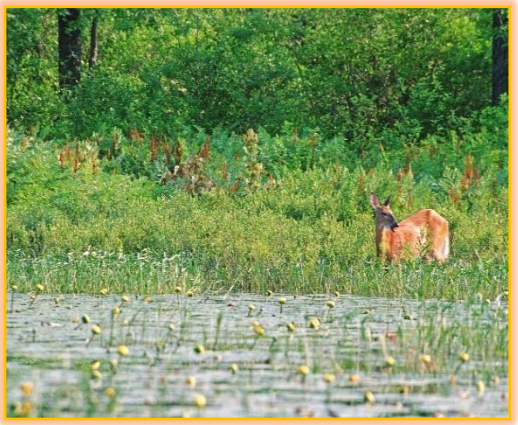
CLIMATE CHANGE AND EXTREME WEATHER: UTILIZING NATURAL INFRASTRUCTURE FOR COMMUNITY RESILIENCE






Prepared for:

FCM

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UNIVERSITY OF WATERLOO

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AGENDA

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1. Rising costs of climate change and extreme weather: *flooding is the "elephant in the room" in Canada:*
   - P&C catastrophic insurable claims
   - Mental health and time off work
2. Examples of new guidelines and standards for flood-resilience:
   - Homes
   - Communities
   - Commercial Real Estate
3. The role of natural infrastructure in climate adaptation and community resilience
4. Discussion

COSTS OF EXTREME WEATHER: P&C CATASTROPHIC INSURABLE LOSSES ($BLN)

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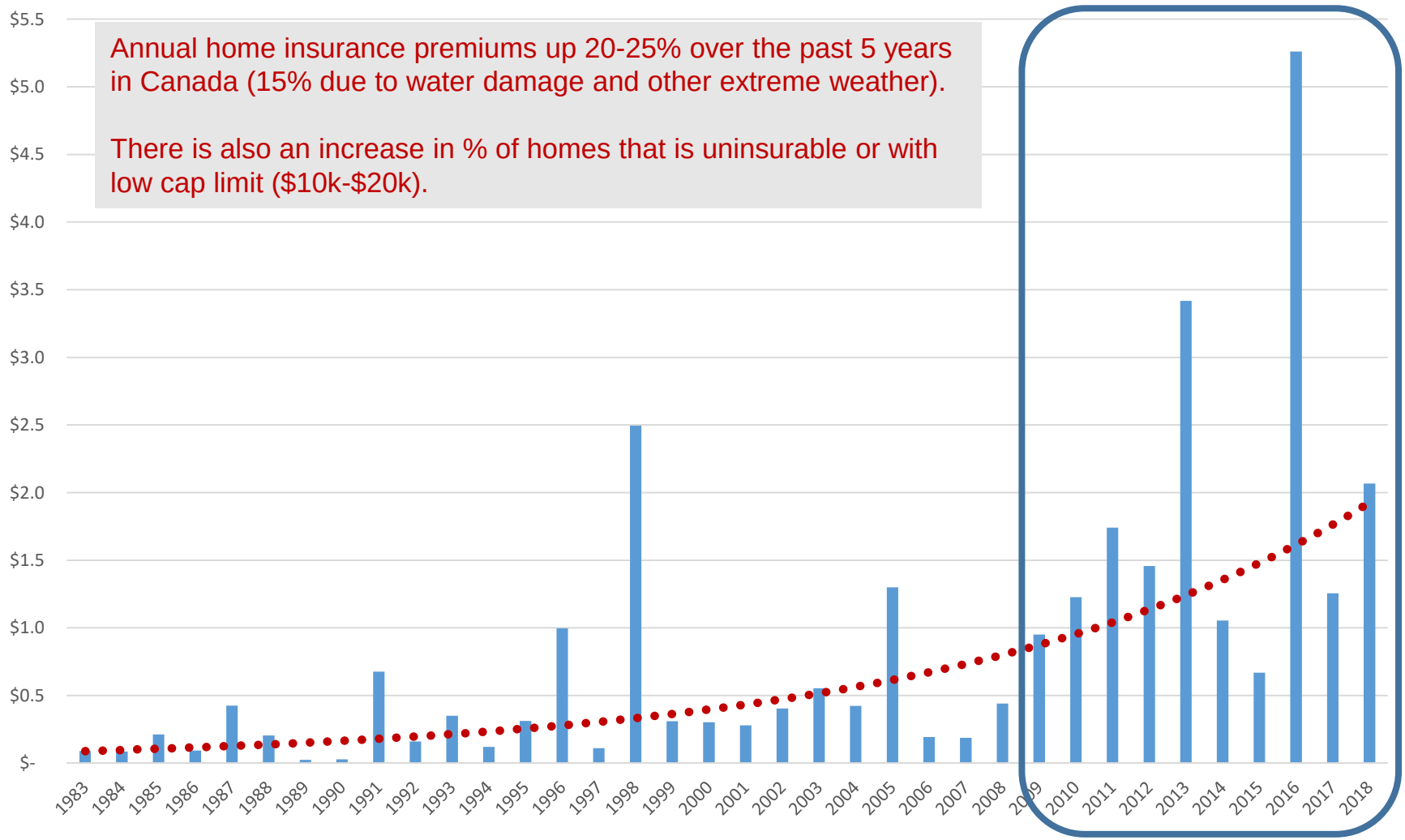
Annual home insurance premiums up 20-25% over the past 5 years in Canada (15% due to water damage and other extreme weather).

There is also an increase in % of homes that is uninsurable or with low cap limit ($10k-$20k).



Source: IBC Facts Book 2019, PCS, CatIQ, Swiss Re, Munich Re & Deloitte. Values in 2018$ CAN; total natural catastrophe losses normalized by inflation and per-capita wealth accumulation.

MENTAL HEALTH AND TIME OFF WORK IMPACTS OF BASEMENT FLOODING

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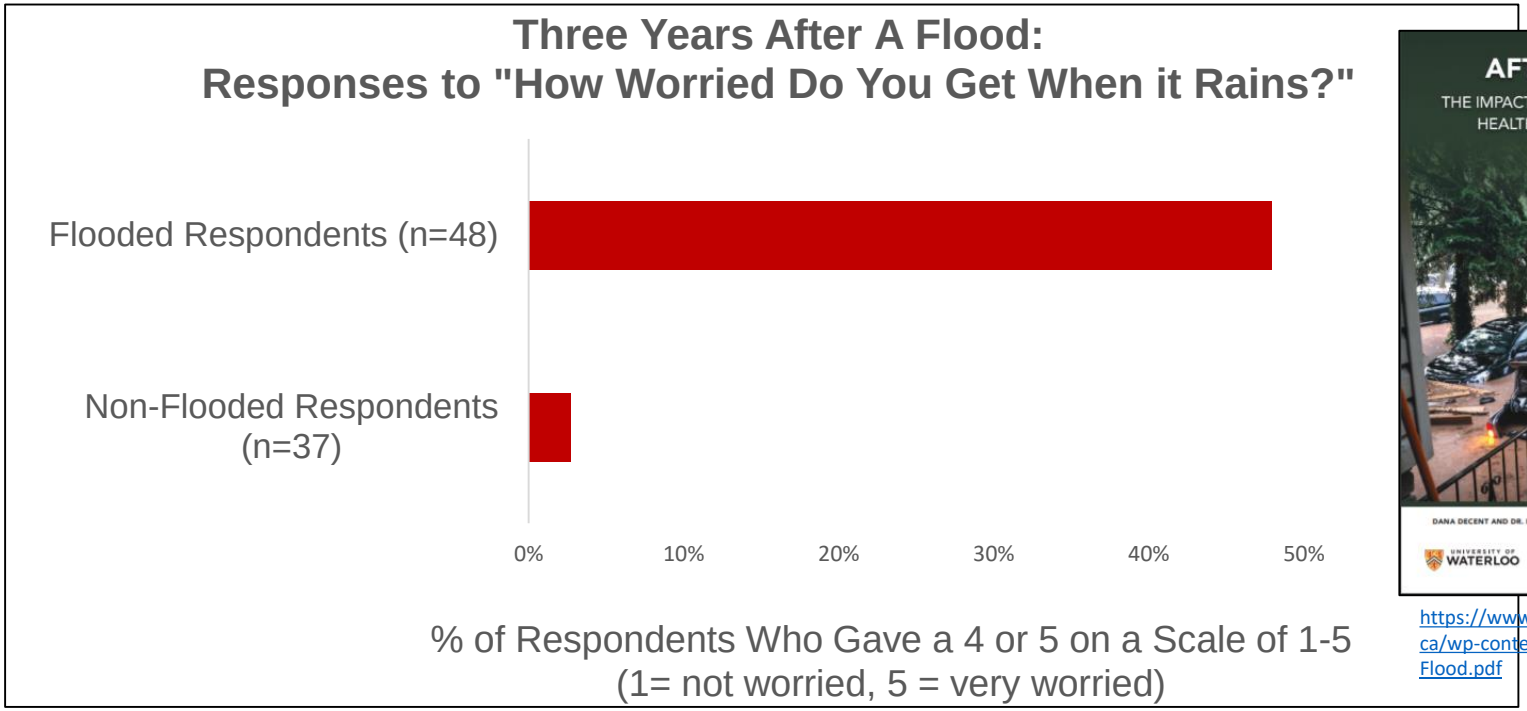
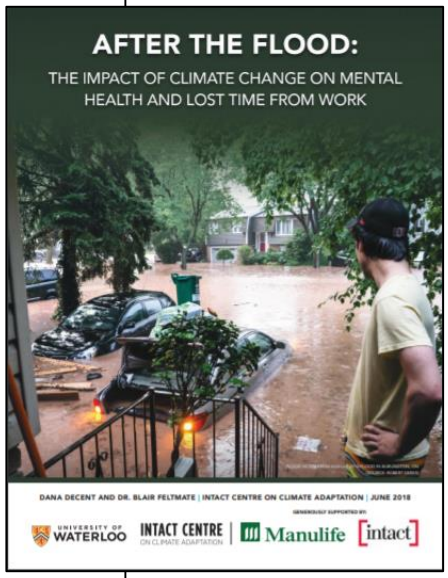
- Average time off work following basement flood ~7 days
- Mental health impact / stress that lingers (~50% of respondents worried when it rains, 3 years after the flood event)





https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2018/06/After-The-Flood.pdf

NEW GUIDELINES AND STANDARDS FOR FLOOD-RESILIENCE (EXAMPLES):

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Homes - Flood Protection Guideline

https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2019/04/Home-Flood-Protection-Program-Report-1.pdf

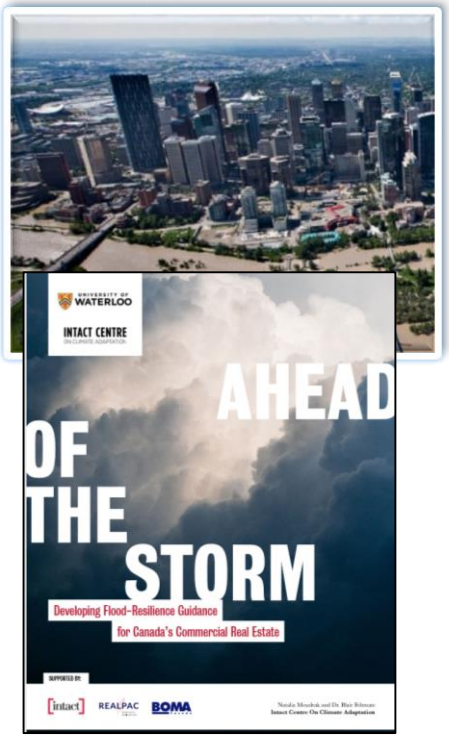
New Community Design Standard

https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2017/10/Preventing-Disaster-Before-it-Strikes.pdf

Existing Community Retrofits Standard

https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2019/01/Weathering-the-Storm.pdf

Commercial Real Estate Retrofits Guideline



https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2019/10/Ahead-of-the-Storm-1.pdf

New Standards Supported by:

National Research Council Canada

Standards Council of Canada
Conseil canadien des normes

50-100 Subject Matter Experts per Standard

COMMON FACTORS AFFECTING BASEMENT FLOOD RISK

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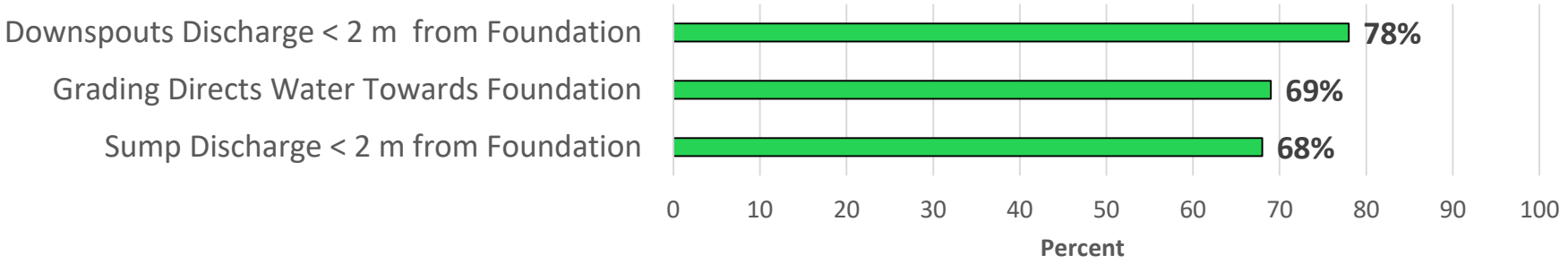
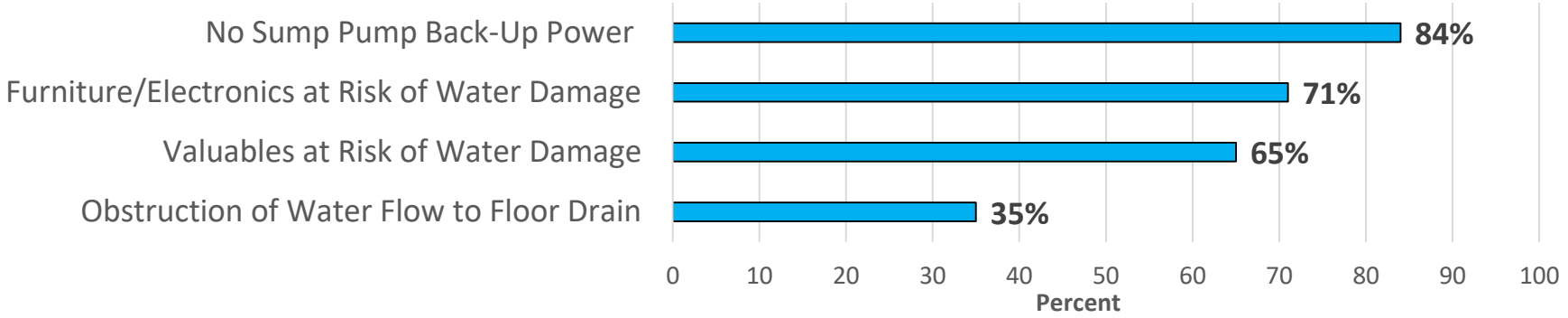
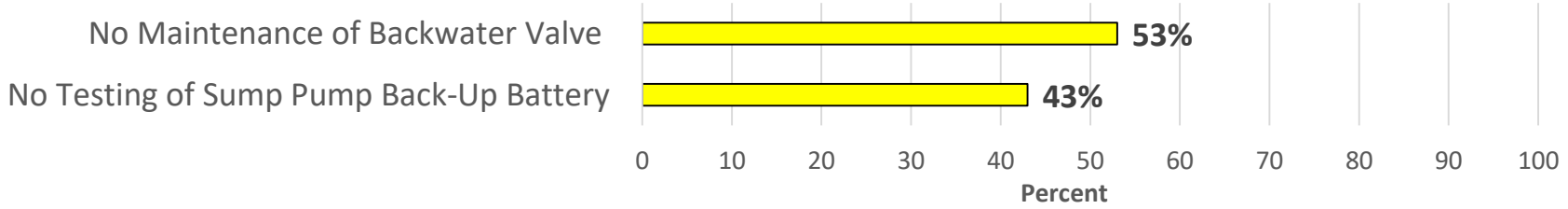
Top Flood Risks Recorded Outside the Home



Top Flood Risks Recorded Inside the Home



Top Self-Reported Maintenance Flood Risks Inside the Home



ENGAGING WITH HOMEOWNERS ON FLOOD-RESILIENCE ACTIONS

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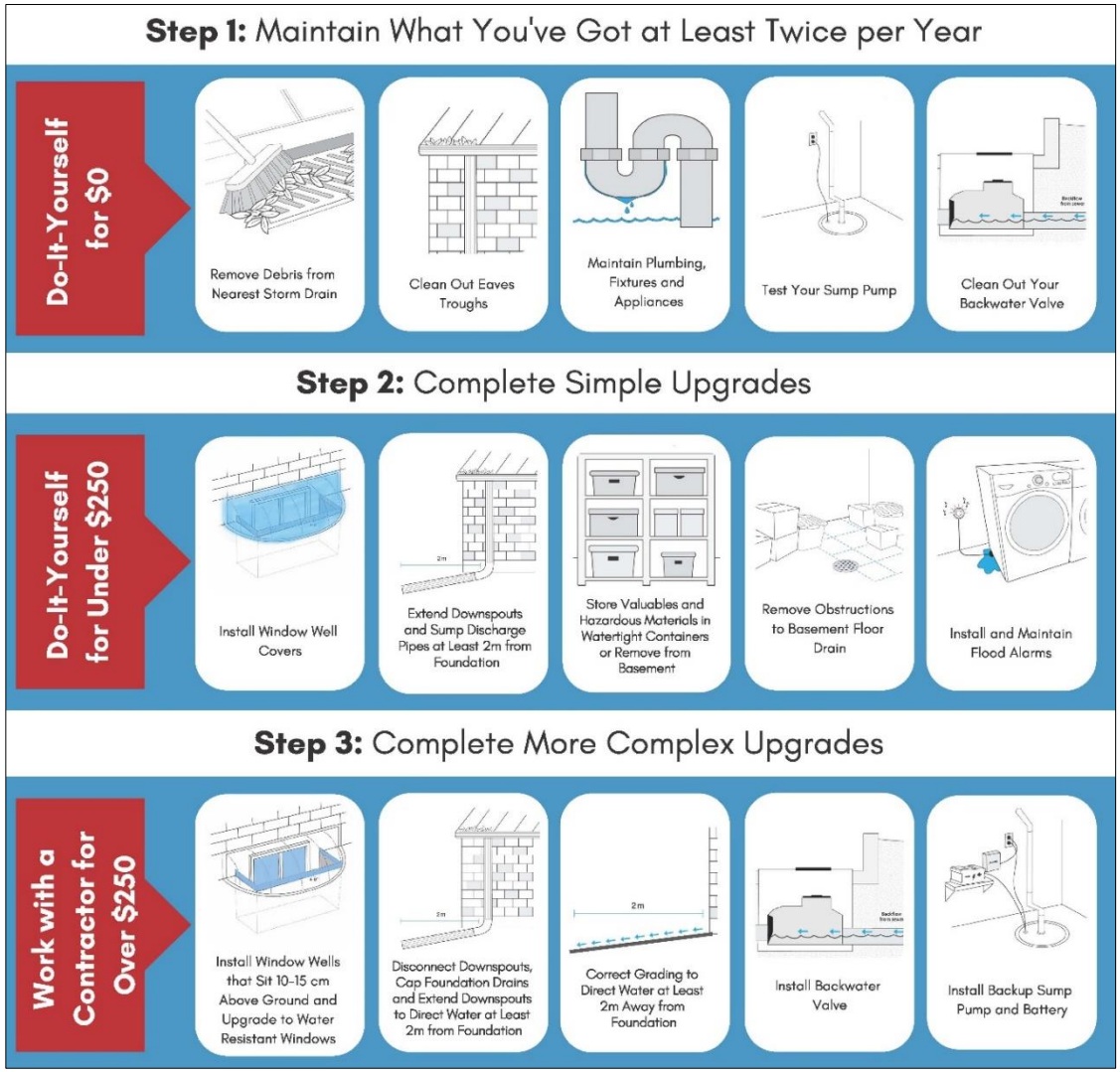

https://homefloodprotect.ca/checkup/

THE ROLE OF NATURAL INFRASTRUCTURE IN CLIMATE ADAPTATION AND COMMUNITY RESILIENCE

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A framework was developed for assessing the business case of natural infrastructure (NI) for climate adaptation.

Key finding: NI can be a strong complement to grey (built) infrastructure for climate adaptation (e.g., flood/drought attenuation), but it's essential to quantify its total economic value for an informed investment analysis.

https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2018/09/IBC_Wetlands-Report-2018_FINAL.pdf

IBC BAC | Insurance Bureau of Canada / Bureau d'assurance du Canada

IISD International Institute for Sustainable Development

Prairie Climate Centre From Risk to Resilience

IT'S CRITICAL TO CONDUCT A TOTAL ECONOMIC VALUE ASSESSMENT OF NATURAL VS GREY INFRASTRUCTURE

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Costs (examples)	NI	Grey
Pre-Construction		
• Baseline data collection	X	X
• Stakeholder consultation	X	X
• Site identification	X	X
• Assessment of design alternatives	X	X
• Detailed engineering design of selected alternative	X	X
• Land acquisition	X	X
• Environmental assessment	X	X
• Permitting and legal fees	X	X
• Development of construction specifications	X	X
• Development of monitoring program and key performance indicators (KPIs)	X	X
Construction		
• Site preparation	X	X
• Site construction	X	X
Post-construction		
• Infrastructure maintenance activities	X	X
• Infrastructure condition assessment	X	X
• Monitoring against KPIs	X	X
• Evaluation and reporting	X	X
• Carbon cost over project life cycle		X
Administration		
• Project management and oversig		

Benefits (Example)	NI	Grey
• Storm water storage	X	X
• Water quality	X	
• Habitat creation / improvement	X	
• Microclimate stabilization (e.g., urban heat island reduction)	X	
• Air filtration	X	
• Recreational amenity and aesthetic services	X	
• Energy savings	X	
• Carbon savings	X	

A comprehensive assessment of the financial, environmental and social costs and benefits (i.e., a total economic value [TEV] assessment) is required to illuminate otherwise uncaptured benefits of natural infrastructure (NI) projects.

- Water quality improvement
- Habitat creation
- Urban heat island reduction
- Air filtration
- Recreational amenity
- Aesthetic services
- Carbon sequestration

EXAMPLES OF NATURAL INFRASTRUCTURE ASSETS ASSESSED IN CANADA

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Naturally occurring **wetlands** in Southern Ontario reduce flood damage costs to buildings by $3.5 million (or 29%) at a rural site and by $51.1 million (or 38%) at an urban site

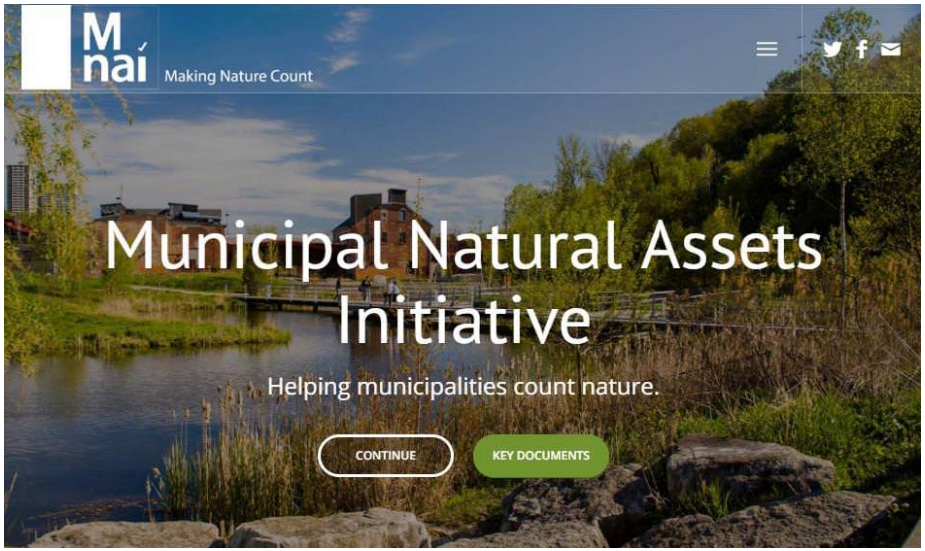
- Intact Centre, 2016

Protecting 182 ha of **forested area** along the St. John River provides $3.5 million in flood attenuation benefits to Florenceville-Bristol community in New Brunswick

- Municipal Natural Assets Initiative, 2020

Naturally occurring **ponds** in the coastal town of Gibsons, British Columbia provide $3.5 - $4 million of stormwater storage services annually

- Municipal Natural Assets Initiative, 2018



RECOGNIZING NATURAL ASSETS AS ASSETS ON FINANCIAL POSITION STATEMENTS

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In Canada, there is a prohibition from recognizing natural assets as assets on financial position statements.

"Purchased natural resources and Crown lands are recognized in government financial statements. However, when natural resources and Crown lands have been inherited by the government in right of the Crown and have not been purchased, they are not given accounting recognition as assets in government financial statements. These items are not recognized as assets because the costs, benefits and economic value of such items cannot be reasonably and verifiably quantified using existing methods. Similarly, art and historic treasures are also not recognized as assets."

- Public Sector Accounting Board rules, Financial Statement Concepts, Section PS 1000, paragraph .57

Next Public Sector Accounting (PSA) Discussion Group Meeting: **April 24, 2020**, 8:30 am to 3:30 pm EST

Location: Chartered Professional Accountants of Canada - 9th Floor, Quebec and Ontario Rooms
277 Wellington Street West, Toronto Ontario M5V 3H2

Contact: Martha Jones Denning, CPA, CA, Principal, Public Sector Accounting Board
P: +1 416 204 3288 E: mjonesdenning@psabcanada.ca

Web: https://www.frascanada.ca/en/psab/committees/psadg/psadg-agenda-apr-2020

URBAN HEAT ISLAND REDUCTION – NATURAL INFRASTRUCTURE PLAYS A ROLE

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De-Paving + Water Storage in Rotterdam, NL

Green Roofs, Toronto, CAD

Urban Tree Planting

Daylighting Rivers - The Cheonggyecheon Stream, Seoul, SK

DISCUSSION

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Climate change is real, is happening and will continue to impact Canadians

There are practical means that can materially improve our resilience to extreme weather events – Natural Infrastructure should be considered as part of the solution

Adaptation and resilience (A&R) is a Gift that Keeps on Giving

ROI is in the range of 6-11$ for every $1 invested in resilience measures over a 10 year timeframe

Thank You! @ICCA_Canada