

PROVIDING MEARIE MEMBERS WITH GUIDANCE TO REDUCE PHYSICAL CLIMATE RISK

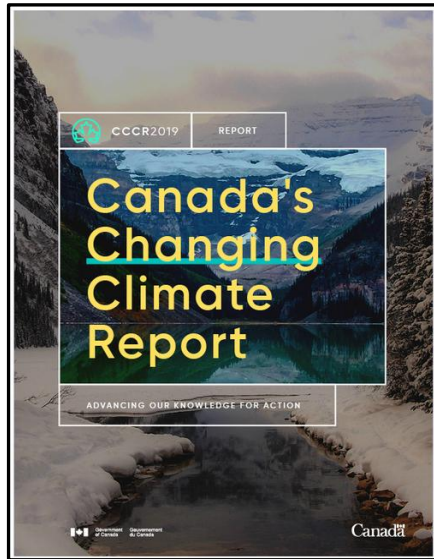


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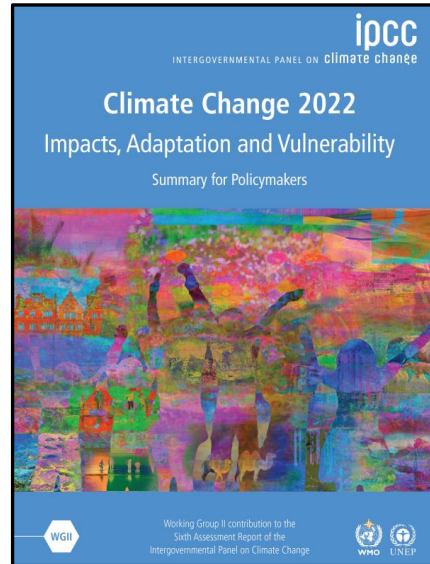
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CLIMATE CHANGE IS IRREVERSIBLE: SEVERITY OF WEATHER WILL INCREASE



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

ECCC/CCCR 2019



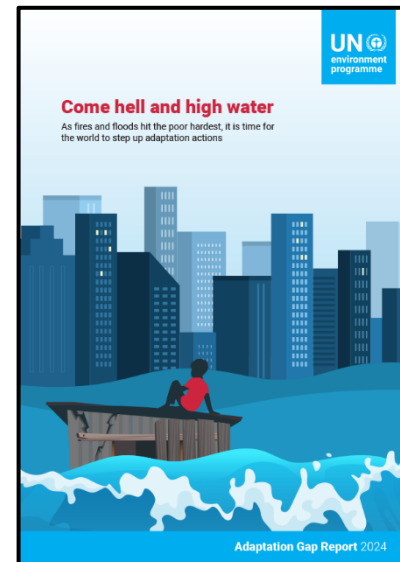
It is indisputable that human activities are causing climate change, making extreme climate events, including heat waves, heavy rainfall, and droughts, more frequent and severe

IPCC 2022



There's no credible pathway to 1.5 C in place

UNEP, 2024

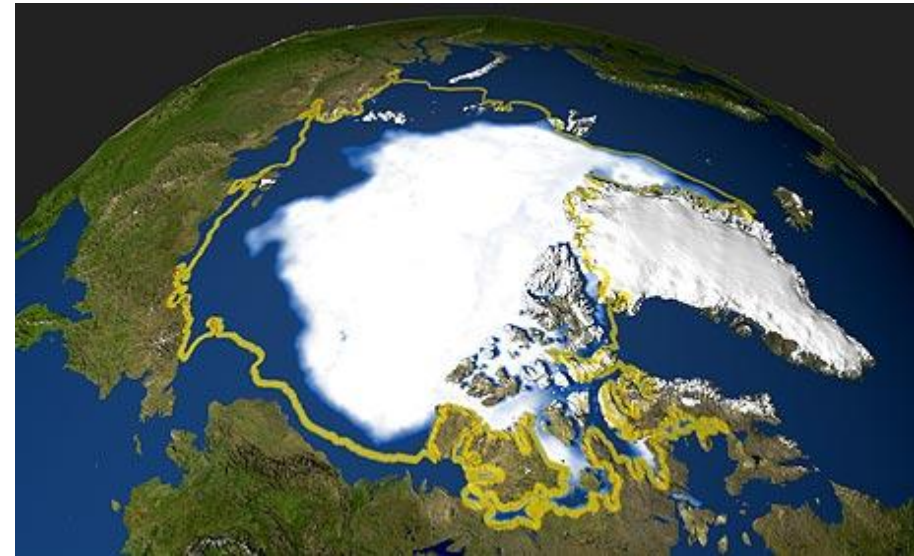
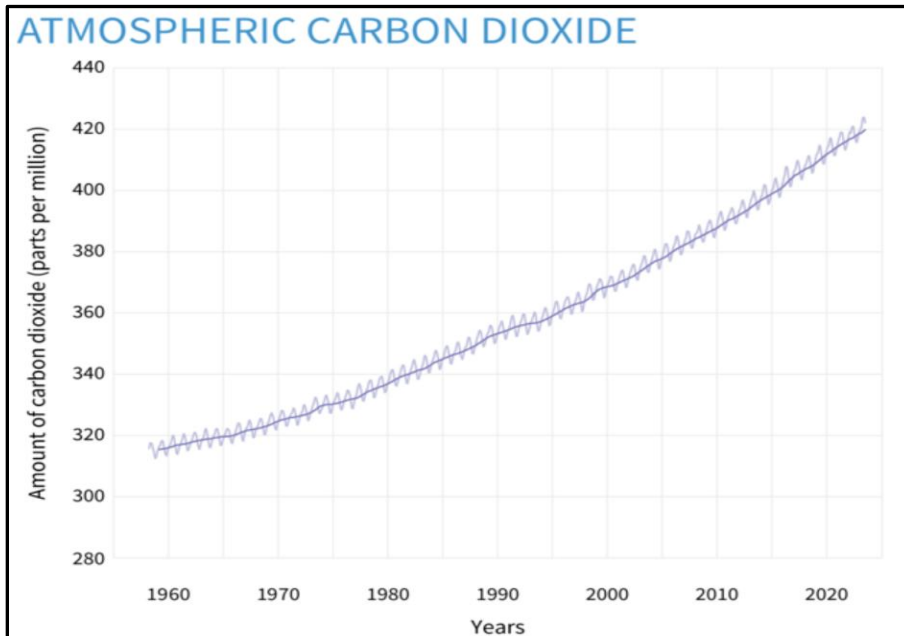


Climate adaptation finance, planning and implementation are all plateauing

UNEP, 2024

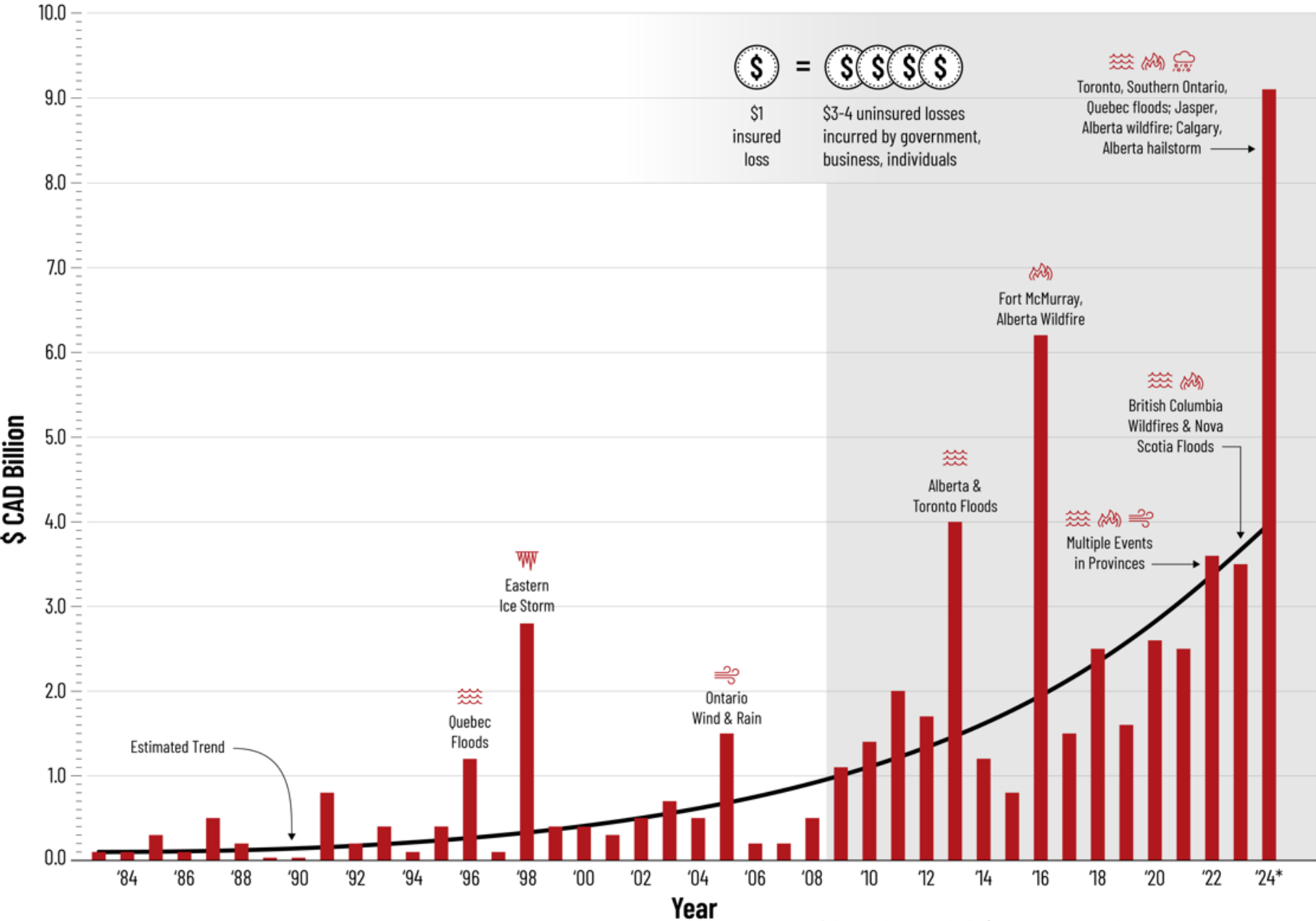
WHY CLIMATE CHANGE WILL BE MORE CHALLENGING

- Global energy mix will remain fossil fuel dependent (International Energy Agency)
- Key GHG driver is population growth (net global increase is 8,000 people/hour & 70 million people/year)
- Climate change is driving climate change (loss of ice, permafrost and algae)



Loss of Ice

Costs of Extreme Weather: Catastrophic Insurable Losses



Source: IBC Facts Book, PCS, CatIQ, Swiss Re, Munich Re & Deloitte

*2024 preliminary values in 2024\$ CAD, corrected for inflation and per capita wealth accumulation.

IMPACT OF FLOODING ON RESIDENTIAL HOUSING



Average Sold Price

- *8.2% reduction* in sold price

Average Number of Listings

- *44.3% decrease* in listings

Average Days on Market

- *19.8% longer* on the market

Mortgage Impact

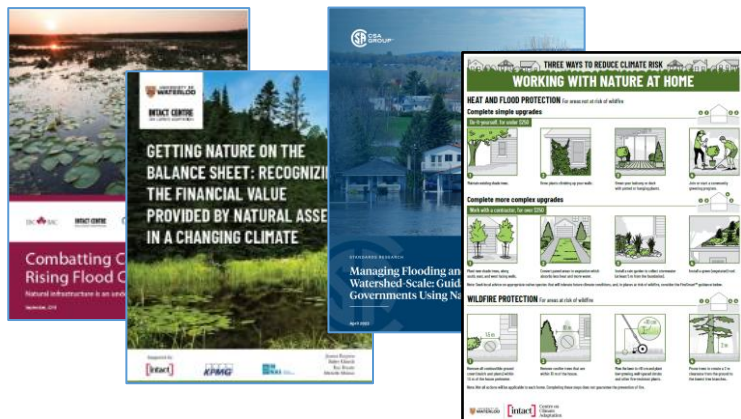
- *loan-to-value ratio*

GUIDANCE TO LIMIT IMPACTS OF FLOODING, WILDFIRES AND EXTREME HEAT

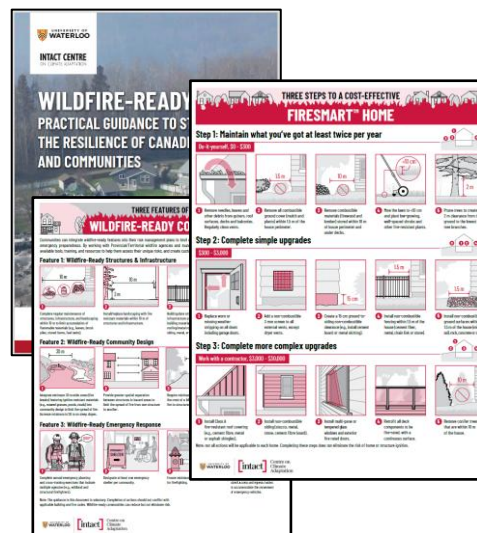
FLOOD



NATURAL INFRASTRUCTURE



WILDFIRE



HEALTH



EXTREME HEAT



CAPITAL MARKETS



PROMOTE HOME FLOOD PROTECTION

- Upon receiving the infographic, within six months **70% of homeowners take two actions to limit basement flooding**
- Mearie member organizations can be key in distributing the **HOME FLOOD PROTECTION** infographic.

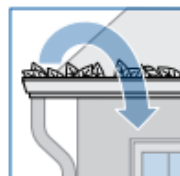
THREE STEPS TO COST-EFFECTIVE HOME FLOOD PROTECTION

Step 1: Maintain what you've got at least twice per year

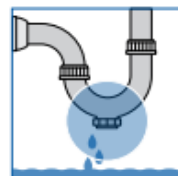
Do-it-yourself, \$0



- 1 Remove debris from nearest storm drain or ditch and culvert.



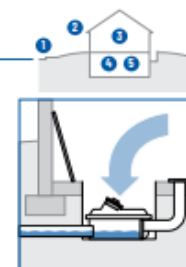
- 2 Clean out eaves troughs.



- 3 Check for leaks in plumbing, fixtures and appliances.



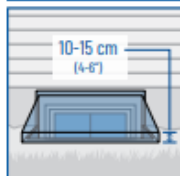
- 4 Test your sump pump.



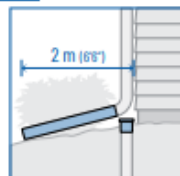
- 5 Clean out your backwater valve.

Step 2: Complete simple upgrades

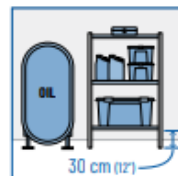
Do-it-yourself, for under \$250



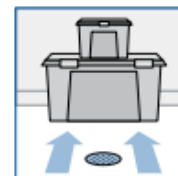
- 1 Install window wells that sit 10-15 cm (4-6") above ground, and window well covers (where fire escape requirements permit).



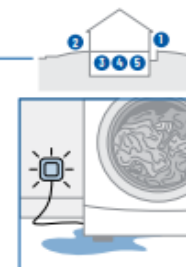
- 2 Disconnect downspouts, cap foundation drains and extend downspouts and sump discharge pipes to direct water at least 2 m from foundation.



- 3 Store valuables and hazardous materials in watertight containers and secure fuel tanks.



- 4 Remove obstructions to floor drain.



- 5 Install and maintain flood alarm.

Step 3: Complete more complex upgrades

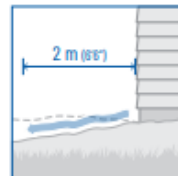
Work with a contractor, for over \$250



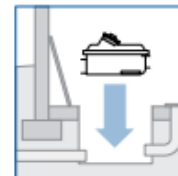
- 1 Install a rain garden to collect stormwater (at least 5 m from the foundation).



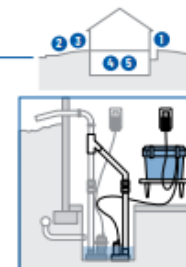
- 2 Convert paved areas to vegetation which absorbs more water and less heat.



- 3 Correct grading to direct water at least 2 m away from foundation.



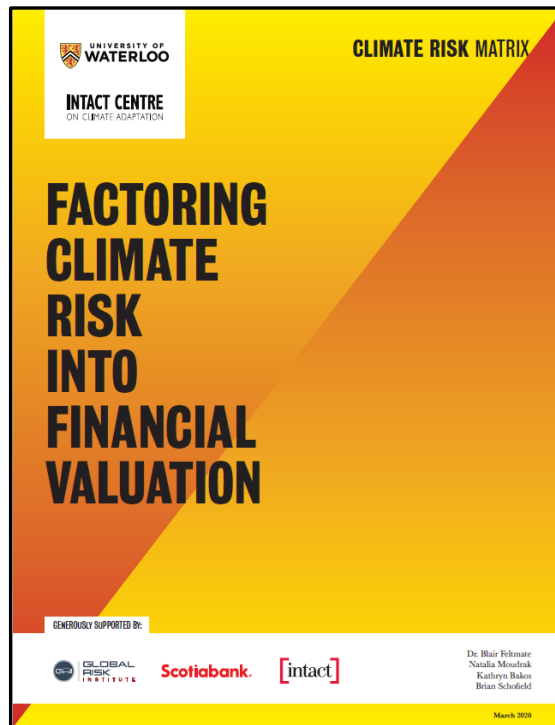
- 4 Install backwater valve.



- 5 Install backup sump pump and battery.

INDUSTRY SPECIFIC PHYSICAL CLIMATE RISKS













Climate Risk Matrices (CRMs) offer a practical means to incorporate physical climate risk into institutional portfolio management, securities disclosure, credit rating adjustments and Board oversight



CRMs developed: Commercial Real Estate, T&D Electricity, Insurance (P&C), Banking (mortgages), Hydro Electricity Generation, Wind Electricity Generation

Electricity Transmission and Distribution (T&D)



Key Climate Risk Impacts					
 Flood Flood-induced high-water levels result in inadequate electrical clearances below lines that are hazardous to the public.	 Wildfire Wildfire along T&D corridors can cause outages if corridors are not adequately clear of brush. ! Vegetation/tree contacts with transmission lines can cause arcing, fires, and outages.	 Extreme Heat Extreme heat can increase the risk of power outages. Very high temperatures make the likelihood of technical failure greater, at a time when operators may already be challenged in their ability to meet peak demand.	 Windstorm Vegetation/tree branches can fall onto T&D lines causing outages. Distribution poles and overhead lines can be brought down by wind forces.	 Snow and Ice Loading ! T&D lines and structures can collapse under heavy ice loading (emphasis on distribution poles and lines).	 Thawing Permafrost Thawing/discontinuous permafrost can displace transmission tower foundations, causing structural collapses and outages.
Risk Reduction Measures					
 Ensure structures are tall enough for safe clearance under foreseeable flood levels, or T&D lines are installed underground.*	 Conduct patrols (visual and/or drone** inspection of utility equipment and structures) in wildfire prone areas. ! Clear vegetation along transmission corridors.	 Enhance the system's capacity to deal with higher demand under high temperature conditions.	 Clear vegetation along transmission corridors. Install anti-galloping devices on conductors and ensure structures are designed to withstand winds.	 ! Install visual monitors to detect ice loading. Before ice loads build, boost current to melt ice (i.e., short the line).	 Modify structure/designs to readily permit adjustment of towers when line patrols identify permafrost thaw displacement.

Key Questions and Responses to Determine Readiness to Mitigate Physical Climate Risk



What percentage of T&D lines in flood-prone areas have sufficient clearance to safely accommodate a 1:200-year flood without de-energizing the line?

Excellent response
> 75%

Good response
50% or more



! Have companies taken action to address wildfire mitigation?

Excellent response
yes



Has system capacity been enhanced (i.e., is there sufficient capacity) to fulfil higher demand during heat waves and avoid outages?

Excellent response
System has already been enhanced

Good response
Enhancements have been scheduled and budgeted



What percentage of total length overhead T&D lines in treed areas are closer than 10 metres horizontally to tree branches that are higher than the conductors?

Excellent response
< 5%

Good Response
< 25%



! Are overhead lines that are susceptible to icing monitored during winter months?

Excellent response
yes



Do transmission structures, in discontinuous permafrost areas, have enough redundant capacity available?

Excellent response
yes