

Impact of Climate Change and Wild Weather on Mental and Physical Health, Lost Time from Work and the Need to Prepare



National Collaborating Centre
for Environmental Health

Centre de collaboration nationale
en santé environnementale



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ON CLIMATE ADAPTATION

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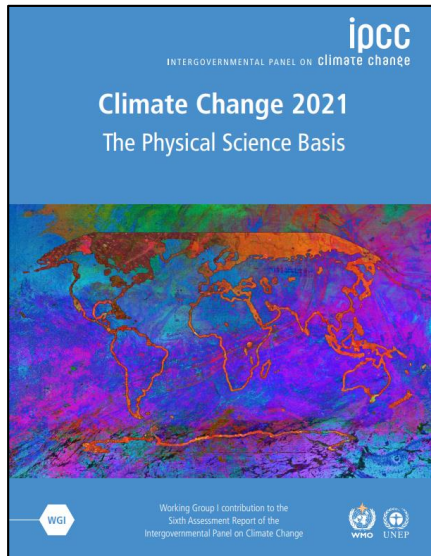
1. Climate change is real and irreversible
2. Costs of climate change are going up
 - financial costs
 - mental/psycho-social costs (often underestimated)
3. Mitigating risks - adaptation standards & guidelines
4. Conclusion / next steps

**THE BEST WAY TO SOLVE A PROBLEM IS
DON'T HAVE IT IN THE FIRST PLACE**

CLIMATE CHANGE IS IRREVERSIBLE: SEVERITY OF WEATHER WILL INCREASE

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3



It is indisputable that human activities are causing climate change, making extreme climate events, including heat waves, heavy rainfall, and droughts, more frequent and severe.

IPCC 2021

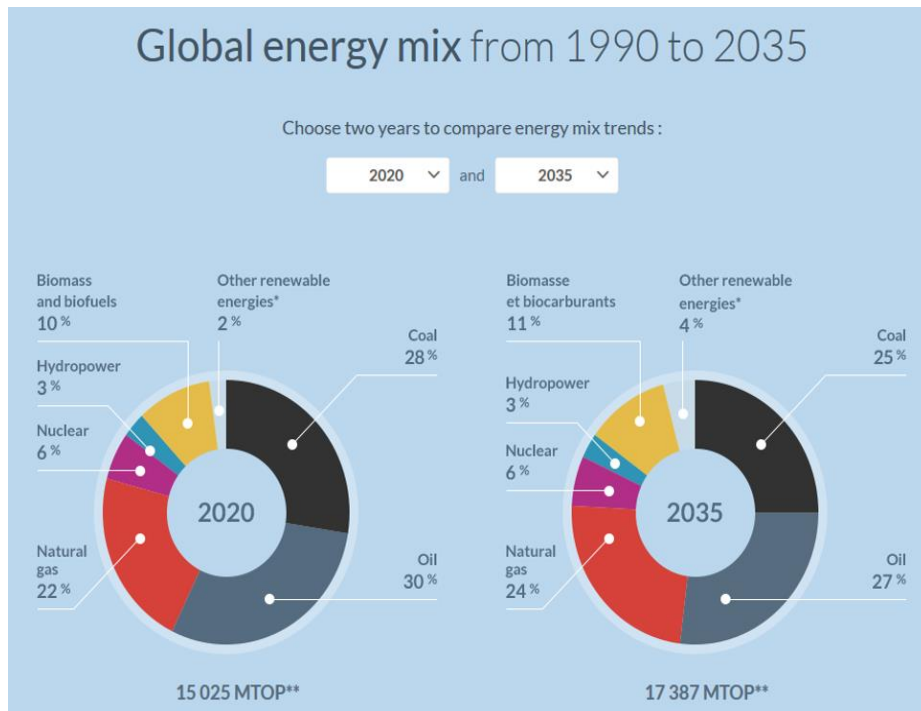


Canada's climate has warmed and will warm further in the future, driven by human influence... this warming is effectively irreversible.

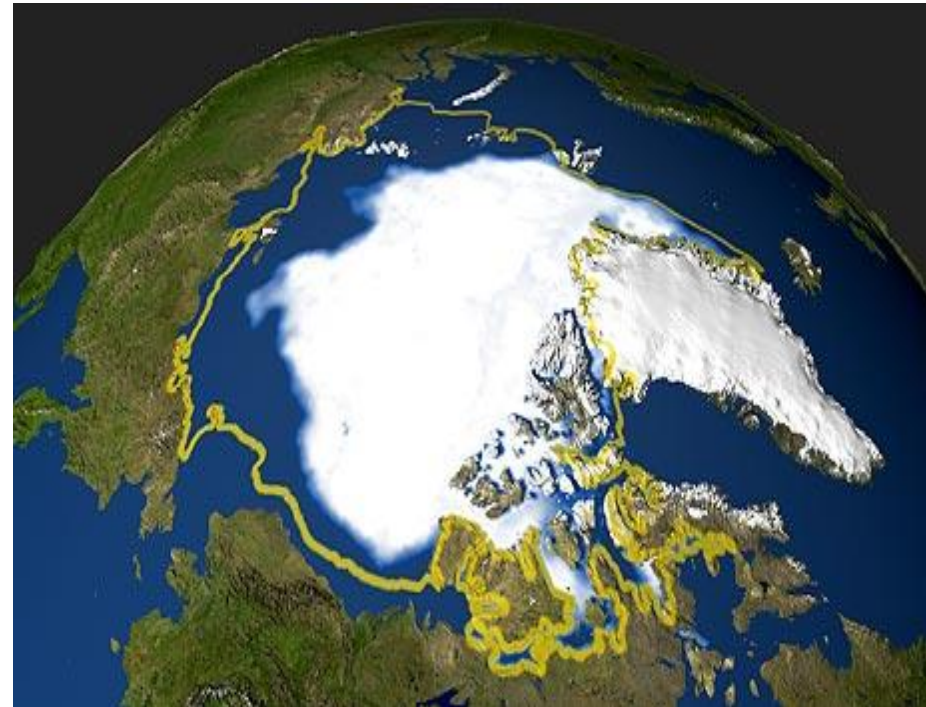
ECCC/CCCR 2019

WHY CLIMATE CHANGE IS EFFECTIVELY IRREVERSIBLE

- Global energy mix will remain fossil fuel dependent (International Energy Agency)
- Key GHG driver is population growth (net global increase is now **9,000 people/hour**)
- Climate change is driving climate change – three drivers (loss of ice, loss of permafrost, loss of algae from surface of oceans)



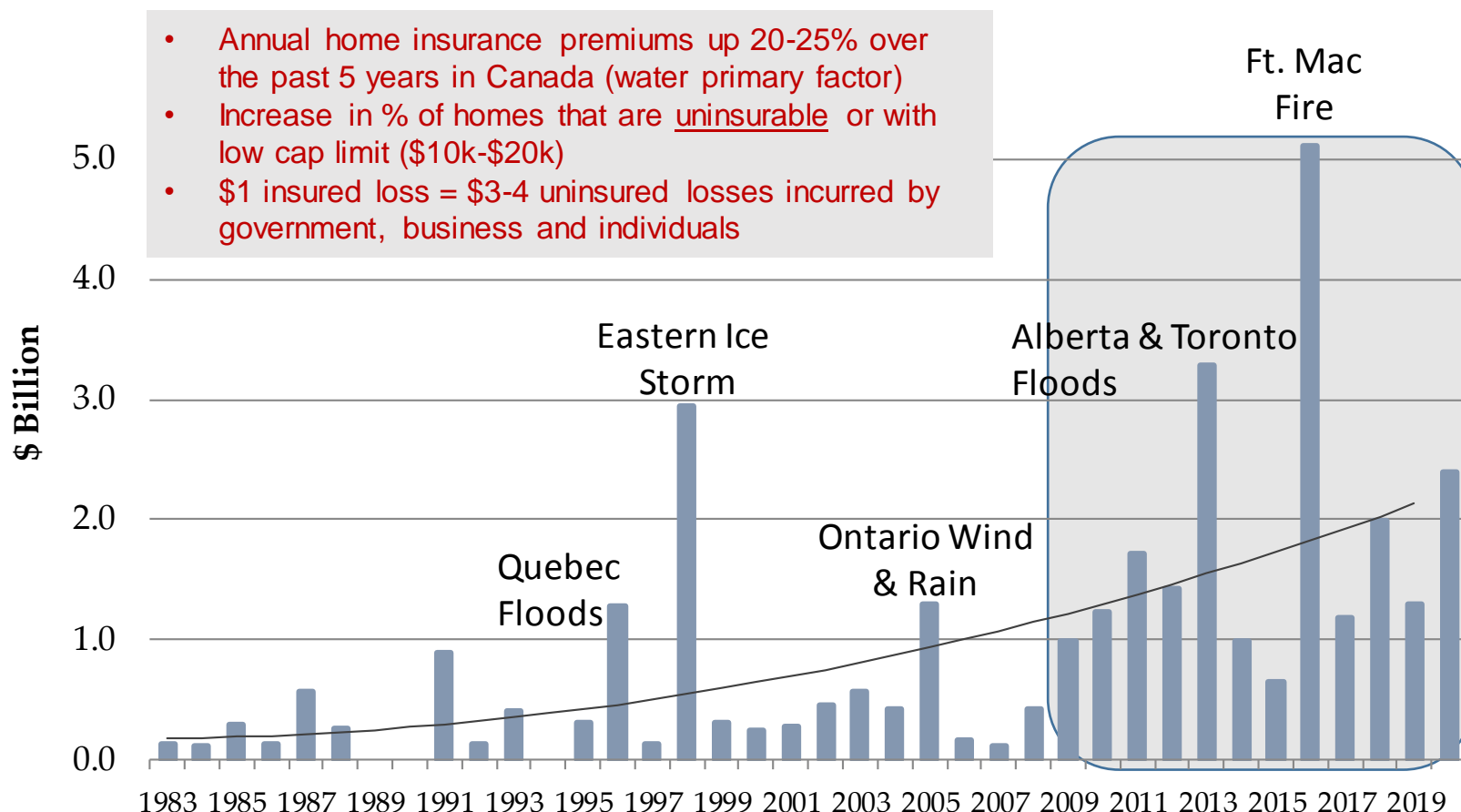
17.4 billion tonnes of oil equivalent by 2035



COSTS OF EXTREME WEATHER: CATASTROPHIC INSURABLE LOSSES (\$CAD)

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5



Loss + Loss Adjustment Expenses

\$2020 - total natural-catastrophe losses normalized by inflation and per-capita wealth accumulation

Excluding events when loss < \$25 M, 2008 onward

2020 January to November CAT events

Source: CatIQ, PCS, IBC Facts Book, Statistics Canada, IMF WEO Database

MENTAL HEALTH STRESS DUE TO BASEMENT FLOODING

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6

Flood victims suffering from psychological distress, Montreal officials say

Of the 1,000 homes in the city inspected so far, 60 of them deemed uninhabitable

By [Salorina Marendola, CBC News](#) | Posted: May 18, 2017 8:12 AM ET | Last Updated: May 18, 2017 7:55 PM ET



'Worst flooding in 20 years': Burlington cleaning up after record rainstorm



By [James Armstrong & David Shum](#) • Global News

Posted August 5, 2014 7:00 pm • Updated August 5, 2014 7:01 pm

Anger, frustration, fear all normal emotions after a flood, expert says

Victims have been distressed, fearful, looking for people to blame

[CBC News](#) | Posted: May 10, 2017 6:59 AM ET | Last Updated: May 10, 2017 6:59 AM ET



Gatineau resident Chantal Therrien had to leave her home last weekend after water filled her basement.

How to cope when your stress levels rise with the floodwaters

Stay Calm... stressful disasters to deal with, because 'it goes on for a

Sections

[thestar.com](#)

[Opinion](#) • [Commentary](#)

How climate change is bad for Torontonians' health

As the recent heat wave showed, Torontonians are not immune from the ill health effects of climate change.



Levels continue to rise.

Fort McMurray fire evacuees suffering from PTSD symptoms: study

MARTY KLINKENBERG

EDMONTON — The Globe and Mail

Published Wednesday, Jan 11, 2017 1:00 PM

Last updated Thursday, Jan 12, 2017 1:00 PM



Climate change a significant threat to public health, CMA members hear

ANDRÉ PICARD - PUBLIC HEALTH REPORTER

VANCOUVER — The Globe and Mail

Published Monday, Aug. 22, 2016 9:01PM EDT

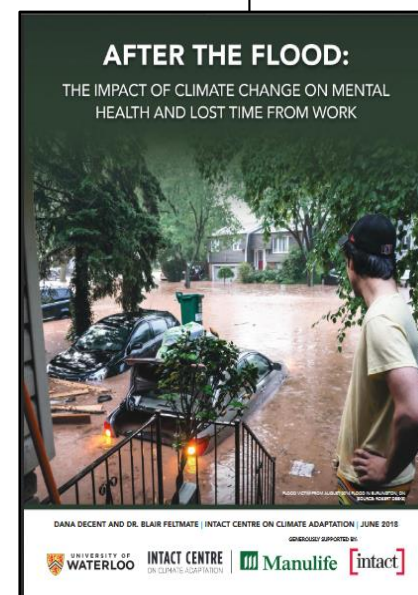
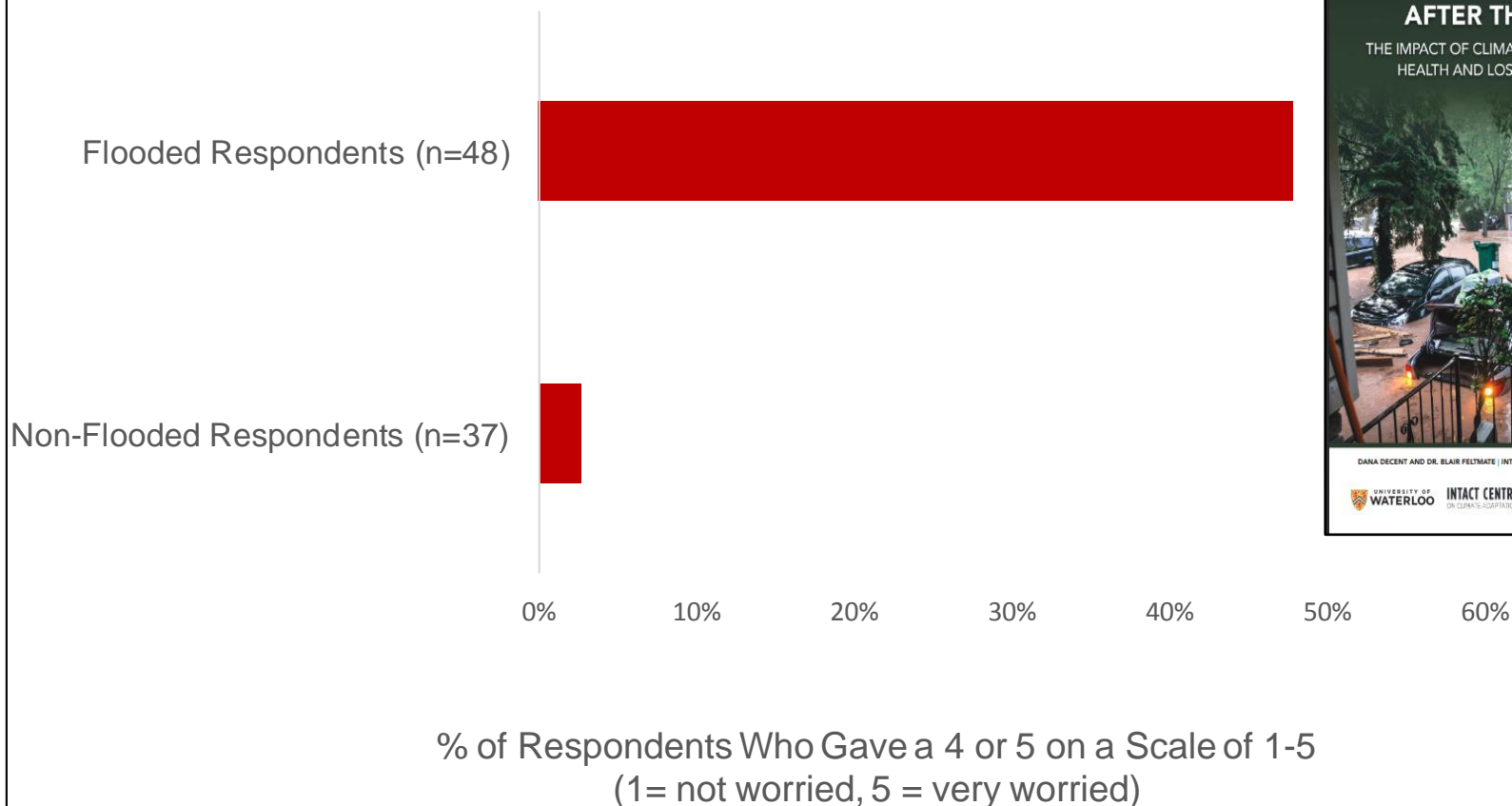
Last updated Monday, Aug. 22, 2016 9:20PM EDT

MENTAL HEALTH STRESS DUE TO BASEMENT FLOODING

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7

Three Years After A Flood: Responses to "How Worried Do You Get When it Rains?"



MENTAL HEALTH STRESS DUE TO BASEMENT FLOODING

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8

- *“No health issues – just my sanity”*
- *“I have PTSD from it [the flooding]”*
- *“I think of something I want and it’s gone”*
- *“My kids still question me when it rains”*
- *“We suffered mentally more than anything else”*
- *“I had 20 rose bushes. Now I don’t have one”*
- *“I just hope nobody else goes through it, that’s for sure”*





1. Increased or new medication

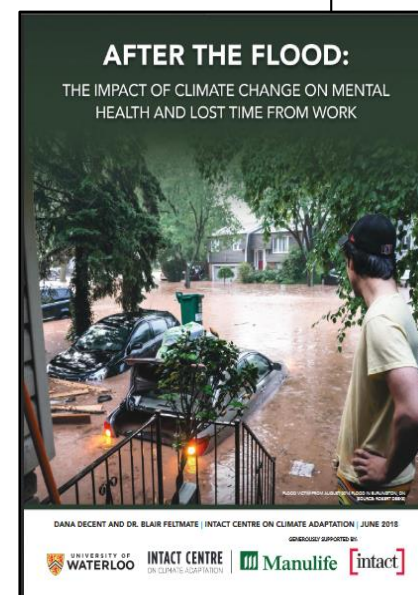
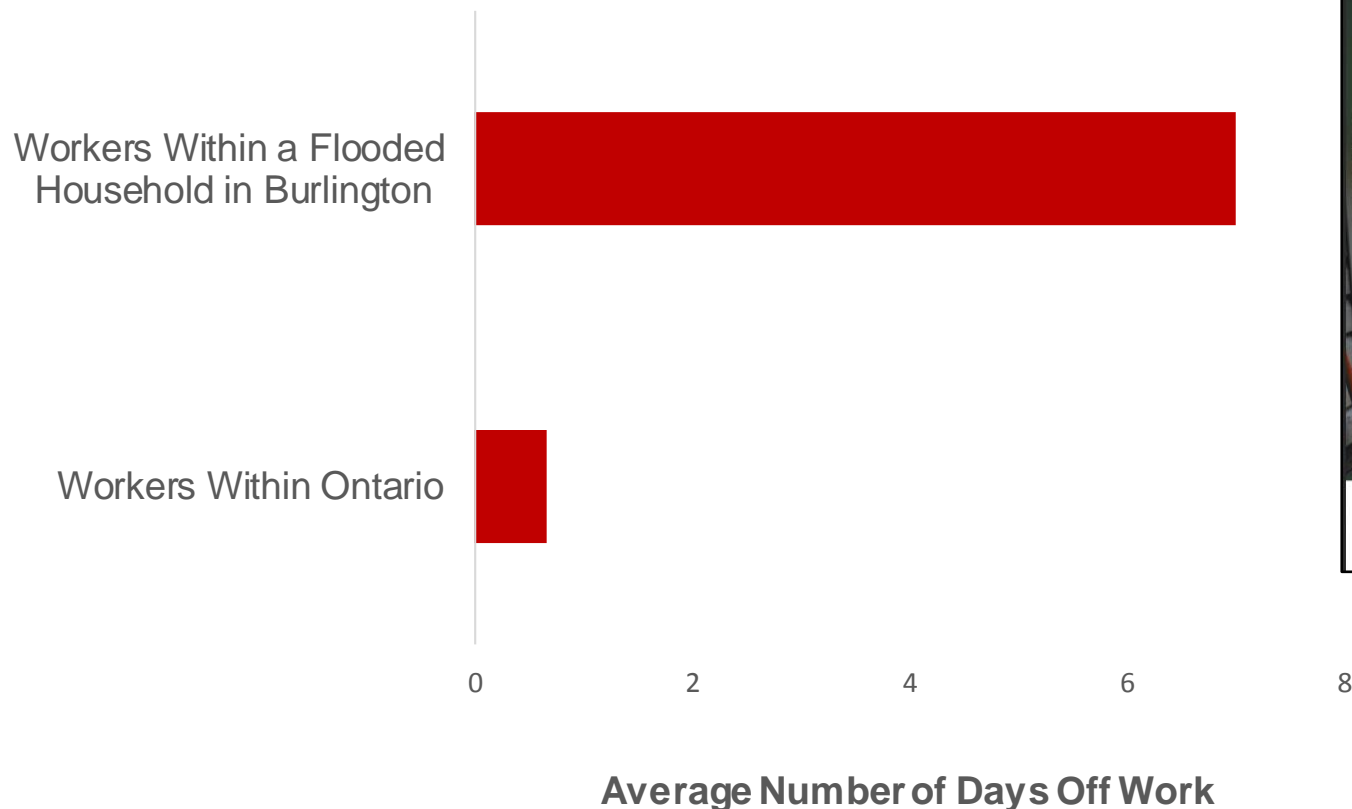
- for Calgary (AB) residents following 2013 floods
 - 164% increase in anti-anxiety medication
 - 232% increase in anti-depressants (Sahni *et al.* 2016)

2. Sick leave from work

- for Saguenay-Lac-St-Jean (QB) residents following 1996 floods
 - 12% had to take sick leave or were absent from work
 - 6% took an early retirement (Malthais *et al.* 2000)

LOST TIME FROM WORK DUE TO BASEMENT FLOODING

**Average Number of Days Off Work Per Worker
for 1 Month in 2014**

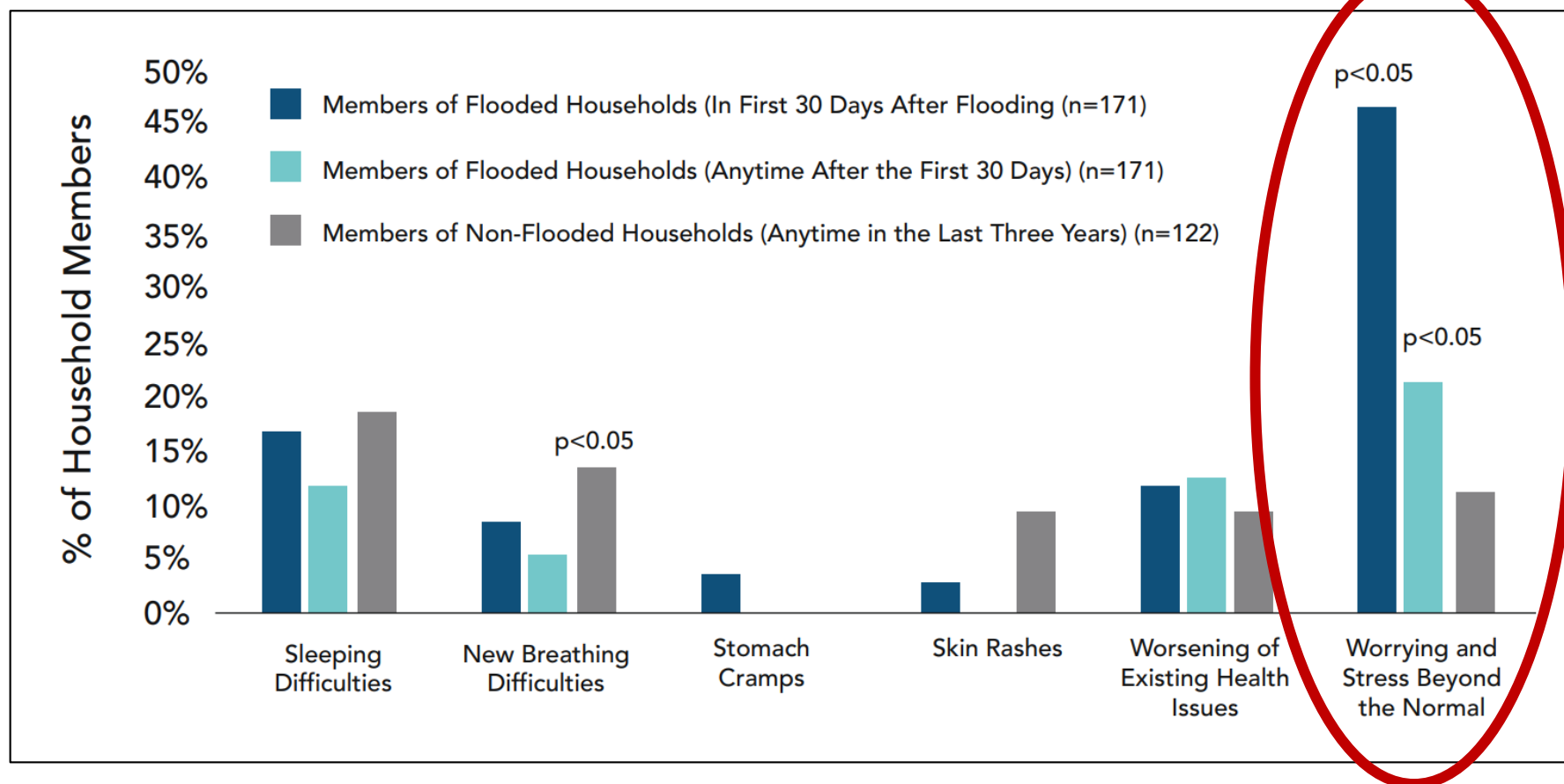


HEALTH IMPACTS (PHYSICAL / MENTAL) OF BASEMENT FLOODING

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11

Health Impacts in the First 30 Days After Flooding and Anytime Since
(Members from Flooded vs. Non-Flooded Households)



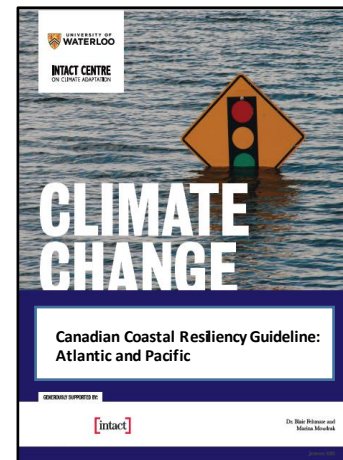
GUIDELINES TO LIMIT FLOOD RISK

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12



Home



Sea Level Rise



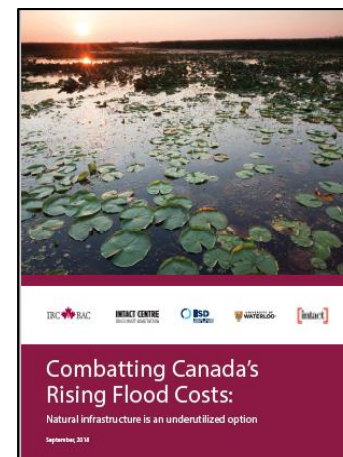
New
Community



Existing
Community



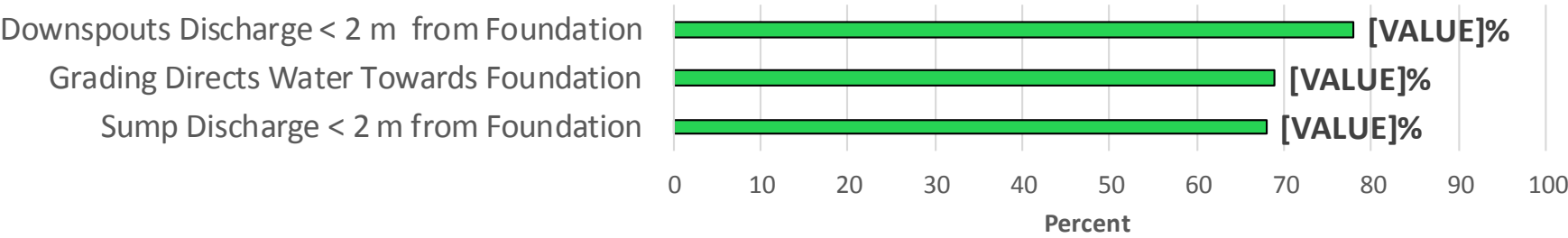
Commercial
Real Estate



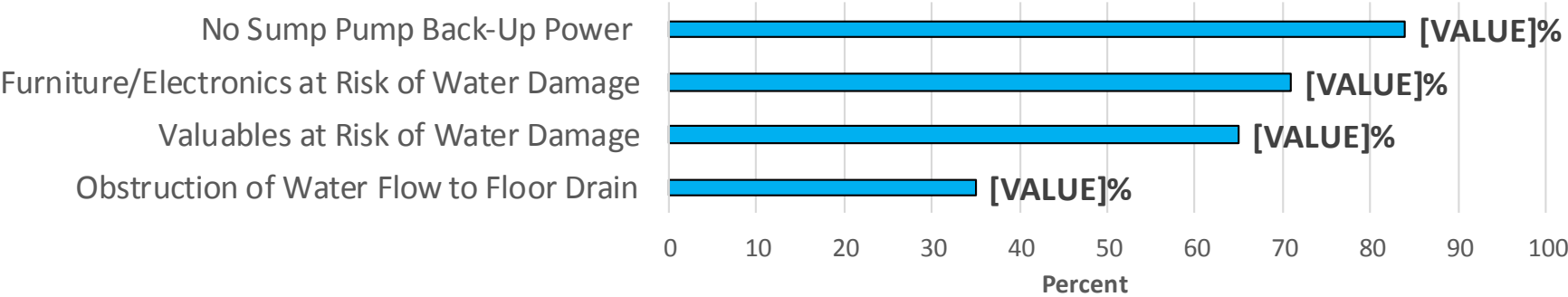
Natural
Infrastructure

KEY FACTORS THAT AFFECT BASEMENT FLOOD RISK

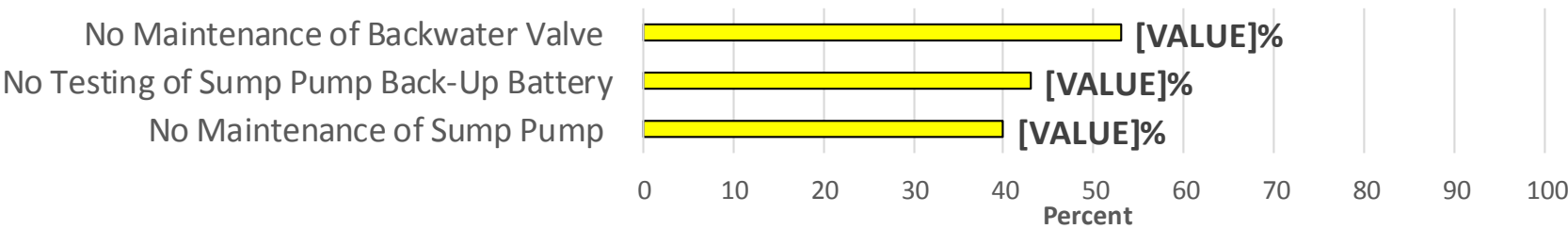
Top Flood Risks Recorded Outside the Home



Top Flood Risks Recorded Inside the Home



Top Self-Reported Maintenance Flood Risks Inside the Home



HOME FLOOD PROTECTION

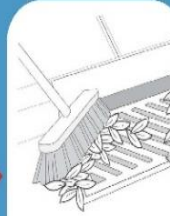
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Most homeowners can limit risk of basement flooding (i.e., Canada's No. 1 extreme weather cost):

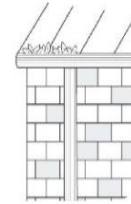
- without special expertise
- generally for less < few \$100
- often over a long weekend

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

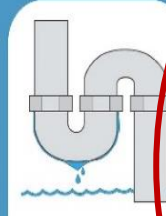
Do-It-Yourself
for \$0



Remove Debris from
Nearest Storm Drain



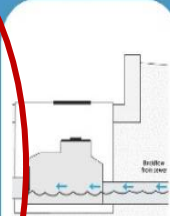
Clean Out Eaves
Troughs



Maintain Plumbing,
Fixtures and
Appliances



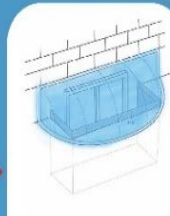
Test Your Sump Pump



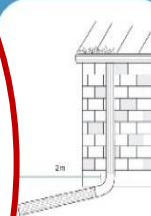
Clean Out Your
Backwater Valve

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



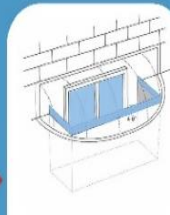
Remove Obstructions
to Basement Floor
Drain



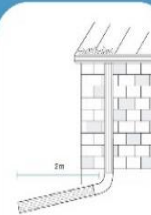
Install and Maintain
Flood Alarms

Step 3: Complete More Complex Upgrades

Work with a
Contractor for
Over \$250



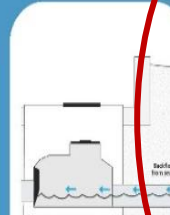
Install Window Wells
that Sit 10-15 cm
Above Ground and
Upgrade to Water
Resistant Windows



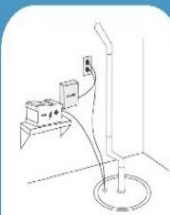
Disconnect Downspouts,
Cap Foundation Drains
and Extend Downspouts
to Direct Water at Least
2m from Foundation



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



Install Backwater
Valve



Install Backup Sump
Pump and Battery

MITIGATING MENTAL / PHYSICAL HEALTH IMPACTS DUE TO FLOODING AND FIRES

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15

Canada will “create a Climate Adaptation Home Rating Program... as a companion to the EnerGuide home energy audits. We will also expand the eligibility requirements of the CMHC deep home retrofit program and Canada Greener Home Grants to include more climate resilient measures. We will partner with the insurance industry... by finding cost-effective ways to better protect communities and homes for climate impacts like floods and wildfires.”

Fighting Wildfires and Adapting to a Changing Climate

Everyday the evidence mounts that climate change is happening faster and with more intensity than many scientists expected.

The extreme heatwave and wildfires in Western Canada this summer underscore the urgency of fighting and adapting to climate change. This includes preparing for more regular extreme weather events that cause wildfires, droughts and flooding. We must remain united in our goal of ensuring affected Canadians are fully supported through this crisis. But as the mounting evidence of climate change becomes even more clear, we need to invest now to mitigate the impact of future disasters.

Training 1,000 Community-Based Firefighters

Through parts of this fire season, Canada faced a shortage of up to 1,000 fire personnel. With intensifying wildfire seasons across the globe, key allies face similar challenges, leading to shortages of fire fighting personnel and resources.

That is why a re-elected Liberal government will invest \$50 million to help train at least 1,000 firefighters in targeted wildfire risk management strategies in communities across the country. A portion of these funds will also be directed to support and expand Indigenous-led fire crews and build capacity to better incorporate Indigenous traditional knowledge strategies in fire management.

Providing firefighters with the equipment they need to stay safe and fight wildfires

As we adapt to the reality of climate change, we need to make sure provinces and territories can provide firefighters the tools they need to be able to do their job safely. That's why a re-elected Liberal government will invest \$450 million ahead of the next fire season to allow provinces and territories to invest in the equipment needed to fight wildfires and keep firefighters safe, like Canadian-made firefighter aircraft.

Protecting Homes and Communities from Floods and Wildfire

Information is power. And as climate change intensifies, it will only become more important for Canadians to understand what positive, affordable and practical measures they can take to protect their homes and communities against flood and wildfire.

To help ensure Canadians have this information, we will create a Climate Adaptation Home Rating Program that will be developed as a companion to the EnerGuide home energy audits. We will also expand the eligibility requirements of the CMHC deep home retrofit program and Canada Greener Home Grants to include more climate resilience measures.

We will also partner with the insurance industry and the private sector to develop strategies to reduce insurance premiums by finding cost-effective ways to better protect communities and homes from climate impacts, like floods and wildfires.

FIRESMART PROTECTION

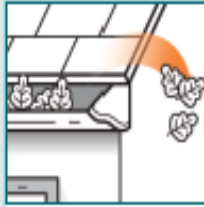
16

Step 1 actions to limit fire risk can be executed by most home owners

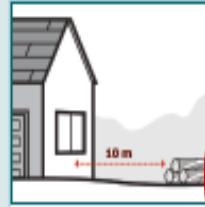
Steps 2 and 3 actions require technical expertise and higher costs – however, when a scheduled retrofit is required, the cost between retrofitting “right” vs. “wrong” to limit fire risk is immaterial

STEP 1: MAINTAIN WHAT YOU'VE GOT AT LEAST TWICE PER YEAR

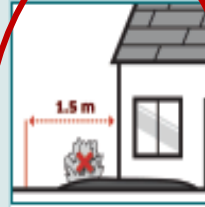
\$0 - \$300



Remove needles, leaves and other debris from gutters, roof surfaces, decks and balconies. Regularly clean vents.



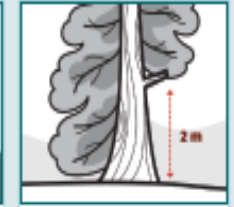
Remove combustible materials (firewood and lumber) stored within 10 m of the house perimeter and under decks.



Remove all combustible ground cover (mulch and plants) within a 1.5 m of the house perimeter.



Mow the lawn to <10 cm and plant low-growing, well-spaced shrubs and other vegetation.



Prune trees to create a 2 m clearance from the ground to the lowest tree branches.

STEP 2: COMPLETE SIMPLE UPGRADES

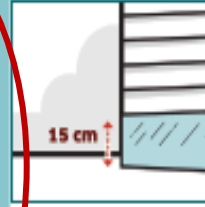
\$300 - \$3,000



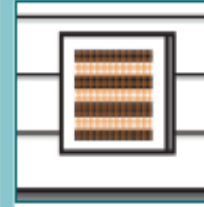
Install non-combustible fencing within 1.5 m of the house (cement fiber, metal, chain link or stone).



Install non-combustible ground surfaces within 1.5 m of the house (mineral soil, rock, concrete or stone).



Create a 15 cm ground-to-siding non-combustible clearance (e.g., install cement board or metal skirting).



Add a non-combustible 3 mm screen to all external vents, except dryer vents.



Replace worn or missing weather stripping on all doors, including garage doors.

STEP 3: COMPLETE MORE COMPLEX UPGRADES

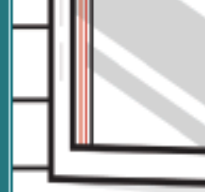
\$3,000 - \$30,000



Install Class A fire-resistant roof covering (e.g., cement fibre, metal or asphalt shingles).



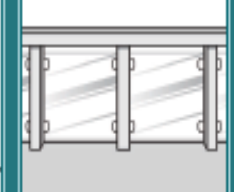
Install non-combustible siding (stucco, metal, stone, cement fibre board).



Install multi-pane or tempered glass windows and exterior fire rated doors.



Remove conifer trees that are within 10 m of the house.



Retrofit all deck components to be fire-rated, with a continuous surface.

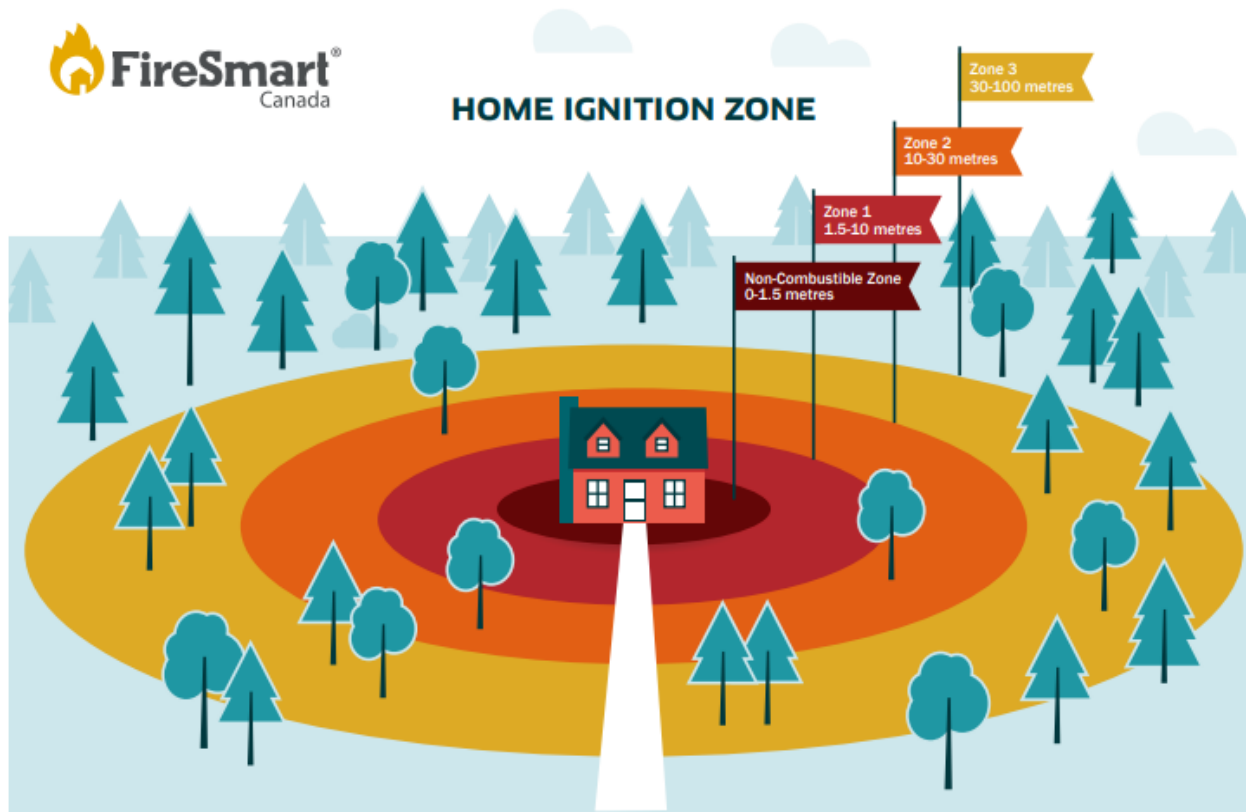
FIRE BREAKS / FIRE EXCLUSION ZONE

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17



HOME IGNITION ZONE



Work with your neighbours in any overlapping priority zones!



**Non-combustible Zone
0-1.5 metres**



**Zone 1
1.5-10 metres**



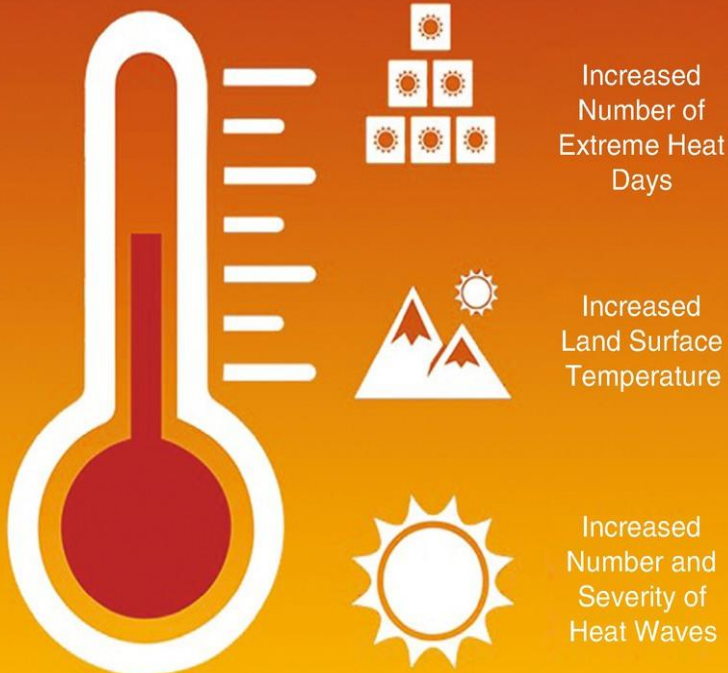
**Zone 2
10-30 metres**

EXTREME HEAT GUIDELINE: UNDER DEVELOPMENT NOW

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18

Climate Change and
Rising Temperatures



Increased
Number of
Extreme Heat
Days

Increased
Land Surface
Temperature

Increased
Number and
Severity of
Heat Waves

- Serious public health issue, with impacts measured in **deaths** rather than damages, that are most severely felt by vulnerable communities

ADAPTATION GUIDELINE

1. **Community Level** (e.g.)
 - White roofs, more tree canopy
2. **Building/Structural Level**
 - on site back up generation for electricity
3. **Individual Level**
 - checking on the vulnerable

COSTS: Costs of climate change and extreme weather events should be considered in equal measure relative to impact on physical infrastructure, mental health and physical well-being

PREPARATION & PROTECTION: Avoid “*Management by Disaster*” scenarios. Health associations and practitioners should actively engage in preparing and protection Canadians relative to growing risks of:

- Flood
- Fire
- Extreme heat

} Need data on increasing prescriptions to address mental health/psychosocial stress and counseling services

URGENCY: Every day we don't adapt is a day we don't have!