

# Stormwater Management in the Great Lakes and St. Lawrence Basin: Cities Charting the Way Forward



This summary provides highlights from the Great Lakes and St. Lawrence Cities Initiative's first Green CiTTs report, 'Stormwater Management in the Great Lakes and St. Lawrence Basin: Cities Charting the Way Forward'. The Green CiTTs (Cities Transforming Towards Sustainability) program adopts a comprehensive approach to protecting our shared water resources, involving a broad range of municipal operations and responsibilities. ([www.glsccities.org/initiatives/greencities.cfm](http://www.glsccities.org/initiatives/greencities.cfm)). The Green CiTTs program showcases municipal leadership and provides support to municipalities to further expand these activities. It is through the promotion and expansion of best practices that cities will set the course for a sustainable future for the Great Lakes and St. Lawrence region.



## Green CiTTS and Stormwater

The first year of the Green CiTTS program has focused on reducing the impact of stormwater runoff, recognized as a leading source of pollutants to the Great Lakes and St. Lawrence. In recent years, conventional stormwater management practices have been pushed to the limit, as municipalities face a convergence of pressures, including urban intensification, climate change and the cumulative impact of runoff on shoreline water quality. Municipalities are rising to the challenge, but solutions go beyond local government. Coordinated actions and mutual support are needed involving governments, developers, property owners, insurers, and the public-at-large.

### Survey of Municipal Practices

Based on a comprehensive survey of stormwater practices of members of the Great Lakes and St. Lawrence Cities Initiative, the report paints a fascinating portrait of municipal stormwater activities in transition across the Basin, demonstrating the range of issues facing municipal stormwater practitioners.

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### Survey Highlights

- a large majority, 20 out of the 25 survey respondents felt that government requirements are a main driver for stormwater action;
  - Eighteen of 25 cities identified lack of funding as their main obstacle to stormwater implementation;
  - Most cities have multiple municipal departments involved in stormwater management;
  - Most responding US cities have a formal stormwater management plan, while fewer than half of Canadian cities have one;
  - Twenty municipalities stated that they have stormwater performance standards for new industrial, commercial or institutional developments;
  - Fifteen cities surveyed have measured or noticed changes to precipitation patterns in the municipality;
  - Nineteen of 25 municipalities are applying low impact development measures in their community.
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### Cities In Action

As part of the Green CiTTS Stormwater program, Cities Initiative member cities have shared their best practices in stormwater management, demonstrating their leadership in the Great Lakes and St. Lawrence Region.

The **City of Milwaukee's** Stormwater Management Charge, introduced in 2006, is based on the impervious surface area of a property defined by the Equivalent Residential Unit, or 1,610 square feet per unit. The charge applies to residential, non-profit and tax exempt organizations, as well as non-residential and commercial property owners.

[http://city.milwaukee.gov/ImageLibrary/Groups/WaterWorks/files/StormWaterManagementCharge\\_2011.pdf](http://city.milwaukee.gov/ImageLibrary/Groups/WaterWorks/files/StormWaterManagementCharge_2011.pdf)



▲ Stormwater plume entering the Lake

Photo Credit: Toronto and Region Conservation Authority

MODIS Satellite image of runoff contamination ►  
into Lake Erie after a storm event

Photo Credit: National Oceanic and Atmospheric Administration





#### ▲ Duluth cityscape

Photo Credit: City of Duluth

#### Ellesmere Road in City of Toronto, during a major storm in 2005 ►

Photo Credit: City of Toronto



The **City of Toronto's** Wet Weather Master Flow Plan outlines programs and projects over the next 25 years to reduce the adverse impacts of stormwater and to sustain Toronto's rivers, streams and environment. Examples include mandatory downspout disconnection in certain areas of the City, tree planting, construction of wetlands and storage tanks, and green roof construction bylaw and incentive grants.

[http://www.toronto.ca/water/protecting\\_quality/wwfmp/index.htm](http://www.toronto.ca/water/protecting_quality/wwfmp/index.htm)

The **City of Duluth** is part of the Regional Stormwater Protection Team which includes 16 regional governments and groups. The Regional Stormwater Protection Team delivers TV ads, brochures, and exhibits on stormwater impacts and mitigation strategies throughout Northeastern Minnesota and Northwestern Wisconsin.

[http://www.lakesuperiorstreams.org/stormwater/rspt\\_press.html](http://www.lakesuperiorstreams.org/stormwater/rspt_press.html)

The **City of Trois-Rivieres** (QC) has implemented a strategy to integrate natural areas in urban development. The strategy's goal is to protect one hectare of land for every 1 hectare of land developed. After one year of implementation, the strategy has already had an impact on 31 site plans involving 125 hectares of lands under development and has resulted in 128 hectares of protected lands.

<http://citoyen.v3r.net/portail/index.aspx?sect=0&module=5&module2=1&MenuID=1040&CPage=4>

The **City of Grand Rapids** uses a long term river monitoring program to monitor for the percent saturation of dissolved oxygen, the change in temperature, pH, biochemical oxygen demand (BOD), total solids, fecal coliform, phosphate, nitrate, and turbidity. This practice is used to complement end-of-pipe monitoring and provides an effective means to tracing water quality concerns back to their source.

[http://grcity.us/index.pl?page\\_id=1958](http://grcity.us/index.pl?page_id=1958)

## Charting the Way Forward

The Cities Initiative has identified ten areas where municipal improvements have resulted in more effective stormwater management and significant cost savings, and where support is needed from federal, state, and provincial governments and others.

### Stormwater-friendly Land-Use Planning

As cities grow and become paved over, stormwater flow becomes more polluted and concentrated. Some municipalities are leading the way in designing communities that reduce stormwater flow 'at source' in a way that allows for maximum infiltration and reuse of stormwater flow.

### Climate Change Adaptation

As impacts of climatic change are felt at the local level, municipalities are developing adaptation strategies that work best given their unique circumstances. Predicting how the weather will change in the coming years, and assessing the risk of the anticipated increased storm intensity to their infrastructure would benefit from technical and financial support from other levels of government and other experts, to develop local predictive modeling and to undertaking climate change infrastructure vulnerability assessments.

### Monitoring Impacts, Reporting on Progress

To tackle the impact of urban run-off on water quality, cities are increasingly measuring their progress in reducing this source of pollution. But drawing a direct link between stormwater control measures and improvement in water quality has proved challenging. New monitoring protocols and support are needed from other levels of government to make stormwater monitoring programs more effective in identifying and tracing back pollution to its source.



### ▲ Vegetated swale in parking lot

Photo Credit: Center for Neighborhood Technology

### Water quality monitoring at an outfall ►

Photo Credit: Town of Ajax



## Stormwater Plans

While stormwater plans are common in the United States, fewer Canadian cities have them to guide their stormwater activities. By developing a comprehensive stormwater management plan that sets corporate goals and assigns clear responsibilities, municipalities have brought focus to decentralized stormwater activities.

## Low Impact Development

The use of green infrastructure like green roofs or pervious pavements can capture stormwater naturally before it flows into and pollutes waterways. Municipalities have shown how green infrastructure can also enhance people's enjoyment of their property while saving cities money from deferred infrastructure costs. Support from regulators and researchers, through demonstration projects, the sharing of performance data, and increased public and private sector awareness would go a long way to maximize its potential.

## Public Education and Outreach

Public education and outreach are important to inform the public about what they can do to help to reduce the impacts of stormwater on the Great Lakes and St. Lawrence. More support for public education and outreach, from the local level to the state, provincial and national levels, is needed to help increase public awareness.

## On-Site Stormwater Management

Municipal on-site stormwater performance standards, and sewer-use ordinances or by-laws provide a strong first-line defense from stormwater flow and pollutants. Requirements or incentives for the installation of stormwater controls in retrofitted ICI properties are also used to reduce inflow and infiltration of stormwater into a municipal storm or sanitary collection system.

## Government Regulation

The regulatory environment is a primary driver for, and barrier against, stormwater action. The U.S. stormwater permitting system has put in place a comprehensive stormwater program at the local level. By comparison, in Ontario and Quebec, authority over stormwater is less prescriptive, resulting in a varied approach.

## Financing Stormwater Management

Securing a stable and sufficient source of funding is vital to maintain and improve stormwater practices. Some municipalities have found ways that could secure a dedicated source of funding, by introducing a stormwater fee. Given the shared interest in improving nearshore water quality, financial support from other orders of government is also needed.

## Training, Inspections and Maintenance

Cities have demonstrated how training can be used to improve interdepartmental coordination, including maintenance and inspections, paying dividends in the effectiveness of their stormwater programs.



To view the entire report, more best practices from Cities Initiative member cities, and to see the winners and candidates of the Green CiTTS Stormwater Awards, please visit the Cities Initiative website at: [www.glslcities.org/initiatives/greencities/stormwater.cfm](http://www.glslcities.org/initiatives/greencities/stormwater.cfm)

The Great Lakes and St. Lawrence Cities Initiative is a binational coalition of over 80 mayors and other local officials representing over 14 million citizens, that works actively with federal, state, tribal, first nation and provincial governments and other stakeholders to advance the protection, restoration and promotion of the Great Lakes and St. Lawrence River basin.