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MANAGING RAIN ... where it falls

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Managing Rain Where It Falls

RAIN program builds community support, involvement

As urban areas are built out, hard surfaces like roads, parking lots, and buildings cover more of the landscape, interrupting the natural hydrological cycle. As a result, run-off increases several-fold, with consequences for peak flows, flooding, erosion, and waterway contamination.

And yet, most urban dwellers never give stormwater a second thought – at least, not until their basements are flooded.

This article explores the rainwater management challenges facing municipalities, green infrastructure solutions, and RAIN – an innovative community engagement program designed to build public acceptance and support.

The Trouble with Normal

Conventional modern stormwater management systems are designed to channel rainwater away as quickly as possible into stormwater management ponds, which release the water slowly into local water bodies while removing some suspended solids. However, research by Credit Valley Conservation and others concludes that new urban development, even when built to modern standards of stormwater management, nevertheless degrades watershed health. In other words, the status quo is not working. There are also issues with prohibitive lifecycle costs for management and decommissioning of wet ponds.

Run-off accumulates pollutants like oil, grease, heavy metals, road salt, and nutrients – so much so that a



Volunteers at a Depave Paradise event in Toronto gave street trees a new lease on life. These fun and inspirational events often attract local politicians, media attention, and new partnerships. Photo: Liz Cooper

recent study found that salmon left to swim in stormwater died within a few hours. Stormwater ponds treat some, but not all, of this pollution.

Further, much of the landscape in built-up areas does not have modern stormwater management, so untreated precipitation drains directly into receiving waters.

Some older systems channel both stormwater and wastewater into the same system, which flows to a wastewater treatment plant. Peak flows of rainwater during storms overwhelm treatment capacity, resulting in raw sewage discharge into local waterbodies (known as combined sewer overflows, or CSOs).

Cities across North America are struggling to deal with a combination of threats: increased run-off as a result of development (including intensification of built-up areas); aging and inadequate infrastructure; and more frequent extreme wet weather events. Many municipalities find that standard solutions are no longer vi-



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able; they lack the hundreds of millions of dollars required to upgrade existing systems to modern standards, and climate change adds to the challenge.

New approaches are required to increase resiliency.

The Green Infrastructure Solution

Fortunately, there is a solution: manage rain where it falls. This involves minimizing run-off by restoring, maintaining, and mimicking pre-development natural hydrology. It's an increasingly popular approach that goes by many names: green infrastructure, low impact development (LID), natural infrastructure, source controls, stormwater innovation, etc. Engineered systems like bioswales, rain gardens, infiltration galleries, permeable paving, and dry ponds absorb water into the ground, treating and filtering it along the way. This reduces the stress on existing infrastructure, reduces risk of flooding and CSOs, increases green space, improves run-off quality, recharges groundwater, and helps maintain waterway baseflows during droughts.

Many U.S. cities are making ambitious commitments to green infrastructure. New York City, for example, is investing in a 20-year, 2.4-billion-dollar green infrastructure plan, focused on curbside rain gardens. The plan is in operation, with 250 gardens already installed, and another 2,000 planned for the next year.

Milwaukee has a goal of capturing and infiltrating 2.8 billion litres of stormwater every time it rains, through a combination of techniques, including buying and preserving undeveloped lands in strategic areas, and installing green infrastructure in already built up areas. The regional

green infrastructure plan saves \$44 million in infrastructure costs compared to deep tunnel construction, and creates 500 long-term maintenance jobs and 160 construction jobs.

Canadian cities are coming to realize the value of green infrastructure as well. Cities like Toronto, Vancouver, Mississauga, and Ottawa have begun to install demonstration projects and incorporate green infrastructure into their policies and plans.

RAIN – Getting Community Buy-In

Since green infrastructure is generally above ground instead of under it, requiring installation in visible places (including on private property), community buy-in is essential. To this end, RAIN (an initiative of Green Communities Canada) is an intensive community engagement program that promotes green infrastructure and ecological stormwater management. It builds public understanding of rainwater management challenges and impacts, and support and participation in implementing infiltration landscaping solutions.

RAIN has been implemented in several communities in Ontario. Activities include the following.

Depave Paradise – Supervised volunteers tear up areas of unused pavement by hand and replace it with permeable gardens. These are fun and inspirational events that attract local politicians, media attention, and partnerships.

Home and business visits – Trained RAIN guides visit with property owners at their home or business, advising them on best practices for infiltrating stormwater onsite while reducing the risk of flooded basements.

Contractor training – This training builds capacity in the landscaping sector for installing green infrastructure like permeable paving and rain gardens.

Demonstration projects – Demonstration sites showcase ways of managing rain onsite and reducing run-off.

Hands-on workshops – Community members are trained to install rain barrels, build pet waste composters, and take action to “slow it down, soak it up, and keep it clean.”

The cities of Kitchener and Waterloo are leaders in Canada in innovative stormwater funding and management. Both cities have implemented stormwater utilities that are funded through a fee based on the contribution to run-off (impermeable surface area). Credits and incentives are provided to property owners who take action to reduce their run-off.

The two cities worked with Green Communities Canada and the local member organization, REEP Green Solutions, to deliver intensive RAIN programming. From 2011 to 2014, over 9,700 people were directly engaged, over 50 media items were published, and over 2,000 volunteer hours contributed to RAIN projects.

RAIN also helped the cities increase uptake on the residential credit program for run-off reduction measures. In total, over 4,800 residential credits and 260 commercial credits were issued from 2011 to 2013. The actions represented by these credits diverted over half a million cubic metres of water from entering storm sewers.

“The City of Waterloo has benefited tremendously from its partnership with RAIN,” said Todd Chapman, manager of programs for water services with the City of Waterloo.

“RAIN has been a huge help in educating the public about best management practices for stormwater management.”

Growing Problem

In 2014, REEP developed the RAIN Business Visit, which expanded on the model of the home visit to

tackle the more complex stormwater issues faced by larger commercial sites.

In 2014-2015, RAIN and Depave Paradise activities took place in 11 communities, and the program is looking to expand into the future as more cities take action on stormwater. Green Communities Canada is also

playing an active role in the Green Infrastructure Ontario Coalition, which is working to accelerate implementation of green infrastructure through policy change and capacity development.¹ *MW*

¹ Learn more at <www.slowrain.ca> and <www.greeninfrastructureontario.org>.

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