

Changing Climate, Changing Basin:

A planning and action initiative with local governments and First Nations

CLIMATE CHANGE AND CLIMATE VARIABILITY

Climate change is a significant shift in the average climatic conditions over an extended period of time (typically decades or longer). Climate change is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods.

Climate variability is the range of fluctuation around long-term average climate conditions. It refers to variations in the state of the climate on all temporal and spatial scales beyond that of individual weather events.

Climate change is attributed to human activities altering atmospheric composition, whereas **climate variability** is attributed to natural causes.

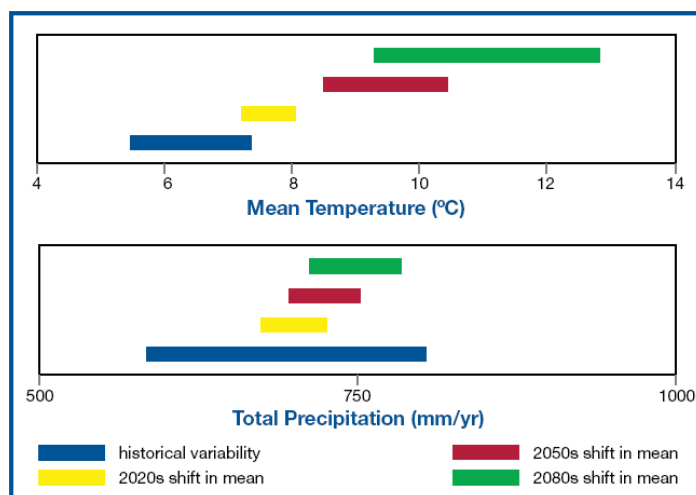
Climate change can include changes in any of the following:

Precipitation: Global Climate Models predict an increase in precipitation of 1-6% by the middle of the century; this is extremely variable from location to location.

Temperature: In the Columbia Basin, average annual temperatures are likely to increase by 2.1- 3.4°C by the middle of the century.

Increased occurrence of extreme weather events.

Increased variability: Variability in temperature and precipitation is expected to increase in the Columbia Basin. The graph below projects the possibility of dramatically higher average temperatures at the end of the century.



For references and more information visit:

www.cbt.org/climatechange
<http://www.cses.washington.edu/cig/>
www.ipcc.ch

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IMPACTS AND SENSITIVITY

Impacts are either direct or indirect effects of climate change on built, natural and human systems. Impacts can be positive or negative.

Depending on the consideration of *adaptation*, there are potential impacts and residual impacts.

Potential impacts are all impacts that may occur given a projected change in climate, without considering adaptation. *Residual impacts* are the impacts of climate change that would occur after adaptation.

Example: Increased average temperatures could lead to a longer growing season, which could lead to increased forest/vegetation growth. However, decreased soil moisture conditions could lead to decreased forest/vegetation growth.

Example: Increased temperatures and drier climates could lead to an increase in the incidence of forest fires.

Example: Increased temperatures will lead to a decrease in glacier mass in the Columbia Basin. The photos here show the recession of the Illecillewaet Glacier at Rogers Pass between 1902 and 2002.

Sensitivity is the degree to which built, natural and human systems are directly or indirectly stressed by changes in climate conditions or specific climate change impacts. Systems may be affected either adversely or beneficially by climate-related stimuli.

The effect may be direct, such as a change in crop yield in response to a change in the average, range, or variability of temperature. Or the effect may be indirect, such as damages caused by an increase in the frequency of flooding.

Vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change. It is a function of a system's sensitivity to climate and the capacity of that system to adapt to changes.



Illecillewaet Glacier at Rogers Pass taken in 1902



Illecillewaet Glacier at Rogers Pass taken in 2002

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ADAPTATION AND MITIGATION

Adaptation refers to the initiatives to reduce the vulnerability of natural and human systems against actual or expected climate change effects. These are actions to minimize anticipated impacts, or enhance potential benefits, of climate change.

Adaptation benefits are the avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures.

Adaptation costs are the costs of planning, preparing for, facilitating, and implementing adaptation measures, including transition costs.

Example: Communities could increase their flood protection to adapt to heavier precipitation events and the potential of higher peak flows.

Example: The heating and cooling systems in new public buildings could be installed with climate change scenarios in mind.



Heavy rains on Baker St in Nelson, BC, 2006 resulted in water running off the pavement and into the sewer systems. Increasing volume and pressure overwhelmed the underground piping and burst through manholes along several streets and some sanitary lines including toilets without check valves.

Mitigation refers to actions that will reduce the sources or enhance the sinks of greenhouse gases emissions.

Example: Create communities that are less car-dependent to reduce CO₂ emissions. This may include good public transport, accessible ride share programs, and extensive biking and walking path networks.



**Nelson & Area
Rideshare**

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ADAPTIVE CAPACITY AND RESILIENCE

Adaptive capacity is the ability of natural and human systems to adjust to climate change, to moderate potential damages, to take advantage of opportunities, and to cope with the consequences. This capacity refers to the capabilities, resources and institutions of a country or region to implement effective adaptation measures.

Example: People from around the Columbia Basin met at a conference in Nelson (November 2007) to discuss the “Future of Food in the Kootenays”. Many spoke of adaptation to climate change and noted that we have tremendous *adaptive capacity* in relation to food production. People spoke of increasing our local food production, encouraging value-added food production, and supporting local farmers.

Cedar Grove near Retallack, BC (Right)
Backyard garden produce in the Kootenays (Below)



Resilience is the amount of change a system can undergo without changing state. It refers to biophysical and socio-economic abilities to recover from and/or adjust to the impacts of climate change. For example, mature forests are most likely to be able to withstand the additional stress brought by climate change.

We can build the resilience of both human and ecological systems in order to deal with future climate impacts and surprises. Many countries around the world are already doing this in light of already witnessing the effects of climate change.

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