Climate Change: What does it mean for Qualicum Beach?

April 25th, 2025

Ed Beard
www.pacificclimate.org

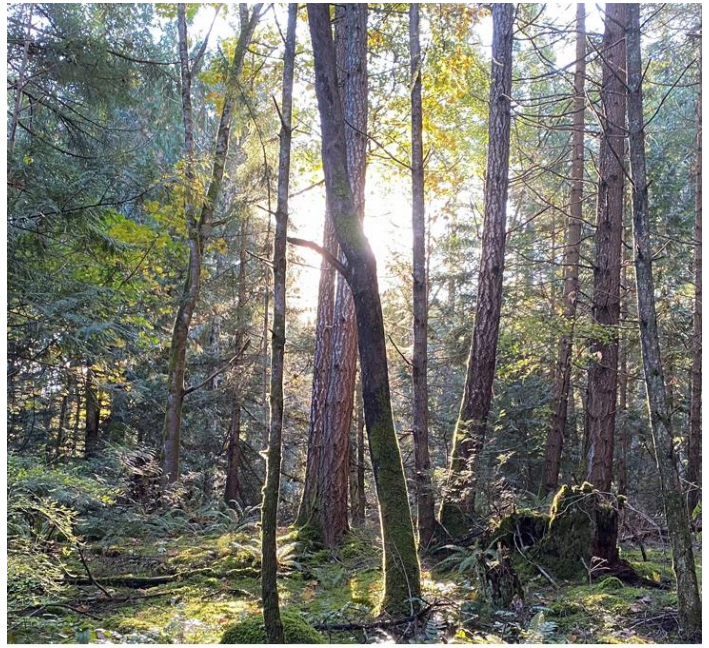
Land acknowledgement

Today’s talk takes place on the traditional territories of Qualicum First Nation.

We acknowledge the Qualicum peoples, whose historical relationships with the land continue to this day.

Today's presentation

- **PCIC:** who are we?
- **Key concepts:** climate science and modelling
- **Local climate projections**
- **Impacts and adaptation**
- **Questions**



Climate Projections for
the Regional District of Nanaimo

REGIONAL DISTRICT OF NANAIMO

PACIFIC CLIMATE IMPACTS CONSORTIUM

What do you think when you hear the term ‘climate change’?

PACIFIC CLIMATE IMPACTS CONSORTIUM

Who are we?

About the Pacific Climate Impacts Consortium

- Regional climate service provider for BC and Yukon
- Launched 2005; sister organization to Pacific Institute for Climate Solutions (PICS)
- Partner with researchers and users of climate information

HISTORICAL CLIMATE

Climate Analysis and Monitoring

FUTURE CLIMATE

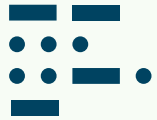
Regional Climate Impacts

WATER & CLIMATE

Hydrologic Impacts

ENGAGEMENT & TRAINING

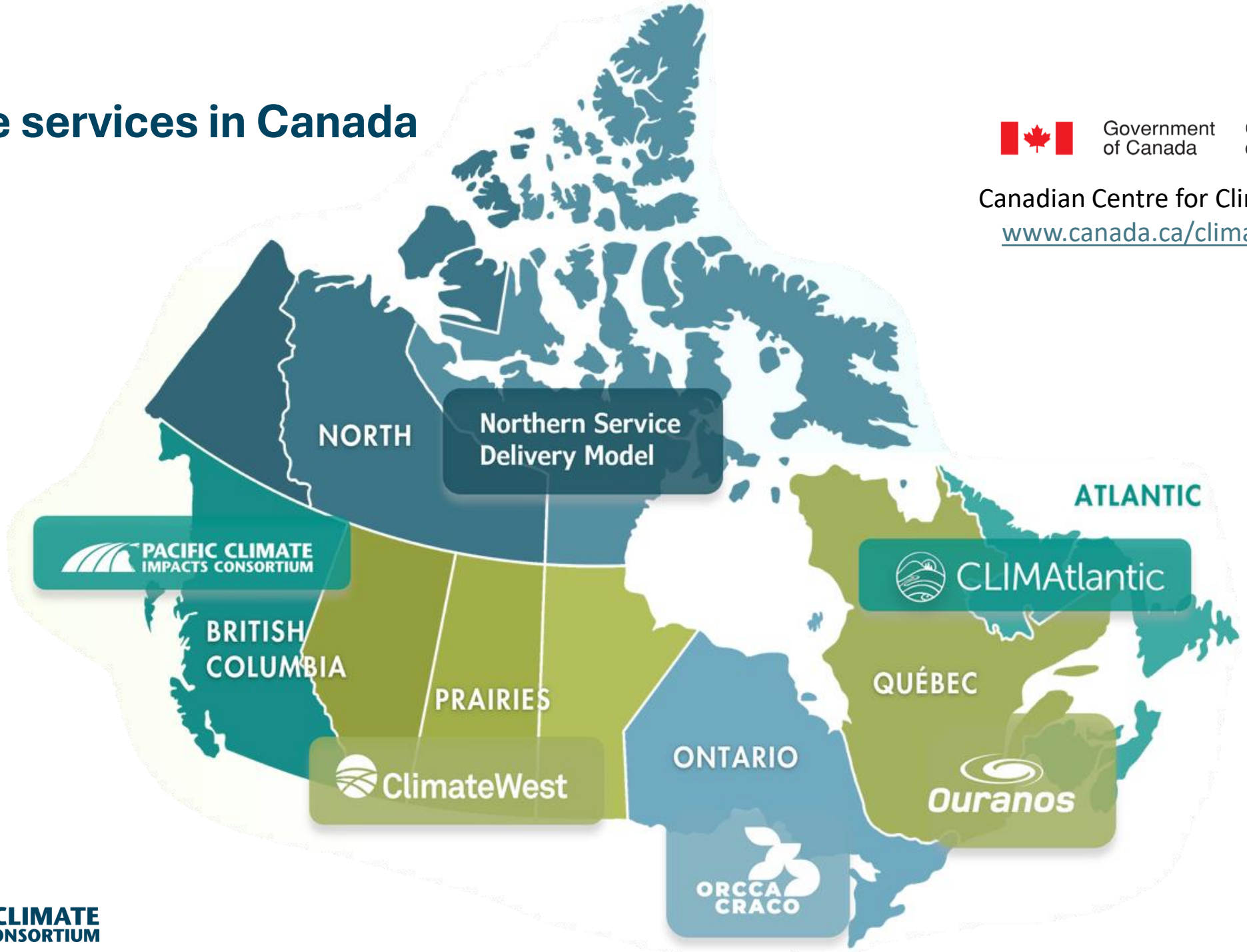
COMPUTATIONAL SUPPORT GROUP



Climate services in Canada

Government of Canada / Gouvernement du Canada

Canadian Centre for Climate Services
www.canada.ca/climate-services



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Climate science and modelling

What do we mean by climate?

WEATHER

VS.

CLIMATE

Conditions at a specific location and time

(minutes to hours to days to weeks)

Sun, rain, snow, clouds, etc.

Conditions over long periods of time

(typically measured over *30+ years*)

Determined by many factors, including elevation, proximity to ocean, etc.

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WEATHER

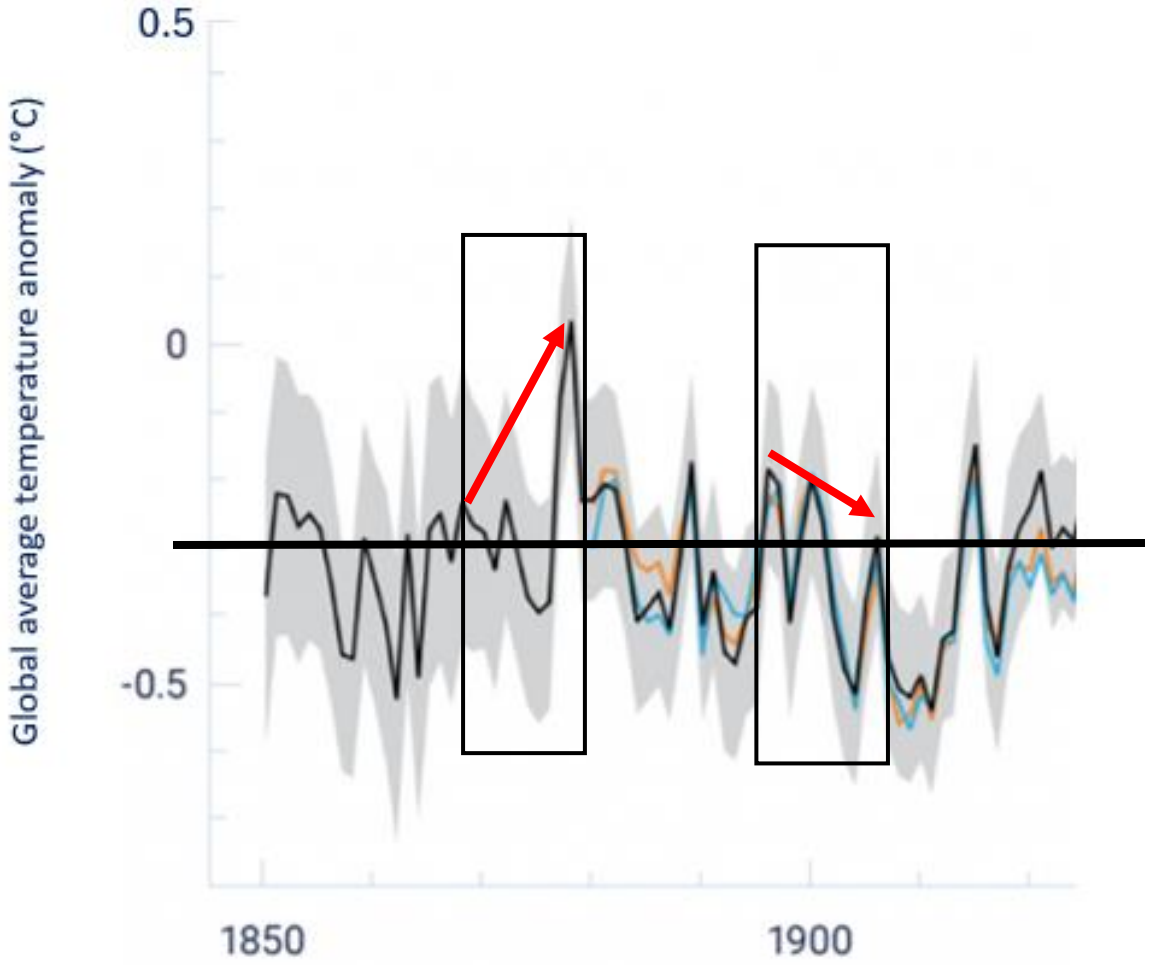
Tells you what to wear each day

CLIMATE

Tells you what types of clothes to have in your closet

Natural climate variability

- Climate varies naturally on different time scales because of *internal* processes
- **NOT** influenced by human activity
- e.g., **El Niño** Southern Oscillation



OBSERVED GLOBAL MEAN TEMPERATURE CHANGE, 1850-1925 | ECCC

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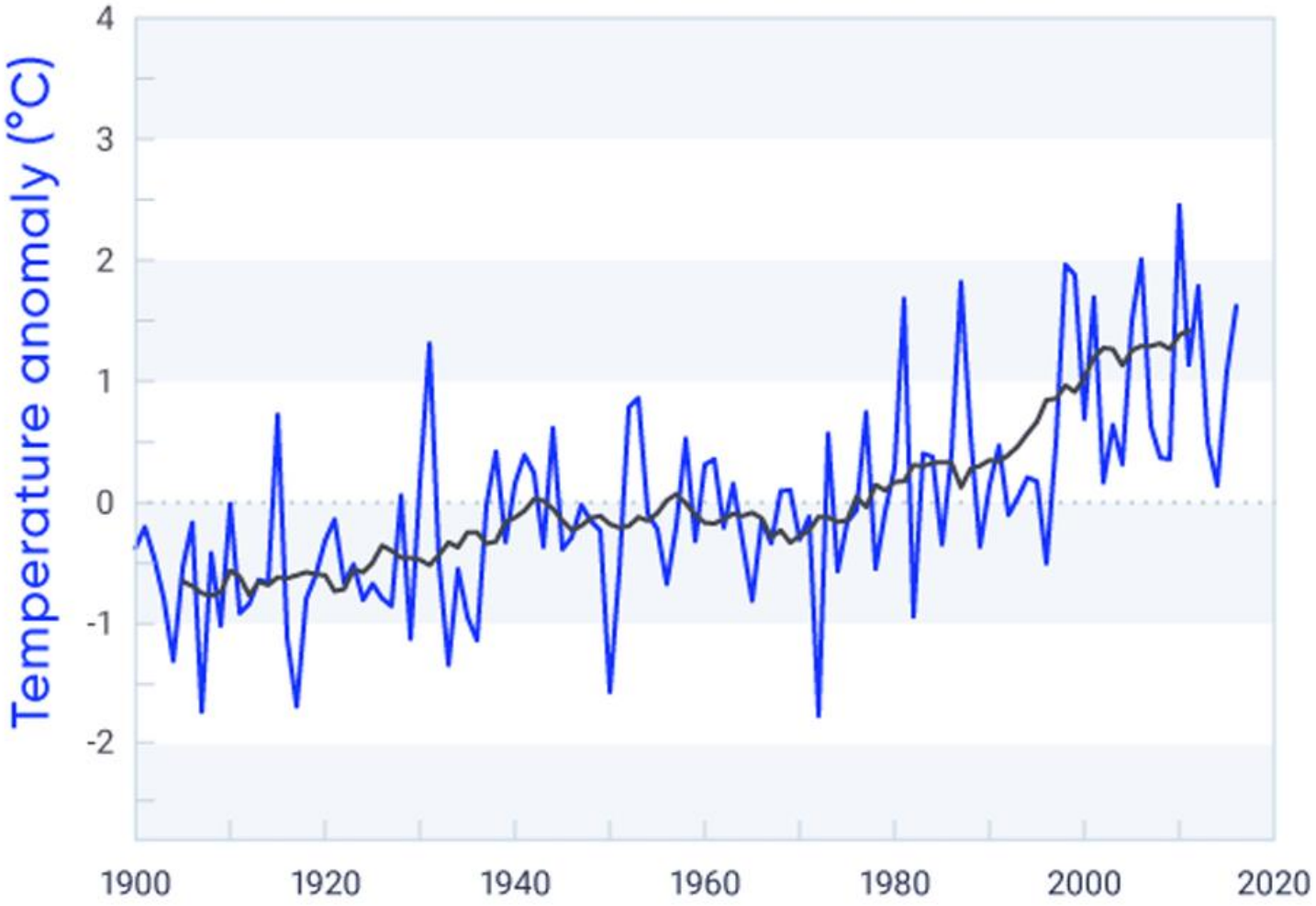
For most of human civilization, we have been able to use past and current climates as reliable predictors of future conditions

CBC | NOVEMBER 15, 2021

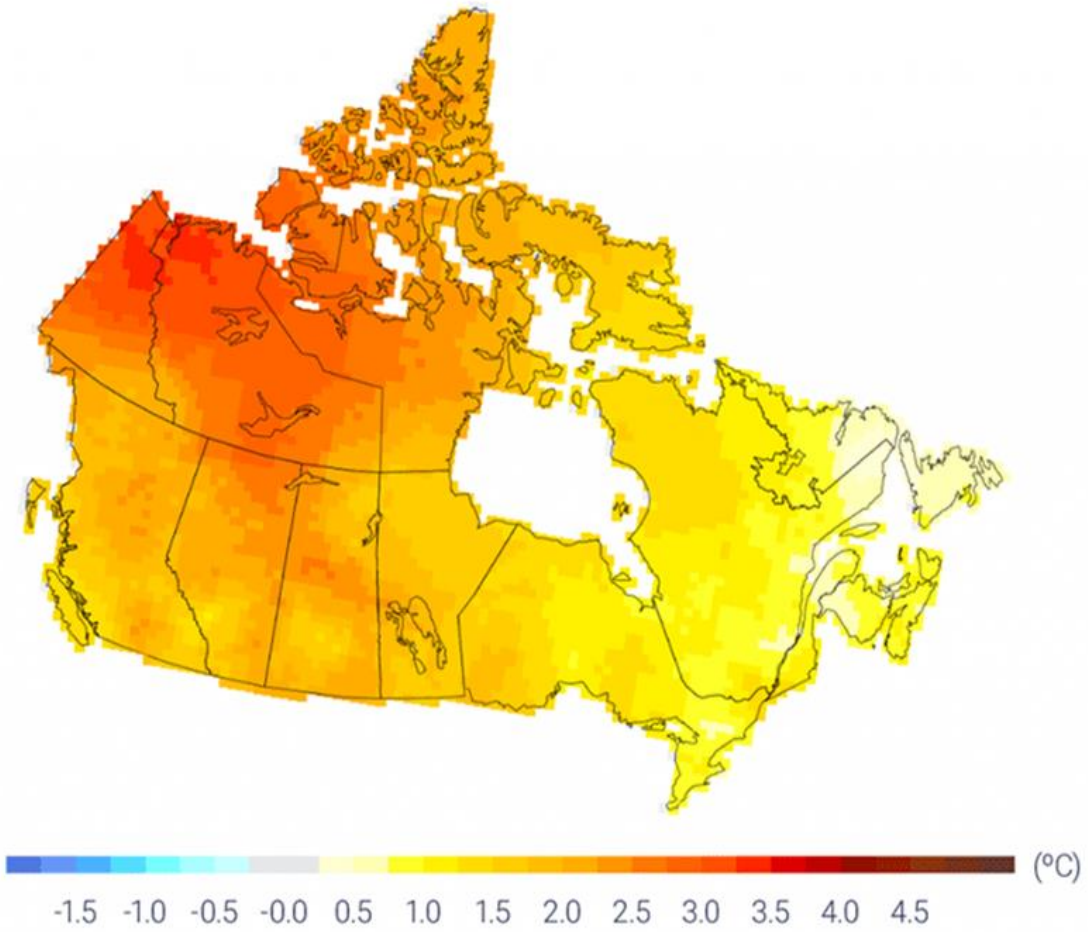
The climate is changing



SOURCE: CCCR, 2018

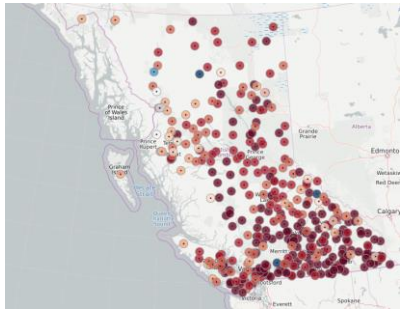
The climate is changing

- Earth has warmed ~1.3°C
- Canada is warming at 2X the global rate
- BC has experienced **~2°C of warming**
- Changes of only a couple of degrees can bring significant impacts and risks



WARMING IN CANADA BETWEEN 1948-2016 | ECCC

How do we know?



Different ways of understanding the climate

lived experiences

community-based climate monitoring

weather station data

Past

Elder knowledge, stories & song

climate projections data

Future

climatologies

observations of seasonal patterns

weather apps

Present

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Observed changes in BC from ~2°C of warming

- Warmer temperatures year-round
- Longer frost-free season
- Hot temperatures becoming hotter
- More cooling demand

ANDREW KURJATA | CBC | MARCH 18, 2024

Modelling climate *change*

Emissions Scenarios

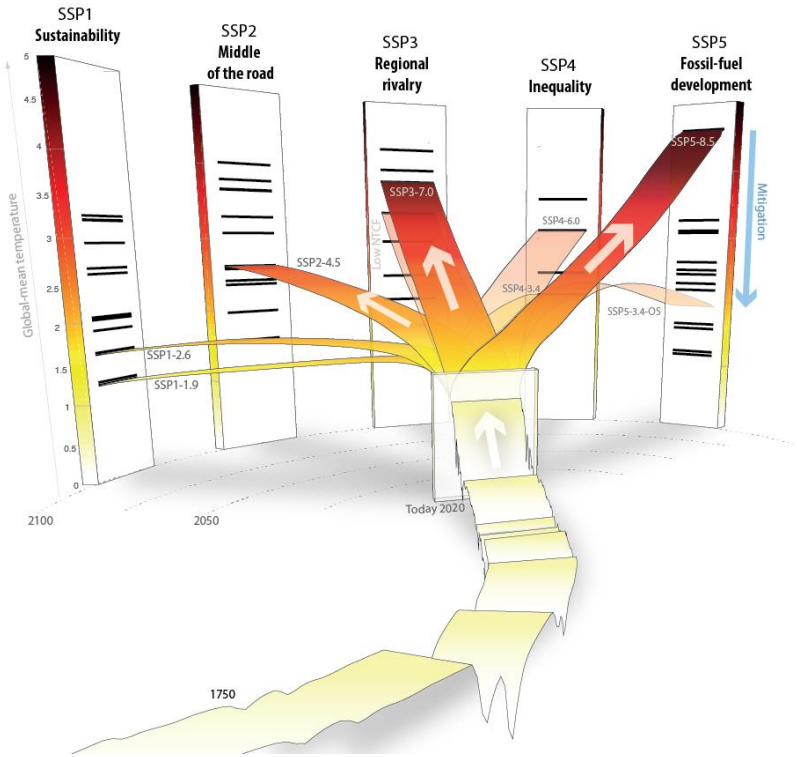
Changes in GHG emissions, social/economic development patterns, land use patterns, and other climate drivers

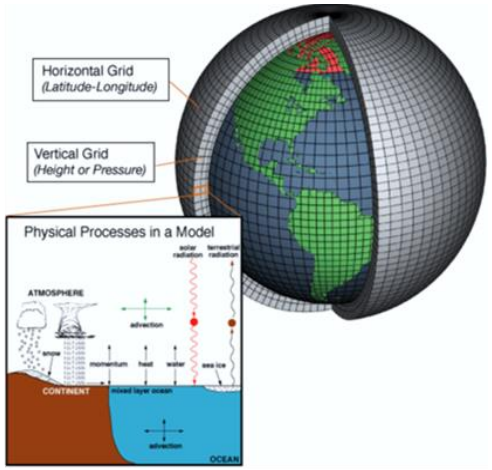
GCM

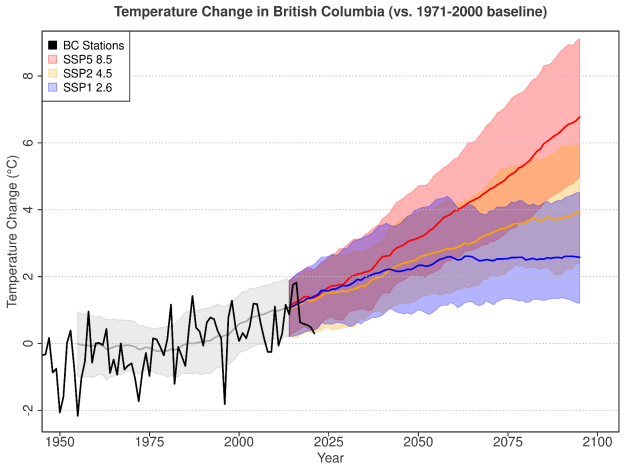
Modelling global climate change

Climate Projections

Information about the future climate based on different emissions







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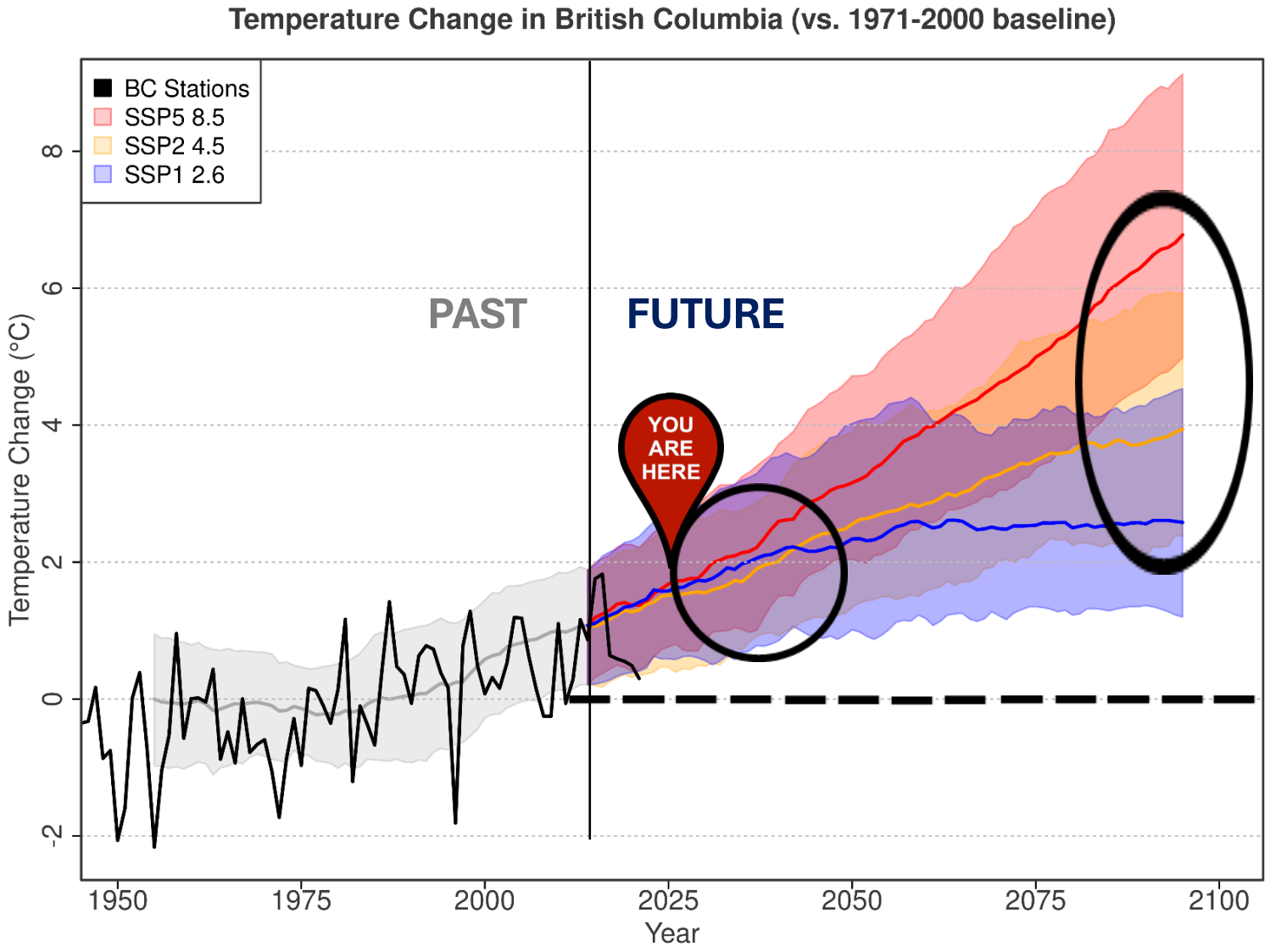
Climate projections



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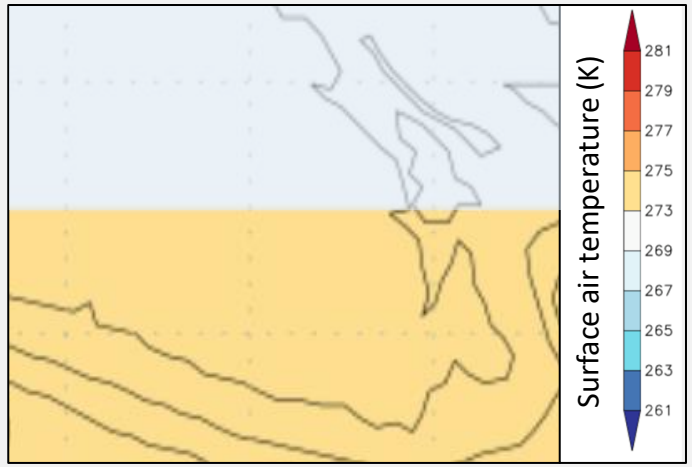
Local climate projections

How do you think climate change will impact your community?

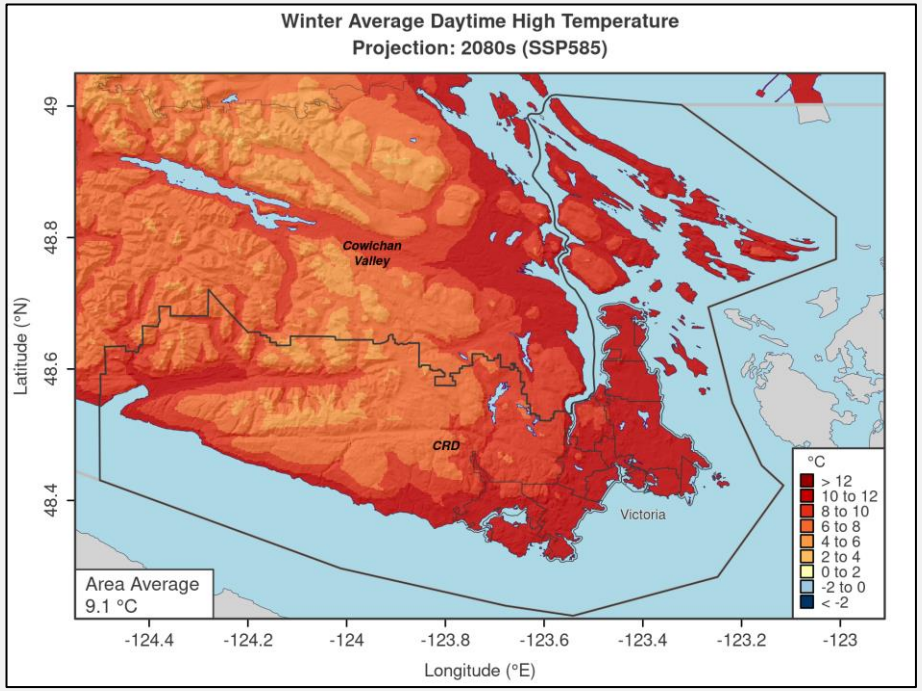
At PCIC, we take coarse output from global models to develop localized projections for regions in BC

GLOBAL CLIMATE MODEL



Low resolution
100-200km

PCIC DOWNSCALED MODEL



High resolution ~800m

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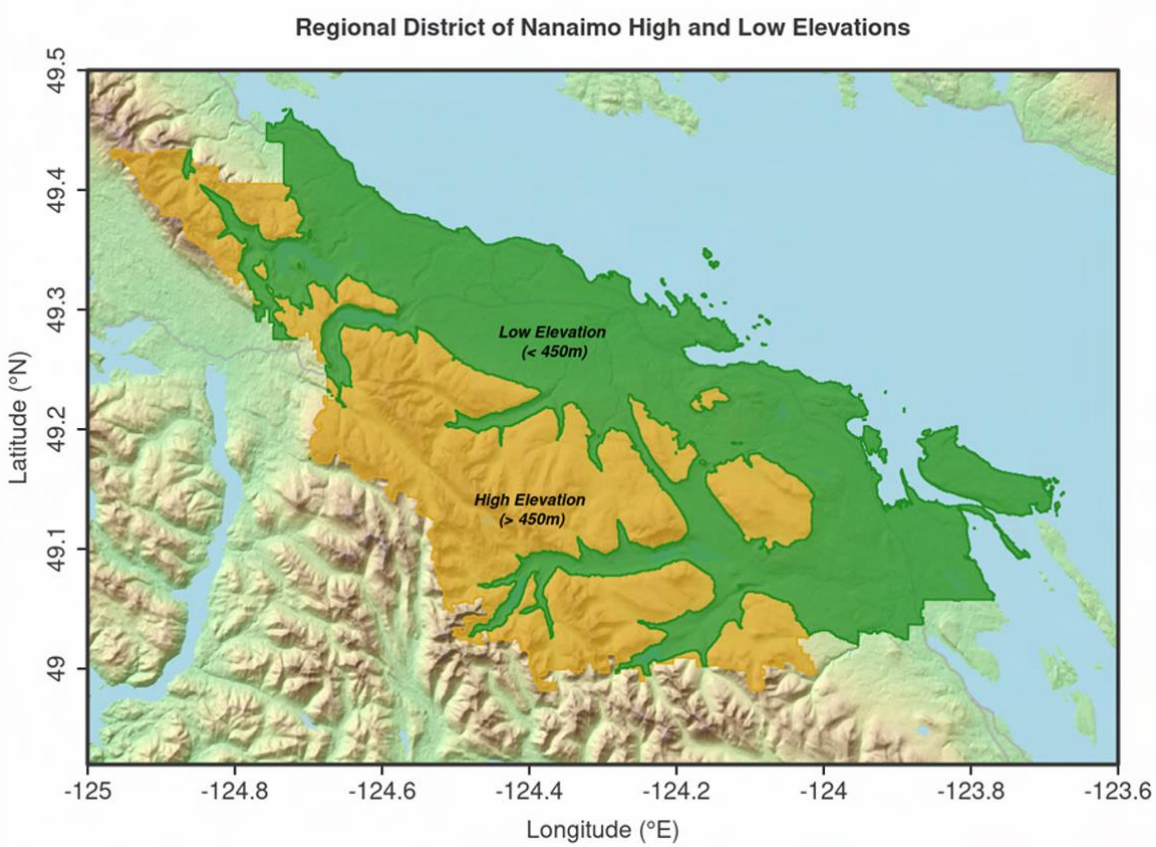
Climate Projections for the Regional District of Nanaimo (2024)



More days **above 25°C** and more nights **above 16°C**

Longer, hotter, and more frequent **heat waves**

Less rainfall and longer dry spells in the summer

Less annual **snowfall**

More precipitation in the fall, winter, and spring

Larger amounts of rainfall occurring **in a single day**

Climate Projections for the Regional District of Nanaimo

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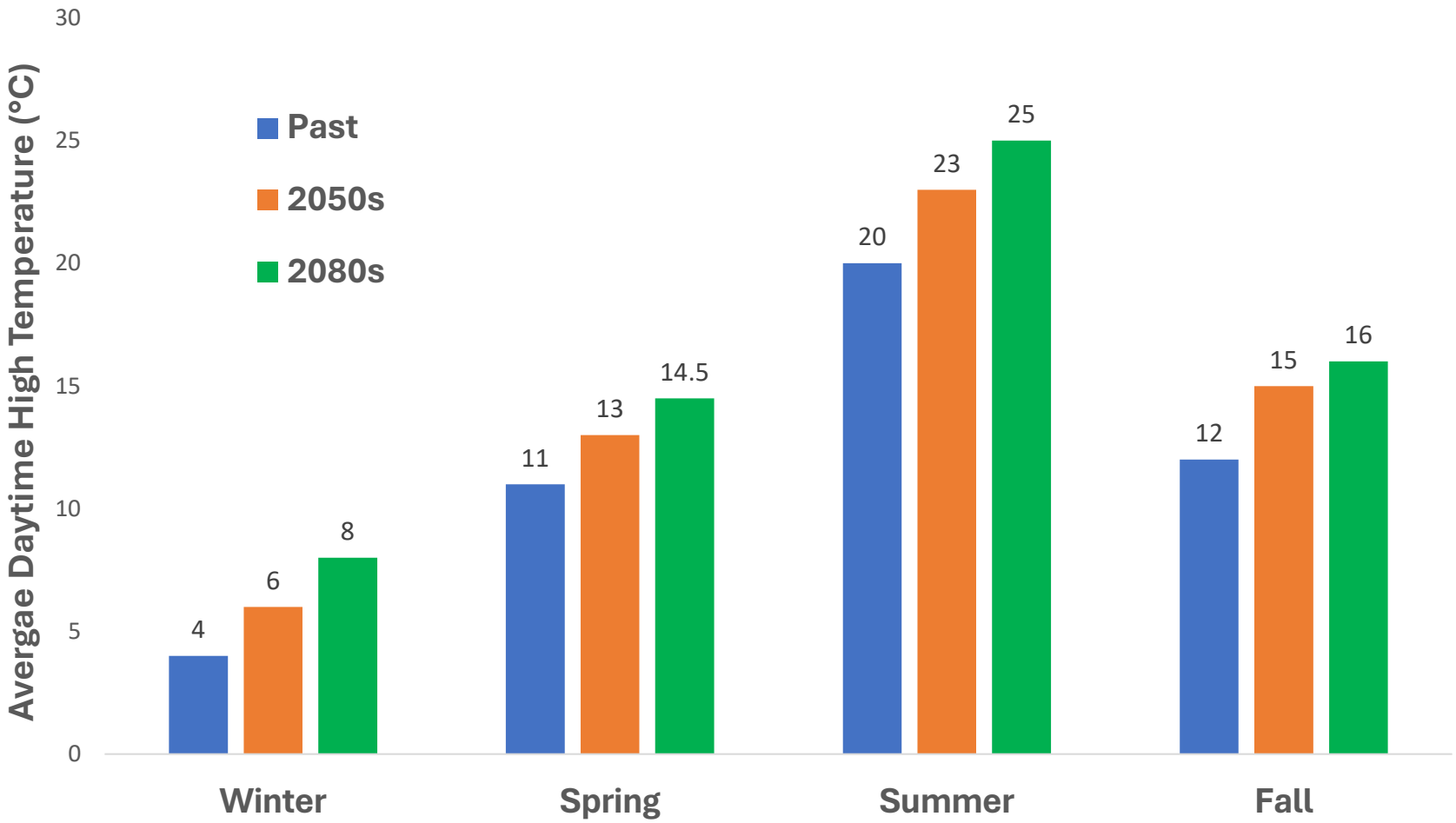
Warmer year-round temperatures



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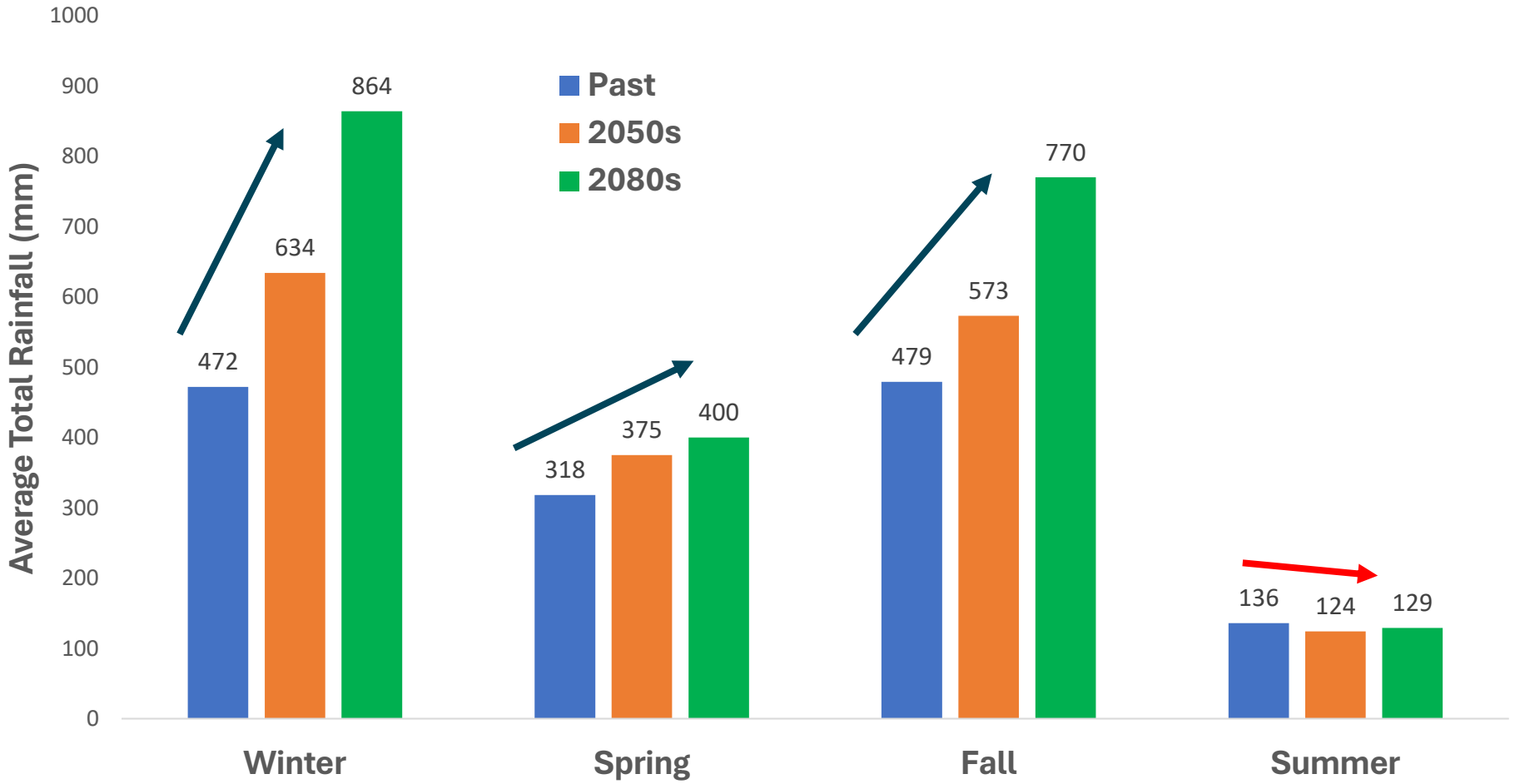
More rain when it's wet, less rain when it's dry



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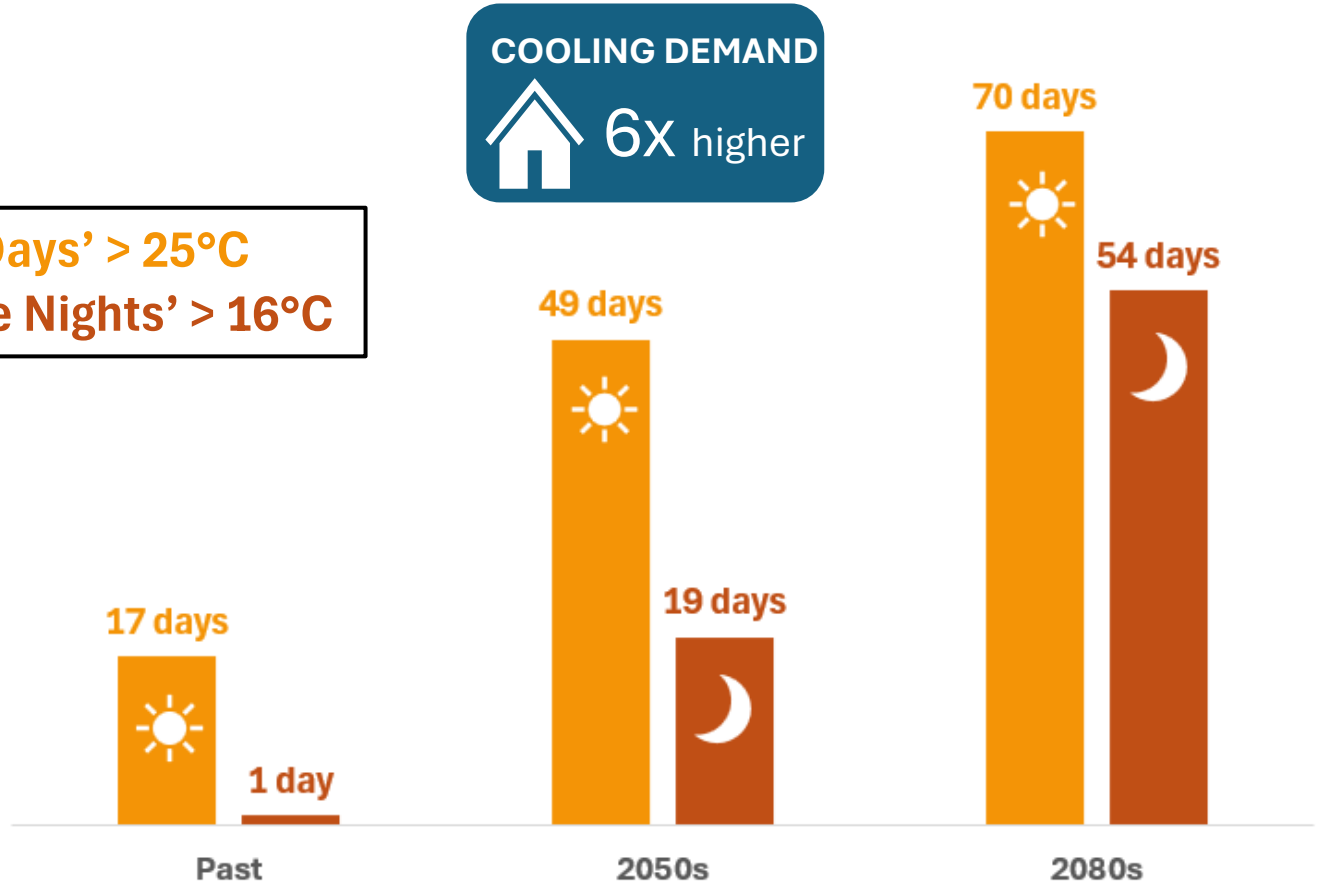
Hotter Days & Warmer Nights

‘Summer Days’ > 25°C
‘Temperate Nights’ > 16°C



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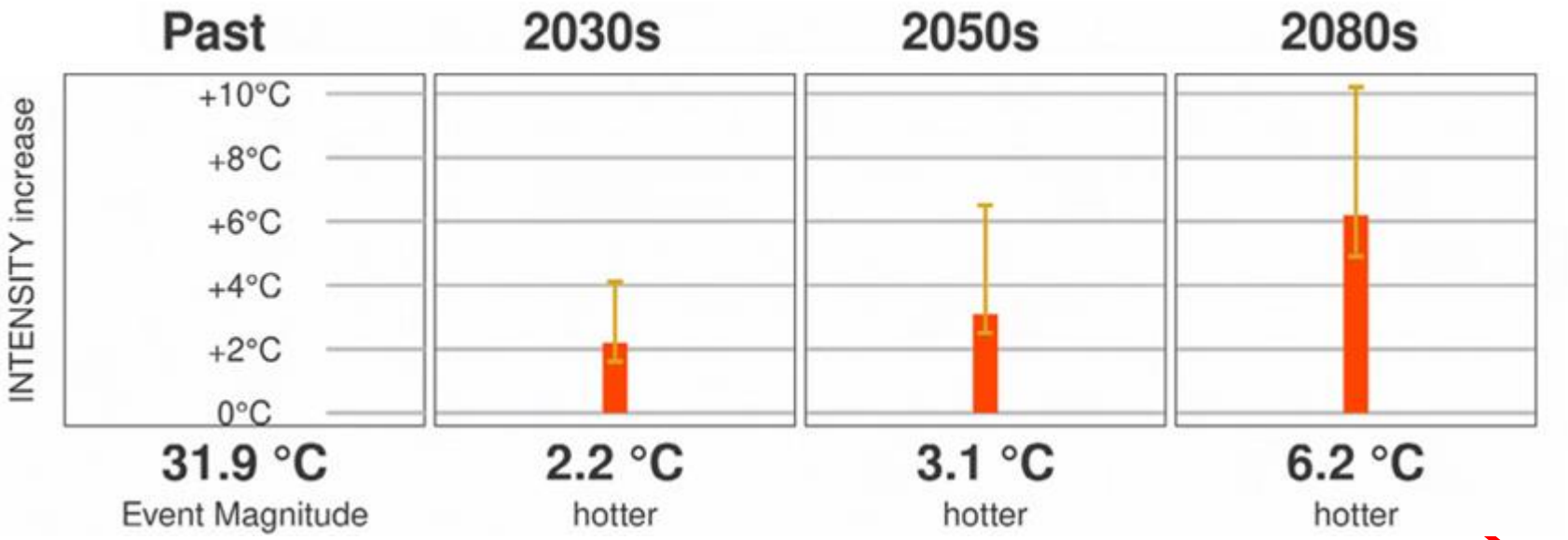
Extreme heat events: intensity

1-in-20-year event
5% chance



~38 °C

June 2021 heat wave

- **1-in-1000-year event** *(based on historical temperatures)*
- ***37.3°C** at QB Airport, June 27th, 2021*

[Source: PCIC's BC Station Data]

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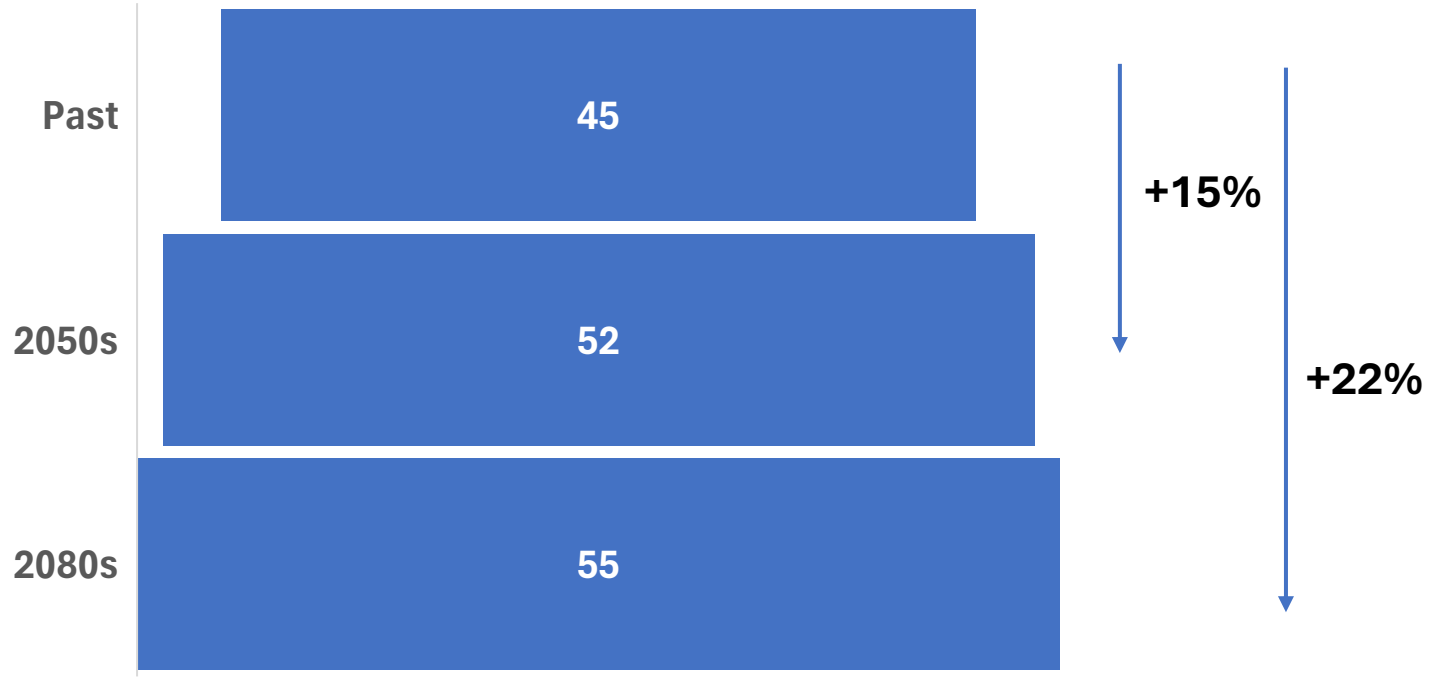
Maximum 1-day precipitation

The maximum amount of precipitation (in mm) occurring in a single day.



Total rainfall at QB airport on November 15, 2021 (atmospheric river): **49.6mm**

Data source: PCIC BC Station Data

https://www.comoxvalleyrecord.com/news/residents-evacuated-from-qualicum-beach-campground-as-flood-waters-rise-1625228

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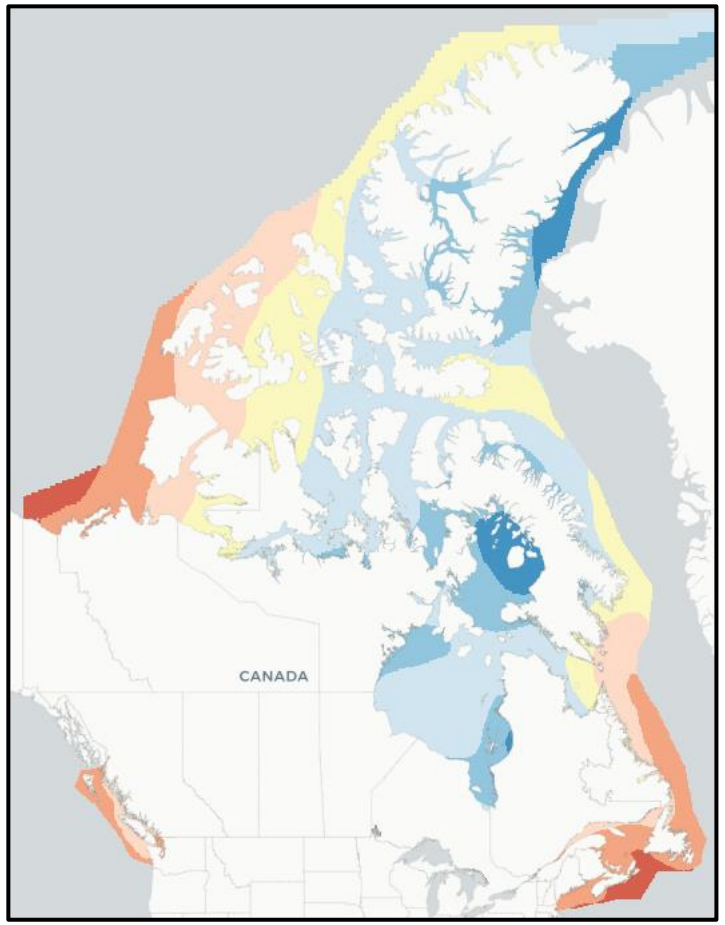
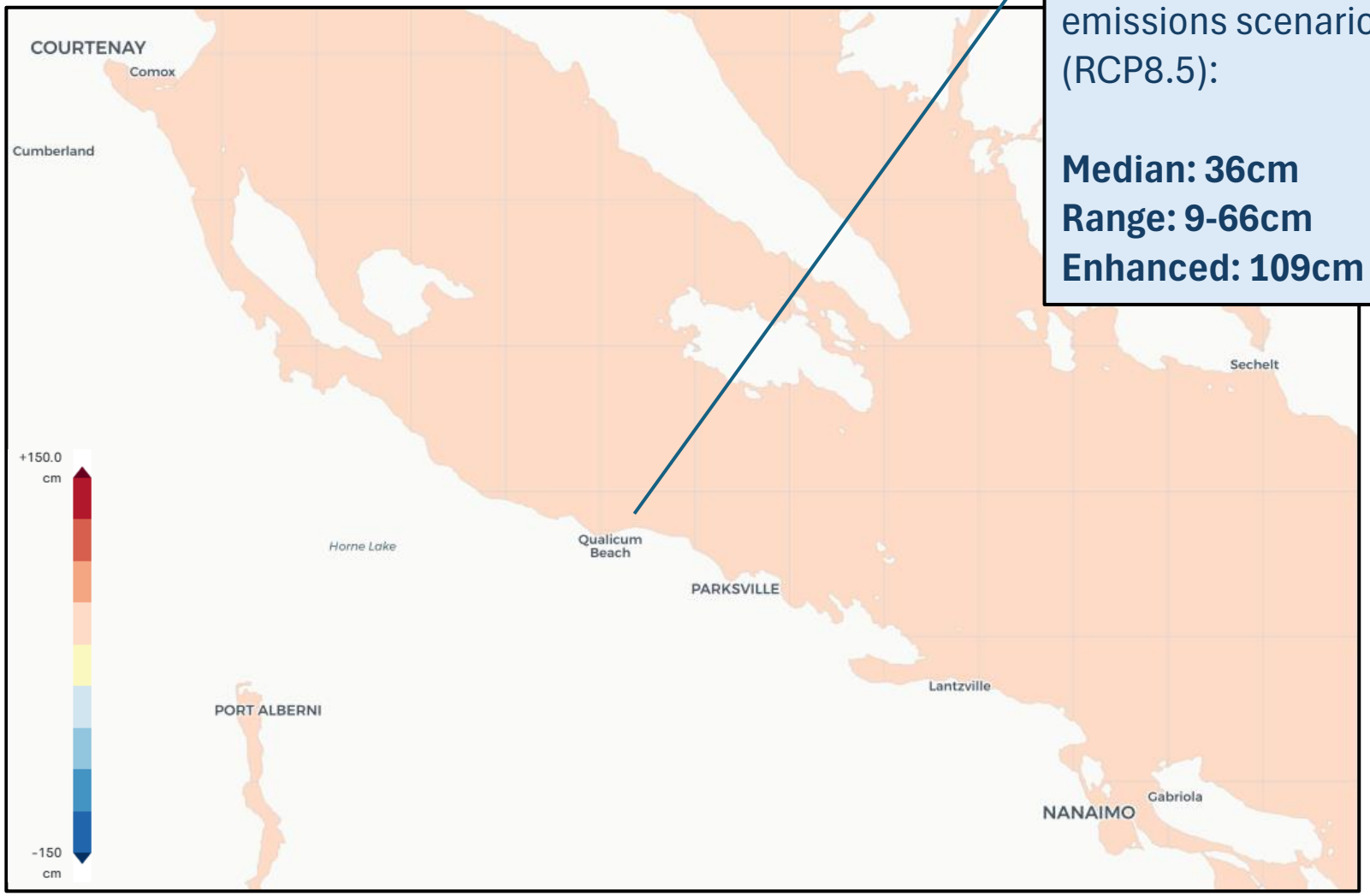
Sea-level change





Projections for French Creek, BC in **2100**, under a **high** emissions scenario (RCP8.5):

Median: 36cm
Range: 9-66cm
Enhanced: 109cm

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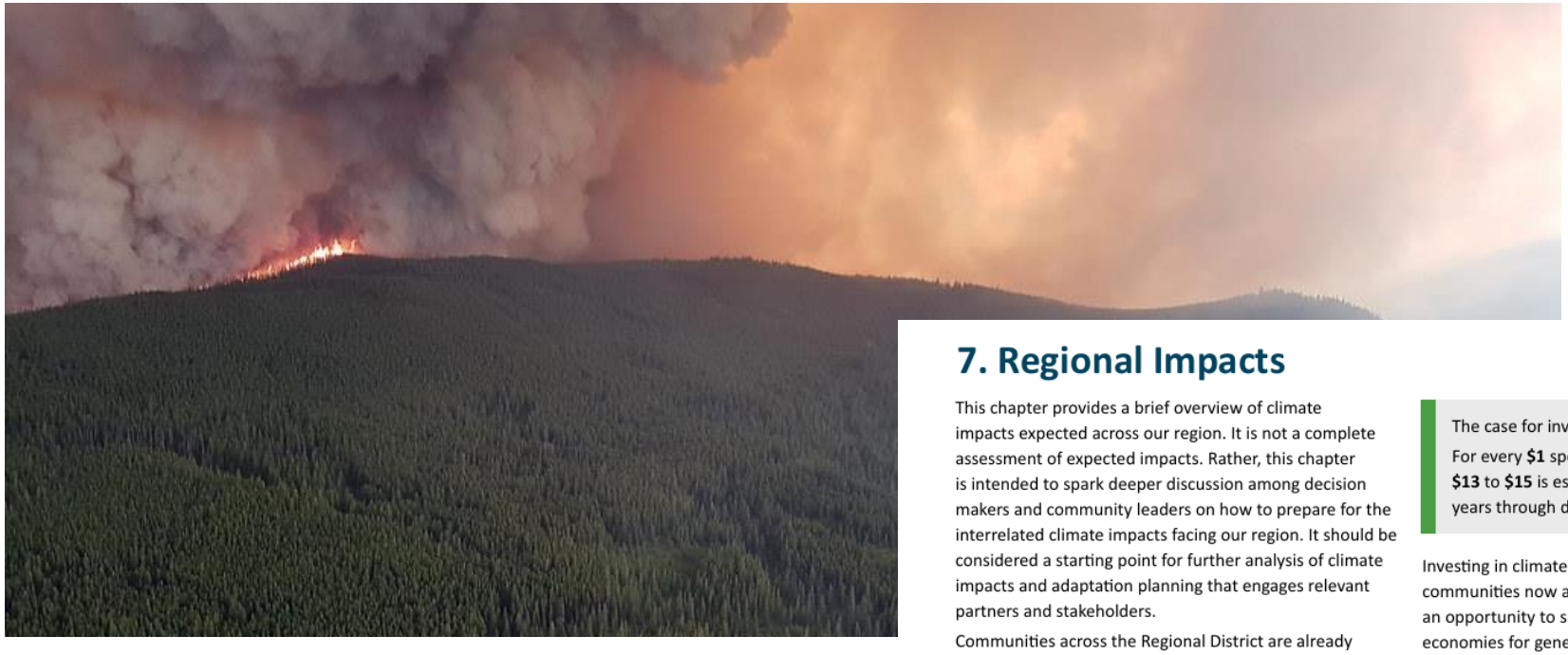
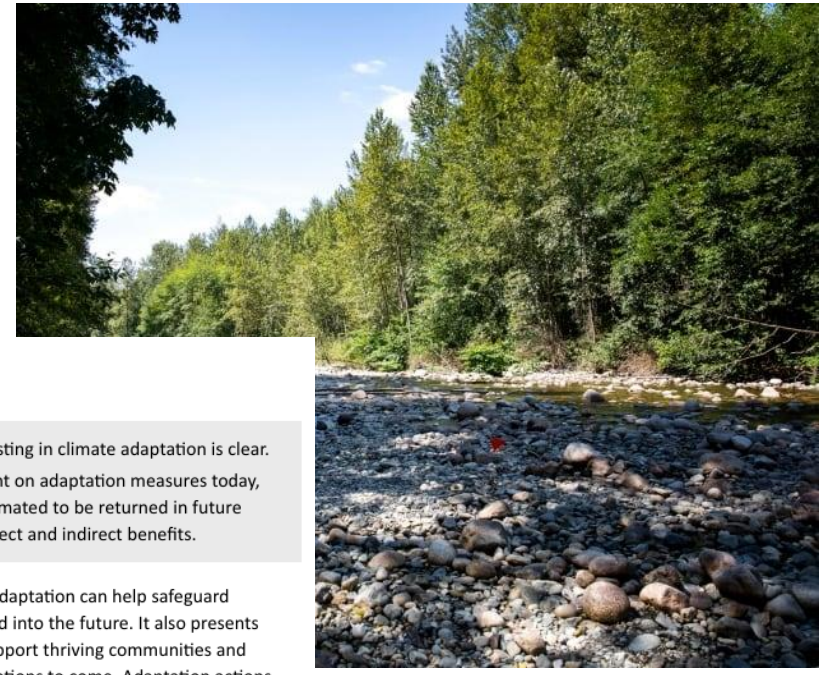
Impacts and adaptation





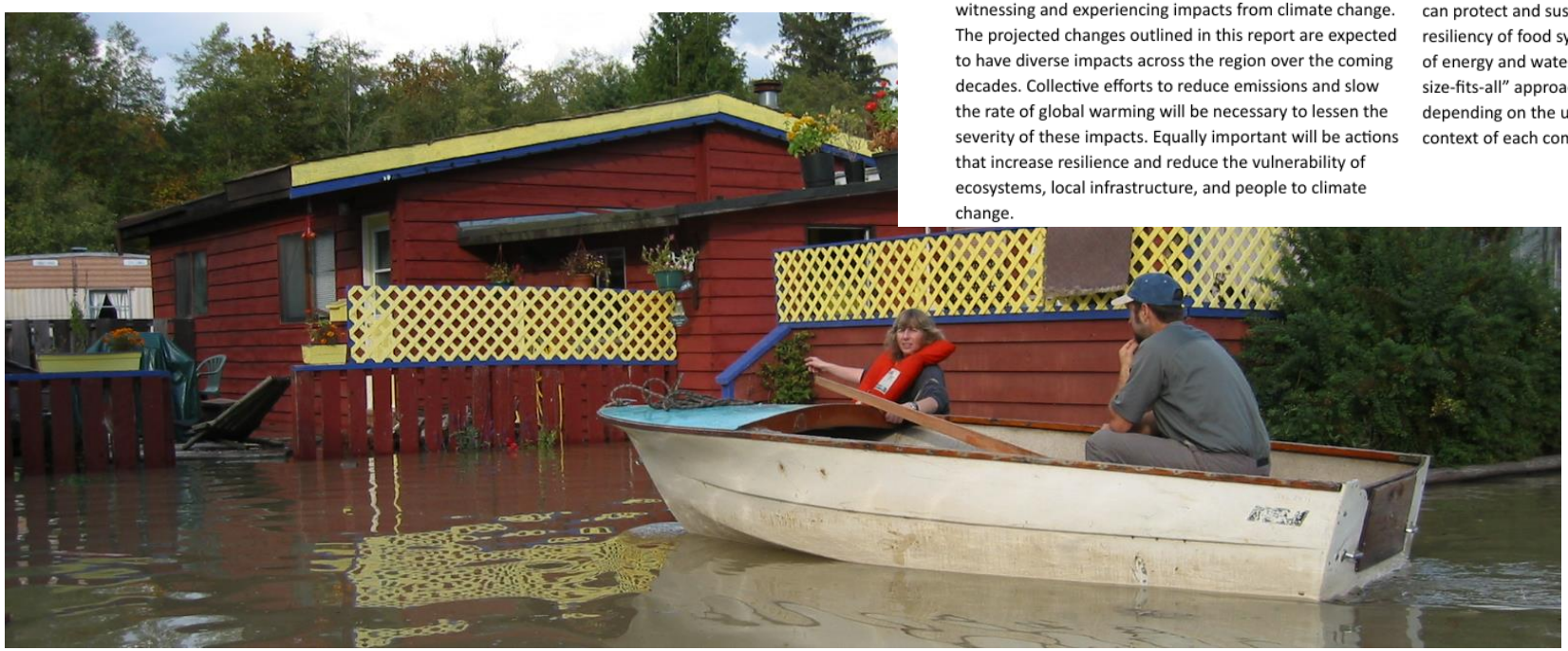
7. Regional Impacts

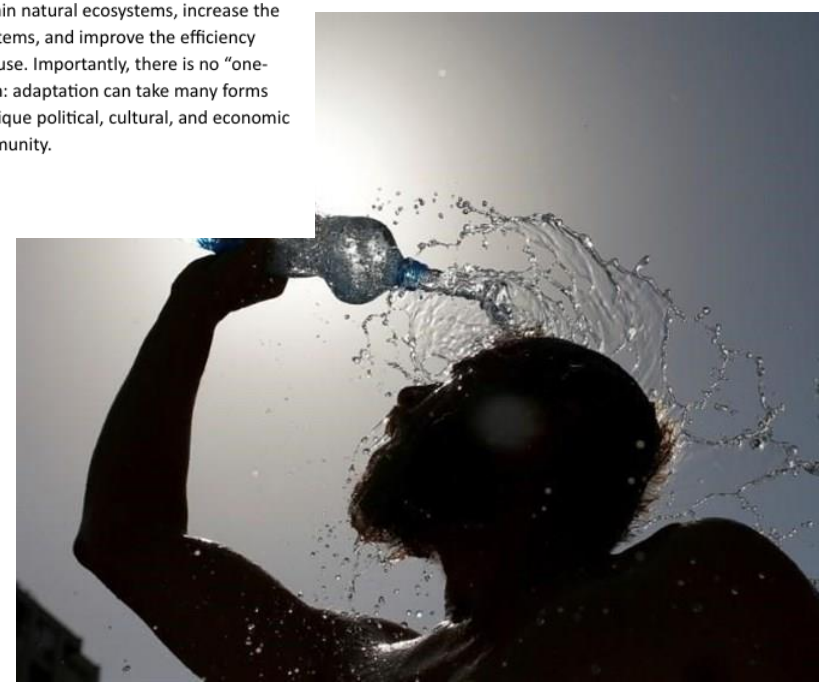
This chapter provides a brief overview of climate impacts expected across our region. It is not a complete assessment of expected impacts. Rather, this chapter is intended to spark deeper discussion among decision makers and community leaders on how to prepare for the interrelated climate impacts facing our region. It should be considered a starting point for further analysis of climate impacts and adaptation planning that engages relevant partners and stakeholders.

Communities across the Regional District are already witnessing and experiencing impacts from climate change. The projected changes outlined in this report are expected to have diverse impacts across the region over the coming decades. Collective efforts to reduce emissions and slow the rate of global warming will be necessary to lessen the severity of these impacts. Equally important will be actions that increase resilience and reduce the vulnerability of ecosystems, local infrastructure, and people to climate change.

> The case for investing in climate adaptation is clear. For every **$1** spent on adaptation measures today, **$13** to **$15** is estimated to be returned in future years through direct and indirect benefits.

Investing in climate adaptation can help safeguard communities now and into the future. It also presents an opportunity to support thriving communities and economies for generations to come. Adaptation actions can protect and sustain natural ecosystems, increase the resiliency of food systems, and improve the efficiency of energy and water use. Importantly, there is no "one-size-fits-all" approach: adaptation can take many forms depending on the unique political, cultural, and economic context of each community.





Examples: hotter, drier summers

Water supplies

Strain on water resources.

Implement water conservation initiatives.

Ecosystems

Stress trees, such as the **Western Red Cedar**.

Problematic for **fish species** requiring cool waters to thrive.

Protect natural assets, minimize the impact of development and actively conserve endangered species.

Agriculture

Impact crop yields.

Apply on-farm water storage and hydroponics or switch to drought- resistant crops.

Examples: warmer and wetter fall, winter and spring

Flooding

Pressure on stormwater infrastructure.

Utilize green infrastructure, more permeable surfaces, and upgrade stormwater infrastructure.

Transportation

Heavy rainfall and flooding make travel more dangerous and cause disruptions and road closures.

Upgrade transportation infrastructure to account for climate-related hazards.

Buildings

Damaged buildings and property loss.

In coastal areas, sea level rise also poses a flood risk.

Build outside of high-risk areas, such as flood plains, low coastal areas, and steep slopes.

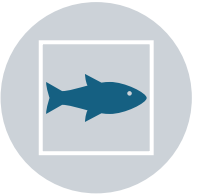
Analysis tools by PCIC

Plan2Adapt

User friendly.
High emissions scenario only. Less configurable options.

PCIC Climate Explorer

More technical.
Climate extremes.
Risk Assessments.



Salmon Climate Impacts Portal

Freshwater streamflow and temperature.

Design Value Explorer

Designing infrastructure for the future.

Seasonal Anomaly Maps

Past weather anomalies, such as the 2021 heat dome

Regional Climate Assessments

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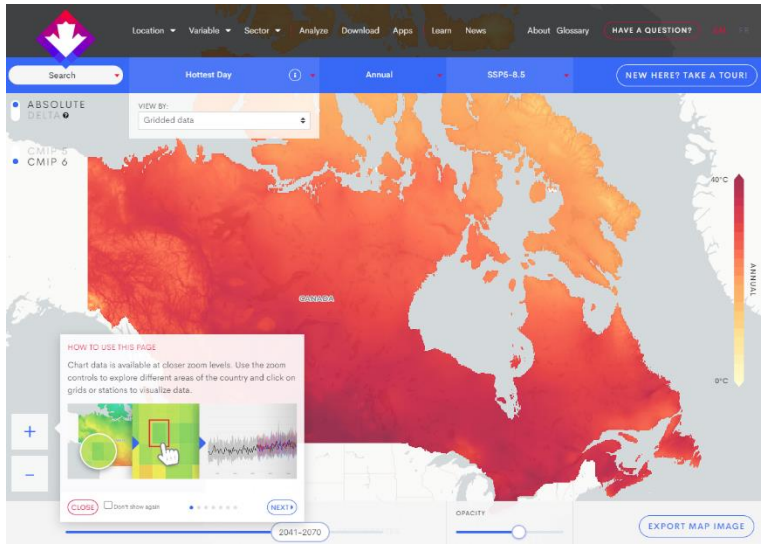
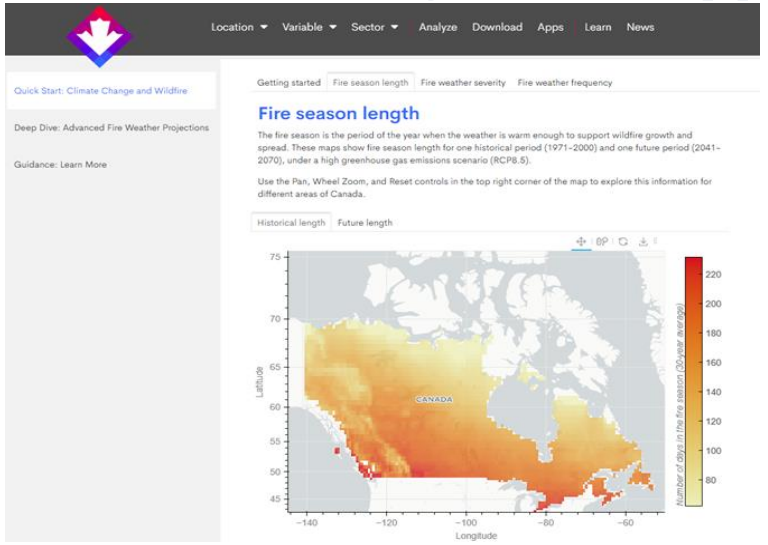
Maps, Analyze, Download

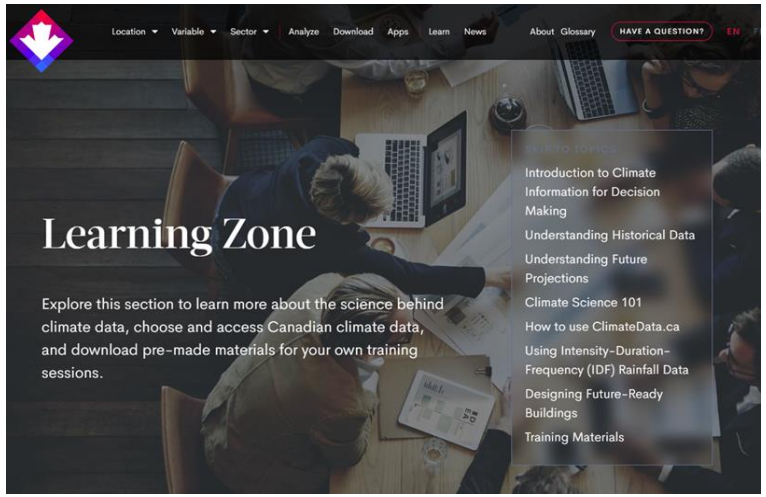


ClimateData.ca

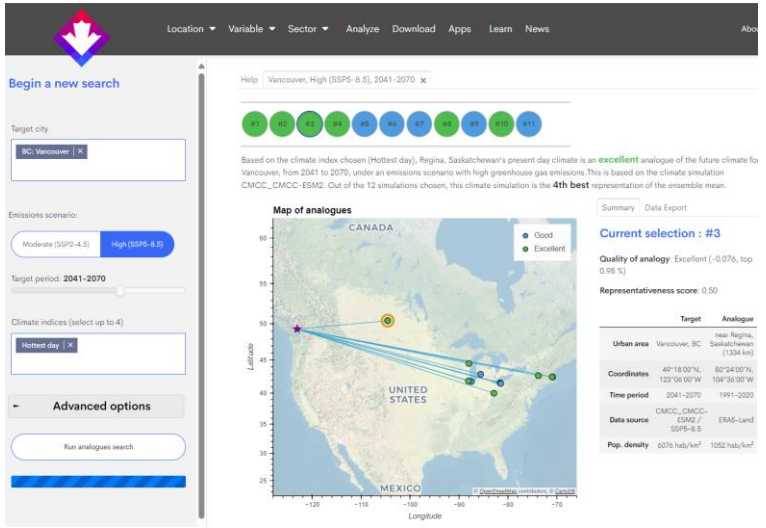
Fire Weather Projections App



Learning Zone



Spatial Analogues



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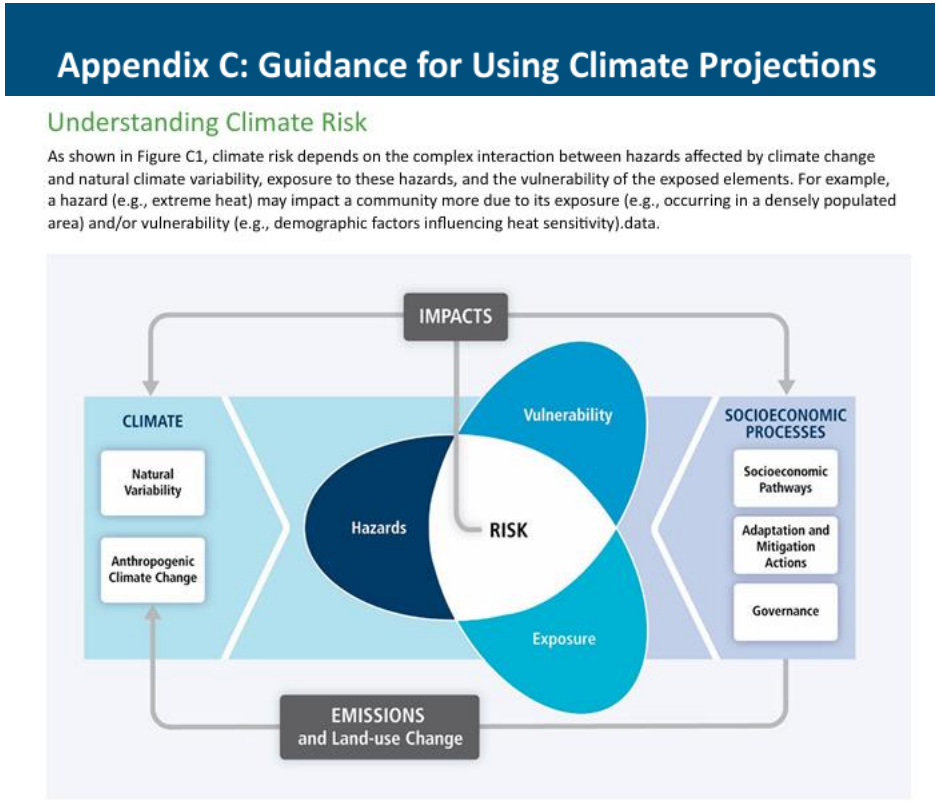
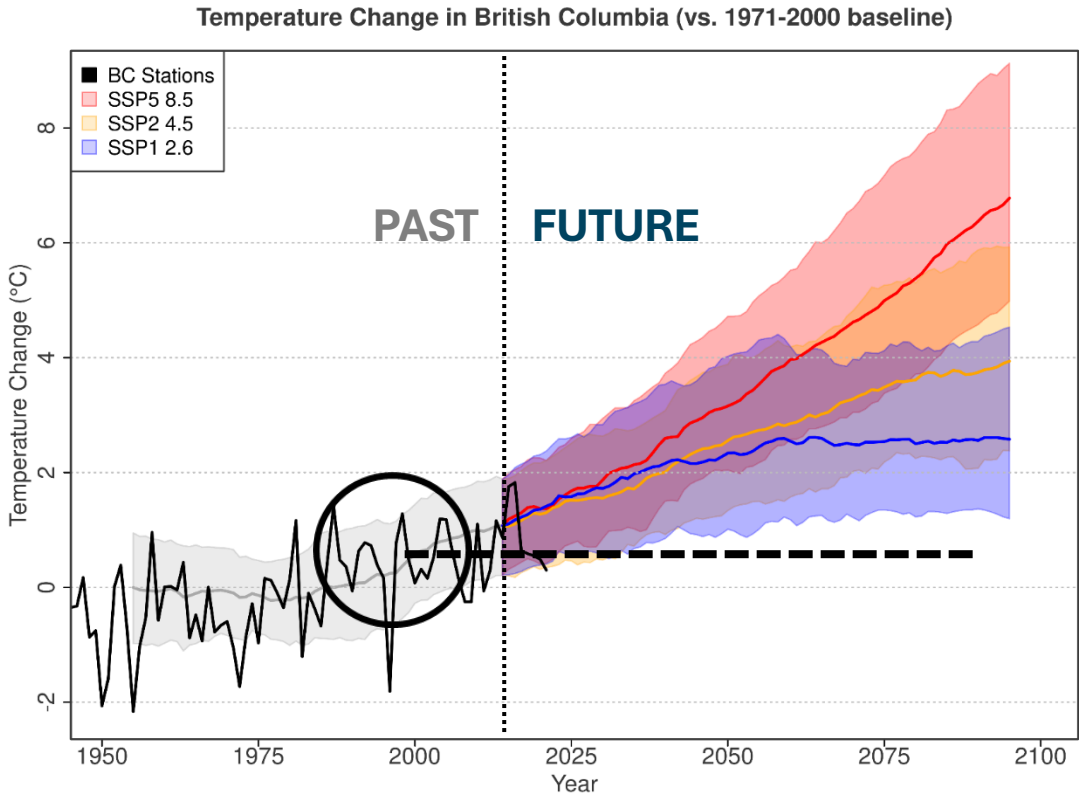
How should this information be used?

- **Climate data = one piece of the puzzle.**
- Climate science tells us a good story about how the climate is changing and what we can expect in the future.
- **Background and guidance** on using climate data available in the report appendices.





Support is available

PLAN2ADAPT

Climate Atlas of Canada

Climate Projections for the Regional District of Nanaimo

REGIONAL DISTRICT OF NANAIMO

PACIFIC CLIMATE IMPACTS CONSORTIUM

pacificclimate.org

ebeard@uvic.ca

Thank you!

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Questions

Thinking and talking about climate change can bring up **complex emotions.**

Do what you need to take care of yourself today.

Resources

- Eco-Anxious Stories
- Project InsideOut
- Toolkit: Addressing and Coping with Climate Grief

IMAGE: ATTUNE – PROJECT INSIDE OUT (PROJECTINSIDEOUT.NET)