



Unflood Ontario

# WHAT THE PROVINCE SHOULD DO



Unflood Ontario

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# 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

Floods in Ontario have become more frequent and devastating for many Ontario communities over the past few years. During the spring of 2019, heavy rains paired with melting snow and a sudden temperature increase led to devastating flooding across many areas throughout southern Ontario. Emergency declarations were made by 23 municipalities and one First Nation, with significant flooding impacting households, commercial properties, roads and other key infrastructure, such as bridges.<sup>1</sup>

The 2019 spring floods in Ontario were record-breaking. In fact, flooding along the Ottawa River was recognized as the most important weather event of the year in Canada.<sup>2</sup> As the government agency reviewing the floods said:

**“The main cause of the exceptional 2019 spring flooding can be described easily in just a few words: rain, rain and even more rain... all this water generated record volumes and major peak water levels in the Ottawa River and its tributaries, exceeding those set in 1974 and 1976.”**

In the spring of 2017, record flooding — likely the “most extraordinary conditions to ever occur,”<sup>3</sup> devastated shoreline communities in eastern Ontario and western Quebec, forcing thousands to evacuate their homes and causing more than \$200 million in insured damage.<sup>4</sup>

As well, many First Nations communities were affected by flooding in 2017 in Northern Ontario. The Kashechewan First Nation sits in the Floodplain of the Albany River and is affected by flooding pretty much annually. Members of the Nation have voted to relocate up river to prevent flooding, however this will require between \$500 million and \$1 billion dollars.<sup>5</sup>



Many parts of the Greater Toronto Area were hit especially hard by floods in 2017: Durham Region and the Toronto Islands in particular. Flooding on the Islands cost the Parks, Forestry, and Recreation Department millions of dollars. In May, a combination of torrential rains and record runoff around the Great Lakes from an unusually warm winter raised Lake Ontario one metre above normal spring levels, its highest in more than 100 years.<sup>6</sup>

Perhaps the most dramatic urban flooding occurred on July 8, 2013, when a severe thunderstorm dropped more than 120 millimetres of rain over parts of the GTA during the afternoon rush hour, causing roughly \$1 billion in insurable losses and stranding thousands of commuters, including over 1,400 passengers who needed to be rescued from a GO train marooned in floodwaters from the nearby Don River.<sup>7</sup>

Put simply, flooding is now a fact of life for most Ontarians and will only become worse as the climate crisis progresses. Because flooding is something municipalities usually deal with (e.g. basement flooding programs, managing stormwater systems, overseeing Conservation Authorities), few understand the role of the Provincial government in dealing with floods.

This paper is written for concerned Ontarians who want to better understand flooding and the role the Province plays in responding to and minimizing the damage done by flooding. We argue that while the Province is doing many things well, it is not adequately utilizing an important tool, natural infrastructure, in its fight against flooding. The paper concludes with key recommendations for what the Province can do.



## 2. THE COSTS OF FLOODING

Floods are hugely expensive and now cause more property damage than any other hazard in Canada, and water-related losses now exceed fire and theft as the main source of property insurance claims.<sup>8</sup> A basement flood will cost the average homeowner \$43,000 in damage,<sup>9</sup> and uninsured flood damage costs Canadian property owners almost \$600 million out of pocket per year.<sup>10</sup>

The serious effects of flooding also cost governments hundreds of millions: for example, the 2013 flood in Toronto costs the City more than \$65 million for response and recovery.<sup>11</sup> And that does not include expenses related to infrastructure repairs, which are estimated to be in the hundreds of millions.

The costs to the broader economy are also now better understood. For households that experienced basement flooding, a recent study identified the scale of lost work time:

**Flooded household members were forced to take days off work due to flooding. More than half (56 per cent) of flooded households with at least one person working took time off work, for an average of seven days per flooded household. This is 10 times the Ontario average for non-flooded households.<sup>12</sup>**

As well, the federal government has spent more: flood recovery consumes more than 75% of federal disaster assistance payments, totalling more than \$670 million annually.<sup>13</sup>

Finally, aside from the staggering economic costs, flooding is also now recognized as causing significant health problems: physical, mental and loss of health infrastructure.<sup>14</sup>

Unfortunately, these staggering costs already borne by residents, homeowners, businesses and governments are only the beginning. With a changing climate, the costs of flooding will only increase.



## 3. THE EFFECTS OF CLIMATE CHANGE

It is now accepted wisdom that frequent floods are not a coincidence: they are a result of the changing climate. The risk of urban flood damage is increasing, with changes in snowmelt run-off caused by rising temperatures and intense rainfall associated with severe storms are expected to heighten the risk of flooding in many Canadian communities.<sup>15</sup>

With climate change, most regions in Canada will experience higher than average rainfall and that most regions in Canada will experience higher extreme rainfall.<sup>16</sup>

Blair Feltmate, head of the University of Waterloo's Intact Centre on Climate Adaptation, puts it best when he refers to flooding as the "evolving normal because climate change is here to stay."<sup>17</sup> In other words, the new normal is more flooding.

These stark realities mean that governments, particularly the province of Ontario, have to step up their actions on flood prevention, climate change mitigation, and adaptation. A cost effective and multi-beneficial approach is to use natural solutions (also known as green or natural infrastructure) to reduce the harm caused by flooding.<sup>18</sup>

Ontario Premier Doug Ford also believes climate change is among the reasons flooding is inundating communities for the second time in three years: "They say it's 100-year storms — well it's a few years later and we're back in the same boat," Ford said. "Something is going on and we have to be conscious of it."<sup>19</sup>





## 4. PERCEPTION OF FLOODING BY CANADIANS

Public opinion research in 2016, surveying 2,300 Canadians living in communities with high flood risk, found that:

**94% of Canadians located in flood risk zones are unaware of their risk and currently only about 30% of Canadian are taking action on reducing their flood risk.<sup>20</sup>**

This is a result of a serious gap in awareness of flood risk. Only 6% know they live in a designated flood risk area, and only 21% believe that the risk of flooding will increase over the next 25 years.<sup>21</sup> Now, that may have changed since 2016 due to the increasing profile of climate change and its contribution to flooding and due to the massive floods of 2017 and 2019.

Yet, as the authors note:<sup>22</sup>

**“Canadians need and want more information to be actively engaged in flood management and protected from flood risks. There is a major opportunity for transparent information sharing.**

**Over 90% of homeowners think that flood maps should be made publicly available, sellers of property should be required to disclose flood risk, and property owners should be notified if their home is located in a flood risk area.”**

So there are growing risks of more flooding due to climate change, with a significant economic and health cost. But Canadians are mostly unaware, want more information and are looking to government to lead.



## 5. ROLES AND RESPONSIBILITIES FOR FLOODING

### 5.1. GENERAL RESPONSIBILITIES

In Canada, flood management is the responsibility of the provinces and territories, and is often delegated to municipalities through legislation.<sup>23</sup> Therefore, most flood management activities including mapping, planning, preparation, response and recovery are executed at the local rather than provincial, territorial or federal levels. The management of flood hazards, including the prevention and mitigation of impact, is by necessity therefore a coordinated approach by the province, municipalities and Conservation Authorities. The federal government can become involved if federal disaster assistance is triggered.

Flood management and prevention is achieved through a series of provincial acts, regulations, policies, and technical guides, which together enable local decision making to protect people and property from the impacts of flooding. These individual tools are managed by various agencies in the province creating a network that has been called "complex."<sup>24</sup>





Indeed, many laws and policies have some role in flood prevention, mitigation, emergency response and recovery. They are described elsewhere<sup>25</sup>, but include the following:

**The Planning Act and the Provincial Policy Statement**

**The Conservation Authorities Act**

**Lakes and Rivers Improvement Act**

**Water Management Planning**

**The Emergency Management and Civil Protection Act**

**The Environmental Assessment Act**

**Natural hazard technical guides**

The [Ontario Auditor General's report](#) of December 2017 had tough words about the province's readiness for weather and other emergencies.<sup>26</sup> The report notes that "growing research about the impact of climate change has focused attention on the increasing likelihood of more frequent and extreme natural hazards" and that "...some municipalities may not be adequately prepared to respond if a local emergency arises, resulting in different levels of public safety across the province in the case of an actual emergency."



## 5.2. MUNICIPALITIES

Municipalities deal with the immediacy of flooding as they provide the emergency response with ambulance, fire and police services. It's about saving lives and preventing long-term harm.

Conversely, before floods even occur, municipalities are responsible for identifying areas subject to flooding and to develop flood contingency plans.<sup>27</sup> This includes identifying floodplains in municipal plans and incorporating policies to address new development consistent with the Provincial Policy Statement. It is up to the municipality to determine how best to achieve this requirement and the use of floodplain mapping is one tool available to demonstrate hazard areas. Municipalities can choose to involve their Conservation Authority in preparing floodplain mapping on the municipality's behalf, but are not required to do so.<sup>28</sup>

Municipalities are also responsible for stormwater management which deals with the component of the urban surface runoff that is or would be collected by means of separate municipal storm sewers and, in some areas, by combined sewers.<sup>29</sup> They can choose the technologies – whether grey, green or a hybrid of the two.

As well, municipalities can require all kinds of flood reduction or prevention activities: mandating the use of permeable surfaces, green roofs for new buildings, downspout disconnect programs, and so on.

When Conservation Authorities (see below) issue flood messaging to municipalities, they in turn need to:<sup>30</sup>

- notify municipal officials, departments and agencies according to their emergency plan
- determine appropriate response to a flood threat and if necessary, deploy municipal services
- if required, declare a flood emergency and implement Emergency Procedures Plan
- maintain liaison with Conservation Authority flood coordinators

Finally, municipalities pay for the costs of flooding: most often municipal infrastructure is damaged that cities and towns need to repair and maintain.



### 5.3. CONSERVATION AUTHORITIES

Unique to Ontario, Conservation Authorities are local watershed management agencies that deliver services and programs to protect and manage impacts on water and other natural resources. They do so in partnership with all levels of government, landowners and many organizations.

Conservation Authorities are on the front lines of the Provincial Flood Forecasting and Warning Program. They are responsible for monitoring and predicting flood flows and water levels within their watersheds, operating flood control structures such as dams, and disseminating flood messages to local municipalities and agencies.<sup>31</sup> Conservation Authorities use information gathered from stream gauges, weather stations, snow surveys, meteorological forecasts and computer models to forecast potential floods.

Conservation Authorities work closely with the Ontario Ministry of Natural Resources and Forestry and Environment Canada to provide advice to municipalities in the preparation of flood contingency plans and during the flood emergencies.

The roles and responsibilities of Conservation Authorities around flooding can be summarized as follows:<sup>32</sup>

- Monitoring conditions
- Computer modeling and forecasting flooding
- Issuing of flood messages
- Regulating development in flood prone areas
- Providing planning support and advice to municipalities to minimize the impact of flooding
- Buying land
- Protecting significant ecosystems such as wetlands and forests that help to control flooding
- Educating the public



Financial capacity among Conservation Authorities varies greatly, with annual budgets ranging from less than \$1 million to more than \$100 million.<sup>33</sup> This divergence in capacity affects the extent to which a Conservation Authority can support flood prevention and management.

Conservation Authorities have limited tax bases within their jurisdictions to support program and service delivery. The umbrella organizations for CAs, Conservation Ontario, and municipalities have repeatedly requested increases to provincial funding levels to Conservation Authorities, which have not increased in over 20 years. Indeed, in 2019 the provincial government reduced funding to CAs. Moreover, changes made to the Conservation Authorities Act in 2020 have further impacted the ability of CAs to ensure proper flood protection measures are followed when new development is proposed.

Conservation Authorities own and operate \$2.7 billion dollars worth of infrastructure and operate over 900 dams, dykes, channels and erosion control structures along longrivers and shorelines.<sup>34</sup>



## 6. THE SPECIAL ADVISOR ON FLOODING REPORT

Following the devastating floods in 2019, Douglas McNeil, a flooding expert, was appointed by the Minister of Natural Resources and Forestry John Yakabuski in July of 2019 to review the province's flood management framework. In addition to considering policies and activities which influenced spring flooding, he was also asked to consider both Great Lakes and urban flooding.

The Special Advisor commented on "the complex policy framework for flood management in Ontario" in his independent review of the flood events in 2019. For his work, Mr. McNeil needed an "understanding of the various roles of agencies involved, including the federal government, municipalities, Conservation Authorities and individual provincial ministries, along with the policies and technical guidance..."

He made many recommendations to the provincial government on opportunities to improve the existing flood policy framework. They include:

- incorporating the "impacts of a changing climate" in relevant urban planning policies;
- considering new legislation that has a lead minister responsible for all flood-related policy, standards, regulations and legislation;
- adopting legislation that will require flood risk properties to be identified in some way that is publicly accessible so that prospective buyers are aware;
- improving drainage standards in urban areas to restrict runoff flows to pre-development rates; and
- raising awareness among homeowners about the increasing risk of flooding.

While the report is a valuable contribution to addressing flooding, it falls short on two main themes.



First, the 66 recommendations are presented in a way that fails to convey the urgency of the flooding situation. For example, more often than not, the author frames his recommendations as “the province **should** consider...” (emphasis added) as opposed to “the province must act...” Moreover, it’s difficult to discern which recommendations are urgent and require immediate action. Of course, the Special Advisor has no power to compel the Province to act. But he did have the opportunity to send a signal -through his recommendations- what action is required and most urgent.

Second, while the report contains one recommendation on natural infrastructure,<sup>35</sup> it underplays the importance of this cost effective, multi-beneficial tool that an increasing number of jurisdictions are using to huge benefit. One recommendation of dozens ignores the growing evidence that natural infrastructure is a major tool to reduce the harm caused by flooding.



## 7. NATURAL INFRASTRUCTURE

Natural infrastructure is the natural vegetative systems and green “technologies” that collectively provide society with a multitude of economic, environmental and social benefits. These include:

- rain gardens
- trees
- bioswales, engineered wetlands and stormwater ponds
- green roofs and green walls
- parks, gardens and grassed areas.

It also includes technologies like porous pavements, rain barrels and cisterns, which are typically part of natural infrastructure support systems. These green technologies effectively replicate the functions of ecosystems, such as stormwater storage and filtration.

Natural infrastructure can be a cost-effective way to save money and reduce damage that would otherwise result from flooding.<sup>36</sup> As well, natural infrastructure offers other valuable benefits that are often not attained through the implementation of traditional, grey-engineered solutions, which generally include:

- decreasing the economic and community impacts of flooding
- beautifying communities
- encouraging more neighborhood socialization
- improving economic health by increasing property values and providing jobs and opportunities for small businesses involved in installing and maintaining natural infrastructure
- delivering environmental benefits such as habitat and reducing the urban heat island effect.



Natural Infrastructure is used extensively in other jurisdictions:

- in 2016 the City of Vancouver adopted a strategy to treat 90% of Vancouver's average rainfall with green infrastructure measures.<sup>37</sup>
- Philadelphia wants to reduce stormwater pollution by a stunning 85 percent using mostly natural infrastructure.<sup>38</sup> Started in 2011, Philadelphia Water and private developers have already added over 1,100 green stormwater tools to their landscape.<sup>39</sup>
- by 2035 Milwaukee wants to create enough natural infrastructure to capture 740 million gallons of water every time it rains.<sup>40</sup> And with its policies and funding, they are well on their way to meet this ambitious goal.

There is no reason Ontario cannot join those jurisdictions in a leadership effort to become a leader in natural infrastructure.





## 8. RECOMMENDATIONS

The Province has much to do to help Ontarians properly utilize natural infrastructure to reduce the incredible damage caused by flooding. Thankfully, there are many resources to help them. The insurance industry summarized it best on how to approach cost-effective means to mitigate flood damage using natural infrastructure:<sup>41</sup>

- retain what you have;
- restore what you've lost; and
- build what you must.

This is the equivalent to the 3Rs of waste management and is a useful framework.

Diving into more specifics, many organizations have provided thoughtful strategies on how to employ natural infrastructure to its full potential. We are partial to the 2017 “Roadmap for Green Infrastructure in Ontario.” created by Green Infrastructure Ontario and the Clean Air Partnership.<sup>42</sup> The Roadmap uses strategies and objectives to achieve the vision framework of the insurance industry. It explicitly acknowledges that a wide variety of organizations need to collectively implement this roadmap in order for its vision to be achieved.

Thus, we recommend that the Province of Ontario:

1. Adopt the “Roadmap for Green Infrastructure in Ontario” as a guiding vision for the Province
2. Using the strategies identified in the “Roadmap,” immediately undertake a coordinated review of the laws, regulations, policies and expenditures related to flooding and natural infrastructure. The goal of this review should be a series of updates to these laws, regulations, policies and expenditures so that collectively they support the vision of the Roadmap.



## A Roadmap for Green Infrastructure in Ontario:

### **1. Research and Communicate**

Study natural infrastructure performance and implementation barriers while effectively communicating the benefits and business case:

- Monitor performance and communicate natural infrastructure cost/benefits to key influencers in municipalities, the province and development community.
- Collect and share natural infrastructure examples, especially among professionals
- Continue to distill experience to create general and predictive data about costs/benefits.
- Share and reward best practices

### **2. Regulate and Fund**

Create a natural infrastructure-positive regulatory and funding environment:

- Remove funding barriers and seize legislative/planning opportunities
- Remove other regulatory and professional barriers
- Create an enabling environment that encourages natural infrastructure
- Enshrine preferences for natural infrastructure in legislation at all levels

### **3. Manage as assets**

Incorporate natural infrastructure into asset management:

- Identify barriers to adding natural infrastructure assets to asset management systems and remove those barriers.
- Train asset managers to work with natural infrastructure asset classes.
- Improve data quality and performance information for natural assets.
- Use natural infrastructure asset management to continuously improve management of natural infrastructure assets.



#### **4. Support professionals**

Support practitioners with natural infrastructure tools, training and resources

- Understand gaps and how best to fill needs of practitioners.
- Roll out tools, resources and training, and monitor effectiveness
- Expand beyond target market to meet resources or training needs of others who can influence natural infrastructure
- Expand scope to support natural infrastructure nationally and internationally<sup>43</sup>

## **More Important Facts about Flooding in Ontario**

### **Brantford:**

Brantford was hit by flooding in February 2018, however, they had more robust disaster relief plans in place. Six months prior to the flood, the city had run a full-day training exercise that simulated a hurricane strike. As a result, City official Visocchi says, "We felt competent in making the decisions that had to be made in the time that they had to be made. Because the waters rose so swiftly, the primary consideration was public safety and the preservation of life. The flooding caused major damage, but due in large part to the quick response of local authorities, no lives were lost."<sup>44</sup>

### **Ottawa's 2019 Flood by the Numbers:**<sup>45</sup>

21: Homes in Ottawa that had voluntarily been evacuated

600: Troops sent to Ottawa to help with flooding

50: Centimetres the Ottawa River was above 2017 flood levels, which were then a record

1 million: Sandbags prepared in the national capital



### Canada's most famous climatologist says:<sup>46</sup>

"We use the same old infrastructure that our parents did — the '50s, '60s and '70s, we're still on that infrastructure," says Dave Phillips, senior climatologist with Environment Canada.

"We think prosperity is paving it over and cementing it," says Phillips. "That raindrop that falls on a very dry Hamilton or a very dry Toronto becomes a flood drop because it falls on a hard surface."



### An expensive gap<sup>47</sup>

"Inadequate funding has created a \$6.8 billion stormwater infrastructure deficit in Ontario. This financial gap could get even bigger in the future as population growth leads to the creation of more impermeable surfaces and, consequently, worsens runoff," reads a 2016 report from the Environmental Commissioner of Ontario.

### Ninja Storm<sup>48</sup>

On August 8, 2018, a highly localized "ninja" storm dumped over 100 millimetres of rain in less than two hours. This storm was not forecast and was so localized that its track evaded detection by TRCA's real-time precipitation gauges. Flows in Black Creek in the Rockcliffe neighbourhood, a highly flood vulnerable area, rose over two metres in 75 minutes, spilling into nearby properties and stranding two men in an elevator when they attempted to retrieve their vehicles from underground parking. They were rescued by first responders just in time.



## ENDNOTES

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- 19 [https://globalnews.ca/news/5206116/100-year-floods-canada-increasing/?utm\\_expid=.kz0UD5JkQOC06yMqxGqECg.0&utm\\_referrer=https%3A%2F%2Fglobalnews.ca%2Fnews%2F5206116%2F100-year-floods-canada-increasing%2F](https://globalnews.ca/news/5206116/100-year-floods-canada-increasing/?utm_expid=.kz0UD5JkQOC06yMqxGqECg.0&utm_referrer=https%3A%2F%2Fglobalnews.ca%2Fnews%2F5206116%2F100-year-floods-canada-increasing%2F)
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**WE CAN UNFLOOD ONTARIO  
TOGETHER, NATURALLY.**