

INTACT CENTRE ON CLIMATE ADAPTATION

A BRIEF STORY OF ACHIEVEMENTS TO DATE

(2016-2019)

EXTREME WEATHER RISK MITIGATION

2015



✓ **Canadian Climate Change Priorities**

2016-19



Flood Risk Mitigation

- ✓ National Flood Risk Assessment
- ✓ Home Flood Risk
- ✓ New and Existing Communities
- ✓ Commercial Real Estate
- ✓ Natural Infrastructure

2019



Extreme Heat Risk Mitigation

- New and Existing Communities

2019



Wildfire Risk Mitigation

- National Standard



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INTACT CENTRE
ON CLIMATE ADAPTATION

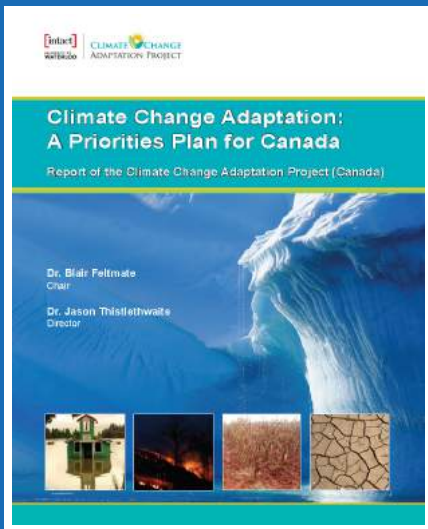
GENEROUSLY SUPPORTED BY:



ABOUT THE INTACT CENTRE ON CLIMATE ADAPTATION

The Intact Centre on Climate Adaptation (Intact Centre) is an applied research centre with a national focus housed within the Faculty of Environment at the University of Waterloo. The Intact Centre works with homeowners, communities, governments and businesses to identify the impacts of extreme weather and climate change and develop the practical tools needed to help communities adapt to these changes and minimize impacts.

Over the last three years, the Intact Centre has developed and tested a variety of tools that have advanced flood risk reduction in Canada. The Centre is now expanding its scope of work to address other extreme weather challenges, such as extreme heat and wildfire.



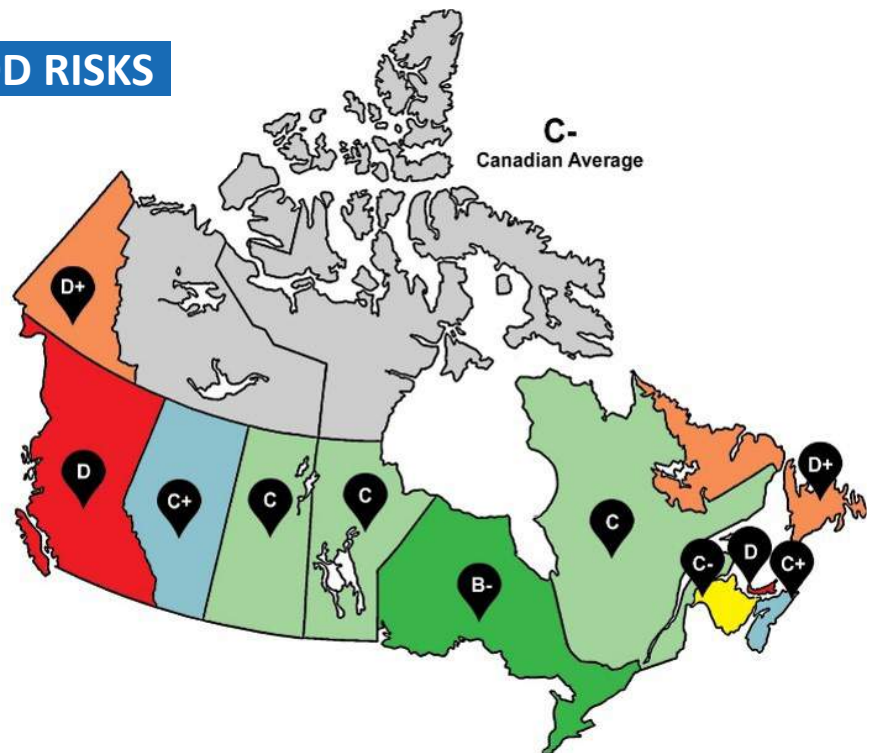
WE PRIORITIZED CLIMATE CHANGE CHALLENGES IN CANADA

The Climate Change Adaptation Project for Canada (CCAP) compiled Canada’s first short list of national priority areas of climate change challenges and solutions (2015). In consultation with over 70 experts, it was determined that the impact of flooding on city infrastructure was the greatest climate change challenge facing Canada. The prioritization of flood risk as a key challenge in Canada has directly informed the work of the Intact Centre to reduce extreme weather risk in Canada.

WE IDENTIFIED NATIONAL FLOOD RISKS

In 2016, Canada scored a “C-” on flood preparedness, based on 12 categories of assessment in a survey completed by the Intact Centre.

The survey includes responses from 103 government representatives across 91 provincial and territorial ministries, departments and agencies. The report influenced governments to take enhanced action on flood risk. A follow up report will be released Fall 2019.



WE ARE PROTECTING RESIDENTS FROM FLOOD RISK

From 2016-2018 the Intact Centre’s Home Flood Protection Program developed a home flood risk assessment tool, assessor training program and delivered over 500 flood risk assessments to residents in Ontario and Saskatchewan. Learnings from the program delivery contributed to the publication of a national guideline for basement flood protection (CSA Z800-18) in 2018. Additionally, in April 2019 a report was released summarizing the top flood risks associated with residential homes and the best practices for motivating action in order to reduce risk. The diagram below presents a summary of the top actions residents can take to reduce flood risk.


Driving Nation-Wide Basement Flood Protection in 2019 and Beyond:

- Training Red Cross volunteers to educate residents
- Training insurance brokers and real estate agents to educate clients
- Training home inspectors to educate residents, through a nationally available online course, in collaboration with Fleming and Seneca Colleges
- Working with municipal and provincial governments to educate residents




Step 1: Maintain What You've Got at Least Twice per Year

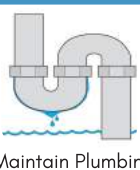
Do-It-Yourself for \$0




Remove Debris from Nearest Storm Drain



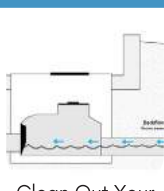
Clean Out Eaves Troughs



Maintain Plumbing, Fixtures and Appliances



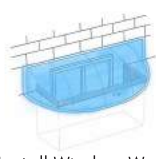
Test Your Sump Pump



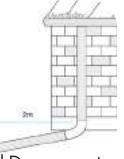
Clean Out Your Backwater Valve

Step 2: Complete Simple Upgrades


Do-It-Yourself for under \$250



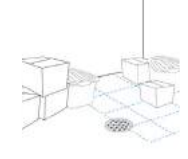
Install Window Well Covers




Extend Downspouts and Sump Discharge Pipes at Least 2m from Foundation



Store Valuables and Hazardous Materials in Watertight Containers or Remove from Basement




Remove Obstructions to Basement Floor Drain



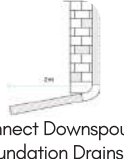
Install and Maintain Flood Alarms

Step 3: Complete More Complex Upgrades


Work with a Contractor for Over \$250



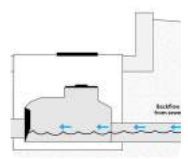
Install Window Wells that Sit 10-15 cm Above Ground and Upgrade to Water Resistant Windows




Disconnect Downspouts, Cap Foundation Drains and Extend Downspouts to Direct Water at Least 2m from Foundation



Correct Grading to Direct Water at Least 2m Away from Foundation



Install Backwater Valve



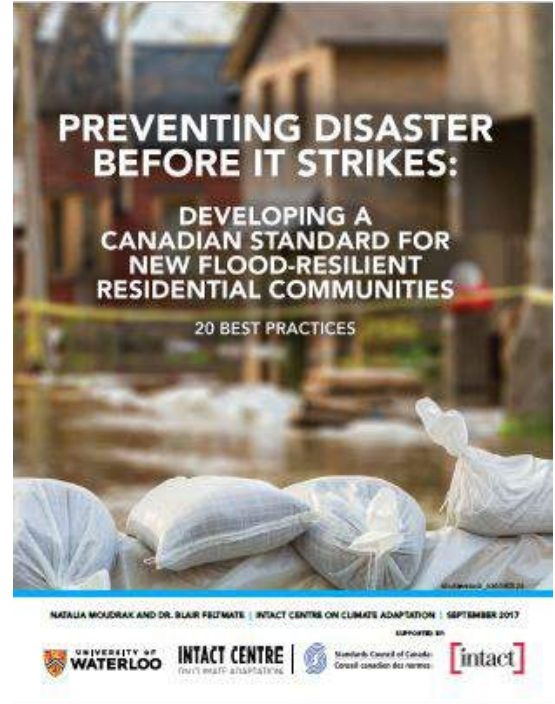
Install Backup Sump Pump and Battery

WE IDENTIFIED & APPLIED BEST PRACTICES FOR NEW COMMUNITIES

The Intact Centre has a strong working relationship with Standards Council of Canada, National Research Council of Canada, and CSA Group to develop Standards, Codes and Guidelines to reduce flood risk for new and existing communities.

We identified 20 best practices for new communities to advance flood resiliency, involving feedback from 100+ experts from across Canada.

Some of the best practices outlined include prohibiting new residential developments in floodplains, ensuring that the storm water infrastructure is sized appropriately in order to handle extreme rain events, grading of lots, streets and public spaces to convey excess rainwater away from properties, and minimizing runoff from impervious surfaces. These best practices are informing the development of a new National Standard of Canada (CSA W204).



Standards Council of Canada
 Conseil canadien des normes

WE IDENTIFIED & APPLIED BEST PRACTICES FOR EXISTING COMMUNITIES



Following on the momentum to develop a new National Standard of Canada for flood-resilient new community design, we identified a framework for existing (older) communities in Canada to address flood risk.

The framework will help communities to select areas that should be prioritized for flood-resilience retrofits. A new National Standard of Canada will be developed based on this research.

Best practices for designing new communities and retrofitting existing communities to be more flood-resilient are being deployed on the ground in communities across the country, including Calgary, AB; Charlottetown, PEI; Edmonton, AB; Ottawa, ON; Winnipeg, MB.



Standards Council of Canada
 Conseil canadien des normes

WE MADE THE CASE TO CONSERVE NATURAL INFRASTRUCTURE

Our research demonstrated that natural infrastructure assets (e.g., wetlands and ponds) can act as “sponges” to absorb flood water and reduce flood damages. We worked with Insurance Bureau of Canada and the International Institute for Sustainable Development to develop an economic analysis framework to assess the value of natural infrastructure assets for climate adaptation.

This framework allows for a better “green versus grey” investment analysis, allowing practitioners to allocate funds to conservation and restoration of wetlands, ponds, forests and other natural spaces in Canada. Next steps include working with relevant stakeholders to transform accounting standards that currently prohibit recognition of natural assets on public sector financial position statements.



Combating Canada's Rising Flood Costs:

Natural infrastructure is an underutilized option

September, 2018



DANA DECENT AND DR. BLAIR FELTMAE | INTACT CENTRE ON CLIMATE ADAPTATION | JUNE 2018



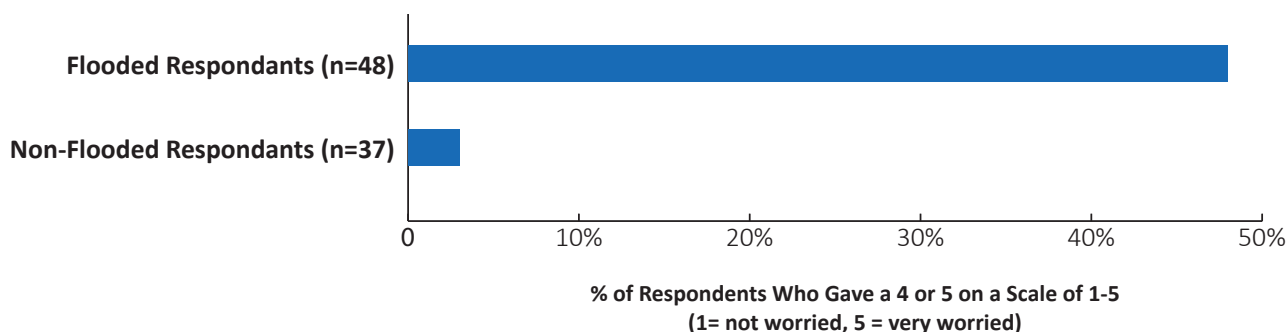
WE LEARNED THAT FLOODING CAUSES MENTAL HEALTH IMPACTS

The Intact Centre conducted 100+ interviews with residents in neighbourhoods impacted by flooding. This never-before done study assessed the potential health implications of flooding on Canadians. Some key findings include:

- Three years after a major flood, nearly half of residents were still worried every time it rains
- The homeowners surveyed took an average of seven days off work

The Intact Centre is now working closely with the life and health insurance industry to further explore this impact.

Responses from Flooded and Non-Flooded Households ~ 3 Years After Flood Event on How Worried They Are When it Rains



2019 & BEYOND

In 2019, the Intact Centre is continuing its work to advance flood risk reduction and has added wildfire risk reduction and urban heat island risk reduction to its portfolio. We are also increasing our international presence, with Blair Feltmate a Senior Advisor, Infrastructure for the Global Commission on Adaptation in the Netherlands.

WE ARE PARTNERING TO PROTECT CANADIANS FROM WILDFIRES

The Intact Centre on Climate Adaptation has a working relationship with FireSmart Canada to better protect Canadians from wildfires. This partnership will develop programming to educate homeowners, developers, and municipalities on best practices to reduce wildfire risk and integrate those practices into National Standards for Canada.



WE ARE MITIGATING EXTREME HEAT IN URBAN CENTERS



Extreme urban heat is on the rise in Canada and is directly impacting Canadian urban centers and the citizens that reside in them.

The Intact Centre on Climate Adaptation is leading research on extreme urban heat in city centers to determine how to better protect Canadian communities, both existing and new, to adapt to extreme heat. This is a necessary endeavor as urban heat poses serious health and life threats to Canadians.

WE ARE PROVIDING THOUGHT LEADERSHIP ON FLOOD-RESILIENCE FOR COMMERCIAL REAL ESTATE SECTOR IN CANADA AND GLOBALLY

The Intact Centre is working with commercial real estate owners and managers, insurance industry professionals, institutional investors, management consulting firms and others to **develop a guide featuring flood-resilience measures that can be implemented in office towers to reduce property damage, business disruptions and flood-related loss of life.**

This effort is supported by the Real Property Association of Canada (REALPAC) and Building Owners and Managers Association (BOMA) Canada. Companies that are active participants in the guideline development process include AON, BGIS, CBRE, GRESB, Infrastructure Ontario, PCL, Tridel, Triovest, and USAA Real Estate Company.



Two men trapped in elevator rescued from Toronto floods

© 8 August 2018

Cars face flooded roads in Toronto due to heavy rains

Heavy flooding in the Canadian city of Toronto nearly caused two men trapped in an elevator to drown.

Police rescued the two men who were standing on top of a handrail in order to stay above 6ft of water (2m) as rising waters flooded a basement below.

A police spokeswoman said there was "only one foot of airspace left" for the two to breathe

Source: BBC News, August 8, 2018

WE ARE PROVIDING THOUGHT LEADERSHIP ON CLIMATE RISK MANAGEMENT TO INSTITUTIONAL INVESTORS

Climate change and extreme weather events (e.g., floods, droughts, storm surges) may impact the operations and cash flow of companies spanning many, if not all, industry sectors (TCFD, 2018). In some cases, these impacts could be material to the point of affecting the share price of publicly traded issuers (e.g., through supply chain disruptions).

The Intact Centre has developed a novel methodology (“Climate Risk Matrix”) that allows portfolio managers to identify material industry-specific climate risks and incorporate them into investment decision-making.

The Intact Centre delivers talks and workshops to advance the understanding of climate change by institutional investors and how they can play a leadership role to protect asset values in face of a growing extreme weather risk.



OVER 3 YEARS WE BECAME THE VOICE OF CLIMATE ADAPTATION IN CANADA

Over 450 Media Interviews

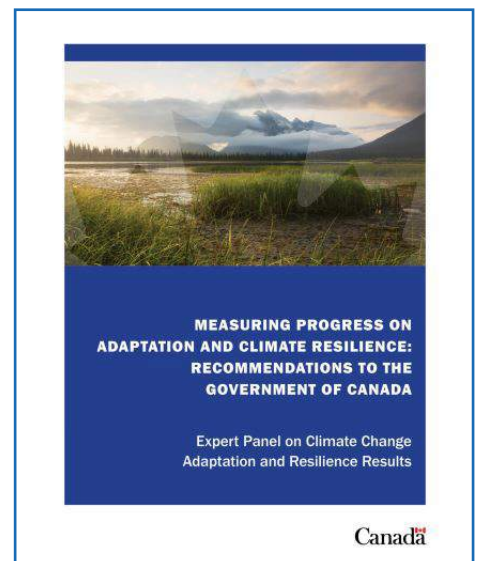
INCLUDING:



Member of 10+ Committees

INCLUDING:

- Chair of the Pan-Canadian Framework
- Expert Panel on Climate Adaptation and Resilience
- Chair of CSA Group Electricity Sector (Transmission and Distribution) Adaptation Standard



400+ PRESENTATIONS ACROSS THE COUNTRY:



BEHIND THE INTACT CENTRE: WHO WE ARE



Dr. Blair Feltmate
Head



Natalia Moudrak
Director,
Climate Resilience



Cheryl Evans
Director,
Home Flood Protection
Program



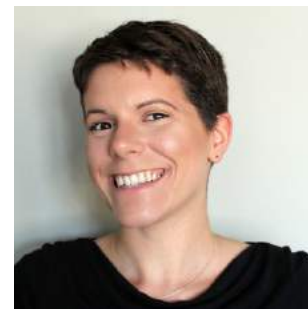
Daniel Filippi
Program Specialist



Andrea Curley
Manager



Marina Moudrak
Senior Research
Associate



Taylor Legere
Operations
Coordinator

Our Advisory Committee

The Intact Centre Advisory Committee comprises members from finance, insurance, pension funds, credit rating agencies, real estate, and academia.



Dr. Jean Andrey
Dean,
University of Waterloo



Patrick Barbeau
Senior Vice President, Claims,
Intact Insurance



Monika Federau
Senior Vice President and
Chief Strategy Officer, Intact
Financial Corporation



Giselle Gagnon
Senior Vice President, Strategic
Resources Group, Bentall
Kennedy (Canada)



Maryam Golnaraghi



Veronica Scotti
Chairperson, Global Partner-
ships at Swiss Re



Douglas Turnbull
Vice-Chairman, Country Head,
Canada, DBRS



Benita Warmbold
Corporate Director (Former
CFO, CPP Investment Board)

WE HAVE ONGOING WORKING RELATIONSHIPS WITH ORGANIZATIONS ACROSS THE COUNTRY

FINANCIAL SERVICES AND CAPITAL MARKETS

AIG
 Bank of Montreal
 Canadian Institute of Underwriters
 Certified Professional Accountants
 CPA Canada
 DBRS
 Deloitte Canada
 Ernst and Young Canada
 Great-West Life
 Financial Services Commission of Ontario
 Insurance Bureau of Canada
 Insurance Institute of Canada
 Insurance Brokers Associations
 KPMG
 Manulife
 Ontario Teacher's Pension Plan
 PriceWaterHouseCoopers Canada
 Royal Bank of Canada
 Scotiabank
 Standard and Poor's
 Sun Life Financial
 Swiss Re

MUNICIPALITIES

Aurora	Laval
Burlington	Mississauga
Calgary	Ottawa
Charlottetown	Saskatoon
Clarington	Squamish
Edmonton	Toronto
Fredericton	Windsor-Lakeview
Kelowna	Winnipeg

NGOS

Canadian Red Cross
 Canadian Water and Wastewater Association
 Civic Action
 Conservation Authorities in Ontario
 CSA Group
 Ducks Unlimited Canada
 Federation of Canadian Municipalities
 Municipal Natural Assets Initiative
 Institute for Catastrophic Loss Reduction
 International Institute for Sustainable Development
 Ontario Biodiversity Council
 Ontario Climate Consortium
 Nature Conservancy of Canada
 Smart Prosperity

FEDERAL AND PROVINCIAL GOVERNMENTS

Bank of Canada
 Chief Safety and Risk Officer, Ontario
 Commissioner of Environment, Ontario
 Emergency Management BC
 Environment Canada
 Finance Canada
 Health Canada
 Infrastructure Canada
 Ministry of Environment and Climate Change
 Ministry of Natural
 National Research Council Canada
 Natural Resources Canada
 Resources and Forestry
 Premier's Office
 Privy Council Office
 Public Safety Canada
 Standards Council of Canada
 Treasury Board

CORPORATIONS

AECOM
 Associated Engineering
 Bentall Kennedy
 BGIS
 BOMA
 Brookfield Residential
 Canadian Electricity Association
 (Enterprise Risk Management)
 Canadian Green
 Canadian Home Builders' Association
 CBRE
 Cement Association of Canada
 CoreNet
 EPCOR
 FirstOnSite
 Fujutec
 GRESB
 Institute for Catastrophic Loss Reduction (ICLR)
 Lasalle NHC
 Marsh Real Estate
 Mattamy Homes
 Menkes
 Metrolinx
 REALPAC
 Stantec
 Tridel
 Triovest
 US Green Building Council
 Wood
 88 Strategy Group



Source: Robert Deeks

**FOR FURTHER INFORMATION ABOUT THIS REPORT,
PLEASE CONTACT:**



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