NATURAL INFRASTRUCTURE IN A CHANGING CLIMATE

The forests, wetlands and grasslands in the Greenbelt provide the residents of Ontario with access to nature for recreation and restoration. But they do more than just that! Like the pipes beneath our city streets, these natural areas provide hidden but important infrastructural services. They store and purify our drinking water, they help prevent our basements from flooding by capturing excess stormwater, and they keep our neighbourhoods cool by offsetting the urban heat-island effect. These natural areas are increasingly being referred to as *natural infrastructure or green infrastructure*.

Conventional or "grey" infrastructure is under pressure. This is particularly true as the population in the Greater Golden Horseshoe grows exponentially and climate change leads to more frequent extreme weather events. Across Canada, an estimated $5.3 billion per year is needed to adapt infrastructure to climate change. While this is a significant investment, studies show that **climate-resilient infrastructure provides a 6:1 return-on-investment**. In other words, for every dollar invested in natural infrastructure, $6 is saved in future damages.[1]

NATURAL OR "GREEN" INFRASTRUCTURE refers to natural or built elements that provide important infrastructural services using natural processes. Natural Infrastructure can include wetlands, park systems, stormwater ponds, street trees, urban forests, permeable sidewalks, and green roofs.

(Ontario PPS, 2020)

CLIMATE CHANGE IMPACTS AND THE BENEFITS OF NATURAL INFRASTRUCTURE

CLIMATE IMPACT	IMPACT ON MUNICIPAL WATER MANAGEMENT	BENEFITS OF GREEN AND NATURAL INFRASTRUCTURE	EXAMPLES
Warmer and drier summers	• Dry summers can lead to soil sealing, which prevents water from infiltrating into soil when it finally rains. • Drought can lower water tables.	• Roots of vegetation and healthy soil help water penetrate. • By capturing water on site, more water is able to infiltrate into the ground and become groundwater.	Tree-covered areas have higher infiltration rates than areas without trees. One study found roots provided 27 times greater infiltration than bare soil.[2]
Wetter springs and falls	• Wetter springs and falls can lead to flooding and fresh-water contamination.	• Vegetation can intercept rain and help it absorb into the soil. • Healthy forest soil is often more porous than urban soil, meaning it has more capacity to store water.	Urban areas store only 50% as much water as forests.
Less snow and more rain in the winter	• Less snow and more rain can result in overflows of existing stormwater controls like drains and combined sewers.	• Natural infrastructure, like a wetland, can provide flexible capacity and store varying volumes of water right where it falls. This helps to reduce the strain on grey infrastructure, such as storm sewers, which have a fixed capacity.	Protecting and restoring wetlands can be important for water storage and carbon sequestration.[3]

EXAMPLES OF GREEN AND NATURAL INFRASTRUCTURE

Forests

The Greenbelt has over 180,000 ha of forests.[4] Ongoing conservation and restoration of forested lands can protect developed areas, like those across the Greater Golden Horseshoe, from extreme weather events, by mitigating flood-risk, protecting our fresh-water source and keeping nearby areas cool.

Rain garden

This is a garden created in a depression in the ground, filled with vegetation and rocks, which collects and filters runoff water. Unlike a rain barrel, a rain garden does not require emptying between rainstorm events. This makes rain gardens a good strategy for homeowners who want a passive stormwater management system that helps protect their foundation from water damage.

Wetlands

An estimated 85% of wetlands that once existed in the Greater Golden Horseshoe are now gone.[5] The 100,000+ ha of wetlands currently protected by Ontario's Greenbelt provide a wide variety of water management services including storage and purification. The Greenbelt Foundation is working with Municipal Natural Assets Initiatives to help municipalities value and invest in their natural assets, such as their wetlands.

Wet or dry pond

These are very old techniques, which can add green space to our urban landscape, and help reduce flooding. By including stormwater management ponds in new residential developments, parks and large public spaces, we can mitigate flood-risk to nearby developed areas. The Greenbelt Foundation is working with Ducks Unlimited Canada to mainstream the use of naturalized stormwater management ponds in new Greenbelt-adjacent developments.

SUPPORT NATURAL INFRASTRUCTURE IN YOUR COMMUNITY

Community and Municipal Action

- **Advocate** for incorporating natural infrastructure solutions into community design and retrofits.
- **Educate** your friends and family on the benefits that natural infrastructure can provide and the investments needed to prepare for the changing climate.
- **Follow and share** the work of municipal leaders across the Greater Golden Horseshoe on social media. The Regional Municipality of York, for example, is planting 400,000+ trees and shrubs over eight years to improve natural infrastructure. By sharing their work on social media, you can help encourage other municipalities to follow their lead.

Individual Action

- **Let the rain in** by removing pavement or sealed surfaces on your property. (See Rain Community Solutions)
- **Plant** a tree, replace your lawn with a mixed-species ground cover that improves infiltration and/or install a rain garden. (See your local Conservation Authority)
- **Volunteer** to help keep natural areas or street trees healthy. (See LEAF's Adopt a Street Tree)
- **Speak up** and let your municipal and provincial representatives know you support natural infrastructure solutions to climate change. (See MPP Contacts)

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ABOUT THIS SERIES:
The Greenbelt Foundation partnered with experts to understand how climate change is affecting our daily lives, and ways that we can individually and collectively respond to these challenges. For other installments in the series, visit www.greenbelt.ca/in_a_changing_climate