

Climate Change in Alberta



PREPARING FOR CHANGE

Communities in rural Alberta must prepare for diverse and complex climate impacts in order to be resilient against immediate and emerging challenges.

Slow-onset climate change impacts like warming average temperatures, shifting precipitation patterns and intensifying climate variability will require proactive solutions for adaptation.

Severe extreme weather events will occur more frequently, creating the imperative for community disaster resilience planning.

Worsening extreme weather events

FLOODING

More intense, heavy rainfall events will lead to a greater risk for flooding.

RISK: In the prairies, inundation of agricultural land is common given the large area of depression storage, including sloughs and wetlands.

DROUGHT

There is an increasing risk of frequent and intense drought during the summer and fall as warmer temperatures increase evaporation and transpiration, leading to soil moisture deficits.

The worst-case future scenario is the reoccurrence of consecutive years of severe drought across the prairies.

RISK: Lack of rain can immediately affect dryland farming, and low water levels affects irrigation, municipal and industrial water supplies.

RISK: Drought is the most costly weather event in the prairies. Crop failure, soil loss, and soil erosion are some of its most serious consequences.

THE LAND OF EXTREMES

Variable weather is characteristic of the prairies. Multi-year drought spells followed by wetter periods have created challenging conditions for rural Albertans in the past and will continue to do so with much greater intensity in the future.

With climate change, patterns like precipitation cycles are becoming increasingly uncertain, variable and unpredictable. Cycles will be exacerbated; dry years will be drier, and wet years will be wetter.

THE COST OF DISASTER

Six of Canada's top 10 most costly environmental disasters impacted Albertan lives and livelihoods.

Recent disasters have been worse than anything we've experienced before; The 2013 Calgary flood and the 2016 wildfires in Fort McMurray were the two most expensive natural disasters in Canadian history—combined, the insurance claims were more than \$5 billion.

WILDFIRE

Fire season will get longer as regularly hot and dry conditions strip moisture from fuels with winds carrying flames further.

RISK: Wildfires will likely be more difficult to control. The average area burned by wildfire each year will increase.

RISK: Potential interactions between people and fire will grow, requiring people adapt to living alongside wildfire, while working to reduce its likelihood of threatening communities and other assets.

PRECIPITATION CYCLE CHANGES

With climate change, dry years will be dryer and wet years will be wetter, and communities and ecosystems will face an increased risk for water scarcity.

Total annual precipitation will increase

Total annual precipitation will increase across most of Alberta and the Prairies as spring and fall will have more rainfall and precipitation events.

Growing risk for drought

Despite increasing precipitation over the year, there will be a greater risk of drought during the summer and the fall due to higher rates of evaporation of soil moisture.

Dryer winters

Snow cover at the end of March has decreased considerably in the Prairies—nearly to zero on an average year. The snow cover season will continue to get shorter and the total area for snow coverage will shrink.

Water supply impacts

The risk for water shortages is high in a hot summer climate. The Rocky Mountains, also known as the water towers of the western interior, are seeing loss of glacier ice and declining streamflows. This has serious implications for water supply in the watershed as demand continues to grow.

SHIFTING ECOSYSTEMS

Changes in precipitation and annual temperatures will lead to broad scale ecosystem shifts across the prairies.

Certain plant species will become more or less competitive in new conditions, and fires, severe drought, insect outbreaks and wind-throw events will speed up the establishment of newly suitable species.

Wetlands will be dryer for longer during the year due to increased evaporation during the summer and longer snow-free periods in the fall, winter, and spring.

New vegetation patterns will emerge due to changes in soil moisture levels.

Because grasslands are expected to expand, at-risk species could benefit from grassland protection and habitat restoration.

Aspen forests in the southern boreal region particularly are expected to decline, shift northward, and suffer reduced productivity due to periods of drought and insects.

Some tree species such as Douglas-fir, ponderosa pine, western larch, Scots pine and Siberian larch may gain new suitable habitat in western Alberta.

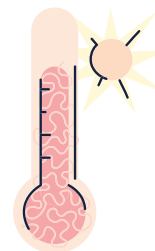
Alberta's Forecasted Climate Change Trends

WARMING TEMPERATURES

Western Canada and the prairies are warming faster than the rest of Canada and at three times the global rate since 1948. We will see additional warming of 2 degrees by 2050.

Changing seasons

- Winters will become much warmer and shorter.
- Summer will have higher maximum temperatures and more heatwaves.



Number of days above +30°C

historically: 4 days
by 2050: 23 days

Number of days below -30°C

historically: 10 days
by 2050: 5 days

Number of days below 0°C

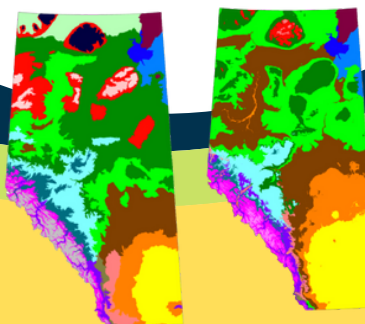
historically: 96
by 2050: 77

Changing growing season

Overtime, the frost-free season will grow; by 2050, the first fall frost could come as late as September 28.

2005

2050



Alberta's ecozones will gradually shift; the boreal forest will recede northward as aspen parkland and grassland ranges grow. Grasslands will begin moving up in elevation on the lower foothills and eastern slopes of the Rockies as alpine ranges shrink.