PRINCE EDWARD ISLAND CLIMATE CHANGE ADAPTATION

June 2017

Public Input Document

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Dear Islanders,

The UPEI Climate Lab is developing the Prince Edward Island *Climate Change Adaptation Recommendations Report* for the Government of Prince Edward Island. We are seeking public input to help us develop relevant, practical, and innovative recommendations for climate change adaptation. Climate change adaptation refers to the ways in which we can take advantage of the opportunities arising from climate change, as well as reducing the negative impacts from climate change. This *Public Input Document* provides information about climate change adaptation and how climate change impacts will affect the Island.

As you review the information and provide feedback, please consider the following questions:

1. How important is climate change adaptation?
2. What roles should businesses, property owners, the public, and the different levels of government play in climate change adaptation?
3. How do you recommend each of the sectors adapt to climate change?
4. How should climate change adaptation work be prioritized?

We look forward to receiving your input and recommendations and hope to see you at one of the public engagement sessions later this fall.

Thank you,

Dr. Adam Fenech
Director, UPEI Climate Lab
upei.ca/climate

Prince Edward Island Climate Change Adaptation

PUBLIC INPUT DOCUMENT

1. WHAT IS CLIMATE AND CLIMATE CHANGE ADAPTATION?

Climate is not weather. Weather is short-term changes (hours, days) in temperature, cloud cover, precipitation (rain, snow, sleet), humidity or wind at the local or regional scale. Climate, on the other hand, is long-term changes (months, seasons, years, decades) in these variables at the global, regional or local scale. Changes in our climate are often so small as to take decades, centuries, or millennia to be observable. These small changes in climate, however, can have significant impacts on the economy and ecology of Prince Edward Island.

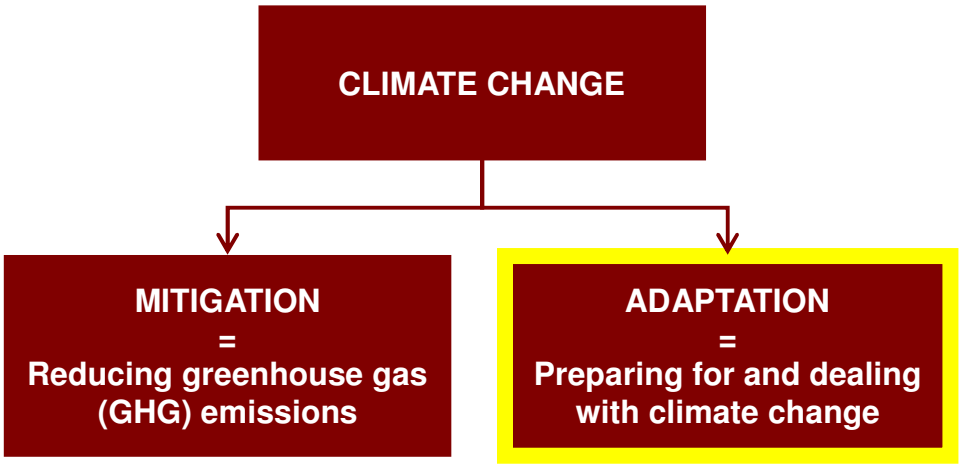


Figure 1: Climate change mitigation versus climate change adaptation.

There are two main responses to addressing climate change: mitigation and adaptation. Mitigation looks to combat climate change by reducing greenhouse gas emissions, the root cause of climate change. Adaptation addresses the symptoms of climate change by taking advantage of the opportunities arising from climate change, as well as reducing the negative consequences of climate change so as to minimize the risk posed by these changes to the economy and ecology of Prince Edward Island.

2. HOW WILL CLIMATE CHANGE AFFECT PEI?

Temperatures are expected to increase, with more extreme hot days and fewer extreme cold days.

According to research conducted at the UPEI Climate Lab, Prince Edward Island has experienced changes in annual temperatures of 0.5 degrees Celsius (°C) over the past 100 years, and will experience cumulative increases into the future by 0.7°C on average by the 2020s, 1.6°C on average by the 2050s and 2.4°C on average by the 2080s. These seemingly small increases in annual mean temperatures will influence the extremes of temperature significantly - the number of days exceeding extreme hot temperatures (>27.5°C) will likely increase from our current normal of 8 per year on average (1981-2010) to 16 per year on average in the 2020s (2011-2040), to 22 per year on average in the 2050s (2041-2070) and to 35 per year on average in the 2080s (2041-2100) (see Figure 2). The number of days exceeding extreme cold temperatures (<-20°C) will likely decrease from our current normal of 6 per year on average (1981-2010) to 5 per year on average in the 2020s, to 4 per year on average in the 2050s, to 3 per year on average in the 2080s (see Figure 3).

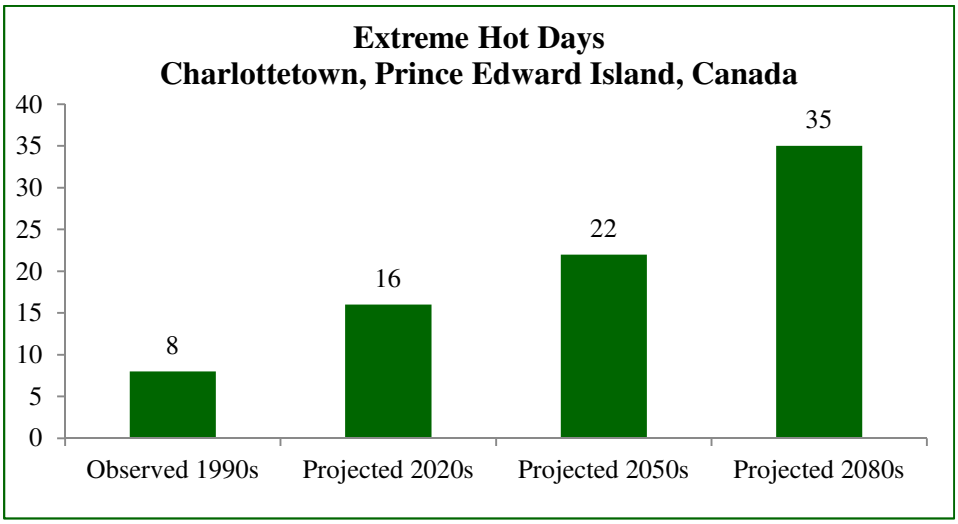


Figure 2: Projected number of days exceeding extreme hot temperatures (>27.5°C) for Charlottetown, PEI, Canada (Source: Preliminary results from statistically downscaled averages from Fenech and Jien (2015) using SDSM).

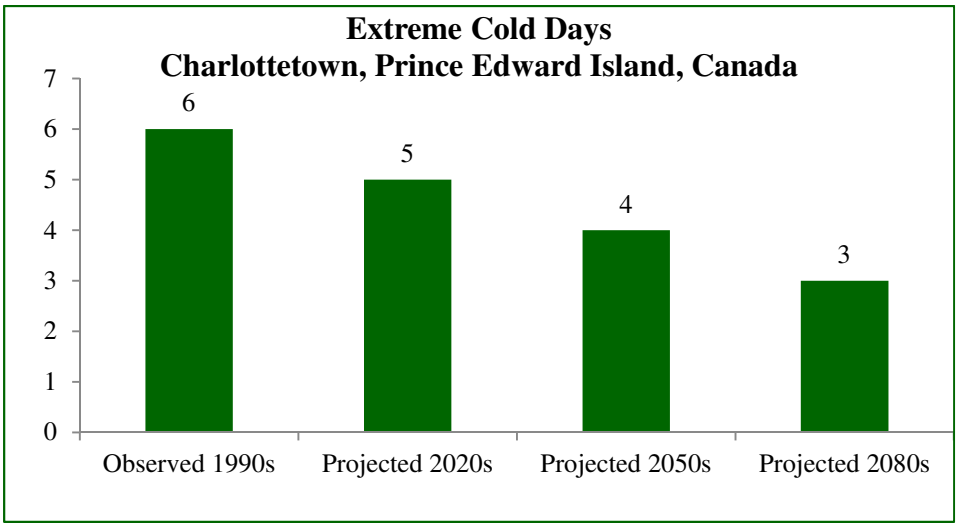


Figure 3: Projected number of days exceeding extreme cold temperatures (<-20°C) for Charlottetown, PEI, Canada (Source: Preliminary results from statistically downscaled averages from Fenech and Jien (2015) using SDSM).

Precipitation is expected to decrease from current levels before returning to today's normal by the 2080s.

Our results show that drier conditions are ahead for Prince Edward Island with annual total precipitation (rain, snow, sleet) decreasing from today's normal (1981-2010) by 6% on average by the 2020s making it drier and more susceptible to drought conditions. Over time, our models show precipitation returning to today's normal by the 2080s (2071-2100).

Sea-levels could rise 2.7 metres by 2100.

Sea-levels continue to rise as well as the future projections made by scientists. According to the most recent assessment by the U.S. National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, U.S. Geological Survey, Rutgers University, and the U.S. Department of Commerce, global mean sea-level could rise in the range of 2.0 to 2.7 metres by 2100. Rising sea-levels will lead to an increase in the reach and severity of coastal flooding and coastal erosion. This has implications for our future infrastructure such as roads and buildings built on the coasts of Prince Edward Island.

Storm events will increase in severity.

Precipitation events are expected to decrease in frequency and increase in severity under a changing climate. That means there will be fewer events but they will be much more intense, leading to increased incidences of run-off, inland flooding, road washouts, etc.

Figure 4: Souris breakwater in October 2015 (Source: 2016 PEI Weather Trivia Calendar).

Overall, the climate has changed and is expected to change significantly. Humans will have to prepare for these changes by taking advantage of opportunities arising from climate change and by reducing the risks to Prince Edward Island's economy and ecology that climate change will inevitably bring.

3. WHAT TYPES OF CLIMATE CHANGE ADAPTATION RECOMMENDATIONS WILL BE MADE?

The climate change adaptation recommendations selected for the final report aim to:

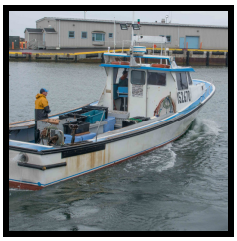
- Reduce vulnerability to current and projected climate change impacts;
- Increase resilience of the natural and built environment, the economy, etc.;
- Benefit from climate change opportunities, where possible; and
- Be relevant and practical.

Specific recommendations will be provided for each of the identified sectors:

Agriculture

Education

Energy



Fish & Aquaculture

Forestry & Biodiversity

Insurance

Public Health & Safety

Tourism

Transportation & Infrastructure

Water

4. HOW WILL CLIMATE CHANGE IMPACT THE SECTORS?

Sector	Potential Opportunities	Potential Challenges
Agriculture	• Longer growing season • Planting of new and possibly more profitable crops	• Extreme weather events may decrease yield • Warmer temperatures may decrease milk production and weight gain in beef cattle • Introduction of new pests and diseases • Field irrigation may be required • Existing crops may not thrive in the new climate
Education	• Climate science allows for multidisciplinary learning	• Limited exposure to climate science (e.g., future projects, international negotiations, adaptation options, etc.) in K – 12 curriculum • Limited resources and tools for K – 12 teachers in climate science
Energy	• Fewer extreme cold days will reduce winter heating costs • Higher efficiency for groundwater heat pump units	• Warmer summers may cause a higher reliance on electricity for air conditioning
Fish & Aquaculture	• Higher groundwater temperature increases fish culture growth rates • Warmer water affects quality and value of lobster meat and harvest periods of lobster and crab	• Increased run-off incidences from extreme precipitation events could impact aquaculture health • Warmer water affects quality and value of lobster meat and harvest periods of lobster and crab • More acidic ocean waters make it difficult for shellfish to develop hard shells • Greater growth of sea lettuce decrease oxygen available for shellfish and fin fish • Introduction of new pests and diseases

Forestry & Biodiversity	• Increase in growing degree days for hardwood species (e.g., yellow birch, sugar maple) • Expansion of suitable habitat for white ash, red maple, red oak	• Deterioration of suitable habitat for cold-hardy species (e.g., white spruce, balsam fir, white birch) • Wildlife will need to cope with changes in their habitats • Introduction of new pests and diseases
Insurance	• Businesses and homeowners will look for flood damage insurance • Farmers will look for crop insurance for new types of crops • Opportunity to encourage businesses and homeowners to adapt to climate change by "de-risking" their properties	• Climate indicators for crop insurance will need to be updated to reflect a changing climate • Manage risk arising from extreme events
Public Health & Safety	• More opportunities for outdoor activities and exercise	• Poorer air quality (e.g., longer pollen season, increase in smog or ground-level ozone) • Poorer water quality (e.g., water-borne disease outbreaks, saltwater intrusion, run-off contamination of drinking wells) • Higher risk of heat stroke and exacerbation of respiratory illnesses • More incidences of Lyme disease and West Nile virus • Increased risk to the safety of residents living in vulnerable coastal areas
Tourism	• More days suitable for outdoor recreational activities (e.g., biking, golfing, camping) • More vineyards being established to support wine tourism • More visitors from areas experiencing rapid warming looking for relief in a relatively cooler climate • More locals enjoying a "staycation" rather than traveling south	• Damage to coastal attractions and infrastructure from flooding and erosion (e.g., boardwalks, scenic routes, beaches)

Transportation & Infrastructure	• Longer construction season	• Flooding and erosion will damage coastal infrastructure and properties • Inland flooding from heavy rain events may wash out roads with undersized culverts and bridges • Heavy rain events may overwhelm wastewater treatment infrastructure • Existing engineered adaptation structures may be overtopped/overwhelmed • Properties may become unsuitable for development
Water		• Decrease in water quality (e.g., water-borne disease outbreaks, saltwater intrusion, run-off) • Change in precipitation patterns will affect rate and timing of river and groundwater recharge • Water quantity may be impacted as irrigation needs for farms increase as climate gets warmer and drier

5. WHAT'S NEXT?

The public input collected during this process will be considered by the project team and/or sector representatives when formulating the final climate change adaptation recommendations. The timeline for the remaining activities is as follows:

To help inform the development of the climate change adaptation recommendations, please consider the following questions when providing input:

1. How important is climate change adaptation?
2. What roles should businesses, property owners, the public, and the different levels of government play in climate change adaptation?
3. How do you recommend each of the sectors adapt to climate change?
4. How should climate change adaptation work be prioritized?

If you or your organization would like to participate in the sector consultations, please send an email to: climate@upei.ca.

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