



Environment  
Canada

Environnement  
Canada

Canada

# Summary of Findings: North America Chapter Intergovernmental Panel on Climate Change (IPCC), WGII 5<sup>th</sup> Assessment Report

[www.ipcc.ch](http://www.ipcc.ch)

## Chapter Lead Authors

Patricia Romero-Lankao (Mexico), Joel Smith (US)

## Lead Authors

Debra Davidson (Canada), Noah Diffenbaugh (US), Patrick Kinney (US),  
Paul Kirshen (US), Paul Kovacs (Canada), Lourdes Villers Ruiz (Mexico)

**Presented by:**

**Linda Mortsch**

**Review Editor North America Chapter**

**Climate Research Division, Environment Canada**

# Changes in climate...

---

- **North America's climate has changed and some societally-relevant changes have been attributed to anthropogenic causes (*very high confidence*)**
- **Observed climate trends include:**
  - increased occurrence of severe hot weather events over much of the US
  - increases in heavy precipitation
- **Recent climate changes and individual extreme events demonstrate both impacts of climate-related stresses and vulnerabilities of exposed systems (*very high confidence*)**



# Future climate hazards and risks ...

- **Many climate stresses that carry risk – particularly related to severe heat, heavy precipitation and declining snowpack – will increase in frequency and/or severity in North America in the next decades (*very high confidence*).**
- Climate hazards - higher sea levels and associated storm surges, more intense droughts, and increased precipitation variability - projected to lead to increased stresses to water, agriculture, economic activities and urban and rural settlements (high confidence)



# Water Resources

- **Water resources are already stressed in many parts of North America due to non-climate change anthropogenic forces, and are expected to become further stressed due to climate change (*high confidence*)**
- Projected future changes:
  - decreases in water quality
  - increases in urban drainage flooding
  - decreases in water supplies for urban areas
- Many adaptation options currently available can address water supply deficits; adaptation responses to flooding and water quality concerns are more limited (*medium confidence*)



# Economic sectors

---

- **Most sectors of the North American economy have been affected by and have responded to extreme weather - hurricanes, flooding, and intense rainfall (*high confidence*)**
- Growing experience with **reactive adaptation**
  - few examples of **proactive adaptation** anticipating future climate change impacts, and these are largely found in sectors with longer-term decision-making, including energy and public infrastructure.
- Emerging concern that dislocation in one sector of the economy may have an adverse impact on other sectors due to supply chain interdependency (medium confidence)



# Infrastructure

---

- **Much of North American infrastructure is currently vulnerable to extreme weather events and, unless investments are made to strengthen them, would be more vulnerable to climate change (*medium confidence*).**
  - Water resources and transportation infrastructure are in many cases deteriorating, thus more vulnerable to extremes than strengthened ones (*high confidence*).



# Settlements – Urban and Rural

- **Observed impacts on livelihoods, economic activities, infrastructure and access to services in North American urban and rural settlements have been attributed to ... changes in temperature and precipitation, and occurrences of such extreme events as heat waves, droughts and storms (high confidence)**
- Severity of climate impacts on human settlements are strongly influenced by context-specific social and environmental factors and processes that contribute to risk, vulnerability and adaptive capacity such as hazard magnitude, populations access to assets, built environment features and governance (high confidence)
  - urban areas - human and capital risks are highly concentrated
  - rural areas - geographic isolation and institutional deficits are key sources of vulnerability.



# Agriculture

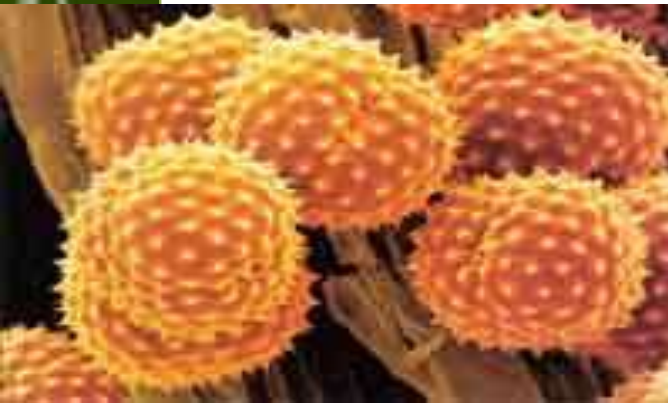
- **Effects of temperature and climate variability on yields of major crops have been observed (high confidence)**
  - Ontario and Quebec productivity affected by climate variability
- Projected increases in temperature, reductions in precipitation in some regions, and increased frequency of extreme events would result in net productivity declines in major North American crops by the end of the 21st Century without adaptation... (very high confidence)
  - some regions, particularly in the north, may benefit





# Human Health

- **Human health impacts from extreme climate events have been observed, although climate change-related trends and attribution have not been confirmed to-date.**
- Infectious diseases (water-, food-, and vector-borne ), air pollutants, and airborne pollens are influenced by climate variability and change (medium confidence)
- Further climate warming in NA will impose stresses on the health sector through more severe extreme events such as heat waves and coastal storms, as well as more gradual changes in climate



# Adaptation

- **Adaptation – including through technological innovation, institutional strengthening, economic diversification, and infrastructure design – can help to reduce risks in the current climate, and to manage future risks in the face of climate change (medium confidence)**
- In North America governments are engaging in incremental adaptation assessment and planning particularly at the municipal level with some proactive adaptation occurring to protect longer-term investments in energy and public infrastructure (SPM, 26.7-9)
- **Adaptation planning and implementation can be enhanced through complementary actions across levels, from individuals to governments (*high confidence*)**

