Unflood Ontario

Best Practices across the Great Lakes:

WHAT GREAT LAKES CITIES ARE DOING TO SUPPORT NATURAL SOLUTIONS

Unflood Ontario

ABOUT US

Unflood Ontario. Together, Naturally.

Our name is our mission: reduce flooding through natural infrastructure.

A project of Community Foundations around Lake Ontario, we build public demand for Natural Infrastructure and promote its many benefits.

Learn about solutions, engage with your community, and take action.

Join us.
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1. INTRODUCTION

We learn from imitation. Babies learn to talk by imitating the sounds, expressions and actions of our parents. Teenagers learn important social skills by imitating others. Adults learn key skills by imitating the success of others, aptly described by the well-known phrase "let's not reinvent the wheel."

This report takes this simple fact and applies it to an emerging issue facing cities and towns across the Greater Golden Horseshoe – flooding. From St. Catharines to Bowmanville, residents are increasingly dealing with flooded basements, property destruction, mental health problems, and higher bills. Governments are dealing with damaged transportation infrastructure and huge bills to update increasingly inadequate stormwater systems. Whether the flooding is caused by higher lake levels, overflowing rivers or severe rain events that overwhelm existing stormwater systems, flooding harms us all.

These flooding problems aren't unique to the Greater Golden Horseshoe. Towns and cities across the Great Lakes basin are also facing urban, lake and/or riverine flooding. And some of them have come up with innovative approaches that are worth considering, if not imitating, because they will save us time, money and lots of harm.

Key to these approaches is an acknowledgement that natural infrastructure must play a more prominent role in how we deal with stormwater. Whether it's revitalizing naturalized spaces to reduce the impact of riverine and lake flooding or depaving hard surfaces and replacing them with plants (eg. rain gardens) to reduce the impact of severe rain events, natural infrastructure has emerged as a financially viable and effective tool to reduce the harm caused by flooding.

This paper looks at three cities – Milwaukee, Buffalo and Thunder Bay – that have made natural infrastructure an important tool in their stormwater management toolbox. Their efforts – think of them as having "invented the wheel" – mean we now have an opportunity to learn from them and, where appropriate, imitate them.

Accordingly, each case study concludes with a set of insights and recommendations that residents of the Greater Golden Horseshoe can consider as we work together to build more natural infrastructure and reduce the harm caused by flooding.

2. MILWAUKEE

Head north from Chicago and follow the shore of Lake Michigan about 160 km and you reach Milwaukee, Wisconsin. The City of Milwaukee, like the City of Toronto, is right on the lake and has a wonderful waterfront that residents enjoy, especially during the summer. Also like Toronto, the City of Milwaukee is surrounded by smaller towns that make up Metropolitan Milwaukee. The Metro area has a population of just over 1.5 million people and covers about as much land as the City of Toronto.

Where Milwaukee sets itself apart from Toronto and other Greater Golden Horseshoe communities is how it has embraced natural infrastructure as a vital tool to manage stormwater.

It starts with how natural infrastructure is presented to the public.

To most people in Greater Golden Horseshoe, natural infrastructure, also known as green infrastructure, is not something they know about. And if they have heard of natural infrastructure, it's probably not been as a useful tool for the stormwater system. Indeed, municipal water departments typically see no role for the public in stormwater management, beyond funding the system.

Things are quite different in Metro Milwaukee. Stormwater and sewage is managed by the Metropolitan Milwaukee Sewerage District (MMSD). A visit to the MMSD website and you immediately see the phrase "Partners for a cleaner environment." Which is a nice way of saying that sewers and stormwater are everyone's business.

The homepage has a prominent "What you can Do" icon. Green infrastructure is everywhere. Click the "What We Do" and "What you can do" tabs and viewers are given a host of information on green infrastructure, designed to show Milwaukee residents that green infrastructure is a viable, effective tool that will help manage water.

To empower and engage residents, the MMSD urges people to become "Fresh Coast Guardians" and join a big, collective effort:

We have an aggressive goal and we need your help! It's to create, by the year 2035, enough green infrastructure in our region to capture 740 million gallons of water every time it rains. Why? To reduce water pollution and improve our rivers and Lake Michigan. Yes, 740 million gallons is huge, but consider this: One Inch of Rain on MMSD's Service Area = 7.1 Billion Gallons of Water.

Interested residents are provided with accessible and fun resources that anyone can use to install green infrastructure on their property. There is even a section to help residents find reputable businesses to help install green infrastructure.

To further entice residents to install green infrastructure, the MMSD has created the Green Luminary Award that it gives to businesses, community groups and local governments who installed green infrastructure. Each Green Luminary recipient is recognized online and has a short video describing and celebrating their green infrastructure success.

This type of public engagement and empowerment ensures the true power of green infrastructure is harnessed by crowdsourcing green infrastructure installations. Milwaukee has learned that supporting thousands of small green infrastructure projects can have a huge, collective impact.

But Milwaukee doesn't just "talk the talk." It's also using its own resources to install green infrastructure throughout the Metro area. In January 2020, it announced a $20 million program over three years to install green infrastructure that will store 8.45 million gallons of rainwater. This is on top of 33 million gallons of storage already created.

MAIN METRO MILWAUKEE INSIGHTS:

See the public as an important partner in stormwater management solutions and then give them the tools to participate.

Make natural infrastructure solutions easy-to-understand, easy-to-use, and part of a larger community effort.

3. BUFFALO

For most people in the Greater Golden Horseshoe, Buffalo is a city you probably only pass through on the way to other U.S destinations or to go to a Buffalo Bills game. Like Toronto, Buffalo is a Great Lakes city. It's situated on the upper north eastern corner of Lake Erie, right where the Niagara River starts winding north towards Niagara Falls.

In 1950, Buffalo had a bustling 560,000 residents, roughly half the size of Toronto. Today, Buffalo has just under 260,000 residents while Metro Buffalo has just over 1.1 million. Decades of deindustrialization has transformed Buffalo's economy and built form.

What has also changed over the decades is how they deal with stormwater, given that over 20% of the world's freshwater flows past Buffalo every year.[1] Buffalo, like many older Great Lakes cities (including Toronto), has an old stormwater system that includes combined sewer overflows (CSOs), essentially pipes that combine raw sewage and stormwater. When there is lots of rain, raw sewage overflows into streams and rivers.

In 2010 the Buffalo Sewer Authority (an arms-length governmental corporation) decided that the traditional solution to CSOs – focusing solely on replacing them with separated pipes – wasn't the right answer to improving water quality. Instead, they started considering the use of other tools. By 2015, they developed a plan to champion "green infrastructure solutions with a comprehensive approach to improve local water quality" and called it *RainCheck*, which they describe as follows:

Buffalo Sewer is implementing a careful balance of traditional gray infrastructure projects with smart approaches and green solutions. We champion green infrastructure solutions because they provide opportunities for a holistic approach to managing stormwater, while positively impacting the city's triple bottom line and supporting Mayor Byron W. Brown's vision to make Buffalo a more sustainable, equitable city.[2]

The RainCheck Program began with a focus on green streets, green parking lots, demolitions and vacant lot restoration, and rain barrels and downspout disconnections. Through to 2018, Buffalo ramped up its investment in green infrastructure and has seen impressive results.

A RainCheck 1.0 Update, published in 2018, showcases these results.

GREEN STREETS

Green street projects initiated between 2013-2017 manage runoff for 101.5 acres of the city, an area the size of 44 city blocks. Green street projects use a variety of approaches, including replacing nearly 16 acres of asphalt and concrete with plantings and other materials that absorb water. These investments have the potential to keep 1,908,045 gallons of water out of our sewer system when it rains or snow melts. That's enough water to fill 180 NHL ice rinks.[3]

GREEN PARKING LOTS

"Across six green parking lot projects, green infrastructure investments manage stormwater runoff for 6.8 acres of the city—an area nearly the size of 3 city blocks. These investments manage much of the surface area of the parking lots themselves, as well as some impervious area from adjacent buildings and nearby sidewalks and streets. Additionally, through plantings, rain gardens, and porous pavement, these projects have replaced 2.7 acres of asphalt and concrete with materials that absorb water. When it rains or snow melts, these parking lots keep 257,083 gallons of water out of sewers. That's enough water to do 6,400 loads of laundry."[4]

RESTORATION OF VACANT LOTS AND DEMOLITION SITES

"City of Buffalo demolitions completed between 2001 and 2017 removed 628 acres of impervious surface (buildings, driveways, parking areas). Altogether, the vacant lots created by these demolitions manage stormwater runoff for 931 acres of the city—about the size of 405 city blocks. During a typical rainfall event, these lots are capable of keeping 14,650,161 gallons of water out of our sewer system. That's enough water to fill 22 Olympic-sized swimming pools."[5]

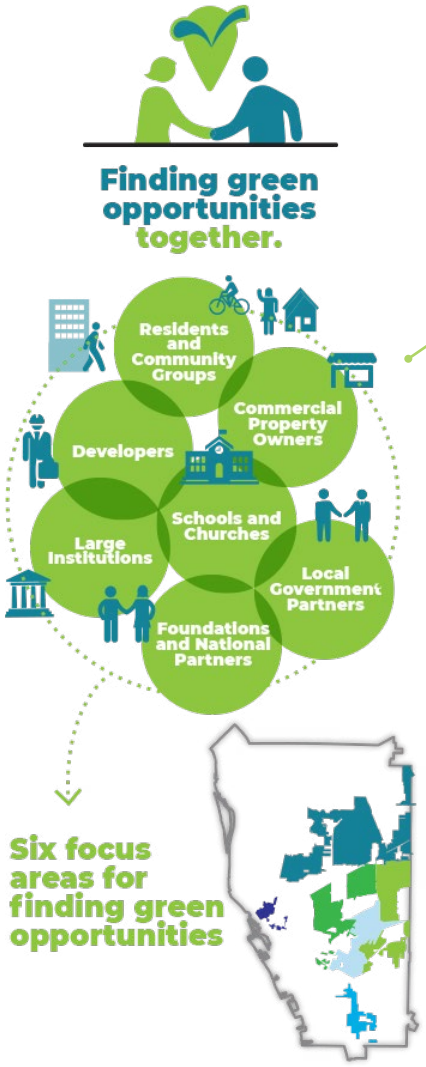
DOWNSPOUT DISCONNECT:

"Though controlling roof runoff with rain barrels doesn't remove any impervious areas, the 1,018 rain barrels installed in 2015 and 2016 approximately manage roof area equivalent to 7.4 acres—an area bigger than 3 city blocks. During a typical rainfall event, these investments have the capacity to keep 172,920 gallons of water out of our sewer system. That's enough water to take over 10,000 showers." P. 70

RainCheck 1.0 is just the beginning. Like their Milwaukee "Great Lakes" neighbour, Buffalo has great ambitions to scale up green infrastructure. In early 2019, Buffalo Sewer released RainCheck 2.0 to guide planners over the next decade. It's based on a "nested" stormwater strategy:

- Prevent water from entering the system with green infrastructure
- Manage water more effectively within the existing system with smart controls
- Improve the existing gray system with resiliency and for large events

The document provides a blueprint for what can be done and how to do it. Like Milwaukee, Buffalo wants to harness the power of crowdsourcing green infrastructure installation by engaging people and focusing on specific stakeholder groups.



A great graphic showing the Raincheck 2.0 engagement strategy

A quick tour of the Raincheck website shows Buffalo Sewer has a great understanding of its audiences and, more importantly, how to communicate the benefits of green infrastructure.

The RainCheck Program has another remarkable feature that showcases the power of natural infrastructure. Buffalo has an unemployment problem. In 2009 a local group called People United for Sustainable Housing (PUSH) decided green infrastructure was more than a good environmental idea. PUSH's mission is to "mobilize residents to create strong neighborhoods with quality, affordable housing; to expand local hiring opportunities; and to advance economic and environmental justice in Buffalo."[7] They saw the potential for green infrastructure in helping advance "economic and environmental justice" and started advocating for green infrastructure.

By 2013, they were working with Buffalo Sewer and became involved in developing and delivering RainCheck 1.0. Today, PUSH Blue is a key program that trains people to install and manage green infrastructure across Buffalo.[8]

KEY BUFFALO INSIGHTS:

Engage, engage, engage a diversity of stakeholders

Have a plan, execute it and then create a new plan

Take advantage of the job creation benefits of green infrastructure

4. THUNDER BAY

For people in the Greater Golden Horseshoe, Thunder Bay is a long, long way away. On a good day, you can drive the 1,400 km from Toronto in about 15 hours.

Thunder Bay is the northernmost Great Lakes city with a population of just over 121,000 people. It's surrounded by wilderness so residents have an intimate relationship with their natural surroundings because it is literally in their backyard. So it's not surprising the City of Thunder Bay puts this relationship with nature at the core of how it does business, including how it manages stormwater.

This is made clear in its 2016 Stormwater Management Plan (SMP) that places "Ecosystem Health" as the top goal of the plan.[9] This is realized by incorporating green infrastructure into the heart of the plan, as noted in a staff report to City Council:

the "[new] paradigm in stormwater management is the importance of green infrastructure."[10]

Not surprisingly, this is reflected in how they deal with stormwater infrastructure: "utilize structural and non-structural Best Management Practices (i.e. Green Infrastructure and Low Impact Development) to improve infrastructure capacity by retrofitting existing practices or implementing projects on public lands."[11] It's also reflected in the role played by the public; the Plan calls for actions (eg. an incentive program, bylaws that reward people for installing green infrastructure) that make it easier for residents to adopt green infrastructure.

Like Milwaukee and Buffalo, Thunder Bay has made it a priority to engage residents in creating a better stormwater system. The City does this through a broader environmental engagement program called EarthCare:

EarthCare Thunder Bay is a partnership between the City of Thunder Bay and the community to work together on issues of community sustainability, climate adaptation, and greenhouse gas reduction. Our mission is to lead the community in securing the environmental health of our region, and thereby improve the social, cultural, and economic well-being of future generations.[12]

Government and community actions are divided into Sections and scattered throughout the sections are actions to support natural infrastructure. For example:

- Water Section: actions that support and promote the installation of natural infrastructure through Low Impact Development (LID).
- Community Greening Section: actions to increase tree planting, provide awards for residents who install green infrastructure on their properties, and educating landscapers on the benefits of living green infrastructure.
- Green Building Section: actions to support LEED buildings, which includes the use of green infrastructure for stormwater management.

And, like its other Great Lakes counterparts, Thunder Bay celebrates its successes. In its 2018 Earthcare Annual Report[13], the City highlights tree planting initiatives, installation of three green infrastructure/LID projects and rain garden tours and training. The report also notes that "14,000 cubic meters of annual runoff volume [was] treated by municipal low impact development facilities."

Thunder Bay has also engaged community stakeholders to help it promote natural infrastructure. EcoSuperior, a non-profit group, provides programs that support rain gardens and rain barrel installations as well as general education about the role residents play in maintaining the water quality in Lake Superior.[14]

KEY THUNDER BAY INSIGHTS:

In building support for natural infrastructure, use a frame that appeals to people (in Thunder Bay's case, the love of nature)

Make it easy for residents to install green infrastructure

FINAL THOUGHTS

As cities and towns in the Greater Golden Horseshoe tackle the ever-growing harm caused by flooding, there is hope: our Great Lakes neighbours have shown us the power of using natural infrastructure as an effective way to manage rainfall. They have also successfully involved residents and businesses in natural infrastructure, thereby showing that stormwater management can become everyone's business, not just municipal governments'.

While grey infrastructure (the pipes underneath our roads that carry water away) will always have a place in our cities, we can learn from our Great Lakes neighbours that inspiring the public to build natural infrastructure and giving them the tools to build it will go a long way towards reducing the harm caused by flooding and building more resilient communities.

ENDNOTES

1 https://raincheckbuffalo.org/app/uploads/2018/05/Buffalo_Sewer_Authority_RainCheck1.0_Spring2018 _SinglesReduced.pdf p. 6

2 p. 3 https://raincheckbuffalo.org/app/uploads/2018/05/Buffalo_Sewer_Authority_RainCheck1.0_Spring2018_SinglesReduced.pdf

3 p. 34

4 p. 48

5 p. 60

6 https://raincheckbuffalo.org/app/uploads/2019/05/190515-RC2-OpportunityReport_sml.pdf p. 10

7 https://www.pushbuffalo.org/mission/

8 https://www.pushbuffalo.org/push-blue/

9 https://www.thunderbay.ca/en/city-services/resources/Documents/Stormwater-Management-Plan-for-web---Vol1.pdf

10 Presentation to Thunder Bay City Council on Stormwater Management Plan - 2016

11 Thunder Bay Stormwater Management Plan 2016 - Vol. I p. 99.

12 https://www.thunderbay.ca/en/city-hall/resources/Documents/EarthCare/Attachment-A---EarthCare-Annual-report-2018.pdf p. 3

13 https://www.thunderbay.ca/en/city-hall/resources/Documents/EarthCare/Attachment-A---EarthCare-Annual-report-2018.pdf

14 https://www.thunderbay.ca/en/city-hall/resources/Documents/EarthCare/Attachment-A---EarthCare-Annual-report-2018.pdf, p. 19

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WE CAN UNFLOOD ONTARIO TOGETHER, NATURALLY.