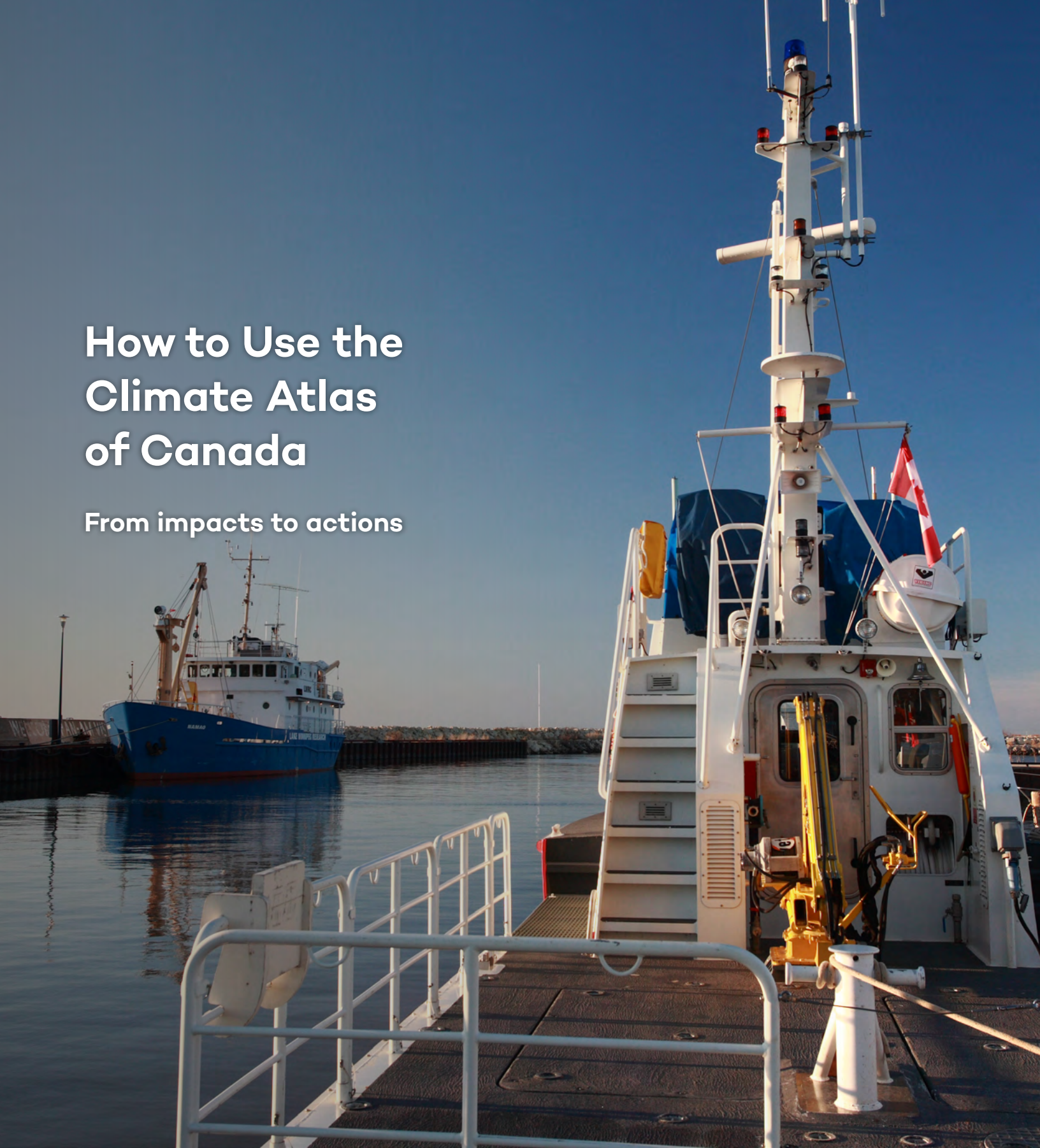


# How to Use the Climate Atlas of Canada

From impacts to actions



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### How to Use the Climate Atlas of Canada: From impacts to actions

Final Draft: April 26, 2024

Prepared by: IISD under the Manitoba-IISD 2023-24 Work Plan

Submitted to: Climate Action and Energy Innovation Division, Manitoba Environment and Climate Change

Photo: iStock

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## Glossary

<b>Adaptation planning</b>	“The process and mechanism of incorporating climate risks and anticipated outcomes in the development of planning documents so as to make communities more resilient to the potential impacts of climate change” (Manitoba Climate Resilience Training, 2021, p. 1).
<b>Climate change</b>	A change in long-term weather patterns due to natural phenomena and human activities (e.g., the use of fossil fuels and the release of carbon dioxide) that affect the chemical composition of the atmosphere through the accumulation of greenhouse gases. Climate change contributes to rising global temperatures, changing rain and snowfall patterns, warming oceans and many other impacts (Canadian Council of Ministers of the Environment [CCME], 2021).
<b>Climate projection</b>	A computer model showing how certain aspects of the climate, such as the average temperature in a region, could change based on different levels of greenhouse gas emissions (CCME, 2021).
<b>Climate scenario</b>	Representation of what the Earth’s climate may be in the future, based on the current state and considering different possible levels of greenhouse gas emissions (CCME, 2021). Climate scenarios are used to investigate the potential impacts of climate change.
<b>Representative Concentration Pathways (RCP)</b>	Standard scenarios that are used in climate modelling to simulate how the climate might change in response to different levels of human activity, representing possible trajectories of greenhouse gas concentrations (Prairie Climate Centre, 2018). For example, RCP8.5 has the most warming, using a high-carbon scenario due to ongoing increases in greenhouse gas emissions; RCP2.6 has the least warming, reflecting a future with aggressive and immediate efforts to reduce greenhouse gas emissions.
<b>Resilience</b>	The ability of infrastructure, natural ecosystems and social systems to maintain their function and cope when exposed to hazards (CCME, 2021). Resilience can increase by making changes to prepare for a hazard, such as relocating a house that was built in a floodplain in preparation for the increased frequency and severity of floods.

# Introduction to the Climate Atlas of Canada

The University of Winnipeg's Prairie Climate Centre (PCC) developed the Climate Atlas of Canada (Atlas) to help municipalities make risk management decisions, build resilience and find information about practical ways to adapt and mitigate climate change on a local level. Reducing the impacts of climate change on a community is an opportunity to improve the health, safety and quality of life of its residents.

*How to Use the Climate Atlas of Canada: From Impacts to Actions* (the Atlas guidebook) provides you with instructions for the Atlas. You can use it as part of the *Climate Adaptation Planning Process Guidebook for Manitoba Communities* or as a stand-alone activity to learn more about climate change in your community and across Canada. This step-by-step guide is intended to provide you with a user-friendly resource to help gather climate projections for use in adaptation planning.

Appendix A provides an optional worksheet where you can record the climate projection information from the Atlas.

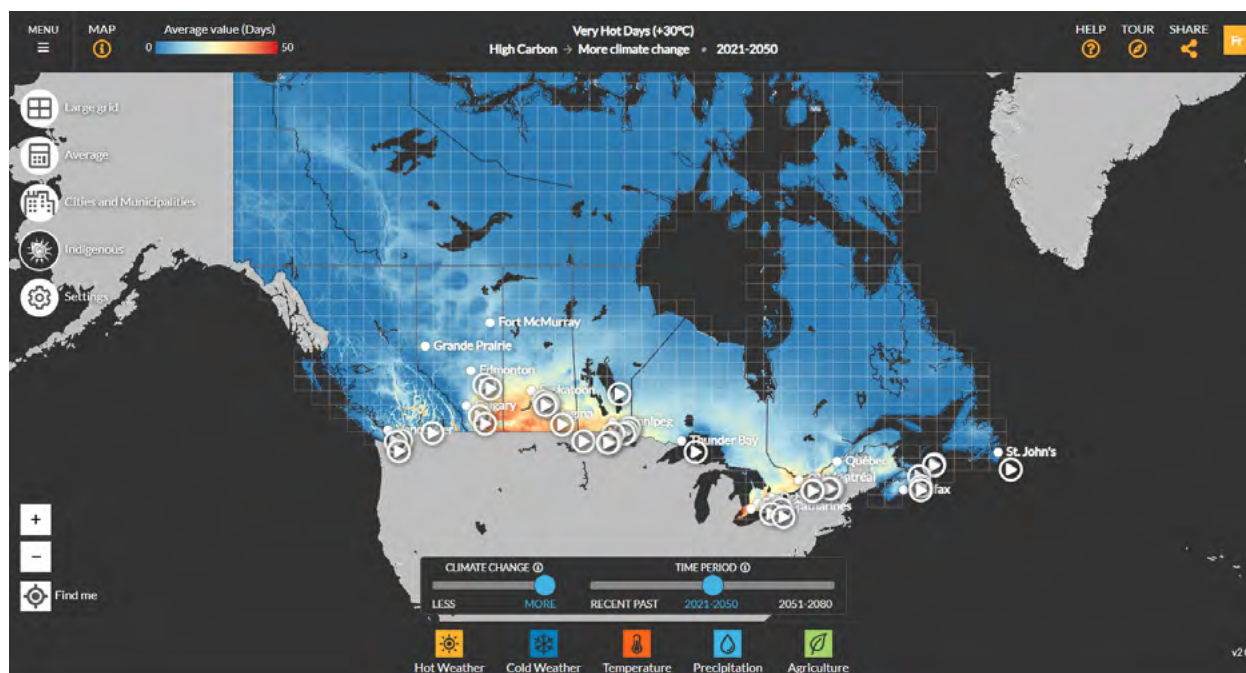


## Getting Started

Please visit [www.climateatlas.ca](http://www.climateatlas.ca) and click on MAP at the top of the page.



## Navigating the Atlas



### Title Bar








The title bar along the top of the Atlas describes the variable that the current map is displaying. The legend is on the left and the coloured bar defines the values of the data being shown. To the right of the legend is your selected climate variable, along with the climate change scenario and time period. Hover over the map info icon for a full breakdown of what the map is displaying.

The example in this map shows:

- Variable: Very hot days (+30°C)
- Legend: Average values (Days)
- Climate change scenario: High-carbon scenario and more climate change
- Period: 2021–2050

## Legend

 Large grid	Select the scale you want for regions shown on the map by large grid, small grid, or provinces/territories
 Average	The map can show average values for a future time period, or the amount of change between recent past and a future time period
 Cities and Municipalities  Indigenous	To find a particular location, toggle between Cities & Municipalities or Indigenous options such as First Nations Communities, Inuit Communities, or Métis Projects
 Settings	Additional settings can display highways, winter roads, rivers, watersheds and video markers on the map or change units between imperial and metric

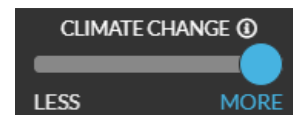
The legend is on the top left of the Atlas. Select options from the legend to display on the map.

## Climate Change Scenarios

There is an option to select climate change scenarios along the bottom of the Atlas. These scenarios are based on different levels of potential future greenhouse gas emissions called Representative Concentration Pathways (RCPs).

The Atlas has two options to choose from:

- **More Climate Change**, or “High-Carbon” Scenario (RCP 8.5): This is the “business-as-usual” scenario, which assumes that world greenhouse gas emissions will continue to increase at current rates through to the end of the century.
- **Less Climate Change**, or “Low-Carbon” Scenario (RCP 4.5): This scenario assumes that greenhouse gas emissions will increase until about 2050 and then rapidly decline.





## Time Periods

There is an option to select the period of interest along the bottom of the Atlas:



- **The Recent Past (1976–2005):** The “baseline” maps and data describe climate conditions in the recent past generated by climate models and have been shown to accurately represent observed records.
- **The Immediate Future (2021–2050):** This period has just begun and we will be in the middle of it in about 10 years. Most Canadians will see these changes come to pass. This timeline may be most useful for community planning timelines.
- **The Near Future (2051–2080):** Younger Canadians will likely experience all of these changes and many older Canadians will at least see them begin. This timeline may be most useful when considering assets with long service lives (e.g., a concrete bridge).

## Climate Variables

The Atlas has 39 different variables that can be explored and the bar at the bottom of the map provides five categories of variables. Click on the category, then select the specific variable to learn about the climate projections and read a description. You can also read about the climate variables [here](#).

Hot Weather

Cold Weather

Temperature

Precipitation

Agriculture

HOT WEATHER	COLD WEATHER	TEMPERATURE	PRECIPITATION	AGRICULTURE
<input checked="" type="checkbox"/> Very Hot Days (+30°C) <input type="checkbox"/> Tropical Nights <input type="checkbox"/> Warmest Maximum Temperature <input type="checkbox"/> Summer Days <input type="checkbox"/> Cooling Degree Days <input type="checkbox"/> Number of Heat Waves <input type="checkbox"/> Average Length of Heat Waves <input type="checkbox"/> Longest Spell of +30 °C Days <input type="checkbox"/> Hot (+30 °C) Season <input type="checkbox"/> Extremely Hot Days (+32 °C) <input type="checkbox"/> Extremely Hot Days (+34 °C)	<input type="checkbox"/> Very Cold Days (-30°C) <input type="checkbox"/> Freeze-Thaw Cycles <input type="checkbox"/> Frost Days <input type="checkbox"/> Icing Days <input type="checkbox"/> Coldest Minimum Temperature <input type="checkbox"/> Heating Degree Days <input type="checkbox"/> Freezing Degree Days <input type="checkbox"/> Mild Winter Days (-5 °C) <input type="checkbox"/> Winter Days (-15 °C)	<input type="checkbox"/> Mean Temperature <input type="checkbox"/> Maximum Temperature <input type="checkbox"/> Minimum Temperature	<input type="checkbox"/> Precipitation <input type="checkbox"/> Heavy Precipitation Days (10 mm) <input type="checkbox"/> Heavy Precipitation Days (20 mm) <input type="checkbox"/> Wet Days <input type="checkbox"/> Dry Days <input type="checkbox"/> Max 1-Day Precipitation <input type="checkbox"/> Max 3-Day Precipitation <input type="checkbox"/> Max 5-Day Precipitation	<input type="checkbox"/> Frost-Free Season <input type="checkbox"/> Date of First Fall Frost <input type="checkbox"/> Date of Last Spring Frost <input type="checkbox"/> Corn Heat Units <input type="checkbox"/> Growing Degree Days (Base 5 °C) <input type="checkbox"/> Growing Degree Days (Base 10 °C) <input type="checkbox"/> Growing Degree Days (Base 15 °C) <input type="checkbox"/> Growing Degree Days (Base 4 °C)

## Getting Climate Projections for Your Municipality

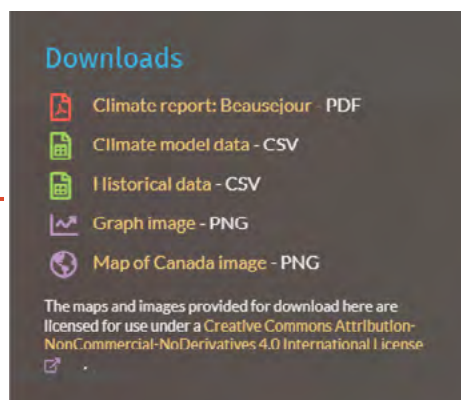
Zoom in on the map until you see the region of your municipality. Click on the region and climate projection information will appear in an information box on the right side of the screen. Select different climate change scenarios, periods and variables from the bottom of the map to see how the projections change in the information box.





## Downloads

Scroll down the information box on the right side of the map to see downloadable documents available for your municipality, including local climate reports, climate models and historical data, graphs, images and a map of Canada. Examples of the climate report, graph images and the map of Canada are provided below.



## Examples of downloads:

### Climate Atlas Report Municipality: Beausejour



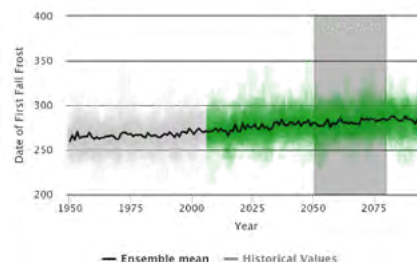
#### RCP 8.5: High Carbon climate future

GHG emissions continue to increase at current rates

Variable	Period	1976-2005 Mean	2021-2050			2051-2080		
			Low	Mean	High	Low	Mean	High
Precipitation (mm)	annual	539	420	571	731	432	575	734
Precipitation (mm)	spring	116	64	127	200	74	135	207
Precipitation (mm)	summer	229	130	232	339	123	223	343
Precipitation (mm)	fall	125	74	134	207	78	134	205
Precipitation (mm)	winter	89	44	77	112	50	83	121
Mean Temperature (°C)	annual	2.6	3.2	4.9	6.6	5.2	7.3	9.4
Mean Temperature (°C)	spring	2.6	1.4	4.8	8.1	3.7	6.9	10.2
Mean Temperature (°C)	summer	18.2	18.6	20.3	22.1	20.3	22.6	24.8
Mean Temperature (°C)	fall	4.6	4.6	6.8	8.9	6.8	9.1	11.3
Mean Temperature (°C)	winter	-15.4	-16.5	-12.7	-9	-13.3	-9.6	-5.7
Tropical Nights	annual	1	0	6	13	4	18	35
Very hot days (>30°C)	annual	12	10	27	46	22	48	73
Very cold days (<-30°C)	annual	18	1	8	18	0	3	8
Date of Last Spring Frost	annual	May 17	April 21	May 9	May 25	April 7	April 29	May 18
Date of First Fall Frost	annual	Sep. 24	Sep. 17	Oct. 6	Oct. 26	Sep. 27	Oct. 17	Nov. 5
Frost-Free Season (days)	annual	127	122	147	175	139	167	198

#### Date of First Fall Frost

Beausejour (Municipality)



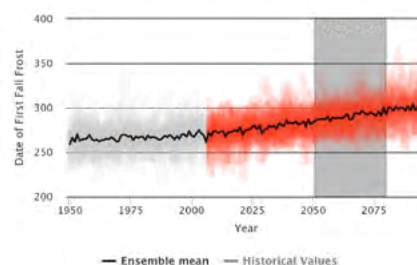
#### RCP 4.5: Low Carbon climate future

GHG emissions much reduced

Variable	Period	1976-2005 Mean	2021-2050			2051-2080		
			Low	Mean	High	Low	Mean	High
Precipitation (mm)	annual	540	426	567	723	425	572	732
Precipitation (mm)	spring	116	67	126	197	70	130	201
Precipitation (mm)	summer	229	136	230	337	129	227	338
Precipitation (mm)	fall	125	74	133	209	74	136	209
Precipitation (mm)	winter	89	48	79	114	48	80	116
Mean Temperature (°C)	annual	2.6	3	4.7	6.4	3.9	5.8	7.8
Mean Temperature (°C)	spring	2.6	1.6	4.7	7.9	2.6	5.7	9.1
Mean Temperature (°C)	summer	18.2	18.2	19.9	21.7	18.9	21	23
Mean Temperature (°C)	fall	4.6	4.4	6.6	8.7	5.2	7.5	9.8
Mean Temperature (°C)	winter	-15.4	-16.7	-12.9	-9.4	-15.1	-11.3	-7.4
Tropical Nights	annual	1	0	5	12	1	8	19
Very hot days (>30°C)	annual	12	9	25	42	14	34	55
Very cold days (<-30°C)	annual	18	1	9	20	0	5	14
Date of Last Spring Frost	annual	May 17	April 23	May 11	May 30	April 13	May 7	May 27
Date of First Fall Frost	annual	Sep. 24	Sep. 16	Oct. 5	Oct. 25	Sep. 19	Oct. 8	Oct. 30
Frost-Free Season (days)	annual	127	116	143	170	121	151	186

#### Date of First Fall Frost

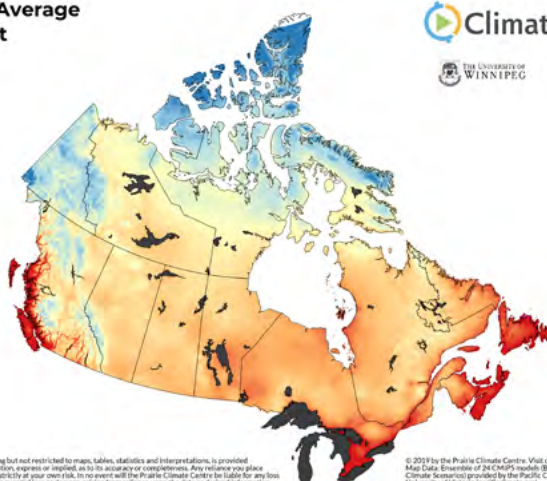
Beausejour (Municipality)



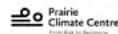
### 2051-2080 Projected Average Date of First Fall Frost

Under the RCP4.5 scenario

Day of the Year



ClimateAtlas.ca



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© 2019 by the Prairie Climate Centre. Visit climateatlas.ca for more information. Mean Date Ensemble of 24 CMIP5 models (RCP4.5) Statistically Downscaled Climate Scenario(s) provided by the Pacific Climate Impacts Consortium University of Victoria (see climateatlas.ca).



# Manitoba Report and Municipal Climate Cards

Virtually all social, economic and ecological systems in Manitoba depend, 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 because of its northern latitude and continental geography. These changes are likely to have very large impacts on Manitoba and its people.

The Manitoba and Climate Change report offers a summary of projected climate changes for several Manitoba communities, as well as an overview of some important regional and local impacts. The [Municipal Climate Cards](#) summarize climate impacts for each individual municipality. These reports include some ideas and approaches that can be used to take meaningful climate action across the province.

## Manitoba and Climate Change report





## References

- Canadian Council of Ministers of the Environment. (2021). *Guidance on good practices in climate change risk assessment*. <https://ccme.ca/en/res/riskassessmentguidancesecured.pdf>
- Manitoba Climate Resilience Training. (2021). *Glossary of climate terms*.
- Prairie Climate Centre. (2018). *Climate atlas guidebook*. [https://climateatlas.ca/sites/default/files/ClimateAtlas-Guidebook\\_V1\\_Nov2018.pdf](https://climateatlas.ca/sites/default/files/ClimateAtlas-Guidebook_V1_Nov2018.pdf)

## Appendix A. Optional Worksheet: Climate projections for your community

Use this optional worksheet to record data from the Atlas. The worksheet suggests some optional variables that might be useful and there are blank rows to add additional variables, as required.

Variable	Recent past 1976–2005	Immediate future 2021–2050	Near future 2051–2080	Change (+/-) immediate to near future
Example: Very hot days (30°C) in Morden	17.3 days	34.5 days	56.9 days	+ 17.2 days + 39.7 days
Very hot days (30°C)	days	days	days	days
Very cold days (–30°C)	days	days	days	days
Annual mean temperature	°C	°C	°C	°C
Mean spring precipitation	mm	mm	mm	%
Frost-free season	days	days	days	days

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**If you have questions throughout the process, please contact:**

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