



## Flooding in Canada: Why Is It Happening, and What Are We Doing About It?



*Source: Bruxelle, (2017); Montreal, Quebec.*

# Flooding in Canada

Why Is It Happening, and What Are We Doing About It?  
July 2021



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## INTRODUCTION

A recent article in *The New York Times* crystallized the plight of many communities across North America, and in fact, the globe, in its story of Avon, North Carolina. A beach community established in the early 1900s, its beginnings make today's dire situation unsurprising: A hurricane devastated the area in 1899, causing the state to abandon land development. Speculators later moved in, purchased the properties, and created a tourist destination. Flash forward to today, and hurricanes continue to threaten the area, and the beach is quickly receding, leaving many residents facing the threat of losing their homes and property to the ever-rising Atlantic. Proposed solutions such as dredging the ocean floor to create new sand dunes are costly and temporary. County Manager, Bobby Outten, spelled it out plainly at a recent public meeting, reiterating the same message: "There's nobody coming to the rescue. We have only ourselves" (Flavelle, 2021, para. 4).

This message can't be overlooked. And it doesn't apply only to those residents of beach communities, and tropical locales. A quick scan of local, provincial, and national news articles is enough to realize that flooding is a far-reaching issue, and one that is happening across Canada.



Source: NC Dept. of Transportation, (2012); North Carolina, USA.

Since 2017, AET Group has worked closely with the Intact Centre on Climate Adaptation (ICCA) at the University of Waterloo to implement the Home Flood Protection Program (HFPP) in communities across Canada. This program is, at its core, an education tool for homeowners to learn where their property and structures are vulnerable to flooding, and how to increase their resiliency. The HFPP aims to empower homeowners by providing them with the tools necessary to "rescue themselves" but with the help of compassionate, trained professionals, through the Home Flood Protection Assessment. The HFPP was initially developed by the Intact Centre on Climate Adaptation (Intact Centre) at the University of Waterloo and delivered by AET Group Inc. from 2017 to 2018. In 2019 AET Group Inc. received a license from the University of Waterloo to continue delivering the program across Canada. This is but one of many tools that Canadians need to arm themselves against the rising waters of our rivers, lakes, and oceans, and localized, torrential rainfalls that overwhelm existing infrastructure.

As a country, we can't pretend that flooding isn't a real threat. Between 2015 and 2020 the Canadian Disaster Database (CDD) recorded 10 major floods across eight provinces and territories (Public Safety, 2015), which doesn't include the countless other flood events that don't appear on the list but whose wreckages are covered in local newspapers and on news sites. At the lot-level, a flood doesn't need to be categorized as a national disaster to be devastating. As the threat of flooding becomes more of a reality for Canadians, all levels of government, the insurance



Source: Cold (2017); Montreal, Quebec

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industry, and homeowners must assess their role and responsibility in repairing existing property damage while preventing future destruction.

## BACKGROUND – MAJOR FLOOD EVENTS IN CANADA, 2015-2020

Many of the major flood events of the past five years have been due to massive amounts of rainfall in a localized area over a short amount of time. These types of events debunk the long-held belief that flooding is only a threat to those who live on or near waterways.

The table below indicates the rainfall recorded, for six of the 10 major flood events documented by the CDD. As a point of reference, the average rainfall for that month is also included, as calculated by Environment and Natural Resources Canada's Monthly Climate Summaries (NRCan 2015, 2016, 2017).

Major Flood Events & Associated Rainfall Amounts - Selected			
Area	Year	Rainfall Recorded	Average Monthly Rainfall (by province)
Chestermere, AB	July 2015	223 mm in only a few hours	52.3 mm
Peace River Region, BC	June 2016	99 – 135 mm over a 2-day period	60.4 mm
Kenora, BC	June 2016	109 mm over a 2-day period	60.4 mm
Tecumseh, ON	September 2016	190 mm in 24 hours	60.8 mm
Windsor, ON	September 2016	78-106 mm in 24 hours	60.8 mm
Various areas, NB	May 2017	150 mm on top of a 36-hour non-stop downpour	152.9 mm

Receiving more than a month's worth of rainfall in a single day or only a few hours is devastating to aging infrastructure in cities, towns, and counties. These types of floods were usually referred to as 100-year floods, a statistical designation meaning that "a serious flood has a one per cent probability of occurring in any given year" (Dangerfield, 2019, para. 9). This designation is becoming almost meaningless as the frequency of these events increases. Government data, indicates that "108 of the 170 major disasters between 2008 and 2018 were floods" (Bronskill, 2020, para. 3).

Homeowners caught in the path of such floods face devastating consequences, including power outages, forced evacuations, and significant property damage. A 2016 flood in the Peace River region of BC, for instance, left approximately 6,000 people without power. Similarly, a flood in Fort Albany and Kashcewan First Nation territory, ON, in April 2015, required 1,300 people to be evacuated (Public Safety, 2015). The financial and emotional toll these events can take on a community is often devastating as residents attempt to navigate insurance claims and wait to find out if they will receive emergency/disaster relief funding. After a 2017 flood in Quebec some homeowners were left waiting four months or more to find out whether they would receive funding from the province so they could rebuild their homes (Lowrie, 2017).



Source: 51Systems (2013); Calaarv.



## WHO'S TO BLAME?

It can't be denied that catastrophic flooding is happening across Canada. But why is it happening? Who's to blame? The obvious culprit is Mother Nature. Without massive amounts of rainfall in short amounts of time, and rising water levels in our rivers, lakes, and oceans, this wouldn't be happening. This view, however, simplifies a complex problem. Most, if not all, experts would likely agree climate change is a contributing factor. But even this explanation is incomplete. Climate change is just one element of a problem that has long existed. Historically, communities were situated along waterways due to their advantage for trade and agriculture. What this means is that not only are these communities in danger of flooding due to rising water levels, but they are also located on flood plains. And in case you breathed a sigh of relief because you don't live on or near a waterway, these are not the only areas identified as flood plains. It's estimated that "80% of Canadian cities are built on flood plains" (Bronskill, 2020, para. 4).

Given the rise of flooding in Canada, one might assume that the practice of developing and building communities on flood plains would be a thing of the past. Unfortunately, attempts to curb this practice have proved largely unsuccessful despite the efforts of conservation groups and federal politicians ("If we Build it, the Waters Will Come", 2017). For example, according to an article printed in the *Montreal Gazette*, it was recently discovered that "between 1940 and 2000, the rate of home construction within areas known to be flood zones within Ste-Marthe-sur-le-lac



Steven\_Kriemadis (2019); Windsor, ON

[QC] was twice the rate outside the flood zones." (Bruemmer, 2019, A1). In total, approximately 2,200 homes were built in areas known to be flood risks (Bruemmer, 2019). David Etkin, a scientist with Environment Canada concluded that the area was flooded "not because there was a lot of rain, but because we build communities in flood plains." (Bruemmer, 2019, A1). Further to this, it's estimated that only 6% of residents living in flood zones are aware that they live on one (Perreux, 2017). So why does development in high-risk areas continue to happen? The answer is simple: revenue. Municipalities "allow and encourage development" in these areas to increase their revenue streams (Perreux, 2017, A8). Interestingly, they are often then put in the position of offering incentives to homeowners to help fortify their properties against flooding (Langford, 2016).

Although much of the blame appears to lie with government at all levels, the insurance industry has a part to play. While they do not determine where homes are built, they do determine who is eligible for insurance, and the premiums available. A startling part of this, as mentioned previously, is that many homeowners are not aware of their risk, but insurers are. And, not surprisingly, a home built on a known flood plain isn't good for business. As a result, when flood victims call their insurance companies, many of them are told "We're sorry, but your insurance doesn't cover flood damage" (Thistlethwaite, 2017, A13). A 2017 study co-authored by University of Waterloo

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professor Jason Thistlethwaite estimated that Canadians paid “almost \$600-million out of pocket annually for flood damage, making it the most common and expensive natural hazard” (Thistlethwaite, 2017, A13). Further to this, trends indicate that “water related disasters have begun to overtake fire as the most costly source of claims in the Canadian property and casualty insurance industry – a reversal of the historical norm” (Nelson, 2017, B5). The Insurance Bureau of Canada (IBC) reports that overland flood insurance first became widely available across Canada in 2015 (Chilibeck, 2020). In 2016 there were only four insurers offering overland flood insurance, and by 2018 (the most recent numbers that could be located) there were 16, with this number representing 77% of the market (Meckbach, 2018). Approximately one-third of Canadians have overland flood insurance. However, for those in high-risk areas, options are limited, and few of them are affordable (Forani, 2019).

So, what role do homeowners play in all of this? Some make the point that those who live in high-risk areas (i.e., flood zones) shouldn’t be bailed out by government relief (Paas-Lang, 2019). Others would argue that a vast majority of these residents are (blissfully) unaware of their risk (Perreux, 2017). What about those homeowners who have been flooded multiple times but choose to stay put? Returning to the opening case study in Avon, North Carolina, any assessment of homeowner responsibility must take into account the emotional investment people have in their homes. Some long-time residents in Avon, for example, can’t imagine a life anywhere else. One resident, Audrey Farrow, 74, “lives on the same piece of land she, and her mother before her, grew up on” (Flavelle, 2021, para. 16). Similarly, residents of the Toronto Islands who experienced destructive flooding in 1973 were still around, fighting high waters again, in 2017 (Gzowski, 2017). Ninety-year-old Jimmy Jones speaks protectively of the islands he’s called home his entire life, saying local residents need to “guard the island, so to speak” (Moore, 2020, para. 16), referring to both natural disasters like floods, as well as tourism, both of which can alter the natural landscape (Moore, 2020).

Although it can seem like homeowners are merely bystanders in all of this, at the lot-level they exercise tremendous influence – both good and bad – over the effects of flooding. A simple lack of understanding of proper drainage and maintenance activities accounts for much of the damage homeowners inflict on themselves and their neighbours. Even something as benign as making changes

to your property can decrease yours or your neighbours’ resilience to flooding. A quick internet search will reveal countless articles from landscaping companies and discussion forums talking about lot-level flooding caused by landscape changes. Many communities have passed by-laws to try and curb this type of action. The City of Markham warns residents that “changing the land’s surface, or grade, could interfere with the way water moves off your property. Water that can’t drain off can cause problems for yourself or your neighbour” (City of Markham, 2021, para. 1). Any changes at the lot-level should be carefully considered for their impact on water flow. Seeking the guidance of a qualified professional prior to beginning work can often prevent issues.



*Steven\_Kriemadis (2019); Toronto Islands, ON*



## CANADIAN RESPONSES TO FLOODING

Most commentators agree that, overwhelmingly, Canada’s response to flooding has been to throw money at the problem and hope it goes away. As one journalist summarized, the Federal government’s main response has been to “send in the military and help pay bills.” (Perreux, 2017, A8). According to 2017 numbers, “costs for federal disaster assistance have risen from an annual inflation-adjusted average of \$54-million before 1994 to \$410-million since 2004” (Perreux, 2017, A8). Increasingly, this response is showing itself to be ineffective. The number of large flood events is ever-increasing and the impact to our communities is devastating, both in terms of the destruction of infrastructure and the emotional toll on affected residents. For their part, the insurance industry has responded by increasing the availability of overland flood insurance, at least in terms of the number of providers offering it (Meckbach, 2018). The availability of coverage to those in high-risk areas who need it most, however, is minimal. According to Craig Stewart at IBC, “there really is not affordable high-risk insurance available for those that are going to be at repeated risk of flooding” (Forani, 2019, para. 4). Further, IBC is recommending that “strategic retreat,” (i.e., relocation), be considered by governments (Forani, 2019). Some residents in these areas have responded by putting their homes on stilts. These and other drastic measures are costly, and for most homeowners emergency aid is their best and only hope to rebuild. Despite this, in recent years some provincial and federal lawmakers have been warning that disaster relief could be drying up for those who rebuild in “flood-vulnerable areas” (Laucius, 2019, A3). From a financial perspective this response is understandable. But what of ethics? As noted previously, municipalities are largely responsible for allowing development in known flood-zones, and as a resident, it is not always easy to find out where these zones are. When purchasing a home, it isn’t a requirement to disclose past flood damage or whether a home lies in a flood zone (Laucius, 2019). Why should it be homeowners who suffer the consequences of these decisions and gaps in information?



Source: Jewelsy (2012); Nova Scotia

Canadian Response to Increased Number of Flood Events – Selected Highlights		
Government	Insurance	Residents/Homeowners
Federal Disaster Assistance <sup>a</sup> <ul style="list-style-type: none"> <li>\$410-million between 2004 and 2017</li> </ul>	Increased number of insurers providing overland flood coverage <sup>c</sup> <ul style="list-style-type: none"> <li>77% of the market</li> </ul>	Purchase overland flood insurance <sup>e</sup> <ul style="list-style-type: none"> <li>Approximately one-third of Canadians</li> </ul>
National Disaster Mitigation Program <sup>b</sup> <ul style="list-style-type: none"> <li>\$184-million pledged to prevent flood damage by funding local projects</li> </ul>	2019 Report to the Federal Government <sup>d</sup> <ul style="list-style-type: none"> <li>Outlined three options for future disaster assistance</li> </ul>	

<sup>a</sup>Perreux 2017, <sup>b</sup>Bronskill Jan. 2020, <sup>c</sup>Meckbach 2018, <sup>d</sup>Paas-Lang 2019, <sup>e</sup>Forani 2019

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## WHAT CAN CANADIANS DO TO PROTECT THEMSELVES?

There is something to be said for personal responsibility and taking action to safeguard your home. As county manager Outten reminded residents of Avon, “[W]e have only ourselves.” While this may not be entirely the case for homeowners, as both the government and the insurance industry have shown an interest in working to protect Canadians, bureaucracies take time to reach decisions and funnel those decisions out to the public. So, how can Canadian homeowners protect themselves, their loved ones, and their property?



Source: *diane555 (2018); Chatham, ON*

The below chart details actions homeowners can take to educate and empower themselves against the threat of flood.

Suggested Homeowner Actions		
Action	Contact	Resource
<ul style="list-style-type: none"><li>• Research overland flood insurance</li><li>• Determine whether your property is on a flood plain</li><li>• Improve grading on property</li><li>• Keep up with seasonal maintenance inside and outside your home</li><li>• Take advantage of available subsidies, grants, and mitigation programs</li><li>• Attend public forums – be informed and let decision-makers know your concerns</li></ul>	<ul style="list-style-type: none"><li>• Current insurance provider (switch if necessary/able)</li><li>• Conservation Authority, municipality</li><li>• Landscape professional, municipal/city codes</li><li>• Do-it-yourself; contact plumber, landscape professional, etc. as needed</li><li>• local, provincial, and federal government; insurance provider; other</li><li>• local, provincial, and federal government; condo boards; other</li></ul>	<ul style="list-style-type: none"><li>• <a href="#">Flood Smart Canada</a></li><li>• <a href="#">ICCA: Seasonal Flood Protection Maintenance</a></li><li>• <a href="#">AET: Home Flood Protection Program</a></li></ul>



## CONCLUSION

How can Canada prepare itself to not just recover from, but be prepared for, the “next big flood”?

For its part, the federal Liberal government has extended the National Mitigation Program (NDMP) until 2022 with the promise of \$25 million dollars available to provinces and territories. The original program saw \$200 million



*Source: Hilscher (2013); Huntsville, ON*

available over five years, from 2015-2020 (Public Safety Canada, 2021). While it is provinces and territories that are eligible to receive funding, they are encouraged to collaborate with local entities on submitted projects (Public Safety Canada, 2021). The NDMP is available to help with risk assessments, flood mapping and small-scale projects such as replacement of storm culverts (Bronskill, Nov. 2020). Admittedly, the NDMP has not been as successful as many had hoped. According to an internal evaluation conducted in 2020, only half of the funds were

used, largely due to administrative and scheduling delays (Bronskill, Jan. 2020). Still, the funds are available, and programs of this sort are a step in the right direction. Also promising was the creation of a Task Force, announced in 2020, consisting of government representatives and insurance industry experts to consider the possibility of a low-cost national flood insurance program (Bronskill, Nov. 2020). The creation of a steering committee by Indigenous Services Canada in coordination with First Nations representatives is similarly encouraging. The Task Force began meeting in early 2021 and aims to present their recommendations to the Minister of Public Safety in Spring 2022 (Meckbach, 2021).

The Insurance Bureau of Canada (IBC) has also been active. In 2019 they released a paper entitled “Options for Managing the Flood Costs of Canada’s Highest-risk Residential Properties” where they outlined three options for moving forward. The first was a “pure market approach, meaning homeowners would decide whether to self-insure, relocate, or try to get insurance from the private market” (Meckbach, 2021, para. 15). The second involved the private sector taking on much of the liability for flood in low to medium risk properties and leaving high-risk properties to government disaster



*Source: ImagineGolf (2020); British Columbia*

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assistance programs. The third option was a public-private high-risk pool where capital would come from various sources (government, homeowners, property tax, etc.) (Meckbach, 2021). As yet, no decision has been made by the federal government. In addition to the 2019 report, IBC is also co-chairing one of the teams on the Federal Task Force.

Efforts by the federal government and IBC are being complemented by more practical and immediate initiatives launched by research institutions like the University of Waterloo through its affiliate organizations the Intact Centre for Climate Adaptation and Partners for Action, as well as private businesses like AET Group Inc., and local/not-for-profit environmental entities like Conservation Ontario. Organizations such as these (and countless others) are aimed at educating the public and increasing the resilience of Canada's communities. When faced with the fallout of a flood it is easy to share the Avon County Manager's feelings of isolation and despair. However, it is clear, that in Canada many minds are at work looking for ways to educate and protect homeowners from the risks of unforeseen flooding. Because one thing is for certain: extreme weather is not going away, and efforts are required from all of us to deal with this reality.

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# APPENDIX A COMPANY PROFILE



# AET GROUP INC.

[www.aet98.com](http://www.aet98.com)

FOUNDED IN  
**1998**

**35**  
EMPLOYEES

Kitchener, Cambridge, Locations

## HOME FLOOD PROTECTION PROGRAM CLIENTS

Burlington, Ontario

Rocky View County, Alberta

Toronto, Ontario

Saskatoon, Saskatchewan

Private clients throughout Ontario

Established in 1998, AET is a multi-disciplinary environmental consulting, auditing and scientific services company providing professional services in: Home Flood Protection, Building Sciences, Waste, Air, Compliance, Mitigation, GHG, Sustainability, Audits, Water, Management Systems, and Energy. AET has a staff of 35 professionals and is headquartered in Kitchener, Ontario with an additional office in Cambridge, Ontario.

With over 1,000 projects completed across Canada, United States, South America, Europe and the Caribbean, AET offers extensive experience, capabilities and proven track record that, among other benefits, assures that our clients receive value-added services, credible results and effective solutions. Quality service, solid performance and professional integrity are embodied in all aspects of our work which has allowed us to benefit from a high level of client satisfaction and repeat business of over 90%. As a result of our extensive work experience, technical proficiencies, and diversified capabilities, AET has positioned itself as a highly credible, sought after and leading-edge environmental consulting company.

For over 4 years, AET has worked with municipalities in 3 provinces across Canada completing over 700 Home Flood Protection Assessments for residents with the goal of helping homeowners reduce their risk of basement flooding and reduce damage in the event of a flood.

In roughly 60-90 minutes, our highly trained assessors work with homeowners to complete a 50-point visual assessment of potential sources of water entry into the home. Following the assessment, homeowners receive a confidential report listing practical actions to:

- Reduce risk of damage to structure and contents
- Manage infiltration, sewer backup and overland flood risk
- Wisely manage water onsite
- Manage indoor humidity to reduce mold and mildew risk
- Understand risks as they relate to insurance coverage

For more information on AET's Home Flood Protection Assessments visit [www.aet98.com/services/home-flood-protection/](http://www.aet98.com/services/home-flood-protection/)