FREE WEBINAR

Irreversible Extreme Heat: Protecting Canadians and Communities from a Lethal Future

April 27, 2022 @ 12 - 1pm PT

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Introduction

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Webinar Agenda

1. Why we need to adapt
2. Overview of extreme heat projections for Canada
3. Actions to reduce risk
4. Achieving multiple benefits

New National Guidance

Launched Wednesday April 20, 2022
https://www.intactcentreclimateadaptation.ca/irreversible-extreme-heat-protecting-canadians-and-communities-from-a-lethal-future/

Input from over 65 national experts (including hosts NCCEH)

A record-breaking release for the Intact Centre on Climate Adaptation

Climate Change - The Canadian Context

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1. Canada's climate **has warmed and will warm further** in the future, driven by human influence.
2. Both past and future warming is on average **about double** the magnitude of global warming.
3. Warming is **effectively irreversible**.

Climate Impacts

- More extreme heat / less extreme cold
- Shorter seasonal coverage of snow and ice
- Melting of glaciers and permafrost
- Rise in sea level

+ Intensification of certain extremes:

- Intense rainfall and urban flooding
- Coastal flooding
- Severity of heat waves
- Risk of drought and forest fire

This is not « just » an environmental issue….

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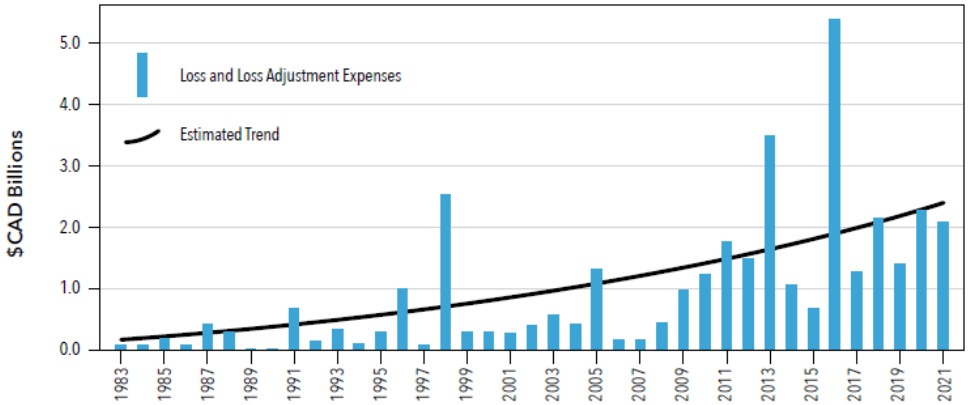
Figure 1: Catastrophic Insurable Claims ($ Can/billions) in Canada, 1983-2021. Blue bars represent loss + loss adjusted expenses. $1 in insured loss reflects an "insurance gap" of $3-4.



Source: IBC (2022) & CatIQ (2022)
Note: claims have been normalized for inflation ($2021) and per capita wealth accumulation.

Most recently $2billion insured losses

Most losses are not insured - per $1 of insured loss, there are $3-4 of uninsured losses incurred by government, businesses and individuals

Source: Bakos, K., Feltmate, B., Chopik, C. & Evans, C. (2022). Treading Water: Impact of Flooding on Canada's Residential Housing Market. Intact Centre on Climate Adaptation

Catastrophic losses are not all "financial", particularly with extreme heat

Source: AON (2021). 2021 Weather, Climate and Catastrophe Insight

Exhibit 30: Top 5 Most Significant Events in the Americas

Date	Event	Location	Deaths	Economic Loss (USD billion)	Insured Loss (USD billion)
01/01-12/31	La Plata Basin Drought*	South America	N/A	4.7	0.1
06/26-06/30	Heat Wave	Canada	800+	-	-
11/13-11/15	BC Atmospheric River	Canada	4	2.4	0.4
08/14	Haiti Earthquake	Haiti	2,248	1.6	Millions
08/16-08/21	Hurricane Grace	Mexico	13	0.5	0.1
		All other events	~425	~13 billion	~2.8 billion
		TOTALS	~3,500	22 billion	3.4 billion

*Combines annual drought loss data from Brazil, Argentina, Paraguay, and Bolivia

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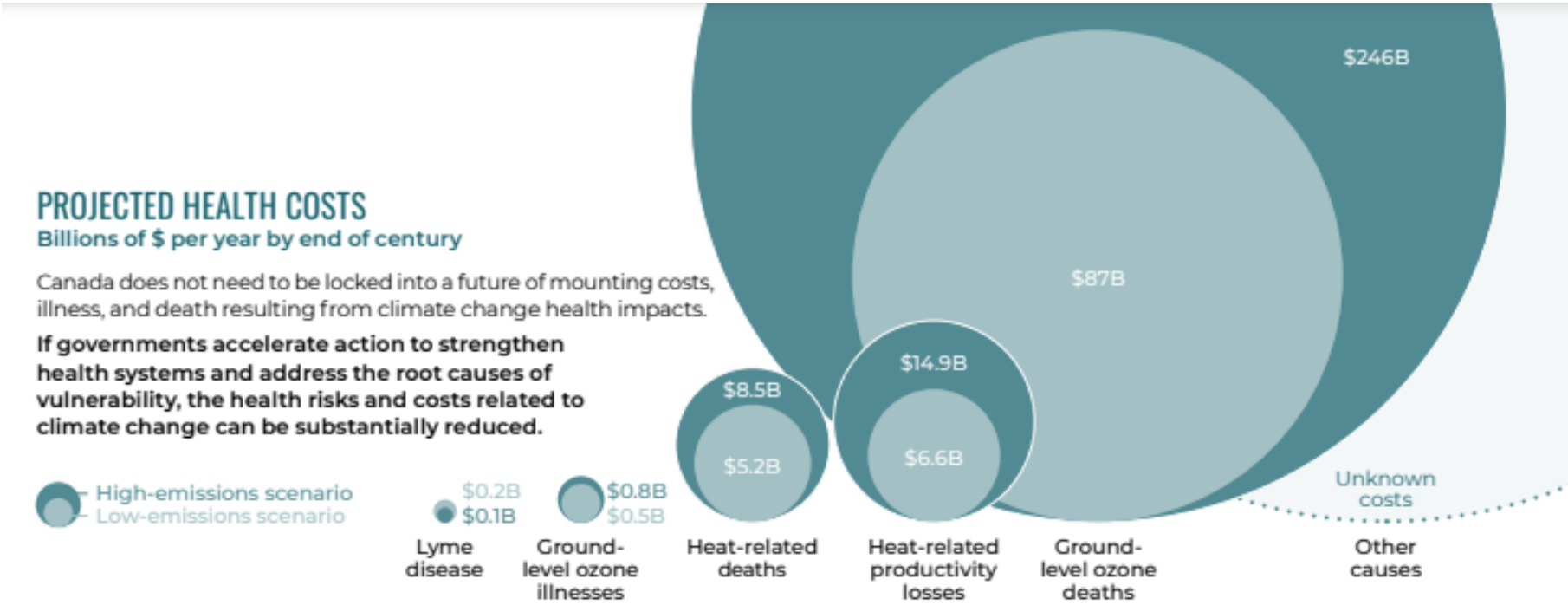
Climate change is already negatively impacting the health of Canadians.
Climate change has been a driver of recent health effects related to rising temperatures and extreme heat, wildfires, and the expansion of zoonotic diseases into Canada, such as Lyme disease

Source: Berry, P., & Schnitter, R. (Eds.). (2022). Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. Ottawa, ON: Government of Canada.



Source: Canadian Climate Institute (2021). The Health Costs of Climate Change.

Tackling Climate Change on Both Fronts

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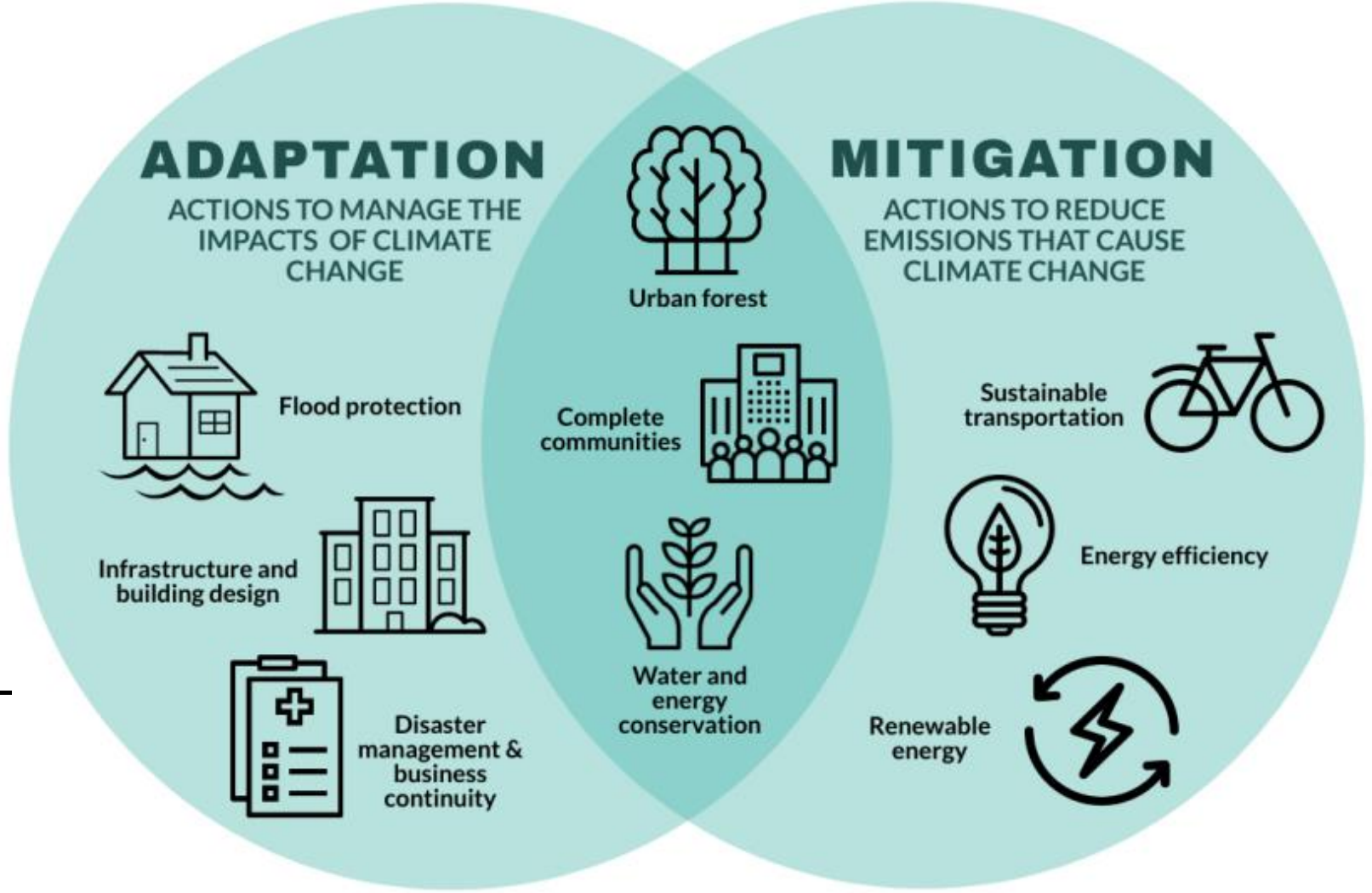
- **Adaptation** is managing the unavoidable
- **Mitigation** is avoiding the unmanageable
- It is not a choice – we must do both



Climate Adaptation Priorities

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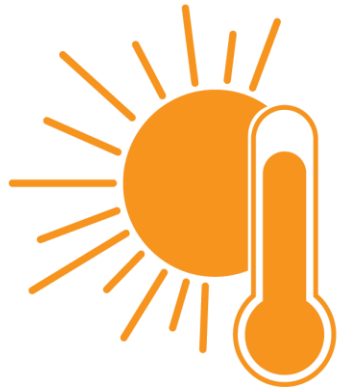
Hazards

Flood

Wildfire



Extreme Heat

Capitals (our wealth)

Nature

Finance

Health

Urban Areas are the Hotspots of Global Warming

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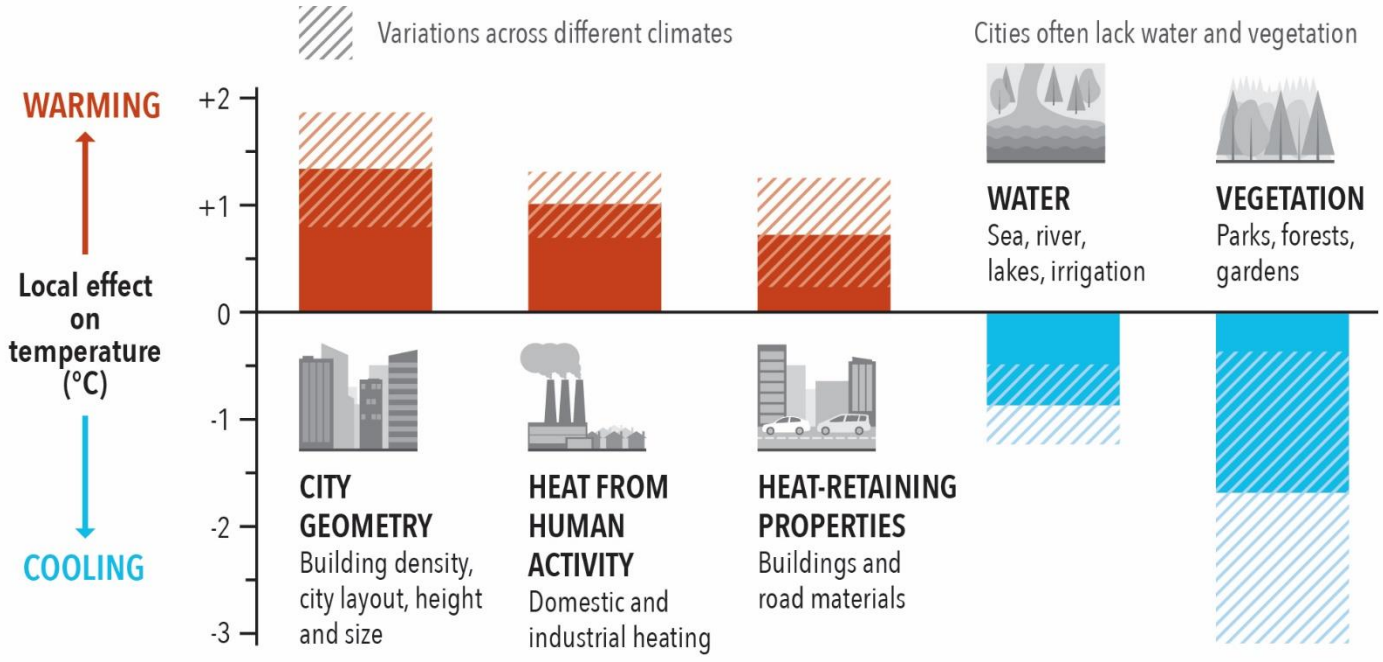
Extreme Heat identified as a key 2National Issue" for Canadian Cities and Towns

- Urban heat island = urban area that is significantly warmer than surrounding areas.
- Air, or surfaces, or both, may exhibit warmer temperatures.
- Nighttime air temp. up to +12C
- Surface day temps. up to +10-15 C



Source: Adapted from IPPC. 2021.

Around 1 in 7 Canadians lives in one of our 35 metropolitan areas

Impacts on Health and Beyond

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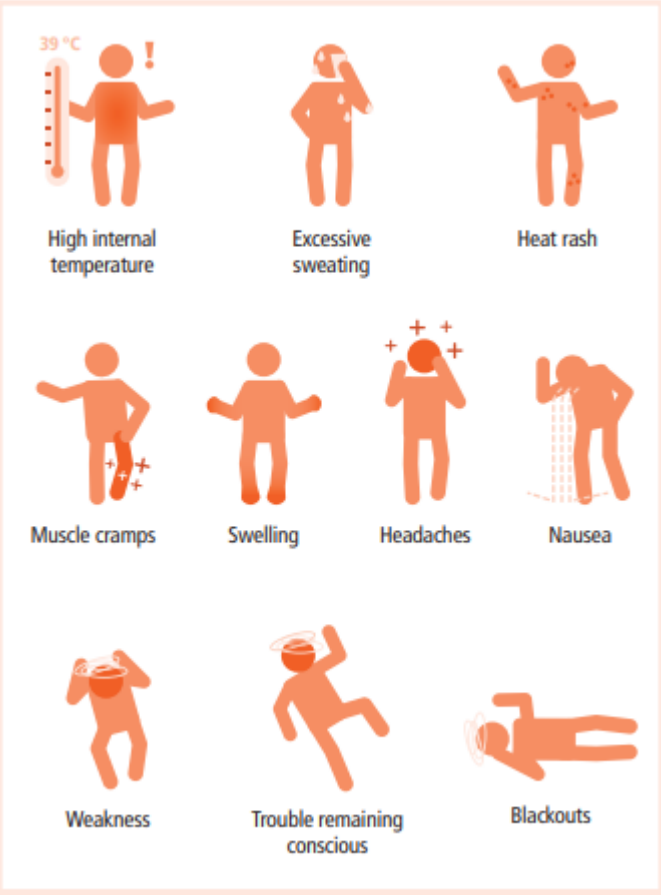

https://ville.montreal.qc.ca/pls/portal/docs/PAGE/ENVIRO_FR/MEDIA/DOCUMENTS/2017_PACCAM_2015-2020_REPORT.PDF

- Health impacts
  - Physical health (potential fatalities)
  - Mental health and well-being
- Infrastructure impacts
  - Electrical Power
  - Digital and telecommunications
  - Transportation (rail, road, bridges)
  - Water and wastewater
  - Buildings
- Systems
  - Health and social services
  - Food systems
  - Natural systems

526

Deaths as a result of extreme heat in British Columbia, June 25 to July 1, 2021.

86

Number of excess heat-related deaths in Quebec during the summer of 2018 - the hottest on record.

Inequality - Vulnerable People are More At Risk

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Risk Factors	Populations at Risk
Increased exposure to extreme heat	• People living in urban-heat-island areas with limited vegetation and natural habitat • People living outdoors • People living in housing that is poorly adapted to extreme heat (higher floors of apartment buildings; prisons; housing without access to air conditioning or without ventilation) • People with mobility issues • People who are socially isolated (living alone, do not leave home) • People who work in the heat (outdoors and indoors) • People who exercise in the heat
Increased sensitivity to extreme heat	• Older adults • Infants and young children • Pregnant women • People with chronic illnesses such as breathing difficulties, heart conditions, obesity or diabetes • People living with mental illness • People who are malnourished or dehydrated • People taking certain medications • People taking certain drugs or alcohol
Limited access to resources and/or information	• People with low incomes • People experiencing homelessness • People living in underserved communities • People who neither speak nor understand English or French

Extreme Heat Indicators - Projections across Canada

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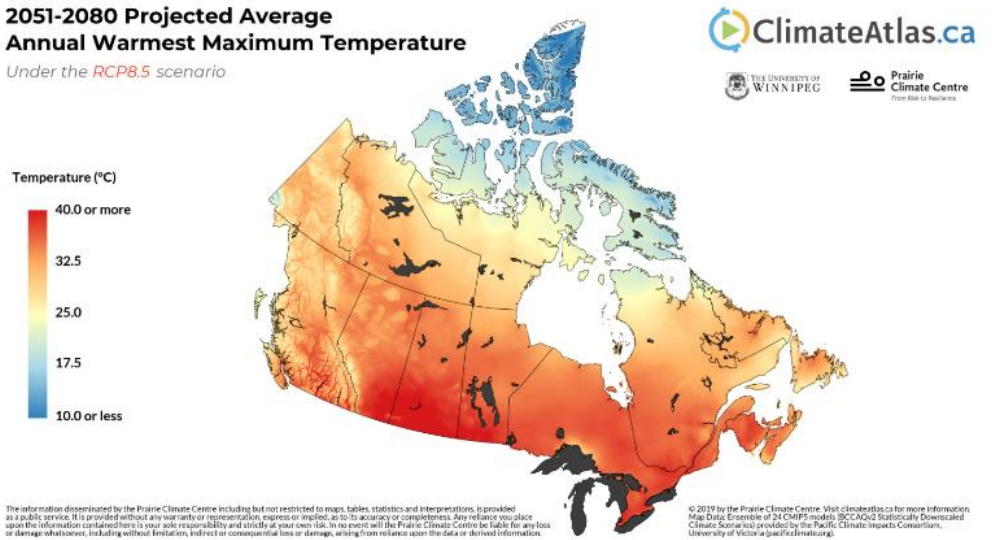
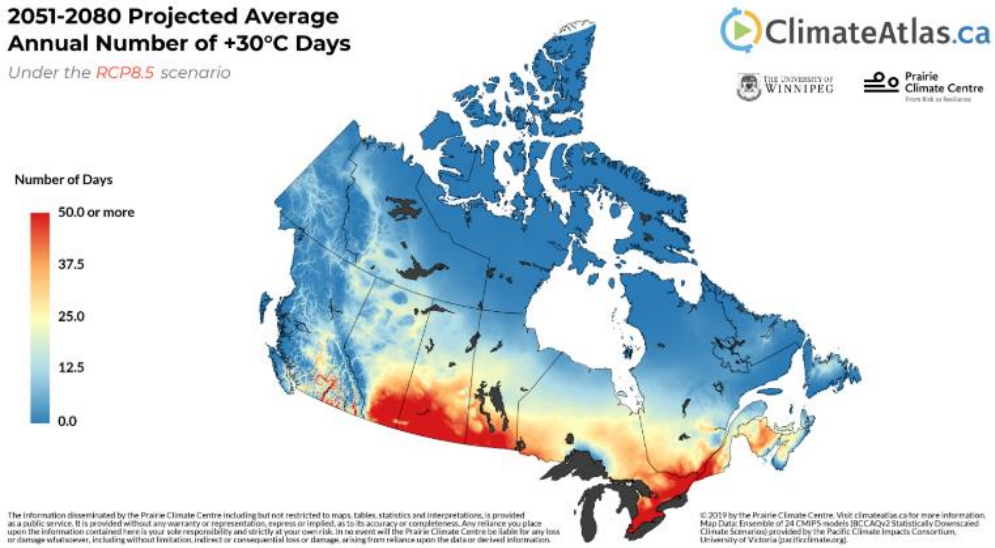
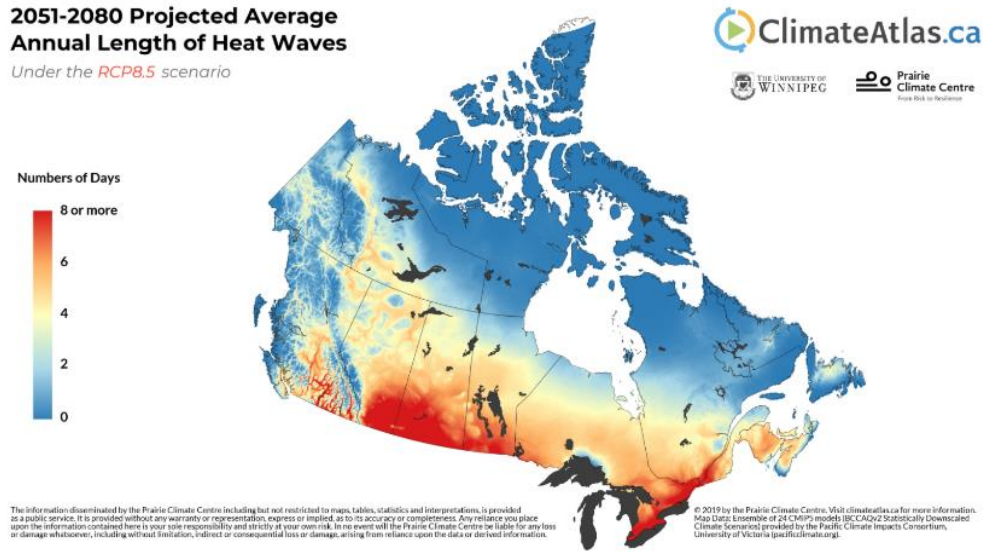
Three “red zones” most exposed to extreme heat:

1. Valleys between the West Coast and the Rocky Mountains in B.C.,
2. Prairie communities bordering the U.S, and
3. North of Lake Erie through the St. Lawrence River Valley in Ontario and Quebec.

Data at www.climateatlas.ca (fantastic resource)







Extreme Heat Indicators – Ranking of CMAs

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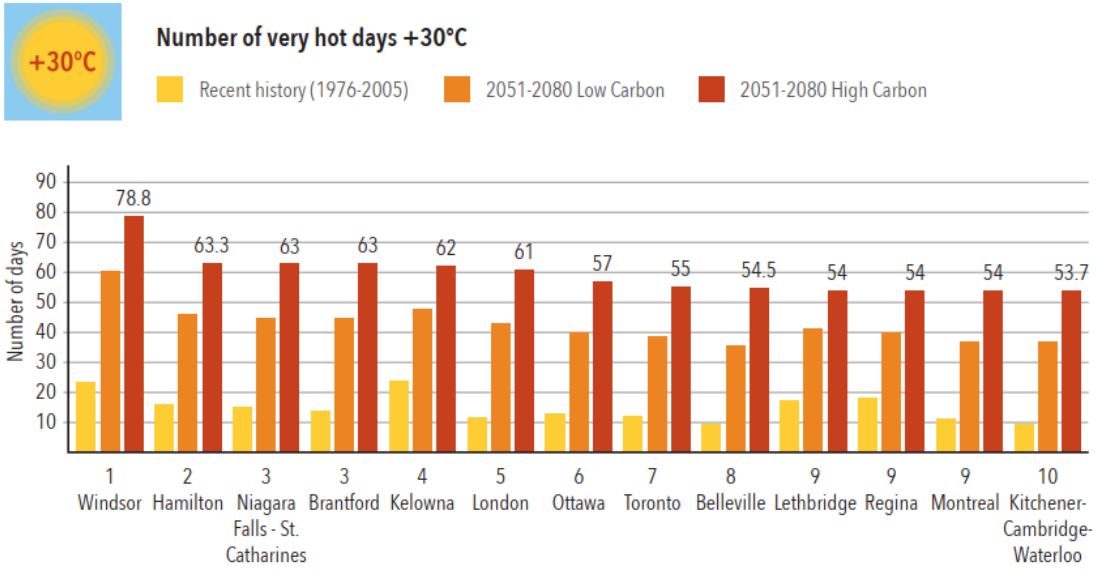

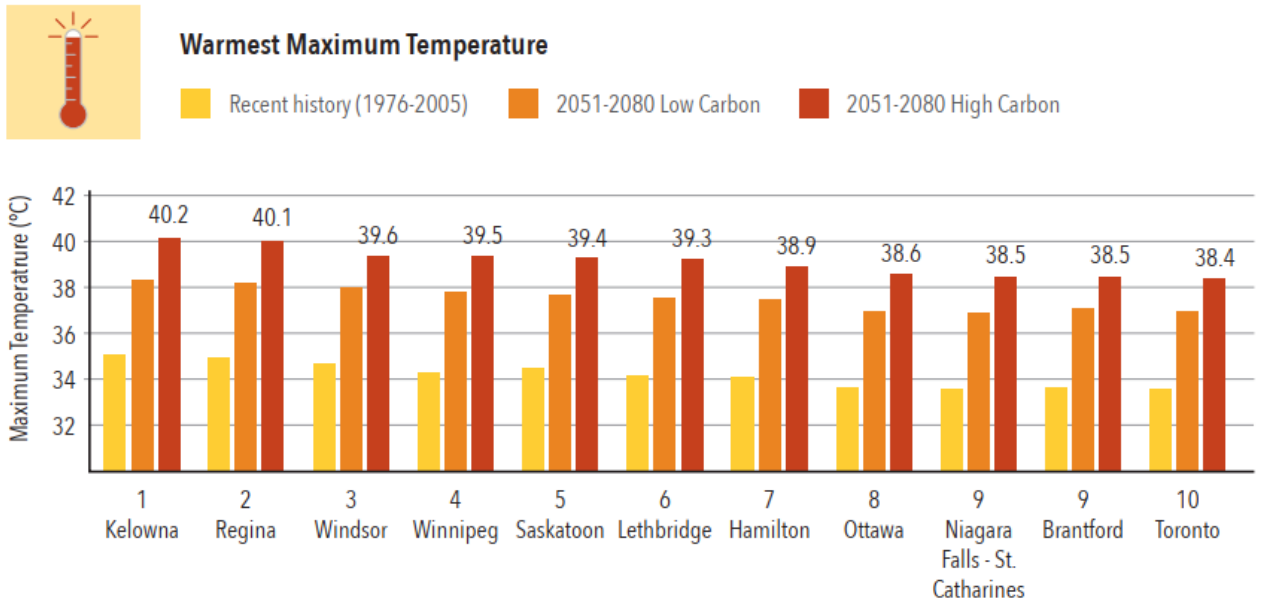

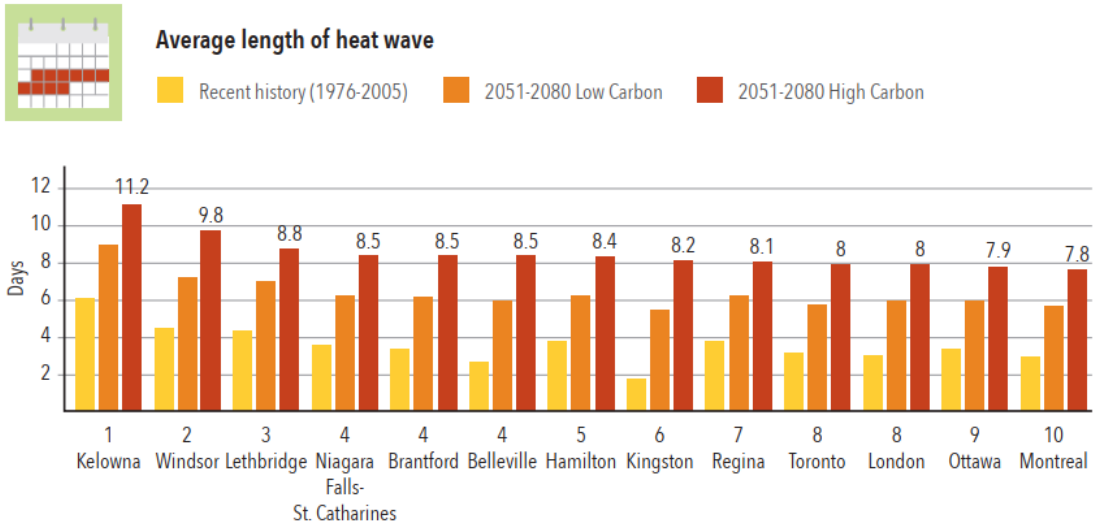

Ranked CMAs and Their Populations

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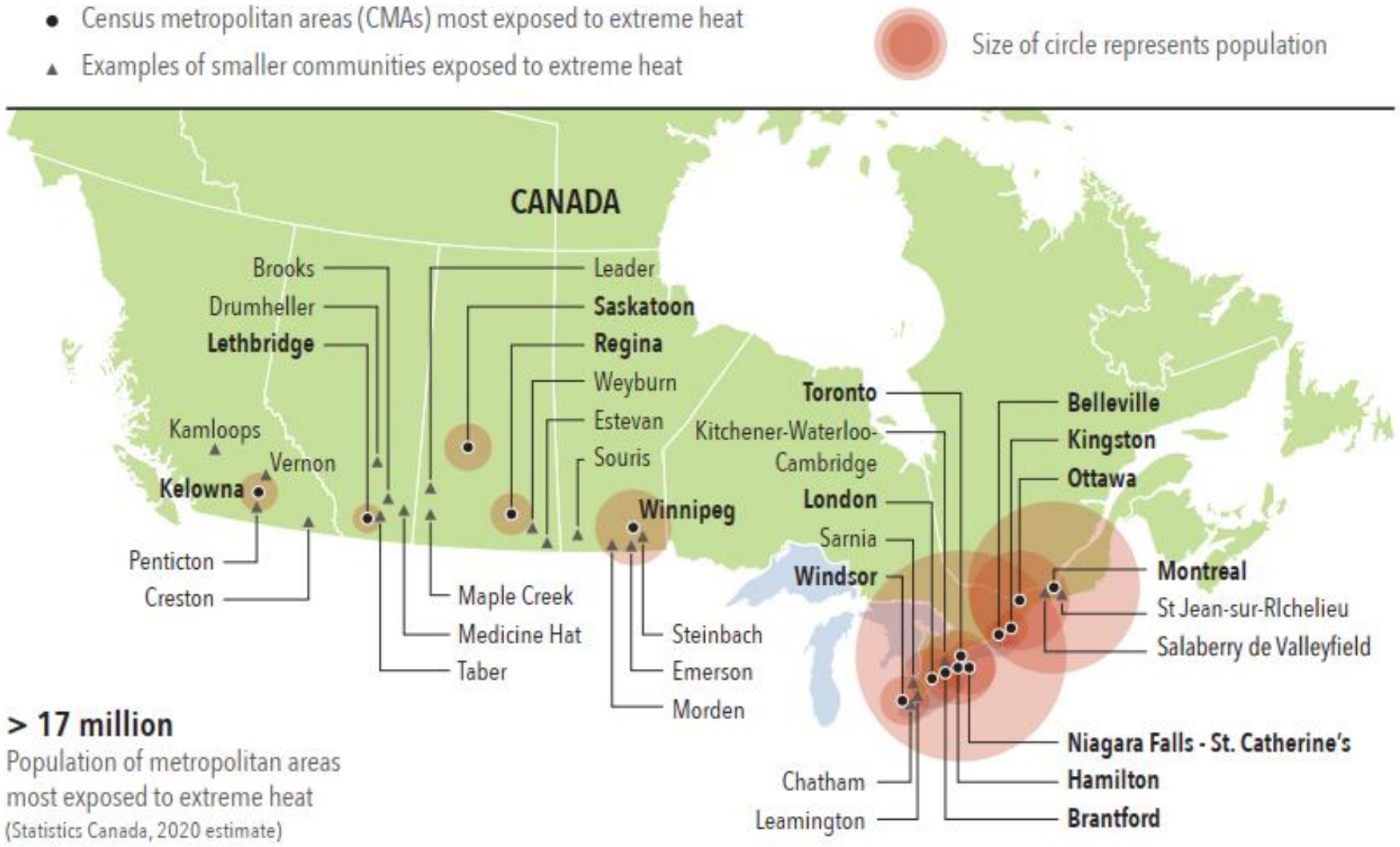

Pause for Questions

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Three Types of Action

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Actions fall into three categories

Three groups of Canadians have a role to play, by acting on their own and encouraging others to act to build resilience to extreme heat at the local and community scale

Individuals

Property Owners and Managers

Communities

Non-structural (planning and behavioural changes)	Green Infrastructure (working with nature)	Grey Infrastructure (improving buildings and public infrastructure)
Work with neighbours, friends and family to prepare	Plant and maintain trees 	Install shading devices (shutters, awnings, overhangs, blinds, heat-resistant curtains)
Understand building-scale vulnerabilities to extreme heat	Install a green (vegetated) roof 	Install and maintain backup power generation (e.g. to maintain air conditioning in designated "cool" rooms)
Develop extreme-heat emergency plan	Expand vegetated areas and water bodies and absorb more water (forming a blue-green infrastructure network) 	Adapt community infrastructure to extreme heat (e.g. transport, utilities, water supply)

Individuals

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Actions by Individuals

Non-structural (planning and behavioural changes)	Green Infrastructure* (working with nature)	Grey Infrastructure (improving buildings and public infrastructure)
IND-1 Work with neighbours, friends and family to prepare**	**GI-1** Plant and maintain trees	**BI-1** Enhance insulation and airtightness
IND-2 Arrange to receive public heat warnings**	**GI-2** Expand vegetation cover and absorb water to keep gardens and balconies cooler**	**BI-2** Install cool (reflective) roof / wall / paving surfaces
IND-3 Learn how to use natural ventilation**	**GI-3** Install a green (vegetated) roof	**BI-3** Use concrete, brick, stone and tile finishes that absorb heat
IND-4 Minimize "waste" indoor heat production, for example by switching off unused appliances**	**GI-4** Grow a green (vegetated) façade**	**BI-4** Install windows that reduce heat gain from the sun
IND-5 Plan for modified working, living and sleeping arrangements**		**BI-5** Install shading devices (shutters, awnings, overhangs, blinds, heat-resistant curtains) **
		BI-6 Install temperature and humidity monitors or controls**
		BI-7 Use ceiling / portable fan(s)**
		BI-8 Install and maintain air conditioning / heat pump

* In places at risk of wildfire, particularly at the wildland-urban interface, the use of green infrastructure must be considered alongside FireSmart guidance.[70]
** Denotes actions that may be most achievable by tenants and those with fewer resources

Individuals – Extra Advantages

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- Improved comfort, well-being, and mental health
- Lower energy bills (for heating and cooling potentially)
- Improved productivity (esp. if working from home)
- Enhanced property values
- Stronger social networks and relationships

Property Owners and Managers

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Multi-unit residential building challenges:

- Older infrastructure not designed for extreme heat
- Higher temperatures on higher floors from solar radiation
- Limited opportunity for natural ventilation
- A reliance on a power supply to operate elevators, provide air conditioning, and pump water to higher floors
- Vulnerable residents

Commercial buildings may have additional vulnerabilities:

- Specific heat-sensitive equipment
- A reliance on a power supply to run the heating, ventilation and air-conditioning (HVAC) system
- Large, sun-exposed parking lots that contribute to locally high outdoor temperatures and the wider urban-heat-island effect

Property Owners and Managers

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Actions by Property Owners and Managers

(multi-unit residential and commercial buildings)

Non-structural (planning and behavioural changes)	Green Infrastructure* (working with nature)	Grey Infrastructure (improving buildings and public infrastructure)
PROP-1 Understand building-scale vulnerabilities to extreme heat **PROP-2** Provide information and help occupants adapt **PROP-3** Identify and support vulnerable occupants (e.g. the elderly or those living alone) **PROP-4** Use natural ventilation in common areas **PROP-5** Develop extreme-heat emergency plan with occupants	**GI-1** Plant and maintain trees in grounds and parking lots **GI-2** Expand vegetated areas and absorb water around buildings, on balconies and in parking lots **GI-3** Install a green (vegetated) roof **GI-4** Grow a green (vegetated) façade or wall	**See individuals BI-1 to BI-8, plus:** **BI-9** Install and maintain backup power generation (e.g. to maintain air conditioning in designated "cool" rooms) **BI-10** Arrange for backup water supply during power outages (pumped water supply cannot function properly without power)

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Property Owners and Managers – Extra Advantages

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- Better experiences for tenants
- Lower operating costs
- A greater chance of avoiding business interruptions
- An enhanced reputation
- Improved performance in terms of Environmental, Social and
- Governance (ESG) criteria
- Additional foot trafc in pedestrian and retail environments
- Higher property values and rent premiums, and lower vacancy rates

Communities

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Actions by Communities

Non-structural (planning and behavioural changes)	Green Infrastructure* (working with nature)	Grey Infrastructure (improving buildings and public infrastructure)
COM-1 Assess and map vulnerability to extreme heat **COM-2** Use education and outreach campaigns to encourage preventive action **COM-3** Set up community support programs for vulnerable populations (e.g. underserved communities) **COM-4** Require heat-sensitive urban planning, infrastructure design, and operation **COM-5** Provide incentives to increase passive cooling and reduce "waste" heat (e.g. by subsidising tree planting or home retrofits) **COM-6** Develop extreme-heat emergency plan	**GI-1** Plant and maintain trees (including in urban forests, green corridors, and urban parks) **GI-2** Expand vegetated areas and water bodies and absorb more water (forming a blue-green infrastructure network)	**BI-11** Adapt community infrastructure to extreme heat (e.g. transport, utilities, water supply) **BI-12** Reduce vehicular traffic **BI-13** Install "cool" reflective or permeable pavements **BI-14** Expand artificial shade (e.g. using canopies or shelters) **BI-15** Install water-based cooling systems (e.g. ponds and sprinklers) and drinking fountains

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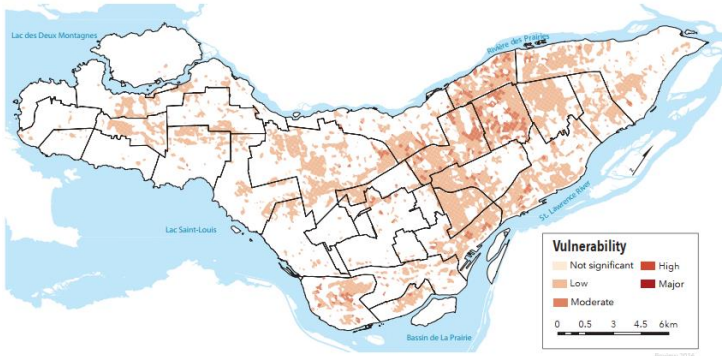
** Denotes actions that may be most achievable by tenants and those with fewer resources



Communities – Extra Advantages

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- Reduced greenhouse-gas production (where energy is produced using fossil fuels)
- Improved air quality with associated health benefits
- Carbon sequestration and storage by vegetation and soils
- Improved habitats and biodiversity
- Flood and erosion regulation
- Opportunities for recreation and active transportation

Achieving Multiple Benefits

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- Working with nature achieves the most additional benefits

		Human Co-Benefits			Ecosystem Service Co-Benefits						Direct Financial Co-Benefits		
Ref.	Action	Knowledge and Education	Social Networks and Relationships	Recreation / Active Transport	Improved Air Quality	Reduced GHG Production	Vegetation and Soils	Improved Habitat and Biodiversity	Improved Water Quality	Flood and Erosion Regulation	Enhanced Value / Longer Design Life	Improved Business / Work Continuity	Energy-Efficiency and Cost Savings
GI-1	Plant and maintain trees												
GI-2	Expand vegetated areas and water bodies and absorb more water												
GI-3	Install green roofs												
GI-4	Grow green façades or green walls on buildings												

Natural Infrastructure Reduces Extreme Heat and more…

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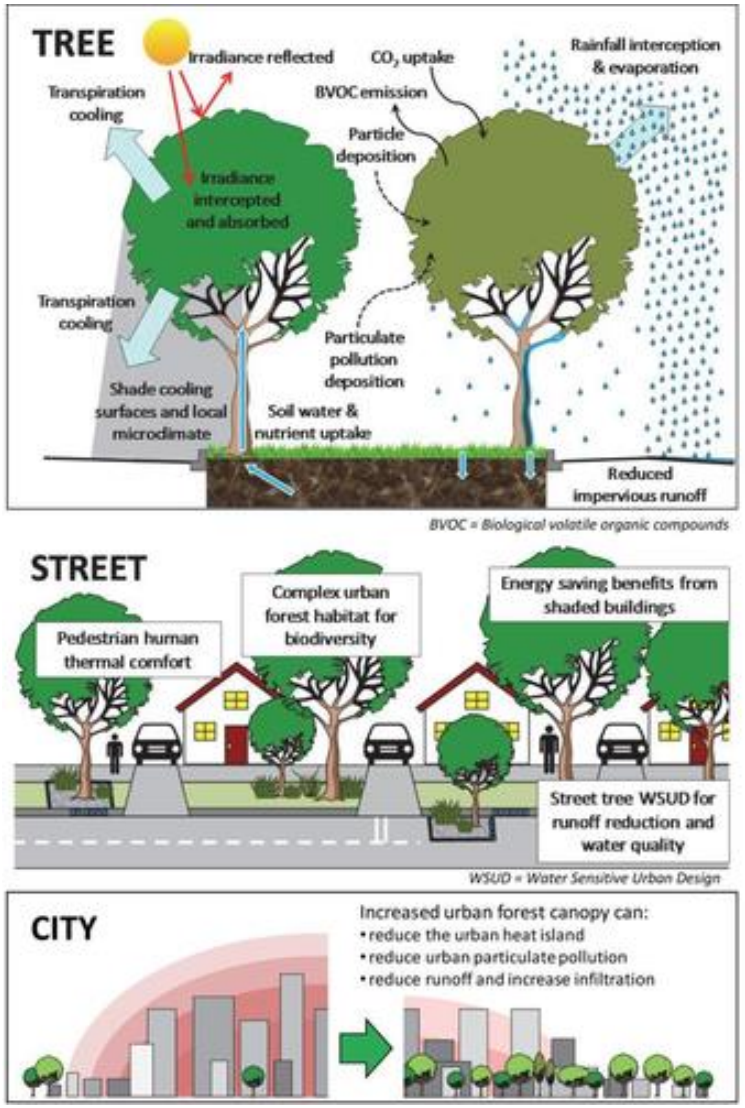

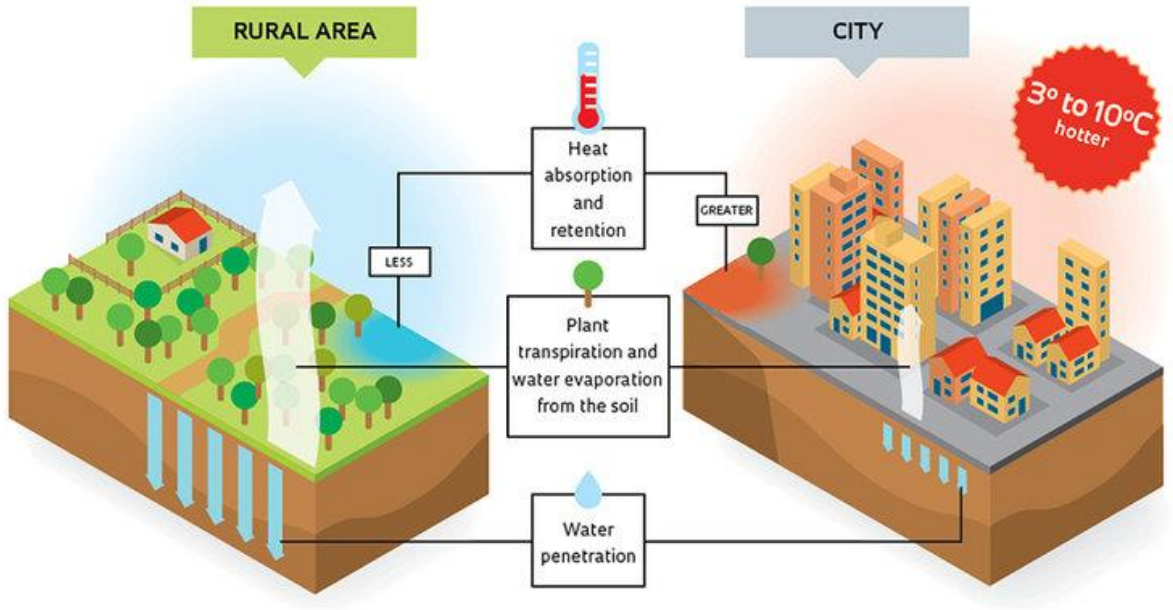

Source: Livesley et.al (2019) The Urban Forest and Ecosystem Services: Impacts on Urban Water, Heat, and Pollution Cycles at the Tree, Street, and City Scale https://www.ecori.org/green-tip/2019/8/9/cool-ideas-for-reducing-urban-heat-island-effect

Source: ecoRi (2019) Cool Ideas for Reducing Urban Heat-Island Effect https://www.ecori.org/green-tip/2019/8/9/cool-ideas-for-reducing-urban-heat-island-effect

This is not « just » an environmental issue….

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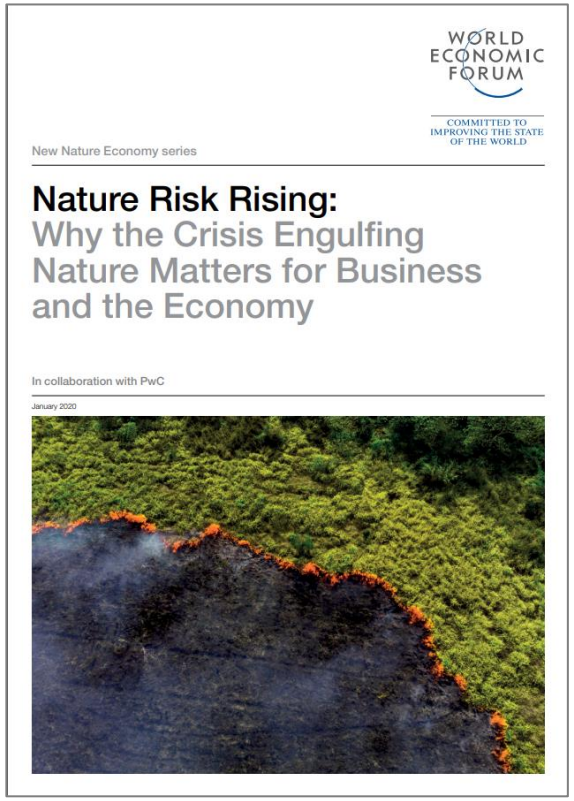
World Economic Forum

New Nature Economy Series 2020:

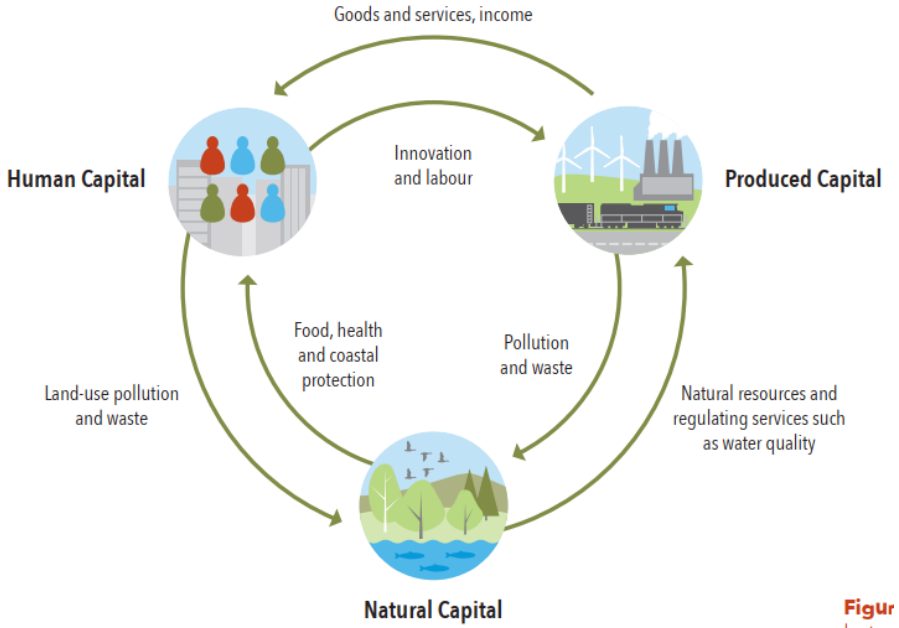
"$44 trillion of economic value generation – over half the world's total GDP – is moderately or highly dependent on nature".

"Fighting climate change is critical – but not enough – to halt biodiversity loss and safeguard nature".



Source: World Economic Forum (2020) New Nature Economy Series 2020
https://www.weforum.org/reports/new-nature-economy-report-series

"Our economies are embedded within Nature, not external to it"



Figur
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types

Adapted from HM Treasury (2021) The Economics of Biodiversity: The Dasgupta Review
https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review

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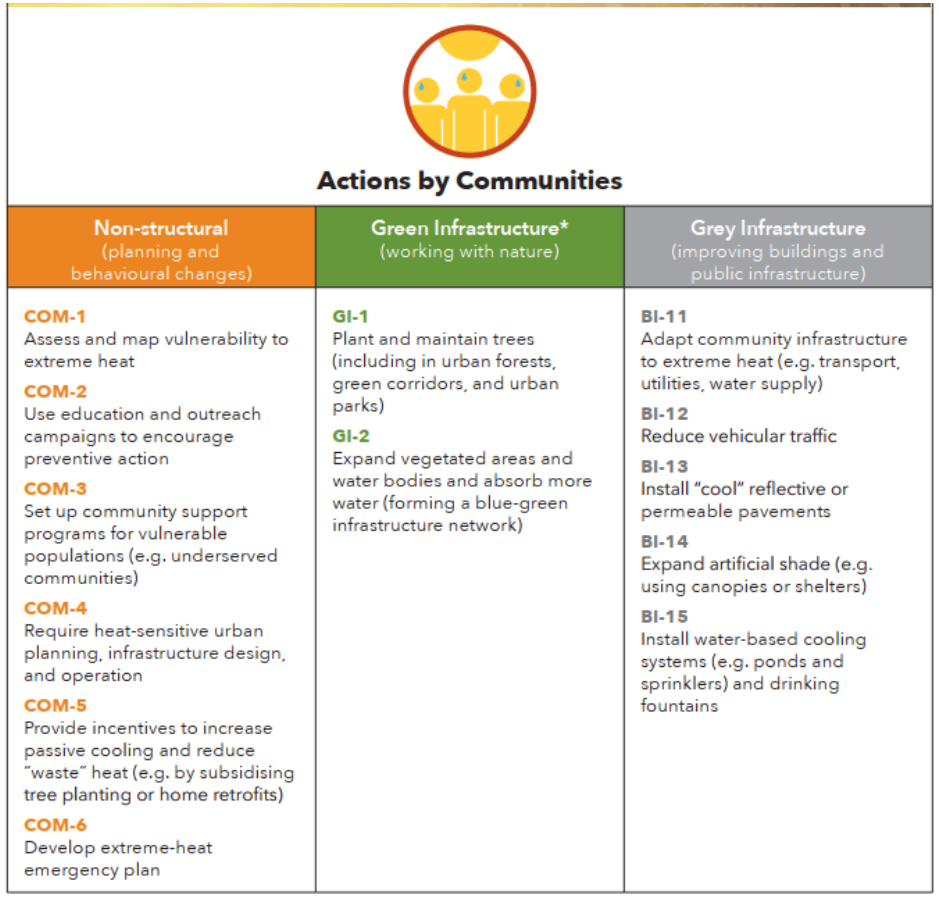
Chris Rol, Manager, Policy, Insurance Bureau of Canada
Emmanuel Rondia, Executive Director, Conseil régional de l'environnement de Montréal
Didier Serre Ruah, FSA; Head of Climate Risk Modeling and Research, Clearsum
Jeanette Southwood, FCAE, FEC, LL.D. (h.c.), P.Eng.; Vice-president, Corporate Affairs and Strategic Partnerships, Engineers Canada
Alejandro Terrones, Director, Disaster Risk Reduction, Canadian Red Cross
Dwayne Torrey, P.Eng.; Director, Construction and Infrastructure Standards, CSA Group
Conservation and Parks
Sarah Warren, Member, Environmental Health Work Group, Ontario Public Health Association
Ralph Wells, Community Energy Manager, University of British Columbia
Heather Wheeliker, Program Manager, Community Involvement, City of Edmonton
T. Luke Young, Practice Lead, Resilience and Climate Change, Americas, AECOM

User-Friendly Digital Features

INTACT CENTRE
ON CLIMATE ADAPTATION

Clickable Actions



Actions by Communities

Non-structural (planning and behavioural changes)	Green Infrastructure* (working with nature)	Grey Infrastructure (improving buildings and public infrastructure)
COM-1 Assess and map vulnerability to extreme heat	**GI-1** Plant and maintain trees (including in urban forests, green corridors, and urban parks)	**BI-11** Adapt community infrastructure to extreme heat (e.g. transport, utilities, water supply)
COM-2 Use education and outreach campaigns to encourage preventive action	**GI-2** Expand vegetated areas and water bodies and absorb more water (forming a blue-green infrastructure network)	**BI-12** Reduce vehicular traffic
COM-3 Set up community support programs for vulnerable populations (e.g. underserved communities)		**BI-13** Install "cool" reflective or permeable pavements
COM-4 Require heat-sensitive urban planning, infrastructure design, and operation		**BI-14** Expand artificial shade (e.g. using canopies or shelters)
COM-5 Provide incentives to increase passive cooling and reduce "waste" heat (e.g. by subsidising tree planting or home retrofits)		**BI-15** Install water-based cooling systems (e.g. ponds and sprinklers) and drinking fountains
COM-6 Develop extreme-heat emergency plan		

* In places at risk of wildfire, particularly at the wildland-urban interface, the use of green infrastructure must be considered alongside FireSmart guidance.[70]

** Denotes actions that may be most achievable by tenants and those with fewer resources

Useful References

Chapter 3: Resilience to Extreme Heat: 35 Practical Actions

67 Health Canada. 2020. "Reducing urban heat islands to protect health in Canada." Accessed at: https://www.canada.ca/en/services/health/publications/healthy-living/reducing-urban-heat-islands-protect-health-canada.html

68 Guilbault, S. P. Kovacs, P. Berry and G.R.A. Richardson (eds.) "Cities Adapt to Extreme Heat – Celebrating Local Leadership." Accessed at: https://www.iclr.org/wp-content/uploads/PDFS/cities-adapt-to-extreme-heat.pdf

69 Jay, O. et al. "Reducing the health effects of hot weather and heat extremes: from personal cooling strategies to green cities." *The Lancet*, vol. 398, issue 10301, 2021, pp. 709-724. DOI: https://doi.org/10.1016/S0140-6736(21)01209-5

70 FireSmart Canada. 2019. "FireSmart Begins At Home Manual." Accessed at: https://www.firesmartcanada.ca/wp-content/uploads/2019/10/FS_Generic-HomeOwnersManual_Booklet-November-2018-Web.pdf

3.1.1 Non-Structual Actions: Individuals (IND)

IND-1 Work with neighbours, friends and family to prepare

71 Health Canada. 2011. "Extreme Heat Events Guidelines: Technical Guide for Health Care Workers." Accessed at: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/climat/workers-guide-travailleurs/extreme-heat-chaleur-accablante-eng.pdf

IND-2: Arrange to receive public heat warnings

72 Government of Canada. "Public Weather Alerts for Canada." Accessed at: https://weather.gc.ca/warnings/index_e.html

73 Government of Canada. 2020. "Criteria for public weather alerts: Heat." Accessed at: https://www.canada.ca/en/environment-climate-change/services/types-weather-forecasts-use/public/criteria-alerts.html#msc-map

74 Government of Canada. 2020. "WeatherCAN" Accessed at: https://www.canada.ca/en/environment-climate-change/services/weather-general-tools-resources/weathercan.html

75 Government of Canada, 2021. "MetNotes". Accessed at: https://www.canada.ca/en/environment-climate-change/services/weather-general-tools-resources/weathercan/metnotes.html

Media Highlights

INTACT CENTRE
ON CLIMATE ADAPTATION

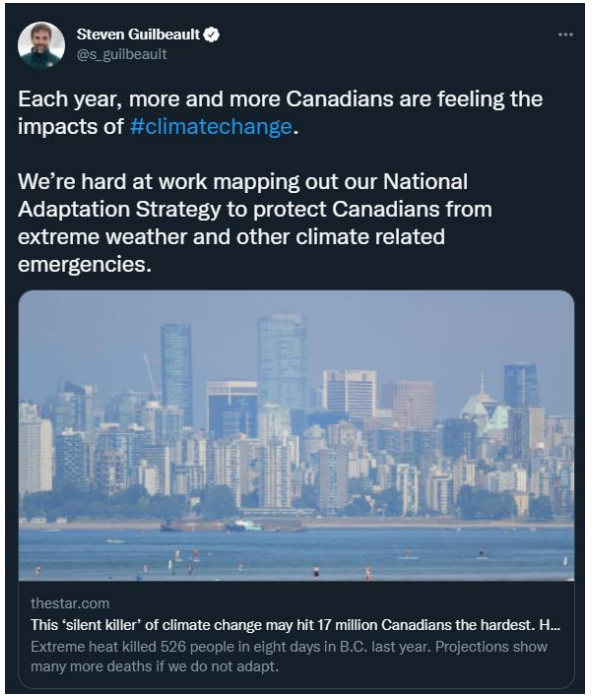
- Coverage extensive, in English and French, despite not being in a « disaster »

- **Mainstream Television Coverage:**
  - Radio-Canada RDI (Launch morning on breakfast news)
  - CBC News (Canada Tonight, Rundown)
  - Global National (part of Earth Day programming)
  - The National

- **Radio Coverage:**
  - 30 CBC Morning News interviews across Canada
  - Radio-Canada Ottawa, Toronto, Winnipeg
  - Many other local stations

- **Written Coverage:**
  - The Canadian Press / La Presse canadienne (in The Globe and Mail , La Presse)
  - Toronto Star (inc. front page of printed version)
  - CBC and Radio-Canada - Multiple articles

- **Social Media:**
  - Extensive sharing by partners, journalists and decision-makers



A Suite of Free Tools and Guidance

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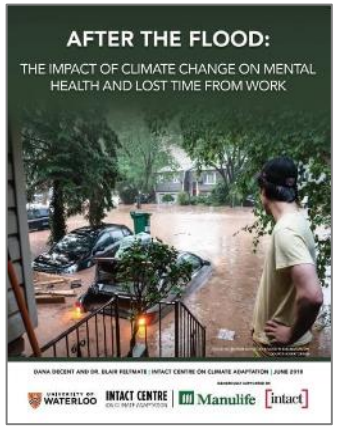
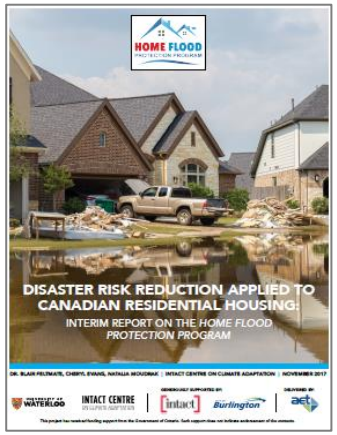
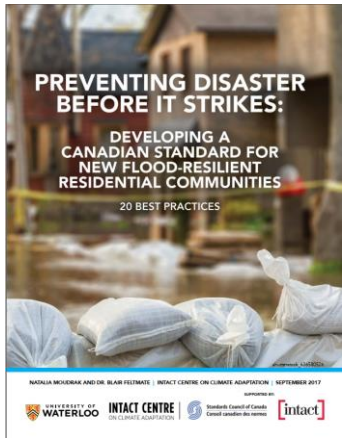


Citizens

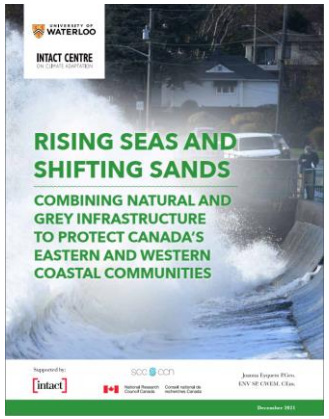


Homes

Commerical Real-Estate

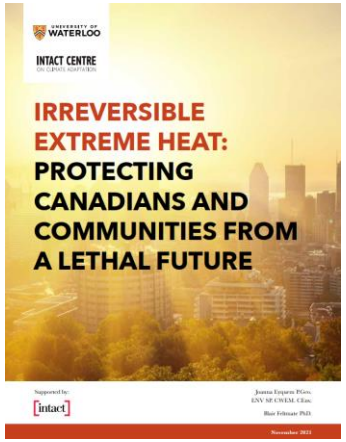


Communities



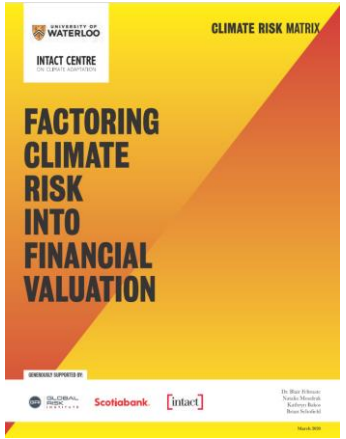
Coastal Protection

Wildfires



Extreme Heat

Role of Natural Infrastructure



Application of TCFD

https://www.intactcentreclimateadaptation.ca

Key Messages

INTACT CENTRE
ON CLIMATE ADAPTATION

1. We need to adapt to extreme heat now in southern Canadian cities.

2. We can empower residents, building owners and managers and communities to take action to reduce risks.

3. Nature and social networks have a key role to play, combined with grey infrastructure.

4. There are many « win-win » opportunities to both reduce risk and make life better!

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New National Guidance

Launched Wednesday April 20, 2022
https://www.intactcentreclimateadaptation.ca/irreversible-extreme-heat-protecting-canadians-and-communities-from-a-lethal-future/

Input from over 65 national experts (including hosts NCCEH)

A record-breaking release for the Intact Centre on Climate Adaptation