Disaster Resilient Cities

Adapting to the Growing Threat of High Impact Weather

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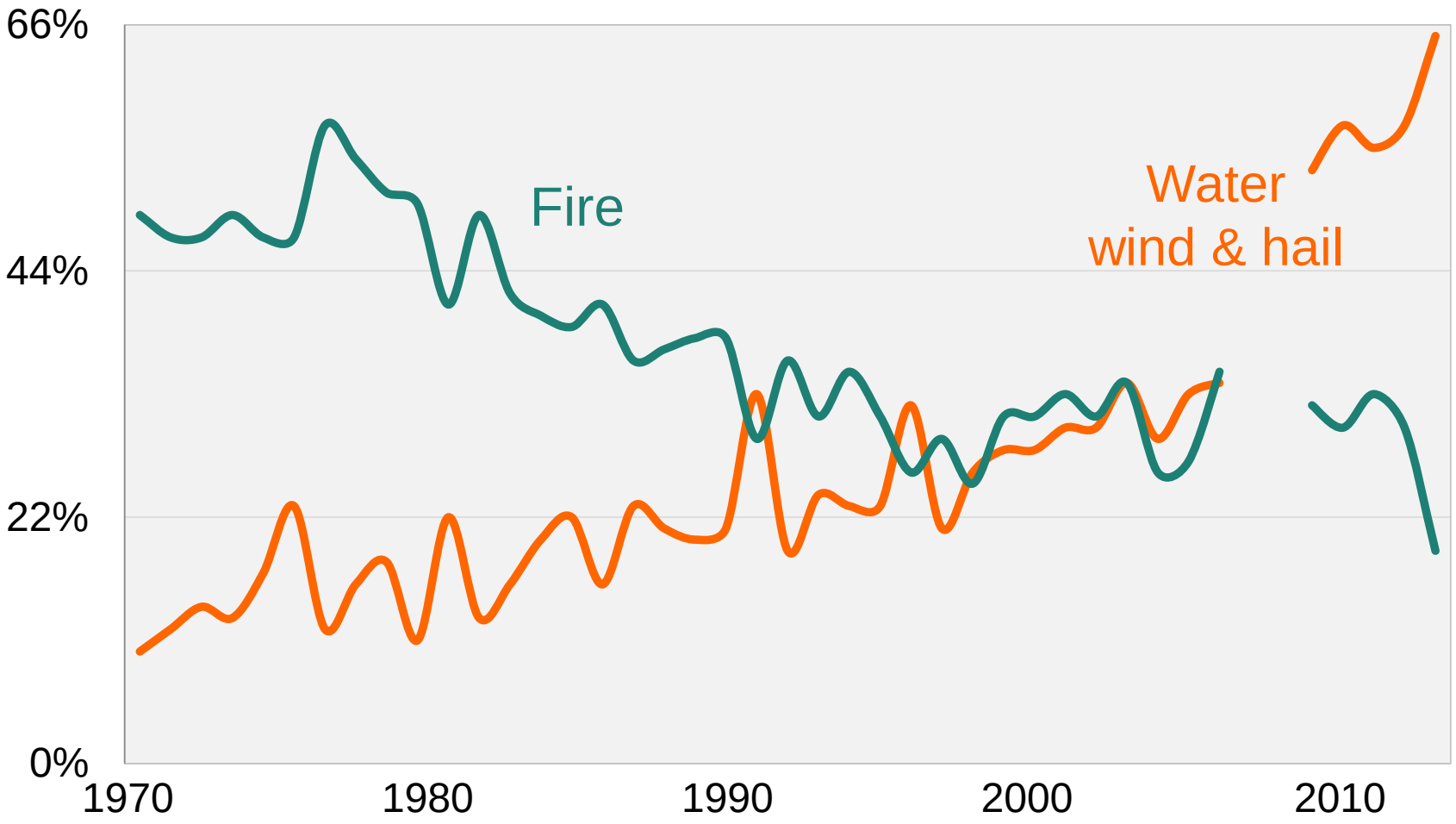
Western Institute for Catastrophic Loss Reduction (ICLR)

Findings

- Extreme rainfall is now the leading cause of damage to homes
- The public see local governments as owning this issue
- Strong science foundation for local action
- ICLR case studies share best practices

Extreme rainfall - the leading source of damage

Share of insurance property claims incurred, Canada



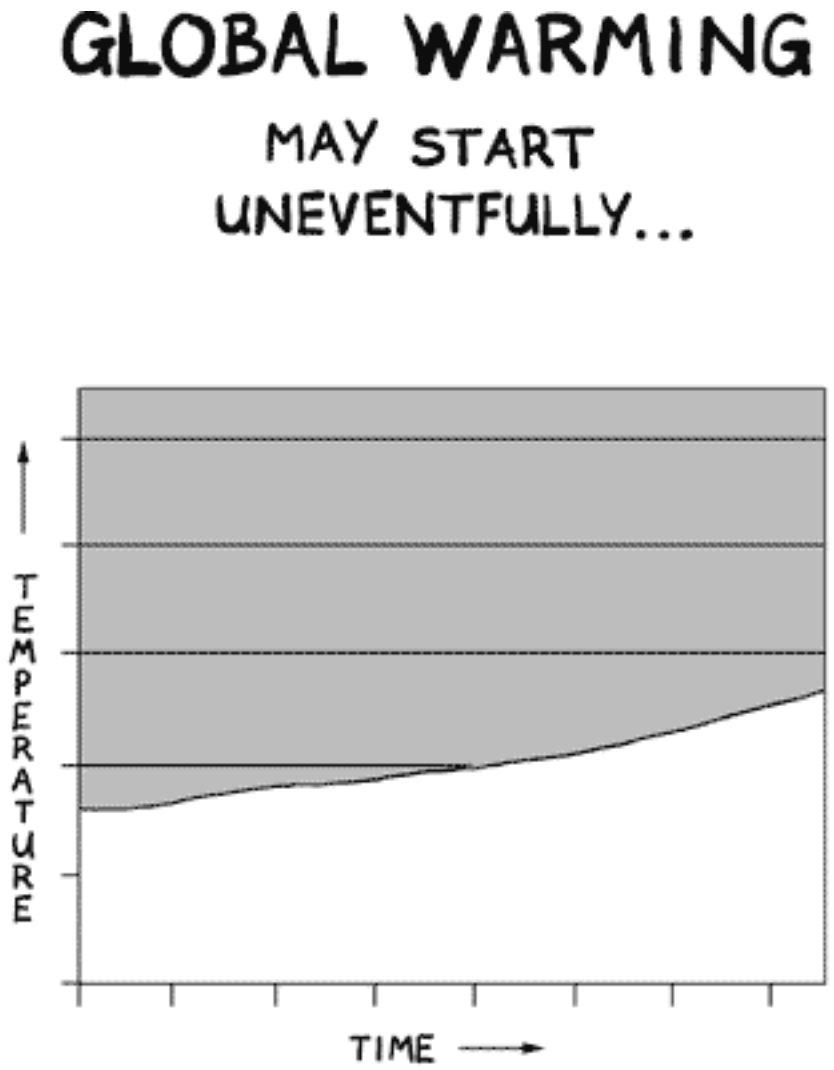
Several factors are contributing

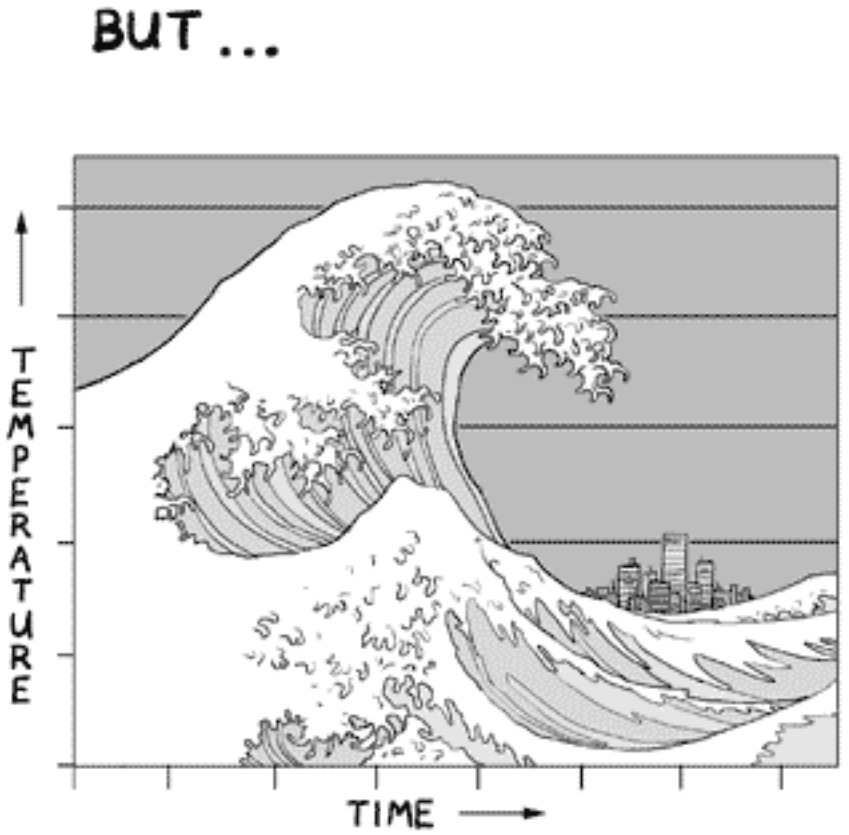
Population growth in areas of risk

Ageing infrastructure

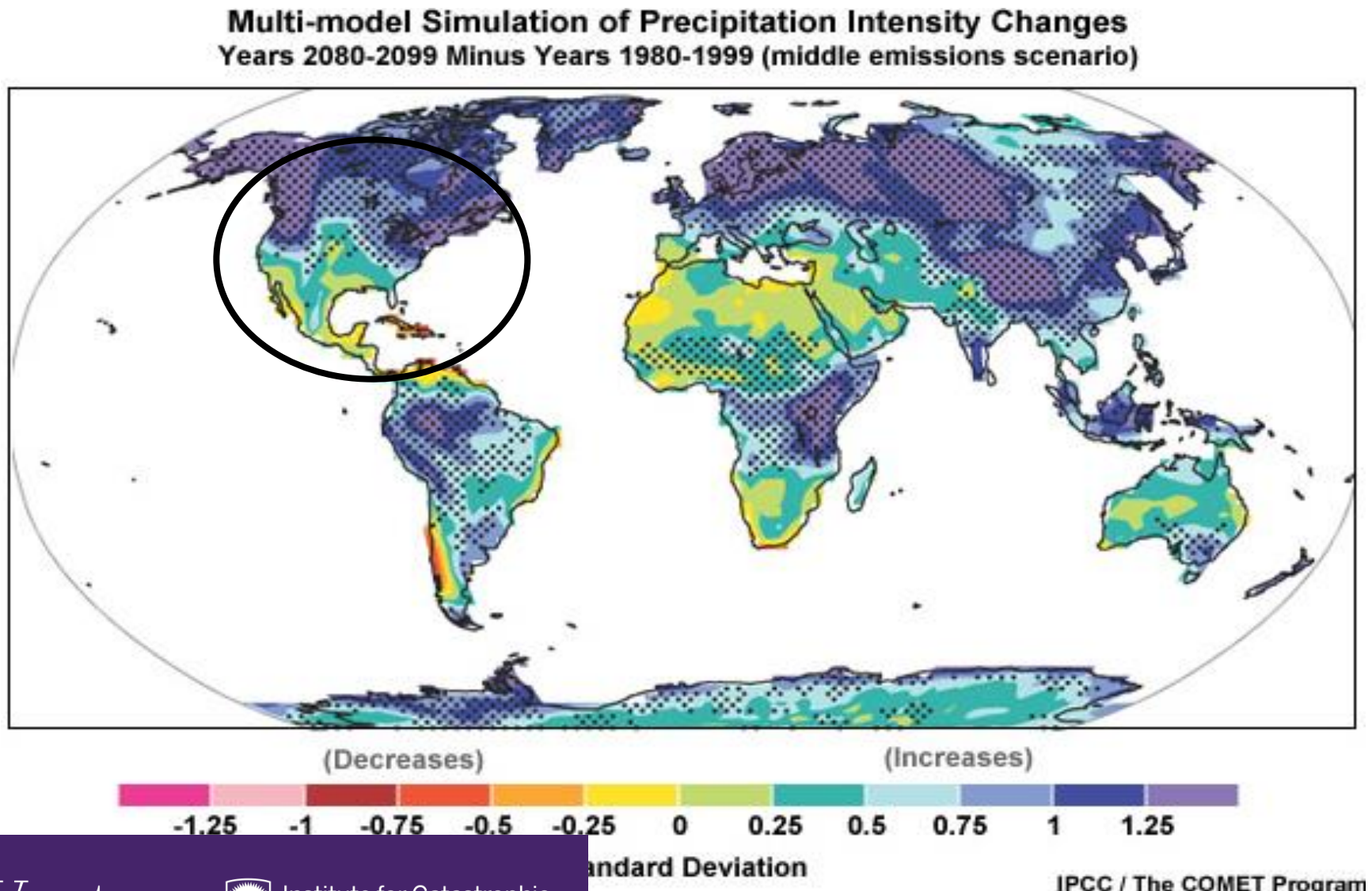
Behaviour (finished basements)

… including climate change

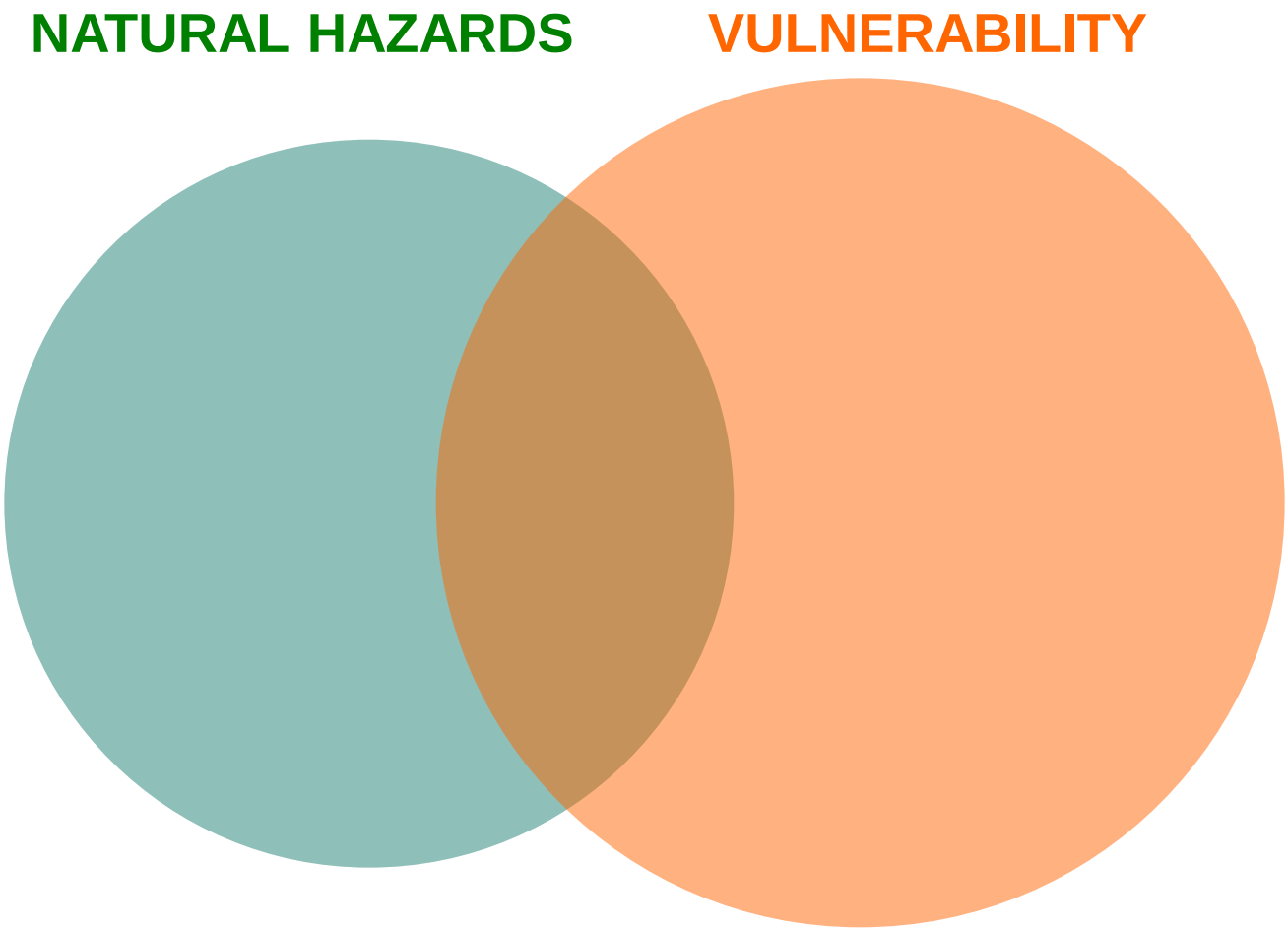




More extreme rainfall



Most losses can be prevented



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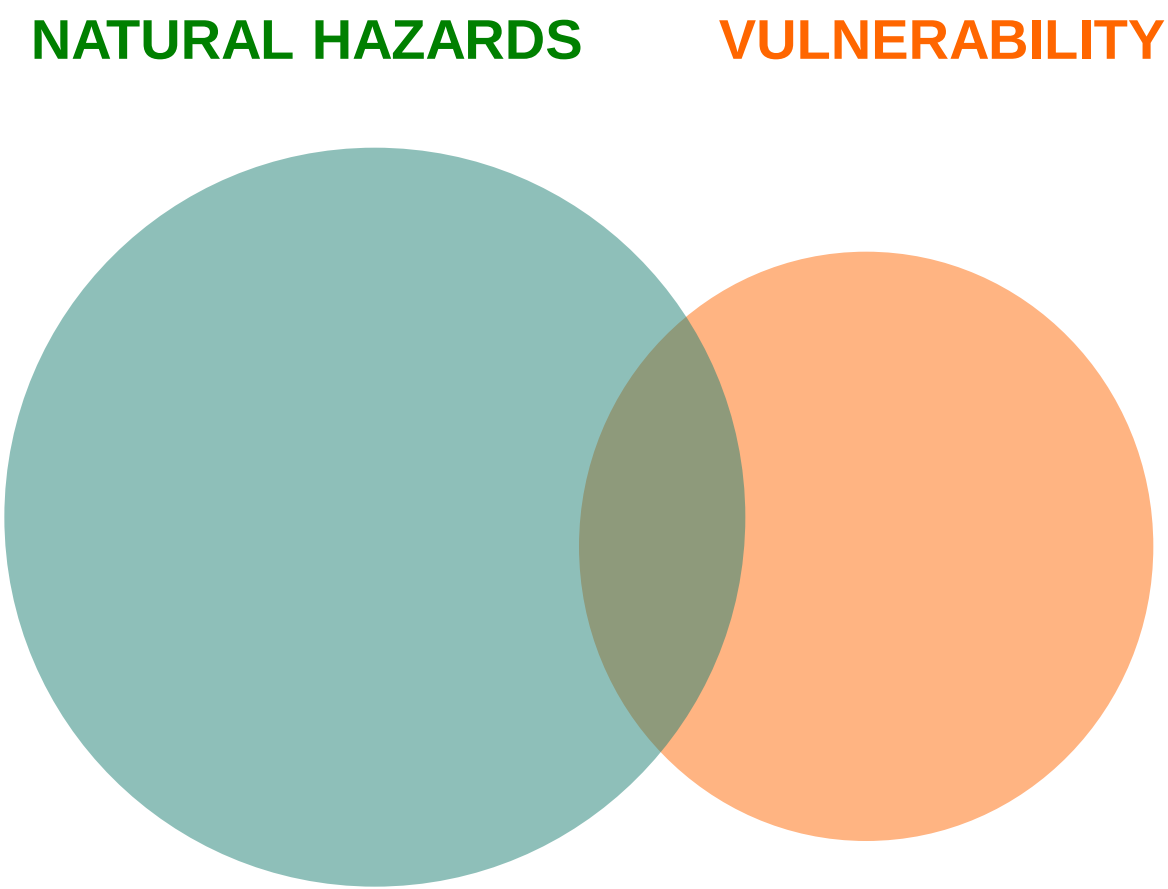

Focus on homeowner participation

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Celebrating local leadership

New ICLR book of 20 case studies showcasing local leadership to confront the growing risk of loss and damage from extreme rainfall.

Examples across Canada of

cities adapting

consistent with ICLR's research

on best local practices

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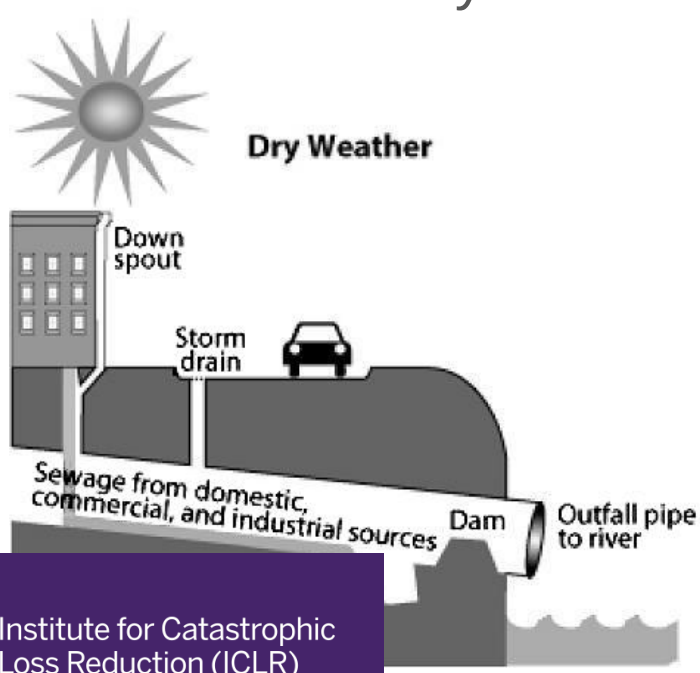
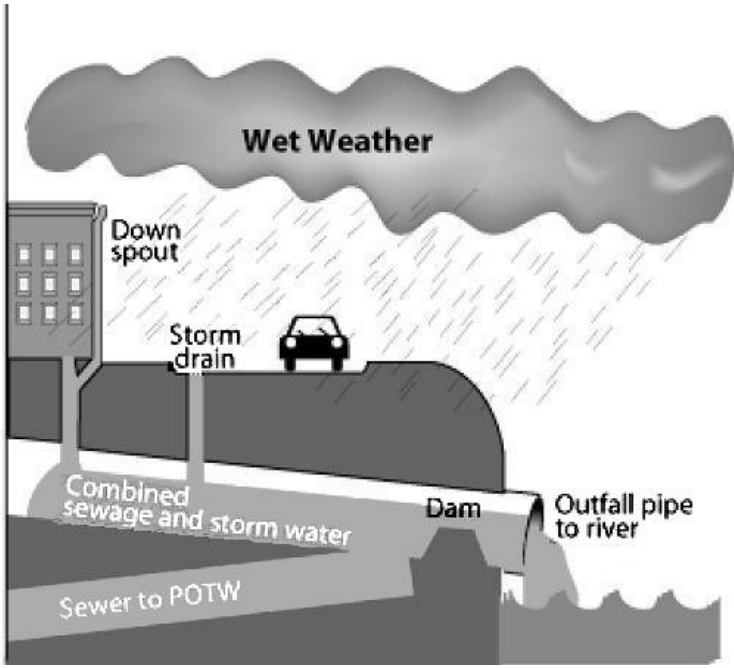
CITIES ADAPT
TO EXTREME RAINFALL EVENTS

VANCOUVER – Replace combined sewers

Research: Installation of combined sewers for sanitary and storm water has been prohibited for more than 40 years because of discharge into rivers and lakes during extreme rainfall events

Action: Vancouver and other communities across British Columbia will replace all combined sewers over the next 25 years with independent storm and sanitary sewers.





KITCHENER / WATERLOO – Stormwater credit

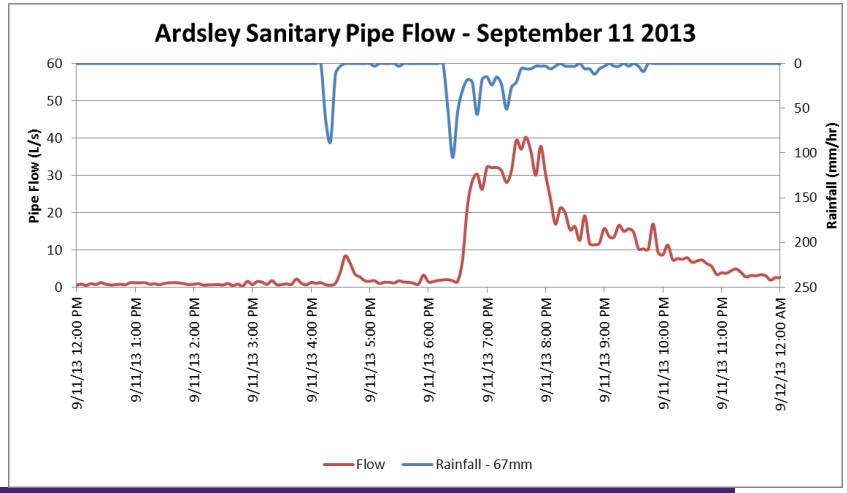
Research: Stormwater volume in the sewer system is determined during extreme events by the capacity, or lack of capacity, of the ground to absorb the rainfall

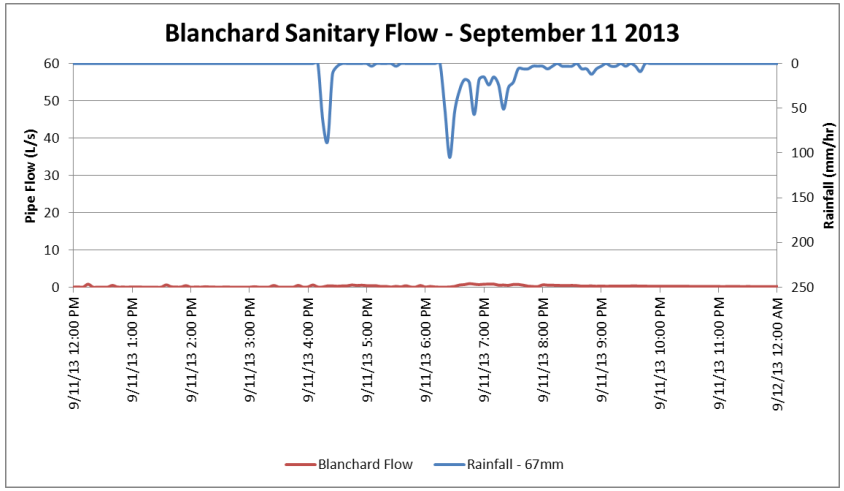
Action: User pay fee, based on the amount of impervious area on each property, replaced previous sources of revenue to fund stormwater management and infrastructure. Credit for stormwater ponds, water cisterns, rooftop storage, permeable pavement

LONDON – Remove weeping tiles

Research: Waste water flows increased ten fold during extreme rain events, partly due to older homes connected to to the waste water sewers through weeping tiles

Action: London paid the full cost to disconnect homes in the target neighbourhood, avoiding the cost of replacing the sanitary sewers

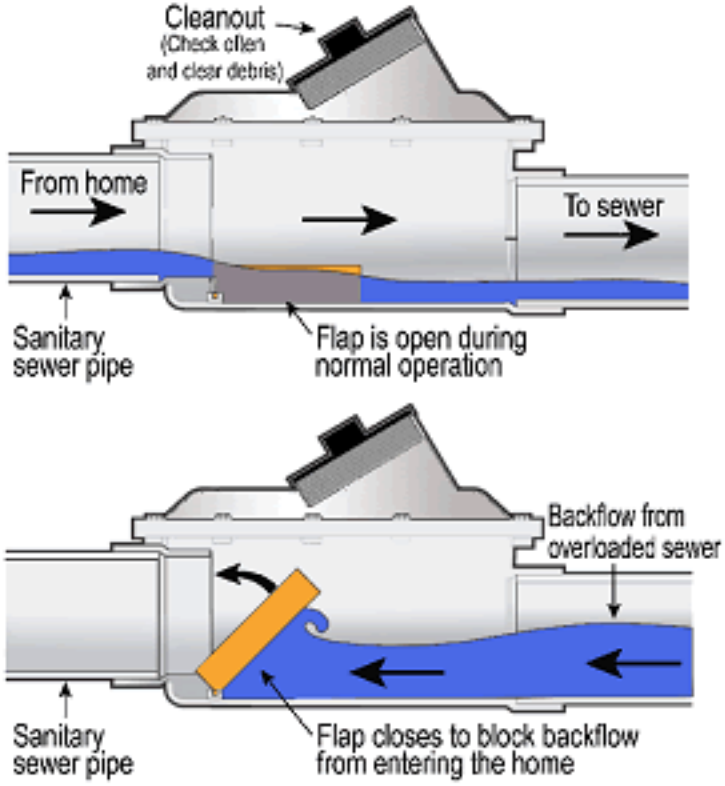




OTTAWA – Backwater valve research

Research: Almost 6 percent of the homes with basement flooding had a backwater valve that was not properly maintained

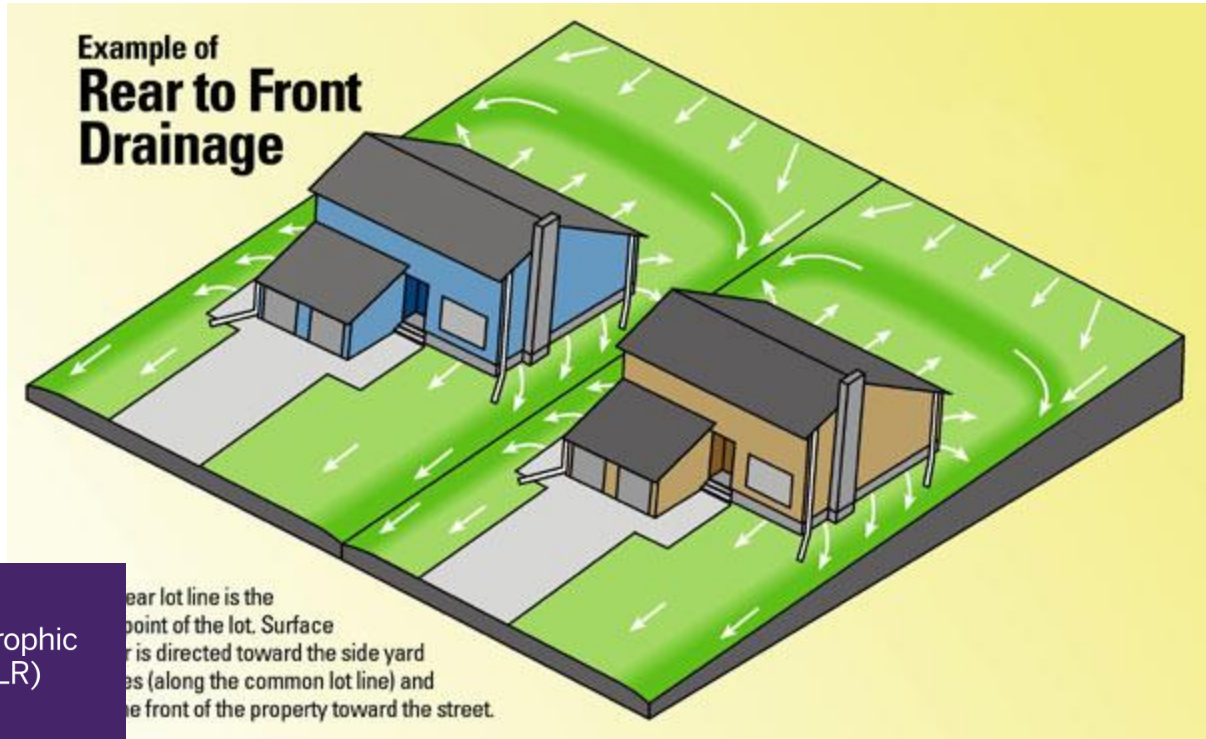
Action: Now all new homes are required to have a backwater valve on the sanitary and also the storm connections, and valves are recognized as the secondary source of protection



EDMONTON – Lot drainage

Research: Rain water should safely move away from homes to reduce the risk of damage

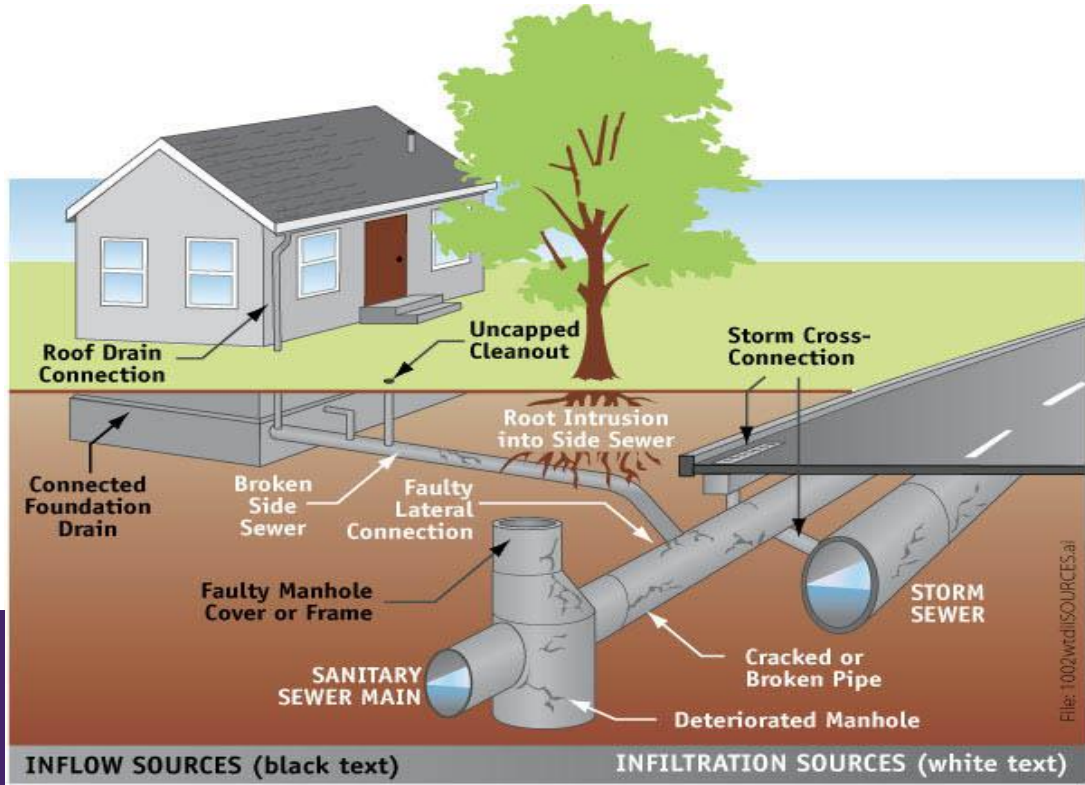
Action: All new homes must be inspected by the City to demonstrate that they comply with lot drainage regulations



SURREY – Sewer lateral replacement

Research: Aging infrastructure is contributing to excessive infiltration of the sewer system, with perhaps 50 percent of the increase coming from laterals on private property

Action: Homes in Surrey with extensive renovations ($100,000+) are required to replace sewer laterals that are more than 30 years old or install a new service



MARKHAM – Prohibit reverse slope driveways

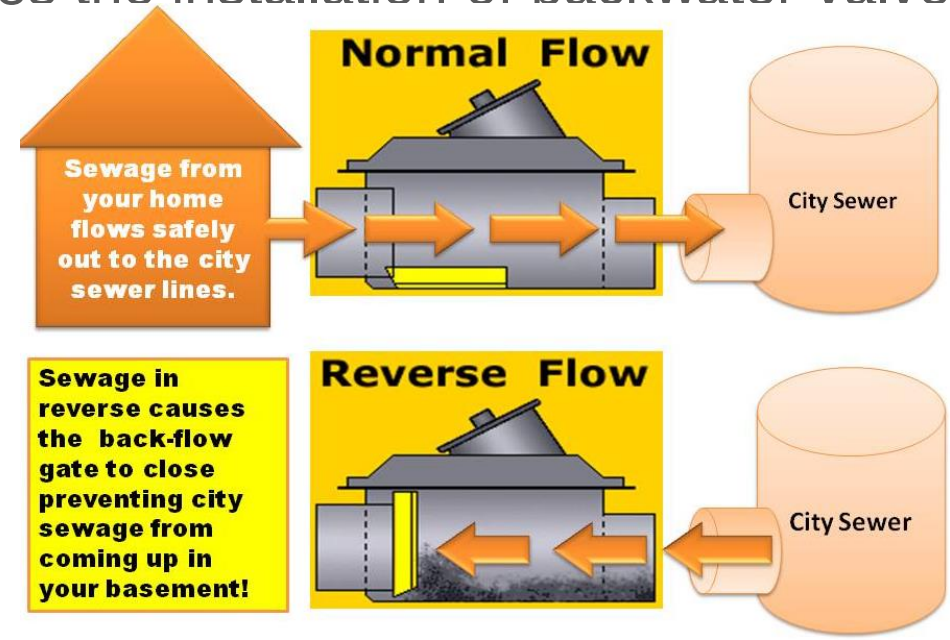
Research: Reverse sloped driveway increase the risk of water damage to homes during intense rainfall events

Action: Markham passed a bylaw prohibiting the construction of reverse sloped driveways when the garage is attached to the home

COLLINGWOOD – Building code interpretation

Research: All homes connected to the sewer system have some risk of backflow yet most new homes do not have backwater valves despite the building code requirement that "*where a building drain or branch may be subject to backflow, a backwater valve shall be installed*"

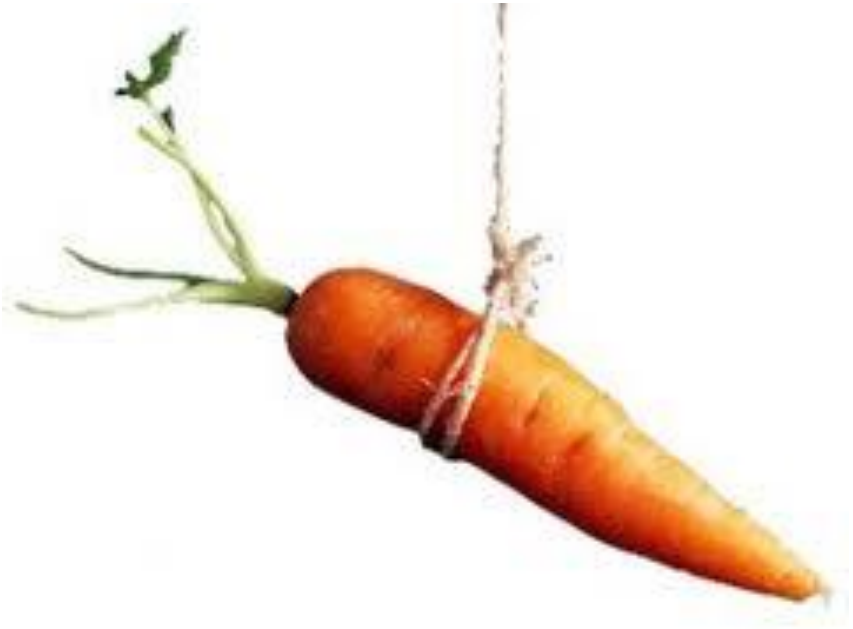
Action: Collingwood's Chief Building Official drafted a public letter indicating that the town requires the installation of backwater valves in all new homes



SASKATOON – Financial incentives

Science: Homes connected to the sewer system may experience damage from backflow, and backwater valves reduce this risk

Action: Following extreme rainfall events in 2005, 2007 and 2010 Saskatoon offered financial incentives to homeowners that experienced basement flooding to cover most of the cost of installing backwater valves, achieving 50 percent takeup



QUEBEC CITY – Downspout disconnection

Research: Downspouts connected directly to the sewer system increase the risk of basement flooding

Action: Quebec City ultimately secured 100 percent disconnection.
Some volunteered when the city offered to cover the cost.
Some responded when disconnection became mandatory.
Fine for non compliance was introduced. The key was a sustained campaign of information,
incentives and penalties.

Conclusion

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- ICLR case studies share ideas

  and celebrate local leadership

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I wish I'd invested in waders back when I first heard of global warming.
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