



Climate Change Impacts, Adaptation and Federal Support for Natural Infrastructure

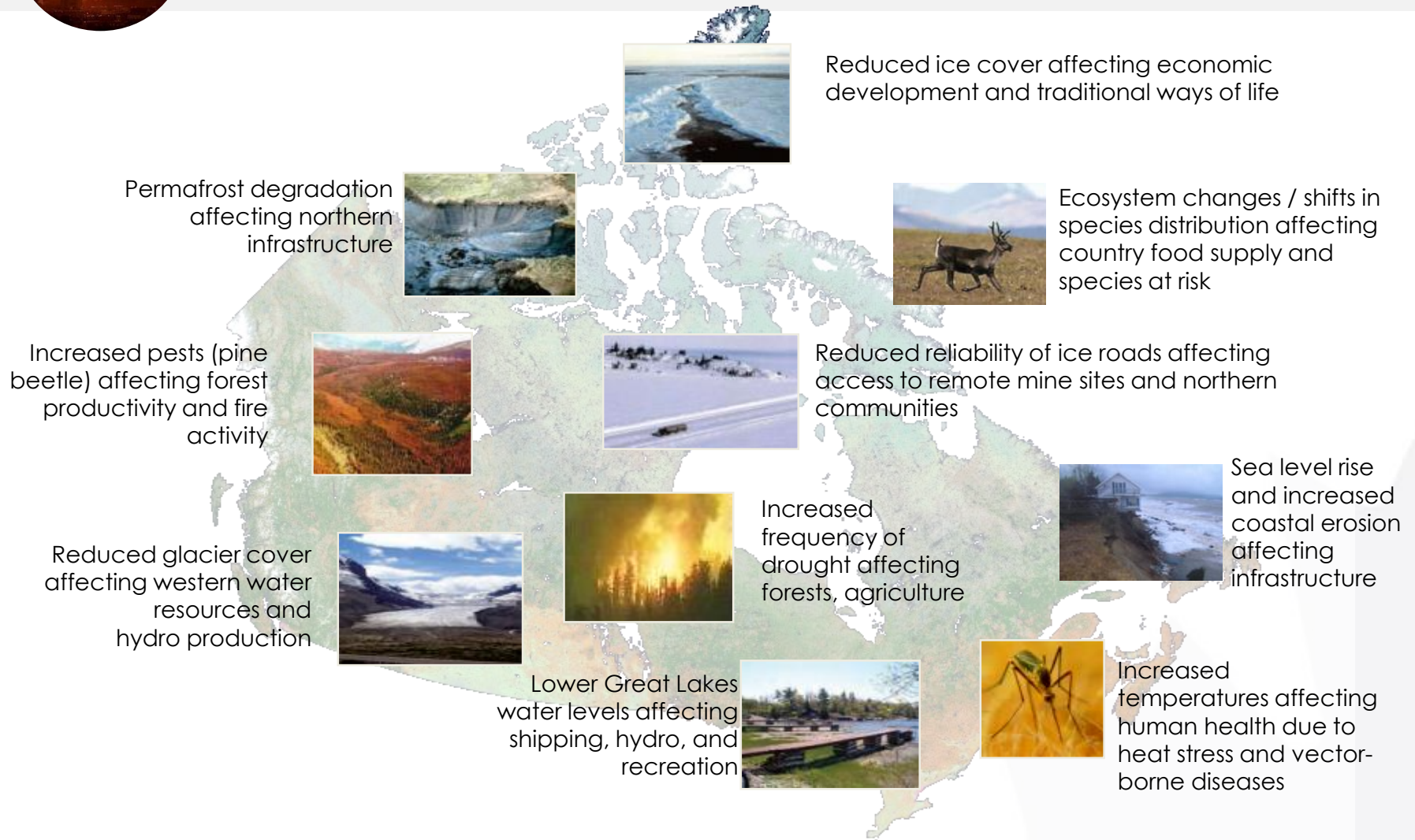
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Overview

- Climate Change Impacts in Canada
- Pan-Canadian Framework on Clean Growth and Climate Change
- Federal Support for Natural Infrastructure



Climate change is affecting communities across Canada





Impacts are clear, costly, and increasing

At a Glance: Impacts of Climate Change in Canada

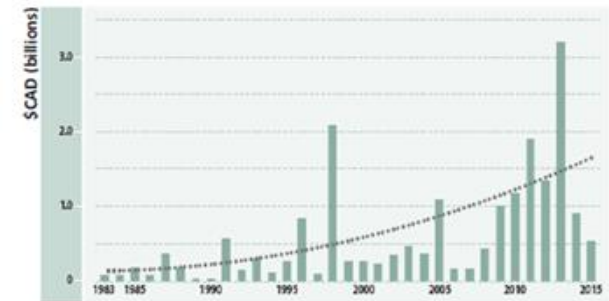
since 1948, average temperatures in Canada have risen the global average **2x** in Canada's Arctic, the increase has been **3x**

globally, 9 of the 10 **hottest years on record** have occurred in the **last 10 years**



reduced arctic sea ice can result in new transportation options and challenges, offshore resource development, increased coastal erosion and Arctic sovereignty issues

Insured losses from natural catastrophes in Canada



area burned by **wildfires** across Canada has more than **doubled** since 1959

an average of **2 million hectares** burn annually in Canada

shorter ice road seasons cause shortages of food, fuel and medical supplies, and impact development

shipping goods by air costs **2-3 times** more than shipping by ground

sea level rise and more frequent and intense storms increase the risks from storm surges

flooding from a December 2010 storm surge caused more than

\$50 million

in insured damages in Atlantic Canada and Eastern Quebec

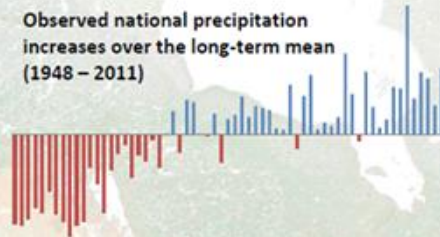
extreme weather events that used to happen every **40** years can now be expected every **6**

18 million hectares affected

warmer winters are a key factor in the extent and severity of the **mountain pine beetle** outbreak

since 2007, AgriInsurance has paid out almost **\$4 billion** in relief from hail, droughts, flooding and disease

Observed national precipitation increases over the long-term mean (1948 - 2011)



health care costs related to asthma exceed **\$40 million** annually in BC alone

asthma and **allergies** will be exacerbated by increased pollen production, earlier onset of allergy seasons, and increased temperatures

increased evaporation is expected to contribute to **lower water levels in the Great Lakes** impacting: transportation, fisheries, energy, municipalities, industry, agriculture, health, tourism, recreation

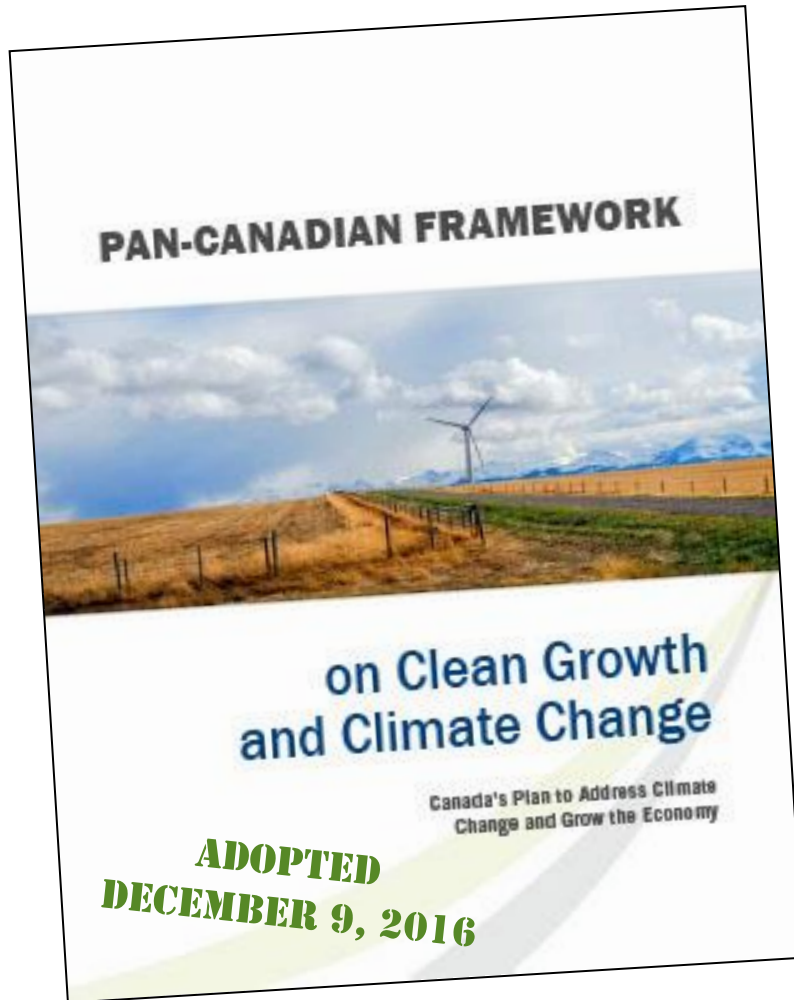
every 2.5 cm decline in water levels forces ships to reduce their load by as much as **180 tonnes**

increasing **sea surface temperatures** and changing **ocean chemistry** are affecting the abundance and distribution of ocean species

Canadian fisheries provide **80,000** jobs and **\$4.1 billion** in exports



Pan-Canadian Framework – 4 Pillars



Pricing carbon pollution



Complementary mitigation actions across all sectors



Adaptation and climate resilience



Clean technology, innovation & jobs





Adaptation and Resilience Pillar



Translating science & information into action



Climate Resilient Infrastructure



Protecting Human Health



Supporting particularly vulnerable regions



Reducing climate-related hazards and disaster risks

The Confederation Bridge connects Prince Edward Island to New Brunswick and was designed to accommodate a one meter rise in sea levels over 100 years.





Natural Infrastructure

- Highlighted in Pan-Canadian Framework under adaptation pillar
- Eligible for support through funding programs led by Environment and Climate Change Canada:
 - EcoAction Community Funding Program
 - Climate Action Fund



Natural Infrastructure

- Eligible for support through funding programs led by other federal departments:
 - Infrastructure Canada
 - Disaster Mitigation and Adaptation Fund
 - Integrated Bilateral Agreements with provinces and territories
 - Crown-Indigenous Relations and Northern Affairs Canada
 - Climate Change Preparedness in the North Program
 - First Nation Adapt
 - Agriculture and Agri-Food Canada
 - Canadian Agricultural Partnership

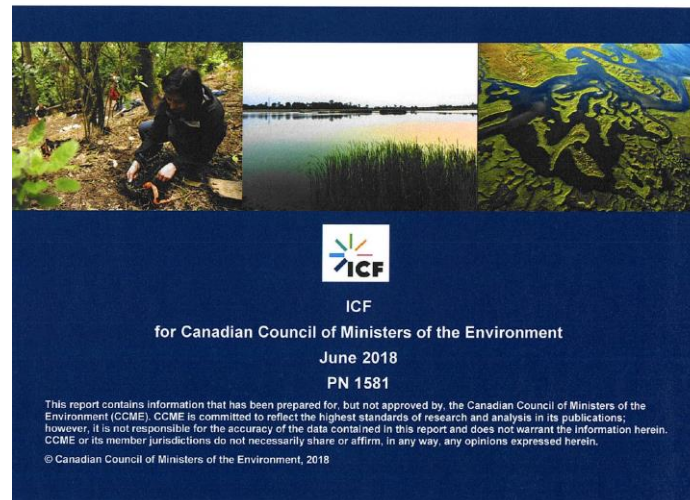


Natural Infrastructure

- Ongoing area of focus in the context of climate change adaptation under Canadian Council of Ministers of the Environment

- CCME commissioned report on *Best Practices and Resources on Climate Resilient Natural Infrastructure*

Best Practices and Resources on Climate Resilient Natural Infrastructure



PAN-CANADIAN FRAMEWORK



on Clean Growth and Climate Change

Canada's Plan to Address Climate
Change and Grow the Economy

Thank you / Merci

 Canada.ca/en/services/environment/weather/climatechange.html



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Annex 1: Adaptation and Resilience Pillar Commitments



Translating Science & Information into Action

Establishing a Canadian Centre for Climate Services

Building Regional Adaptation Capacity and Expertise



Climate Resilient Infrastructure

Investing in infrastructure to build climate resilience

Developing climate-resilient codes and standards



Protecting Human Health

Addressing climate change-related health risks

Supporting healthy Indigenous communities



Supporting Particularly Vulnerable Regions

Investing in resilient infrastructure to protect vulnerable regions

Building climate resilience in the North

Supporting community-based monitoring for Indigenous Peoples

Supporting adaptation in coastal regions



Reducing Climate-Related Hazards and Disaster Risks

Investing in infrastructure to reduce disaster risks

Advancing efforts to protect against floods

Supporting adaptation in Indigenous communities



Annex 2: Federal Action on Adaptation

Federal Actions Supporting Adaptation and Climate Resilience

Foundational Knowledge and Information

Environment and Climate Change Canada

- Canadian Centre for Climate Services
Whole-of-government approach to providing credible, useful, and timely climate information, products, tools, and services

Crown-Indigenous Relations and Northern Affairs

- Indigenous Community-based Monitoring
Collect climate data at the community level; foster an understanding of climate change that is based on Indigenous Knowledge and science

Natural Resources Canada

- National-scale knowledge synthesis and dissemination
Science / knowledge assessments presenting the latest knowledge on impacts and adaptation
- Building Regional Adaptation Capacity and Expertise
Building capacity and enabling decision-makers to apply tools and information to plan and act

Foundational Climate and Impacts Research

- Climate modelling, prediction, scenarios (ECCC)
Past, present and future states of the climate system, how it functions, and related impacts
- Oceans science (DFO)
Foundational information about the oceans system, how it functions, and related impacts
- Resource science (NRCan, AAFC)
Geoscience, forestry, agro-climate, soils, water, drought and crop information, climate change impacts on agricultural landscapes
- Extramural climate change and adaptation research (Granting Councils)

Public Safety Canada

- National Emergency Management System
Risk assessment tools and data to support development of rigorous and coordinated risk and resilience assessments.
- National Risk Profile Pilot
Pilot project to consolidate and aggregate a single all-hazards picture of the national risk environment for senior decision makers
- Advisory Council on Flooding
Develop advice on how best to manage significant policy issues caused by flooding

Economy

Natural Resources Canada

- Building Resilience in Canada's Natural Resource Sectors and Communities
Adaptation Platform (convening stakeholders to address shared priorities), facilitating the production and exchange of knowledge and tools that enable the inclusion of climate change in decision-making
- Building Regional Adaptation Capacity and Expertise
Building capacity and enabling decision-makers to apply tools and information to plan and act
- Research
Geoscience for land-based and coastal infrastructure in the north to help land-use planners, industry and regulators reduce risks arising from climate change

Fisheries and Oceans Canada

- Aquatic Climate Change Adaptation Services Program
Identification of impacts and vulnerabilities, development of tools and improvement of ocean forecasting in vulnerable coastal regions

Agriculture and Agri-Food Canada

- Researching new technologies and production practices for adoption by the agriculture sector
- Supporting on-farm environmental risk assessments and adoption of beneficial practices; regional agricultural weather and climate change risk assessments; national drought monitoring and recovery from extreme weather and climate events

Public Safety Canada

- Disaster Financial Assistance Arrangement
Provides funding to support P/Ts for response and recovery costs from extreme weather and natural disaster

Infrastructure

Infrastructure Canada

- Disaster Mitigation and Adaptation Fund
Funding for built and natural large-scale infrastructure projects reducing risks of natural disasters and extreme weather events
- Green Infrastructure Integrated Bilateral Agreements
Funding for infrastructure that increases climate resilience
- Climate Lens
Considering climate change in infrastructure investment

Transport Canada

- Transportation Assets Risk Assessment
Funding to undertake climate risk assessments of federal transportation infrastructure
- Research
Researching climate change impacts and adaptation options for the transportation sector

National Research Council

- Climate-resilient Building Codes and Guides
Developing codes and guides for climate-resilient buildings and infrastructures

Standards Council of Canada

- Standards to Support Resilience in Infrastructure
Standardization solutions that improve the resilience of infrastructure

Infrastructure Canada/Statistics Canada

- Canada's Core Public Infrastructure (CCPI) survey
Taking stock and tracking progress of climate change considerations in community asset management plans

Parks Canada

- Asset Sustainability
Strategic planning to ensure the sustainability of assets for today and into the future

Ecosystems

Environment and Climate Change Canada

- Promoting natural solutions to climate change
Integrating biodiversity and climate change considerations, providing models and data
- Research
Understanding climate change impacts on species and ecosystems

Parks Canada

- Parks and protected areas as natural solutions for climate change
Protecting and restoring healthy, climate resilient ecosystems; building knowledge and understanding of impacts and solutions

Fisheries and Oceans Canada

- Research
Understanding climate change impacts on oceans and marine ecosystems
- Aquatic climate change adaptation services program
Identification of impacts and vulnerabilities, development of tools and improvement of ocean forecasting in vulnerable coastal regions

Agriculture and Agri-Food Canada

- Research and Programs
Building resilience to climate change in agricultural ecosystems

Communities

Environment and Climate Change Canada

- EcoAction
Support for community engagement projects by community-based non-profit organizations

Treasury Board Secretariat / Environment and Climate Change Canada

- Resilient Government Institutions
Planning for impacts of climate change on government operations

Public Safety Canada

- National Disaster Mitigation Program
Support for risk assessments, planning, and small-scale infrastructure related to flood risks

Natural Resources Canada

- Building Regional Adaptation Capacity and Expertise
Building capacity and enabling decision-makers to apply tools and information to plan and act

Federal Funding to Support Community Action

- Municipalities for Climate Innovation and Municipal Asset Management Programs
Funding, training, and resources to help municipalities adapt to climate change impacts

Health and Well-Being

Health Canada

- Climate Change and Health Adaptation
Address knowledge gaps on climate-related health impacts through health monitoring and surveillance, support capacity-building and adaptation within the health system, and protect the health of Canadians from extreme heat

Indigenous Services Canada

- Climate Change and Health Adaptation for First Nations and Inuit
Community-led assessments on the health impacts of climate change and development of adaptation strategies

Public Health Agency of Canada

- Infectious Diseases
Evidence, education, and awareness to respond to infectious diseases exacerbated by climate change (including those transmitted by insects and ticks, foodborne, and waterborne diseases)

Canadian Institutes of Health Research

- Climate Change and Health Research Initiative
Targeted research to inform adaptation decision-making related to climate change-driven health risks: Lyme disease and food security in the North

Particularly Vulnerable Communities and Regions

Infrastructure Canada

- Disaster Mitigation and Adaptation Fund
Funding for built and natural large-scale infrastructure projects reducing risks of natural disasters and extreme weather events
- Green Infrastructure Integrated Bilateral Agreements
Funding for infrastructure that increases climate resilience

Transport Canada

- Northern Transportation Adaptation Initiative
Building capacity and supporting research, development, and testing of innovative adaptation technologies for resilient northern transportation infrastructure and operations

Crown-Indigenous Relations and Northern Affairs

- Climate Change Preparedness in the North
Coordinate adaptation action in the North and build climate-resilient infrastructure in northern communities
- Indigenous Community-based Monitoring
Foster collaboration between communities and researchers, teach youth about climate change and climate science in a culturally-relevant way
- First Nations Adapt
Decision support tools to guide the assessment of climate change impacts and funding for First Nation communities that are encountering repeated and severe climate impacts
- Northern Adaptation Strategy
Develop and implement a Northern Adaptation Strategy to strengthen northern capacity for climate change adaptation

Indigenous Services Canada

- Climate Change and Health Adaptation for First Nations and Inuit
Build community capacity and awareness on health impacts and create opportunities for adaptation actions

Fisheries and Oceans Canada

- Research
Understanding climate change impacts on oceans and marine ecosystems

Environment and Climate Change Canada

- Research
Understanding climate change impacts on arctic species and ecosystems

Agriculture and Agri-Food Canada

- Research and Programs
Improve the ability to grow nutritious food in the north, and understand climate change impacts