

# IPCC Working Group II March 2014

## Summary of findings North America Chapter

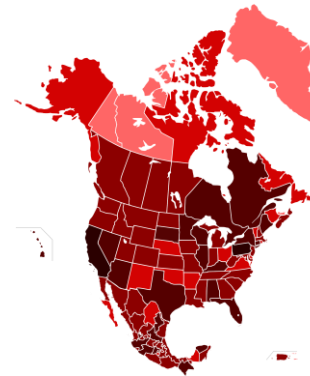


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Western University

### ***Bienvenido Mexico***

The North America Chapter provides a synthesis of the climate impacts and adaptation research for Canada, the United States and Mexico.



This is the first time IPCC has included Mexico in North American.

Impacts in the far North continue to be assessed in the Polar Regions Chapter.



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## Key findings

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1. North America's climate has changed and some societally-relevant changes have been attributed to anthropogenic causes (*very high confidence*). Recent climate changes and individual extreme events demonstrate both impacts of climate-related stresses and vulnerabilities of exposed systems (*very high confidence*).
2. 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*).
3. North American ecosystems are under increasing stress from rising temperatures, CO<sub>2</sub> concentrations, and sea-levels, and are particularly vulnerable to climate extremes (*very high confidence*).



## Key findings

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4. 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*).
5. Effects of temperature and climate variability on yields of major crops have been observed (*high confidence*). 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 21<sup>st</sup> Century without adaptation, although the rate of decline varies by model and scenario, and some regions, particularly in the north, may benefit (*very high confidence*).
6. Human health impacts from extreme climate events have been observed, although climate change-related trends and attribution have not been confirmed to-date.



## Key findings

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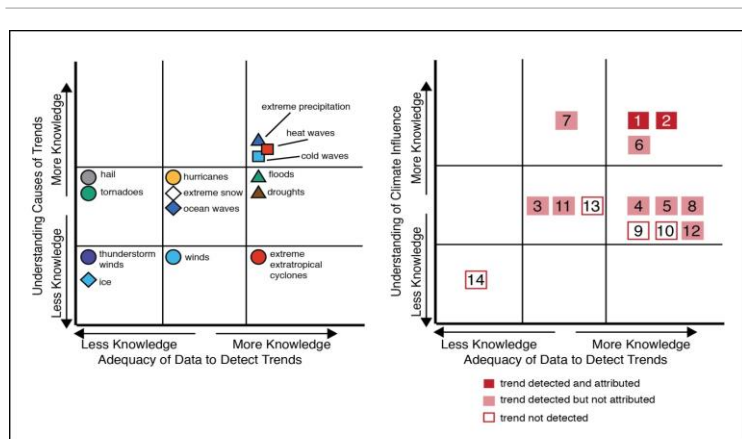
7. Observed impacts on livelihoods, economic activities, infrastructure and access to services in North American urban and rural settlements have been attributed to sea level rise, changes in temperature and precipitation, and occurrences of such extreme events as heat waves, droughts and storms (*high confidence*).
8. 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*).
9. Most sectors of the North American economy have been affected by and have responded to extreme weather, including hurricanes, flooding, and intense rainfall (*high confidence*).

## Key findings

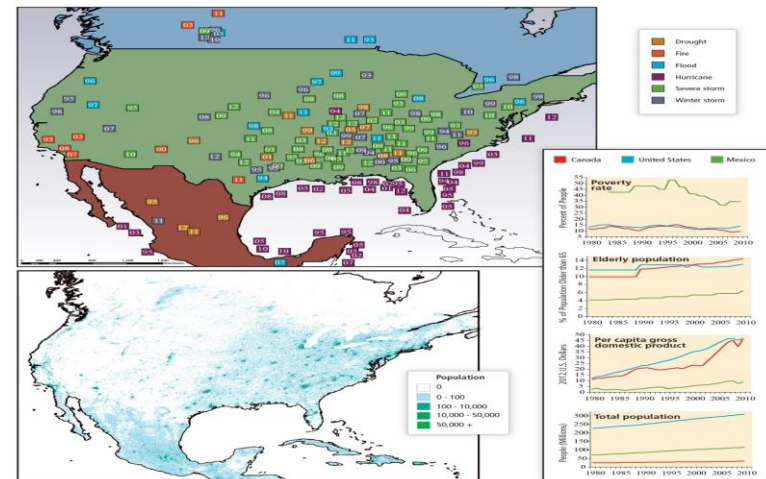
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10. Adaptation – including through technological innovation, institutional strengthening, economic diversification, and infrastructure design – can help to reduce risks in the current climate, and to manage future risks in the face of climate change (*medium confidence*).

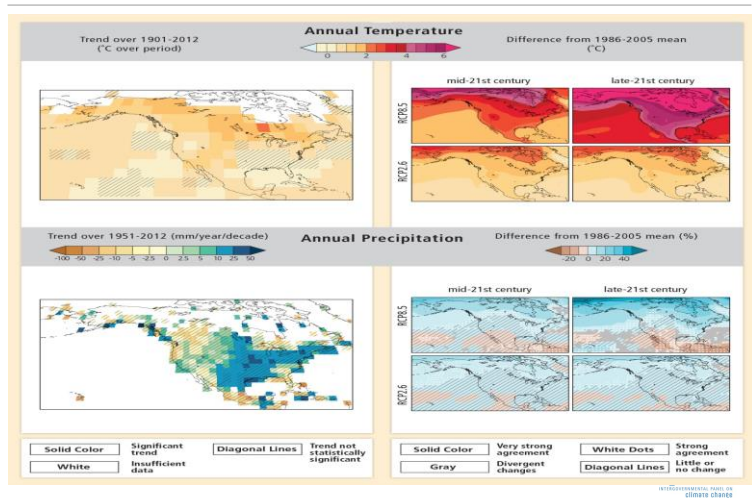
## Detection and attribution of impacts



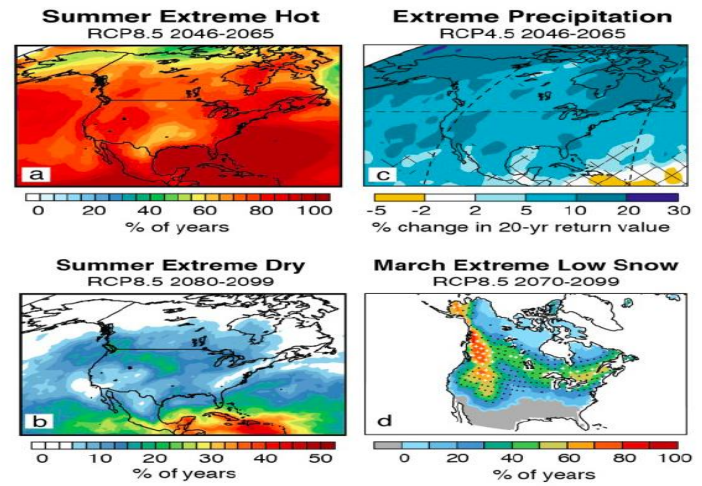
## Extreme events illustrate vulnerability












## Observed and projected change in climate



## Temperature and precipitation trends



## Key risks and potential for adaptation

Key risk	Adaptation issues and prospects	Climatic drivers	Supporting ch. sections	Timeframe	Risk for current and high adaptation											
Loss of ecosystem integrity, property loss, human morbidity and mortality due to wildfires (high confidence)	Some ecosystems are more fire-adapted than others. Forest managers and municipal planners are increasingly incorporating fire protection measures (e.g., prescribed burning, introduction of resilient vegetation). Institutional capacity to support ecosystem adaptation is limited. Adaptation of human settlements is constrained by rapid private property development in high-risk areas and by limited household-level adaptive capacity.		26.4, 26.8.1.2, Box 26-2	<table border="1"> <tr> <td>Present</td> <td>Very low</td> <td>Medium</td> <td>Very high</td> </tr> <tr> <td>Near-term (2030-2040)</td> <td colspan="3"></td> </tr> <tr> <td>Long-term (2080-2100)</td> <td colspan="3"></td> </tr> </table>	Present	Very low	Medium	Very high	Near-term (2030-2040)				Long-term (2080-2100)			
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Heat-related human mortality (high confidence)	Residential air conditioning (A/C) can effectively reduce risk. However, availability and usage of A/C is often limited among the most vulnerable individuals, and is subject to complete loss during power failures. In addition, there are vulnerable populations including athletes and outdoor workers for whom air conditioning is not available. Community- and household-scale adaptations have the potential to reduce exposure to heat extremes via: family support; heat warnings; cooling centers; greening; high albedo surfaces, etc.		26.6.1.2, 26.8.1.2	<table border="1"> <tr> <td>Present</td> <td>Very low</td> <td>Medium</td> <td>Very high</td> </tr> <tr> <td>Near-term (2030-2040)</td> <td colspan="3"></td> </tr> <tr> <td>Long-term (2080-2100)</td> <td colspan="3"></td> </tr> </table>	Present	Very low	Medium	Very high	Near-term (2030-2040)				Long-term (2080-2100)			
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Property and infrastructure damage; supply chain, ecosystem and social system disruption; public health; and water quality impairment from river and coastal urban floods (high confidence)	Implementing management of urban drainage is expensive and very disruptive to urban areas. There are many no-regret strategies with co-benefits (e.g., less impervious surfaces leading to more groundwater recharge, green infrastructure, and roof-top gardens). Sea level rise increases water elevations in coastal outfalls, which impedes drainage. In many cases, older rainfall design standards are being used which need to be updated to reflect current climate conditions. Significant challenges are also being faced by urban managers due to increased flooding from coastal storms and river-flooding.		26.2.2, 26.3.2, 26.3.3, 26.3.4, 26.4.2, 26.4.2.2, 26.6.1.1, 26.6.1.5, 26.6.2, 26.7, 26.7.1.1, 26.7.5.2, 26.8.1.1, 26.8.1.2, 26.8.2.1, 26.8.3, 26.8.4.1.2	<table border="1"> <tr> <td>Present</td> <td>Very low</td> <td>Medium</td> <td>Very high</td> </tr> <tr> <td>Near-term (2030-2040)</td> <td colspan="3"></td> </tr> <tr> <td>Long-term (2080-2100)</td> <td colspan="3"></td> </tr> </table>	Present	Very low	Medium	Very high	Near-term (2030-2040)				Long-term (2080-2100)			
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<b>Climatic drivers of impacts</b>				<b>Risk &amp; potential for adaptation</b>												
 Warming trend	 Extreme temperature	 Precipitation	 Extreme precipitation	 Drying trend	 Sea level	<table border="1"> <tr> <td>Potential for adaptation to reduce risk</td> <td></td> <td></td> </tr> <tr> <td>Risk level with high adaptation</td> <td></td> <td>Risk level with current adaptation</td> </tr> </table>	Potential for adaptation to reduce risk			Risk level with high adaptation		Risk level with current adaptation				
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