



---

# Climate Change Impacts and Adaptation in Ontario: **Municipal Planning**

---

## **Introduction**

In cities and towns throughout Ontario, a complex and interdependent network of governance systems, ecological assets and infrastructure can be found<sup>1</sup>. Here, there are both opportunities and risks with regard to climate change adaptation. Municipal planning, when informed by knowledge of projected climate change and potential impacts, can be an effective point of intervention to increase the resiliency of Ontario municipalities and townships.

Both rural and urban municipal planners are key actors in addressing multiple climate change risks, including those from extreme heat and weather variability, and long-term changes to temperature and precipitation.

Land-use and municipal planners have a number of instruments and tools that can be leveraged to support resiliency and adaptation objectives including regulatory and zoning tools, taxation and charges, incentives and voluntary tools, and acquisition tools.

## **Climate Change Impacts**

Extreme precipitation and flooding are a primary concern for cities, as these events can be disruptive and very costly for citizens and businesses. According to Insurance Bureau of Canada, the 2013 flooding following heavy rainfall in Toronto area caused \$940 million of insured damages. Meanwhile, the federal national disaster financial assistance program has experienced cost increases over the last two decades, attributable to the increased frequency and intensity of large weather events<sup>2</sup>.

Swiss RE, a global reinsurance company evaluated flood risks across Canada and described what a 200-year loss event in Ontario would look like: heavy precipitation on already-saturated soils leading to flooding in the Greater Toronto Area including a number of regional rivers. This type of event would overwhelm urban drainage systems, with resultant losses exceeding \$6 billion dollars, with only \$2.5 billion of losses insured<sup>3</sup>.

For Ontario communities however, flooding is not the only risk. Longer wildfire seasons coupled with fires of greater extent and severity, can threaten communities. The 2016

disaster in Fort McMurray, Alberta, resulting in \$3.7billion in insured damages<sup>4</sup>, is a reminder of the risks to property and safety posed by wildfire.

For communities across Ontario, climate change will also cause increase in other emergencies, such as extreme heat. For Toronto, the average number of days above 30°C each summer is anticipated to increase from 12 to 35 by the 2050s, making the 38 days above 30°C that occurred in 2016<sup>5</sup> (more than previous three summers combined) a regular occurrence.

Toronto's Future Weather (MacLeod)	2000-2009	2040-2050
Daily temperature maximum	37°C	44°C
Number hot days above 30°C	20	66
Number extended heat waves	0.6	2.5
Daily rainfall maximum	66mm	166mm

Municipal infrastructure is critical for the health and safety of citizens, and for continuous functioning of local economies. Windstorms, intense rainfalls or ice storms can quickly lead to infrastructure damage or failures. And while the cost of repair or replacement can on its own be high, the consequences of failure of any individual asset or infrastructure system can have cascading effects for other systems. Flooding caused by overwhelmed sewer systems can quickly lead to interruptions in power and communication networks.

## Addressing Climate Change

Policy responses at the federal, provincial and local level can all contribute to addressing climate change. For municipalities, a variety of policy tools are available that can be leveraged to control or manage climate risks, reduce exposure, or lessen impacts. These include official planning documents and processes, regulatory and zoning tools, voluntary or incentive programs, taxes and charges, or information and communication tools.

Incentives or requirements for on-site stormwater management or green infrastructure can be required or encouraged through incentives such as density bonuses, or mandated through updated standards and permitting processes<sup>6</sup>. Zoning and planning tools can reduce exposure to different hazard types, and information and communication tools can help residents or businesses prepare for and respond to risks on their own.

Key objectives of adaptation and emergency management for cities include reducing frequency or severity of events, and minimizing consequences of losses when and if they occur. Critical to achieving these objectives is establishing the networks and systems to respond before and during events, and to restore critical services after emergencies. Strong collaboration is required between to respond to climate change and extreme weather, including collaboration and communication between departments within a municipality, and collaboration between municipal, regional, provincial and federal agencies. The ability of cities and communities to 'get back on their feet' following an emergency is important to reduce the overall social and economic impacts of extreme events.

Robust and well-executed adaptation planning, including engagement with all stakeholders throughout the process, is important for development of the networks and capacity to address climate risks. Including a variety of voices and perspectives can help decision-makers understand how different individuals, businesses or neighbourhoods might be

affected by climate change<sup>7</sup>. Developing plans through consultation and engagement can increase public and political support for programs meant to improve resiliency, and they are an opportunity to provide educational information on actions that businesses or homeowners can take to protect themselves.



Figure 1: Photo: Canadian Press; Vaughn Merchant.

## Climate Change Adaptation Resources

**Natural Resource Canada's Adaptation Platform** is a unique online resource hub for tools and information that members of the mining sector can use to support their efforts to adapt to a changing climate. Led by the Climate Change Impacts and Adaptation Division (CCIAD), the Adaptation Platform is a national forum that brings together key Working Groups to collaborate on various climate change adaptation priorities and to produce project-level research and activities. The Infrastructure and Buildings Group aims to facilitate a more resilient and sustainable mining sector in a changing climate.

### How can the adaptation platform products help?

The following is a sample of resources available on the platform that members of the municipal sector can utilize in their efforts to prepare for a changing climate:

**Product:** [Making Strides on Community Adaptation in Canada](#).

**Description:** This report outlines a set of recommendations to support effective implementation of adaptation in communities, cities and municipalities. The strategies recommended are chosen because they are attainable, low-cost and easy to put into action.

**Product:** [Cities Adapt To Extreme Rainfall](#)

**Description:** This book describes 20 of the many successful local projects underway in communities that are adapting to better address the risks associated with extreme rainfall.

This book recognizes and acknowledges local leadership in addressing the risk of basement flooding. Mini case studies showcase successful local actions that can and should be used by communities across the country to confront the dual challenge of waste and stormwater management. The local policy decisions presented in this report are, in our opinion, scientifically sound, and provide a sustainable foundation for long-term success.

**Product:** [The Adaptation Library](#)

**Description:** The Adaptation Library is an accessible and searchable database of tools, resources and case studies to support those seeking to take on climate change impacts and adaptation projects. The tools available through the library provide practical approaches and guidance for assessment of risks and opportunities related to climate change.

For more information, and to view more products through the Adaptation Platform, visit: <http://www.nrcan.gc.ca/environment/impacts-adaptation/adaptation-platform/10027>

**Footnotes**

1. McVey, I. 2016.
2. Office of Parliamentary Budget Officer. 2016.
3. Honegger, C. 2016.
4. Insurance Bureau Canada. 2017.
5. Blog TO. 2016.
6. McVey, I. 2016.
7. Meaney, M. 2016.

**Full References**

Blog TO. 2016. Summer 2016 was the hottest on record in Toronto.  
[http://www.blogto.com/city/2016/09/summer\\_2016\\_was\\_the\\_hottest\\_on\\_record\\_in\\_toronto/](http://www.blogto.com/city/2016/09/summer_2016_was_the_hottest_on_record_in_toronto/)

Honegger, C. and Christoph Oehy. The Road to Flood Resilience in Canada. 2016. Swiss RE.  
[http://www.swissre.com/library/The\\_road\\_to\\_flood\\_resilience\\_in\\_Canada.html#inline](http://www.swissre.com/library/The_road_to_flood_resilience_in_Canada.html#inline).

IBC. Severe weather, natural disasters cause record year for insurable damage in Canada. 2017.  
<http://www.ibc.ca/nb/resources/media-centre/media-releases/severe-weather-natural-disasters-cause-record-year-for-insurable-damage-in-canada>.

McVey, I. Sharma, C., Allan, T., Kyriazis, J., Douglas, A., Cobb, P., Mallette, J., Taylor, L., Cooper, S. 2016. Research and Information Gathering on Climate Change Mitigation and Adaptation.

Meaney, M., Jackson, E., Houle, M., Schwantes, Ch., Lapp, H. Making Strides on Community Adaptation in Canada. 2016. ICLEI Local Governments for Sustainability.

Office of the Parliamentary Budget Officer. 2016. Estimate of the Average Annual Cost for Disaster Financial Assistance Arrangements due to Weather Events. Ottawa, Canada. [www.pbo-dpb.gc.ca](http://www.pbo-dpb.gc.ca)

This information sheet was developed by the Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR) with federal funding support through Natural Resources Canada's Regional Adaptation Collaboratives Program.

[www.ClimateOntario.ca](http://www.ClimateOntario.ca)

MIRARCO/Laurentian University  
935 Ramsey Lake Road  
Sudbury, ON P3E 2C6  
P: 705 675 1151

