



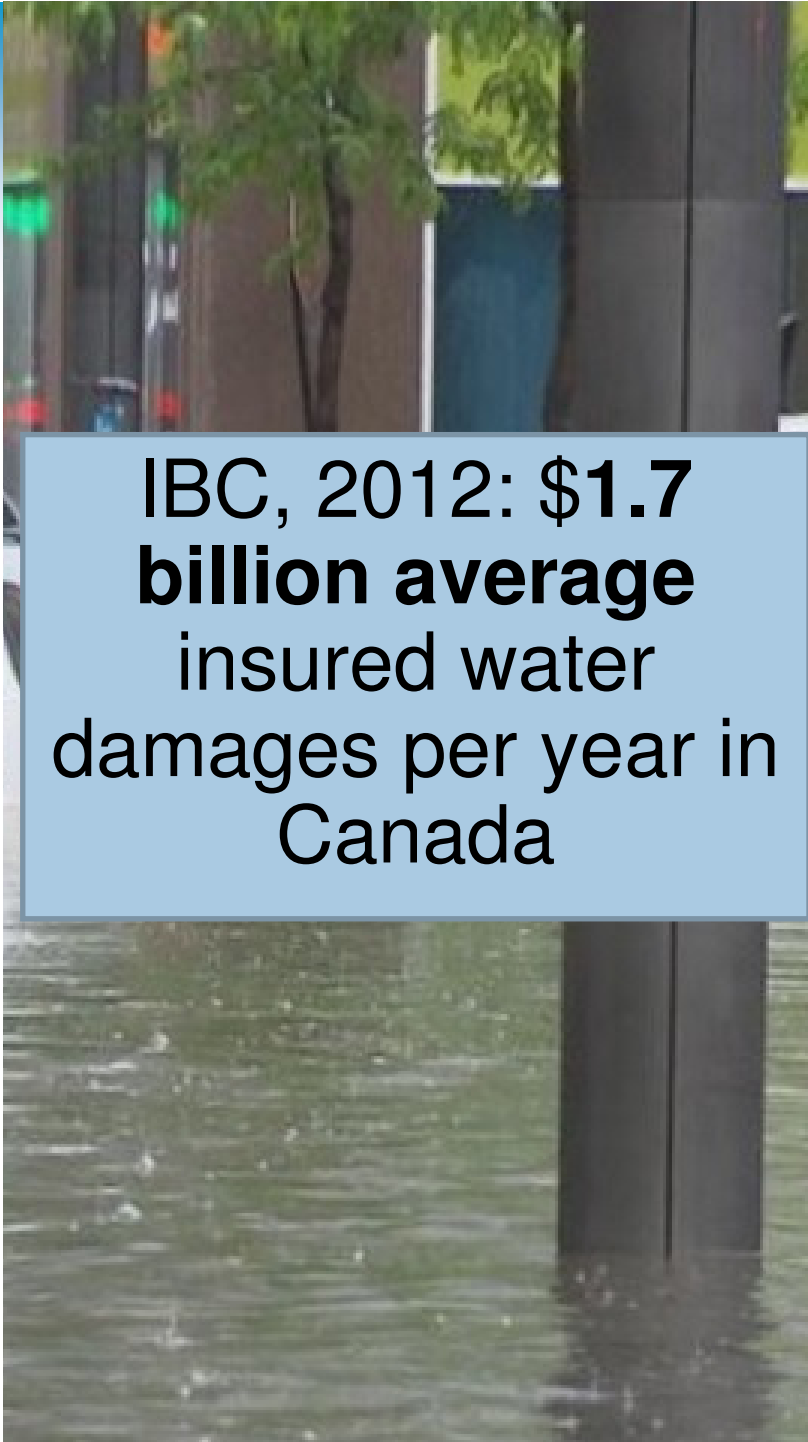
URBAN /
BASEMENT
FLOODING
Symposium

September 19, 2013
Toronto Board of Trade

Presented by the Institute for Catastrophic Loss Reduction (ICLR)

Recent large loss events

- Mississauga, Brampton, Toronto, 2013: >\$850 million
- Thunder Bay, Montréal, Ottawa, Hamilton, Toronto, Steinbach, 2012: >\$350 million
- Hamilton, 2009: \$100-150 million
- Southern Ontario, 2005: >\$500 million
- Peterborough, 2004: \$87 million
- Edmonton, 2004: \$166 million
- ***MANY OTHERS!***

A photograph of a flooded street with a blue text box overlaid. The text box contains the following text: IBC, 2012: \$1.7 billion average insured water damages per year in Canada. The background shows a street with a tree and a building, with water reflecting the scene.

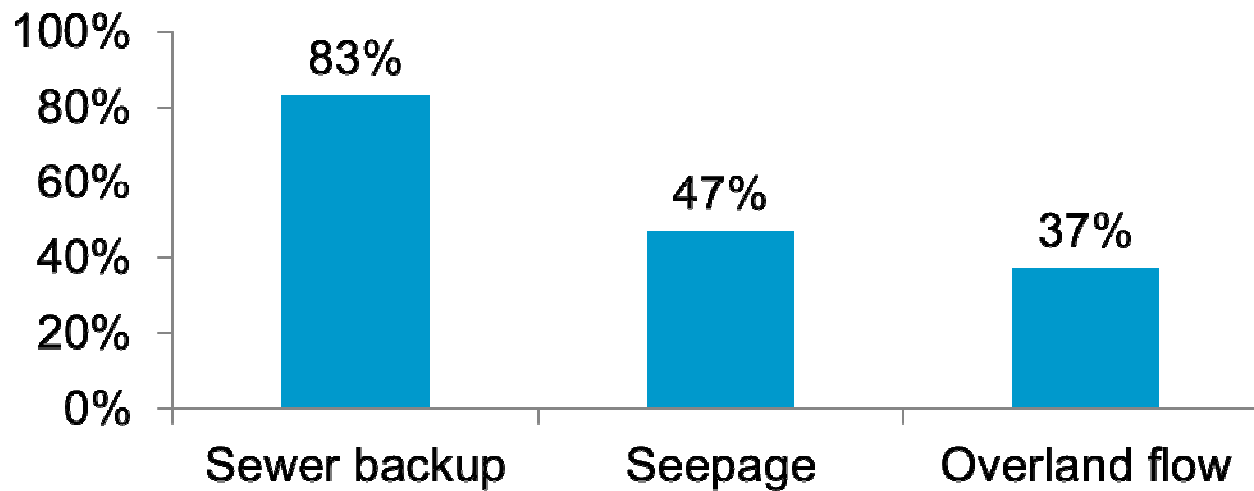
IBC, 2012: \$1.7 billion average insured water damages per year in Canada

Urban flooding

A 2012 CNT survey of 48 Great Lakes municipalities

100%

have received homeowner complaints about flooding



Source: Center for Neighbourhood Technology, 2012

Water damage claims

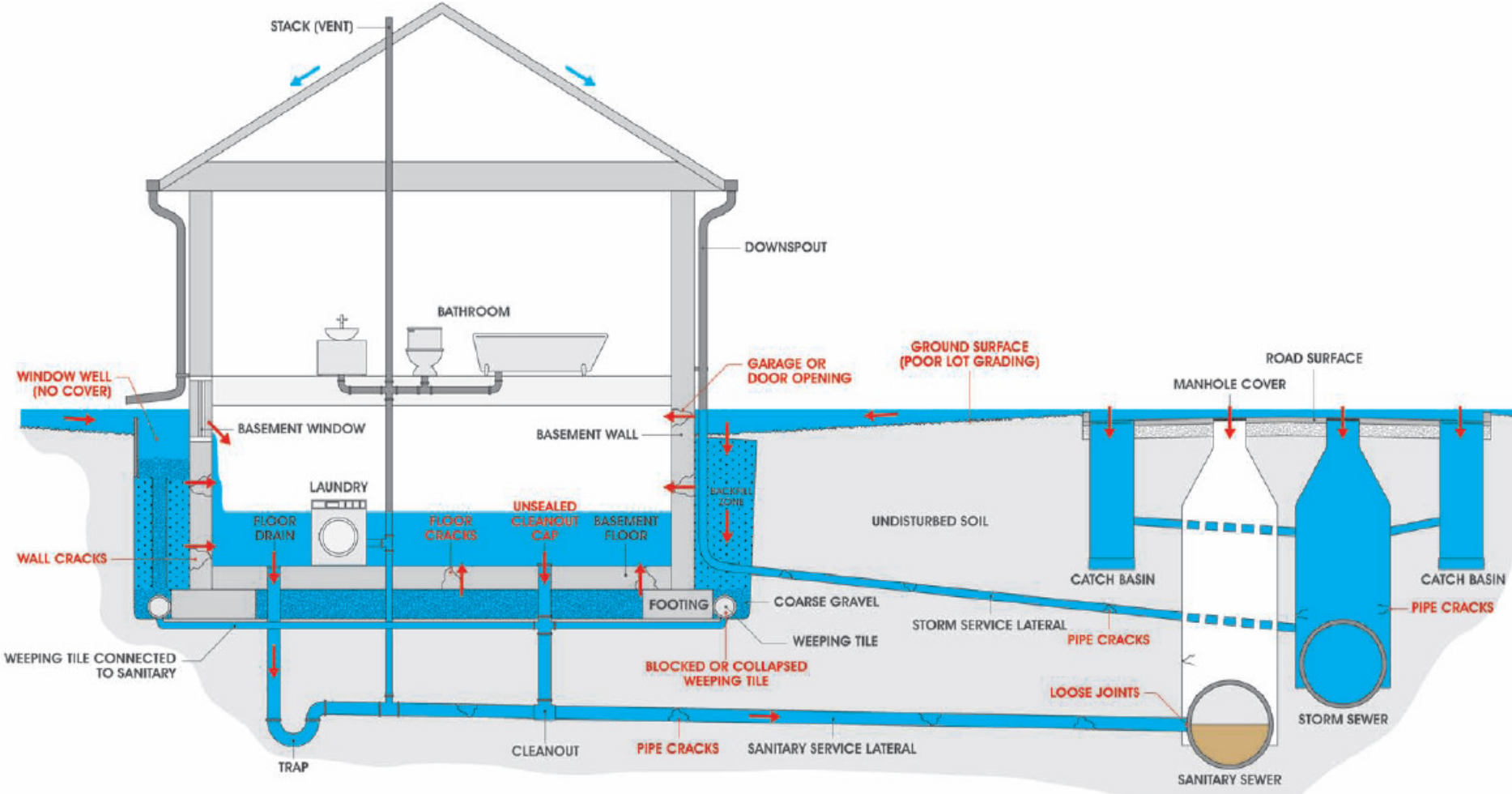
Province	Increase: 2002-2012
British Columbia	154%
Ontario	136%
Alberta	109%
NFLD/Labrador	107%
Quebec	84%
Nova Scotia	61%
New Brunswick	50%
National average	117%

- 2002 average: **\$7,192**
- 2012 average: **\$15,500**
- Use of basements as living spaces

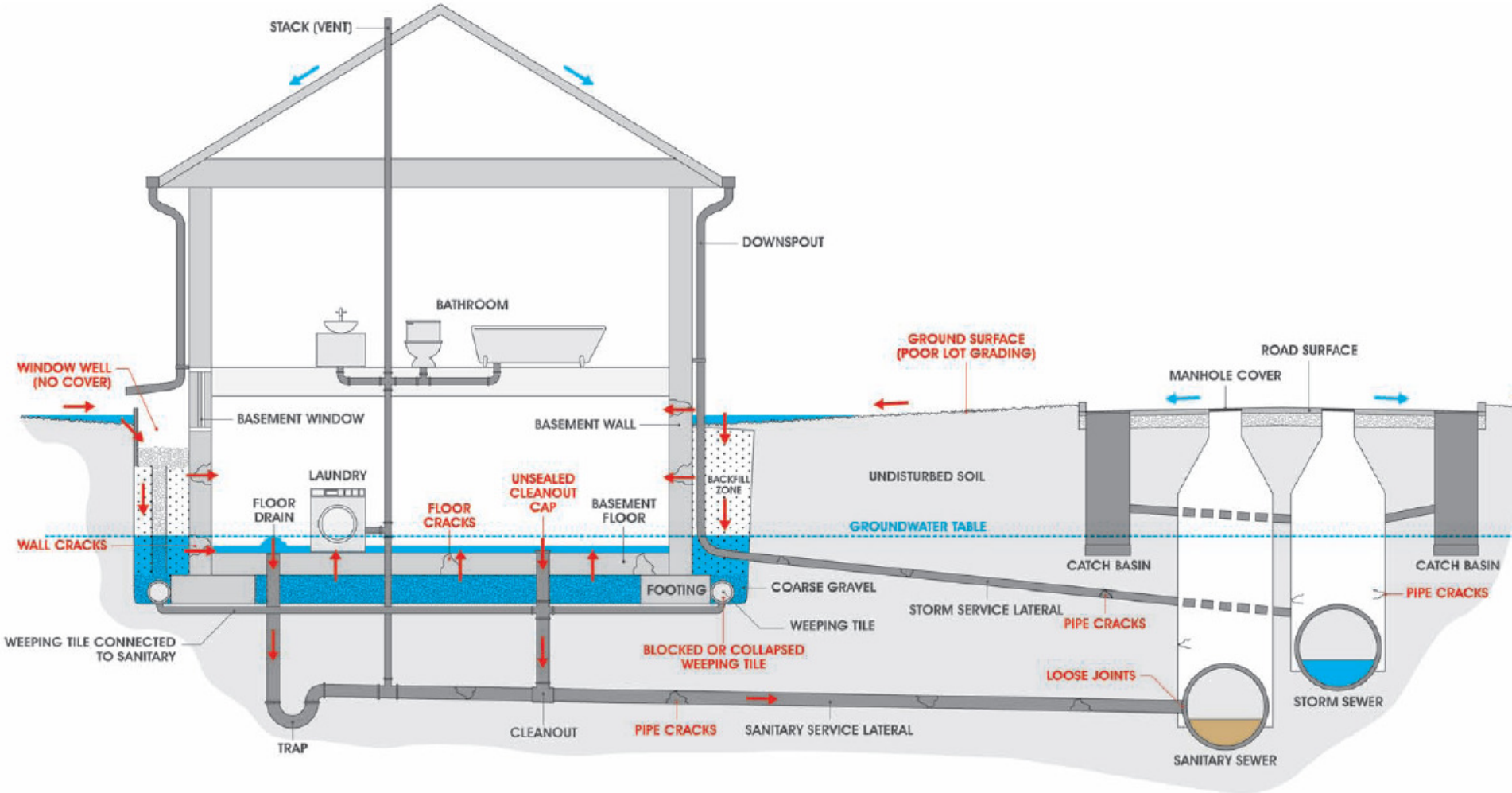


Urban flooding & risk factors

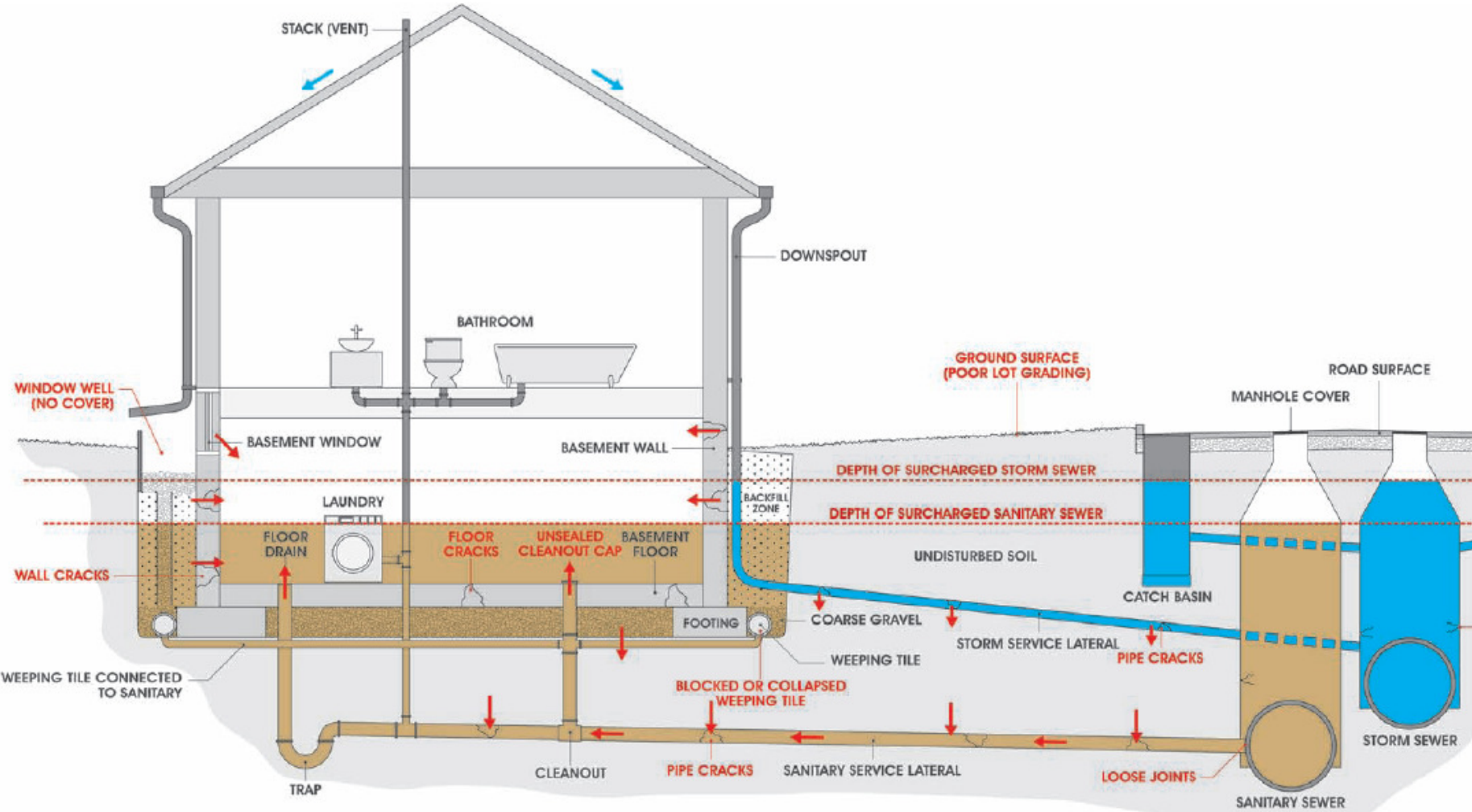
Overland flooding



Infiltration flooding

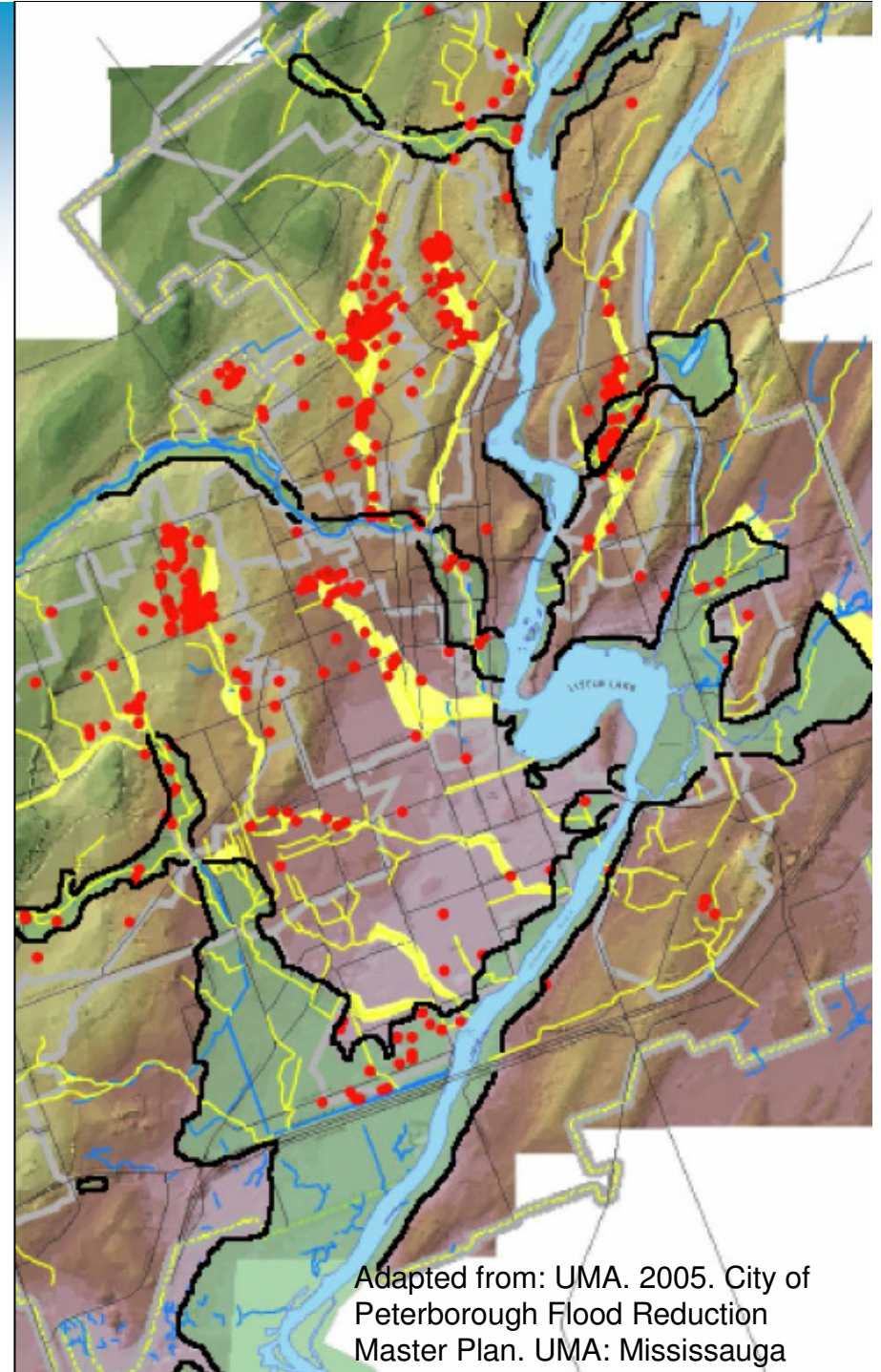


Sewer backup



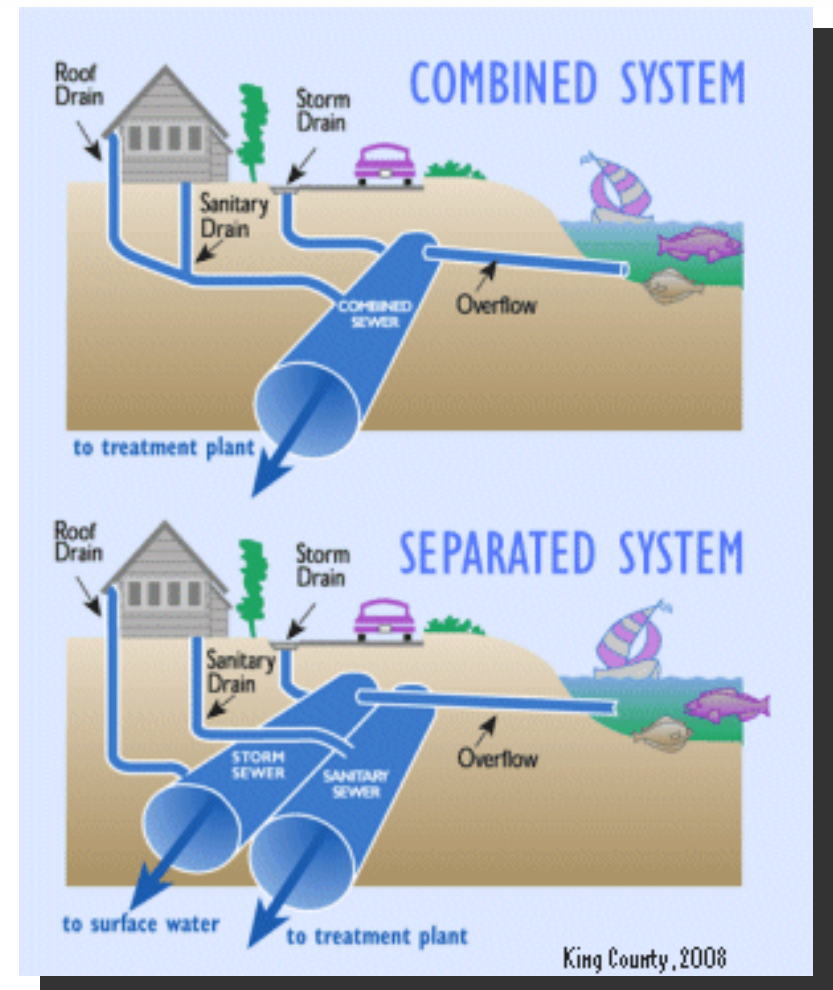
Risk areas

- Riverine floodplain areas relatively well defined in Canada
- Urban flood risk areas not as well defined

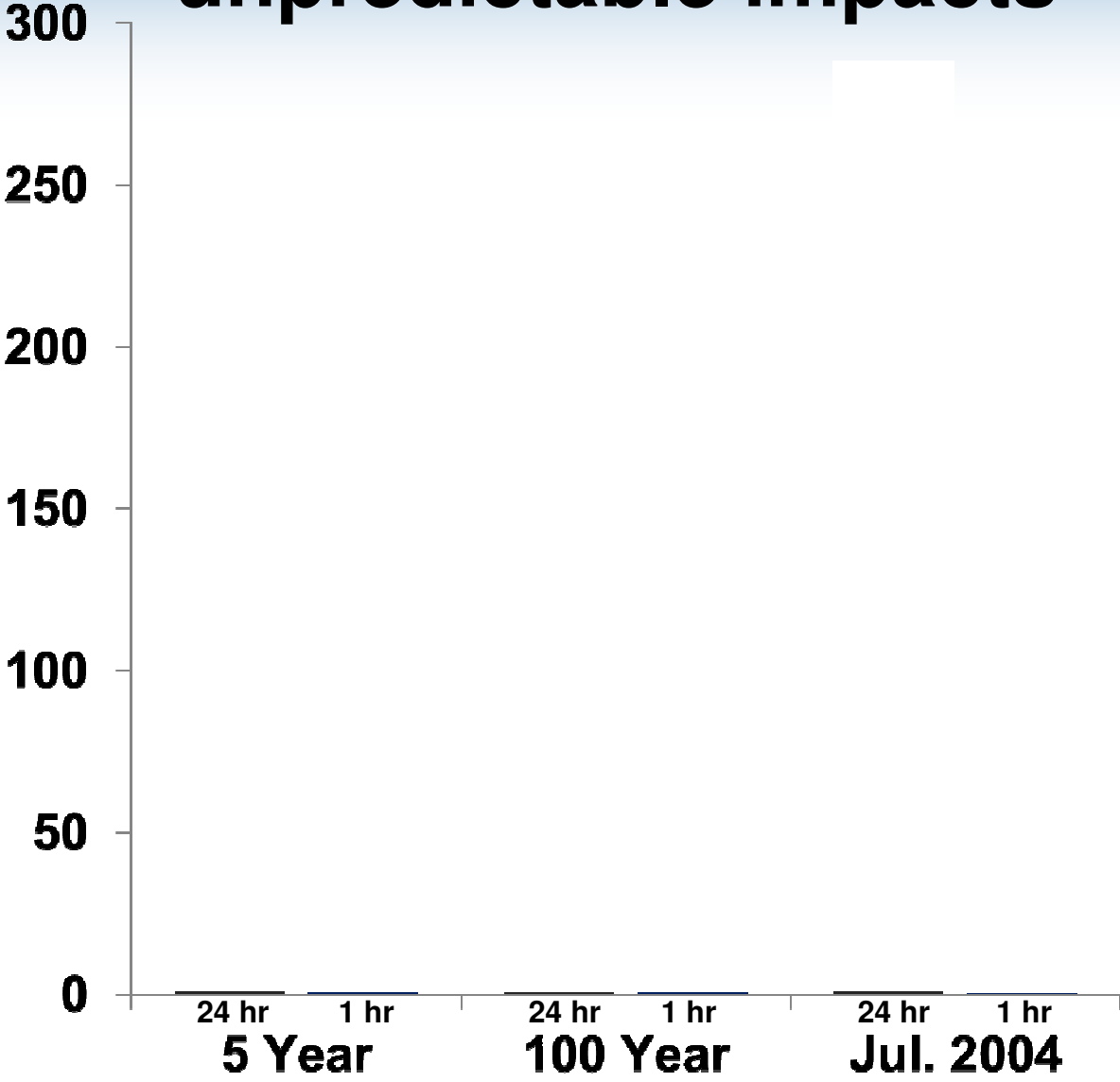


A range of infrastructure

- Storm Sewer Era: ~1880-1970
 - ◆ Rapid removal of stormwater through storm sewer networks
 - ◆ 2-10 yr design standards
- Stormwater Management Era: ~1970-1990
 - ◆ Major (100 yr) & Minor (2-10 yr) system
- Best Management Practice Era: ~1990-
 - ◆ Stormwater **quality** and quantity

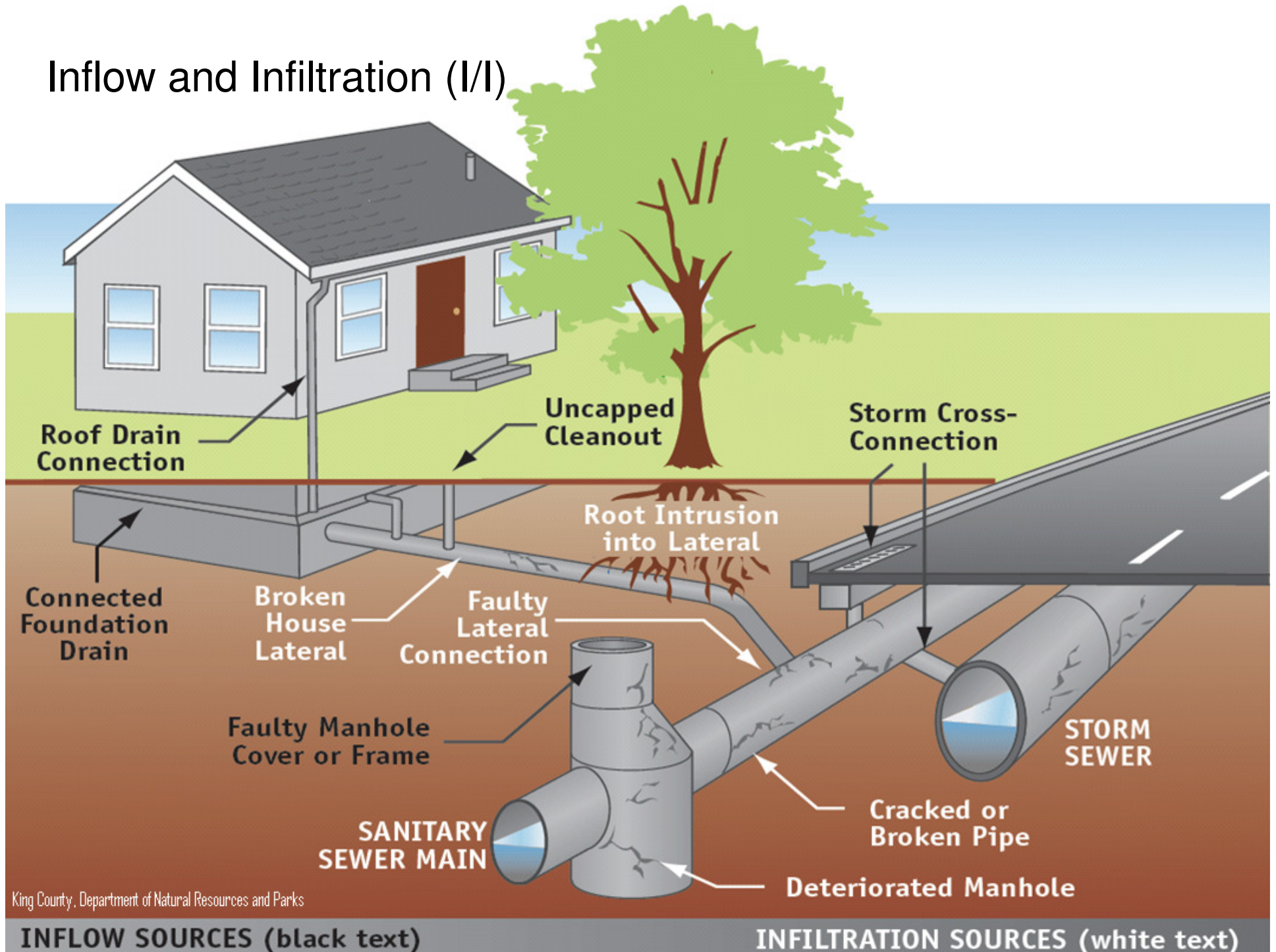


Extreme rainfall, unpredictable impacts



City of Peterborough

Inflow and Infiltration (I/I)



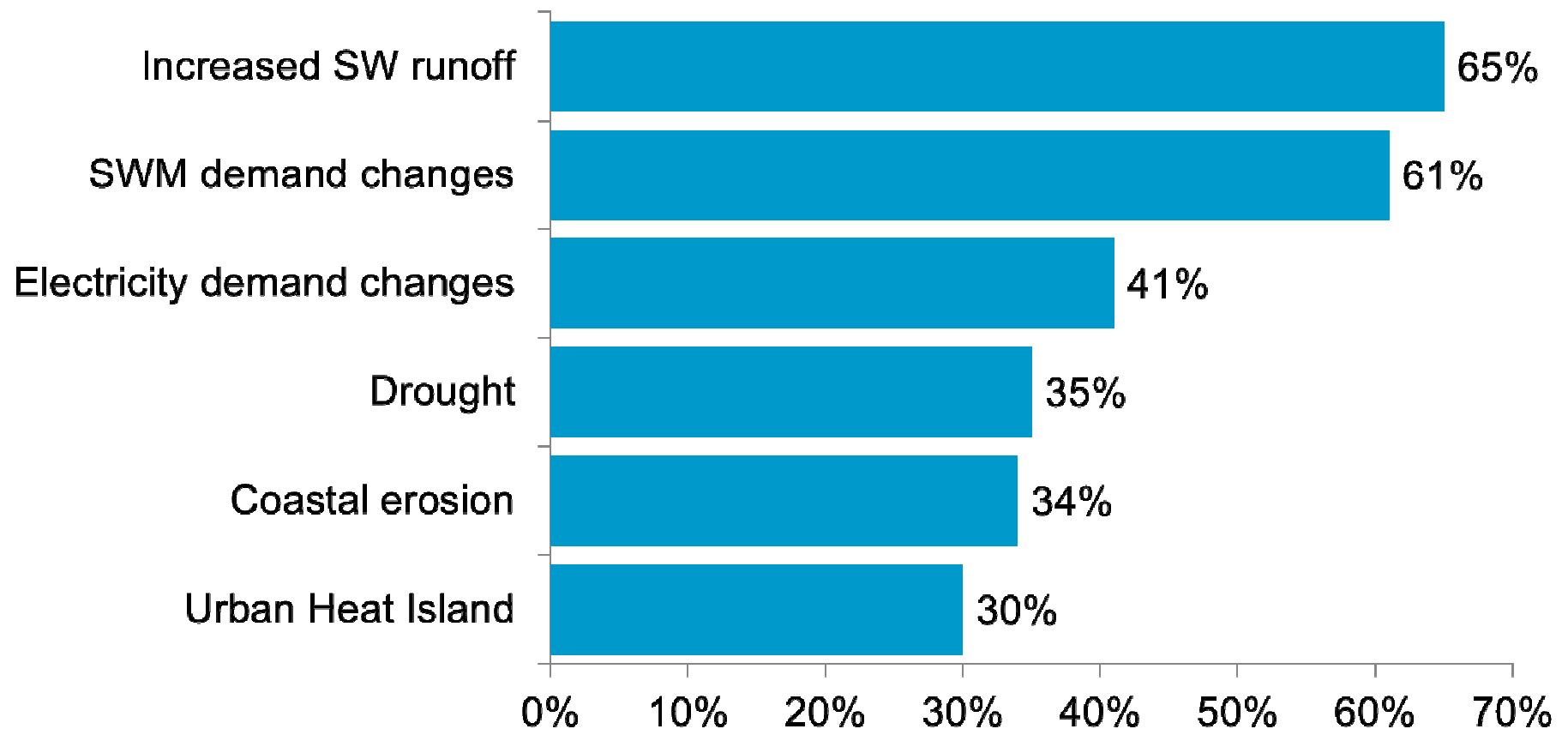
Climate change

Regionalized changes in precipitation regimes—more intense extreme rainfall events

- Bruce, 2011:
 - ◆ By 2050, **1 in 20** → **1 in 10 yr** events, S. Ont.
- SENES, 2012:
 - ◆ **46% increase** in intensity of max **1-hr** precipitation events by 2040-2049, Pearson Airport
- Prodanovic & Simonovic, 2007:
 - ◆ 2 hr rainfall events: **1 in 100** → **1 in 30 yr** under “wet” scenario in London, Ontario

Adaptation priorities

~500 global local gov't responses: 298 US, 26 Canadian



Source: Carmin, JoAnn, Nikhil Nadkarni, and Christopher Rhie. 2012. Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global Survey. Cambridge, MA: MIT.

Insurers

- Water now major source of homeowner claims – surpassed fire
- Financial measures
 - ◆ Limit financial exposure through:
 - ☞ Caps, availability
- Mitigation measures
 - ◆ Education materials
 - ◆ Incentives
 - ☞ Caps, availability, premiums
 - ☞ Backwater valves, sumps



Homeowners, residents

- The most affected stakeholders
- Understanding insurance coverage
- Considerable role in risk reduction
 - ◆ Reducing contributions to municipal sewer system
 - ◆ Reducing risk of water/sewage entering home

More than just cost and inconvenience

- Irreplaceable items
- Damage to structure
- Mould, potential health risks
- Stress about property value loss
- Vulnerable basement apartment residents

“I can’t sleep when it rains...”

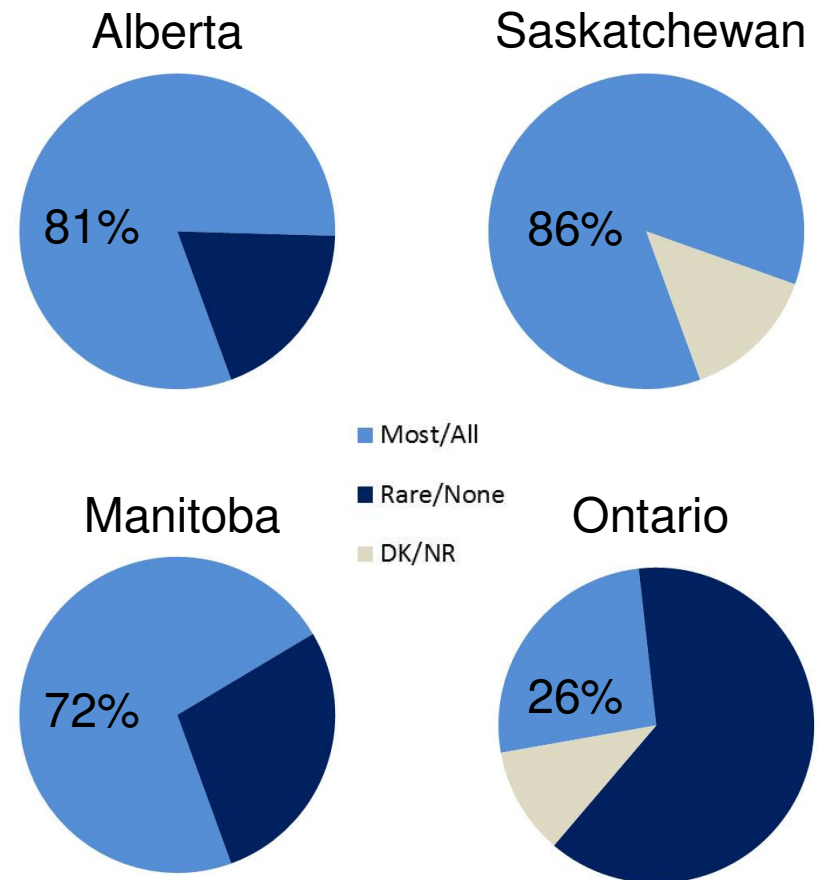


Additional key players

- Codes & new buildings
 - ◆ NRC, provincial authorities, local inspectors, builders
- Contractors, plumbers, restoration specialists
 - ◆ Homeowners look to these professionals as experts

Code development and implementation

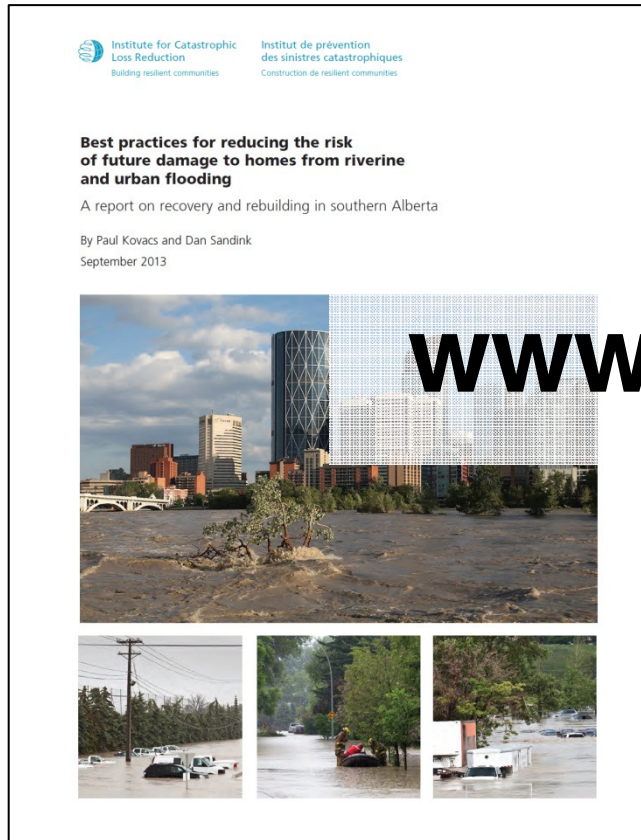
- NPC, 2010 2.4.6.4.(3)
- “...where a building drain or branch **may** be subject to backflow...a backwater valve shall be installed...”
- Additional code opportunities:
 - ◆ Lot grading & backfill
 - ◆ Sump capacity and backup
 - ◆ Other opportunities



Today's topics

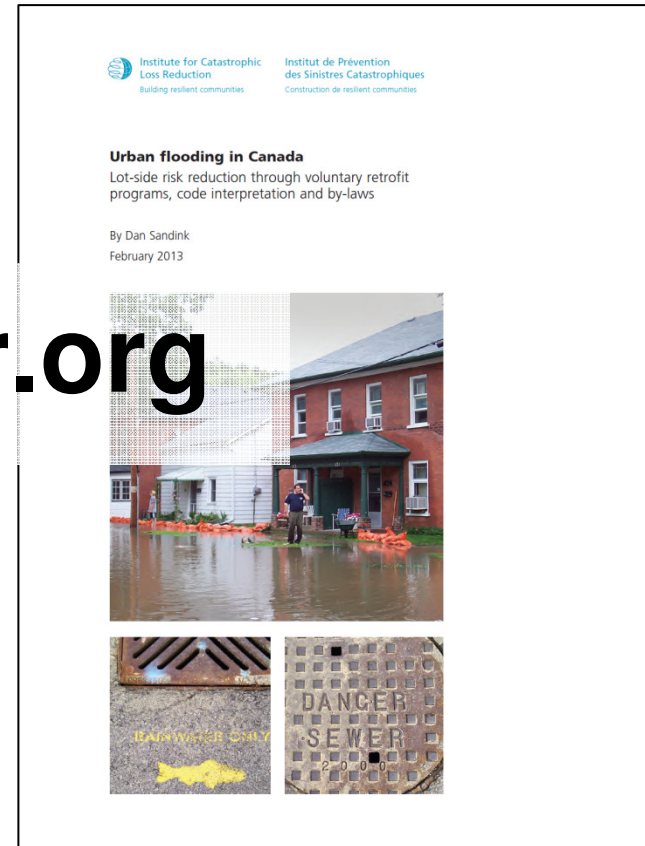
- Causes and impacts of urban flood events
- Mitigating the risk
 - ◆ Lot-level and municipal-side risk reduction
 - ◆ Builders, code issues
- Issues related to long-term risk reduction
 - ◆ Low Impact Development, SWM financing and incentives, climate change
- Discussion panel
 - ◆ How to move forward on reducing risk in new and existing subdivisions?

New ICLR resources



Best practices for reducing
flood risk

September 2013



Lot-side urban flood risk
reduction

February 2013

www.iclr.org



Have fun!