



Manitoba AND CLIMATE CHANGE

Virtually all social, economic and ecological systems in Manitoba are dependent, either directly or indirectly, on a stable and predictable climate system.

However, Manitoba's climate is changing, and the province is projected to continue to warm much faster than the global average—a product of the region's northern latitude and continental geography. These changes are likely to have very large impacts on the province and its people.

This report offers a summary of projected climate changes for several Manitoba communities, an overview of some important regional and local impacts, and ideas and approaches that can be used to take meaningful climate action across the province.

How is Manitoba expected to change?

This map shows how climate change is likely to affect communities across Manitoba in the coming decades. It is evident that dramatic changes are expected in the future under the High Carbon future scenario.* And this is just a small sample of the many kinds of data available in the Climate Atlas.

Manitoba's southern cities and towns that already experience hot summers will face large increases in both daytime and nighttime temperatures. Many northern places will have to start coping with significant heat for the first time, which will have serious consequences for communities, ecosystems and infrastructure. Changes in seasonal patterns of precipitation will impact the entire province.

Climate change will affect our seasonal experience of place, identity, and community, as well as our built environment,



governance, and economy. However, solutions to this pressing global problem do exist. When these solutions incorporate local perspectives, expertise, and commitment, we can take meaningful and effective adaptation and mitigation measures where we live.

Projected Temperature Changes for Cities and Towns in Manitoba

This table shows five temperature indicators that are important for understanding the implications of climate change for select communities in Manitoba. These indicators demonstrate how climate change could transform the seasonal conditions that are the basis of many of Manitoba's cultural and economic activities.

The table allows you to compare values for the **recent past (1976-2005)** with values for the **near future (2051-2080)** for both the High Carbon and Low Carbon scenarios.* The dramatic difference between the two possible outcomes shows just how important it is that we act now to mitigate greenhouse gas emissions in an effort to reduce the societal and environmental risks associated with climate change. Importantly, global greenhouse gas emissions are tracking very closely with the High Carbon scenario.

These data also show the need to adapt to moderate changes even if we avoid a worst-case level of warming. Understanding possible climate futures such as those summarized here is the first step to taking meaningful climate action.

Communities	Average hottest temperature of the year			Average coldest temperature of the year			Average number of days per year above 25 °C			Average number of below-zero days per year			Average length of the frost-free season		
	Recent Past	Low-Carbon Future	High-Carbon Future	Recent Past	Low-Carbon Future	High-Carbon Future	Recent Past	Low-Carbon Future	High-Carbon Future	Recent Past	Low-Carbon Future	High-Carbon Future	Recent Past	Low-Carbon Future	High-Carbon Future
Winnipeg	34.5 °C	37.8 °C	39.3 °C	-36.0 °C	-31.5 °C	-29.8 °C	55	87	98	189	161	149	127	149	161
Brandon	34.8 °C	37.7 °C	39.3 °C	-37.9 °C	-33.2 °C	-31.5 °C	57	88	100	196	170	157	117	140	150
Morden	35.1 °C	38.5 °C	40.1 °C	-34.1 °C	-29.6 °C	-27.9 °C	57	90	102	186	158	145	130	153	164
Dauphin	34.0 °C	36.6 °C	38.0 °C	-37.4 °C	-33.5 °C	-31.8 °C	48	79	91	196	168	156	118	141	148
Gimli	32.8 °C	35.8 °C	37.3 °C	-37.5 °C	-33.2 °C	-31.3 °C	41	73	85	194	164	152	124	146	156
Flin Flon	32.5 °C	35.0 °C	36.5 °C	-39.0 °C	-35.3 °C	-33.2 °C	28	52	66	205	177	164	124	147	158
Thompson	31.8 °C	33.9 °C	35.4 °C	-43.3 °C	-38.6 °C	-36.3 °C	22	41	53	225	198	185	94	118	134
Churchill	29.4 °C	31.5 °C	33.1 °C	-40.7 °C	-35.0 °C	-32.3 °C	7	13	18	242	216	204	97	118	132



Agriculture

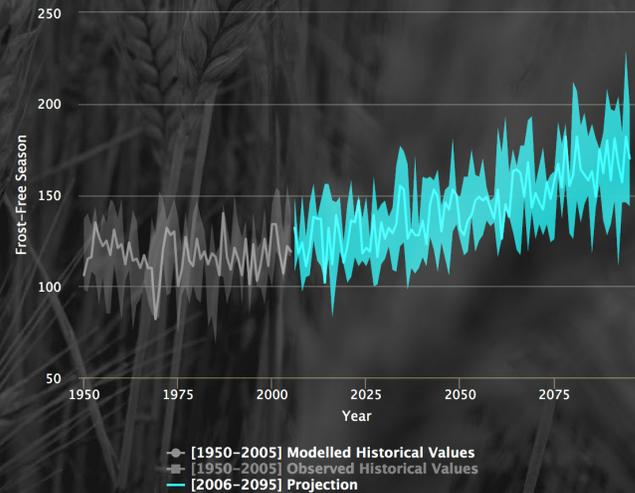
Manitoba farmers know all too well that agriculture is highly dependent on weather and climate. The length of the growing season, typical average temperatures, and the timing and severity of hot and cold spells all work together to determine what crops can be grown and how to best manage livestock.

Climate models show that Manitoba's winters will get shorter, resulting in a longer growing season and, therefore, new opportunities for agriculture. However, the longer growing season will have higher temperatures, which will likely increase the risk of drought, crop heat stress, and pest problems. The models also show that summer precipitation in southern Manitoba may decline.

Interviews featured in the Climate Atlas demonstrate that many farmers are not only aware of these changes, but are already taking action by breeding climate resilient seed, sequestering carbon through livestock management, and developing on-farm renewable energy strategies.

These lessons from the land show that there is great potential for agricultural producers to continue to adapt and demonstrate climate leadership. Agricultural adaptation and mitigation are necessary to create a sustainable future for Manitoba's farms, and the rest of society has a fundamental role to play in supporting the development of the resilient agricultural systems so necessary for us all.

Municipality: Brandon
Frost-Free Season (RCP 8.5)



*This graph shows the projected changes in the the length of the frost-free season for Brandon, Manitoba under the High Carbon scenario.**



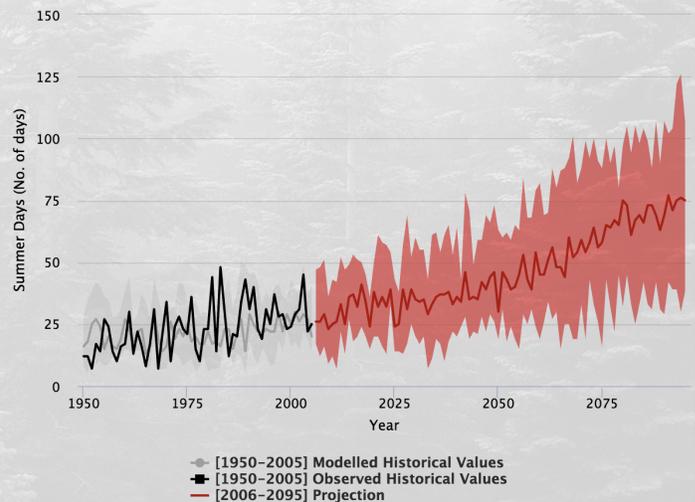
Forests

Manitoba's forests clean the air, water, and soil. They support human and natural systems and are vital for tourism, recreation, and commercial and traditional activities.

Hotter summers are projected for all parts of Manitoba and will have a significant impact on our forests. These conditions are expected to increase the frequency, intensity, and extent of forest fires, droughts, and pest outbreaks. Forestry management, emergency preparedness, and planning standards that take the new climate reality into account can help communities adapt.

Manitoba's forests – especially its boreal forest – are a vital part of the climate change solution because they are a "carbon sink" that helps reduce greenhouse gas levels in the atmosphere. Protecting these forests is necessary given their capacity to defend against climate change, as well as their ecological, cultural and economic importance.

Municipality: Thompson
Summer Days (RCP 8.5)



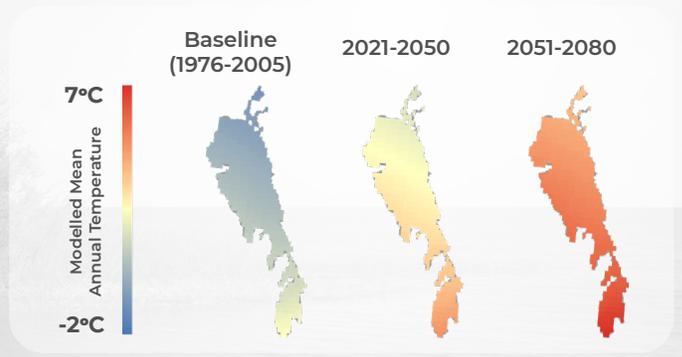
*This graph shows projected changes in the number of summer days (+25 °C) per year for Thompson, Manitoba under the High Carbon scenario.**



Lake Winnipeg

Lake Winnipeg – an iconic and important feature of Manitoba – is a vibrant lake ecosystem, which now supports fishing, recreation, tourism, and community and economic development.

The lake will be impacted by climate change. Its water level, temperature, nutrient load, oxygen content, and ice thickness are all susceptible to climate change. In turn, these changes will have profound effects on the lake’s productivity, biodiversity, and overall health.



*These maps show projected mean annual air temperatures over Lake Winnipeg under the High Carbon scenario.**

Many communities will be affected by these changes. This underscores the importance of watershed and lake management, adaptation planning and policy, and effective collaborations that address climate change and the other immediate threats facing Lake Winnipeg.



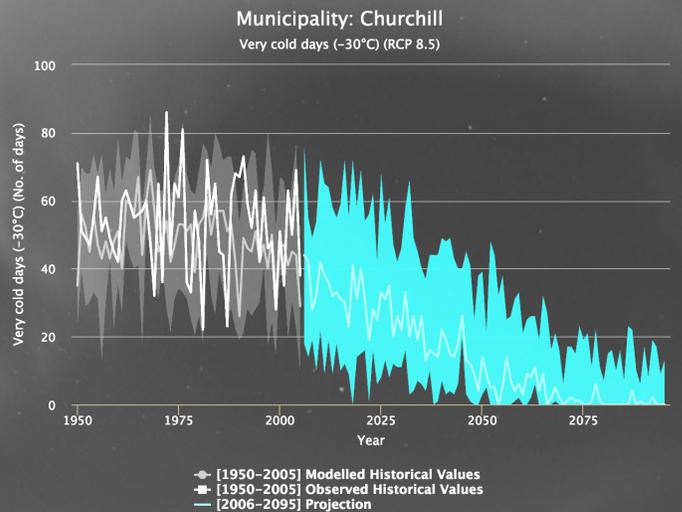
Northern Life

Manitoba’s north is a vast landscape made up of diverse yet remote communities and environments, which have largely been reliant on a cold climate. However, northern climates are changing rapidly.

In the coming decades, northern Manitoba is projected to experience a dramatic reduction in the number of cold days. For example, Churchill could lose virtually all of its -30 °C days by the end of the century under a High Carbon scenario. This would be a loss of six weeks of -30 °C weather.

Many of Manitoba’s remote communities rely on winter roads for the delivery of food, fuel, construction supplies and equipment, and other vital goods that are too large, heavy, or costly to fly in. The ongoing loss of cold weather will decrease the reliability and viability of these roads.

The challenges that climate change presents to the north are complex and will certainly affect culture, ecosystems, transportation and local economies. There may be new opportunities as a result of climate change, provided we plan for this future in collaboration with northern communities.



*This graph shows projected changes in the number of -30 °C days per year for Churchill, Manitoba under the High Carbon scenario.**

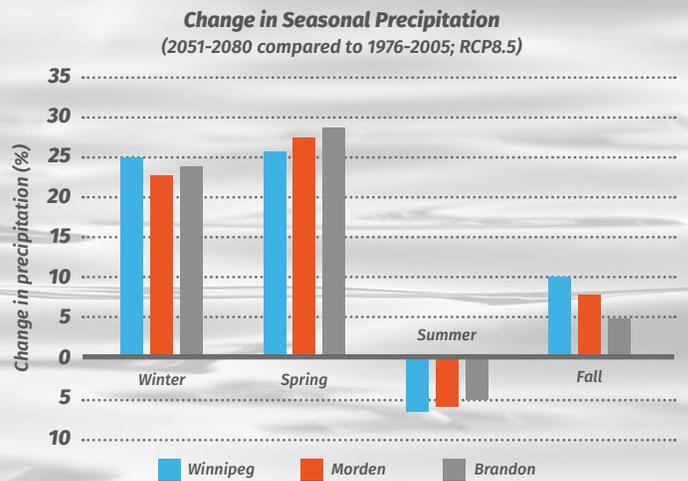


Flooding and Drought

Manitoba has always experienced floods and droughts. However, the frequency and intensity of these events are likely to increase as the climate changes.

Climate models suggest that southern Manitoba is expected to get wetter – especially in the spring – but summers may see a decline in precipitation. Given that many communities in the south are projected to see a tripling or even quadrupling in the number of very hot days, even minor declines in summer precipitation will create the perfect recipe for drought.

The combination of wetter springs and drier summers means that southern regions may have to cope with flooding and



*This graph shows projected changes in seasonal precipitation for select southern Manitoba communities under the High Carbon scenario.**

drought in the same year. We can foster community resilience to these conditions by adapting infrastructure, enhancing water and drought management, and refining emergency planning.



Take Action

With creative and forward-thinking planning, Manitobans can take meaningful action on climate change. Practical ways to take action include:

- Investing in strategies that increase resilience and protect communities in the event of floods, droughts, heatwaves, forest fires and other disasters that may increase as a result of climate change;
- Developing and improving long-range planning, engineering, emergency preparedness across all sectors within society, including communities, governments and businesses;
- Accelerating our transition to a low-carbon economy through policies and investments that promote carbon pricing and greenhouse gas mitigation through innovation in renewable energy and green jobs;
- Supporting education, training and outreach that engages citizens in conversation and action regarding climate change, its impacts, and local solutions;

- Enhancing active transportation and public transit through meaningful investments and changes in the built environment.
- Acting now to reduce economic risk and save on the rapidly increasing long-term damages and costs associated with climate change.

Climate change solutions start close to home, with simple actions in our own homes and families, but also involve new ways of thinking, planning, and acting in our workplaces, neighbourhoods, and communities. Smart climate action can help make all of Manitoba healthier, more livable, more productive, and more resilient.



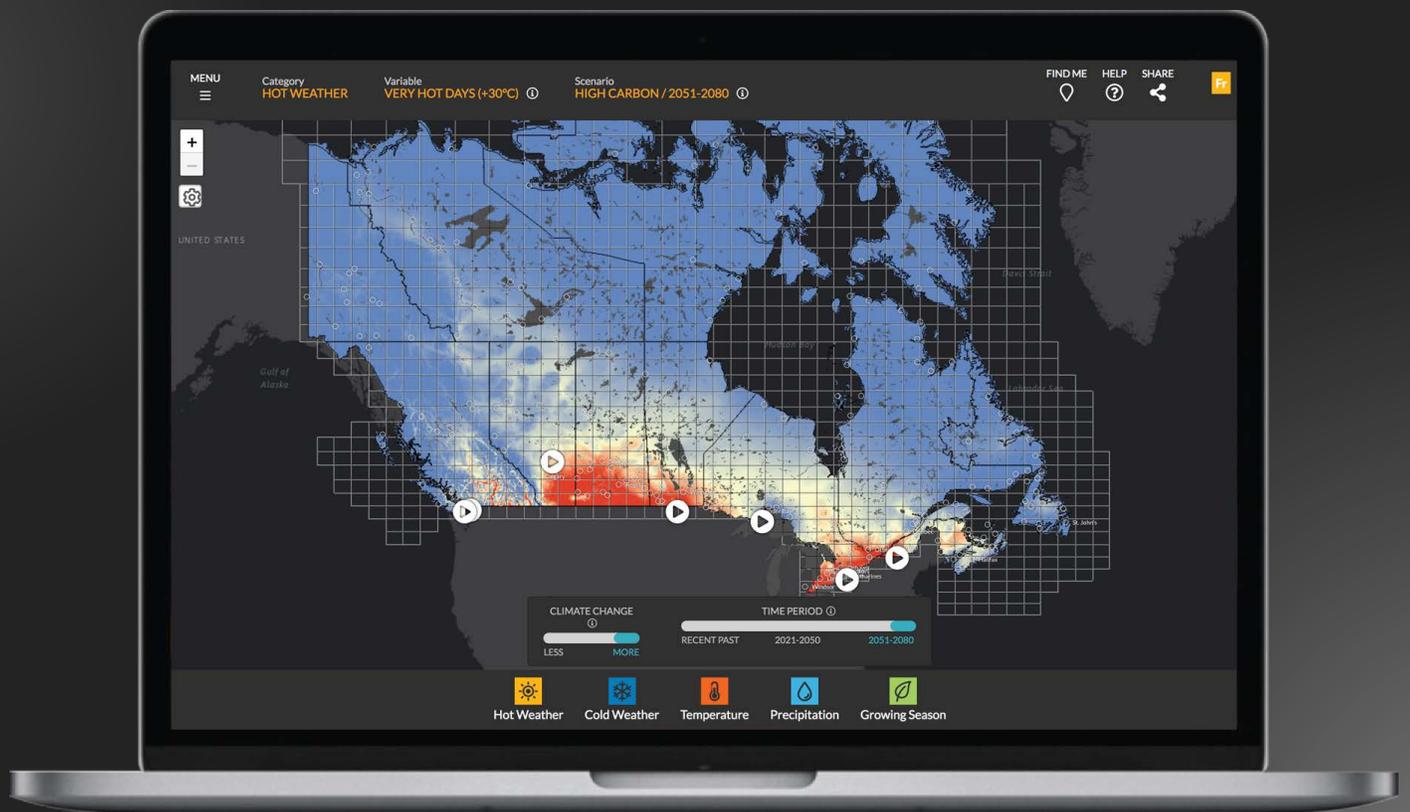
“With creative and forward-thinking planning, Manitobans can take meaningful action on climate change.”

The Prairie Climate Centre is committed to making climate change meaningful and relevant to Canadians of all walks of life. We bring an evidence-based perspective to communicating the science, impacts, and risks of climate change through maps, documentary video, research reports, and plain-language training, writing, and outreach.

The Climate Atlas Of Canada

The Climate Atlas of Canada is an interactive tool for citizens, researchers, businesses, and community and political leaders to learn about climate change in Canada. It combines climate science, mapping and storytelling to bring the global issue of climate change closer to home, and is designed to inspire local, regional, and national action and solutions.

The Atlas is one of the only tools in the world that integrates interactive web design with climatology, cinema, and cartography to geovisualize and connect scientific data with personal experience in compelling and easy-to-use ways.



Learn More at: climateatlas.ca

* The Climate Atlas of Canada presents climate indices derived from 12 downscaled global climate models obtained from the Pacific Climate Impacts Consortium (PCIC; pacificclimate.org). For each model, values for two future time periods (2021-2050 and 2051-2080) are computed under two emissions scenarios. The 'high carbon future' emissions scenario (RCP8.5) assumes greenhouse gas emissions will continue to increase at current rates for the foreseeable future. The 'low carbon future' scenario (RCP4.5) assumes emissions will peak mid-century and then rapidly decrease.

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