ClimateWest
Building Prairie Resilience

Manitoba Climate Resilience Training: How to Conduct a Climate Vulnerability and Risk Assessment

Elizabeth Shearer, Network Coordinator
March 12, 2025

Acknowledgement

ClimateWest's work occurs on the traditional land of many Indigenous Nations and covers the Territories of Treaties 1 through 8, and 10.

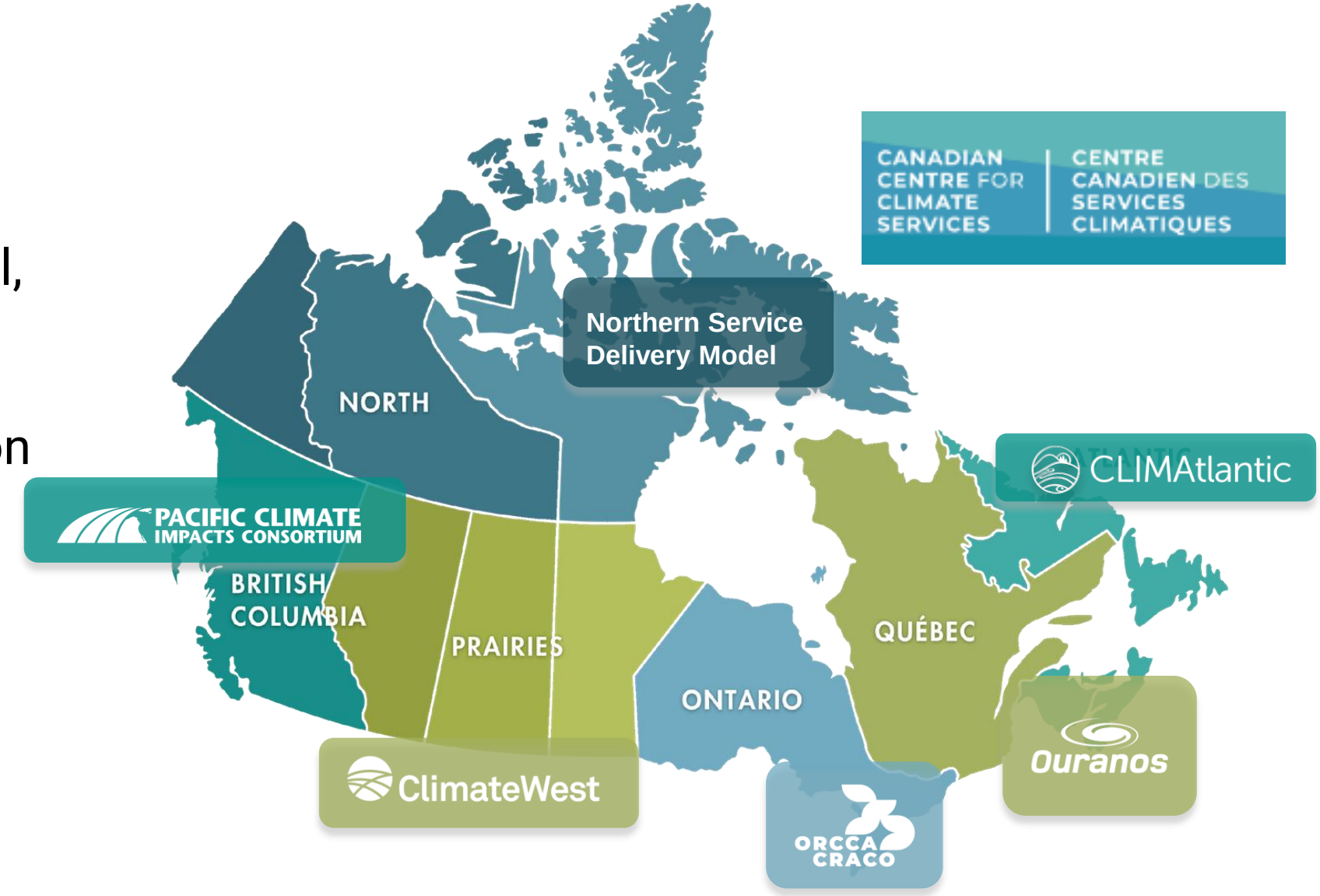
Our office is located on Treaty 1 Territory, the historic meeting place of the Anishinaabeg, Cree, Inninewuk, Anishininiwag, Dakota and Dene, and the Homeland of the Métis Nations.

Overview

- ClimateWest
- Manitoba Department of Environment and Climate Change
- Q&A

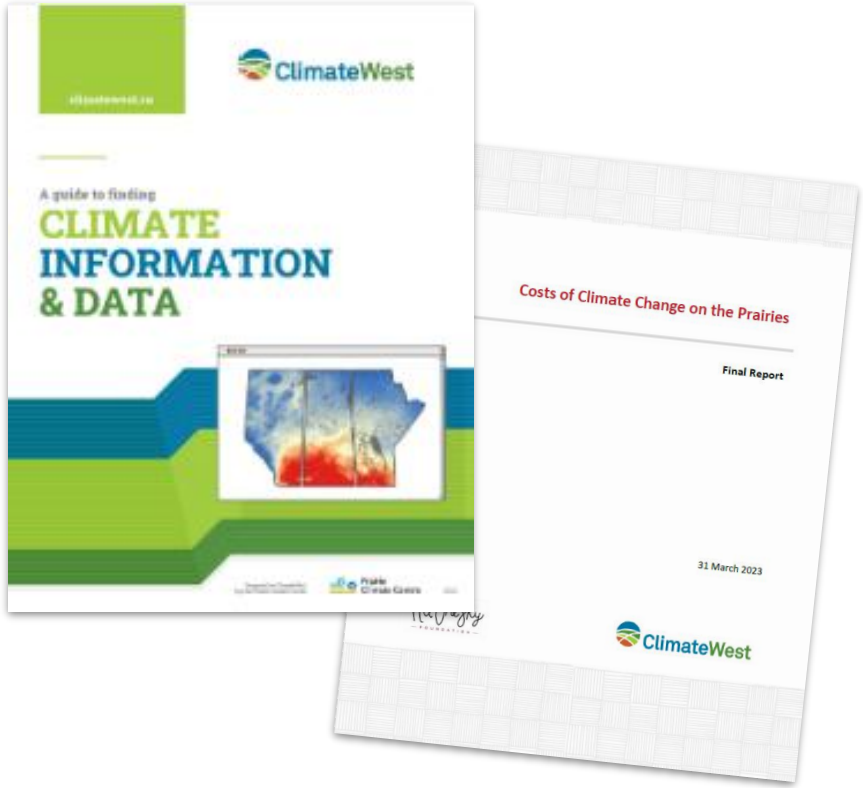
Who is Climate West?

ClimateWest's Mandate:
To deliver credible, useful, and timely climate information, data, and tools tailored to the region in support of positive adaptation to a changing climate.



What does ClimateWest do?

- Amplifier
- Connector
- Collaborator
- Champion
- Facilitator
- Translator



ClimateWest

Building Prairie Resilience

Connect With Us

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Email: info@climatewest.ca

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LinkedIn: @ClimateWest
Website: climatewest.ca
Newsletter: scan QR code

ClimateWest

Manitoba Environment and Climate Change

WEBINAR SERIES

Manitoba Climate Resilience Training

How to Conduct Vulnerability and Risk Assessment

Webinar # 2

March 12, 2025

Manitoba.ca

Manitoba

Elaine Fox

Manager
Climate Preparedness and Communications

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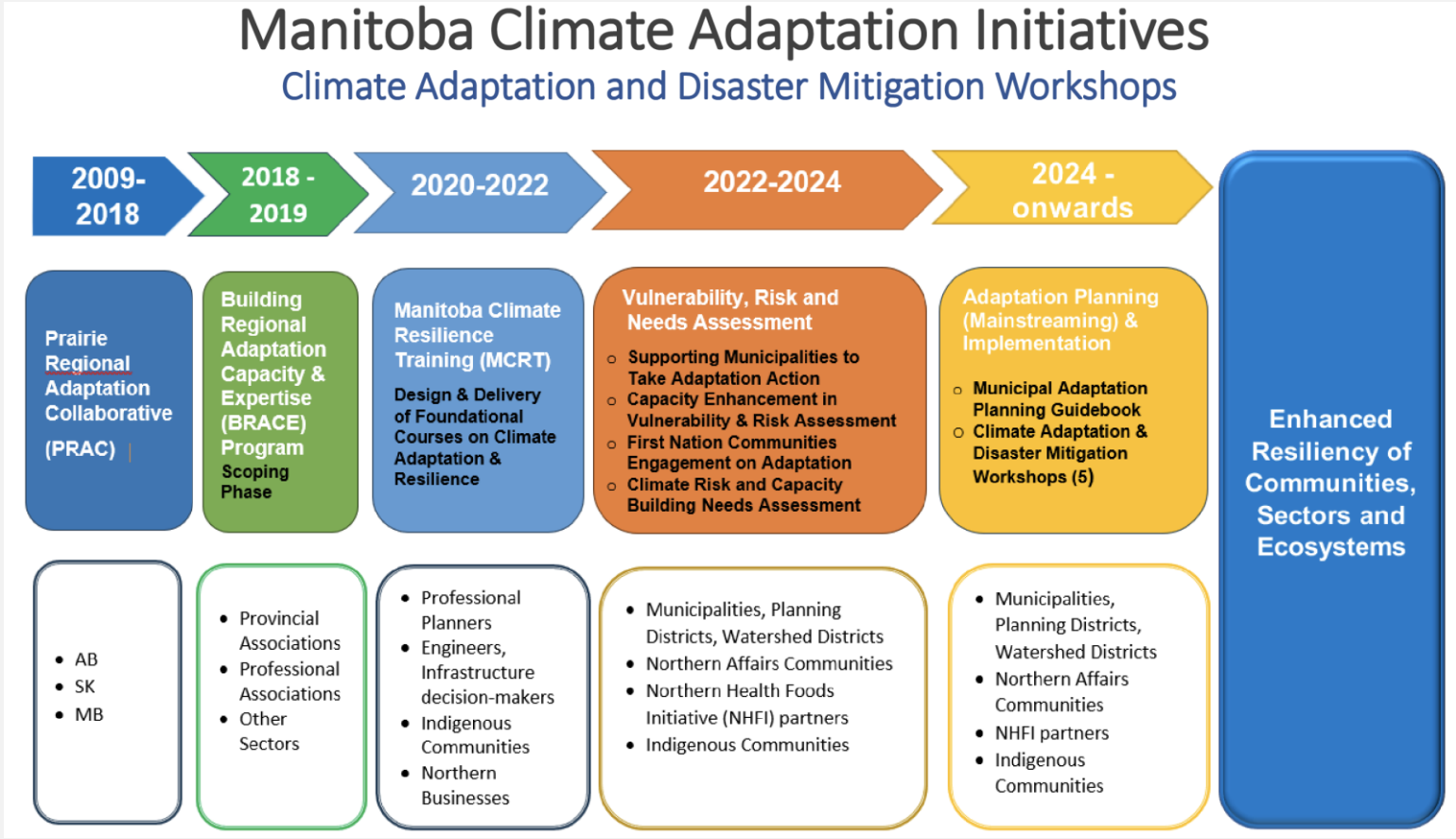
WEBINAR OUTLINE

- MCRT Progress
- Recap: Webinar #1 (Climate Preparedness 101)
- MB's Climate Adaptation Planning Process
- Why do a Vulnerability & Risk Assessment
- Stage 1- Starting the Process: Considerations
- Stage 2: Vulnerability & Risk Assessment
  - Climate Hazard Assessment
  - Climate Impacts Assessment
  - Climate Risk Assessment
- Key Takeaways

MANITOBA CLIMATE RESILIENCE TRAINING

Manitoba Climate Resilience Training (MCRT) Progress



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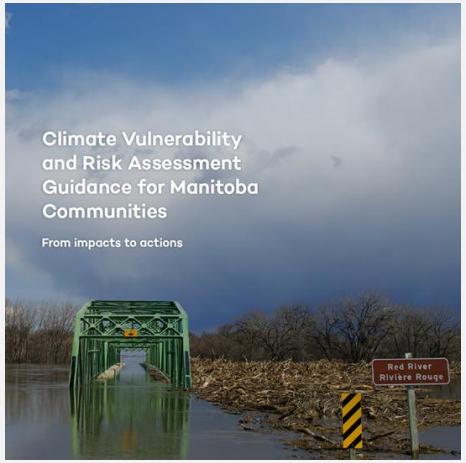
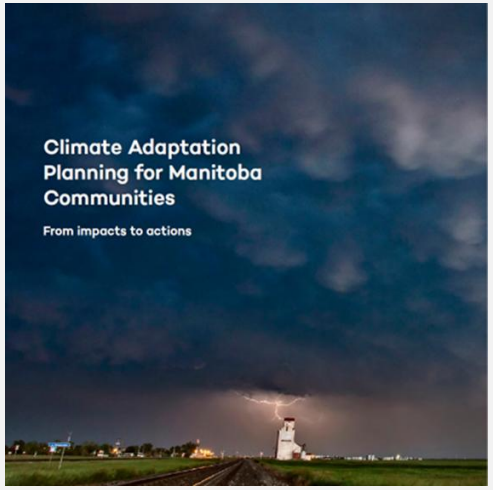
MCRT Webinar Series

OVERALL OBJECTIVE:
This three-webinar series will take you through the adaptation planning journey using free tools and resources developed under the Manitoba Climate Resilience Training (MCRT) Program.

- Gain the knowledge and skills to integrate climate considerations into planning and decision making which will help you prepare for hazards and take advantage of opportunities.





Climate Preparedness 101 – March 5, 2025

How to Conduct a Vulnerability and Risk Assessment (VRA) – March 12, 2025

Climate Adaptation Planning – March 19, 2025

Recap: Climate Preparedness 101:
Key Takeaways

- Human activities are increasing greenhouse gas emissions in the earth's atmosphere and are driving global temperature rise.
- Models have demonstrated that Canada's climate has changed because of global temperature increase, impacting all regions, and providing opportunities.
- We have and will continue to experience increased frequency and severity of climate events.
- The climate will stabilize once we achieve and maintain net-zero global greenhouse gas emissions.
- We will not revert to past climate conditions and will adapt to the new realities.
- Inaction is more costly than taking action. The Climate Risk Institute states for every $1 invested, you save $5 in future costs.
- It is important to consider climate change risk and opportunities in decision-making.
- Climate services are available in Manitoba and across the Prairies region and Canada to support climate-smart decision-making and resilient infrastructure design.
- **Being prepared for a changing climate helps to build resilience for a safe, healthy and prosperous Manitoba.**

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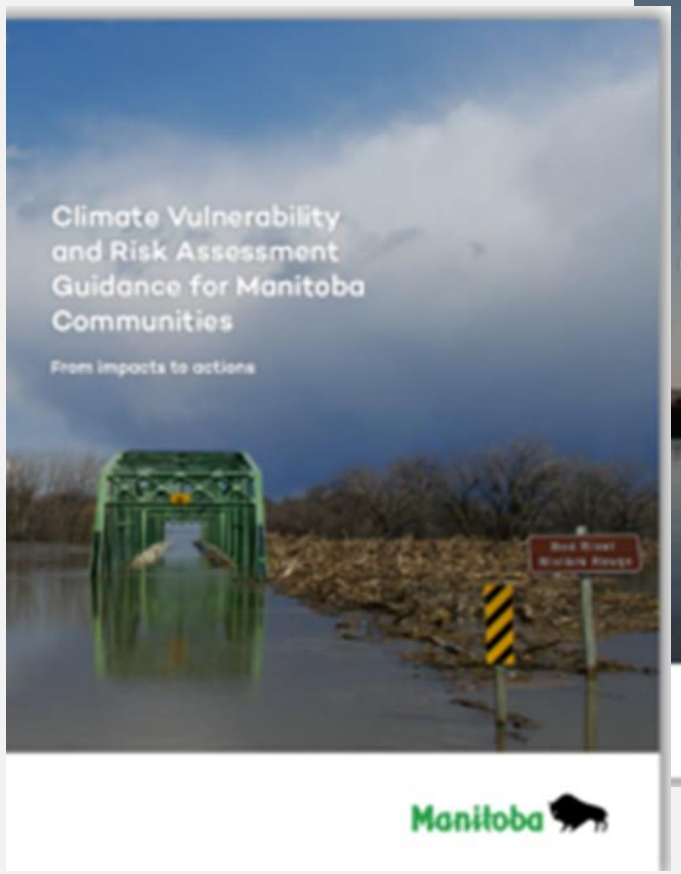
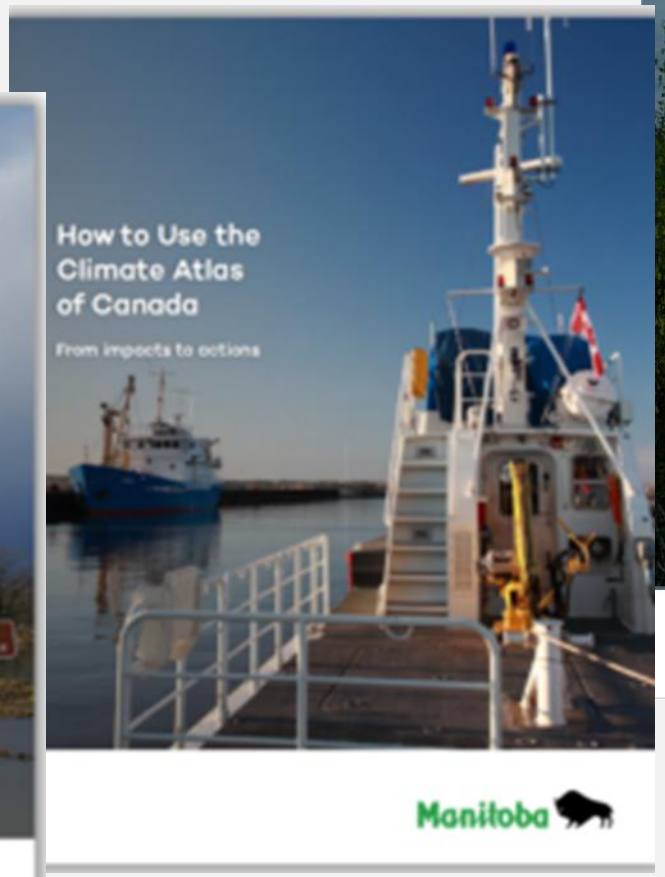
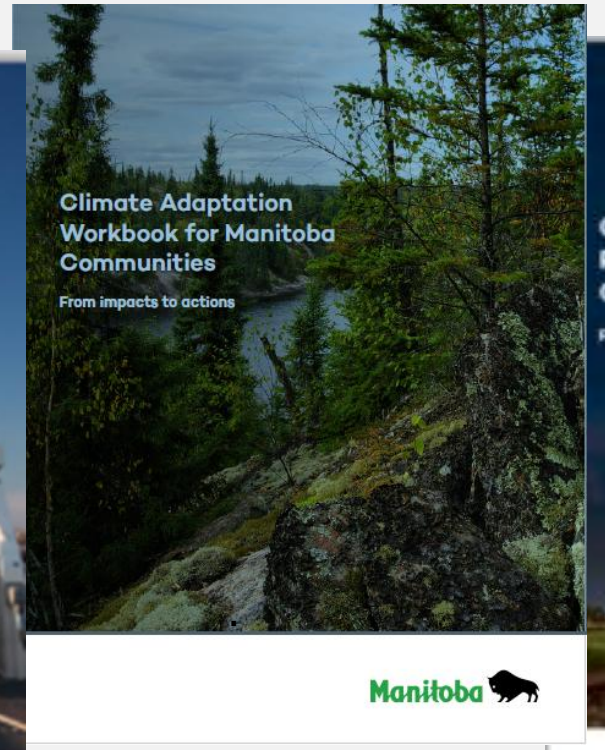
Manitoba's Climate Adaptation Planning Guidebook: From Impacts to Actions







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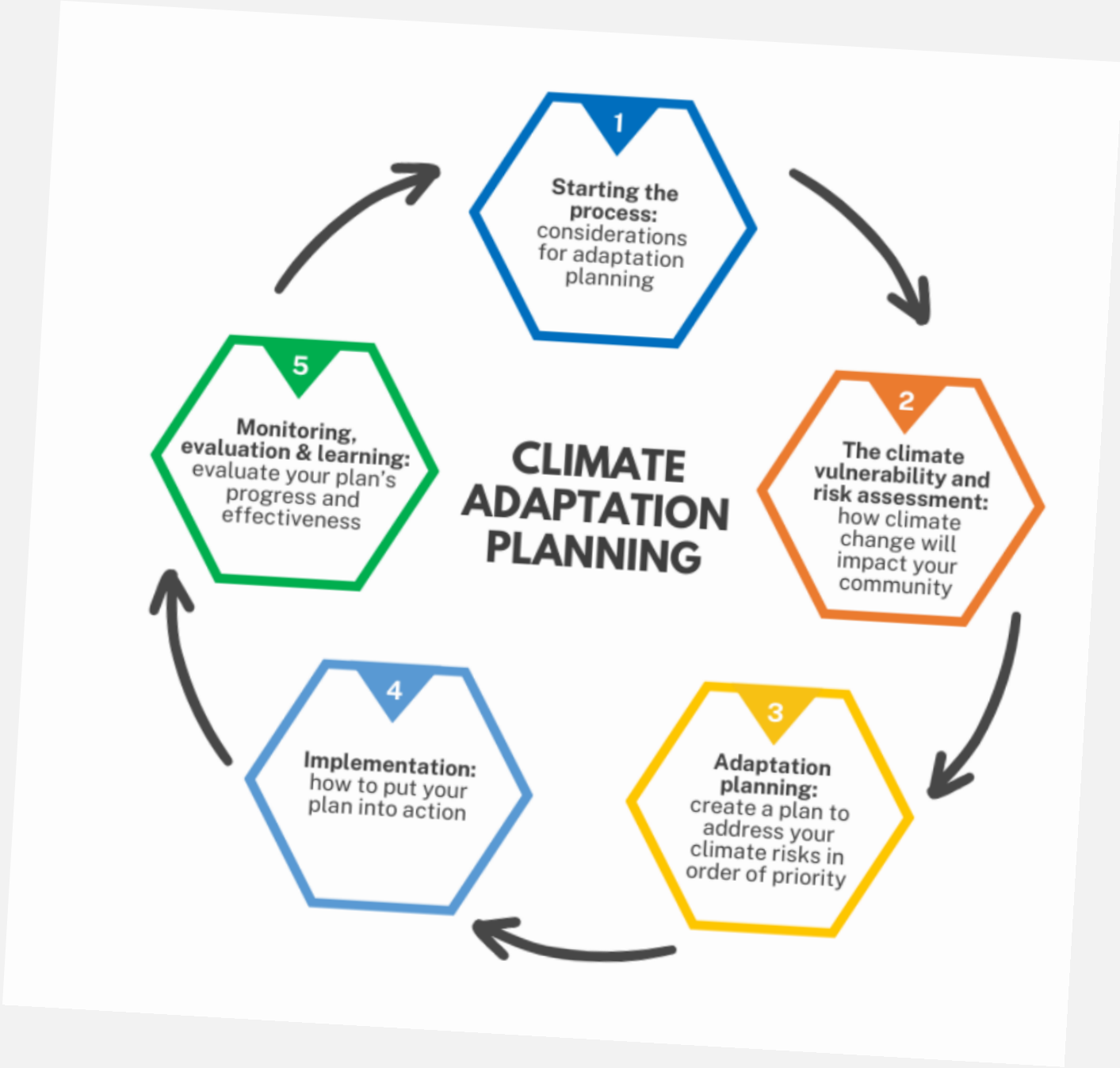
Manitoba's Climate Adaptation Planning Process



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Why do a Vulnerability & Risk Assessment?

- **Promotes informed decision making by providing evidence–based, data-driven information**.
  - Ensuring actions and policies are based on solid knowledge rather than assumptions.
- **Moves knowledge into actions**.
  - support the development of actionable plans and strategies that minimize risks and prepare for a changed climate
- **Supports targeted funding and budgeting**.
  - helps to identify most at-risk sectors and potential impacts of climate change, ensuring efficient resource allocation that addresses the most critical vulnerabilities.
- **Increases desirability for external investment**.
  - a proactive/structured approach to managing climate risk fosters stability for business, citizens and investments
- **Helps create safe, stable and sustainable communities**.
  - A sound VRA that identifies critical vulnerabilities and risks and translated into actionable strategies helps build long-term safety, stability and sustainability of sectors and communities.

Financial Sector

- **Bank of Canada financial system review template**
  - Includes a section on climate change
  - Includes both physical issues, such as extreme weather, as well as transition issues, such as sudden policy moves
  - Alarms are sounding on the need for global financial systems to account for and disclose, climate risk.
- **Moody's and other rating institutions**
  - Incorporate the impact of climate risks and opportunities on business and governments and how they affect revenues, costs, reputations and impacts for commercial lenders.
- **Venture Capital Investment**
  - They use preparedness actions, to evaluate resiliency and stability for investment.
- **Innovative Financial tools**
  - Catastrophe or Green Bonds – an offset to traditional insurance industry which is stepping back from certain situations.
  - DFA is changing

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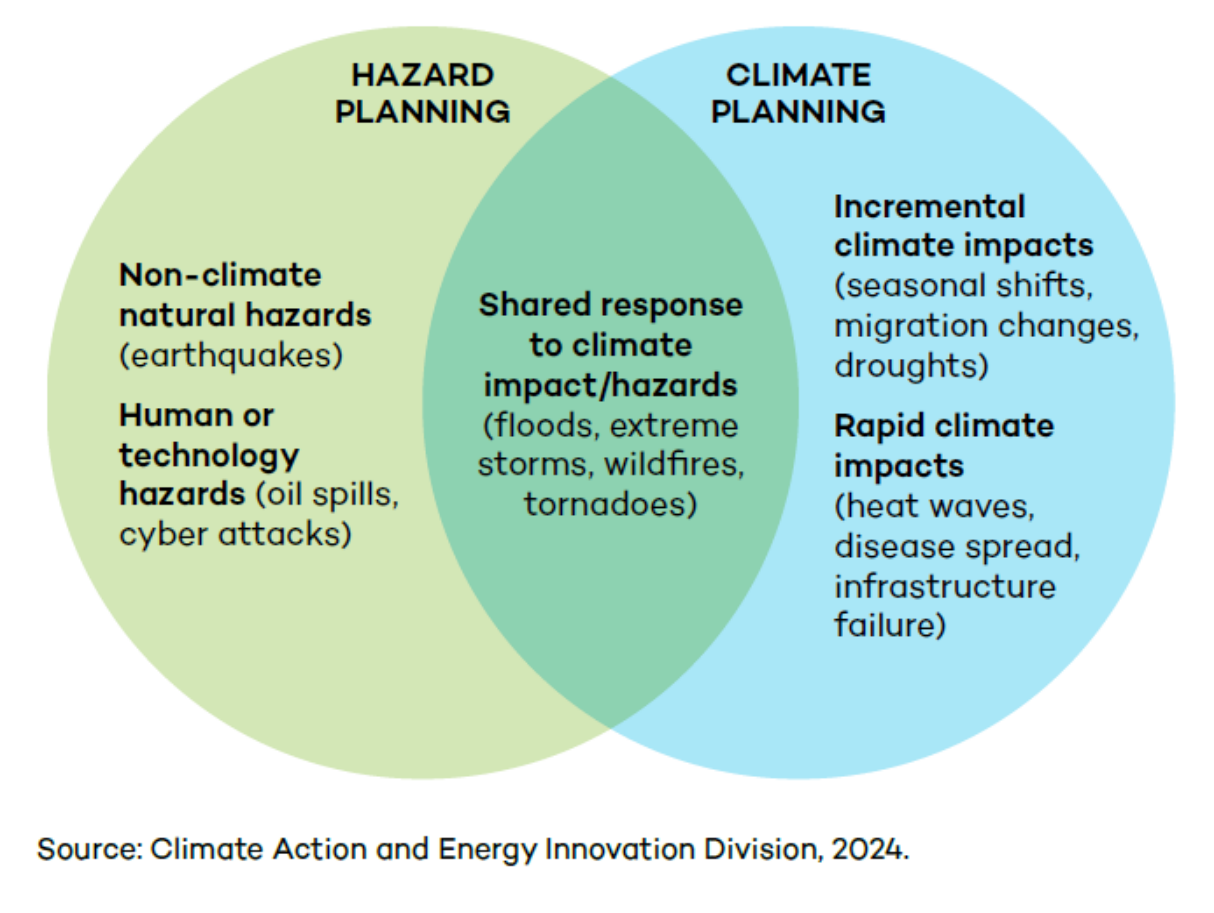
Integration of adaptation planning into hazard mitigation planning



Source: Climate Action and Energy Innovation Division, 2024.

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Applying adaptation to municipal processes

Source: Manitoba Climate Resilience Training, 2023.

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Stage 1: Considerations for Starting the Process:

Just Start!

- Not everyone's planning process is the same.
- Look for leadership support by council, community orgs or individuals.
- Budget for the plan and it's implementation

- ❑ Worksheet 1: Leadership Advisory Committee Members
- ❑ Worksheet 2: Vision, Goals and Objectives
- ❑ Worksheet 3: Resources for the Adaptation Plan
- ❑ Worksheet 4: Scope of your Adaptation Plan
- ❑ Worksheet 5: Community Profile
- ❑ Worksheet 6: Team Members and their Roles
- ❑ Worksheet 7: List of Available Information
- ❑ Worksheet 8: List of Existing Monitoring, Evaluation and Learning Tools
- ❑ Worksheet 9: Work Plan to Prepare the Adaptation Plan

Stage 2: Climate vulnerability and risk assessment

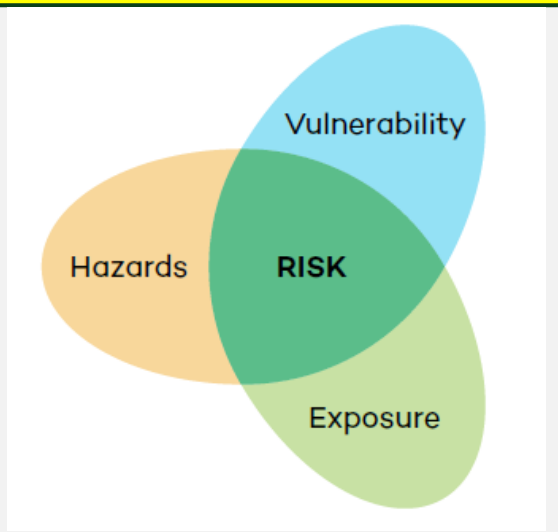
Purpose:
Understanding how a changing climate will impact your community will help you create a priority list of climate risks to prepare for and include in your Adaptation Plan and Budget (Stage 3)

1. **Climate Hazard Assessment**

2. **Climate Impact Assessment**

3. **Climate Risk Assessment**

Climate risk is the interaction of hazards, exposure and vulnerability



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Guidebook Glossary

Glossary

Adaptation	Any effort or action to respond to actual or anticipated impacts of climate change that minimizes the effects and reduces the risk of climate change on infrastructure, natural ecosystems and social systems (Canadian Council of Ministers of the Environment [CCME], 2021).
Adaptation planning	"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).
Adaptive capacity	The ability of infrastructure, natural ecosystems and social systems to adjust to changing environmental conditions (like climate variability or extreme weather events), minimize possible damage, take advantage of opportunities, or cope with, adapt to, or recover from the consequences (CCME, 2021).
Climate change	A change in long-term weather patterns due to natural phenomena and human activities (e.g., use of fossil fuels and release of carbon dioxide) that affect the chemical composition of the atmosphere through the accumulation of greenhouse gases. Climate change is contributing to a rising global temperature, changing rain and snowfall patterns, warming oceans and many other impacts (CCME, 2021).
Climate hazard	A climate-related event that can put infrastructure, natural ecosystems and social systems at risk and produce negative consequences. Climate hazards can be rapid-onset events, like overland floods from a rainstorm, or slow-onset events, like rising temperatures. Other examples of climate hazards include droughts, high temperatures, rain, high winds, tornadoes, wildfires, landslides, sea-level rise and hail (CCME, 2021).

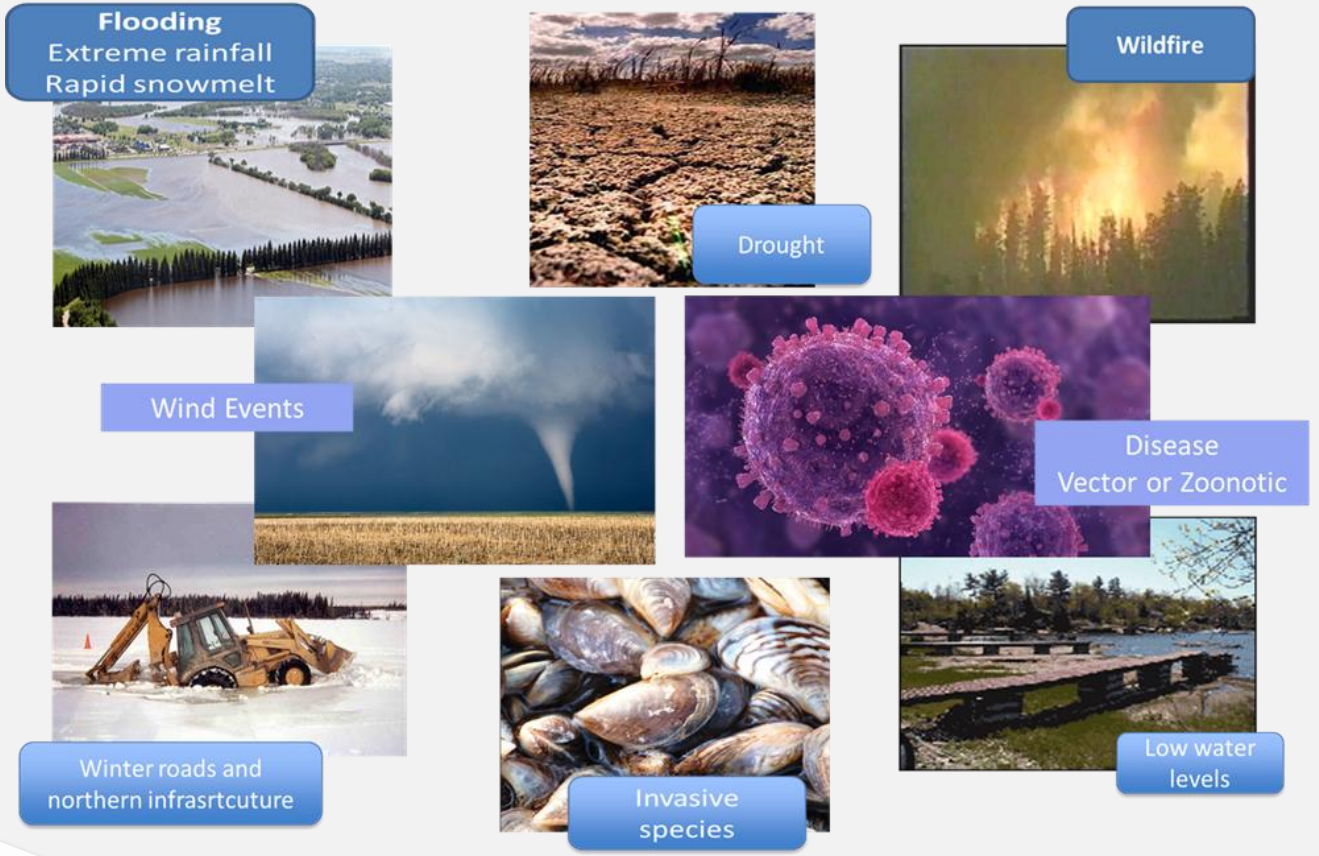
Climate Hazard: A climate-related event that can put infrastructure, natural ecosystems and social systems at risk and produce negative consequences. ***Flood***

Climate Impact: The effects of a climate hazard (either currently or anticipated in the future) on infrastructure, natural ecosystems and social systems. ***Contaminated Well***

Climate Consequences: Something that occurs because of a climate impact. ***Emergency Room increase***

Climate Risk: The potential for negative or positive consequences for infrastructure, natural ecosystems and social systems due to a climate hazard. ***Likelihood x Severity***

Examples of Climate-Related Hazards Affecting Manitoba



STEINBACH ONLINE.COM -14° NEWS WEATHER EVENTS LISTEN

HSD Request for Bids - Seasonal Weed Control
Accepting tenders for weed, poison ivy, and dandelion control on school grounds. View details...

LOCAL NEWS

May hailstorm one of the biggest weather stories of 2024

Written by Shannon Dueck Tuesday, Dec 31 2024, 5:00 AM

Homes, cottages near Flin Flon evacuated as wildfire grows 'significantly' overnight

Manitoba calls in help from Ontario, Saskatchewan

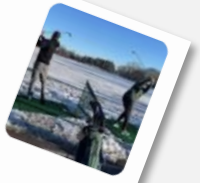
CBC News · Posted: May 11, 2024 10:12 AM CDT | Last Updated: May 11, 2024

CBC

Abnormally mild January full of joy, grief for Manitobans as winter on track to break record

Unexpected warm winter weather in the province has been enjoyable for some people, but not everyone is a fan of the mild temperatures.

1 month ago



CBC

'We are short on water': Morden seeks additional source as droughts become more frequent

A southern Manitoba city that recently declared itself to be in a moderate drought stage after a drier than normal winter says it needs more...

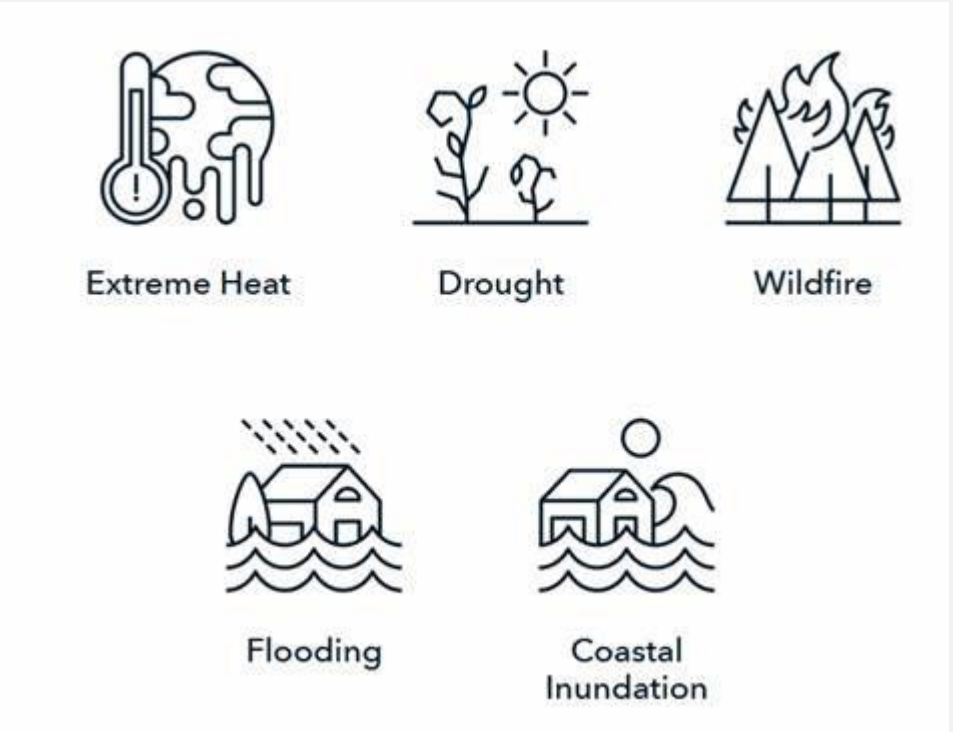
2 weeks ago

- Extended Growing season
- Increased Recreation
- Reliable Supply Lines
- Eco Anxiety & Stress

Climate Hazard Assessment

The goal of this step is to:

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



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Single Event vs. Slow Onset Climate Hazards

Single-event climate hazards		Slow-onset climate hazards
Winds (strong)	Extreme cold	Length of frost-free period; extension or shortening of snowpack season
Heavy snowfall	Wildfire/grassfire	Warming winters and loss of extreme cold
Extremely hot days	Tornadoes	Length of growing season
Lightning	Blizzards	Changes to stream flows and ice-breakup dynamics
Ice accumulation	Floods	Diseases transmitted by animals or insects
Freezing rain	Hail	Freeze-thaw cycles
Rain on snow	Fog	
Heat waves	Heavy rainfall	
Thunderstorms	Multi-year drought	

Source: Adapted from The Resilience Institute & All One Sky Foundation, 2019.

Single- Event Hazards
These are sudden, discrete events that occur over a short period, such as hours or days.

Slow-Onset Climate Hazards
These are gradual changes in climate that occur over extended periods, often years or decades.

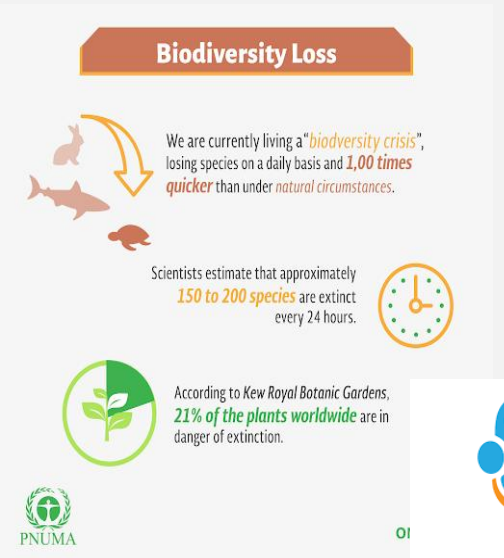
Single Event vs. Slow Onset Climate Hazard Impacts

Single-Event Hazard Impacts

They can cause immediate and severe damage to infrastructure, loss of life, and economic disruption.

Slow-Onset Hazard Impacts

They can lead to long-term environmental changes and socio-economic impacts, such as loss of arable land, displacement of communities, and loss of biodiversity



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Identify trends in emerging climate

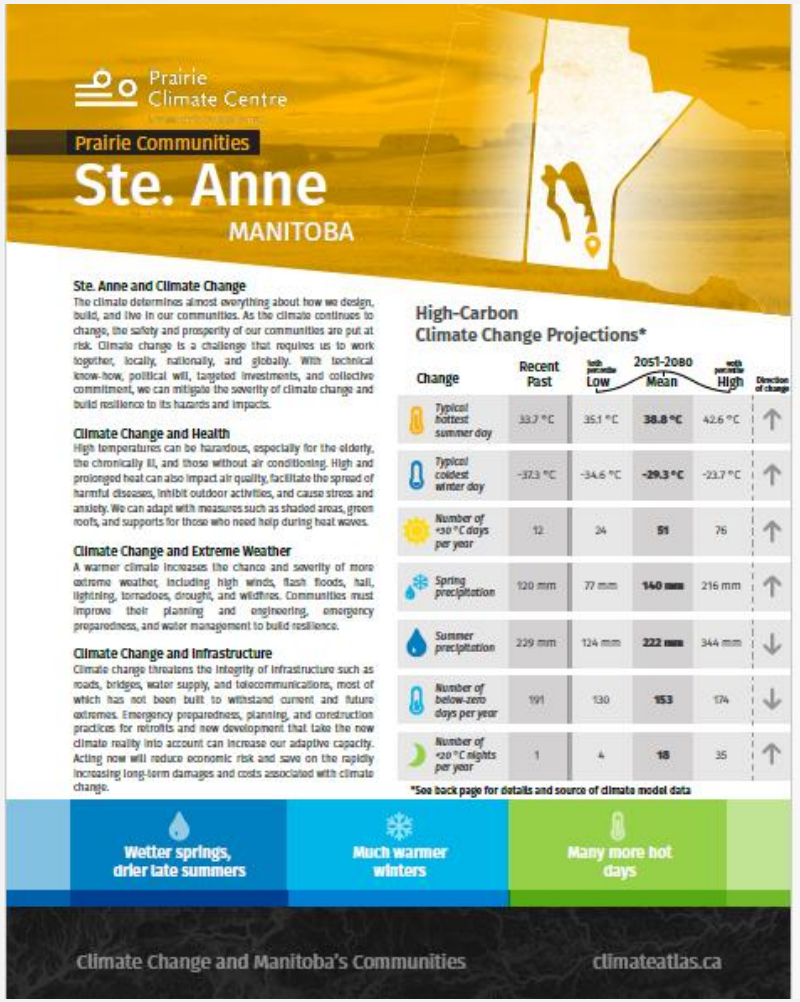
Using Climate Cards

- Provides a scaled down professional forecast
- Updated by the University of Winnipeg
- Allows decision makers reliable information on how the climate is changing

Climate Atlas of Canada

Climate Cards for Manitoba RMs

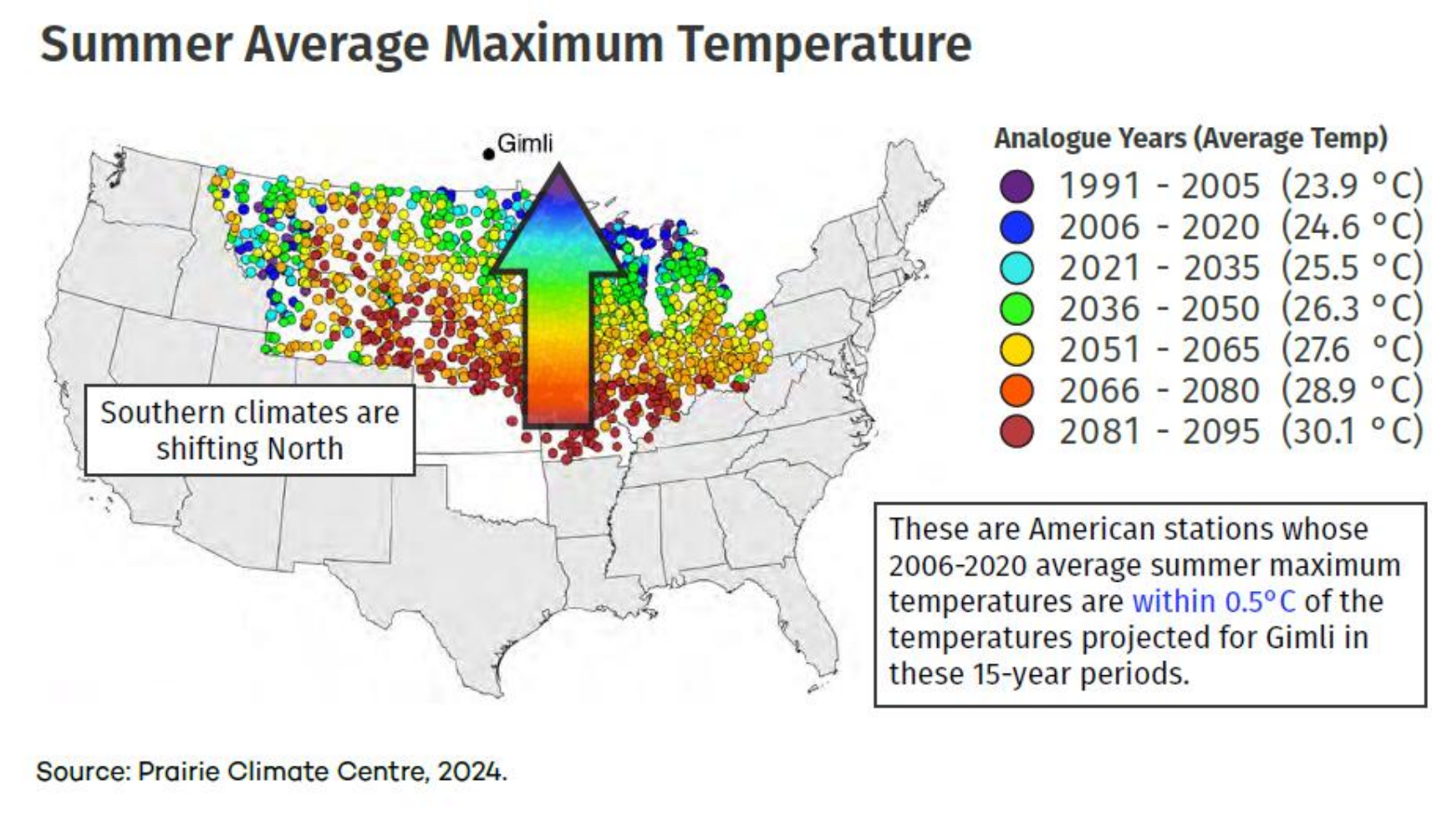
https://climateatlas.ca/climate-cards-manitoba-rms



Forecasts by Emission Levels

Change	Recent Past	2051-2080 10th percentile Low	2051-2080 Mean	2051-2080 90th percentile High	Direction of change
Typical hottest summer day	33.7 °C	35.1 °C	**38.8 °C**	42.6 °C	↑
Typical coldest winter day	-37.3 °C	-34.6 °C	**-29.3 °C**	-23.7 °C	↑
Number of +30 °C days per year	12	24	**51**	76	↑
Spring precipitation	120 mm	77 mm	**140 mm**	216 mm	↑
Summer precipitation	229 mm	124 mm	**222 mm**	344 mm	↓
Number of below-zero days per year	191	130	**153**	174	↓
Number of +20 °C nights per year	1	4	**18**	35	↑

What is our Future Climate?



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Alexandra Bourne

Senior Policy Advisor
Climate Preparedness and Communications

Manitoba.ca

Manitoba

1. Climate Hazard Assessment

KEY STEPS

- Develop a List of Climate Hazards

What weather phenomena or extreme climate event have occurred in your area in the past 30 years?

Have you observed any recent trends in the last decade. Frequency (number of occurrences) or Severity (size and scale) of local climate hazards?

Are there new potential hazards moving your way such as invasive species or seasonal shifts

Worksheet 10. List of climate hazards

Example:

Climate hazard	Frequency	Magnitude	Duration
Heat waves	Annually, in July and August	Night temperatures of >20°C; day temperatures >30°C	3–4 days at a time

Climate hazard	Frequency	Magnitude	Duration

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Define Statements for each Hazard

Worksheet 11. Climate hazard statements

Example:

Climate hazard	How is the hazard projected to change?
	Climate Hazard Statement
Heat waves	• Average annual number of heat waves increases from 1.9 to 4.2; an average of 2.3 more heat waves each year. • Average length of heat waves increases from 3.5 days to 5.3 days; the average heat wave is 1.8 days longer. • Average summer temperature increases from 18.6°C to 20.7°C; the average summer temperature is 2.1°C warmer. • Average number of days per year above 30°C increases from 17.3 to 34.5; there are 17.2 more days per year above 30°C.
	As the average summer temperatures and the number of days above 30°C increase, future heat waves are expected to be 5 days longer and hotter than in previous years.

A Heat wave is typically defined as a three or more consecutive days with temperatures reaching 32 degrees or higher

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2. Climate Impact Assessment

PURPOSE:

- Find the impacts to the climate hazards you have identified
- Consider how these impacts might change in the future
- Identify potential consequences of these changes

It can also help you better understand the cause- and- effect relationships between hazards, impacts and consequences for your community.

KEY STEPS

- Develop an inventory of climate impacts
- There are multiple impacts to hazards
- There are multiple solutions to impacts
- Think in a larger collective area

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Develop an inventory of climate impacts

Worksheet 12. List of the impacts of climate hazards

Example:

Climate hazard	Heat wave: 7 or more consecutive days of +30°C weather each year
Changes to climate hazards	Average annual number of heat waves increasing from 1.9 to 4.2 Average length of heat waves increasing from 3.5 days to 5.3 days Average summer temperature increasing from 18.6°C to 20.7°C Average number of days above +30°C increasing from 14 to 31
Climate hazard statement	As the average summer temperatures and the number of days above 30°C increase, future heat waves are expected to be 5 days longer and hotter than in previous years.
What are the impacts of this hazard?	More hot days and nights Lower water supply Loss of soil moisture Higher chance of wildfires Higher chance of worse drought conditions

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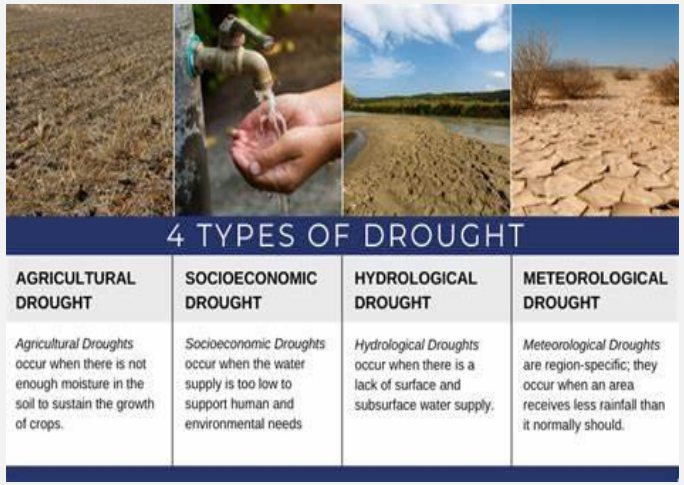
Climate consequences

Climate Consequence
Something that occurs in response to a particular climate impact.



Hazard
Drought

Impact
Crop failure

Consequence
Insurance Claim

Categories and sectors to consider

Have climate hazards interrupted service delivery or the economy

Will climate impacts increase demand for a resource or service?

What consequences have resulted from climate hazards in the past 30 years?

What groups are sensitive to hazards. Impacts, consequences

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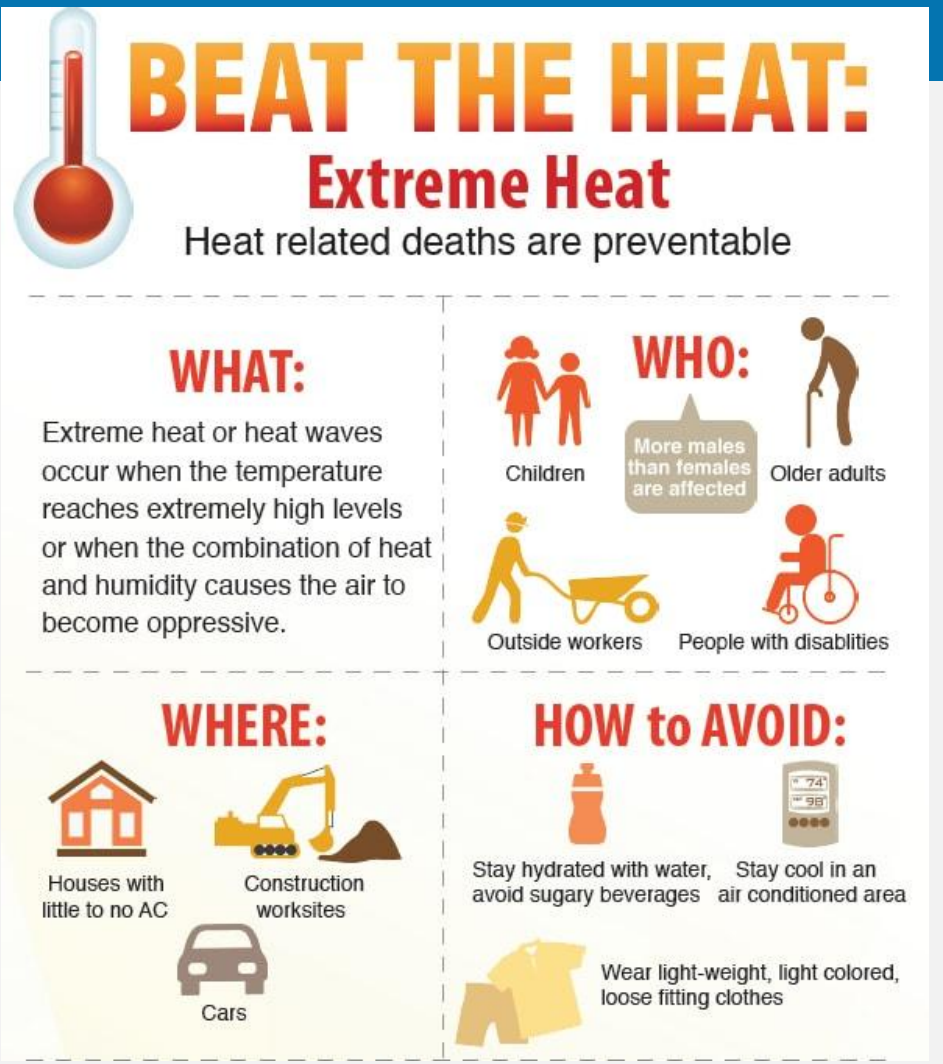
List the consequences of climate hazards (heat wave)

Worksheet 13. List of the consequences of climate hazards

Complete a copy of Worksheet 13 for each climate hazard you considered in Worksheets 11 and 12.

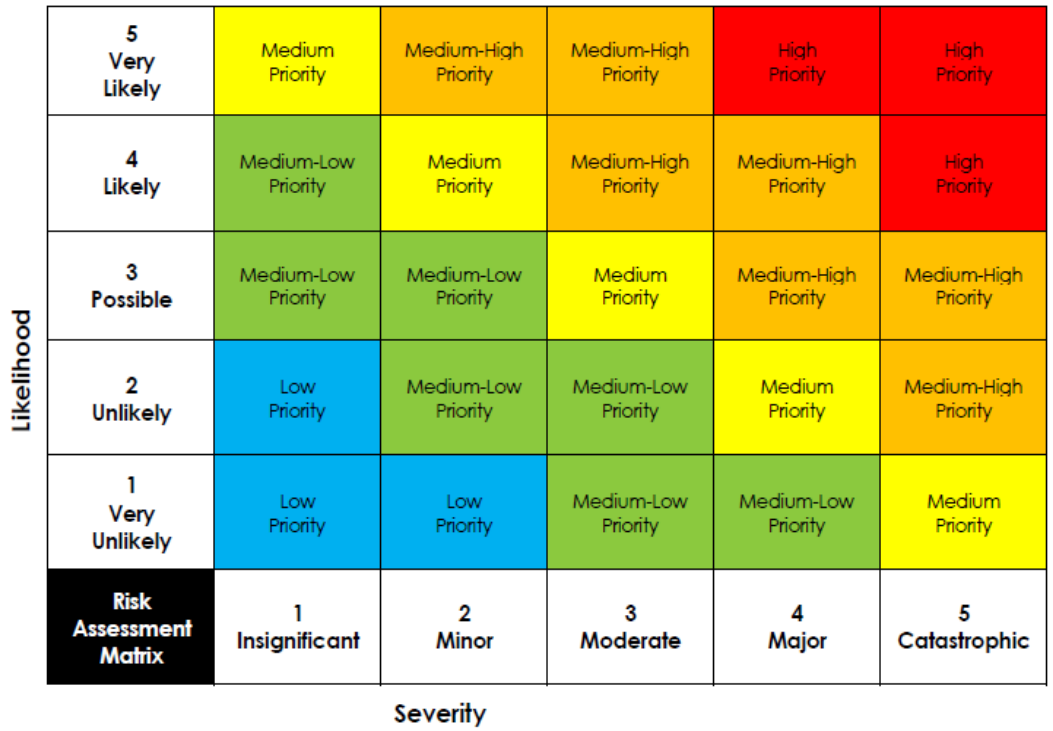
Example:

Hazard	Heat waves
Community & people	• More cases of heat exhaustion, heat stroke and other heat-related illnesses in people who work outdoors (e.g., in construction, landscaping), seniors and other vulnerable populations • Cancellation of outdoor events, sports and gatherings
Critical services	• Higher demand for emergency medical services • Increased use of air conditioning and other cooling equipment may strain the electrical grid and cause localized brownouts/ blackouts
Buildings & infrastructure	• Cracks in building foundations • Heat damage to roads • Equipment failures from overheating
Local economy	• Financial pressure on farmers and agricultural businesses • Overwhelming demand for water-based attractions • Tourism industry disruptions due to fire bans, water restrictions, etc. • Agricultural crop damages and decrease in seasonal quality and quantity
Natural environment	• Stresses to plant and animal life due to heat and water shortages • Lower water quality and quantity leading to boil-water • advisories • Demand for irrigation exceeds water supply



3. Climate Risk Assessment

A Classic Risk Assessment Matrix



Likelihood Rank	Definition
1. Very unlikely	Occurs longer than 10 years
2. Unlikely	Occurs every 5 years
3. Possible	Occurs annually
4. Likely	Occurs every 6 months
5. Very likely	Occurs weekly or monthly

Severity score	Definition
1. Negligible	Consequence has minimum loss, injury, or damage
2. Marginal	Consequence has minor loss, injury, or damage
3. Major	Consequence has considerable loss, injury, or damage
4. Serious	Consequence has significant loss, injury, or damage
5. Catastrophic	Consequence has extensive loss, injury and damage

RISK = LIKELIHOOD X SEVERITY

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Severity and Likelihood of Hazards, their Impacts & Consequences

Worksheet 14. Severity and likelihood of the consequences of each climate hazard

Example:

Climate hazard	Consequence	Severity	Likelihood
Heat wave	Seniors/vulnerable community members suffer heat stroke	4	3
	Cancellation of outdoor events, sports and gatherings	2	2
	Equipment failures from overheating	4	2

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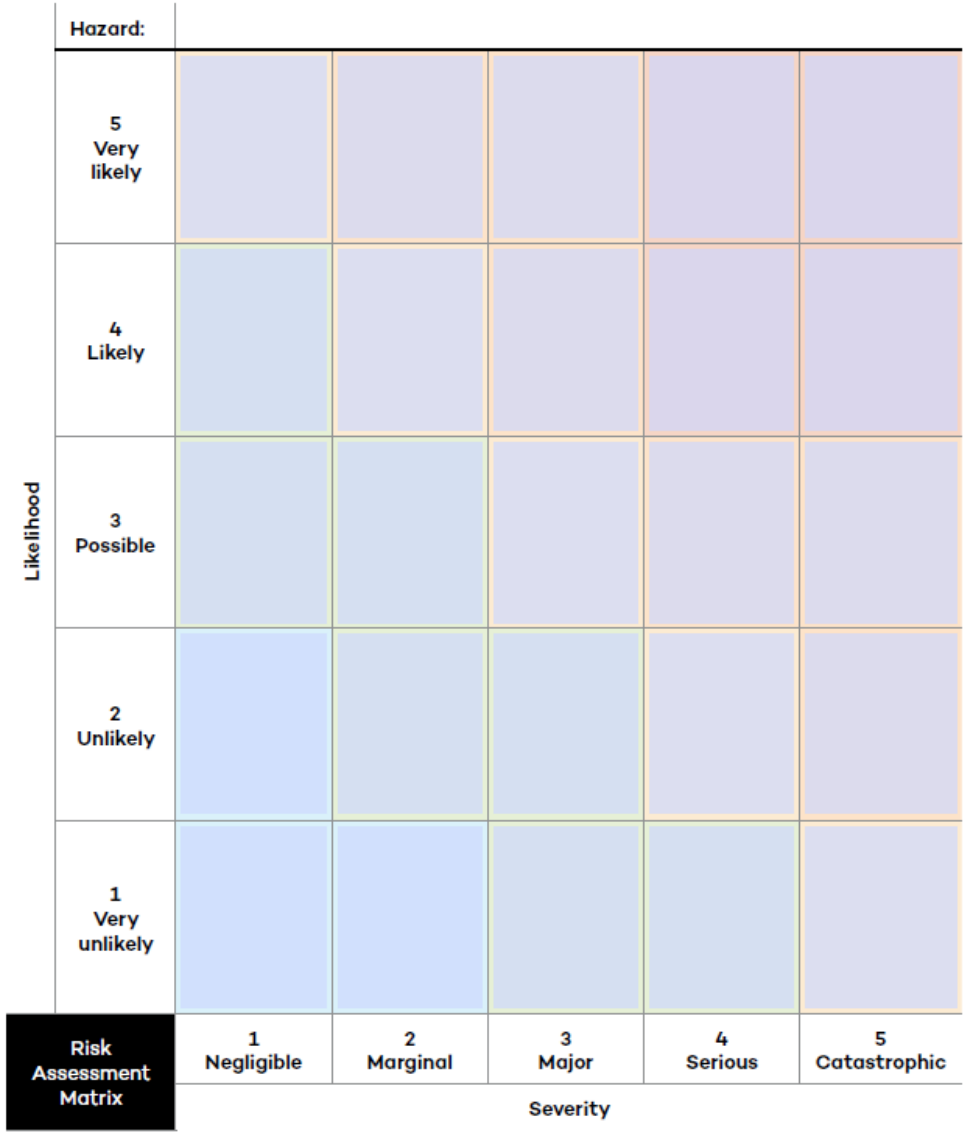
Risk Assessment and Risk Levels

Worksheet 15. Risk assessment matrix and risk levels

Complete a risk assessment matrix for each climate hazard. Refer to Table 7 and define the risk level for each climate risk plotted in the matrix.



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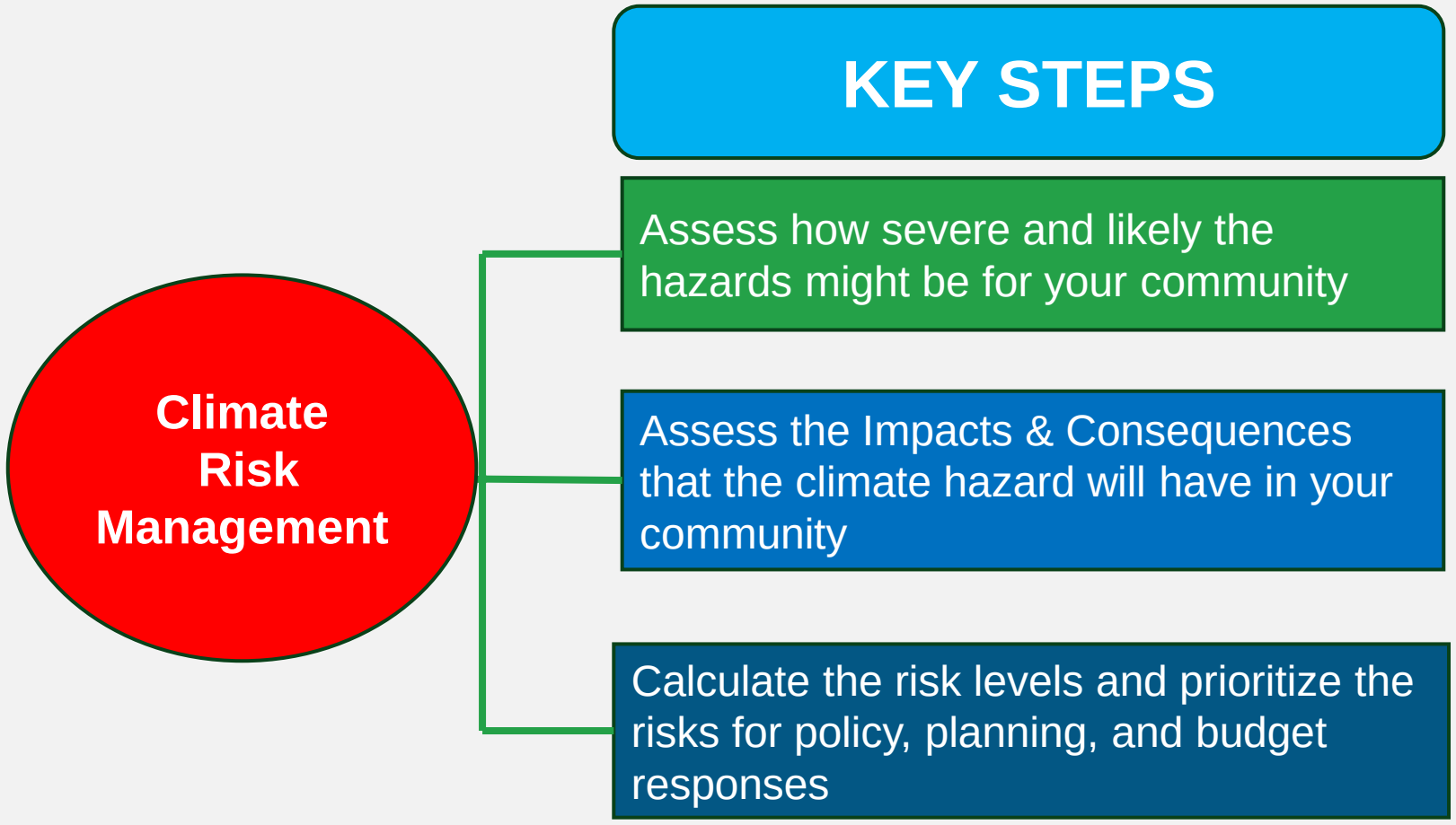
Risk Management is not new.

Risk management is already being applied in your financial documents and audited statements.

Incorporating Climate is just incorporating additional information to your risk system

The templates and guidebooks we are providing help you to decide which risks are low, medium, or high and based on this, you can determine which you want to use during the stage 3 adaptation planning.



Climate Service Organizations

Canadian Centre for Climate Services
www.canada.ca/climate-services/

Government of Canada / Gouvernement du Canada

www.ClimateData.ca

ClimateWest

Eco-West Éco-Ouest CANADA

Prairie Climate Centre
From Risk to Resilience

IISD
International Institute for Sustainable Development

Climate Atlas of Canada
www.climateatlas.ca

Climate Atlas of Canada

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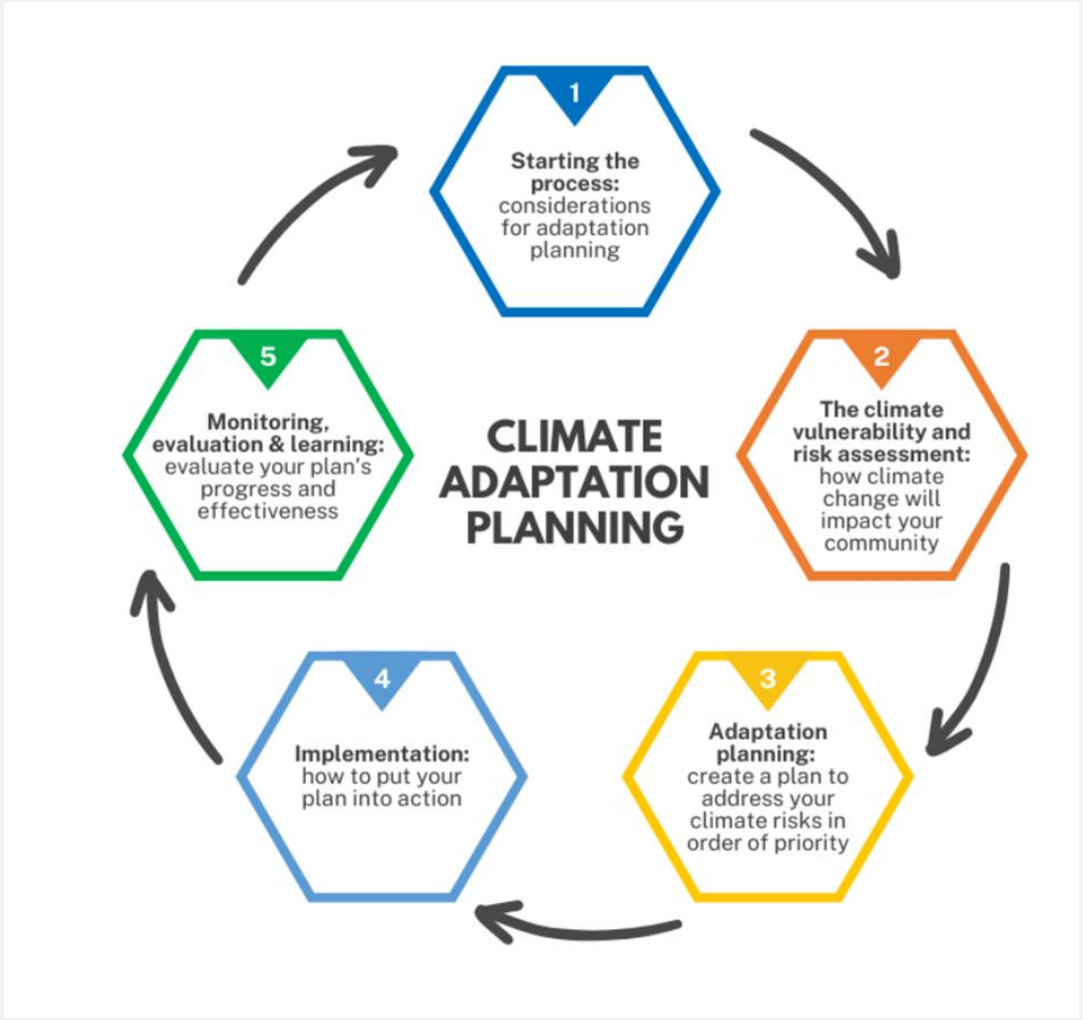
Key Takeaways

- Effective Vulnerability & Risk Assessment (VRA) requires the engagement of diverse stakeholders, including local communities, government agencies, Indigenous, private and other sectors, to incorporate various perspectives and.
- A structured approach helps examine the cause-and-effect relationships between climate hazard, impacts and consequences, fostering a comprehensive and effective risk management process.
- Assessing climate risks involves evaluating the likelihood and severity of climate hazards and the impacts/consequences that will occur on varied sectors, which helps prioritize actions to mitigate these risks.
- VRA is an evidence-based, data driven report verifying that you are considering climate change in your planning and decision making.
- **Understanding your Vulnerability and Risk helps to build resilience for a safe, healthy and prosperous Manitoba.**

MANITOBA CLIMATE RESILIENCE TRAINING

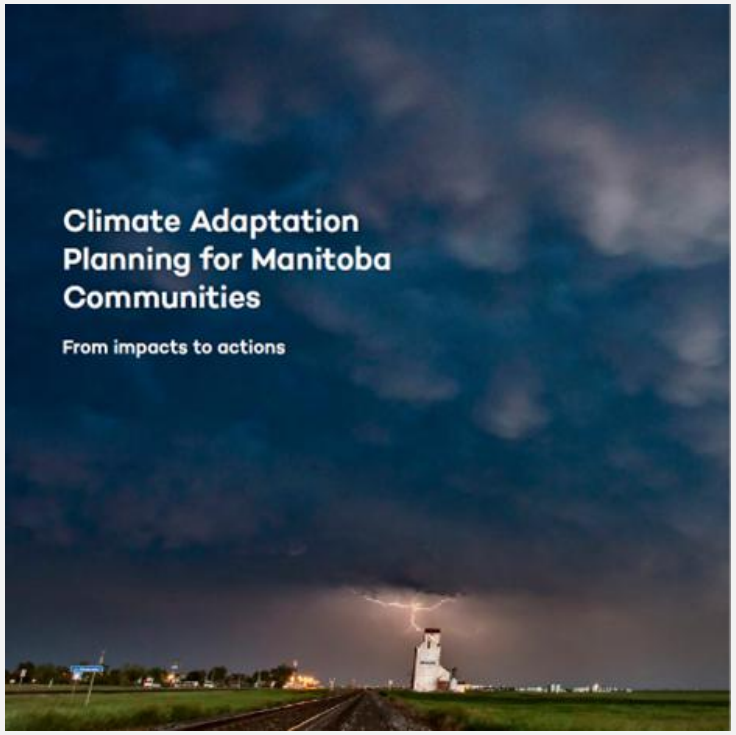
Now you're ready to move to Adaptation planning



MANITOBA CLIMATE RESILIENCE TRAINING

Next MCRT Webinar 2025

Climate Adaptation Planning
– March 19, 2025



ClimateWest

Manitoba
Environment and Climate Change

WEBINAR SERIES

Manitoba Climate Resilience Training

Wednesdays @ 10:00 - 11:00 AM CT

March 5	Climate Preparedness 101
March 12	How to Conduct a Vulnerability and Risk Assessment
March 19	Climate Adaptation Planning

Thank you!!

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