Weathering the Storm
Climate Change, Business Continuity, and Emergency Management

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EPICC
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Outline

• B.C.’s Changing Climate:
  – Observed changes in B.C.’s climate
  – What to expect

• What does this mean for Emergency Preparedness and Business Continuity?

• Additional Resources
B.C.’S CHANGING CLIMATE
Average Temperature (annual)

• BC average annual temp increased 1.4°C per century

• We should expect
  – Relatively warm years will increase in frequency
  – Year to year natural variation will persist
  – The interior will warm faster than other areas
  – The north will continue to warm at rates considerably greater than the global average

SOURCE: Data from Ministry of Environment Climate Related Monitoring Program and Environment Canada. Trend Analysis for 1900 through 2013 conducted by PCIC, 2014 for the Ministry of Environment Climate Action Secretariat. NOTES: All trends are positive and indicate warming.
Daily Max & Min Temperature

• Day-time (max) temp increased 0.7°C per century
• Night-time (min) temp increased 2.0°C per century

SOURCE: Data from Ministry of Environment Climate Related Monitoring Program and Environment Canada. Trend Analysis for 1900 through 2013 conducted by PCIC, 2014 for the Ministry of Environment Climate Action Secretariat. NOTES: All trends are positive and indicate warming. NS indicates that trend is not statistically significant.
Average annual precipitation

increased 12% per century
Seasonal trends variable throughout province
We should expect

– More frequent heavy precipitation events
– A shift poleward of mid latitude storms
– Increase in the strength of most extreme storms

SOURCE: Data from Ministry of Environment Climate Related Monitoring Program and Environment Canada. Trend Analysis for 1900 through 2013 conducted by PCIC, 2014 for the Ministry of Environment Climate Action Secretariat. NOTES: A positive sign indicates increasing precipitation. NS indicates that trend is not statistically significant.
Change in Glacier Area 1985-2005

- Glacier coverage decreased by 2525 km$^2$ from 1985 - 2005 throughout BC (an area slightly larger than Strathcona Provincial park)

- Vancouver island glaciers likely to disappear by 2100
The ocean has warmed and risen
Cool years will be warmer
Climate action includes reducing emissions & preparing for unavoidable impacts.
Changing Averages, Changing Extremes

- Increase in mean
- Increase in variance

Past Climate

New Climate

Temperature

Cold

Average

Hot

Probability of Occurrence
CLIMATE CHANGE AND THE ECONOMY

ENERGY
- Warmer winters decrease the use of natural gas and heating oil
- More air conditioning in the summer increases electricity consumption
- Extreme weather is a common cause of interruptions in power supply
- Heavier spring melts can increase flood risk

MINING
- In the mountains, more frequent heavy rain events increase the chance of mudslides and wash out roads, as well as damage mines
- Ice roads, which are used for transportation in the North during the winter, are becoming less reliable
- Permafrost thawing damages buildings, roads and airport runways

FORESTRY
- Changes in forest composition, pest and disease outbreaks, and more frequent fires could lead to more mill closures and lost jobs
- Winter tourism such as skiing will suffer shorter seasons

FOOD
- Longer and warmer growing seasons would allow crops to be grown farther north, lengthen outdoor feeding seasons for livestock and allow Canada’s maple syrup industry to expand northward
- Loss and damage due to heavy rainfall, hurricanes, tornadoes, wildfires and winter storms is now more costly than fire and theft

HOUSING
- Land-use planners can encourage the construction of homes in areas protected from hazards associated with extreme weather events
- More frequent droughts and heat waves
- Subsidies and other policies promote retrofits that improve energy efficiency and insulation, as well as the resiliency of older homes to extreme weather

TOURISM
- Warm weather tourism such as camping is expected to grow
- More frequent droughts and heat waves

INSURANCE
- Homeowners and businesses are already paying more for insurance due to the greater likelihood of extreme weather

MANUFACTURING
- Climate change can affect the availability of supplies and resources for manufacturing, such as water and timber

For the whole Canada in a Changing Climate report, visit Adaptation.NRCan.gc.ca
The Climate is Changing

- The evidence base is robust
- Additional change is inevitable
- The past climate is no longer an adequate guide to the future
WHAT DOES THIS MEAN FOR EMERGENCY PREPAREDNESS AND BUSINESS CONTINUITY?
Plan for both gradual changes & more extremes

Gradual changes in climate:
• Warmer winters
• Warmer nights
• More frequent freeze-thaw cycles
• Sea level rise

More frequent extreme weather events:
• Heavy precipitation
• Heat waves
• Droughts

Example Climate Change Impacts:
• Longer, more severe wildfire season
• Increased flooding
• Increased seasonal water scarcity
• Increased storm surge
Characteristics of adaptive systems

• Who?
  – Responsiveness
  – Resourcefulness
  – Capacity to learn

• What?
  – Flexibility
  – Redundancy
  – Safe failure

• How?
  – Access to resources, information
  – Accountable, equitable, fair decisions
  – Iterative process
Considerations for business continuity and emergency planning

• Are your plans up to date?
  • Do your business continuity and emergency plans address an increase in the frequency, duration and intensity of extreme weather events?
  • Does your capital management plan identify opportunities to maintain and upgrade vulnerable capital to minimize disruption to business areas as a result of extreme events?
Considerations for business continuity and emergency planning (continued)

- Are all parties sufficiently aware of risks to make informed decisions, which can include acceptance of increased risk
  - Do your business areas work together to address risks to business continuity, staff, assets and infrastructure and the interdependencies between these areas?
- Are your operational assets, information, personnel or customers (consumers and businesses) exposed?
- Insurance and DFAA may not fully cover potential losses – will gaps in insurance coverage result in issues with business continuity or service level disruptions?
Considerations for business continuity and emergency planning (continued)

- Are your supply chains vulnerable?
  - Are your suppliers managing their risk adequately (Canada Post; BC Hydro)
  - Do you depend on a key input that is sensitive to climate (e.g. water; snow; ice roads)
RESOURCES
Climate Insights 101

CO₂ and the Greenhouse Effect
Greenhouse gases, the carbon cycle, water vapour, the Keeling Curve...
WATCH LESSON 1

Mother Nature's Influence
El Niño, the sun's influence, how ancient ice core records reveal our climate history...
WATCH LESSON 2

Observable Changes
Arctic sea ice, ocean acidification, sea level rise...
WATCH LESSON 3

An Introduction to Climate Modelling
Seeing the future: Climate models, all about ‘forcing’...
WATCH LESSON 4

Projected Climate Change in British Columbia
Why BC will heat faster than the global average, downscaling, and handy tools to predict local climate...
WATCH LESSON 2

Climate Impacts in British Columbia
What lies ahead for BC's critical river basins, forests, marine habitat and shorelines...
WATCH LESSON 3

Adaptation
Minimizing risk for BC communities, new opportunities for agriculture and a how-to guide for adaptation planning...
WATCH LESSON 4
Plan2adapt and Regional Climate Summaries

Potential Impacts for British Columbia in the 2050s

Below, you can view a list of potential impacts that may affect British Columbia in the 2050s. This is intended to provide a starting point for more detailed local assessment of climate change impacts. These are based on limited climate change information, as shown in the detailed rules logic. These rules were developed based on a workshop attended by climate impacts experts and subsequent peer review. Although quite comprehensive, the rules are a work in progress, and some key impacts or management implications may be missing. We welcome contributions and suggestions from users of Plan2Adapt.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Affected Sectors</th>
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<tbody>
<tr>
<td>Decrease in Snowpack</td>
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<td>High Intensity Precipitation</td>
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<td>Increase in Temperature</td>
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<td>Longer Dry Season</td>
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<td>Possible Change in Productivity</td>
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<td>Possible Flooding</td>
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<td>Sea Level Rise / Storm Surge</td>
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<td>Shift in Hydrologic Regime Classification</td>
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<td>Waterlogged Soil</td>
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Switch to sector view
ReTooling for Climate Change
Current National Assessments
Climate change and health factsheets
PICS Buildings and Climate Risk Infographic
Regional Climate Projections Reports

CLIMATE PROJECTIONS FOR THE CAPITAL REGION
APRIL 2017

Climate Projections for the COWICHAN VALLEY REGIONAL DISTRICT

Climate Projections for Metro Vancouver
The BC Adapts Video Series

BC Adapts Video Series
Our relationship with water will be central to our adaptation to climate change. This video series illustrates actions B.C. communities are taking to adapt to the impacts of climate change.

The series focuses on three subject areas:
- Coastal Flood Management: examples of adaptation to sea level rise
- Rainwater Management: examples of adaptation to changed precipitation and stormwater patterns
- Water Conservation: examples of adaptation to seasonal droughts

BC Adapts Introduction
Resources

- PICS Climate Insights 101: http://pics.uvic.ca/education/climate-insights-101
- Plan2Adapt and Regional Climate Summaries: http://www.pacificclimate.org/
- Retooling for Climate Change: http://www.retooling.ca/
- Buildings Climate Risk Infographic: http://www.pics.uvic.ca/infographics
- RD climate projections reports:
  - Climate Projections for the Cowichan Valley Regional District
  - Climate Projections for the Capital Region
  - Climate Projections for Metro Vancouver
- BC Adapts Video series: http://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/bc-adapts
QUESTIONS?

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