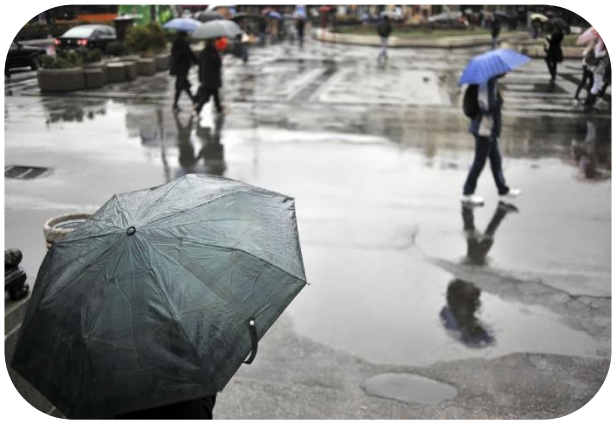
Green Communities CANADA

The Story of Stormwater

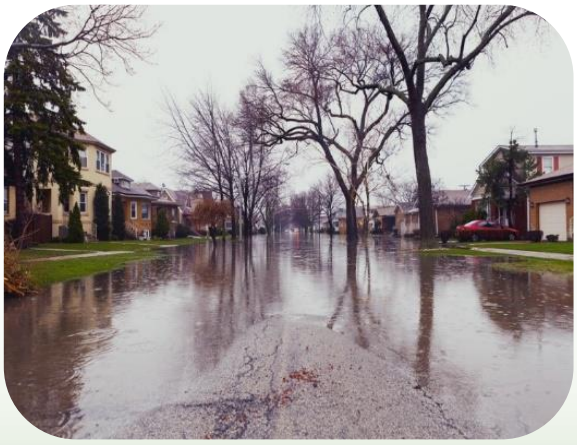
Many of us probably don't give rain a second thought – unless we've got too much or too little of it, but rainfall is becoming a major problem across the globe. Climate change, extreme weather events, and an increasing number of paved areas has caused rainfall and its impacts to become a growing concern. For these reasons, it is imperative that we take action to change our urban landscape and the way rainwater is currently being managed.



What happens when it rains?

In nature, most rainfall absorbs into the ground, gets taken up by vegetation, or evaporates from foliage. Only small amounts of this rainfall will run off the landscape directly into streams and lakes.

In cities and towns on the other hand, the proliferation of concrete surfaces like buildings, roads, and parking lots interrupts the water cycle by preventing water infiltration into the ground. As a result, more than half of the rainfall in cities and towns becomes stormwater runoff.



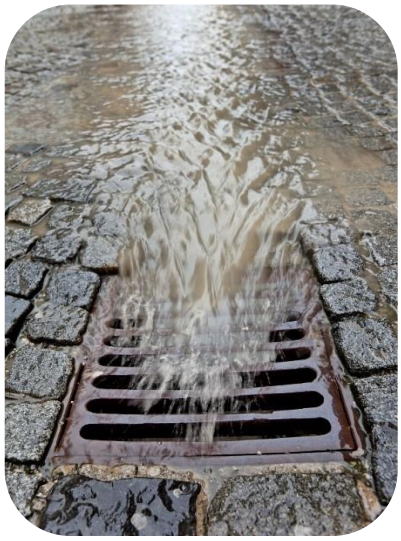
Stormwater runoff in Canada's urban areas is a major problem because it has resulted in significant, damaging events such as flooding and erosion. Alongside this, climate change is causing more frequent moderate to severe wet weather events. Serious flooding events are becoming the 'new normal' especially within our urban landscapes.

Stormwater runoff has also become a leading cause of poor water quality. As rain flows over the pavement, it picks up remnants of plant fertilizers, animal wastes, oil, heavy metals, road salt, cigarette butts, and more. The rain carries these pollutants into rivers and lakes, which results in damaged aquatic systems that can no longer be used for recreational purposes such as swimming, or as a source of drinking water.

Revised in 2021.

Conventional stormwater management

Historically, municipalities managed stormwater by draining it as quickly as possible through underground pipes. This turned creeks and rivers into open storm sewers every time it rained.



Beginning in the 1980s, stormwater ponds were incorporated into new developments to manage increasing peak flows and to help remove total suspended solids. However, we now know that conventional stormwater management is failing on a number of fronts. Failures with conventional stormwater management include:

- Inadequate treatment, leading to situations where ponds become a source of nutrients for waterbodies
- No reduction in stormwater volumes, resulting in increased pressure on streams
- High maintenance costs from the deterioration of ponds' performance as they fill with sediment overtime

Many older developed areas hold a combination of stormwater and sanitary sewers. When heavy rainfall occurs however, sanitary sewers can back up into basements and release raw sewage into waterways, processes known as combined sewer overflows. Between 2011 and 2013, the City of Toronto dumped more than 12 billion litres of raw sewage into Lake Ontario.

Managing rain where it falls

Today, a new era of stormwater management is approaching – managing rain where it falls *before* it can act as stormwater runoff.

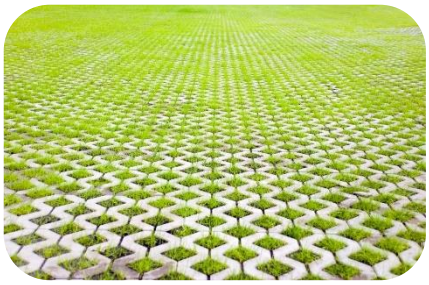
Low impact development (LID) and green stormwater infrastructure measures help to restore our urban water cycle and reduce runoff volumes through infiltration, urban forest enhancement, and the reuse and harvest of rainwater.

The goal of LID and green stormwater infrastructure is to create a city that functions more like a forest, by soaking up rainwater underground and holding rainwater in aquifers for future use. Replenished aquifers are also able to maintain base river flows during periods of drought.

Revised in 2021.

Green stormwater infrastructure features include rain gardens, permeable paving, bioswales, urban forests, green roofs, infiltration galleries, rain barrels, and cisterns. Further instead of wet ponds, an old idea is being brought back to life: dry ponds (e.g., in parks and playing fields) that are able to accommodate large amounts of runoff during heavy rain events.

Below are some images of green infrastructure examples.



Changing the landscape

Stormwater management through the use of green infrastructure is now increasingly being used as a more effective means of meeting water quality and quantity targets at lower lifetime costs than conventional “grey” infrastructure. Learn more about the benefits of managing rain where it falls, or check out the most frequently asked questions about green infrastructure.

Green infrastructure for stormwater management is supported by government policies in most provinces. View the Canada-Ontario agreement on Great Lakes Water Quality, and a previous bulletin outlining expectations regarding stormwater management. Reducing stormwater volumes through source controls is fully supported by the province of Ontario.

Green Communities Canada is proud to help change the way stormwater is managed by working with property owners, municipalities, and community groups to build support for and participation in green infrastructure development.

Interested in learning more? Explore these additional resources:

- Find out other ways that you can manage rainwater by visiting the Toronto and Region Conservation Authority website.
- Take the Rain is a Resource online course to learn more about green infrastructure as a method of stormwater management.
- Attend the virtual Rain Garden Master Class to learn how to build and design your own rain garden.

Revised in 2021.