / OSCIA / OMAFRA / CITY / HWSC	HHWSP	2011-2015
Outdoor Recreation Related Impacts Map Code: OR Definition: Recreational activities occurring in natural areas that inadvertently degrade the natural features of the area.	Support the formation and activities of "Friends of" groups aimed at protecting and rehabilitating natural features.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-8, PAA-1, PAA-2, PAA-3 Pages 115, 126-130	HWSC / BARC / BTC	HHWSP / CITY / HCA / RBG	2011-2015
	Add "tread lightly" messaging to partner recreation oriented websites.				NHC	HCA / CITY / RBG / HNC / BTC	2011-2013
	Promote the City of Hamilton Adopt-a-Park and Extreme Park Makeover Programs.			The Conservation Lands of Ontario – Three Year Business Plan	HCA / RBG / HHWSP / HNC / BTC	CITY	2011-2015
	Install no trespassing signage on off trail areas.				HNC / BTC	HCA / RBG / CITY	2011-2015
	Erect signage explaining the environmental significance of natural areas, ownership of the lands and promoting user "etiquette" for the area.			A Joint Outdoor Tourism Marketing Strategy	HNC	HCA / CITY / RBG / BTC	2011-2013

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
		When undertaking master planning exercises, design trails to meet guidelines as set in HCA's Planning and Regulation Policies and Guidelines.		Niagara Escarpment Access Enhancement Plan Dundas Valley 50 Year Vision Strategy Cootes to Escarpment Conservation & Land Management Strategy	HCA / CITY / RBG	HCA / CITY / RBG	2011-2015
		Develop marketing strategies for sensitive lands that focus on sustainable use.			BTC / HNC	HCA / CITY / RBG	2011-2013
		Continue to monitor Category A and B waterfalls on public lands for signs of degradation.			HCA / CITY	HCA / CITY	2011-2015
		Refer to the Niagara Escarpment Access Enhancement Plan to design infrastructure for high traffic areas to guide users along approved trails.			HCA / CITY / RBG / BTC	HCA / CITY / RBG / BTC	2011-2015
		Consider designating days/areas for ATV and snowmobile use.			HHWSP / HNC	HCA / CITY / RBG	2011-2015
			Rotationally restrict access to degraded areas to allow for the regeneration of vegetation.		HNC / BTC	HCA / CITY / RBG	2011-2012
			Host annual clean up days for natural areas identified as having excessive amounts of litter.		HHWSP / HWSC / HNC / BARC / BTC	CITY / HCA / RBG	2011-2015
			Increase the amount of poison ivy caution signage along trails and in areas known to be degraded by trespassing.		HNC / BTC	HCA / CITY / RBG	2011-2015
			When conducting maintenance of existing trails, seek guidance from the HCA Planning and Engineering Department with respect to materials and design.		HHWSP / HNC / BTC	HCA / CITY / RBG	2011-2015
Perched Culverts Map Code: CP Definition: In-stream culverts that when improperly designed/installed, create barriers to water flow and fish migration.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and create awareness regarding the detrimental effects of perched and closed bottom culverts.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations FW-1, FW-4 Pages 104, 107 Fisheries Act, Section 37 HCA Planning and Regulation Policies and Guidelines Page 41	DFO / HCA / CITY / MNR	HHWSP	2010-2014
	Host training sessions for HCA Lands and City staff to promote the proper design and installation of culverts.				DFO / HHWSP / MNR	CITY / HCA	2010-2014
		Undertake an inventory of perched and closed bottom culverts throughout the subwatershed. Prioritize culverts for mitigation or replacement.			DFO / HCA / HHWSP / MNR	CITY	2010-2014

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

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Plowed Watercourses Map Code: PW Definition: Headwater swales or small watercourses that are worked for agricultural production.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote drainage related BMP's; e.g. Water and Sediment Control Basins and grassed waterways.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-4 Pages 70, 71	DFO / HCA / OMAFRA / OSCIA / HWSC	HHWSP	2011-2015
	Promote the Environmental Farm Plan Program and associated Cost Sharing Programs for the implementation of BMP projects.			Fisheries Act, Section 37	DFO / HCA / OMAFRA / OSCIA / HWSC	HHWSP	2011-2015
	Create demonstrations sites that highlight BMP's that promote good agricultural land drainage; e.g. grassed waterways, Water and Sediment Control Basins, etc.			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 44, 145-150	DFO / HCA / OMAFRA / OSCIA / HWSC	HHWSP	2011-2013
	Conduct a direct mailing to landowners where plowed watercourses have been identified to promote technical and financial assistance available for BMP projects related to agricultural drainage.			OMAFRA Best Management Practices Series – Soil Management	DFO / HCA / OSCIA / HWSC	HHWSP	2011-2015
			Work with landowners to install effective agricultural land drainage; e.g. grassed waterways, Water and Sediment Control Basins, etc.		DFO / HCA / HWSC / RBG / RAP	HHWSP	2011-2015
Runoff Contamination via Transportation Corridors Map Code: TC Definition: Contamination resulting from stormwater runoff from major arterial roadways; often associated with the application of salts for de-icing and the residual precipitate created by automobile exhaust.	Utilize literature, websites, public service announcements & direct landowner contact to promote the use of sidewalk salt alternatives.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-5b Page 71	CITY / DFO / HCA / MTO / GV	CITY	2011-2015
	Host training sessions for City Staff and Contractors using the Ministry of the Environment Snow Disposal and De-icing Operations in Ontario Guidelines.	.		Fisheries Act, Section 34	CITY / MTO	CITY	2011-2015
		Support planning for alternative and sustainable transportation strategies including Rapid Transit.		City of Hamilton 2003 Road Salt Management Plan	HCA / MTO / HHHBA / RAP	CITY	2011-2015
		Undertake a study to determine the most effective method of snow removal that will reduce contamination of watercourses.		Municipalities of Wellington County – 2005 Salt Management Plan	CITY / DFO / HCA / MTO	CITY	2011-2012
			Implement improved snow removal methods as recommended by the study to determine effective methods of snow removal which also reduce contamination of watercourses.		MTO	CITY	2012-2015
			Install vegetated filter strips and riparian buffers along medians and roadsides.		MTO / HCA	CITY	2011-2015

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
Sediment Loading Map Code: SL Definition: Organic and inorganic material that is entrained by the flow of water and is deposited in a creek system.	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote healthy streams and BMP's related to preventing sedimentation.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM-3, ULM-5, FW9 Pages 70, 71, 116	DFO / HWSC / HCA / MNR / OSCIA / OMAFRA / RAP	HHWSP	2011-2015
		Develop a total suspended solids target based on the PWQO turbidity recommendation of between 5-50 FTU (Formazin Turbidity Units)		Fisheries Act, Sections 34 and 36	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP	HCA	2011-2012
			Work to achieve and maintain the total suspended solids target developed based on the PWQO turbidity recommendation of between 5-50 FTU (Formazin Turbidity Units)	Erosion and Sediment Control Guidelines for Urban Construction	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP	HCA	2012-2015
			Monitor and enforce the proper installation and maintenance of sediment and erosion control measure on construction sites.	City of Hamilton By-law for Prohibiting and Regulating the Alteration of Property Grades, the Placing or Dumping of Fill, and the Removal of Topsoil	DFO / HWSC / HHWSP / MNR / OSCIA / OMAFRA / RAP	HCA	2011-2015
			Work with landowners to reduce sediment loading by implementing BMP projects; e.g. streambank stabilization, riparian buffers, natural channel design.	OMAFRA Best Management Practices Series – No-Till Making it Work	DFO / HWSC / HCA / MNR / OSCIA / OMAFRA	HHWSP	2011-2015
			Work with contractors to ensure that site clearing prior to development is phased out as the project phases unfold to reduce the area and length of time bare soil is exposed.	Ministry of the Environment Stormwater Management Design Guidelines	DFO / HWSC / MNR / OSCIA / OMAFRA / RAP / HHHBA	HCA	2011-2015
Site Clearing Prior to Development Map Code: SC Definition: The act of stripping or excavating the vegetation and topsoil from a site prior to construction works.	Host training sessions for City staff, developers and consultants to promote City standards and guidelines related to site preparation prior to development.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-4 Page 71	DFO / MNR / RAP / HHHBA / CITY / HWSC/ HHWSP	HCA	2011-2013
	Promote the City of Hamilton By-law for Prohibiting and Regulating the Alteration of Property Grades, the Placing or Dumping of Fill, and the Removal of Topsoil			HCA Planning and Regulation Policies and Guidelines Pages 50-62, 68-69	DFO / MNR / RAP / HHHBA / CITY / HWSC/ HHWSP	CITY	2011-2015
			Work with contractors to ensure that only necessary areas of development sites are cleared prior to development to eliminate the unnecessary destruction of habitat.	City of Hamilton Draft Private Tree and Woodland Conservation By-Law	DFO / MNR / HHHBA / CITY	HCA	2011-2015

STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work to mitigate non point sediment sources identified in the Watershed Planning Network Priority Remediation Report.	City of Hamilton By -Law No. 03-126 Site Alteration By-Law Erosion and Sediment Control Guidelines for Urban Construction City of Hamilton By-law for Prohibiting and Regulating the Alteration of Property Grades, the Placing or Dumping of Fill, and the Removal of Topsoil	DFO / MNR / CITY / HWSP / HHWSP	HCA	2011-2015
Stormsewer Outfalls Map Code: SO Definition: The point where a sewer system discharges into a watercourse during a storm event.	Implement the Stream of Dreams and Yellow Fish Road Programs with local schools, scouting and girl guide groups and other children's groups, to create awareness regarding the impacts of stormwater on stream systems.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendations ULM -6, ULM-9, ULM-11, RM-7 Pages, 72, 75, 77, 158 Fisheries Act, Section 34	HCA / RBG / GV / HWSC / HHWSP / CITY	BARC	2011-2015
	Promote the Municipal Sewer-Use By-law No. 06-228.				HCA / RBG / GV / HWSC / HHWSP	CITY	2011-2015
	Promote the City of Hamilton Public Works Stormwater Pollution Solutions for Urban and Rural Residents Outreach Program			City of Hamilton Stormwater Master Plan Class Environmental Assessment Report Pages 43, 138, 158-159	HCA / RBG / GV / HWSC / HHWSP	CITY	2011-2015
		Undertake a water quality study evaluating water quality and temperature at a representative sampling of storm sewers to prioritize sewersheds to target for education outreach and remediation.			HCA / BARC / RAP / MOE	CITY	2011-2013
		Undertake a water temperature monitoring study at a representative sampling of storm sewers to determine the impact of storm flows on creek temperature.			CITY / BARC / RAP / MOE	HCA	2011-2013
		Work with Green Venture to develop a Stormwater Mitigation Program.			HCA / RAP / BARC / CITY	GV	2011-2013
			Work with City Staff to retrofit outfalls to incorporate erosion control measures such as plunge pools, rip rap, tree planting etc.		HCA / RAP / BARC / HWSC / DFO / HHWSP	CITY	2011-2015

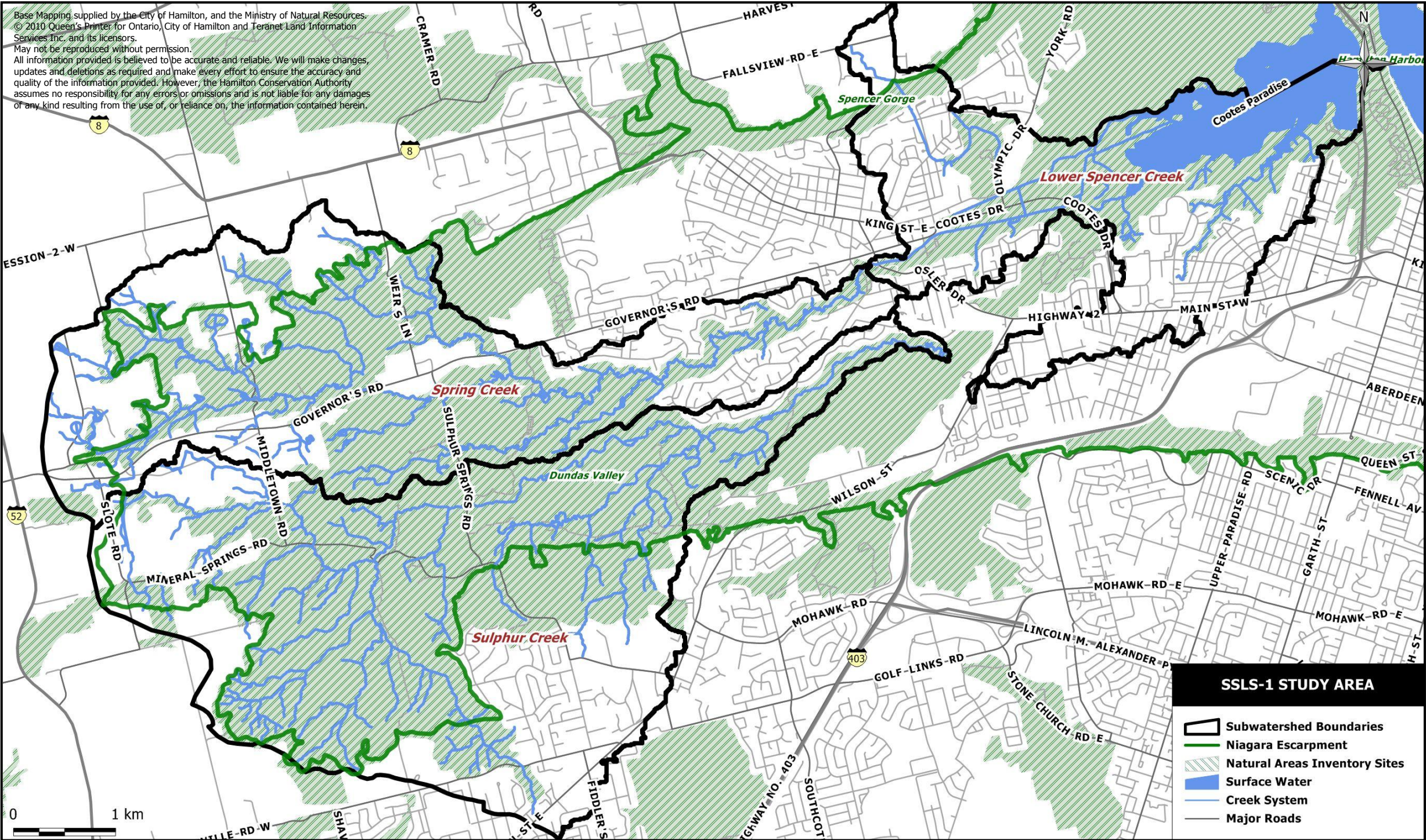
STRESSES	STEWARDSHIP ACTIONS			RELATED DOCUMENTS	PARTNER AGENCIES	LEAD AGENCY	TIMELINE
	Awareness Opportunities	Special Study Opportunities	Restoration Opportunities				
			Work to implement the recommendations in the sewershed water quality study.		HCA / RAP / BARC / HWSC / DFO / HHWSP	CITY	2011-2015
			Work with landowners to establish riparian buffers and/or erosion protection downstream of storm sewer outfalls; e.g. riverstone.		HCA / RAP / BARC / HWSC / DFO / CITY	HHWSP	2011-2015
			Work with landowners to disconnect downspouts and to install rain barrels.		HCA / RAP / BARC / HWSC / HHWSP	CITY	2011-2015
Transportation Corridor Expansion Map Code: TE Definition: The process by which new roads are built or existing roads are widened.	Host training sessions for City staff, developers and consultants to promote BMP's and new environmental technologies relating to transportation corridors; e.g. permeable pavement, wildlife under/overpasses, vegetated filter medians and rights of way, light coloured aggregate in hot mix, etc.		.	HCA Planning and Regulation Policies and Guidelines Pages 50-62, 68-69 Ontario Provincial Standards for Roads and Public Works Erosion and Sediment Control Guidelines for Urban Construction	HCA / MTO / HHHBA	CITY	2011-2015
		When planning for major road works, design transportation corridors using new technologies for environmental solutions.			HCA / MTO / HHHBA	CITY	2011-2015
			When repairing roads, utilize new technologies for road maintenance that are proven to have environmental benefits.		HCA / MTO / HHHBA	CITY	2011-2015
Water Takings Map Code: WT Definition: The process by which surface and groundwater are pumped out of the natural system; for the purposes of irrigation, aggregate extraction, etc.	Host open houses when experiencing low water conditions to address landowner concerns and promote recommended reductions in rates and volumes of takings.			Hamilton Harbour Remedial Action Plan Stage 2 Update: Recommendation ULM-12 Page 77 Ontario Water Resources Act O. Reg. 387/04 OMAFRA Best Management Practices Series – Irrigation Management	HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
	Utilize workshops, information sessions, literature, websites, public service announcements, interpretive signage & direct landowner contact to promote BMP's relating to water conservation technology.				HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
	Encourage landowners with surface water takings to install groundwater systems.				HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
	Encourage landowners with water taking needs to establish an Irrigation Advisory Committee to schedule takings alternately.				HCA / OSCIA / MOE / HWSC / OMAFRA	HHWSP	2011-2015
		Develop monitoring program to assess impacts of surface water takings on creek systems and aquatic wildlife during periods of low water, include recommendations for reducing impacts.			MNR / MOE	HCA	2011-2013

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

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

Partner Agency Acronyms

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



FOREWARD

The following has been extracted from the Spencer Creek Conservation Authority’s publication, The Spencer Story (1965), which was used in local high schools to engage youth in watershed stewardship:

Canada is a country of great natural wealth. With her present growing population and industrial expansion, the 1990’s should see her among the wealthiest nations of the world. But, do we want to live in a land of vanishing beauty, of increasing ugliness, of shrinking open spaces, and an over-all environment that is diminished daily by pollution, noise, blight and drought?

Dr. Edward G. Pleva of the University of Western Ontario and a speaker and conservationist of note, suggests that if a line is drawn from Quebec City through Montreal, Kingston, Toronto, Hamilton, London to Windsor, and then if we think of the land twenty-five miles on both sides of the line, we locate the living and working area of three-fifths of the population of Canada, the situation of four-fifths of the country’s industrial activity, and the source of two-fifths of the agricultural crop value. It is in this corridor which he has named the Grand Trunk Corridor that the greatest expansion population-wise and industrially is taking place and will continue to do so. It is here that the questions asked in the preceding paragraph is most pertinent. We can misuse the land and diminish or even destroy our resources, or we can create a land in which physical and spiritual welfare will go hand in hand. This is the conservation decision we must make in the 1960’s.

A new theory of history is creeping into our textbooks, namely, that earlier civilizations passed away because their people did not learn to live in harmony with nature and to work with her not against her. The great empire of Babylonia situated on the lower reaches of the Tigris and Euphrates Rivers, which we are told was the site of the Garden of Eden and which lasted for over 2000 years, depended on man-made canals to bring the necessary water from the rivers to the dry lands around. When wars and neglect caused the canals to fill with silt and fail in their purpose, fewer and fewer people could live there. Finally, the Garden of Eden changed into a desert. Roman farms were quite fertile at first but suffered from erosion, continual cropping without returning anything to the soil, and poor land management. The Roman Empire had to look to other sources for food but they too eventually could not feed the masses of the Empire and in 455 A.D. the city of Rome was captured and burned by tribes from Northern Europe. The stories of Babylon will happen again and again until mankind learns to work with nature and not try to be her master.

The concept that mankind must work with nature and use the resources of his country wisely knowing that none of these is unlimited and that they were intended also to serve the needs of generations yet unborn, must become part of the way of life of our young people especially, if this land of ours is not to follow in the destructive footsteps of Babylonia and Rome. Teachers know that one of the fundamentals of their profession is to teach from the near to the far. It follows then, that if our young people are to grow up and become the future stewards of the land, they must first of all know the story of the watershed in which they live and understand something of its particular problems. To help in the development of this concept is the chief reason for the publication of the Spencer Creek Story, 1965.

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

BACKGROUND

SPENCER CREEK WATERSHED

The Spencer Creek watershed is the largest watershed within the jurisdiction of the Hamilton Conservation Authority (HCA) at 279 km², or 59% of the HCA watershed, and outlets directly into Cootes Paradise Marsh. The HCA notes this watershed as being comprised of 15 subwatersheds. However two of these, Borer's Creek and Chedoke Creek, feed directly into Cootes Paradise Marsh, and not the Spencer Creek system itself. The Spencer Creek watershed is characterized by wetlands, rural land use and rural communities in the upper part of the watershed and urban development in the lower portion. The subwatersheds of Spencer Creek are located within the City of Hamilton and the Township of Puslinch.

The Niagara Escarpment and Dundas Valley are significant natural features located in the lower portion of the watershed, while the Beverly Swamp is located in upper portion of watershed. There are two large dams located on the Spencer Creek watershed, Christie Dam & Valens Dam. Both of these dams are managed by the Hamilton Conservation Authority. Spencer Creek is a 6th order stream and travels about 40 km before reaching its outlet at Cootes Paradise Marsh, a provincially significant coastal wetland (Source Water Protection Halton-Hamilton Region, January 2006).

For a full characterization of the Spencer Creek watershed refer to the *Preliminary Watershed Description Report for the Hamilton Conservation Authority's Watersheds* (Source Water Protection Halton-Hamilton Region, January 2006) and any updates thereof.

The Spencer Creek Stewardship Action Plans supersede the current Spencer Creek Watershed Management Plan (HCA, 1997) and are deliverables of the Hamilton Conservation Authority Five-year Strategic Plan (2007-2011), within which the completion of up-to-date subwatershed plans are listed as strategic water management objectives. The plans within this document will also contribute to both, the Hamilton Harbour Remedial Action Plan (HHRAP) and the Five-year Strategic Plan (2007-2011) for the HCA's Stewardship Program, also known as the Hamilton-Halton Watershed Stewardship Program.

The Hamilton Harbour was declared an Area of Concern (AOC) in 1987 by the International Joint Commission due to its high contamination of toxic sediments and degradation of water quality and aquatic habitat. As a result, the HHRAP was initiated in order to de-list the Hamilton Harbour as an AOC. The HHRAP aims to remove this designation by 2015 by meeting specific targets as they relate to water quality and bacterial contamination, urbanization and land management, toxic substances and sediment remediation, fish and wildlife habitat, public access and aesthetics, education and public information, and research and monitoring. The HHRAP is implemented by the Bay Area Implementation Team; which is made up of industrial, commercial and government representatives within the limits of the Hamilton Harbour watershed. The Bay Area Restoration Council was formed in response to the HHRAP and works towards community involvement and awareness on the issues surrounding this AOC and the best management practices that are needed in order to de-list this watershed. The Stage 2 Report & Update was released in 2002 listing the targets met to date as well as those stresses still in need of mitigation. The Spencer Creek watershed makes up 57% of the Hamilton Harbour watershed.

The Hamilton-Halton Watershed Stewardship Program is a joint program between the HCA and Conservation Halton. It began in 1994 in cooperation with the Bay Area Restoration Council (BARC) in order to deliver education outreach and complete restoration projects that will directly contribute to the HHRAP efforts as they relate to private landowners within the Hamilton Harbour watershed. This program has effectively created environmental awareness on various issues including the importance of riparian buffers, terrestrial and aquatic habitats, species at risk, water quality, and septic and well water education. Additionally, restoration projects involving water quality improvement and habitat restoration have been completed and annual environmental monitoring protocols have been implemented. This work has been completed by undertaking direct landowner contact by: mail, telephone, door-to-door campaigns, open houses and issue specific workshops. To date this program has contacted landowners of over 1800 properties within the Spencer Creek watershed and more specifically 345 within the Spring, Sulphur and Lower Spencer Creeks subwatersheds. Of these landowners contacted, 206 have entered into hand-shake agreements to remain watershed stewards, 96 of these are within the Spring, Sulphur and Lower Spencer Creeks subwatersheds. The Spencer Creek watershed makes up 19% of the Hamilton-Halton Watershed Stewardship Program's jurisdiction.

BACKGROUND

A detailed Geographical Information Systems analysis of watershed characteristics and monitoring data was conducted to prioritize the order in which the Stewardship Action Plans would be developed for the 15 subwatersheds of Spencer Creek. Additionally, HCA staff and staff of local environmental agencies were consulted to provide expert input into the prioritization exercise. This analysis resulted in a determination that the plans would be developed for each subwatershed in descending order based on urbanization. The urban most subwatersheds would be addressed in the first, second and third years of the project as they demonstrated poor water quality, a lack of riparian vegetation and the absence of protective legislation; whereas the more increasingly rural subwatersheds would be developed in years four and five because they exhibit less degradation. More specifically, Spring, Sulphur and Lower Spencer Creeks were identified as priority subwatersheds because of their urban areas and their direct impact on the health of Cootes Paradise Marsh, a provincially significant wetland found on the western coast of Lake Ontario and adjacent to Hamilton Harbour. Maps of the Spencer Creek watershed and its

SPRING, SULPHUR AND LOWER SPENCER CREEKS SUBWATERSHEDS

The Spring, Sulphur and Lower Spencer Creeks subwatersheds are approximately 38 km², or 13% of the Spencer Creek watershed’s 279 km² area. The waters of Spring, Sulphur and Lower Spencer Creeks drain into the Cootes Paradise Basin. Cootes Paradise is a provincially significant coastal wetland located at the western end of Hamilton Harbour. While Spring Creek feeds directly into Lower Spencer Creek, Sulphur Creek flows into Ancaster Creek which then flows into Lower Spencer Creek at Cootes Paradise.

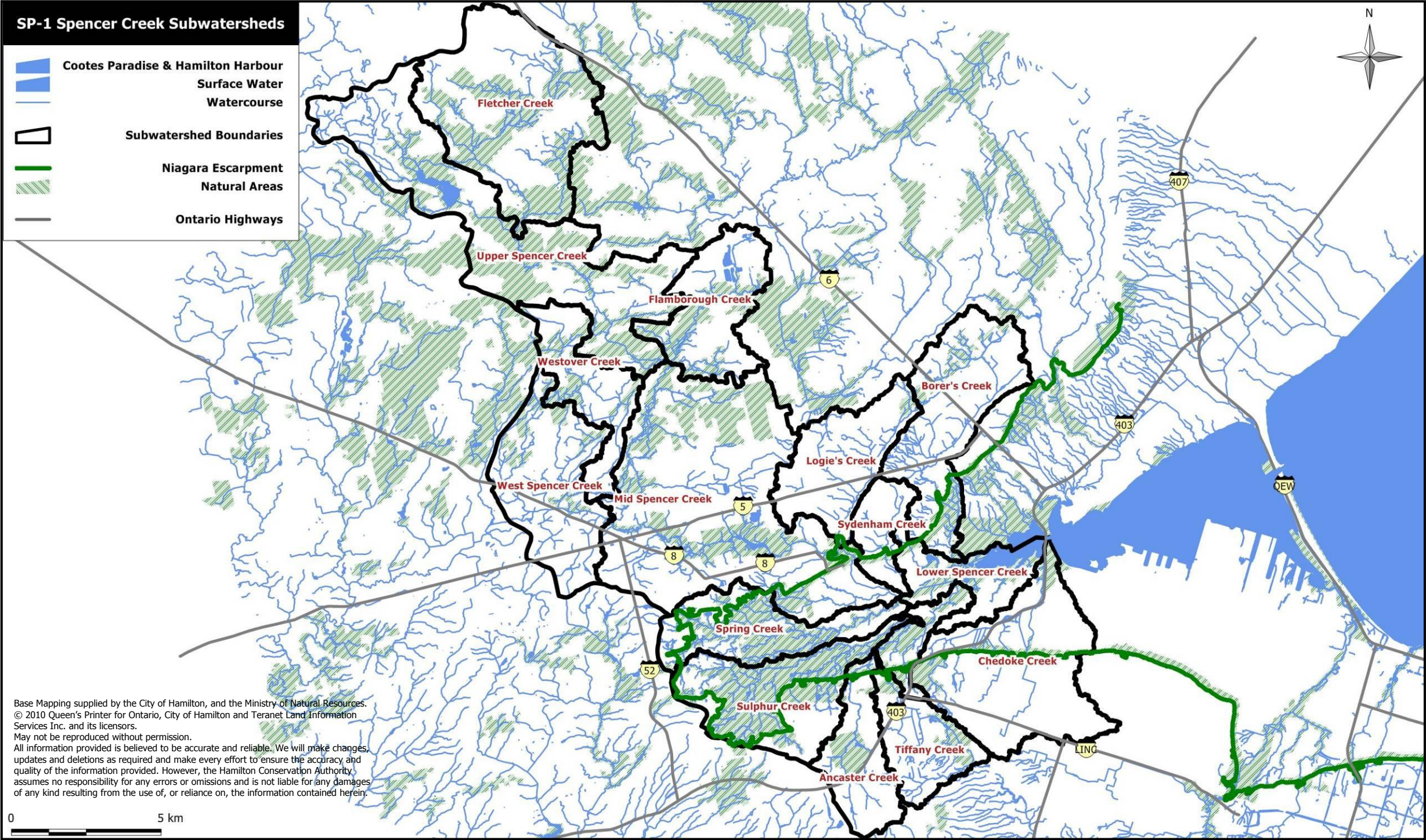
Of the fifteen subwatersheds of Spencer Creek, Spring, Sulphur and Lower Spencer Creeks are a unique mixture of developed lands and natural cover. The natural lands have been targeted for protection and enhancement in a number of initiatives including the Cootes to Escarpment Park System, Dundas Valley 50 Year Vision, Dundas Gateway Naturalization Project Plan and Hamilton Urban Eco Park.

subwatersheds, as well as a schedule for the development of future Stewardship Action Plans can be found within Appendix A, as excerpts from the HCA Stewardship Action Plans Work Plan (March 2007).

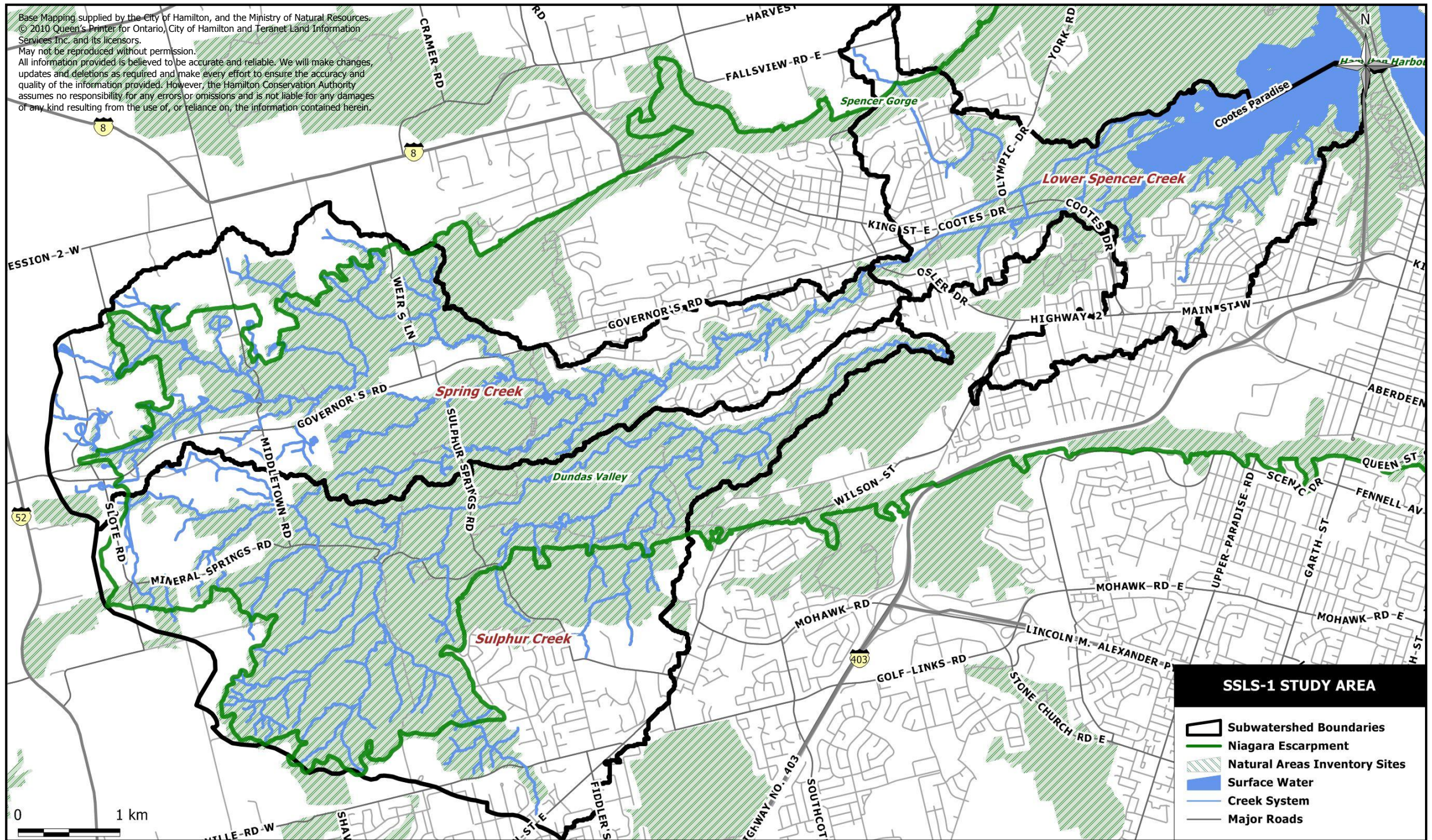
The purpose of the Spencer Creek Stewardship Action Plans are to create awareness by educating the public on the environmental issues within their local subwatershed, and to in turn, improve the ecological functions of the subwatershed through restoration initiatives. These plans provide a comprehensive strategy to support environmental watershed stewardship within the Spencer Creek subwatersheds by focusing on stewardship activities such as, education & awareness, habitat restoration and stress mitigation efforts. Additionally, these plans will help to guide sustainable development for the Spencer Creek watershed. Stresses acting on the subwatersheds, priority areas for restoration, and awareness needs of the communities are specifically identified within these plans.

Below the Niagara Escarpment, the lower reaches of the Spring and Sulphur Creeks subwatersheds as well as the Lower Spencer Creek subwatershed in its entirety, are predominantly residential with supporting institutional, commercial and utility land uses present. Due to protective legislation and ownership of the majority of the natural lands in these subwatersheds by conservation organizations, greenfields development is not a major concern however some areas are intended for intensification, as outlined in the City of Hamilton’s GRIDS project.

Major stresses noted within these plans that are observed to be impacting these three subwatersheds are: stormsewer outfalls, abandoned groundwater wells, on-line ponds, dams, habitat fragmentation, encroachment and impervious surfacing.



Base Mapping supplied by the City of Hamilton, and the Ministry of Natural Resources.
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PLAN LIMITATIONS

Although measures were taken to complete a thorough analysis of the subwatersheds of Spring, Sulphur and Lower Spencer Creeks, some data were missing from this analysis as some research and monitoring has not been completed to date. The following is a list of the data gaps that are present in these plans. It is important that research and monitoring regarding the status of the following characteristics within these subwatersheds is undertaken and kept up-to-date in order to measure our success through the use of these plans. For more information on ecological and water quality assessments within the Spring, Sulphur and Lower Spencer subwatersheds, refer to the appendices.

Data Gaps

- Stream morphology data (none)

- Erosion hot-spots and as it relates to development & natural occurrences

- Fisheries & benthics data
 - There are no annual fisheries or benthic monitoring stations in the Spring, Sulphur or Lower Spencer Creek subwatersheds.
 - There are a number of historical ecological monitoring stations in the Spring, Sulphur and Lower Spencer Creek subwatersheds however none have been sampled regularly in the past so as to generate data suitable for trend analyses.
 - There are Source Water Protection water quality and flow (surface and ground) sampling stations on both Spring and Sulphur Creek; however the sampling of these sites only began in 2006 and has since been discontinued.

- Riparian buffer data (1999 last time collected.)

- Water quality and quantity data
 - There are no stream level/flow gauges in the Spring, Sulphur or Lower Spencer Creek subwatersheds.
 - There are no Provincial Water Quality Monitoring sampling stations in the Spring, Sulphur or Lower Spencer Creek subwatersheds.

- Groundwater quality and quantity data
 - There are no Provincial Groundwater Monitoring sampling stations in the Spring, Sulphur or Lower Spencer Creek subwatersheds.

A complete list of all datasets used in the development of the Spencer Creek Stewardship Action Plans is included In Appendix F.

A public consultation process was initiated during the data collection phase of this project in an effort to solicit input from stakeholders representing the interests of the various sector groups operating in the study area. As a result, input into the plans is limited to those who opted to participate in the process.

Additionally all efforts were made to identify every current and anticipated stress within these subwatersheds, however the stresses identified within this document are not exhaustive and therefore there may be stresses located within these subwatersheds that are not noted within these plans. Occurrences of stresses identified after publication of this document should be reported to the Project Planner for inclusion in any addendums to this document.

IMPLEMENTATION STRATEGY

The Stewardship Action Plans for the subwatersheds of Spencer Creek identify current and anticipated stresses that are impacting the natural environment within these subwatersheds. The Plans also include Stewardship Actions that have been developed to mitigate the impacts of these stresses. These plans are meant to be used by local agencies and groups as guides to deliver Stewardship Programs and activities in these areas. The documents also provide approximate time frames for the implementation of each Action and list partner agencies that may support the Stewardship Action Plans Implementation Team members in executing their Implementation Work Plans throughout the 5 year implementation period (2010-2014).

Specific locations of stresses identified through stakeholder input and GIS analysis are illustrated in detailed Catchment Maps. Descriptions of each stress and listings of appropriate Stewardship Actions are provided in corresponding Catchment Datasheets. Catchment datasheets also provide ecological and water quality monitoring data, if available, to provide users with an understanding of the “state” of the catchment prior to implementation.

The information reported within these documents was collected through public consultation, analyses using Geographical Information Systems and facilitated exercises undertaken by the Spring, Sulphur and Lower Spencer Creeks Stakeholder Advisory Committee.

Within each Stewardship Action Plan, stresses that are believed to be impacting local ecosystems at the subwatershed level have been identified. Specific occurrences relating to these stresses have also been identified, and are inventoried and described in detail for each catchment basin of each subwatershed. The specific occurrences of each stress have been categorized as current or anticipated stresses and are colour coded as such in the catchment basin mapping. The anticipated stresses are predominantly related to development activities and as such may not be apparent at the present time, while current stresses are known to be impacting the local landscape presently. Specific attention should be paid to the implementation of stewardship actions associated with anticipated stresses as the prevention of degradation is a priority of these Stewardship Action Plans.

The details of each specific stress occurrence identified within the study area, have been incorporated into the Hamilton Conservation Authority's Restoration Opportunities Database. The database also houses supplementary detailed descriptions of each specific stress occurrence that was not included in the Stewardship Action Plans. The detailed descriptions were generated through the compilation of anecdotal information gathered during the stress identification exercise undertaken by the Spring, Sulphur and Lower Spencer Creeks Stakeholder Advisory Committee as well as through public consultation and primary research.

Through Stakeholder consultation, Stewardship Actions have been developed that address each type of stress identified. These Stewardship Actions are meant to guide the activities of local agencies and groups to prevent and mitigate the impacts of these stresses that are acting upon the natural environment of each subwatershed. The Stewardship Actions that have been developed include: Awareness Opportunities, Special Study Opportunities and Restoration Opportunities. Lists of local partner agencies to assist with the implementation of the Stewardship Actions as well as approximate time frames for their expected completion are included with each Stewardship Action.

The themes of each of the Stewardship Actions are described below:

- Awareness Opportunity: education and outreach opportunities involving residents, public and private landowners, and active associations / organizations
- Special Study Opportunity: detailed analyses to better understand the events taking place in a specific location or area of the subwatershed
- Restoration Opportunity: on-the-ground restoration work

A Spencer Creek Stewardship Action Plans Implementation Team has been established to carry out the Stewardship Actions identified within the Stewardship Action Plans for all 15 subwatersheds of Spencer Creek; the Hamilton Conservation Authority will serve as the coordinating body for this effort. Biannual meetings will occur throughout each implementation year. Upon the completion of each Subwatershed Stewardship Action Plan,

IMPLEMENTATION STRATEGY

appropriate Subwatershed Stakeholder Advisory Committee members will join the Implementation Team, and as such the Stewardship Actions identified for those subwatersheds will be incorporated into the Implementation Team's work plan for the following year. Implementation Team meetings will be held in the following months of each year in order to discuss the topics noted:

March

- Development of annual work plan, outlining Stewardship Actions to be initiated by each partner during the following implementation year.

September

- Report on progress from each partner as to which Stewardship Actions were initiated and/or completed during the implementation year.

In most cases, the implementation of the Awareness Opportunity will need to precede all other Stewardship Actions developed. It is possible for any Special Study Opportunity to be implemented concurrently with an associated Awareness Opportunity; however Restoration Opportunities will be the final Stewardship Action to be completed for each stress identified. An approximate time frame for the completion of each Stewardship Action has been developed and all are noted within the Stewardship Actions Tables in each of the Stewardship Action Plans.

Where applicable, implementation of Stewardship Actions should be undertaken on a subwatershed scale. Stewardship Actions that address specific occurrences of stresses identified within each of the subwatershed catchments should be undertaken concurrently. For example, the Awareness Opportunities associated with Detachment from Nature should be carried out over the entire subwatershed, followed by the Special Study and Restoration Opportunities that have been developed to address specific occurrences of Detachment from Nature.

The Stewardship Actions noted in these documents are guidelines to be used by the Implementation Team to define priorities as they relate to funding, budgeting and staffing requirements of each project. Stewardship Actions noted in this document can be modified by the Implementation Team as they see fit but should be used as a reference when determining appropriate measures in which to mitigate the stress at hand. Additionally, the

Implementation Team will need to define detailed implementation strategies and in some cases site plans to follow through with the implementation of each Stewardship Action. The Restoration Opportunities Database can be used to target specific stress occurrences for restoration related Stewardship Actions. Implementation Team members can seek out projects by querying the database using a variety of criteria including: stress type, suitable for DFO Compensation, public or private land, etc.

Assessing landowner motivation for participation in restoration activities will be key in determining remediation priorities. It is recommended that the assessment of landowner motivation be completed at the outset of implementation. This will aid in determining funding and staffing requirements for upcoming initiatives, as well as provide a knowledge base for working efficiently to achieve both landowner and partner goals.

It is suggested that the following methods be utilized and built-upon when approaching landowners.

Landowner Contact Procedure Recommendations (private & public)

- Direct Contact
 - a. Door-to-door contact; deliver brochure with personalized explanation of reason for contact (stapled to brochure)
 - i. For those unavailable by door-to-door contact, leave a brochure and follow up with a mailed letter to landowner with additional information regarding the benefits to the environment and landowner
 - b. Phone landowner to set-up a site visit and/or to discuss their concerns in more detail
 - c. Add landowner to a contact list (mailing / phone) regarding relevant topics to their area or natural feature (workshops / educational sessions / activities in the area)
- Indirect Contact
 - a. At neighbourhood associations / community councils / rate-payers organizations (i.e. police associations) host:
 - ii. Information / education sessions,
 - iii. Workshops, and/or
 - iv. Deliver relevant literature

ANNOTATED BIBLIOGRAPHY

City of Hamilton. GRIDS Master Plans

The Growth Related Integrated Development Strategy (GRIDS) is a balanced growth strategy. Its purpose is to identify the most ideal places for growth and the type of growth based on environmental priorities, social issues, economic opportunities and population studies as well as to identify strategies to fund the servicing of these areas. GRIDS, approved by Council in May 2006, includes a strategy to accommodate a projected population of 700 000 and 100 000 additional households by 2031. Essentially is the implementation of the City's Vision 2020 Strategy. GRIDS is 'integrated' because it uses the model of sustainability to draw together land use planning and infrastructure investment planning (water, wastewater, stormwater and transportation) within a framework that considers social/cultural, environmental and economic implications of growth and development decisions. GRIDS brings together, into one process, all of the activities related to development. Coupled with a development staging plan, the strategy enables a more coordinated, time efficient and cost efficient investment process for the public and private sectors (see City of Hamilton. Staging of Development Program, Draft Document. Unpublished, November 2006).

City of Hamilton, Planning and Economic Development. "Vacant Urban Residential Land Inventory." 19 Oct 2007. <http://www.myhamilton.ca/myhamilton/CityandGovernment/CityDepartments/PlanningEcDev/LongRangePlanning/InformationPlanning/Vacant+Urban+Residential+Land+Inventory.htm>

This website provides maps and reports on a quarterly basis that updates the development of vacant urban residential lands (subdivision update being completed biannually). Vacant residential lands are based on secondary plans and the City's Official Plan and are therefore related to subdivisions and condominium developments. Vacant residential lands refer to lands with residential potential but with no draft plans submitted. These reports and maps include the development status for potential development, pending, draft approval, and registered plan. The reports contribute to stewardship actions by determining how many households are within a new development area and therefore how many contacts are needed and the best method in which to complete the awareness task.

City of Hamilton. Staging of Development Program, Draft Document. Unpublished, November 2006.

This document is a multi-purpose tool that has been prepared to establish the City's intention toward processing of plans of subdivision for residential and industrial development to draft plan approval and then to registration. This plan ensures that growth and staging conforms to the City's Official Plan and the Places to Grow Strategy. In addition to assisting the City and the development industry in determining where development is likely to occur between 2007, 2008, 2009 and beyond, this document will assist in the preparation of the Development Charge background studies and related activities, and highlights areas where the completion of planning studies and major capital works are required prior to development proceeding. This document is related to the City's GRIDS project, in meeting a strategy that is coordinated, time efficient and is a cost efficient investment process for the public and private sectors. The Development Engineering section of the Planning and Economic Development Department with input from internal divisions, the Public Works Department, Corporate Services Department and the development industry is responsible for preparing this report on a yearly basis for Council approval and documents the City's intention for processing and registration of subdivision applications. This report includes the staging plan preparation and process, as well as maps illustrating the development staging plan, subdivision plan detail sheets, unbuilt unit and blocks counts for each plan of subdivision, existing secondary plans, and master plans and major engineering studies. This report contributes to stewardship actions by determining upcoming contact targets for new subdivisions and condominiums.

Dwyer, J. et al. Nature Counts: Hamilton Natural Areas Inventory. Hamilton Naturalists' Club, 2003.

This document is a biological inventory of natural areas within the City of Hamilton. Biologists identified plants, animals, birds, butterflies, fish and other significant species living in each natural area which in turn have identified areas of important habitat in need of protection. The inventory is meant to serve as a benchmark against which changes in the environmental health of the habitats can be measured as changes on the landscape take place. The Inventory provided the framework for determining the qualifying criteria for Environmentally Significant Areas identified in the study area.

ANNOTATED BIBLIOGRAPHY

Greater Toronto Conservation Authorities. Erosion and Sediment Control Guidelines for Urban Construction. Greater Toronto Conservation Authorities. March 2006.

This document was prepared from various erosion and sediment control guideline references applied by municipal and provincial agencies within the Greater Toronto Area to guide and review erosion and sediment control practices within their jurisdiction. The application of these guidelines is intended to protect and preserve water quality, aquatic and terrestrial habitats and form and function of natural water resources. It also aims to provide a consistent approach to erosion and sediment control to provide greater certainty to practitioners and to improve environmental protection.

Hamilton Conservation Authority. A.C.T.! A Work Plan for Ancaster, Chedoke & Tiffany Creeks Stewardship Action Plans. Watershed Planning & Engineering Division, March 2007.

The A.C.T. work plan outlines the goals specific to all of the Spencer Creek Stewardship Action Plans, as well as goals specific to the Ancaster, Chedoke and Tiffany Creek Stewardship Action Plans. The document also outlines the Plan Development Phases and actions to be taken during each phase, which were followed during the development of the Ancaster, Chedoke and Tiffany Creek Stewardship Action Plans. This work plan will also be the guiding document for the methodology of the development process for the remaining twelve Subwatershed Stewardship Action Plans that are to be developed for the Spencer Creek Watershed.

Hamilton Conservation Authority. Hamilton Waterfalls & Cascades, Edition 2. Watershed Planning & Engineering Division. November 2007.

This report outlines the set of criteria for examining waterfalls in the City of Hamilton which was used to inventory each waterfall in Hamilton that met these criteria and to evaluate and rank these waterfalls from a visitors' perspective. This information is used to provide updated and consistent information, as well as coordination and guidance, for the Waterfalls Project Advisory Team and their parent organizations so that educated decisions will be made in regards to Hamilton's waterfall visitor potential. This report also provides an international benchmark to which others can define or identify a waterfall.

Hamilton Region Conservation Authority. Spencer Creek Watershed Management Plan. December 1997.

This report was completed in cooperation with a variety of local Stakeholders, including community organizations and government agencies. This Management Plan is an integrated watershed management plan for the Spencer Creek ecosystem. The project incorporated a review of data and qualitative data gathered over 30 years by the Hamilton Conservation Authority as well as data and information from other agencies in the watershed. The development process included public consultation as well as reviews by the steering committee and technical working groups. The plan has been endorsed by the Hamilton Conservation Authority and the local municipalities. The Plan identifies the natural environmental attributes of the watershed and recommends appropriate strategies for the protection, restoration and enhancement of the features with consideration for the social and economic needs of the watershed residents. The plan also includes implementation and monitoring strategies.

Hamilton Region Conservation Authority. Aquatic Resource Monitoring Program. 2004.

The Aquatic Resource Monitoring Program outlines the protocol for routine monitoring of fish, fish habitat and benthic macroinvertebrates throughout the watersheds of the Hamilton Conservation Authority. The program assists HCA staff in identifying areas within the watersheds where net gains in fish habitat can be undertaken, thereby increasing the productive capacity of the fishery within the watersheds. The ARMP focuses on monitoring parameters that are indicators of ecological health.

Hamilton-Halton Watershed Stewardship Program. Watershed Riparian Buffer Mapping & Analysis using GIS. Hamilton Conservation Authority, 2003.

Based on 1999 ortho-rectified aerial photography riparian buffers were digitized and analyzed. This data was not used within this study due to the inaccuracies that exist between 1999 and 2007. However this document will give a general idea of the riparian habitat within the ACT! watershed and will also serve as a guideline for future riparian buffer analysis.

ANNOTATED BIBLIOGRAPHY

O'Connor, K. M. Remedial Action Plan for Hamilton Harbour: Stage 2 Update 2002. Hamilton Harbour RAP Stakeholder Forum, 2003.

This document examines the works completed as of 2002, undertaken in an effort to reach the Hamilton Harbour Remedial Action Plan objectives, and ultimately the delisting of the Hamilton Harbour as an Area of Concern by 2015. This document resulted from the recall of the RAP Stakeholder Group, now called the RAP Forum, to the task of reviewing water quality, toxic contamination, fish and wildlife, land management and public access data and comparing it against the baseline data submitted by the RAP Stakeholders in the Stake 1 Report to the International Joint Commission in 1989. Task groups made up of scientists and Stakeholders reported findings to the forum and these reports were used as the basis for modifying the original report.

Royal Botanical Gardens. Cootes to Escarpment Park System: A Conservation and Land Management Strategy Draft. Royal Botanical Gardens: October 2008.

The strategy is intended to guide the management of natural resources in the public interest in an effort that they remain healthy in the rapidly urbanizing landscape and that they be preserved so that they can provide necessary green infrastructure for future residents so that they may live in healthy communities. This strategy also acknowledges that private landowners will be integral in the protection of these natural areas. The strategy presents a vision of how these lands contribute to sustaining our community for the long term. It is the intention of this strategy that it be used to guide a coordinated effort to manage the natural areas within the study area to ensure their wise use and protection

Source Water Protection Halton-Hamilton Region, Preliminary Watershed Description Report: Hamilton Conservation Watersheds. Unpublished, January 2006.

The preliminary watershed description is a detailed examination of the physical and human characteristics of the Source Water Protection Planning Region, specifically the Hamilton and Halton Conservation Authorities' respective jurisdictions. Numerous maps and tables support a textual report on what makes up the watershed. Topics include population, geology, vegetation, land use, infrastructure, government, hydrology, physiography, hydrogeology, etc.

Source Water Protection Halton-Hamilton Region, Preliminary Conceptual Water Budget Report. Unpublished, October 2006.

This report outlines the conceptual understanding of the water budget for the Hamilton Conservation Authority watersheds. The water budget aims to describe water movement and water uses within the watersheds. Using available data, this report includes a conceptual understanding of a variety of natural features within the watersheds including: climate, geology, physiography, land cover, groundwater, surface water, etc. as they are elements of the water budget for the watersheds. The data in this report will be used to complete models of the hydrologic systems of the watersheds for the purposes of the Source Water Protection initiative.

Thomson, T.M. The Spencer Story. Spencer Creek Conservation Authority, 1965.

This publication outlines the history of the Spencer Creek Watershed and the origin of the Hamilton Conservation Authority as the agency responsible for its management. Topics addressed in this historical account of the watershed are: physiography, cultural heritage, land use, flooding and the installation of flood control structures, natural heritage, recreation and an account of the founding years of Spencer Creek Conservation Authority.

The Tourism Company and The Rethink Group. A Joint Outdoor Tourism Marketing Strategy. Golden Horseshoe Conservation Authorities, December 1995.

This report is the result of the Golden Horseshoe Conservation Authorities collaboration on marketing strategies and identifying new opportunities for revenue generation. The report recognizes the growth in demand for outdoor recreation and specialty outdoor experiences. The report includes a marketing audit, research on potential new markets and a cooperative marketing strategy, clearly defining tourism packages and implementation priorities. The Marketing Strategy section of this report provides a vision, strategic marketing statement and a three year marketing plan in an effort to capitalize on the opportunities identified. Two of the guiding principles in the strategy include: increasing revenues and enhancing the quality of visitor experiences while maintaining the conservation ethic and recognizing the need for ecologically sustainable tourism.

ANNOTATED BIBLIOGRAPHY

Hamilton Harbour Remedial Action Plan, Identifying Non Point Sediment Sources Report. Unpublished, November, 2009.

This report outlines a general overview of major sediment conditions and identifies significant sources of sediment resulting from specific locations or areas of the watersheds of Hamilton Harbour. Urban development sites are excluded from this document as they are addressed in specific sediment control initiatives of the municipalities and conservation authorities.

Royal Botanical Gardens, Cootes to Escarpment Park System – A Conservation and Land Management Strategy. Unpublished, October 2009.

This report outlines the strategic steps to create a park system through a holistic conservation approach by connecting and expanding existing greenspace in areas of the Cities of Burlington and Hamilton that fall below the Niagara Escarpment and adjacent to Cootes Paradise and other near by environmentally significant areas. The report also outlines strategic steps to facilitate sustainable recreational uses in appropriate locations within this area.

Source Water Protection Halton-Hamilton Region, Draft Tier 1 Water Budget Report. Unpublished, November, 2008.

This report outlines the conceptual understanding of the water budget for the Hamilton Conservation Authority watersheds and uses this data to assess the level of stress imposed upon this system. This report includes the results of preliminary models used to determine the location and breadth of vulnerable groundwater aquifers and drinking water supplies that are under significant or moderate levels of stress. This information will trigger or exempt locations from the Tier 2 and 3 assessments as directed by the source protection planning process.

APPENDICIES

APPENDIX A - MAP OF SPENCER CREEK WATERSEHD AND STEWARDSHIP ACTION PLAN DEVELOPMENT SCHEDULE

APPENDIX B – HISTORICAL FISHERIES INVENTORY

APPENDIX C - SIGNIFICANT SPECIES

APPENDIX D - WATER QUALITY ASSESSMENT AT SPRING AND SULPHUR CREEKS

APPENDIX E - SURFACE WATER FLOW ASSESSMENT AT SPRING AND SULPHUR CREEK

APPENDIX F - DATA SOURCES