Overview of Stormwater Management Criteria

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Conservation Toronto and Region

CVC Credit Valley Conservation

Credit Valley Conservation

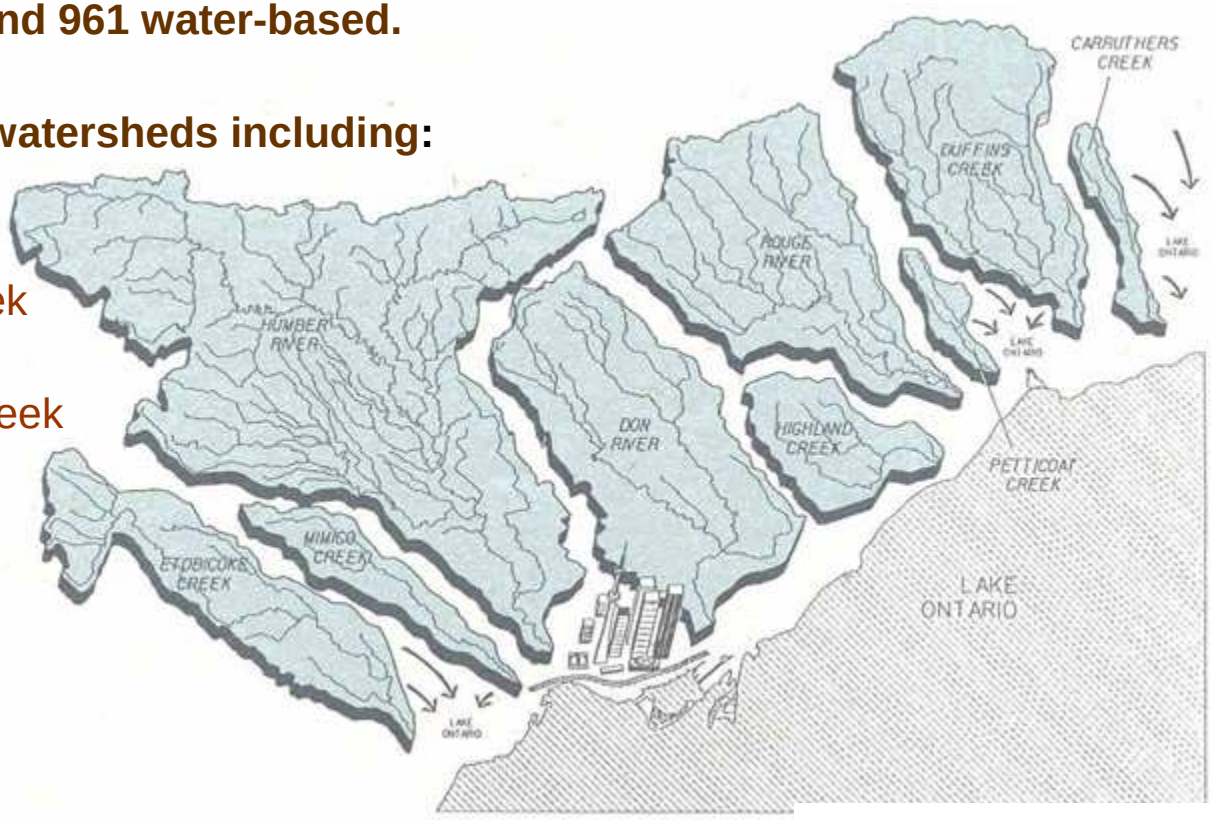
TRCA Jurisdiction

The TRCA's area of jurisdiction includes:

- **3,467 sq. km: 2,506 on land and 961 water-based.**

This area is comprised of nine watersheds including:

- Etobicoke Creek
- Mimico Creek
- Humber River
- Don River
- Highland Creek
- Rouge River
- Petticoat Creek
- Duffins Creek
- Carruthers Creek



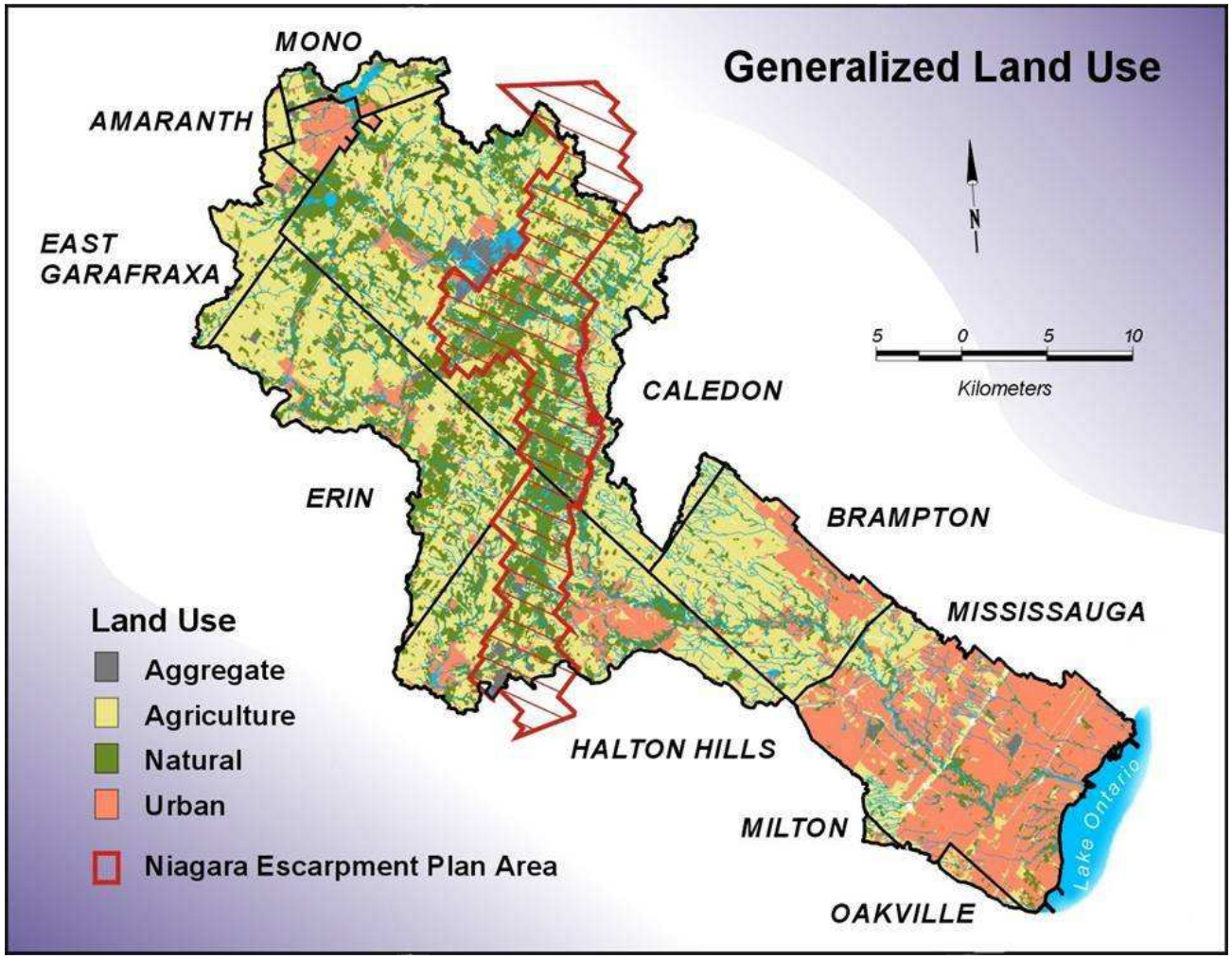
The TRCA's jurisdiction also extends into Lake Ontario to a point defined by the Territorial Divisions Act, R.S.O. 1980

The population in 2004 within TRCA's jurisdiction is approximately 4,300,000 (37% of Ontario's population).

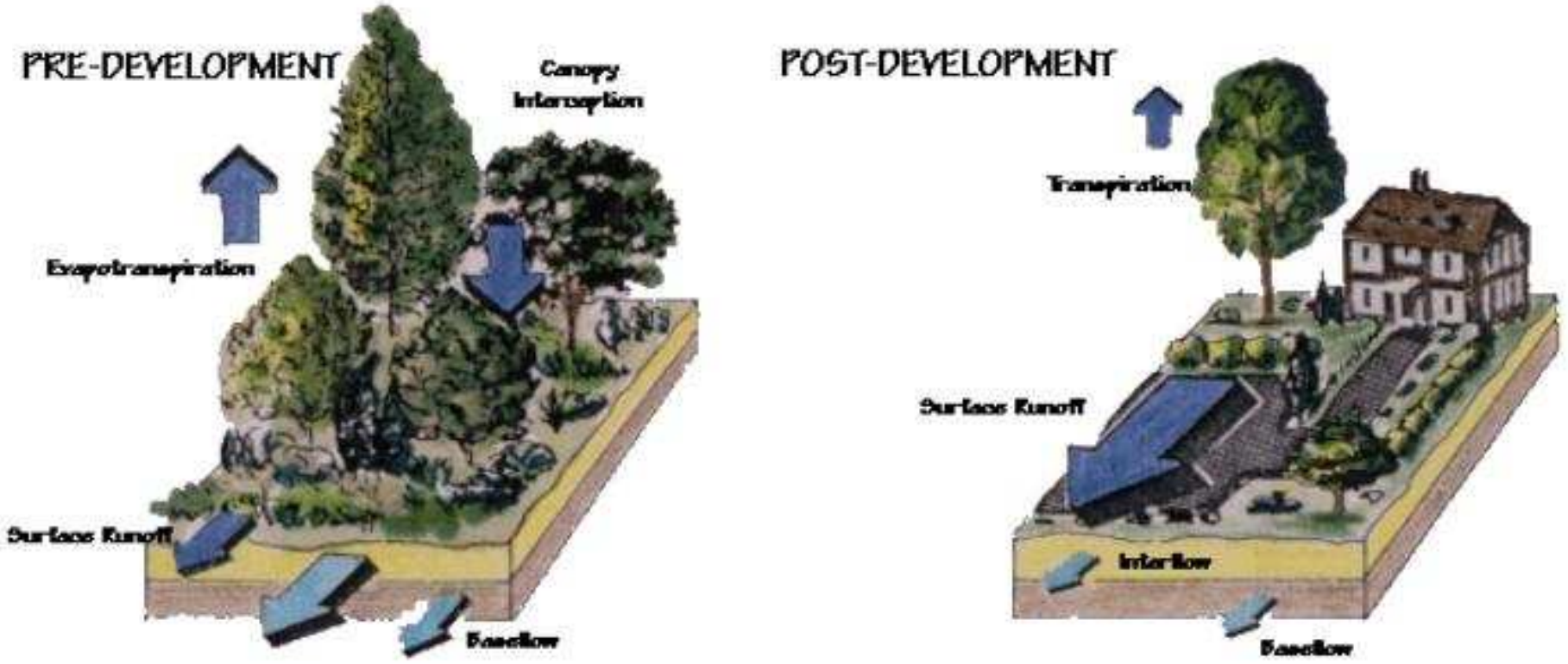
CVC Jurisdiction

The Credit River watershed is comprised of :

- **1000 sq. km of land, drained by the Credit River and its 1500 kilometres of tributaries:**
- **650,000 people**
- **87% of the population lives in the lower third of the watershed**



Impacts of Urbanization on Hydrologic Cycle
(Hydromodification)



Consequences of Hydro modification

- Stream bank erosion and bed degradation
- Increased peak flows - flooding
- Increase pollutant loading (including thermal impacts)
- Reduction of groundwater and baseflow
- Loss of aquatic habitat and natural features
- Risk to Infrastructure

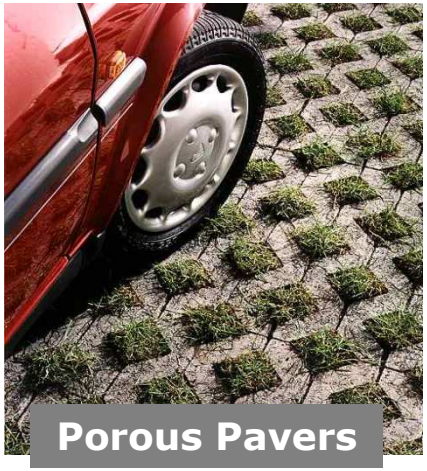
Evolution of Stormwater Management

Time Frame	Objective	Practice	
Early 1980's	• Quantity (flood Control)	Rapid Conveyance through storm sewer design and construction (direct discharge to receiver)	
Early 90's	• Quantity • Quality • Erosion	SW facility construction: Wet ponds, dry ponds etc.	
Today	• Quantity • Quality • Erosion • Treatment • Fisheries protection • Stream morphology • Protection of Groundwater	Water Balance and treatment train approach using green infrastructure	

Stormwater Management Practices

Impacts are mitigated through the implementation of Stormwater Management Practices consisting of:

Source Controls



Porous Pavers

Conveyance Controls

CWC / Infiltration Systems

End-of-Pipe Controls

Wet Pond

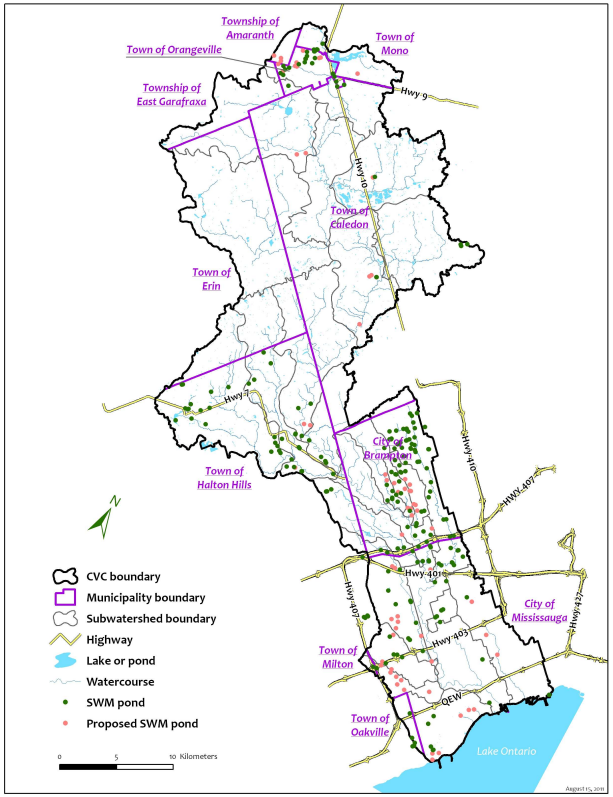
Treatment Train Approach

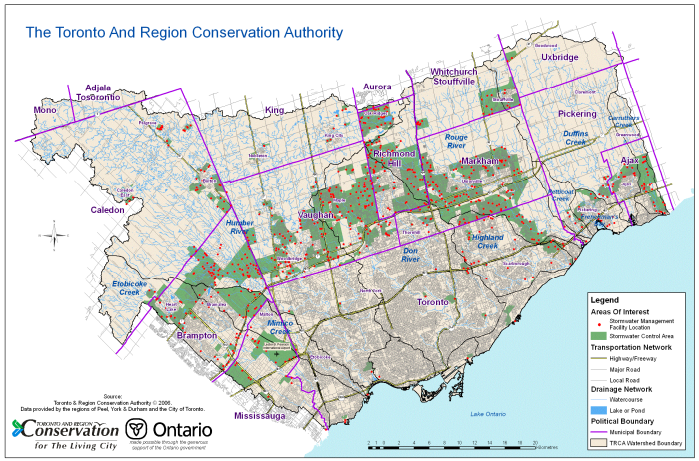

Image © 2010 DigitalGlobe
© 2010 Google
Sep 1, 2009
43°52'57.69" N 79°01'46.08" W elev 362 ft

TRCA/CVC Stormwater Management

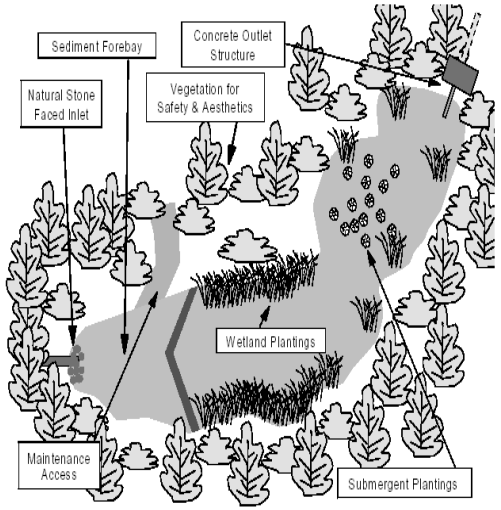
WHERE WE ARE TODAY

- Most of the lower portions of the watersheds were developed prior to introduction of provincial flood plain policies and implementation of stormwater management controls.
- Over 800 SWM Ponds have been constructed in TRCA jurisdiction and 150 SWM Ponds in CVC jurisdiction
- Very few LID sites





End of Pipe Controls (SWM Ponds)



- Mitigates increased peak flows from urban areas (flood and erosion protection)
- Reduces pollutant loadings (water quality control)
- Currently the standard practice for stormwater treatment for areas greater than 5ha.
- Usually the only practice employed in the “treatment train”

Need to Change

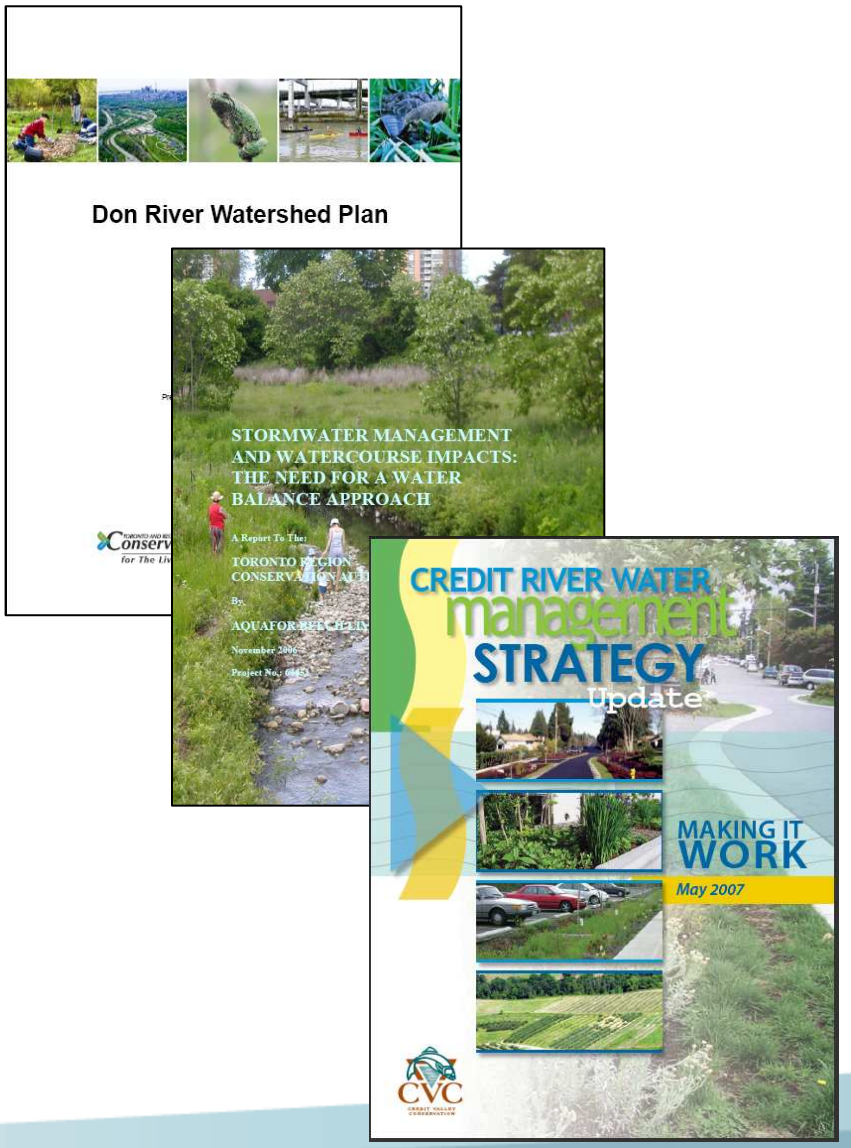
Integrated Approach

- Aggressive Approach
- Innovative SWM Practices
- Treatment Train
- Review Policies, Design Criteria & Guidelines
- Water Balance Approach

Key Recommendation

Watershed Plans, Subwatershed Studies, Research and Monitoring

- Mitigate all impacts to hydrologic cycle and restores natural flow pathways and patterns (protection of aquatic and terrestrial habitat)
- Reduces generation of excess runoff volume (mitigate erosion and water quality impacts including temperature)
- Addresses climate change (more resilient stormwater system)
- Need More Source and Conveyance Controls (Water Balance Approach / Low Impact Development)



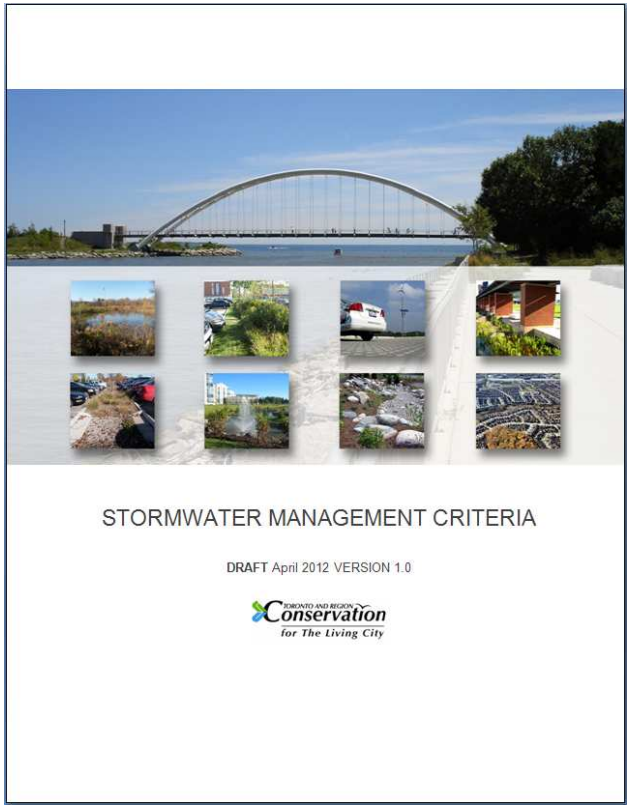
Stormwater Management Criteria

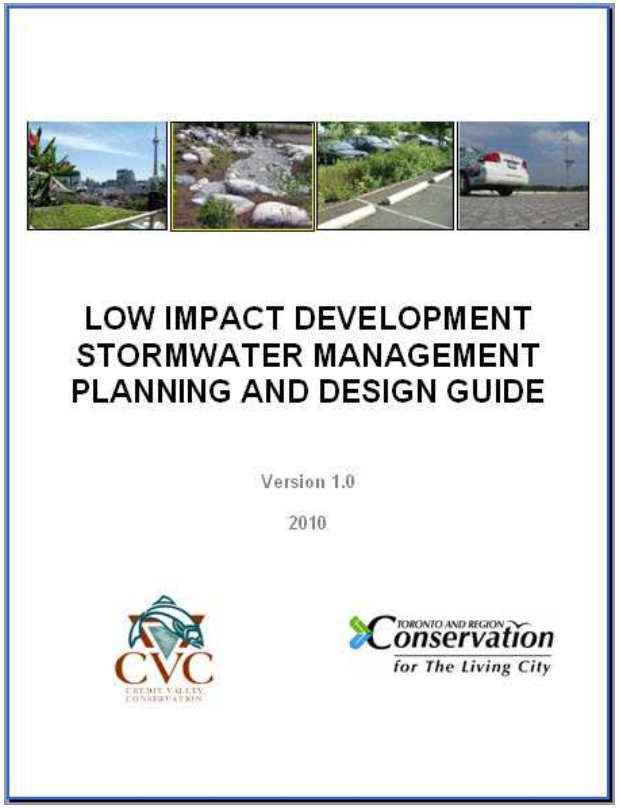
Goal: That stormwater management effectively mitigate the impacts of urbanization on the natural water cycle (Water Balance Approach)

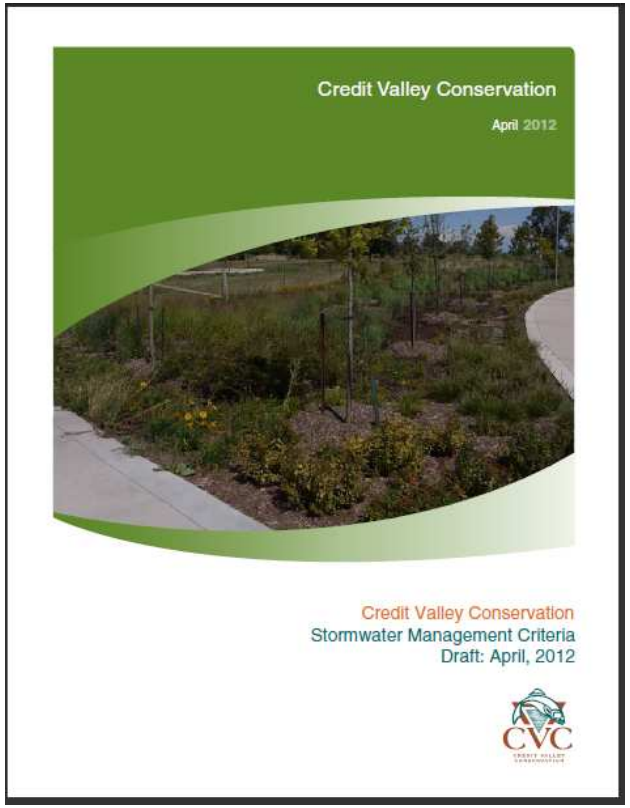
Objectives:

- To prevent increases in flood risk;
- To prevent undesirable geomorphic changes in watercourses;
- To protect water quality;
- To preserve groundwater and baseflow characteristics;
- To maintain an appropriate diversity of terrestrial and aquatic life and opportunities for human use.

Stormwater Criteria and Guidance to support watershed objectives and stormwater policy







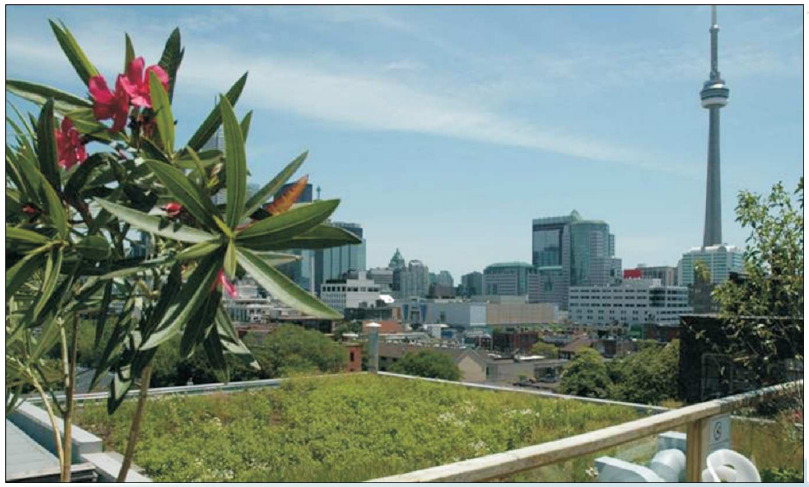
MOEE, Stormwater Management Planning and Design Manual, 2003

New CVC, TRCA SWM Criteria Document

- ✓ Provides SWM Criteria to be applied at the various stages of the planning process ((sub)watershed – subdivision – site)
- ✓ Criteria for Stormwater Quantity (Flood), Erosion, Stormwater Quality and Water Balance (Natural Features and Groundwater Recharge)
- ✓ Provides consistent approach to water management which should lead to a more streamlined and focused design and review process
- ✓ Ensures that the goals, objectives and targets as outlined in larger scale studies (watershed and subwatershed studies) are being met

"Provides guidance based on site conditions – may require a multi-disciplinary approach to stormwater management (Engineers, Planners, Ecologists, Hydrogeologists, Geomorphologists and Landscape Architects)"

Stormwater Management Criteria	CVC TRCA Technical Team
Water Quantity (Flood) Control	Sameer Dhalla, Neelam Gupta
Erosion Control	Paul Villard
Water Balance (Ground Water Recharge)	Don Ford, Kerry Mulchansingh
Water Balance (Natural Features)	Laura DelGiudice, Scott Sampson
Water Quality	Jennifer Dougherty
Stormwater Management Practices	Sameer Dhalla, Rob Lukes



Design Process

- Minimize the impact that urbanization has on the water balance
- Design a SWM system that manages both peak flood flows and the volume of runoff from frequent events
- Satisfy Stormwater Design Criteria (flood protection, water quality, erosion control and water balance)
- Screen and select SWM Practices
- Assess effectiveness (modeling)
- Detailed design and construction

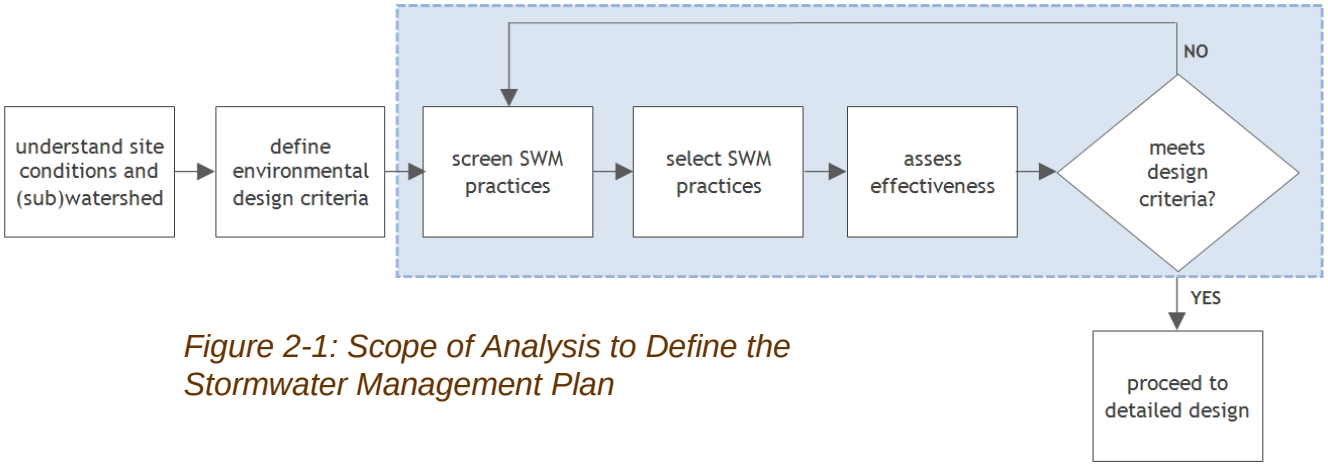


Figure 2-1: Scope of Analysis to Define the Stormwater Management Plan

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