



**Geoffrey F. Bruce Fellowship
in Canadian Freshwater Policy**

A critical review of Climate Adaptation and Flood Management Policy, Plans and Programs in Ontario

Policy Brief

By

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Acknowledgement

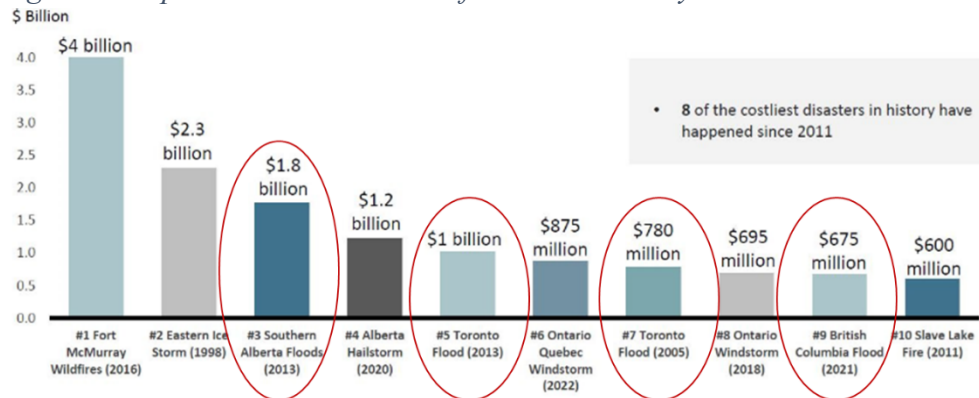
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Introduction

Flooding is a growing concern across Canada (Canadian Water Network [CWN], 2020; Insurance Bureau of Canada [IBC] & Federation of Canadian Municipalities [FCM], 2020) that is only expected to worsen due to climate change (FCM, 2023; Henstra et al., 2020). It is also one of the costliest natural disasters, with damages from the most significant floods resulting in billions of dollars of losses. As shown in **Figure 1**, four of the top 10 most expensive natural disasters in Canada have been flood related.

Figure 1: Top 10 Natural Disasters for Insurance Payouts – Canada.



Source: Insurance Bureau of Canada (2022)

In Ontario, flooding has been identified as the most significant natural hazard in terms of damage to property, civil disruption, and death (Ontario Ministry of Natural Resources and Forestry [MNR], 2020). There have been many significant floods in Ontario in recent years, such as the 2016 and 2017 floods in cities and towns of Windsor, Tecumseh and Lakeshore, and the 2019 flooding along the Ottawa River, in the Muskoka River Watershed, along Lake Ontario and the St. Lawrence River, and along the Lake Erie and Lake St. Clair shorelines (McNeil, 2019).

These floods generally stem from complex interactions between a changing and unpredictable climate, overwhelmed water management infrastructure, and demographic and land-use changes, such as increased population and urbanization (Dordi et al., 2022; Institute for Catastrophic Loss [ICLR], 2021; McClymont et al., 2020). Flood and stormwater management (SWM) infrastructure bears a large portion of these impacts of climate change (Dordi et al., 2022), and is often the first line of defence for managing excess runoff and/flood waters. Consequently, climate adaptation and strategic long-term planning of these types of infrastructure is necessary to reduce the impacts of and damage from current and future flooding. In fact, the recently released Ontario Provincial Climate Change Impact Assessment (PCCIA) identifies “flood mitigation infrastructure” and “urban and rural stormwater management systems” as one of many climate adaptation priorities for the province. The PCCIA classifies flood mitigation infrastructure and stormwater management systems (in some region of the province) as “high risk” with medium adaptive capacity (Climate Risk Institute, 2023).

Policy Context

Ontario’s 444 municipalities own roughly 52 percent of public infrastructure assets in the province, which is more public infrastructure than both the provincial and federal government own combined (Financial Accountability Office of Ontario [FAO], 2021). This consists of predominantly drinking water, wastewater and stormwater management infrastructure, in addition

to some transit infrastructure, roads and other buildings & facilities. Municipalities are also “creatures of the province” and as such derive their policy-making power and mandates from provincial statutes, such as the *Municipal Act (2001)* and *the Planning Act (1990)* (with the exception of municipalities such as the City of Toronto that have their own delegated authorities (Henstra, 2016)).

In the current context, responsibility for climate change (and/or adaptation), stormwater and flood infrastructure management is shared between the municipalities, Conservation Authorities (CAs) and provincial government (Henstra et al., 2020). This results in a complex policy, legislative and regulatory framework, as well as complex management and planning dynamics. Provincial policies, plans and programs that provide a framework for coordinated action across all authorities, and sufficient financial support, play an important role in ensuring progress is made in increasing the flood resilience and climate adaptiveness of municipalities, and the province as a whole.

This policy brief reviews key provincial policies, plans and programs regarding climate adaptation and flood resilience, in order to determine their effectiveness at providing guidance for action and sufficient financial support to municipalities engaged in flood management and infrastructure planning efforts. The review will identify current policy gaps and provide recommendations regarding the actions the province can take in addressing these gaps and supporting the efforts of municipalities.

Review of Provincial Policies and Plans

Four key provincial policies and plans that govern climate (change/adaptation), SWM/flood infrastructure planning and management are the “*Made-in-Ontario Environment Plan*” (Ministry of Environment, Conservation and Parks [MECP] 2018); the *Provincial Policy Statement* (Government of Ontario, 2020); the *Ontario Flood Strategy* (MNRF, 2020); and the *Asset Management Regulation* (O. Reg. 588/17) (Government of Ontario, 2017).

The Made-in-Ontario Environment Plan (“the Plan”) includes a section on addressing climate change that includes “*modernizing the Building Code to potentially include adaptation measures such as backflow valves to reduce the impacts of basement flooding*” and “*reviewing the Municipal Disaster Recovery Assistance program to encourage municipalities to incorporate climate resilience improvements with repairing or replacing damaged infrastructure*” (MECP, 2018). Progress updates on the Plan indicate that the province has completed some of its stated actions including launching the climate change impact assessment (in 2023), updating the Provincial Policy Statement (in 2020) and launching the “Build Back Better” pilot project that provided partial funding to municipalities for making public infrastructure more resilient to extreme weather (from 2020 – 2023). However, it is unclear if there are specific and measurable climate adaptation-flood resilience targets that the province is working towards, and how these actions contribute to meeting those targets.

The updated Provincial Policy Statement (PPS) encourages municipalities to consider climate change and integrate “enhanced stormwater policies” in their land use and infrastructure planning (Government of Ontario, 2020; Ontario Ministry of Municipal Affairs and Housing [MMAH] 2021a). The use of enhanced SWM measures has been noted as very important in increasing climate adaptation and resilience of water management systems (Bednar et al., 2019). However, due to the lack of authoritative power of the PPS (i.e. the power to enforce rules/require compliance), there is no binding requirement for municipalities to comply with these guidelines, meaning that these changes may have limited influence in practice.

Within the Ontario Flood Strategy (OFS), there are proposed actions to encourage climate adaptation and flood resilience across the province, such as “update existing technical guidelines” and “enhance the resilience of provincial infrastructure and other built forms” (MNRF, 2020). However, there are no quantitative or qualitative targets or metrics in the document that could serve as a benchmark to measure progress. Furthermore, the document does not assign responsibility for achieving these actions to specific government agencies or include timelines for initiating or completing these actions; both of which are essential for implementing the strategy.

The Asset Management Regulation (O. Reg. 588/17) requires municipalities to “commit to” considering actions to address climate change impacts under the required *Asset Management (AM) Strategy*, including adaptation options. The Regulation also requires municipalities to provide information on how resilient its stormwater system and properties are to the 5-year and 100-year floods (**Table 1**) and to determine a proposed level of service for existing infrastructure assets (Government of Ontario, 2017).

Table 1: Table from O. Reg. 588/17: An overview of the information to be provided for SWM

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	<ol style="list-style-type: none"> 1. Percentage of properties in municipality resilient to a 100-year storm. 2. Percentage of the municipal stormwater management system resilient to a 5-year storm.

Assets in Ontario Municipal Asset Management Plans

These are important first steps to take in integrating climate adaptation considerations in long-term infrastructure planning and management. However, the phrasing of a “commitment to considering the impact of climate change” can be very broadly interpreted and may not necessarily result in direct action. Furthermore, there are no concrete ways of determining this whether this “commitment” has been made, or the extent to which municipalities “consider” climate change/adaptation in their planning. Without an overarching climate adaptation or flood resilience goal or specific metrics to measure these commitments, the effectiveness of these “actions” cannot be determined and it would be difficult to determine whether or not they are sufficient in meeting municipal or provincial flood resilience goals. They may be effective in nudging some municipalities to take action, however, more likely than not, they will result in uneven progress/impacts across the province – such that municipalities that have the motivation, ability and resources to incorporate climate adaptation/resilience considerations into their long-term infrastructure planning will do so, while those limited in their ability, resources and motivation will not.

Review of Provincial Fiscal Programs and Plans

Three important province-wide fiscal programs that provide financial support for climate adaptation and SWM/flood infrastructure planning are: the “Build Back Better Program” under the Municipal Disaster Recovery Assistance (MDRA) program (MMAH, 2022), the Ontario Community Environment Fund (MECP, 2023), and the Ontario Green Bond Funds (Ontario Financing Authority [OFA], 2023).

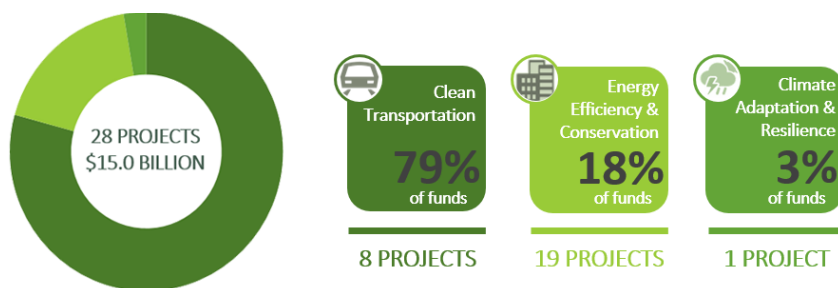
The “Build Back Better” program was launched as a pilot program in 2018, with a budget of \$1 million dollars, which was extended for an additional two years until 2023, with a budget of an additional \$2 million dollars (MMAH, 2021b). The program was designed to cover up to a maximum of 15% of the cost for incorporating additional climate resilience in infrastructure

rebuilding (MMAH, 2022), after “unforeseen natural disasters”. However, the funds only covered a small proportion of the total cost of rebuilding for resilience and could be applied to any type of infrastructure (not just urban/stormwater management systems), reducing the pool of funds available for or utilized on SWM/flood management infrastructure resilience. Furthermore, the program recently expired (March 2023), with no indication on whether it will be reinstated.

In 2023, the Ontario Community Environment Fund will provide over \$1.5 million in funding to both public and private sector organizations as a means of building local community resilience (MECP, 2023). Similar to the “Build Back Better program”, these funds aren’t restricted to that of stormwater or flood management infrastructure, and are also not solely for municipalities. This means that the limited available funds have to be shared between public and private projects, resulting in impacts on a much smaller scale than is needed in the province.

The province also issues Green Bonds funds, to “*help finance public transit initiatives, extreme-weather resistant infrastructure, and energy efficiency and conservation projects*” (Ontario Financing Authority [OFA], 2023). Of the \$15 billion issued in Green Bond Funds, only 3% is allocated to a single “climate adaptation and resilience” project, compared to almost 80% allocated to “clean transportation” and 18% to “energy efficiency and conservation” projects (**Figure 2**) – demonstrating the relative proportions of investment for climate mitigation projects versus climate adaptation projects.

Figure 2: Ontario Green Bond Projects: Overall Allocation by Category



Source: Ontario Financing Authority (2023)

Conclusions and Recommendations

Overall, this review of provincial policies and programs indicates that despite some positive efforts at incorporating climate adaptation considerations/recommendations into climate resilience, flood and stormwater infrastructure management policies, there are some significant policy gaps. First, the lack of province-wide climate adaptation-flood resilience targets means a there are no measurable metrics to guide efforts across the province and determine their effectiveness or success. Second, the lack of authoritative power (i.e. requirement for compliance) and measurable targets in current policies makes it hard to track progress and limits their usefulness in practice. Third, unclear responsibilities for undertaking actions, and missing timelines for initiating and completing these actions in current policies and plans limit the successful implementation of current efforts. Finally, the limited sources and amounts of funding available to municipalities for increasing climate resilience of their flood /SWM infrastructure is a severely limiting factor in their ability to plan for and manage their infrastructure in an uncertain and unpredictable climate future. This leaves the level of climate preparedness and adaptive capacity across the province to be dependent on a municipality’s available resources, capacity and motivation.

Policy Recommendations

Based on the review conducted in this brief, the following recommendations are made.

Recommendations for provincial policies and plans:

Recommendation 1) Develop a **Provincial Climate Adaptation-Flood Resilience Plan** (to complement the OFS) that sets *specific, attainable and measurable* province-wide climate adaptation-flood resilience **targets**. These targets (and their associated indicators) can focus on minimizing climate impacts, increasing adaptation actions or results, as shown in **Table 2**. Having these targets will enable municipalities and the province to work towards a collective goal, thereby unifying current efforts and increasing real-world impact. Implementation of these targets should be embedded in provincial legislation (such as the *Planning Act*) to ensure they have the authority to ensure compliance.

Table 2: Example of Outcome-based climate adaptation Indicators and targets (from Hammill et al., 2014)

Indicators and Targets (by sub- type)		
Climate Impact:	Adaptation Action	Adaptation Results
Number of properties flooded per year/ Number properties located in river/coastal floodplains	Areas of land under “landscape scale” conservation	Reduction in flood damage and disaster relief costs in cities
Total length of sewage and drainage network at risk from climate hazards...	Percent of municipalities with local regs considering climate adaptation & vulnerability assessment	Number of new major infrastructure projects located in areas at risk

Recommendation 2) Develop *Implementation Plans* for the OFS, the Made-in-Ontario Environment Plan, the PPS, and the recommended Provincial Climate Adaptation-Flood Resilience Plan to increase clarity around implementation of these existing policies and increase transparency on the level of progress being achieved. These implementation plans should:

- a. Specify the metrics and criteria for measuring progress and success of the stated goals/targets, actions and activities
- b. Assign responsibility for completing stated activities/actions/ to specific government departments
- c. Include proposed timelines for implementing stated actions/activities and/or meeting objectives.

Recommendation 3) For Ontario Reg. 588/17 (i.e. the Asset Management Regulation), include a *requirement for a climate sensitivity or vulnerability assessment* to be undertaken for “core” municipal stormwater assets/infrastructure, as identified by the municipalities in their Asset Management Plans (AMPs). This will help all municipalities (not just those with the resources, availability and motivation) to identify which of their infrastructure is most vulnerable to climate impacts and more easily consider the impacts of climate change in their AMPs.

To support municipalities in complying with the above recommended changes to provincial policies and plans, the following recommendations are made for the province’s fiscal programs:

Recommendation 4) Re-instate the Build Back Better Program and increase the total financial support available to a minimum of \$20 million* per year for at least 10 years (potential partially funded through Green Bonds, see *Recommendation 6* below). In addition, it is recommended to:

- a. Increase the maximum percentage of funding per project from 15% of the “additional cost to build in resilience” to 25% of the total cost of the project
- b. Remove the restriction for the funds to be used for infrastructure damaged by “unforeseen natural disasters” and replace it with a requirement to use the funds for infrastructure designated as “climate vulnerable” as identified in the proposed climate sensitivity assessment for AMPs mentioned in Recommendation 3
- c. Designate a proportion of the Build Back Better Funds solely for SWM/Flood Management Infrastructure resilience (between 15 – 20% recommended)

**For comparison, it is noted that the province invested \$5 million into the Muskoka River watershed to “save the region from increased development and flooding” and made a commitment to invest an additional \$25 million in “innovative wastewater and stormwater programs for this watershed alone MECP, 2022.*

Recommendation 5) Increase the funding for the *Community Environment Fund* to approximately \$5 million dollars per year, and also designate a proportion (~15 -20%) solely for SWM/Flood Management Infrastructure Resilience.

Recommendation 6) Increase the total number of bonds issued in the province to \$18 billion, with the additional \$2.0 billion designated solely for SWM/flood management climate adaptive and resilient infrastructure projects. Increasing total bond value serves the purpose of providing alternative funding sources for municipalities that do not have to come from the province’s resources. In addition, work with municipalities, as well as private partners and industry organizations, to identify suitable projects for this *new “climate resilience and adaptation” category of the Green Bonds funds*, which will allow municipal flood resilience and climate adaptation infrastructure projects to receive sufficient funding.

Undertaking all of these actions are expected to result in the creation of a solid framework for climate/flood resilient action across the province. These actions will increase the effectiveness of current policies, plans and programs, clarify the province’s overarching climate/flood resilience goals and achieve real-world progress and impact in increasing the climate adaptiveness and flood resilience of the province and Ontario municipalities.

Undertaking as a transparent and inclusive consultation process prior to implementing these recommendations is highly recommended. It is anticipated that there will be strong support for these proposed actions, especially since most municipalities are already dealing with the reality of adapting to a changing climate and strong provincial action will only reinforce existing efforts.

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