

Stormwater consists of rainwater and melted snow that flows over roads, roofs, natural groundcover and other sites. Under natural conditions, stormwater is gradually absorbed into the ground and filtered before replenishing aquifers and nearby streams. This gradual absorption slows the flow and the amount of water reaching the stream at a given time.

Impervious surfaces, which are common throughout urban areas, disrupt this natural process and reduce the volume of stormwater infiltrating into the ground. Instead of gradually entering streams, rivers and lakes, water runs rapidly into storm drains, municipal sewers and drainage ditches picking up pollutants along the way. The sudden force and volume of polluted runoff entering watercourses increases flood risk, river bank erosion, aquatic habitat destruction and overall contamination of the water.

Flow in Urban Watersheds

By monitoring the flow of water in a stream at a given point we can create a graph showing the change in rate-of-flow over time. This graph is called a hydrograph. The hydrograph below (Figure 1) illustrates the impact of urbanization on in-stream water flow. Following a storm event, the rate of discharge/amount of runoff increases dramatically and then tapers off quickly. Pre-urbanization, streams exhibited a more consistent rate of flow.

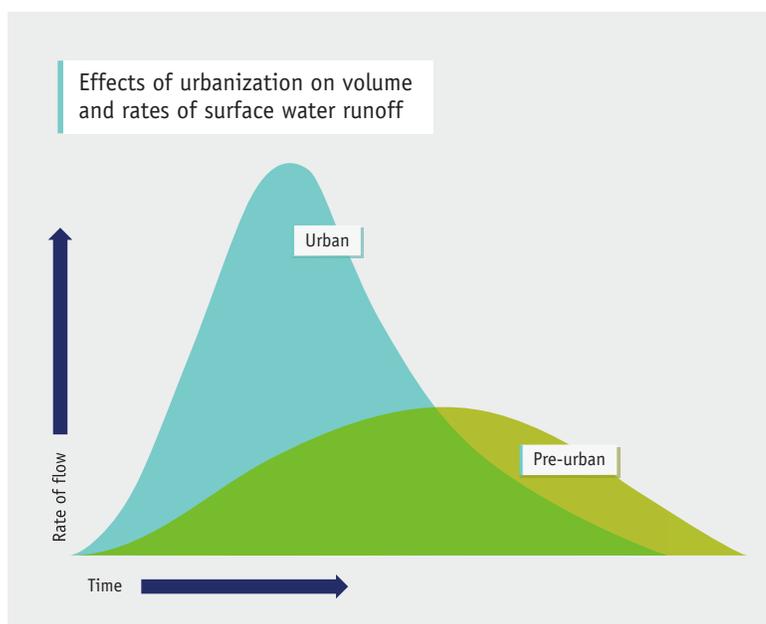


Figure 1: Comparison of peak flows and runoff volumes in pre-urbanized and urbanized areas. (Environment Canada, www.ec.gc.ca)

Stormwater Management

Implementing effective stormwater management practices in cities is essential to protecting the health of our streams, rivers and lakes. These practices help:

- ▶ **Preserve** the natural movement of water in both new and already developed areas
- ▶ **Protect** and enhance the quality of discharged stormwater
- ▶ **Reduce** the volume and frequency of combined sewer overflows (when stormwater mixes with wastewater and overflows untreated into our waterways)

When we built our cities, we focused on getting water off our roads and properties as quickly as possible. This meant laying concrete and asphalt, channelizing rivers and streams and generally trying to lessen the time it took for stormwater to make the journey from our streets to our rivers. As we've learned, this has lowered the quality and purity of the water running through urban areas. Today, erosion and flooding are serious issues that threaten our environment, our properties and our water.

Traditional stormwater management has focused on the built environment—pipes, stormwater drains, retention and detention ponds. Many newer subdivisions in the Greater Toronto Area (GTA) include a retention pond. Also known as a wet pond, they are designed to look natural and are often found in local parks. During a heavy storm, the ponds hold excess water and then slowly release it into the local waterway. While the stormwater is held in the pond, sediment and pollutants have time to sink out and the cleaner surface water is released over time, reducing erosion, flood risk and other negative environmental impacts.

More recently, green infrastructure has been included in the stormwater management portfolio. Green infrastructure describes techniques and technologies that consider and mimic the natural movement of water in the environment. Permeable pavement, rain gardens, soakaways, green roofs and bioswales are all ways of retaining water on property, thus enabling it to infiltrate into the soil. Many of these can be also be done at home! Toronto and Region Conservation Authority have a strong history in watershed management and leadership in applying sustainability practices, and has created the **Stormwater Management Criteria** which provides guidance for developers, consultants, municipalities and landowners in the planning and design of stormwater management infrastructure.

Activities like park naturalization and tree planting also help contribute to urban watershed health by encouraging infiltration, reducing erosion and filtering pollutants. Evergreen's **Uncover Your Creeks** and other **Greenspace initiatives** are always looking for volunteers to lend-a-hand at community greening events. If you're looking to contribute to urban watershed health, consider connecting with us in your community.

For more information visit
evergreen.ca/urbanwatersheds