

# The Adaptation Imperative

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# What is adaptation to climate change?



## **Adaptation:**

- adjusting decisions, activities and thinking because of observed or expected changes in climate
- we adapt to moderate harm or take advantage of new opportunities
- adaptation and mitigation are necessary complements in addressing climate change

“Adaptation means not clinging to fixed methods, but changing appropriately according to events, acting as is suitable”

Zhang Yu (Sung Dynasty 960-1278)

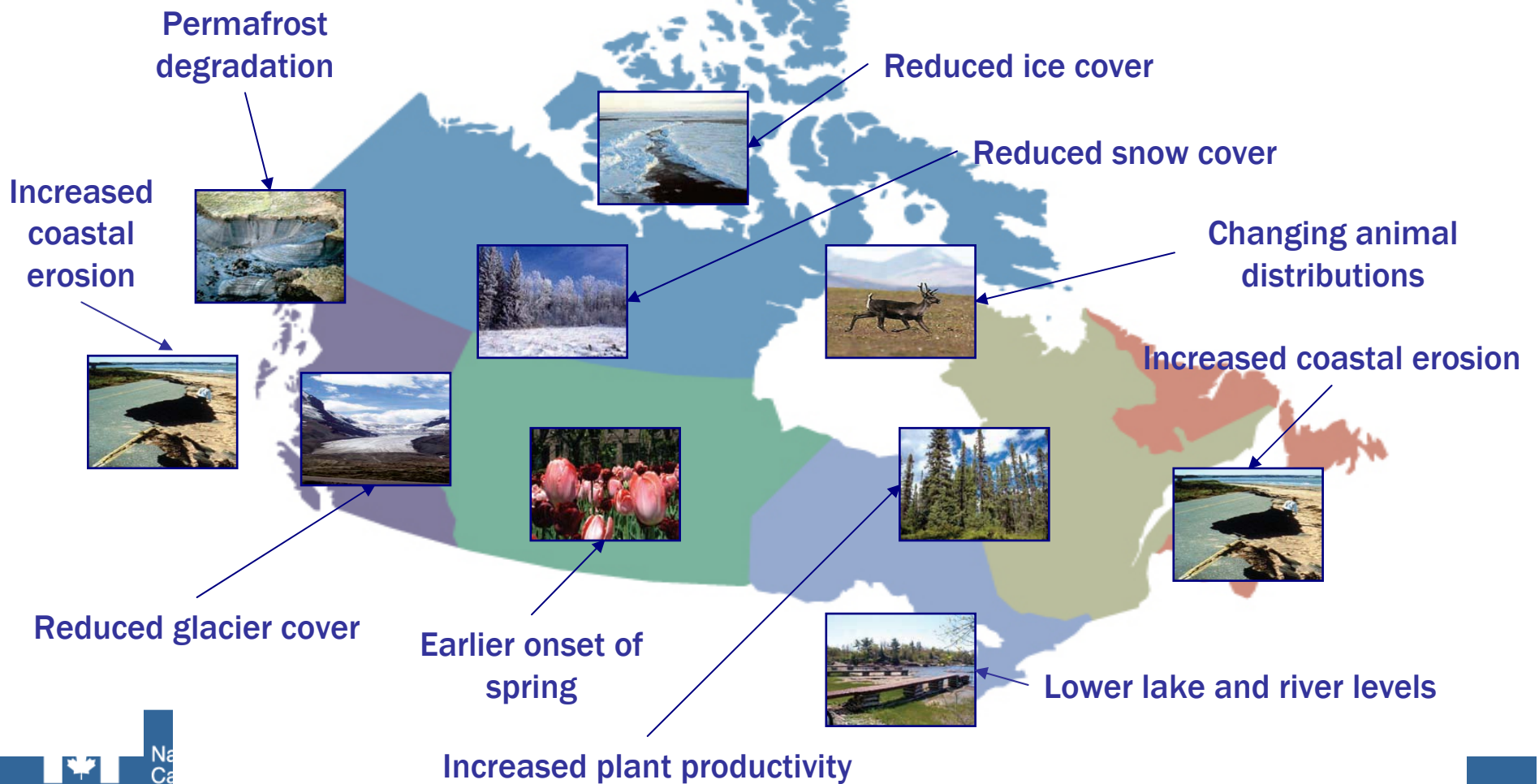


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# The impacts of changing climate are already evident in every region of Canada



# What does adaptation mean?

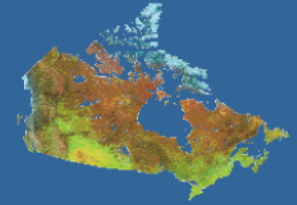


**Adaptation** means insuring ourselves and enhancing our resilience to flourish under changing conditions. We do this by factoring climatic changes into:

- Government and industry planning
- Investment and economic development decisions
- Infrastructure design and standards
- Health and disease prevention planning
- Security and disaster preparedness planning



# Who adapts to climate change?

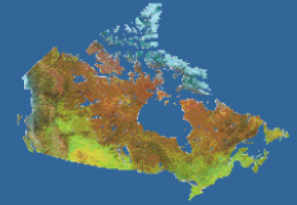


- **Anyone who plans for the future adapts:** architects, engineers, planners, public health officials, natural resource managers, emergency preparedness specialists, economic developers, etc.
- With so many players, adaptation requires partnership, cooperation, coordination, and communication





# Preparing for Changes in Extreme Weather



*(Ontario Emergency Response Team, 2004)*

## Urban infrastructure

- Storm water mgmt
- Sewage systems
- Water supply



## Transportation

- Coastal erosion
- Storm water damage
- Extreme heat



## Buildings and homes

- Wind patterns
- Storms

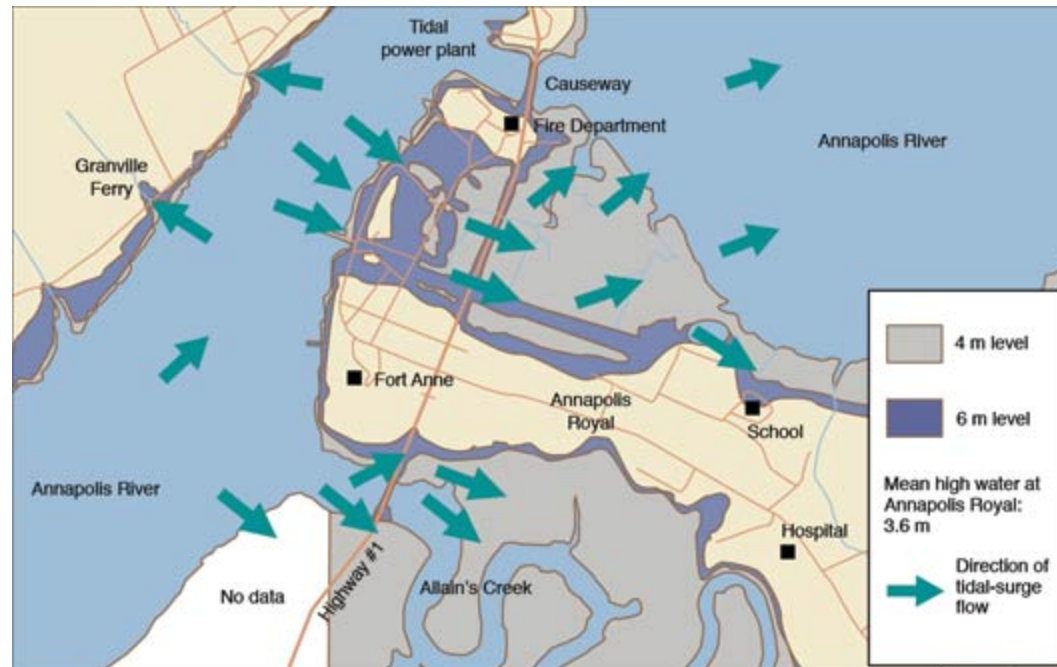
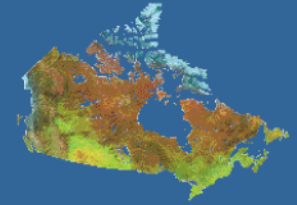


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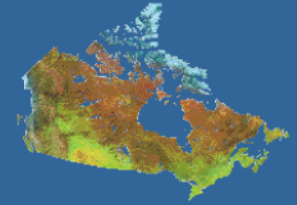
# Assessing tidal surge risk in Annapolis Royal



Flood risk mapping for Annapolis Royal, NS (after Belbin & Clyburn, 1998)



# “Creeping” Impacts

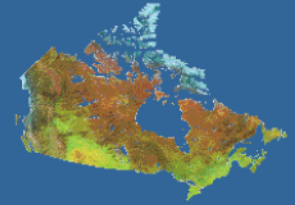


- Premature weathering of materials
- Increased cooling needs and costs
- Changing load factors (e.g. managing storm water discharge)
- Changing temperature and turbidity of intake water (which may change treatments needs)
- New pests and diseases that can damage vegetation





# Impacts and Responses at the Community/Regional Level



- Cooling the Urban Heat Island
  - Vegetation, green roof technology, reflective materials
  - Use of buildings as cooling centres
- Storm water management
  - More porous surfaces, ponding, naturalization
  - Re-evaluation of acceptable loss of service (flooded areas)
- Change to by-laws and local regulations
- Competition for resources (e.g. water)



# National and Global Changes



Climate changes may also influence:

- Shifts in trade flows and transportation needs
- Changes in international standards – can impact availability of materials and products
- Migration – may change demand for services

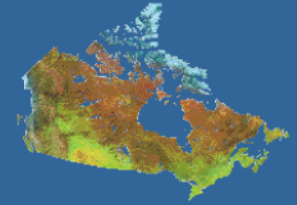


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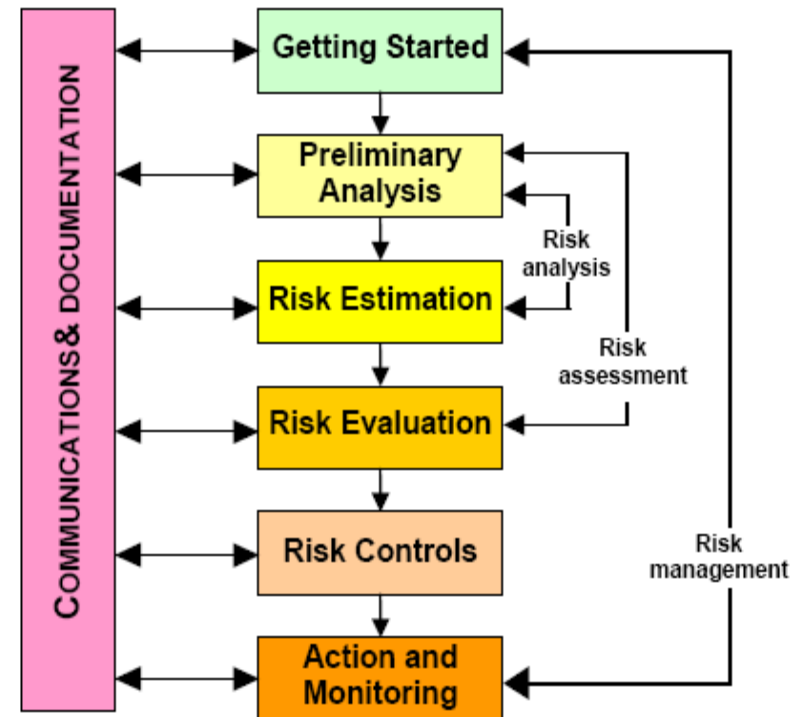
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# Mainstreaming Adaptation

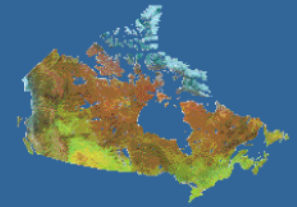


Integrating climate change into existing planning processes, often using risk management methods

- Practical and credible approach
- Way to deal with uncertainties
- Understood by decision-makers



# Some adaptation is occurring in Canada, both in response to, and in anticipation of, climate change impacts



## Limiting development in vulnerable areas



Policies for coastal regions

## Implementing heat-health alert initiatives



Implemented in urban areas in Ontario and Quebec

## Adapting infrastructure design



Thermosyphons to induce artificial cooling of permafrost



Vulnerability maps for permafrost terrain

## Building on pylons to reduce damage from flooding



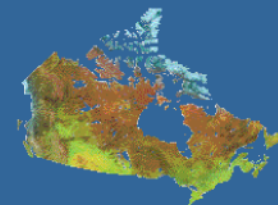
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# Canada's engineers are adapting



## PIEVC

Public Infrastructure Engineering Vulnerability Committee

*Adapting infrastructure  
to a changing climate*

- Created an engineering protocol to assess the vulnerability of infrastructure and capacity to adapt from an engineering perspective; applied in 7 case studies
- Focused on 4 categories of infrastructure: roads, storm and wastewater, water supply, buildings. (report due June 2008)
- Early learnings:
  - Not all infrastructure is vulnerable – some replacement cycles may be able to keep up with changes
  - Good maintenance enhances resilience
  - Emergency Preparedness a good first step (power supply)

[www.pievc.ca](http://www.pievc.ca)



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# Canada's planners are adapting



- Canadian Institute of Planners - project to increase awareness and capacity of the Canadian planning community in order to address adaptation in their work.
- 5 Components including:
  - CIP national policy framework for adaptation
  - Continuous Professional Learning
    - awareness seminar & two day workshop for professionals
    - modules for university courses

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or Gary Davidson ([davidson@scsinternet.com](mailto:davidson@scsinternet.com))

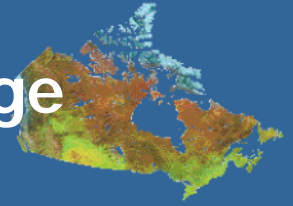


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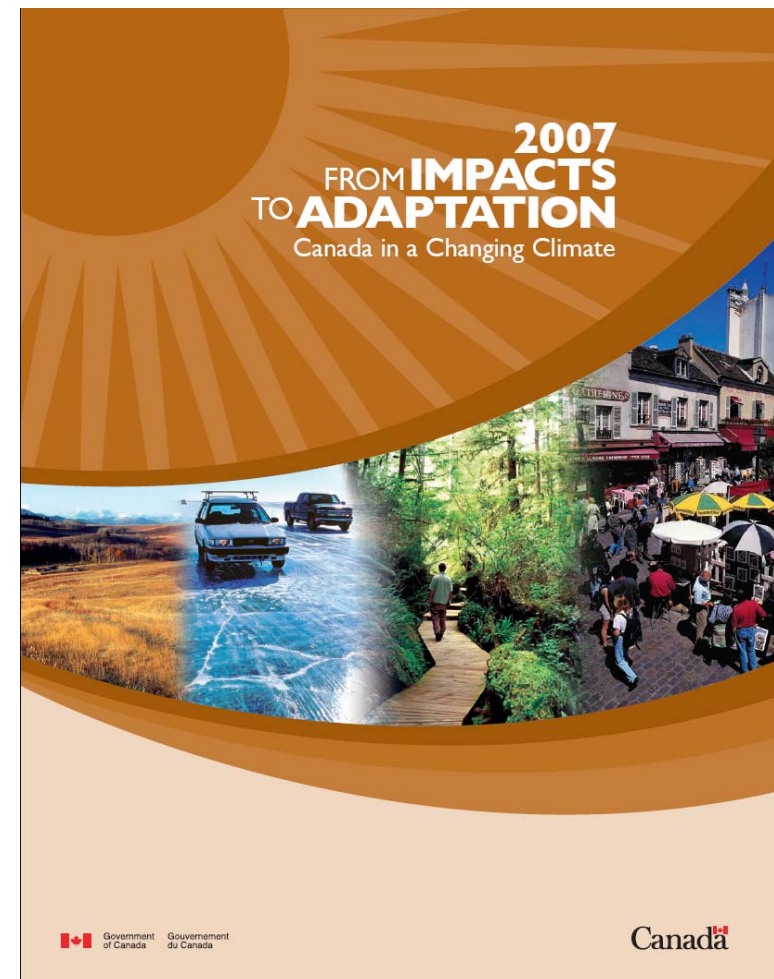
# There is a good foundation of knowledge



The national scale assessment provides a picture of Impacts and Adaptation in Canada with a regional focus

- Available on-line and on CD
- Health Canada leading a national Health Assessment due in 2008

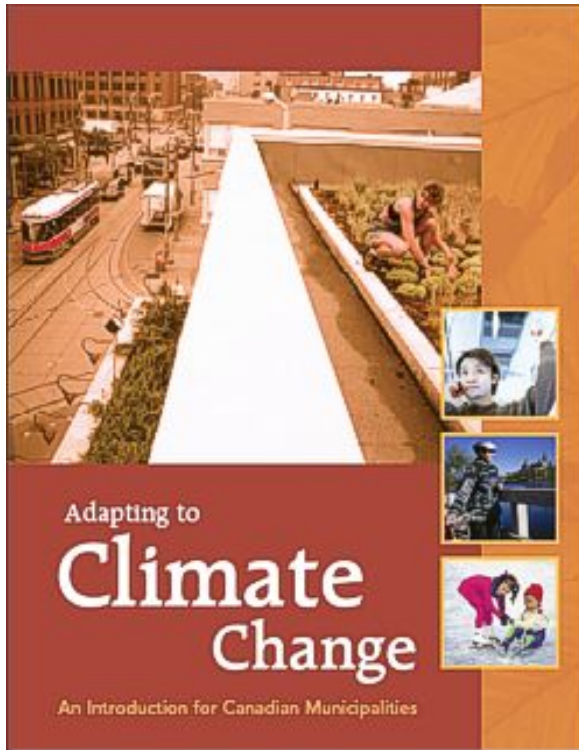
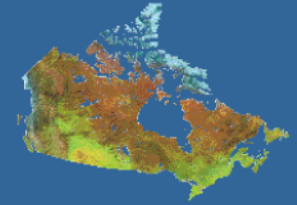
There are also tools available to assist in assessing risks and planning adaptations



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