

From impacts to actions





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Climate Vulnerability and Risk Assessment Guidance for Manitoba Communities: From impacts to actions

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Abbreviations and Acronyms

CCME Canadian Council of Ministers of the Environment

CVRA Climate vulnerability and risk assessment

HRVA Hazard risk and vulnerability assessment

MEL Monitoring, evaluation and learning

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).

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 impact

The effects of a climate hazard (either currently or anticipated in the future) on infrastructure, natural ecosystems and social systems. The impacts may be negative or positive. For example, a drought will have negative impacts, such as reduced crop yields, insufficient drinking water and a higher chance of wildfire. Warmer winters may have some positive impacts, such as fewer cold-related deaths and reduced heating costs. However, even if some of the anticipated positive impacts occur, the impacts of climate change on Manitoba's communities will be overwhelmingly negative (Coffman & Ness, 2021).

Climate projection

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).

Climate risk

The potential for negative or positive consequences for infrastructure, natural ecosystems and social systems due to a climate hazard. Climate risk results from the vulnerability of the affected system to the climate-related hazard and the likelihood that it will occur (CCME, 2021).

Climate vulnerability and risk assessment

A process to understand how climate change will impact important aspects of a community and help prioritize which climate risks to prepare for (CCME, 2021).

Consequence

Something that occurs in response to a particular climate impact (CCME, 2021). For example, a drought (the hazard) causes reduced crop production (the impact), which can lead to an increase in insurance claims (the consequence). Consequences can range in severity.

Exposure

The presence of people, livelihoods, species, ecosystems, resources, infrastructure, or cultural assets in locations and settings that could be affected by climate change (CCME, 2021).

Hazard risk and vulnerability assessment (HRVA)

Evaluation process that each Manitoba municipality must complete as a requirement of the Emergencies Act (Emergency Management Organization, 2024). The HRVA is focused on present-day risk (not considering how the hazards are projected to intensify with climate change) and allows a community to assess and plan for 69 hazards under the categories of natural, human-caused, hazardous materials and critical infrastructure.

Mitigation (climate change)

Actions that reduce the sources of greenhouse gas emissions or enhance the sinks of greenhouse gases to further prevent climate change (Intergovernmental Panel on Climate Change, 2014).

Mitigation (disaster risk reduction)

Actions that reduce the potential impact of a disaster or hazard as part of emergency management planning (Public Safety Canada, 2015).

Monitoring, evaluation and learning (MEL)

Helps to clarify, inform and enhance climate change adaptation efforts by gathering data to track progress, evaluate the results and learn from the experience.

Qualitative data

Non-numerical, descriptive information gathered through processes that aim to learn about the experiences or perspectives of community members (International Institute for Sustainable Development, 2023). Questions might include, "How have the weather and seasons changed since you were a child?" and "If you are a farmer, how will your crop production or livestock be impacted by more frequent droughts?"

Quantitative data

Numerical information gathered through research and analysis (International Institute for Sustainable Development, 2023). Quantitative data includes historical climate and weather information, modelled climate projections and numerical scoring systems for vulnerability and risk.

Resilience

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.

Vulnerability

The degree to which infrastructure, natural ecosystems and social systems are susceptible to harm or damage from climate change impacts (CCME, 2021). Vulnerability is based on the community's sensitivity to climate change and its capacity to adapt to the impacts.

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About the From Impacts to Actions Guidebook

The From Impacts to Actions Guidebook uses three supporting guides to help local government representatives from Manitoba communities complete the adaptation planning process:

- Climate Vulnerability and Risk Assessment for Manitoba
 Communities: From Impacts to Actions (the CVRA guide) helps
 identify a community's climate risks and actions that will reduce
 the risk and severity of these risks.
- Adaptation Planning Guidebook for Manitoba Communities: From Impacts to Actions (the adaptation planning guide) helps identify actions that will reduce the anticipated impacts of climate change on communities and their residents.
- How to Use the Climate Atlas of Canada: From Impacts to Actions (the Atlas guide) provides step-by-step instructions to gather climate projections that can be used in the CVRA process.

These guides are supported by the *Climate Adaptation Workbook for Manitoba Communities: From Impacts to Actions* (the workbook), which has 19 worksheets to guide communities through the adaptation planning process.

This process has been designed to be used by small population centres of between 1,000 and 29,999 residents (Statistics Canada, 2017) and rural areas in Manitoba to complete an adaptation plan to suit their specific needs. As such, the approach is flexible—it can include a review of climate risks and adaptation actions for municipal infrastructure and services, private homes and buildings, natural ecosystems and the well-being of residents. Municipalities will require resources and capacity to successfully complete the adaptation plan, including financial resources, time allocation and trained staff. To leverage resources, smaller communities may consider partnering with others within a larger area.

The guides are intended for use by any municipal employee seeking to lead or participate in the climate adaptation planning process in their community. No previous experience in adaptation planning is required because the guide provides background information about

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climate change and adaptation and provides step-by-step guidance for navigating the planning process.

As you read this CVRA guide, you will see these icons to help you navigate:

The open book icon shows where actions are linked to specific worksheets in the workbook to help complete this step. Some steps do not have worksheets.

The light bulb icon shows a helpful resource (also included in the Resource Library at the end of this CVRA guide).

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Overview of the Process

This CVRA guide follows the five stages of the adaptation planning process shown in Figure 1. Specifically, it covers Stages 1 and 2, while the adaptation planning guide covers Stages 3, 4 and 5.

Stage 1: Starting the process: Considerations for adaptation planning describe how to prepare for an adaptation planning process. You will need to take steps like raising awareness of climate change, explaining the need for an adaptation plan and confirming the plan's scope and objectives. Then, you will work on building a team; identifying knowledge keepers, funding agencies and peers; finalizing a work plan; and creating a community profile.

Stage 2: The climate vulnerability and risk assessment (CVRA) guides you to think about how climate change will impact your community. You will think about how to identify, evaluate and prioritize climate change risks. This stage will help you decide how to manage those risks and which risks to focus on first.

Stage 3: Adaptation planning helps you create a plan to address your climate risks in order of priority. You will think about the timeline, costs, resources, team and more.

Stage 4: Implementation describes how to put your plan into action. You will think about getting approval from decision-makers, finding funds to pay for the work and adding your plan to municipal budgets and policies. This stage is iterative to include improved climate change knowledge and reflect changes in your community.

Stage 5: Monitoring, evaluation and learning (MEL) helps you evaluate your plan's progress and effectiveness. You will use the tools in this stage and new information about climate risk to update your adaptation plan on a regular basis. Information gathered through MEL activities produces important insights that help with the ongoing learning of what works (or does not work) and how to regularly revisit and improve the implementation of the adaptation plan.

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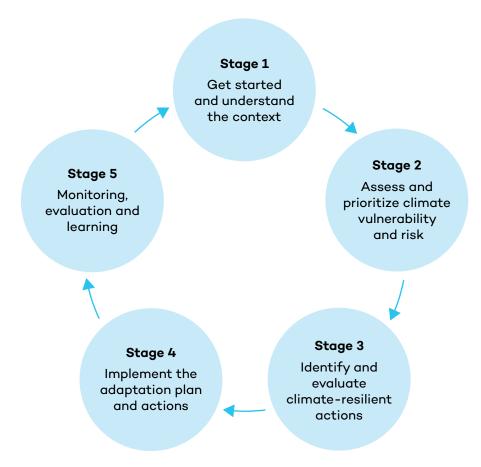
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Figure 1. The adaptation planning process



Source: Intergovernmental Panel on Climate Change (IPCC), 2014.

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Background

Why do we need to adapt?

Manitoba's climate has changed and will continue to change. The Canadian Prairies, Manitoba included, have warmed significantly in recent decades, particularly in the winter (Sauchyn et al., 2020). Our climate has become more variable and uncertain. For example, the province had one of the driest summers on record in 2021, followed by one of the wettest springs in 2022. As Manitoba's climate continues to change, communities will need to deal with the resulting impacts, such as flood damage to infrastructure, drought stress on crops and local economies, heat waves that threaten the health of vulnerable populations and warmer winter temperatures that reduce the reliability of winter roads (Sauchyn et al., 2020).

Adaptation is the process of preparing for a more extreme and less predictable climate expected in the years ahead. Adaptation planning allows for understanding how the climate in your location has changed so that your community can identify and take the necessary steps to reduce the potential negative impacts associated with these changes. At the same time, it can also identify potential new economic and social opportunities that could emerge as Manitoba's climate continues to change.

How is adaptation linked with hazard mitigation?

Municipalities are responsible for different processes (e.g., land-use planning, emergency management) and infrastructure (e.g., waste management, potable water), helping make their communities safe, convenient and desirable places to live. All these municipal processes share concerns about climate change and the increased frequency and/or intensity of climate-related hazards. Embedding climate adaptation across multiple municipal efforts, including development plans, hazard risk and vulnerability assessments (HRVAs) and integrated watershed management plans (in partnership with the local watershed district), will promote a more holistic and integrated approach (Figure 2).

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Figure 2. Applying climate adaptation to municipal processes



Source: Manitoba Climate Resilience Training, 2023.

In Manitoba, municipalities are responsible for emergency management activities within their boundaries, with oversight, support and leadership from the Government of Manitoba's Emergency Management Organization. There is some overlap between the HRVA portion of emergency management planning and the CVRA stage of adaptation planning (Figure 3).

In 2024, the Emergency Management Organization released an updated *HRVA Methodology Guide* to help municipalities assess the potential risk of hazards and take action to reduce future losses (Emergency Management Organization, 2024). The *HRVA Methodology Guide* reminds us that risk is constantly evolving and that the impacts of items such as climate change will have a significant impact on both future risk and what risk reduction measures are most appropriate. Given the shared concerns of some climate hazards between the HRVA and CVRA, your outcomes from the two assessments should be aligned with one another to some extent.

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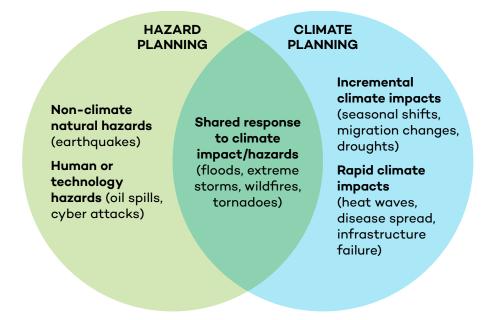
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Figure 3. The integration of climate adaptation and hazard mitigation planning



Source: Climate Action and Energy Innovation Division, 2024.

What are the approaches to climate adaptation?

Climate adaptation can be reactive or planned. Reactive adaptation occurs when climate risk reduction measures are implemented after an event. For example, a town might install larger culverts after the original ones were washed away in an unprecedented rainstorm.

Planned or proactive adaptation occurs when measures are planned and implemented in advance to reduce climate risks, based on an understanding of current and future climate change. For example, a municipal government might anticipate changing precipitation patterns, increased spring runoff and extreme summer rainstorms. To address these changes, they may budget to install larger culverts during scheduled maintenance and replacement. Planned adaptation tends to be more cost-effective, can provide co-benefits and can prevent or minimize the severity of climate change impacts.

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Along with being either reactive or proactive, climate adaptation can also be

- place-based, meaning that climate risks and response strategies are largely determined by local circumstances and capacities.
- iterative, as both the climate and society are continuously changing. New plans that reflect these changes need to be made periodically.
- integrated, meaning that actions taken to reduce climate-related risks need to be part of everyday decision-making processes and included in municipal planning guidance (e.g., municipal development plans). Ideally, municipalities should take a regional approach to integrated planning by partnering with watershed districts, neighbouring municipalities, or planning districts.

The creation of an adaptation plan can focus on identifying risks and adaptation actions using a qualitative process, drawing on the input of residents and relevant actors, Indigenous Knowledge and qualitative information on climate risks and future projections. It could also be more quantitative, particularly in engineering-focused adaptation planning, using systematic hazard mapping, data and scenario analysis. Most adaptation plans use a combination of both qualitative and quantitative processes.

Why should adaptation planning be inclusive and equitable?

It is important to recognize that people experience the impacts of climate change differently and possess different types of knowledge that can enrich the adaptation planning process. To ensure that the full range of climate impacts and knowledge are considered, adaptation planners should take an inclusive and equitable approach.

- Inclusivity means intentionally making space to include all community members and relevant actors in the process (C40 Cities Climate Leadership Group et al., 2019).
- Equity means ensuring that the process is fair and that the identification of risks and subsequent adaptation actions provide equal possible outcomes for everyone (Tozer et al., 2022). An equitable process may require targeted actions for particularly vulnerable groups.

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These two concepts are linked: inclusivity helps ensure fairness and equitable outcomes from the identification of risks and subsequent adaptation actions (C40 Cities Climate Leadership Group et al., 2019). An inclusive process can also support Indigenous rights and reconciliation by ensuring that Indigenous Peoples have a seat at the table and that their knowledge is integrated into the adaptation planning process.

In practice, an inclusive process creates opportunities for a diverse range of community members and relevant actors to participate. This means not only inviting them to sit at the table but also making space for their knowledge and lived experiences to play a role in informing decisions. Outreach can be performed specifically to people who are typically excluded from decision-making processes, such as

- Black, indigenous, and people of color (BIPOC)
- women
- newcomers to Canada without established local support networks
- youth
- people with disabilities
- people experiencing homelessness
- Two-Spirit, lesbian, gay, bisexual, transgender, queer, intersex and other people who identify as part of the sexually and gender-diverse community (2SLGBTQI+ individuals)
- people who are not fluent in English

A good way to start is to engage in dialogue with organizations that provide services to particular groups in your community, such as Indigenous cultural centres, organizations serving people who experience homelessness, or newcomer associations.

What is climate risk? Why is it important to understand climate risk?

In the context of climate adaptation, risk is the potential for adverse consequences due to climate change. These consequences include negative impacts on livelihoods, health and well-being, economies, social and cultural assets, infrastructure, services and ecosystems. Climate risks can result from changes in our climate, as well as from

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human responses to climate change, such as the effectiveness or lack of climate policy and climate-related investments (IPCC, 2022).

Climate risks result from the interactions between a climate hazard; the exposure of people, assets and services to that hazard; and their vulnerability to the impacts of that hazard. The likelihood of a climate hazard occurring and the severity of its consequences are uncertain—and both of those factors may change over time due to socio-economic changes and human decisions. Uncertainty, or more broadly, incomplete knowledge, is a key element of the concept of risk (IPCC, 2022).

Climate change is already occurring and further changes are unavoidable. Understanding climate risks enables proactive planning to reduce exposure to those risks. It supports adaptation actions that will benefit the community and limit the harmful impacts of climate change.

What about uncertainty?

An adaptation plan should use the best available sources of information, data and knowledge. However, even with the best resources, uncertainty remains. Because the process of climate change is ongoing and influenced by changes in global emissions of greenhouse gases, among other factors, the degree of change and the severity and frequency of future climate hazards is uncertain. There is also uncertainty about future exposure to hazards (e.g., if new community assets are built) and how vulnerability to hazards might change (e.g., if steps to reduce climate risks are successful).

This uncertainty about how our climate is changing is not an excuse not to take action. Governments and other groups must constantly act and make decisions in the face of uncertainty (e.g., determining an annual budget for snow clearing or anticipating the future capacity required for an upgraded water treatment plant). Preparing for climate change is no different.

RESOURCE

"Uncertainty 101: Understanding and Managing Climate Models" provides an easy-to-understand description of the three sources of uncertainty: model uncertainty, scenario uncertainty and internal variability.

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Stage 1: Starting the adaptation planning process

Purpose: Start the adaptation planning process by scoping the plan and obtaining leadership approval and budget to complete a climate adaptation plan.

This stage of the adaptation planning process outlines several important considerations as you initiate the adaptation planning process for your community. These considerations will assist you in collecting the required information, building your team and creating a work plan that will guide your decisions as you move through the adaptation planning process. These considerations are suggested but not required. If your community cannot complete a consideration, just move on to the next one.

WORKSHEET

Use Worksheets 1 to 9 (pages 4-27) in the workbook to support the completion of the considerations in Stage 1.

Learn About Climate Change in Your Community

Think about how climate change will affect your community. Sharing this information can help you gain interest and support from community leaders, potential team members and other relevant actors to engage in the adaptation planning process. Expert knowledge is not required, but at this step of the process, you should refresh your knowledge on

- how the climate in your area is expected to change over time,
- the potential negative and positive impacts of these changes on your community and
- the types of adaptation actions that can be implemented and how other communities have taken steps to prepare for climate change.

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The Prairie Climate Centre has prepared Climate Cards for Manitoba RMs, summarizing the expected impacts of climate change for their community.



Manitoba Climate Resilience Training developed a library of courses for Manitoba sectors that offer training on key skill sets, such as Climate 101 and Climate Change Risk Assessment Core Principles.

Identify the Team Leader

A Team Leader takes responsibility for navigating the climate adaptation planning process and managing the scope, schedule, budget, risks and documents associated with the planning project. Identify a Team Leader who will act as project manager during the creation of

your community's adaptation plan.

The Team Leader will also act as the go-to person for questions about the science of climate change, risk and adaptation. Some communities will choose to identify a second person to act as a technical support person.

Get Approval to Prepare a Climate Adaptation Plan

You can gain internal support for the planned scope and scale of the process by sharing knowledge about climate change and how its anticipated impacts could disrupt or damage the community's critical assets and services. Sharing your understanding of how prepared your community currently is for the impacts of climate change and about potential actions that could prevent or lessen the impacts of climate change will also build support.

Consider highlighting this knowledge and understanding as part of a concise one- or two-page briefing note outlining the rationale



CVRA Workshop in Beausejour MB.

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(e.g., business case) for the plan and the importance of it for the long-term success of your community and the well-being of the residents.

As each community has different project management and budgeting processes, you will need to follow your community's process to get approval to complete the adaptation planning process.

There are different approaches to getting approval for the planning process. Your approval may be for specific stages or steps of the adaptation planning process, where the completion of an earlier stage will guide the approval of later stages. Many communities may want to approve Stage 1 separately because Stage 1 will produce a work plan that will provide more information about the resources and effort required to complete the later stages.

RESOURCE

<u>Talking it Through: A Discussion Guide for Local Government</u>
<u>Staff on Climate Adaptation</u> is a useful resource to support conversations around climate change and adaptation with senior decision-makers and elected officials.

Establish a Leadership Advisory Committee

Engaging senior decision-makers and securing their support early in the adaptation planning process is critical to achieving its objectives. Without their support, you may not be able to complete the adaptation plan or implement it in the future.

A Leadership Advisory Committee can provide guidance and direction for these early steps that will help establish the scope and resources for the adaptation planning process.

WORKSHEET

Use Worksheet 1. Leadership Advisory Committee members (page 4) to list the elected officials and administrators who will participate on the committee.

Identify Your Community's Vision, Goals and Objectives

There are many reasons to complete an adaptation plan. Your adaptation planning process may aim to provide a general assessment of climate risks and identify some adaptation actions your community

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can take to reduce those risks. It could also be a more comprehensive assessment of specific sectors, hazards, or aspects of your community that may be most vulnerable to the effects of climate change, providing a basis for a detailed plan for adaptation.

Before you can create an adaptation plan, you need to think about your vision, goals and objectives. These key pieces can help guide your adaptation planning process and can help you effectively communicate your adaptation plan to your community. They should be completed with input from a Leadership Advisory Committee or your senior decision-makers.

A vision is aspirational and looks forward to the future you hope to have for your community.

Goals are broad, high-level outcomes you want to achieve with your adaptation plan. For example, your goal might be to reduce illness and deaths from extreme heat.

Objectives are actions that help you make progress toward your goals. They should be specific, measurable, achievable, results-oriented and time-bound actions. For example, you can expand the number of trees in the community or use air-conditioned community facilities (e.g., library, community centres) as cooling centres.

WORKSHEET

Use Worksheet 2. Visions, goals and objectives (page 6) to document the reasons why your community wants to create an adaptation plan.

Identify the Available Resources

Before you can make a plan, you need to think about the resources you have available. Resources typically include things like money, staff time, expertise and data. Most governments cannot direct all of their time and budget to creating an adaptation plan, so it is important to be realistic when assessing your capacity to engage in the process.

As you consider resources, look into whether similar work has already been done. For example, if you have access to climate change projections for your community, you will not have to spend money and time creating these projections from scratch. You can also consider

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what local knowledge or expertise could be contributed by community members and relevant local actors.

Some municipal governments have taken a collaborative regional approach to climate change adaptation planning. For example, municipalities in the Edmonton Metropolitan Region found success and benefits from working together. Smaller municipalities with limited funding, staff capacity, or technical expertise may especially benefit from collaborating with others. Regional collaboration initiatives vary in scope and scale but often involve loose groups of local governments, government agencies, regional authorities, utility corporations, non-profits and private businesses, among many others (Boyd & Zukiwsky, 2019). You may wish to contact other communities in your region to determine whether a collaborative approach would be beneficial.

WORKSHEET

Use Worksheet 3. Resources for the adaptation plan (pages 9–11) to create a list of the resources (municipal staff or community members, financial, or other) that your community could access to complete the adaptation plan.

Figure 4. Potential scales of adaptation planning processes



Source: All One Sky Foundation, 2021.

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Define the Scope of the Adaptation Plan

Based on your vision, goals and objectives, consider the resources available to your community and identify the scope of your adaptation plan (Figure 4). The scope lays out your plan's boundaries—what will and will not be included.

Some communities may want to consider as many hazards and sectors as possible to create a comprehensive adaptation plan. Other communities may want to create an adaptation plan focused on one climate hazard, one priority sector, or one specific building.

Your community's scope might be any of the following:

- a single focus: a specific facility, building, piece of infrastructure or a natural asset (e.g., wetland or tree canopy).
- all municipal assets, services and operations: parks, sensitive and protected lands, transportation networks, roads and municipal buildings and facilities.
- **community-wide:** all municipal assets and services, plus all homes, private buildings and their infrastructure, public infrastructure, local businesses or economies, public health and natural landscapes across the community.
- a single sector or theme: agriculture, food security, timber/logging, industrial development, education, or water infrastructure.
- a specific group: older people, people experiencing homelessness, or people with disabilities.
- a single climate hazard: heat waves, flooding, or wildfires.

It is also a good idea to think about whether your plan will apply only to your community or if it will consider a larger area. Your community may rely on infrastructure or services from outside its boundaries. For example, food may be grown in other regions and transported to your community by trucks. This guide focuses on adaptation planning at the community-wide level, but different scopes might work better for your community's needs.

WORKSHEET

Use Worksheet 4. Scope of your adaptation plan (page 14) to document the scope of your adaptation plan and consider whether it matches the human and financial resources.

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All One Sky Foundation's <u>Climate Resilience Express: A Community Climate Adaptation Planning Guide</u> (2021) provides a useful table for determining the scope of your adaptation planning process on page 5.

RESOURCE

A more comprehensive assessment of a single asset such as a bridge, road, or port requires an engineering-oriented process, such as the <u>Public Infrastructure Engineering Vulnerability Committee Protocol</u> (PIEVC protocol), which is a framework that offers the flexibility of using high-level qualitative/semi-quantitative data for big-picture screening, as well as more detailed, quantitative data inputs often required for an engineering assessment.

Write a Community Profile

A community profile highlights the most important characteristics of your community—its people, economy, assets, natural environment and critical services. This profile provides a shared understanding of your community for your project team and relevant actors and will be useful in the adaptation planning process to consider how climate impacts may affect your community.

The community profile should align with the scope of your adaptation plan. For example, if you are creating a community-wide adaptation plan, you may choose to highlight more general, community-level characteristics, such as

- · demographics,
- · local economy,
- · assets (including natural assets and green spaces) and
- · critical services.

You may also choose to highlight specific economic sectors that are important to your community. In the case of agriculture, attributes of interest could include

- landcover,
- soil type,
- · main crops,

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- · water allocation needs,
- number of households dependent on agriculture and
- main challenges facing farmers and so on.

It is also important to consider the people in your community and how the demographics of your area might change in the future. Projected rates of growth can be useful to consider when planning for resilience, as community growth or decline affects the demand for and delivery of municipal services, such as roads, emergency services and water usage.

Some societal groups in your community may be better able to respond to and recover from the impacts of climate change (whether these are extreme weather events or economic changes) due to access to financial resources, their livelihoods, education levels and other factors. Others may face greater hardships if they live with limited mobility, have precarious employment, face discrimination, or do not have access to safe housing. For example, elderly residents and people experiencing homelessness may be more at risk of heat-related illnesses as heat waves become hotter and last longer.

Remember that communities and community members are diverse in who they are, what is important to them and the types of services they require to be safe, healthy and happy.

WORKSHEET

Use Worksheet 5. Community profile (pages 16–17) to create a short profile that provides a shared understanding of your community's key characteristics.

Build the Team, Including Collaborators

Considering the scope of your adaptation plan as you build the team allows you to ensure the team has the knowledge and skills required to create and implement the plan. For example, if your scope includes critical community infrastructure, invite team members with sector-specific civil engineering, operations, or public planning expertise for the targeted infrastructure that will be in the plan.

Significant research and experience show that adaptation planning is more successful when the people who will be impacted by climate change are involved at every step of the process (New et al., 2022). It is important to ensure that a diverse group of people and perspectives are reflected in your team or as collaborators.

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When identifying additional collaborators to help with the process, find people with knowledge about climate and assets who will champion the plan to build community buy-in and momentum. These collaborators may be within your local government, such as members of other departments, or external, such as members of the business community, the social sector, Indigenous Peoples, or agricultural producers. The level of planned engagement with collaborators will depend on the scope of your adaptation plan, as well as other driving factors, such as available financial resources and timelines.

Make sure both team members and collaborators understand the adaptation planning process and that they express how they would like to contribute, helping to both identify new sources of information and expertise and build buy-from groups beyond your local government.



WORKSHEET

Use Worksheet 6. Team members and their roles (page 19).

Talk With Collaborators, Knowledge Holders, **Relevant Actors and Community Members**

Adaptation plans that include engagement processes are more likely to lead to robust plans that are successfully implemented, so it is useful to engage key collaborators, knowledge holders, relevant actors and community members in your process as early as possible.

The amount and type of engagement activities will depend on the scope of your adaptation plan, as well as other factors, such as your available financial resources and your plan's timeline.

During initial engagement sessions, you can raise awareness with these groups about climate change, the need to adapt and the scope of the adaptation planning process. This is a good time to ask if they have information that could support the process. Several different approaches can be used to communicate this information, such as

- internal meetings with others within local government;
- community events, workshops, open houses and town halls;
- dialogue with key individuals or groups;
- distribution of printed materials, such as fact sheets or posters;
- social media campaigns, web presence, or radio programming.

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The approach taken should be tailored to the collaborators, knowledge holders, relevant actors and community members that you are planning to reach, keeping in mind the specific needs of different groups. For example, you may need to

- offer childcare or simultaneous children's programming to ensure the participation of parents and caregivers,
- share information in multiple languages,
- hold events at times of the day or year when residents are most likely to be able to participate and
- host events in spaces where particular groups feel most comfortable.

RESOURCE

The International Association for Public Participation developed the <u>Spectrum of Public Participation</u> to help groups define the public's role in any public engagement process.

RESOURCE

The Centre for Indigenous Environmental Resources has developed a <u>Climate Change Adaptation Planning Toolkit for Indigenous Communities</u>. <u>Guidebook 2: Climate Change Impacts in the Community</u>, which is part of the toolkit, includes activities to engage with community members about local climate change impacts while sharing stories of communities that have already experienced negative impacts from climate change. This guidance was developed for Indigenous communities but is insightful for any community.

RESOURCE

ICLEI has developed the <u>Climate Communications Workshop</u> <u>in a Box</u>, which provides many different resources, including a PowerPoint slide deck, facilitator guidance and breakout activity materials to deliver a community workshop.

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Identify and Gather Data and Information to Support the Adaptation Planning Process

A variety of data and information can be used in an adaptation plan. Most adaptation plans use a combination of both qualitative and quantitative data. This guidebook supports a hybrid approach, where the adaptation plan is developed based on climate data along with the experiences, observations and perceptions of relevant actors and community members, including Indigenous Peoples.

The adaptation plan is a living document that will require a monitoring, evaluation and learning (MEL) system to ensure it evolves and continues to reflect your community over time. Look to existing monitoring systems already in use by other groups at the national, provincial and municipal levels. Look at their methodologies, types of data and information, indicators, baselines and platforms, as well as the skills and capacities these organizations have and the other tools they use.

To avoid duplicating work and to use your resources efficiently, you need a good understanding of the data and information that are currently available for your community. Take the time to review available information from past projects, such as engineering assessments, summaries of census information, or past consultations with local sources of knowledge (e.g., community experts or Elders).

WORKSHEET

Use Worksheet 7. List of available information (pages 22–23) and Worksheet 8. List the existing MEL tools (pages 24–25) to create a list of the resources already available in your community.

Finalize the Work Plan

Assemble the information you gathered in Stage 1 to develop a work plan for the completion of a climate adaptation plan (end of Stage 3). This work plan should communicate

- the vision, goals and objectives of the adaptation plan;
- the scope, scale and depth of the proposed adaptation plan;
- team members and collaborators and their roles and responsibilities;

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- the level of planned engagement together with a list of targeted participants;
- the anticipated timeline to complete the adaptation planning process; and
- the financial and other resources you need to complete the adaptation planning process.

The planned budget should include sufficient funding to enable robust outreach and participation throughout the process.

WORKSHEET

Use Worksheet 9. Work plan to prepare the adaptation plan (pages 26-27) to guide your community's work plan.

Obtain Leadership Approval to Proceed With the Adaptation Planning Process

Each community has different budgeting and project approval processes. Follow yours to get approval of the work plan to prepare a climate adaptation plan.

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Stage 2: Climate vulnerability and risk assessment

Purpose: Understand how climate change will impact your community and help you create a list of climate risks to use in Stage 3 of the adaptation planning process.

The workbook includes Worksheets 10 to 15 (pages 30–47) to support the steps in Stage 2 of the adaptation planning process.

This stage will help your team understand how climate change will impact important aspects of your community. The CVRA will also help your team prioritize the climate risks in your adaptation plan (Stage 3).

The risk of a community experiencing the impacts of climate change depends on three elements (Figure 5):

- the type of climate hazards that it experiences (such as river flooding);
- the extent to which people, assets, or services are exposed to this hazard (for example, people and businesses along the river will have greater exposure to a flood than those located away from the floodplain); and
- their vulnerability to the impacts of this hazard (for example, people and businesses without insurance or savings will be more affected by a flood event).

Figure 5. Climate-related risk is the interaction of hazards, exposure and vulnerability



Source: IPCC, 2014.

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Within Stage 2, you will complete the following:

- In the **climate hazard assessment**, you will determine the climate hazards to include in the CVRA. You will review the climate hazards that your community currently experiences and consider how they are projected to change with climate change.
- In the **climate impact assessment**, you will assess the impacts of climate hazards your community has experienced in recent years and how these impacts may change in the future. You will also assess the consequences of the identified impacts on your community. The climate impact assessment will help you better understand the cause-and-effect relationships between climate hazards, their impacts and their consequences.
- In the climate risk assessment, you will consider the likelihood and consequences of climate hazards to identify the highest risks to your community. It will help you prioritize the risks to include in the adaptation planning process.

Climate Hazard Assessment

The climate hazard assessment will help you document the climate hazards facing your community now and those that have affected it in the past 30 years. You will also consider how their frequency, magnitude and duration are projected to change in the future. Consulting multiple sources of data and local knowledge, such as newspapers, municipal records, community members and Elders, will help you prepare a list of climate hazards that have impacted your community, as well as any changes in frequency or severity that community members have observed over time.

Develop a List of Climate Hazards

Climate hazards are climate-related events or processes that can cause harm to human health, economies, infrastructure, natural resources and ecosystems. These may include

- rapid-onset, single events, such as thunderstorms, freezing rain, heat waves and wildfires, that have a defined beginning and end and
- slow-onset hazards, such as gradual changes in average temperatures or changes in the length of seasons.

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While compiling your community's list of climate hazards, your team should consider the following questions:

- What weather phenomena and extreme climate events have impacted your area in the past 30 years?
- Has your community observed any recent trends (e.g., in the last decade) in the frequency (number of occurrences) or magnitude (size and scale) of local climate hazards? For example, are events occurring more or less often? Are they more or less intense?

You may choose to consult with community members and external relevant actors during this step or search online for different sources, such as local newspaper or newsletter archives and social media posts. You could also examine written accounts of historical climate events or sources of historical climate and weather data. Historical climate and weather data can help you understand recent trends and validate community observations. For example, a community that has identified extreme heat as a hazard may want to explore the history of temperature changes to help understand this observed trend.

WORKSHEET

Use Worksheet 10. List of climate hazards (page 30) to develop a list of climate hazards, weather phenomena and extreme climate events that have occurred in your community, as well as their frequency, magnitude and duration.

Identify How These Climate Hazards Might Change

Climate projections can help you understand how the climate in your community may change in the future. These predictions can help you prepare for the coming changes. The first step is to decide on the time periods and emission scenarios to consider in your assessment.

Many communities choose an immediate term period (2021 to 2050) and worst-case emissions scenario where greenhouse gas emissions are high, resulting in more severe climate changes. The immediate term period may be most relevant to your community's planning timeline and the worst-case emission scenario can help you prepare for the worst while hoping for the best. You may also choose to include the long-term period (2051 to 2080). This period is useful for planning that includes assets with lengthy anticipated service lives. For example, the service life of a reinforced concrete bridge could be 50 to 100 years.

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RESOURCE

ClimateWest's Guide to Finding Climate Information & Data contains information on climate models, emission scenarios and choosing the right climate model data.



RESOURCE

ClimateWest is the federal government's regional hub for climate services in the Prairie provinces of Manitoba, Saskatchewan and Alberta. It offers a virtual help desk to assist communities, businesses and others in locating the most relevant climate data and learning how to integrate this data into decision making.

RESOURCE

All Canadians have access to two free sources of credible climate information through the Canadian Centre for Climate Services:

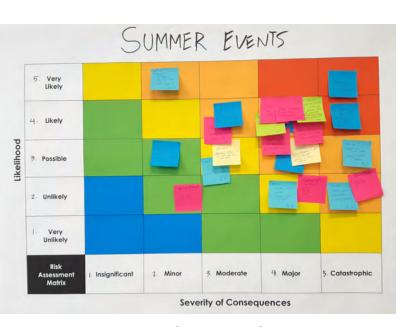
- The Climate Atlas of Canada, which is a great user-friendly source for community-led initiatives. The Atlas guide provides step-by-step instructions.
- · ClimateData.ca, which provides data that is appropriate for highly detailed assessments led by trained experts.

Use climate projections to understand how your identified hazards are projected to change as the climate of your community changes. For example, projected increases in summer temperatures could lead to a greater number of heat waves affecting your community. If your

> community is projected to see higher average summer temperatures and more extreme heat days (temperatures of 30°C and above) compared to the recent past, heat waves and extreme heat events may impact your community more in the future than they have in the past.

Also, consider the potential for new climate hazards that your community has not previously experienced. For example, more snow over the winter could cause flooding in communities that have not previously experienced springtime flooding events.

Your team should also consider how projected changes to the local climate will affect the



An example of a risk matrix for summer events.

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physical or natural environment surrounding your community. For example, fewer extreme cold days (temperatures of -30°C or colder) could result in the emergence of new invasive plants or insects.

The Prairie Climate Centre developed summaries of projected climate changes for select Manitoba communities, which can be found here.

WORKSHEET

If you want to explore the Climate Atlas of Canada on your own, you can follow the step-by-step instructions in the Atlas guide, which includes the optional *Worksheet: Climate projections for your community* (page 11), to explore and summarize how the climate variables in your area are projected to change.

Write Climate Hazard Statements

Climate hazard statements summarize information on each of the climate hazards identified by your team, including how they are projected to change due to climate change.

Your team should prepare concise hazard statements for each of the climate hazards of concern. Use the climate projection summary for your municipality or the projections you gathered to consider how each hazard is likely to change in the future. Your climate hazard statements should contain the following information:

- the name of the hazard or climate event (e.g., heat wave, drought, rain, or wind);
- the observed trend in the hazard's magnitude, meaning its size and scale (e.g., hotter days; longer frost-free periods);
- the frequency of the climate hazard, meaning how often the event occurs (e.g., increased number of days above 30°C, more frequent thunderstorms); and
- new potential climate hazards based on the projected changes to your community's climate.

WORKSHEET

Use Worksheet 11. Climate hazard statements (pages 34–36) describe how your climate hazards are predicted to change.

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Climate Impact Assessment

The climate impact assessment will help you understand the impacts of the climate hazards you have identified, how these impacts might change in the future and the potential consequences of these changes for your community. It can also help you better understand the cause-and-effect relationships between hazards, impacts and consequences for your community.

Develop an Inventory of Climate Hazards and Impacts

Start with the information you developed during your climate hazard assessment and identify the potential climate impacts for each climate hazard.

It is important to understand the relationship between a hazard and an impact. A hazard is a climate event (e.g., drought, rain, or wind), whereas an impact is a direct or indirect effect of a specific hazard (e.g., a drought may cause soil shrinkage and settling).

For each of the climate hazard statements you drafted, develop a list of potential impacts. Ask these questions:

- If this climate hazard happens, what could happen to your community's infrastructure, businesses, natural environment and human health?
- Who and what will be affected by the climate hazard and its impacts? Consider people, livelihoods, ecosystems, resources and economic, social, or cultural assets.
- Who and what are most likely to be exposed or most vulnerable to climate hazards?

WORKSHEET

Use Worksheet 12. List of the impacts of climate hazards (page 37).

Identify the Potential Consequences of Climate Hazards and Their Impacts

Next, examine the potential severity of the consequences of these climate hazards and their impacts. Before understanding the consequences of a climate impact, consider what assets and services

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are exposed to the impact and how vulnerable they are. Remember, vulnerability is the degree to which built infrastructure, natural ecosystems and social systems are susceptible to harm or damage from climate change impacts.

To do this, identify the presence of people, livelihoods, ecosystems, resources, infrastructure and economic, social, or cultural assets in places that are exposed to the climate impact and their vulnerability to the impact. Use the community profile your team developed and identify the assets and services that will most likely be exposed—or are most vulnerable—to climate hazards. The elements exposed and vulnerable to climate hazards may include specific assets, sectors, areas of service, or groups from the following categories:

- critical services
- infrastructure
- community and people
- · local economy
- natural environment
- cultural assets

Consider the following questions to help you identify potential consequences:

- What consequences have resulted from climate hazards in the past 30 years?
- Have historic climate hazards created disruptions or service interruptions that resulted in economic losses? How might such economic losses change in the future based on projected changes in climate?
- What specific stresses already affect a particular service area or community group?
- What specific groups are particularly sensitive to certain impacts and consequences?
- Will climate impacts cause the demand for a resource or service to exceed its current supply or abilities?

WORKSHEET

Use Worksheet 13. List of the consequences of climate hazards (pages 39–40).

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Climate Risk Assessment

The climate risk assessment will consider how susceptible your community is to the consequences to understand the risk to the community, as shown in the formula below. This will help you to decide which risks are low, medium, or high and based on this, you can consider the climate risks and determine which you want to prioritize during the next stage, adaptation planning.

Risk = Likelihood × Severity

Assess How Severe the Consequences Might Be for Your Community

The consequences of climate impacts can be assessed using a simple five-point numerical rating scale that goes, for example, from negligible (1) to catastrophic (5). For example, loss of life would be classified as a catastrophic severity consequence. You can write your own definitions or use the definitions suggested in the workbook. Engage in dialogue with decision-makers, such as the Municipal Emergency Coordinator, to make sure the definitions in your rating scale align with the community's approach to managing risk.

The consequence assessment should consider your community's current vulnerabilities and the capacity of different community members to absorb, cope with, or adapt to the impacts and consequences of a specific climate hazard. Use your climate impact assessment and the consequences you identified in Step 2.5 ("Identify potential consequences of climate hazards and their impacts").

Consider the following questions when assessing the severity of climate consequences:

- When the climate hazard occurs, how severe is the impact?
- How sensitive are community activities, assets and services to changes in hazards and subsequent consequences? Think about changes in the magnitude and frequency of climate hazards and anticipate how community activities, assets and services may respond to those changes.
- How do operations staff currently respond to the impacts and consequences of climate hazards to manage infrastructure and community assets? What risk management measures are

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- the operations staff for a given infrastructure asset already deploying (for example, regular inspections)? Are those measures enough?
- · How does your community adjust to or take advantage of changes in climate and climate hazards? What changes in operations or maintenance programs could provide increased climate resilience? What assets need to be upgraded?

Consider the consequences you identified in Step 2.5 for each element of your community—community and people, critical services, buildings and infrastructure, local economy and natural environment. Now, assess the severity of each of those potential consequences. Note that these values are relative and intended to prioritize the severity of the consequences in relation to each other.

WORKSHEET

Use Worksheet 14. Severity and likelihood of the consequences of each climate hazard (pages 43-44) to assess the severity of the potential consequences.

Assess the Likelihood That the Climate **Consequences Will Occur in Your Community**

The likelihood of a consequence occurring can be assessed on a scale from very unlikely (1) to very likely (5). Your team should agree on specific definitions for each of the likelihood categories or use the example provided in the workbook.

First, determine how often the consequence has occurred in the past 10 years, drawing on information your team collected during the climate hazard assessment. Then consider the climate change projections for your area to determine how or whether the occurrence of the identified consequence is likely to change. Will climate change increase, decrease, or not affect the likelihood of a consequence? Next, use the likelihood scores and definitions to rate the likelihood of each consequence.



WORKSHEET

Revisit Worksheet 14. Severity and likelihood of the consequences of each climate hazard (pages 43-44) to fill in the likelihood assessment.

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Calculate the Risk Levels and Prioritize the Risks

Calculate the risk levels for each risk by using a basic risk equation or by plotting the likelihood and severity on a risk matrix. Risk levels can be used to prioritize the risks, from highest to lowest, to include in the adaptation planning process.

Some climate risks may not require interventions at this time, either because the consequences would be insignificant or because the chance of occurrence is extremely low. It is not realistic or necessary for most communities to develop and implement adaptation actions toward all their identified climate risks.

Consider the following questions when thinking about levels of risk:

- What specific areas, vulnerable populations, or existing inequities might require immediate action?
- Do any risks require early action before they occur if we can no longer meet objectives for safety, well-being, or system performance?

WORKSHEET

Use Worksheet 15. Risk assessment matrix and risk levels (page 47) using the results of your consequence severity and likelihood assessments.

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Next Steps

This CVRA guide was created to assist you and your community in completing the first two stages of the adaptation planning process: getting started (Stage 1) and assessing the anticipated impacts of climate change on your community (Stage 2).

Next, the adaptation planning guide continues the adaptation planning process to assist you in identifying actions that will reduce the identified climate risks (Stage 3); implement the plan (Stage 4); and monitor, evaluate and learn as you implement (Stage 5).

As the climate changes, so will the challenges we face. These guides were created to provide realistic guidance on how to start thinking about adaptation in your community:

- What changes do we expect to see from climate change?
- What impacts and consequences will result from those changes?
- What can we do to start preparing our communities to withstand an extreme climate scenario?

While adaptation planning may seem intimidating, people who know their community intimately—like you and your team—are in the best place to lead this effort. When you need help, guidance, or just to talk, lean on the existing resources and local experts highlighted throughout this guidebook. Extreme and unpredictable weather is only likely to increase and taking steps to safeguard your community is urgent and crucial. Your adaptation plan will evolve and change as your community does and as scientists learn more about climate change and how it is likely to affect different regions.

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Resource Library

These resources can provide additional information to support your work through this CVRA guide.

Information About Climate Change

- The Climate Atlas of Canada has a variety of <u>articles</u> and <u>short videos</u>, which you can filter to see only information about climate science (or you can read and watch them all to learn about health, Indigenous Knowledge, cities and more!).
- <u>Climate Change Connection</u> explains the science behind climate change, focused on Manitoba.
- Up North on Climate's <u>Climate Change and Adaptation Quick Guides: Climate Change</u>
 <u>Adaptations for Northern First Nations Communities & Individuals</u> explains climate change,
 the greenhouse effect and projections in an easy-to-understand format, accompanied by
 fun illustrations.
- The World Wildlife Fund explains the difference between climate change mitigation and adaptation and how both can be used to address climate change.
- The <u>Climate Change Adaptation Quick Guide</u> uses illustrations to show how climate change impacts the land and communities. It also includes examples of actions that can be used to adapt to drought, flooding and wildfires, among other hazards.
- Natural Resources Canada's <u>Adapting to Climate Change: An Introduction for Canadian Municipalities:</u> Chapter 1 covers what climate adaptation is and why it is important in Canada; <u>Chapter 2</u> highlights key components of successful adaptation planning processes.

Information for Local Governments

- Parts 1 and 2 of the Federation of Canadian Municipalities' video series, <u>Climate in Focus</u>

 <u>Jump Start Your Municipality's Climate Action Journey</u>, introduce municipal climate action and how to get started.
- This resource is not specific to adaptation, but Climate West provides a useful guide for <u>Municipal Climate Change Staff</u> that explains municipal governance, the type of information to gather and who to work with.
- The Federation of Canadian Municipalities' <u>The Cost of Climate Adaptation</u> details the urgent need for investment in climate adaptation action, especially for municipalities that own and maintain the majority of their public infrastructure.
- The Centre for Indigenous Environmental Resources has developed an <u>Indigenous</u> <u>Climate Change Adaptation Planning Toolkit</u>. <u>Guidebook 1: Starting the Planning Process</u> helps communities learn about climate change and assemble a team. It also shares community examples.

Strategies for Connecting With Municipal Leaders, Relevant Actors and Community Members

- The Centre for Indigenous Environmental Resources has developed a <u>Climate Change Adaptation Planning (ICCAP) Toolkit</u>. <u>Guidebook 2: Climate Change Impacts in the Community</u> includes activities to engage community members about local climate change impacts. It also shares stories of communities that have suffered from climate change.
- <u>Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation</u> is a useful resource to support conversations around climate change and adaptation with senior decision-makers and elected officials.
- The International Association for Public Participation developed the <u>Spectrum of Public Participation</u> to help groups define the public's role in any public engagement process.
- ICLEI has developed the <u>Climate Communications Workshop in a Box</u>, which provides many different resources, including a PowerPoint slide deck, facilitator guidance and breakout activity materials to deliver a community workshop.

Define the Scope of the Plan

- All One Sky Foundation's <u>Climate Resilience Express: A Community Climate Adaptation Planning Guide</u> provides a useful table for determining the scope of your adaptation planning process on page 5.
- A more comprehensive assessment of a single asset such as a bridge, road, or port
 requires an engineering-oriented process, such as the <u>Public Infrastructure Engineering</u>
 <u>Vulnerability Committee Protocol</u> (PIEVC protocol), which is a framework that offers the
 flexibility of using high-level qualitative/semi-quantitative data for big-picture screening,
 as well as more detailed, quantitative data inputs often required for an engineering
 assessment.

Community Profile Data

- Statistics Canada has a database containing several socio-economic indicators from the 2021 census. Data is available for a range of <u>municipalities</u>, <u>communities</u>, <u>urban districts</u> and <u>census agglomerations and divisions</u> in Manitoba.
- <u>The Canadian Index of Multiple Deprivation</u> uses census data to illustrate socioeconomic and cultural deprivation and marginalization at the local level.
- <u>The Manitoba Bureau of Statistics</u> provides province-wide trends and resources for a number of socio-economic factors, including population, housing and employment.

Climate Data

- <u>Uncertainty 101: Understanding and Managing Climate Models</u> provides an easy-tounderstand description of the three sources of uncertainty: model uncertainty, scenario uncertainty and internal variability.
- ClimateWest's <u>A Guide to Finding Climate Information & Data</u> provides a user-friendly overview of the free sources of climate data and information available to Canadian municipalities and others. ClimateWest also offers a virtual <u>help desk</u> to assist communities, businesses and others in locating the most relevant climate data and learning how to integrate this data into decision-making.
- The Climate Atlas of Canada hosts climate model data through an interactive map. Users can explore their current modelled climate and projected future climates using a number of temperature and precipitation variables and indices. The Climate Atlas allows you to view and download data specific to your location through tables, graphs and reports.
- <u>ClimateData.ca</u> provides high-resolution climate data for a number of climate variables and indices for locations throughout Canada. It provides access to modelled data, observed climate trends and observed station data.
- The Prairie Climate Centre has prepared <u>Climate Cards for Manitoba RMs</u>, summarizing the expected impacts of climate change for their community.
- <u>The Canadian Disaster Database</u> contains information on the costs, losses and locations of over 1,000 disaster events that have affected Canadians at home or abroad.
- The Government of Manitoba hosts a web page detailing the province's <u>flood events and damage</u> since 1950. They also host a page where you can access <u>fire mapping data</u> from 2010 to 2019.
- <u>The Manitoba Drought Monitor</u> includes information on precipitation, river and lake levels, groundwater levels and reservoir supply levels across the province.

Climate Vulnerability and Risk Assessment

- The Centre for Indigenous Environmental Resources has developed a <u>Climate Change Adaptation Planning (ICCAP) Toolkit</u>. <u>Guidebook 3: Identifying Community Sustainability and Climate Change Vulnerabilities</u> works with community members to explore the concept of community sustainability versus community vulnerability to climate change.
- The Canadian Council of Ministers of the Environment developed a <u>Guidance on Good Practices in Climate Change Risk Assessment</u>. The guidance document explains the fundamental elements of climate risk assessment and includes six case studies highlighting good practices in Canada.
- Manitoba Climate Resilience Training developed a library of courses for Manitoba sectors that offer training on key skill sets, such as <u>Climate 101</u> and <u>Climate Change Risk</u> <u>Assessment Core Principles</u>.

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If you have questions throughout the process, please contact:

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