MANITOBA CLIMATE RESILIENCE TRAINING

Capacity Enhancement in Vulnerability and Risk Assessment (CEVRA) Project Workshop

Session for Watershed Districts

AGENDA

Introductions

Getting Started

Assessing Current and Future Climate Risks

Step 1: Climate Hazard Assessment

Step 2: Climate Impact Assessment

Step 3: Climate Risk Assessment

Next Steps

Where To Go From Here?

Manitoba

MANITOBA CLIMATE
RESILIENCE TRAINING

INTRODUCTIONS

HTFC
PLANNING & DESIGN

Manitoba

Introductions - HTFC

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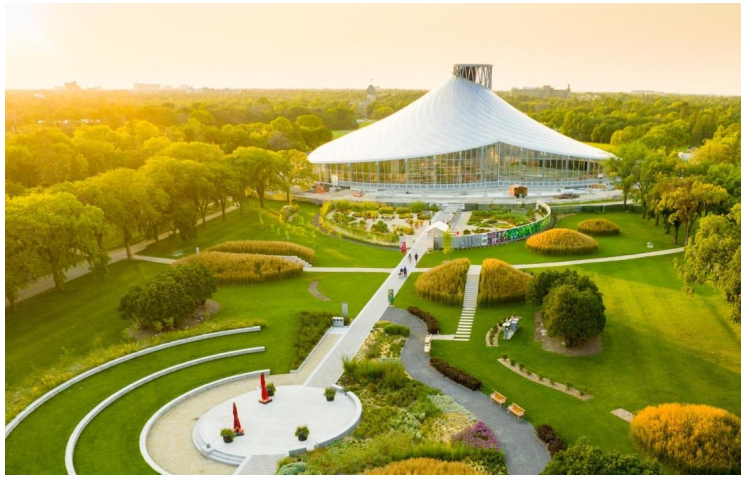
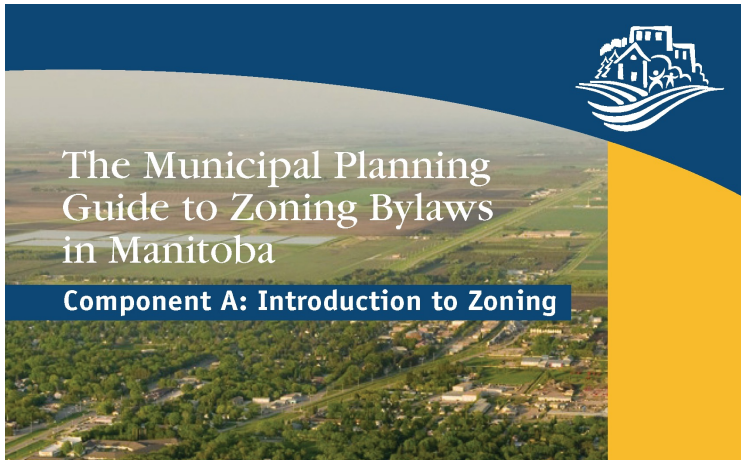
The Leaf / Diversity Gardens



Oodena Celebration Circle



Zoning Bylaw Guide

Oak Hammock Marsh Green Roof

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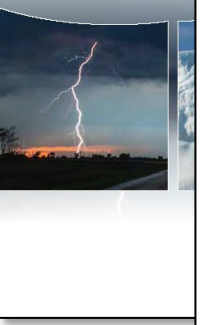
Government of Canada | Gouvernement du Canada

Policy Frameworks

Federal Adaptation Policy Framework



Vision Statement

Recognizing the need to adapt to climate change, the wide variation in climate impacts across Canada, and the many groups that are involved in adaptation, the Government of Canada adopts the following vision:

> Canada is resilient to a changing climate by successfully adapting to the challenges and opportunities, and ensuring the health, safety, and security of Canadians and Canada's environmental, social, and economic wealth in a long term and sustainable manner.

Objectives

The following are the objectives of the Federal Adaptation Policy Framework:

1. Canadians understand the relevance of climate change and associated impacts on their quality of life.
2. Canadians have the necessary tools to adapt to climate change effectively.
3. The federal government, as an institution, is resilient to a changing climate.

The Federal Role

Given the broad health, environmental, social, and economic impacts of climate change, the federal government must take action to ensure that it effectively integrates climate change considerations into its own programs, policies, and operations and facilitates action by others. These roles are accomplished by:

1. Generating and sharing knowledge

The Government of Canada plays a crucial ongoing role in the generation and provision of scientific information to support evidence-based decision-making related to climate change impacts and adaptation. In some cases, the federal government hosts knowledge and expertise not found elsewhere in Canada. This includes a range of activities, such as periodic national assessments of climate change, development of innovative new technologies and practices, ongoing environmental monitoring, research in specific areas (e.g. climate change projections, climate change effects on forests, and transportation infrastructure), and support for and engagement with stakeholders in the development of tools for adaptation. This role capitalizes on federal strengths in science and technology that are not replicated outside the Government. It is also essential to the understanding of critical issues and the ability of stakeholders to develop and apply effective responses.

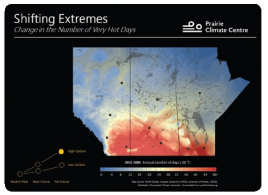
The Government of Canada is well positioned to mobilize economies of scale to generate and deliver fundamental knowledge and information that can be applied across the country. Sharing information, both within the federal government, the international community, and with other external stakeholders (e.g., academia) will increase awareness of climate change impacts, assist with capacity building, and reduce adaptation costs in all regions and sectors. By participating in the generation of new information and tools, the federal government will ensure that this is made public.

Knowledge of climate variability, change, impacts, and adaptation options is a fundamental input to both internal and external adaptation. Further research and modeling to address knowledge gaps, such as socio-economic considerations and refining information at local-scales, will lead to better and more targeted adaptation. Although our climate variability and change knowledge is incomplete, there is now enough information to implement adaptation measures.

Adaptation

Climate change poses real and potentially significant challenges to our environment, economy and the social fabric of our communities. Many regions across Canada have experienced extreme weather events such as flooding, drought, blizzards, hurricanes, tornadoes heat waves and wildfires. These extreme weather events are becoming more common and more severe. The expectation is that this will continue into the future.

According to work developed by the Prairie Climate Centre at the University of Winnipeg, there are real risks for Manitoba, especially associated with increasing temperatures, changes in precipitation, and negative impacts on communities, infrastructure, the economy and nature. Climate change is not just an intangible and far-off issue. Every indication is that it's happening now and will increasingly become more challenging.



The damage caused by record-breaking extreme weather can be costly. Private insurers have paid out billions of dollars over the past years for losses caused by natural disasters. These amounts are up to 10 times what was paid out even a decade ago. These ultimately result in higher customer premiums. Governments have paid out even larger amounts in disaster payments and repairs to infrastructure. The Fort McMurray wildfire is estimated to exceed $8.8 billion in financial, physical, social, health and environmental losses. Here at home, the 2011 spring flood in Manitoba cost the government $1.2 billion and costs continue to rise with recent flooding in the past few years. This is money taken from other priorities such as health care and education.

Extreme weather and the damages and social costs associated with it, should be seen as a warning sign of things to come. Adapting to a changing climate is becoming the new normal. We need to prepare for and take action in response to actual or anticipated climate impacts to minimize their adverse impacts on our economy, environment and the communities in which we live.

Adaptation is about becoming stronger and more resilient in the face of climate change risk. It means investing today for tomorrow.

> **Adaptation** refers to taking action now to reduce the impacts of current and future climate change events such as floods, droughts and wildfires.

The following initiatives are currently being considered to support the Adaptation keystone. Your comments, ideas and suggestions related to this keystone and its proposed initiatives are valuable to government. Please consider sharing your views online at: www.manitobaclimategreenplan.ca.

Climate Knowledge

Understanding how Manitoba's climate is changing and how that might impact us is essential. This knowledge strengthens our ability to plan and make informed decisions about what actions we need to take.

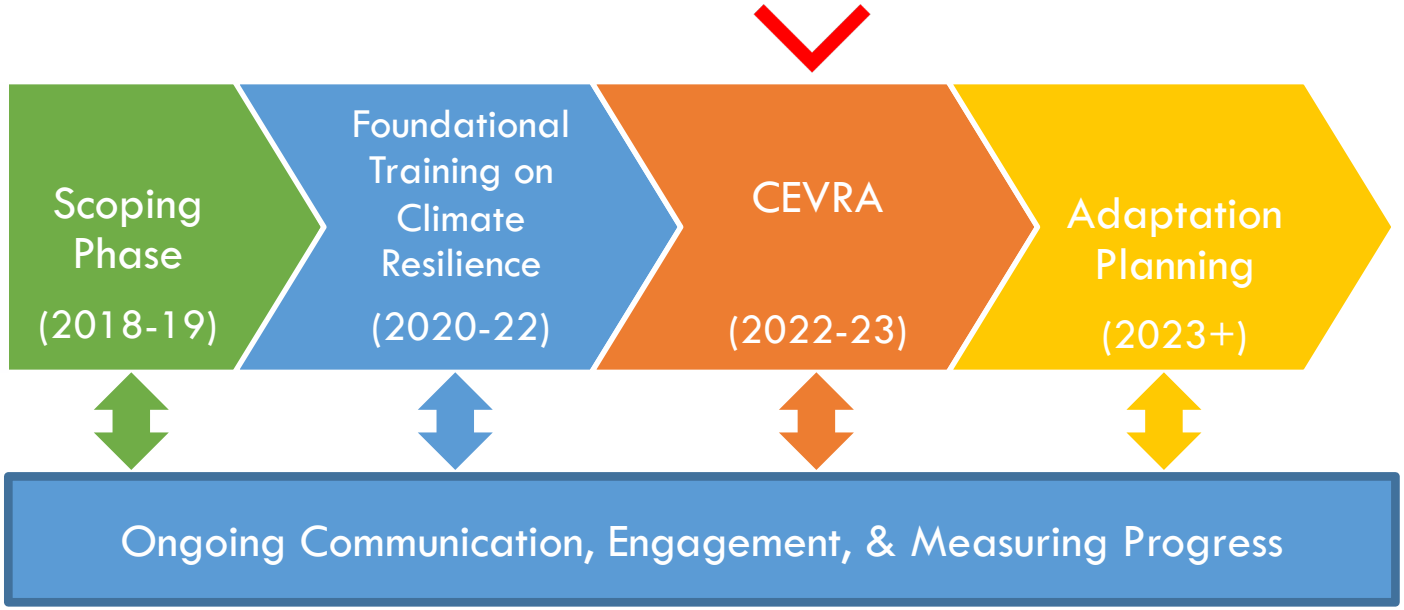
Prairie Climate Centre – The Prairie Climate Centre is a joint initiative of the International Institute for Sustainable Development and the University of Winnipeg. The centre provides governments, businesses, non-government organizations and sectors with reliable climate data and information, enabling them to make informed decisions on addressing climate risk management and adapting to climate change. The Manitoba government has already invested over $400,000 to support this Made-in-Manitoba research organization. This centre is ready-made to become the regional climate services centre for Western Canada.

Manitoba Centre for Sustainable Agriculture – There is an increasing need to build capacity for agriculture-related climate change research that supports agricultural production, decreased emissions of greenhouse gases, enhanced sequestration of carbon in soil and greater resiliency to extreme weather. The Manitoba government is considering options to support the creation of such a research centre to provide this support

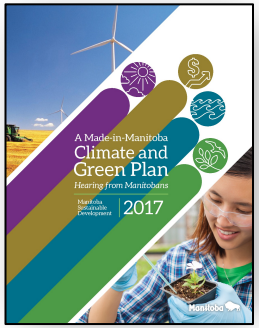
Program Context

MANITOBA CLIMATE RESILIENCE TRAINING

- Manitoba Climate Resilience Training (MCRT) Program: A multi-year, multi-phased program that supports Climate and Green Plan Adaptation Framework
- Supports the development of a Manitoba Climate Adaptation Plan



Enhanced Resiliency of Communities, Sectors, and Ecosystems



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What is CEVRA?

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Capacity

Enhancement in

Vulnerability and

Risk

Assessment

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Applying Workshop Lessons

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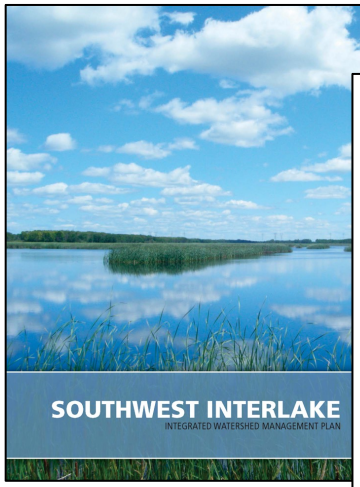
You can apply today's content to:

Climate VRA

IWMP

Climate Action Plan



CLIMATE CHANGE ADAPTATION

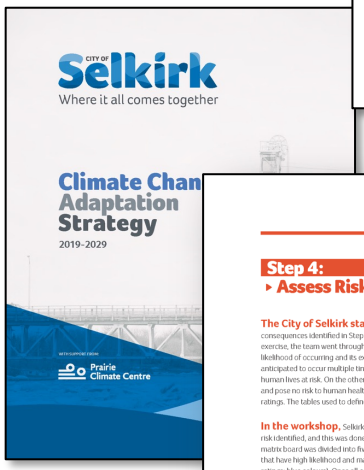
There is consensus among scientists that climate change is occurring, and in some cases effects are already being felt. Climate change projections for this region generally indicate warmer and wetter winters and longer, warmer and drier summers. Precipitation is likely to vary more from year to year and extreme weather events will likely become more common. This will have implications for our economy, natural environment, health and well-being. Adapting to climate change will bring opportunities as well as challenges. The Prairie Climate Center predicts that over the next few decades, Manitoba could experience significant climatic changes and recommends that municipalities start preparing for the anticipated impacts of these changes. To prepare, municipalities should be learning more about the potential impacts and associated risks, discussing necessary updates to their Development Plans and Zoning By-Laws, and developing actions to improve community resiliency.

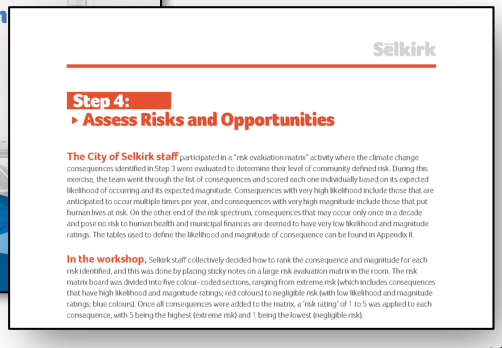
Droughts and floods are natural parts of the climatic cycle and can have devastating impacts on landscapes and communities. Both are difficult to predict and adapt to. The most recent climate change models are predicting higher average temperatures and more days above 30 degrees Celsius over the next 30 to 50 years throughout most of Manitoba. It is possible that these warmer conditions could lead to droughts that are more severe and longer in duration and floods that occur more frequently and with higher water levels. Droughts and floods can create an environment that is more susceptible to erosion, forest fires, disease, and the invasion of less desirable species. It can also cause severe and long-term socioeconomic impacts to farmers and communities.

MANITOBA DROUGHT MANAGEMENT STRATEGY

In January 2016, Manitoba Sustainable Development released the Drought Management Strategy. The strategy proposes to assess drought preparedness of basins across Manitoba using variables such as water sources and their reliability, current management of water supply infrastructure, socioeconomic conditions, drought mitigation strategies currently in place, and existing communication networks. The intent of the strategy is to help increase drought resiliency throughout Manitoba.

RECOMMENDATIONS	LEAD
1. Prepare for the anticipated impacts of climate change by learning more about the potential impacts and associated risks, updating Development Plans and Zoning By-Laws and developing an action plan to improve community resiliency.	Municipalities
2. Work with municipalities and key stakeholders to complete a drought preparedness assessment for the Southwest Interlake Watershed.	Manitoba Sustainable Development - Water Science and Watershed Management Branch





Selkirk

Step 4:
▸ Assess Risks and Opportunities

The City of Selkirk staff participated in a "risk evaluation matrix" activity where the climate change consequences identified in Step 3 were evaluated to determine their level of community defined risk. During this exercise, the team went through the list of consequences and scored each one individually based on its expected likelihood of occurring and its expected magnitude. Consequences with very high likelihood include those that are anticipated to occur multiple times per year, and consequences with very high magnitude include those that put human lives at risk. On the other end of the risk spectrum, consequences that may occur only once in a decade and pose no risk to human health and municipal finances are deemed to have very low likelihood and magnitude ratings. The tables used to define the likelihood and magnitude of consequence can be found in Appendix II.

In the workshop, Selkirk staff collectively decided how to rank the consequence and magnitude for each risk identified, and this was done by placing sticky notes on a large risk evaluation matrix in the room. The risk matrix board was divided into five colour-coded sections, ranging from extreme risk (which includes consequences that have high likelihood and magnitude ratings; red colours) to negligible risk (with low likelihood and magnitude ratings; blue colours). Once all consequences were added to the matrix, a 'risk rating' of 1 to 5 was applied to each consequence, with 5 being the highest (extreme risk) and 1 being the lowest (negligible risk).

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Climate Action Plan Process

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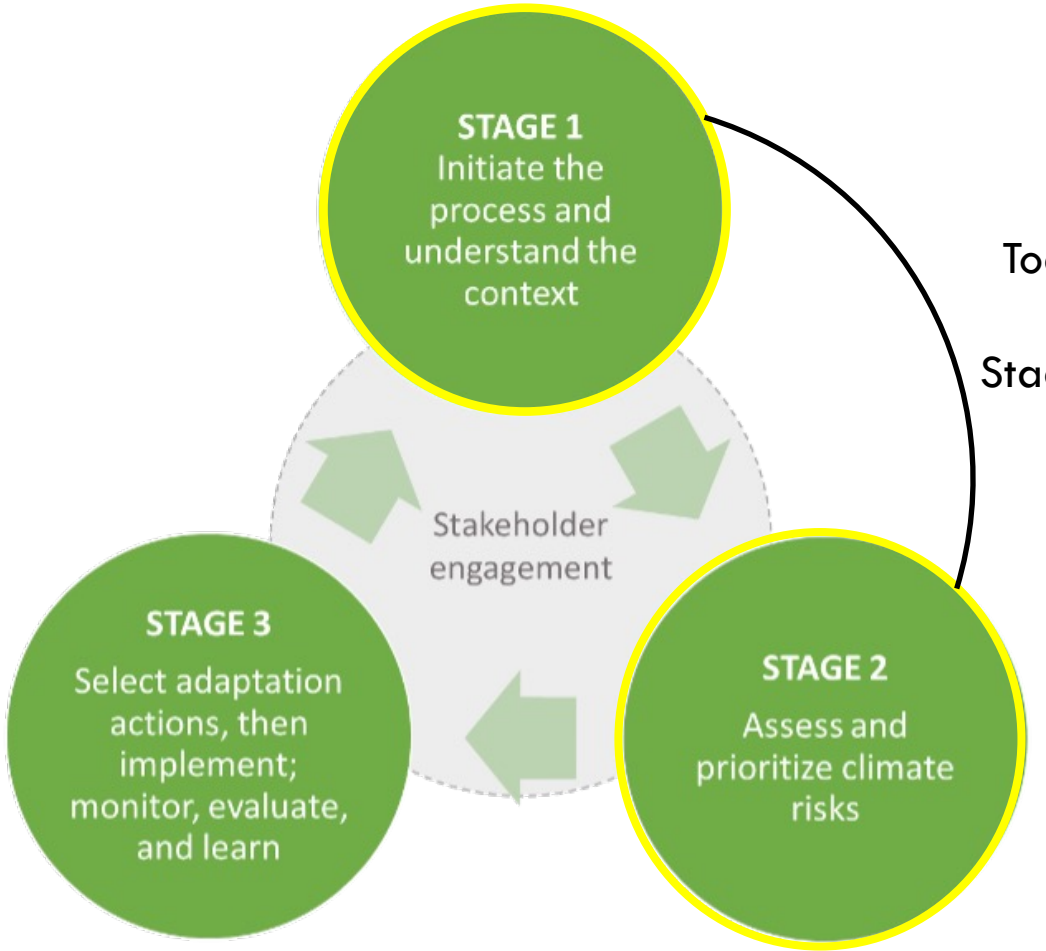

Today's focus is on Stages 1 and 2

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Climate Action Plan Steps

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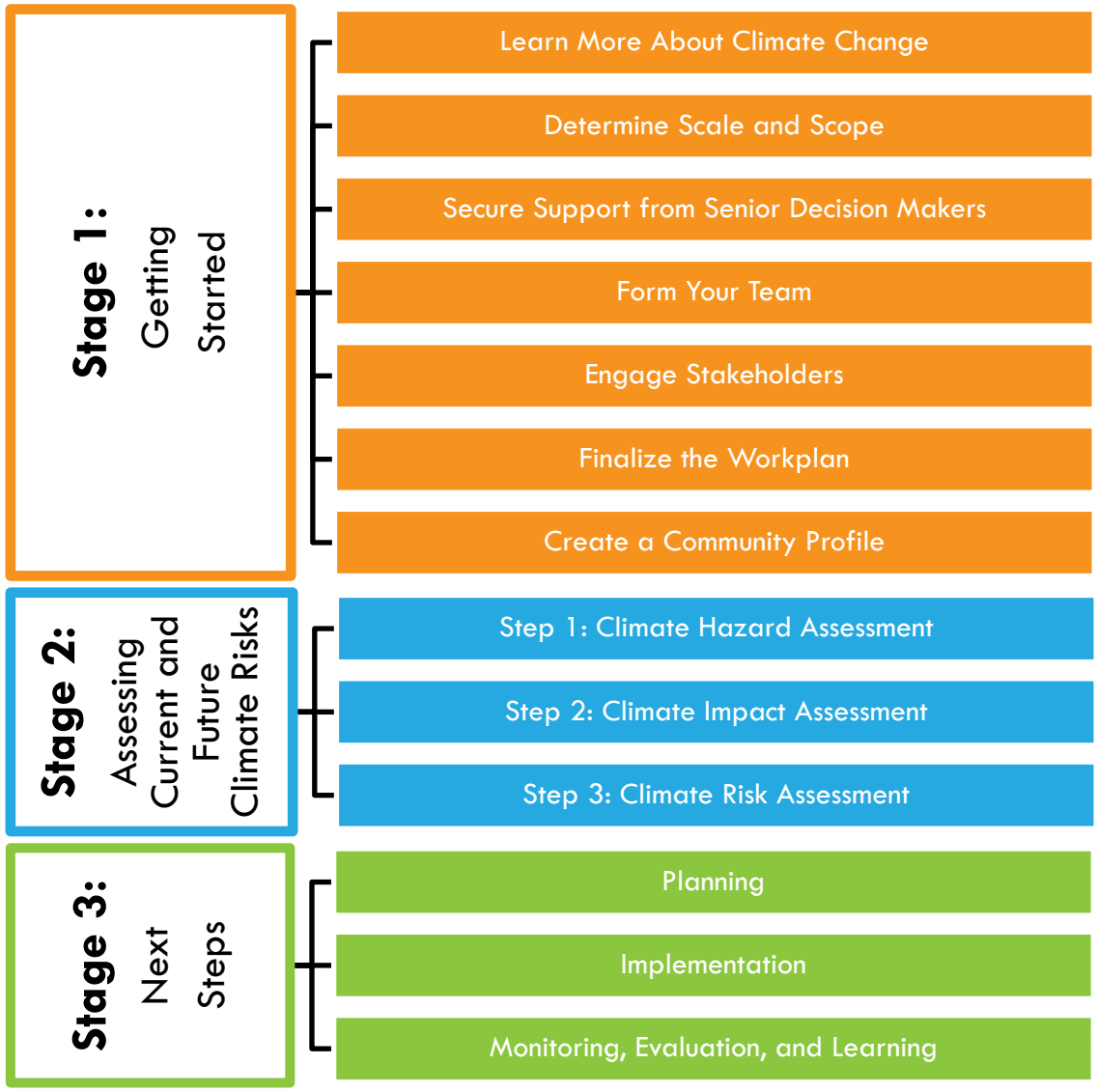

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Today's Key Takeaways and Goals

MANITOBA CLIMATE RESILIENCE TRAINING

1. **Understand** the projected climate future for your district's region
2. **Recognize** climate hazards and how they could change in the future
3. **Identify & assess** the risks to your district
4. **Learn** the steps of a climate vulnerability and risk assessment
5. **Adopt** a mentality of planning for the worst while hoping for the best

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CLIMATE ACTION PLAN
STAGE 1: GETTING STARTED

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Climate Action Plan Stage 1: Getting Started

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Climate Action Plan Stage 1: Getting Started

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Climate Change Basics: Weather vs Climate

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Weather

- Changes by the hour, day, or week
- Readily observable

"Climate is what we expect, weather is what we get"
– *Mark Twain*

Climate

- Changes with the seasons
- A generalization of regional weather over time

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Climate Change Basics:
Earth's Temperature Over Time

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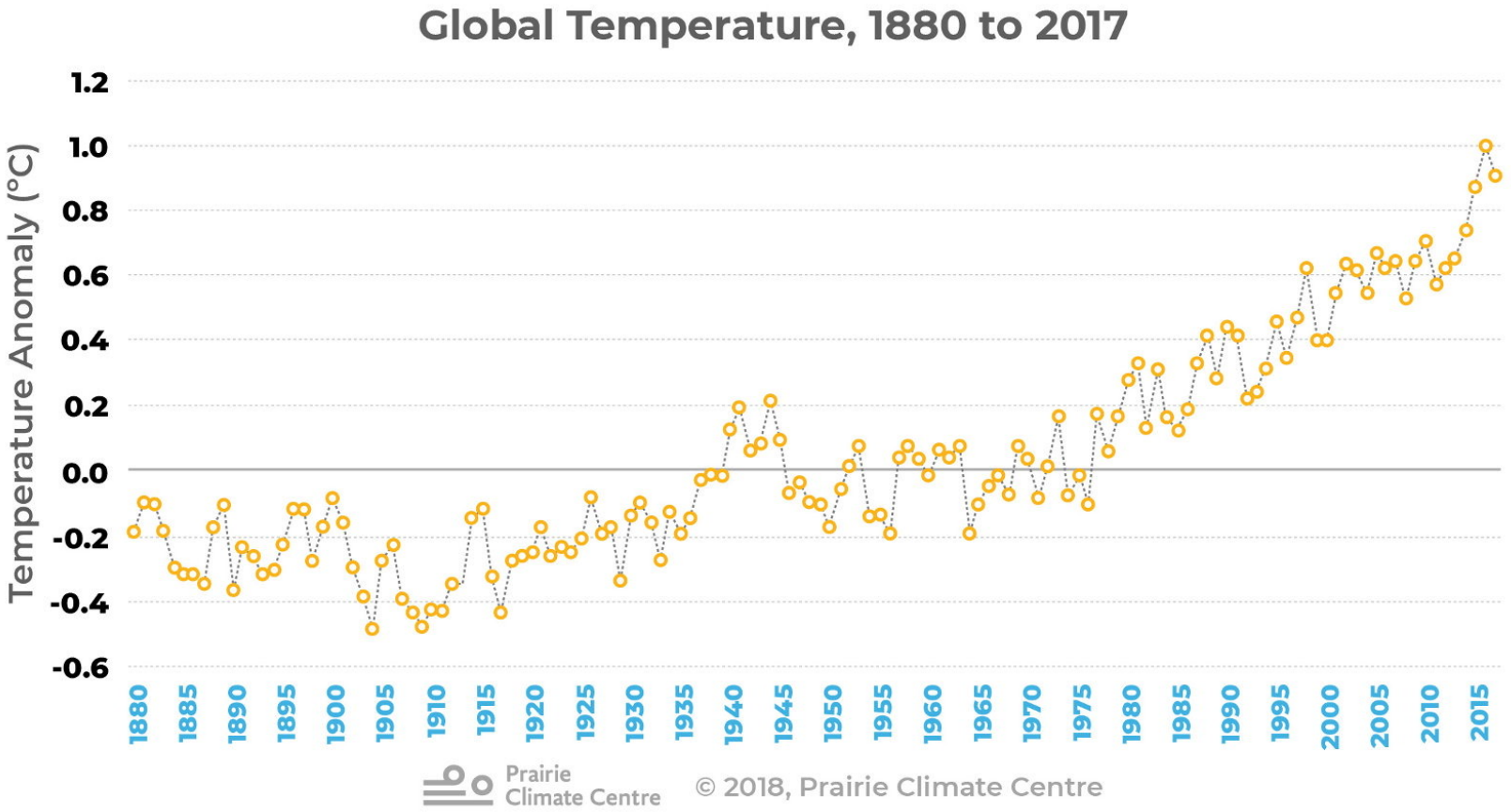

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Source: https://climateatlas.ca/climate-change-basics

Climate Change Basics:
Carbon Dioxide Levels Over Time

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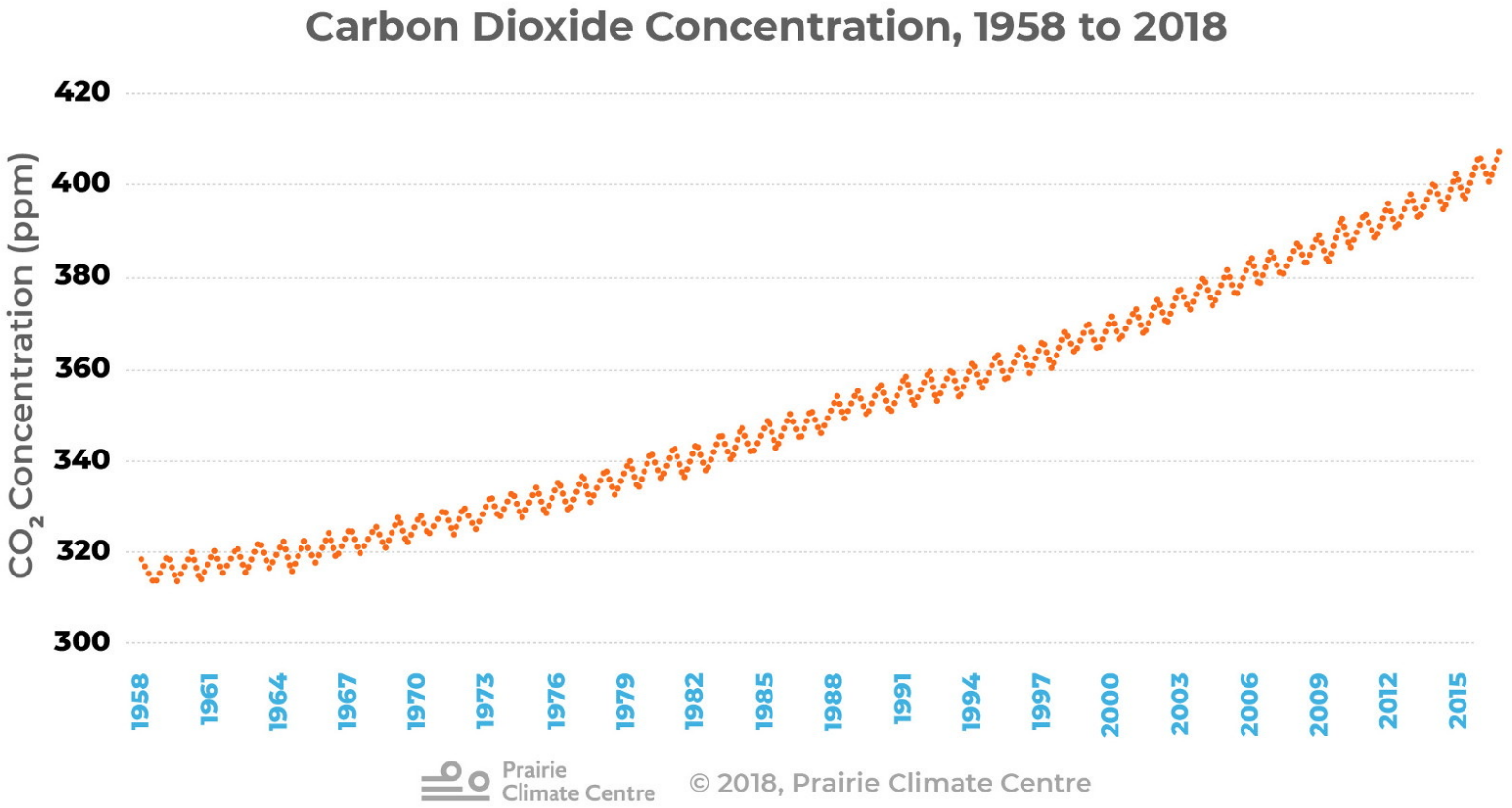

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Source: https://climateatlas.ca/climate-change-basics

Climate Change Basics:
Temperature & CO2 Compared

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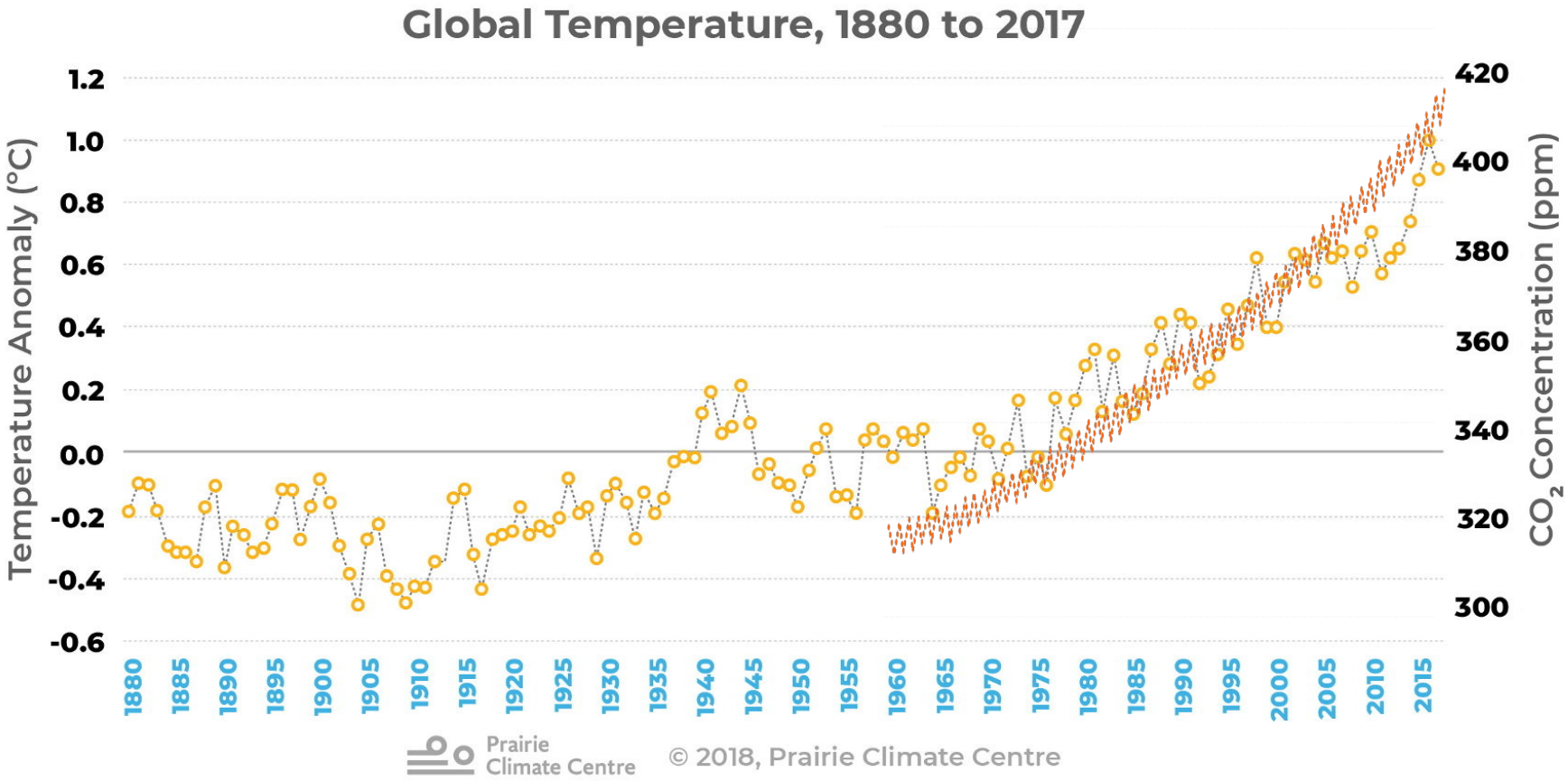

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Source: https://climateatlas.ca/climate-change-basics

Mitigation vs Adaptation

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- **Mitigation –** Efforts to slow the process of a changing climate

- **Adaptation –** Response to a new climate reality

"**Mitigation** will help avoid the unmanageable.

Adaptation is essential to manage the unavoidable."

- All One Sky

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Mitigation vs Adaptation

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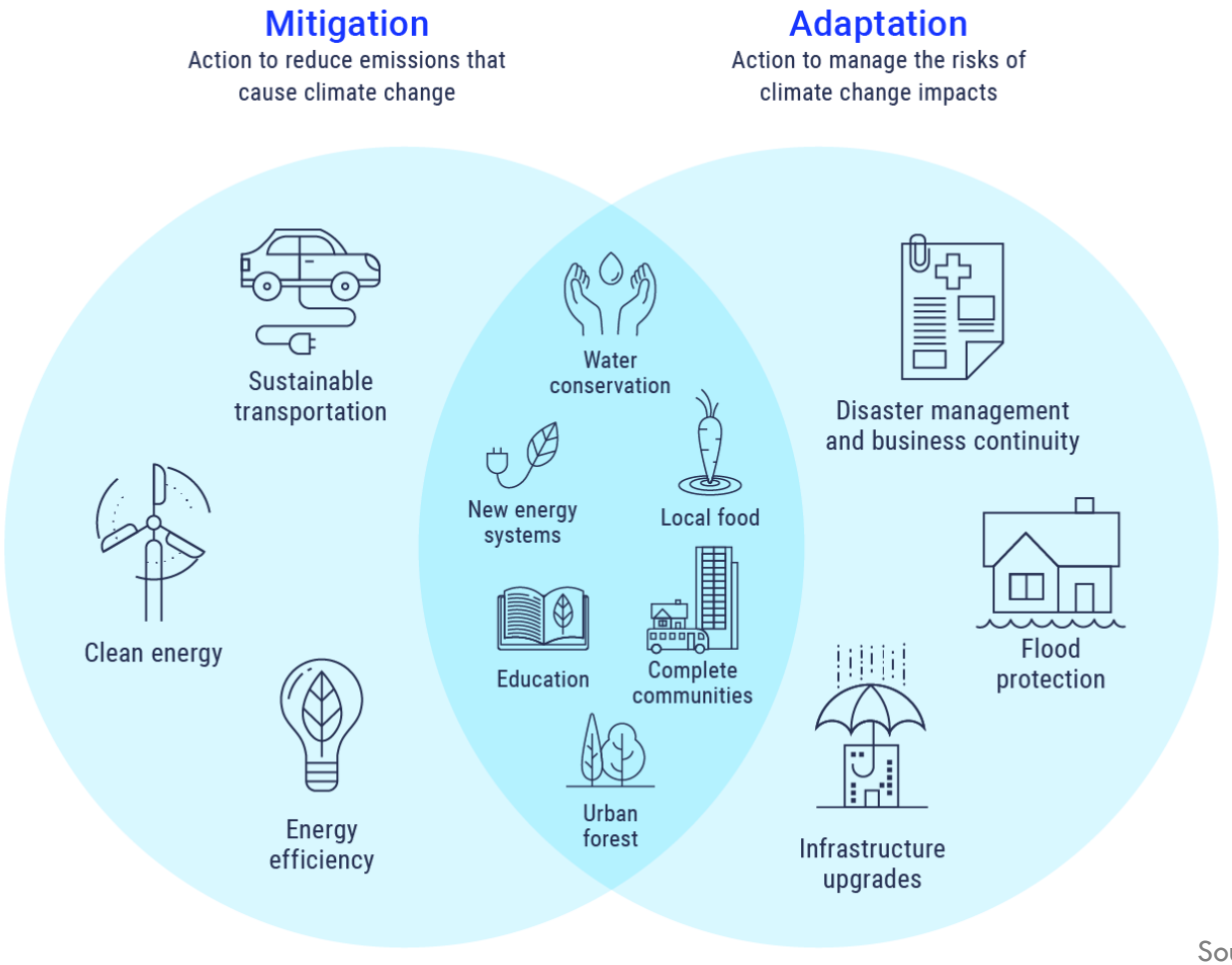

Source: City of Calgary

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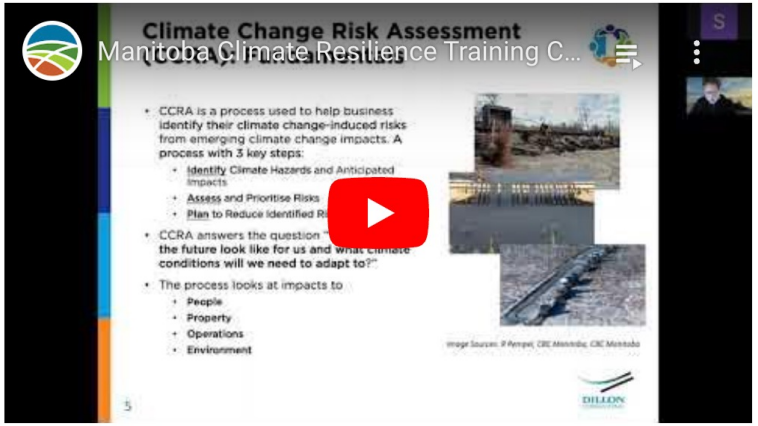
CLIMATE CHANGE 101

A climate change primer course for professionals and practitioners in Manitoba to better understand the causes, future projections, and effects of climate change in the Canadian context. This course serves as a foundational primer for the rest of the MCRT training to be undertaken by select audiences.

RISK ASSESSMENT: CORE PRINCIPLES

Climate Change Risk Assessment: Core Principles

This foundational module provides a foundation of core climate change risk assessment principles and approaches for all BRACE sector audiences. It explores core concepts such as hazard identification, vulnerability assessment, risk assessment and how to use a CCRA process to identify, assess, prioritize climate impacts to inform climate adaptation planning.



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Start here:

MCRT Foundational Training Modules:

https://climatewest.ca/mcrt-foundation-modules

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CLIMATE ACTION PLAN
STAGE 2: ASSESSING CURRENT AND FUTURE CLIMATE RISKS

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Climate Action Plan Stage 2: Assessing Current and Future Climate Risks

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Climate Action Plan Stage 2: Assessing Current and Future Climate Risks

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Step 1:
Climate Hazard Assessment

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The goal of this step is to:

- Identify the climate hazards that already affect or will affect your district; and
- Understand how the climate hazards are predicted to change.

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Examples of Climate-Related Hazards Affecting Manitoba in Recent Years

Polar vortex breaks temperature records across Prairies, bitter cold expected to linger

Environment Canada has issued a cold weather warning for Alberta, Saskatchewan and Manitoba

Mickey Djuric · CBC · Posted: Feb 08, 2021 7:39 AM CST | Last Updated: February 8, 2021

Manitoba's winter road system finally opens for season about a month late

Construction fell behind due to warmer temperatures in December and January

CBC News · Posted: Feb 17, 2021 7:35 AM CST | Last Updated: February 17, 2021

Manitoba floods continue to wreak havoc on communities across the province

By Sam Thompson • Global News
Posted May 4, 2022 9:30 am · Updated May 4, 2022 9:31 pm

Pothole season hits Manitoba drivers in the pocket, leads to spike in claims to public insurer

324 pothole-related claims last month, compared to 56 in March 2021, MPI says

Jenn Allen · CBC News · Posted: Apr 21, 2022 4:22 PM CDT | Last Updated: April 21, 2022

Wildfires continue to cause air quality issues in northern Manitoba

Kayla Rosen
CTVNewsWinnipeg.ca
Published July 22, 2022 8:20 a.m. CDT

Task 1.1: Develop a list of climate-related hazards

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- What climate-related hazards have impacted your region in the past?
  - Examples:
    - Annual heatwaves
    - Red River Flood of 1997
    - Pukatawagan Wildfire of 2022

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Task 1.1: Develop a list of climate-related hazards

MANITOBA CLIMATE RESILIENCE TRAINING

- Consider the attributes of these hazards and write your answers in **Box 1.1** on page 1.

Climate Hazard	Frequency	Magnitude	Duration

Box 1.1: *Identify existing climate hazards in your district.*

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Task 1.1: Develop a list of climate-related hazards

MANITOBA CLIMATE RESILIENCE TRAINING

- Consider the attributes of these hazards and write your answers in **Box 1.1** on page 1.

Climate Hazard	Frequency	Magnitude	Duration
Extreme Heat			

Box 1.1: *Identify existing climate hazards in your district.*

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Task 1.1: Develop a list of climate-related hazards

MANITOBA CLIMATE RESILIENCE TRAINING

- Consider the attributes of these hazards and write your answers in **Box 1.1** on page 1.

Climate Hazard	Frequency	Magnitude	Duration
Extreme Heat	June through August		

Box 1.1: *Identify existing climate hazards in your district.*

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Task 1.1: Develop a list of climate-related hazards

MANITOBA CLIMATE RESILIENCE TRAINING

- Consider the attributes of these hazards and write your answers in **Box 1.1** on page 1.

Climate Hazard	Frequency	Magnitude	Duration
Extreme Heat	June through August	Night temperatures of +20°C	

Box 1.1: *Identify existing climate hazards in your district.*

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Task 1.1: Develop a list of climate-related hazards

MANITOBA CLIMATE RESILIENCE TRAINING

- Consider the attributes of these hazards and write your answers in **Box 1.1** on page 1.

Climate Hazard	Frequency	Magnitude	Duration
Extreme Heat	June through August	Night temperatures of +20°C	Several days at a time

Box 1.1: *Identify existing climate hazards in your district.*

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Task 1.2: Identify how climate hazards are predicted to change

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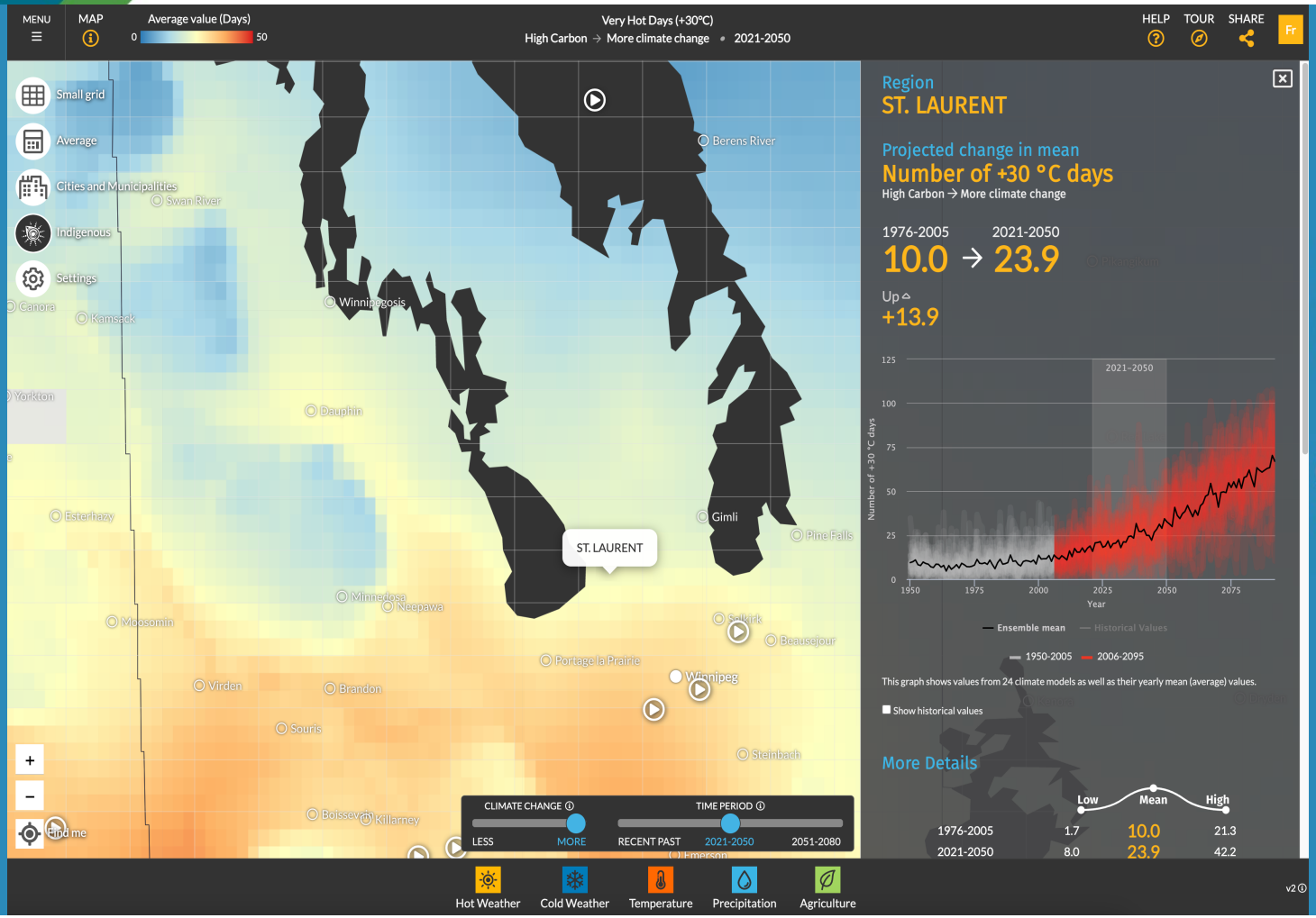

Climate Atlas of Canada

Go to the **Climate Atlas of Canada:** ClimateAtlas.ca

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Task 1.2: Identify how climate hazards are predicted to change

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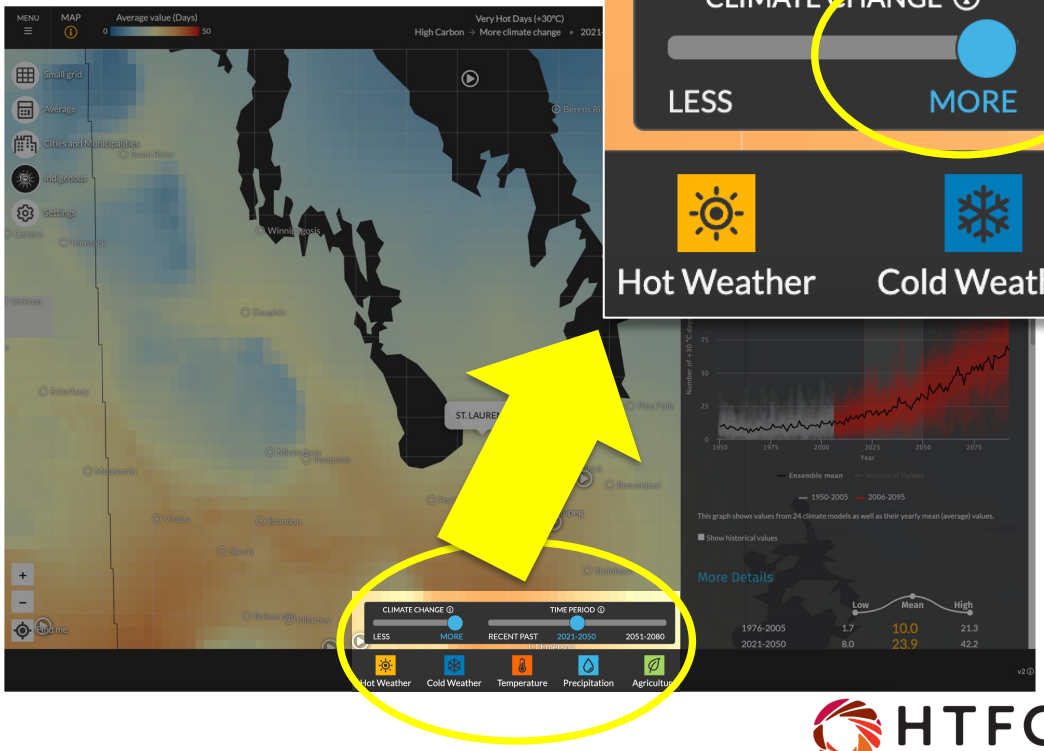
- Visit “ClimateAtlas.ca” on your device
- Click “Map” on the top of the homepage.
- Locate your region and set your sliders to:



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Task 1.2: Identify how climate hazards are predicted to change

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- Use the Climate Atlas of Canada to fill in the blanks in **Box 1.2** on page 2.

Variable	Recent Past: 1976-2005	Near-term Forecast: 2021-2050	Change in Variable (+/-)
Very Hot Days (+30°C)	days	days	days
Very Cold Days (-30°C)	days	days	days
Annual Mean Temperature	°C	°C	°C
Mean Spring Precipitation	mm	mm	%
Frost-Free Season	days	days	days

Box 1.2: *Fill in the boxes using data for your region from the Climate Atlas of Canada.*

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Task 1.2: Identify how climate hazards are predicted to change

MANITOBA CLIMATE RESILIENCE TRAINING

- Use the Climate Atlas of Canada to fill in the blanks in **Box 1.2** on page 2.

Variable	Recent Past: 1976-2005	Near-term Forecast: 2021-2050	Change in Variable (+/-)
Very Hot Days (+30°C)	14.3 days	30.5 days	+16.2 days
Very Cold Days (-30°C)	days	days	days
Annual Mean Temperature	°C	°C	°C
Mean Spring Precipitation	mm	mm	%
Frost-Free Season	days	days	days

Box 1.2: *Fill in the boxes using data for your region from the Climate Atlas of Canada.*

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Task 1.2: Identify how climate hazards are predicted to change

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Variable	Recent Past: 1976-2005	Near-term Forecast: 2021-2050	Change in Variable (+/-)
Very Hot Days (+30°C)	14.3 days	30.5 days	+16.2 days
Very Cold Days (-30°C)	12.3 days	4.4 days	-7.9 days
Annual Mean Temperature	°C	°C	°C
Mean Spring Precipitation	mm	mm	%
Frost-Free Season	days	days	days

Box 1.2: *Fill in the boxes using data for your region from the Climate Atlas of Canada.*

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Task 1.2: Identify how climate hazards are predicted to change

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Variable	Recent Past: 1976-2005	Near-term Forecast: 2021-2050	Change in Variable (+/-)
Very Hot Days (+30°C)	14.3 days	30.5 days	+16.2 days
Very Cold Days (-30°C)	12.3 days	4.4 days	-7.9 days
Annual Mean Temperature	+2.9 °C	+5.3 °C	+2.4 °C
Mean Spring Precipitation	mm	mm	%
Frost-Free Season	days	days	days

Box 1.2: *Fill in the boxes using data for your region from the Climate Atlas of Canada.*

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Task 1.2: Identify how climate hazards are predicted to change

MANITOBA CLIMATE RESILIENCE TRAINING

- Use the Climate Atlas of Canada to fill in the blanks in **Box 1.2** on page 2.

Variable	Recent Past: 1976-2005	Near-term Forecast: 2021-2050	Change in Variable (+/-)
Very Hot Days (+30°C)	14.3 days	30.5 days	+16.2 days
Very Cold Days (-30°C)	12.3 days	4.4 days	-7.9 days
Annual Mean Temperature	+2.9 °C	+5.3 °C	+2.4 °C
Mean Spring Precipitation	119 mm	130 mm	+10 %
Frost-Free Season	days	days	days

Box 1.2: *Fill in the boxes using data for your region from the Climate Atlas of Canada.*

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Task 1.2: Identify how climate hazards are predicted to change

MANITOBA CLIMATE RESILIENCE TRAINING

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Variable	Recent Past: 1976-2005	Near-term Forecast: 2021-2050	Change in Variable (+/-)
Very Hot Days (+30°C)	14.3 days	30.5 days	+16.2 days
Very Cold Days (-30°C)	12.3 days	4.4 days	-7.9 days
Annual Mean Temperature	+2.9 °C	+5.3 °C	+2.4 °C
Mean Spring Precipitation	119 mm	130 mm	+10 %
Frost-Free Season	131 days	150 days	+19 days

Box 1.2: *Fill in the boxes using data for your region from the Climate Atlas of Canada.*

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Task 1.2: Identify how climate hazards are predicted to change

MANITOBA CLIMATE RESILIENCE TRAINING

- Using the climate data you entered in **Box 1.2**, predict how climate change could change the hazards in **Box 1.3** on page 3.
- Consider:
  - What do the climate models predict about the future of your district?
  - Could the predicted changes result in new hazards?

Climate hazard	How Might This Change the Hazard in the Future?

Box 1.3: *Fill in the boxes above to understand how the climate hazards impacting your district may change in the future.*

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Task 1.2: Identify how climate hazards are predicted to change

MANITOBA CLIMATE RESILIENCE TRAINING

- Using the climate data you entered in **Box 1.2**, predict how climate change could change the hazards in **Box 1.3** on page 3.
- Consider:
  - What do the climate models predict about the future of your district?
  - Could the predicted changes result in new hazards?

Climate hazard	How Might This Change the Hazard in the Future?
Example: Heatwaves	

Box 1.3: *Fill in the boxes above to understand how the climate hazards impacting your district may change in the future.*

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Task 1.2: Identify how climate hazards are predicted to change

MANITOBA CLIMATE RESILIENCE TRAINING

- Using the climate data you entered in **Box 1.2**, predict how climate change could change the hazards in **Box 1.3** on page 3.
- Consider:
  - What do the climate models predict about the future of your district?
  - Could the predicted changes result in new hazards?

Climate Hazard	How Might This Change the Hazard in the Future?
Example: Extreme Heat	As summer temperatures and the number of days above +30°C increase, future heatwaves may be hotter, more frequent, and last longer.

Box 1.3: *Fill in the boxes above to understand how the climate hazards impacting your community may change in the future.*

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Climate Action Plan Stage 2: Assessing Current and Future Climate Risks

MANITOBA CLIMATE RESILIENCE TRAINING

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Step 2:
Climate Impact Assessment

MANITOBA CLIMATE RESILIENCE TRAINING

The goal of this step is to:

- Consider impacts of the identified climate hazards
- Explore how these impacts might be felt in the future
- Understand the consequences for your district

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A Note of Caution

MANITOBA CLIMATE RESILIENCE TRAINING

- While our goal is to help you walk through the steps of a Climate Impact Assessment, in practice this process should involve other members of your team—and potentially expert advice—to properly complete.

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Task 2.1: Develop an inventory of climate change hazards and impacts

MANITOBA CLIMATE RESILIENCE TRAINING

- For each climate hazard identified in Step 1, think of **impacts** that may occur as a result.
- Record impacts in **Box 2.1** on page 5. Consider:
  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				

Figure 2.1: *An example of how extreme heat impacts regions.*

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Task 2.1: Develop an inventory of climate change hazards and impacts

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  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				
Example: Extreme heat					

Figure 2.1: *An example of how extreme heat impacts regions.*

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Task 2.1: Develop an inventory of climate change hazards and impacts

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  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				
Example: Extreme heat	-More hot days and night				

Figure 2.1: *An example of how extreme heat impacts regions.*

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Task 2.1: Develop an inventory of climate change hazards and impacts

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  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				
Example: Extreme heat	-More hot days and night	-Reduced water supply			

Figure 2.1: *An example of how extreme heat impacts regions.*

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Task 2.1: Develop an inventory of climate change hazards and impacts

MANITOBA CLIMATE RESILIENCE TRAINING

- For each climate hazard identified in Step 1, think of **impacts** that may occur as a result.
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  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				
Example: Extreme heat	-More hot days and night	-Reduced water supply	-Loss of soil moisture		

Figure 2.1: *An example of how extreme heat impacts regions.*

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Task 2.1: Develop an inventory of climate change hazards and impacts

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  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				
Example: Extreme heat	-More hot days and night	-Reduced water supply	-Loss of soil moisture	-Increased risk of wildfires	

Figure 2.1: *An example of how extreme heat impacts regions.*

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Task 2.1: Develop an inventory of climate change hazards and impacts

MANITOBA CLIMATE RESILIENCE TRAINING

- For each climate hazard identified in Step 1, think of **impacts** that may occur as a result.
- Record impacts in **Box 2.1** on page 5. Consider:
  - *What would occur because of that hazard?*
  - *How could the hazard affect human and natural systems?*

Climate Hazard	What Are the Impacts of This Hazard?				
Example: Extreme heat	-More hot days and night	-Reduced water supply	-Loss of soil moisture	-Increased risk of wildfires	-Amplification of drought conditions

Figure 2.1: *An example of how extreme heat impacts regions.*

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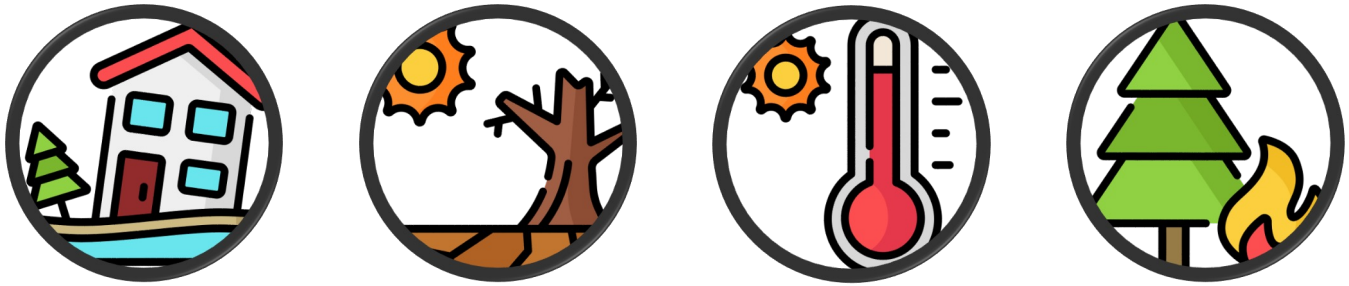
Task 2.2: Identify the climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

- For the most pressing climate hazard in **Box 2.1**, imagine a **worst-case scenario event** that could occur in your district between now and 2050.



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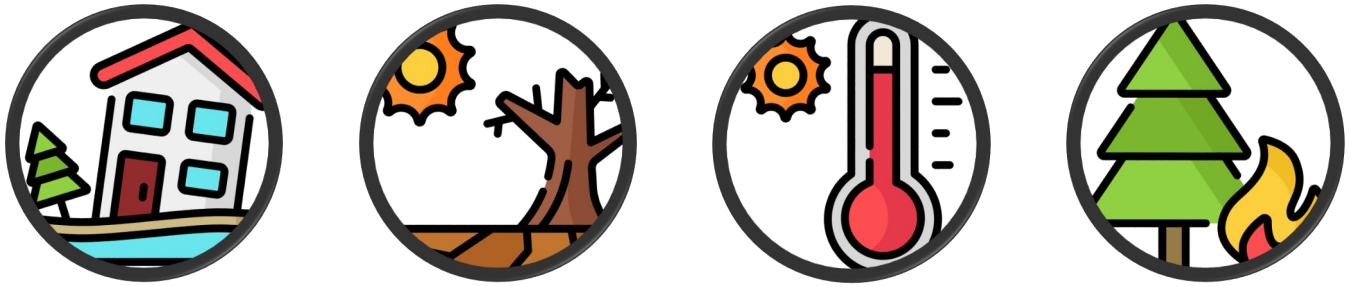
Task 2.2: Identify the climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

- EXAMPLES -

- A 1-in-300-year flood
- A prolonged drought
- Extended summer heat wave
- Extreme rainfall event or summer storm
- Major snowstorm or ice storm



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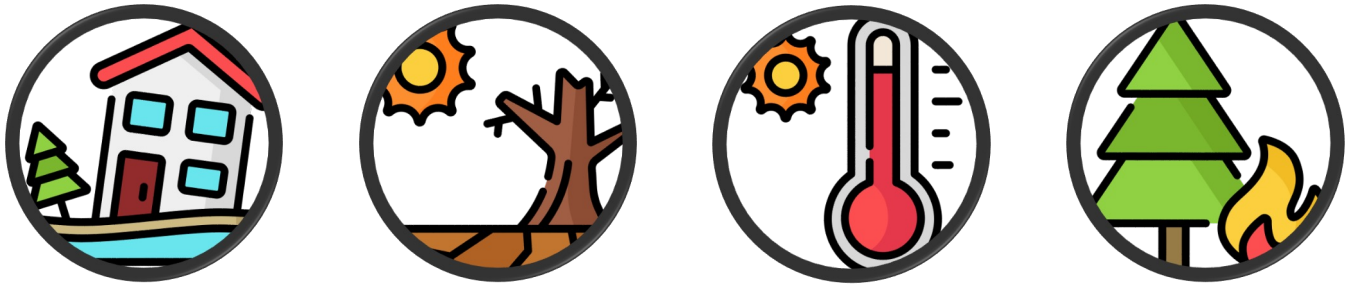
Task 2.2: Identify the climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

What would happen in your district in this worst-case-scenario?



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Task 2.2: Identify the climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

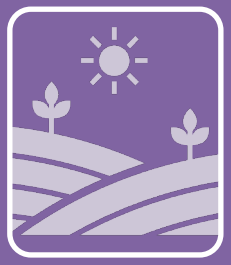
Think about **consequences** to particular areas:

Water management

Impacts to water quality, quantity, systems, and flows.

Plant and animal life

All living things on land and in water.



Land, soils, and agriculture

Impacts to the land, soil quality, and agricultural practices.

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Task 2.2: Identify the climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

- Fill in **Box 2.2** on page 8.
- Write down a bullet point list of potential consequences that could occur in a **worst-case scenario** event.

What Consequences Might You Prepare for in a Worst-Case Scenario?	
Water Management	
Plant and Animal Life	
Land, Soils and Agriculture	

Box 2.2: *A template for completing a Climate Impact Assessment.*

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What Consequences Might You Prepare for in a Worst-Case Scenario?	
 Water Management	
 Plant and Animal Life	
 Land, Soils and Agriculture	

Figure 2.3: *An example of a completed Climate Impact Assessment. Adapted from* All One Sky Foundation (2021). Climate Resilience Express: A Community Climate Adaptation Planning Guide.

What Consequences Might You Prepare for in a Worst-Case Scenario?	
 Water Management	- Streams and creeks run dry - Shortages of well water - Diminished water quality from algae blooms
 Plant and Animal Life	
 Land, Soils and Agriculture	

Figure 2.3: *An example of a completed Climate Impact Assessment. Adapted from* All One Sky Foundation (2021). Climate Resilience Express: A Community Climate Adaptation Planning Guide.

What Consequences Might You Prepare for in a Worst-Case Scenario?	
 Water Management	- Streams and creeks run dry - Shortages of well water - Diminished water quality from algae blooms
 Plant and Animal Life	- Significant mortality to fish and other aquatic life - Long-term damage to habitats - Disruption of ecosystems and food chains - Death and discomfort of farm animals
 Land, Soils and Agriculture	

Figure 2.3: *An example of a completed Climate Impact Assessment. Adapted from* All One Sky Foundation (2021). Climate Resilience Express: A Community Climate Adaptation Planning Guide.

What Consequences Might You Prepare for in a Worst-Case Scenario?	
 Water Management	- Streams and creeks run dry - Shortages of well water - Diminished water quality from algae blooms
 Plant and Animal Life	- Significant mortality to fish and other aquatic life - Long-term damage to habitats - Disruption of ecosystems and food chains - Death and discomfort of farm animals
 Land, Soils and Agriculture	- Large scale grass fires threaten agriculture, tourism, and habitats - Peak demand for water for irrigation - Topsoil loss

Figure 2.3: *An example of a completed Climate Impact Assessment. Adapted from* All One Sky Foundation (2021). Climate Resilience Express: A Community Climate Adaptation Planning Guide.

Climate Action Plan Stage 2: Assessing Current and Future Climate Risks

MANITOBA CLIMATE RESILIENCE TRAINING

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Climate Risk Assessment

MANITOBA CLIMATE RESILIENCE TRAINING

The goal of this step is to:

- Understand how susceptible your district is to each of the impacts and consequences you have previously identified
- Determine priorities for the adaptation planning phase and consider solutions

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Understanding Risk

MANITOBA CLIMATE RESILIENCE TRAINING

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Task 3.1: Assess the severity of identified climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

- Return to your Climate Impact Assessment (**Box 2.2**) on page 8.
- For each consequence you have identified, assign a level of anticipated severity were that consequence to occur.
- Use the numbers 1 – 5 (with 1 being lowest).

What Consequences Might You Prepare for in a Worst-Case Scenario?	
Water Management	4 - Streams and creeks run dry 5 - Shortages of well water 3 - Diminished water quality from algae blooms

Task 3.1: Assess the severity of identified climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

1 Insignificant	No practical impact on the district or its wildlife.
2 Minor	No significant impact on the district or its wildlife and can be handled through business-as-usual practices.
3 Moderate	Moderate impacts at the local and regional scale of minor importance, to be addressed through low-cost or no-regret adaptation actions.
4 Major	Major impacts at the local and regional scale that are of high importance, requiring assistance from national agencies to quickly address through strategic adaptation actions.
5 Catastrophic	Extreme impacts at the local and regional scale of very high importance to urgently address through adaptation.

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Task 3.2: Assess the severity of identified climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

Likelihood

5 Very Likely	Medium Priority	Medium-High Priority	Medium-High Priority	High Priority	High Priority
4 Likely	Medium-Low Priority	Medium Priority	Medium-High Priority	Medium-High Priority	High Priority
3 Possible	Medium-Low Priority	Medium-Low Priority	Medium Priority	Medium-High Priority	Medium-High Priority
2 Unlikely	Low Priority	Medium-Low Priority	Medium-Low Priority	Medium Priority	Medium-High Priority
1 Very Unlikely	Low Priority	Low Priority	Medium-Low Priority	Medium-Low Priority	Medium Priority
Risk Assessment Matrix	**1 Insignificant**	**2 Minor**	**3 Moderate**	**4 Major**	**5 Catastrophic**

Consequences

Task 3.2: Assess the severity of identified climate risks to your district

MANITOBA CLIMATE RESILIENCE TRAINING

Consider how likely this event is to occur.

- The more likely it is happen, the greater your response should be.
- See **figure 3.3** on page 11.

Very Likely – 5	Adaptation actions must be developed and applied immediately
Likely – 4	Develop and apply low-cost and "no regret" adaptation options with urgency
Possible – 3	Integrate low-cost and "no regret" adaptation options into routine planning practices
Unlikely – 2	Monitor and reassess the severity of consequences in the future
Very Unlikely – 1	Adaptation actions unnecessary or impractical

Figure 3.3: *Levels of likelihood and the appropriate response needed.*

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Task 3.2: Prioritize climate risks to your district

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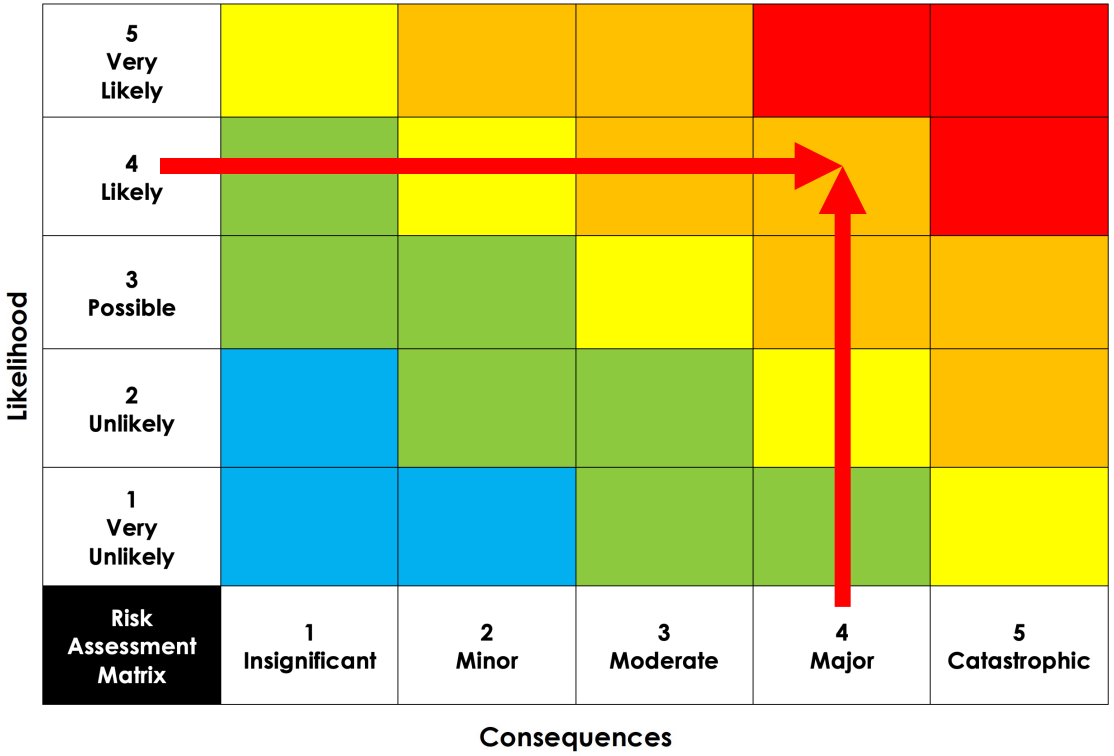

- Plot each consequence you identified in **Box 2.2** onto the blank Matrix in **Box 3.1**.

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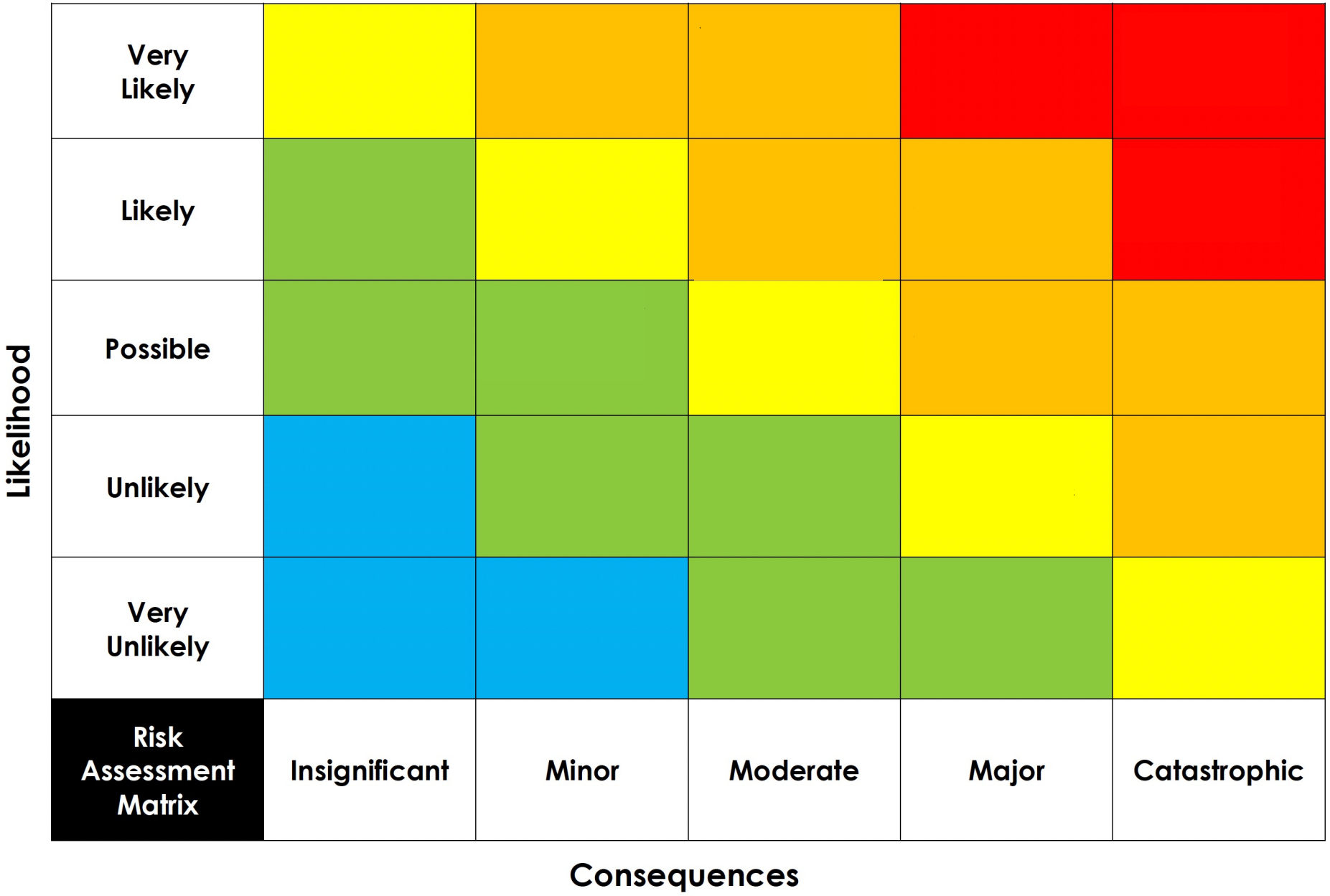
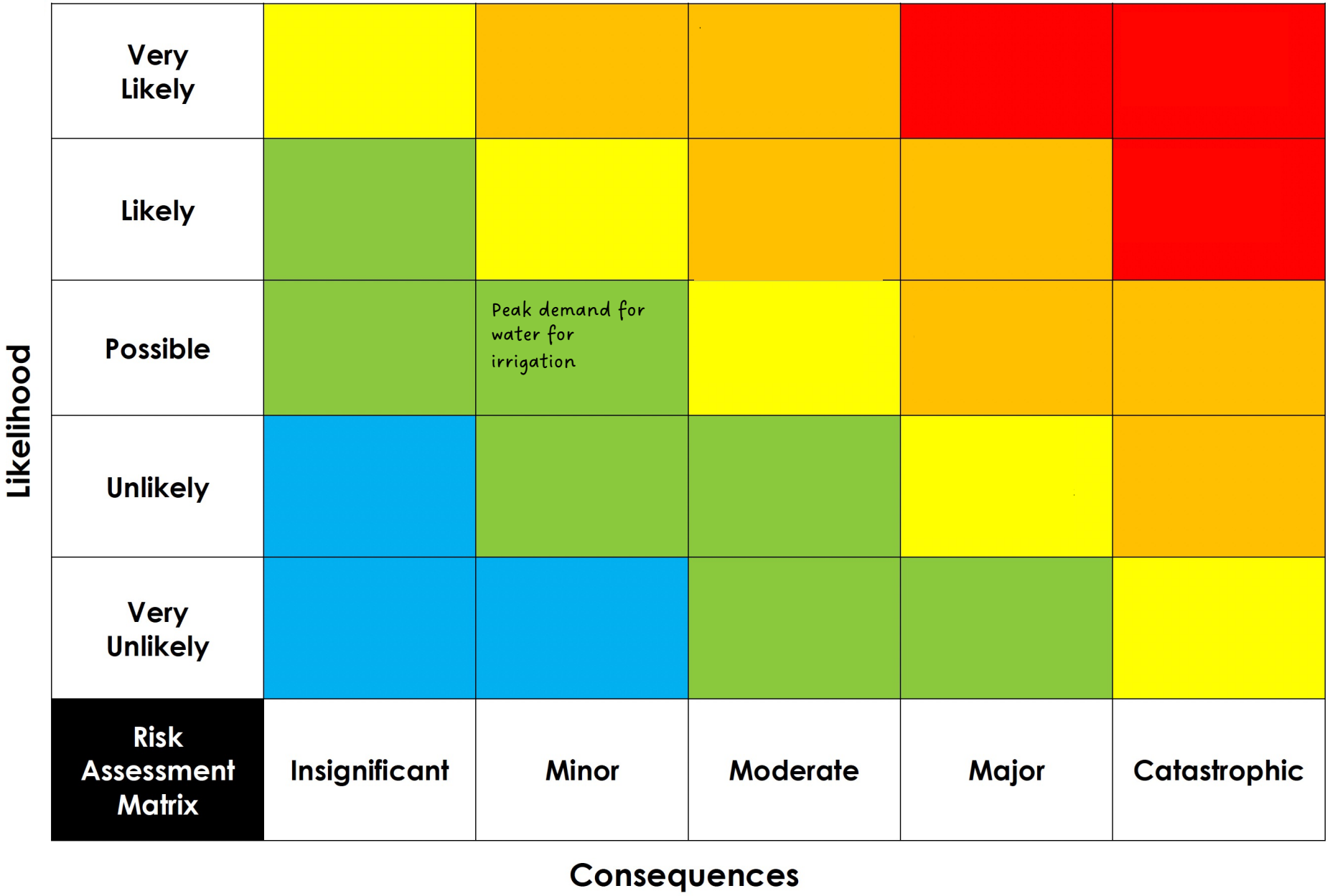
Extreme Heat: 7+ days of +30°C weather



Extreme Heat: 7+ days of +30°C weather



Extreme Heat: 7+ days of +30°C weather

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Very Likely			Topsoil loss		
Likely			Long-term damage to habitats Death and discomfort of farm animals		
Possible		Peak demand for water for irrigation	Disruption of ecosystems and food chains		
Unlikely					
Very Unlikely					
Risk Assessment Matrix					

Consequences

Extreme Heat: 7+ days of +30°C weather

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Very Likely			Topsoil loss		
Likely			Long-term damage to habitats Death and discomfort of farm animals	Diminished water quality from algae blooms	
Possible		Peak demand for water for irrigation	Disruption of ecosystems and food chains	Streams and creeks run dry	
Unlikely				Significant mortality to fish and other aquatic life	
Very Unlikely					
Risk Assessment Matrix					

Consequences

Extreme Heat: 7+ days of +30°C weather

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Very Likely			Topsoil loss		Large scale grass fires
Likely			Long-term damage to habitats Death and discomfort of farm animals	Diminished water quality from algae blooms	Shortages of well water
Possible		Peak demand for water for irrigation	Disruption of ecosystems and food chains	Streams and creeks run dry	
Unlikely				Significant mortality to fish and other aquatic life	
Very Unlikely					
Risk Assessment Matrix					

Consequences

Next Steps:
Adaptation Planning Actions

MANITOBA CLIMATE RESILIENCE TRAINING

"High Priority" Consequence	Potential Actions to Explore Through Adaptation Planning

Box 3.2: *Brainstorm ideas your district can explore further to address the consequences you rated as high priority.*

- For every item in a **red** square in **Box 3.1**, begin brainstorming potential actions in **Box 3.2.**

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Next Steps:
Adaptation Planning Actions

MANITOBA CLIMATE RESILIENCE TRAINING

"High Priority" Consequence	Potential Actions to Explore Through Adaptation Planning
Overland flooding	

Box 3.2: *Brainstorm ideas your district can explore further to address the consequences you rated as high priority.*

- For every item in a **red** square in **Box 3.1**, begin brainstorming potential actions in **Box 3.2.**

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Next Steps:
Adaptation Planning Actions

MANITOBA CLIMATE RESILIENCE TRAINING

"High Priority" Consequence	Potential Actions to Explore Through Adaptation Planning
Overland flooding	- Identify locations of wells

Box 3.2: *Brainstorm ideas your district can explore further to address the consequences you rated as high priority.*

- For every item in a **red** square in **Box 3.1**, begin brainstorming potential actions in **Box 3.2.**

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Next Steps:
Adaptation Planning Actions

MANITOBA CLIMATE RESILIENCE TRAINING

"High Priority" Consequence	Potential Actions to Explore Through Adaptation Planning
Overland flooding	- Identify locations of wells - Raise heights of wells or berm them

Box 3.2: *Brainstorm ideas your district can explore further to address the consequences you rated as high priority.*

- For every item in a **red** square in **Box 3.1**, begin brainstorming potential actions in **Box 3.2.**

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Next Steps:
Adaptation Planning Actions

MANITOBA CLIMATE RESILIENCE TRAINING

"High Priority" Consequence	Potential Actions to Explore Through Adaptation Planning
Overland flooding	- Identify locations of wells - Raise heights of wells or berm them - Update source water protection strategies in Integrated Watershed Management Plans to reflect a changing climate

Box 3.2: *Brainstorm ideas your district can explore further to address the consequences you rated as high priority.*

- For every item in a **red** square in **Box 3.1**, begin brainstorming potential actions in **Box 3.2**.

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MANITOBA CLIMATE
RESILIENCE TRAINING

STAGE 3:
NEXT STEPS

BEYOND THIS WORKSHOP

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Review
Stage 3: Next Steps

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MANITOBA CLIMATE
RESILIENCE TRAINING

WHERE TO GO FROM HERE?

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Applying to an IWMP

MANITOBA CLIMATE RESILIENCE TRAINING

Stage: Pre-Planning

Climate Change Planning Entry Points:

- Add climate change expertise to the Watershed Team.

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Applying to an IWMP

MANITOBA CLIMATE RESILIENCE TRAINING

Stage: Information Gathering

Climate Change Planning Entry Points:

- Add climate change section to Watershed Characteristics report.
- Present CC info at Watershed Team meeting.
- Integrate CC questions into public consultation survey.
- Consider CC impacts in technical submissions.

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Applying to an IWMP

MANITOBA CLIMATE RESILIENCE TRAINING

Stage: Drafting the Plan

Climate Change Planning Entry Points:

- Add section of IWMP summarizing climate change info and anticipated impacts
- Integrate adaptation into IWMP actions.
- Enhance climate change adaptation in Source Water Protection Plans.

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Applying to an IWMP

MANITOBA CLIMATE RESILIENCE TRAINING

Stage: Plan Review & Approval

Climate Change Planning Entry Points:

- Ensure that climate change vulnerability and adaptation has been incorporated into plan

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Applying to an IWMP

MANITOBA CLIMATE RESILIENCE TRAINING

Stage: Implementation

Climate Change Planning Entry Points:

- Monitor and evaluate adaptation actions.

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MANITOBA CLIMATE RESILIENCE TRAINING

THANK YOU!

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Phone: (204) 944-9907 Ext. 228

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