MANITOBA CLIMATE RESILIENCE TRAINING

URBAN SYSTEMS

Manitoba

Climate Vulnerability and Risk Assessment Workshop

MANITOBA CLIMATE
RESILIENCE TRAINING

INTRODUCTION

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Michael Wakely

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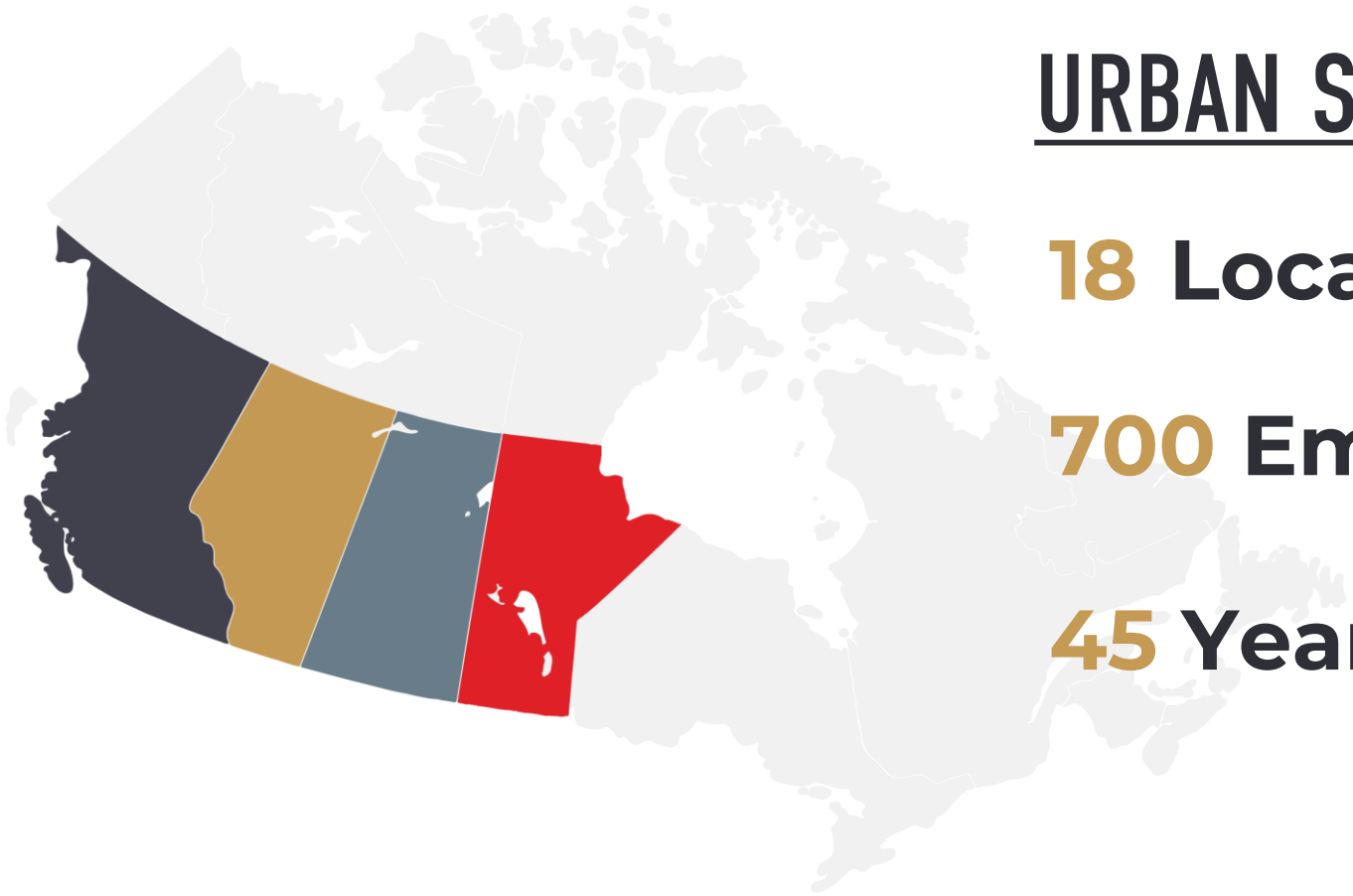
About Urban Systems



URBAN SYSTEMS

18 Locations

700 Employees

45 Years in Business

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About Urban Systems

URBAN SYSTEMS

- Asset Management
- Economic Development
- Governance & Finance
- Land Survey & Geomatics
- Water & Wastewater
- Community Energy Solutions
- Healthy Communities
- Land Development
- Landscape Architecture
- Community Infrastructure
- Community Planning
- GIS
- Land Economics
- Transportation
- First Nations Advisory

URBAN MATTERS

- Homelessness
- Inclusion
- Housing
- Climate Change
- Meaningful Local Economies
- Food & Water Security
- Financial & Environmental Sustainability

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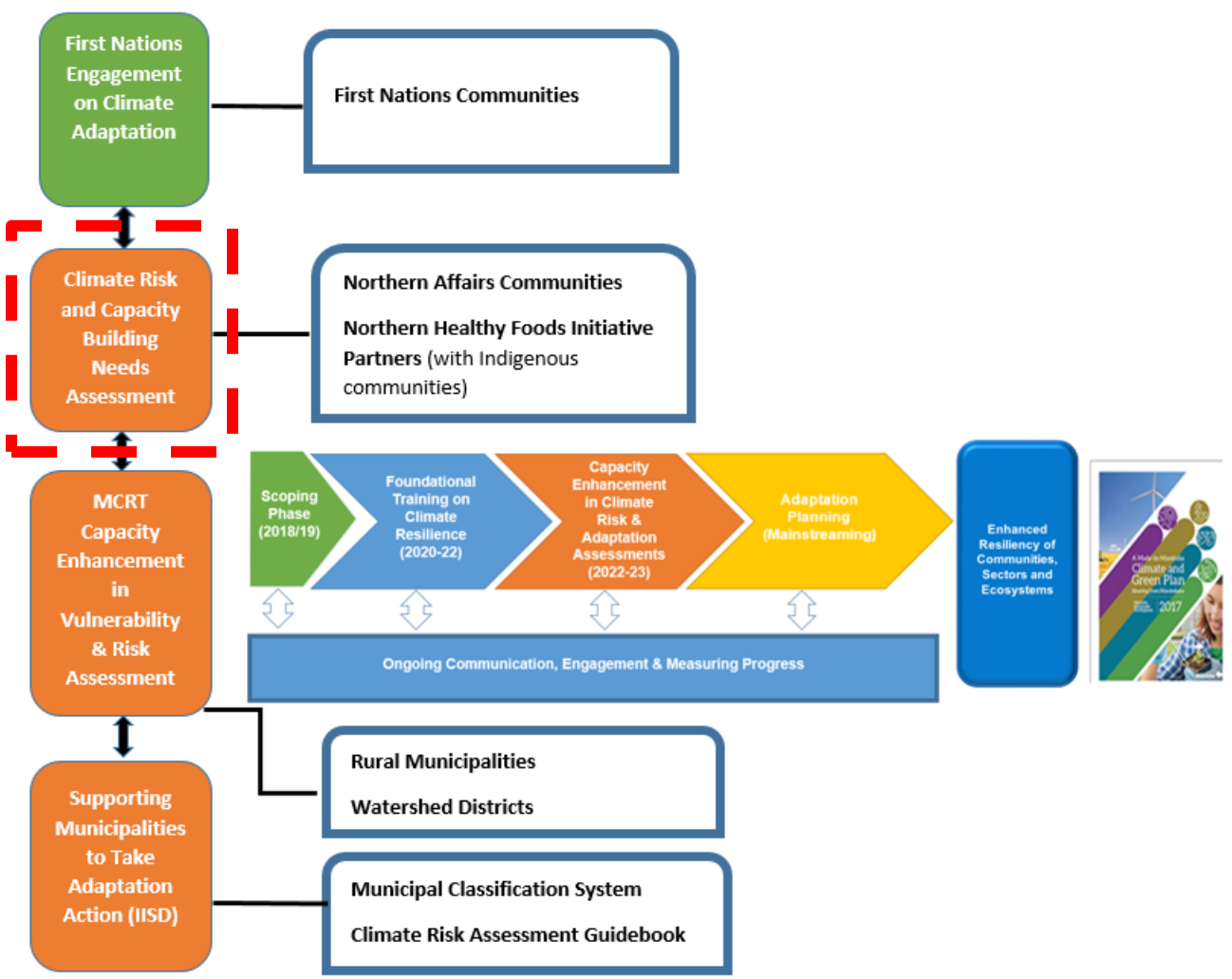
Introduction

- What is your name?
- What community are you from?
- What do you hope to get out of this workshop?
- What kind of food security efforts are underway in the community?

Project Context



Climate Risk and Capacity Building Needs Assessment Project Goals

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- Enhance the resiliency of NHFI communities/partner organizations to climate change
- Build capacity to understand the climate impacts, vulnerabilities, risks (and opportunities) and potential adaptation options resulting from climate change
- Develop a training plan for those communities and organizations

Purpose of Workshop

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- Support you in taking the initial steps of a climate risk and vulnerability assessment
- Build knowledge within communities
- Provide a step-by-step guide that can be replicated in your community in the future
- Help communities prepare for funding applications for adaptation actions

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Workshop Agenda

- Climate Risk Assessment
  - Climate Hazard Assessment
  - Impact Assessment
  - Climate Risk Assessment
- Potential Adaptation Actions

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CLIMATE RISK ASSESSMENT

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WEATHER vs CLIMATE

WHAT YOU GET

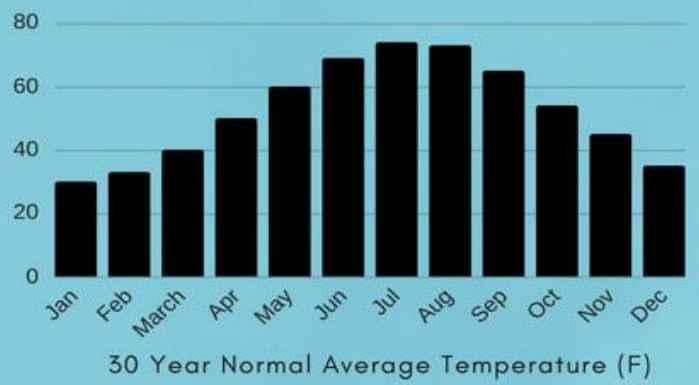
CONDITIONS OF THE ATMOSPHERE OVER A SHORT PERIOD OF TIME

CAN CHANGE WITHIN MINUTES OR HOURS

WHAT YOU EXPECT

HOW THE ATMOSPHERE BEHAVES OVER A LONG PERIOD OF TIME AND SPACE

AVERAGE REGIONAL WEATHER PATTERN OVER DECADES



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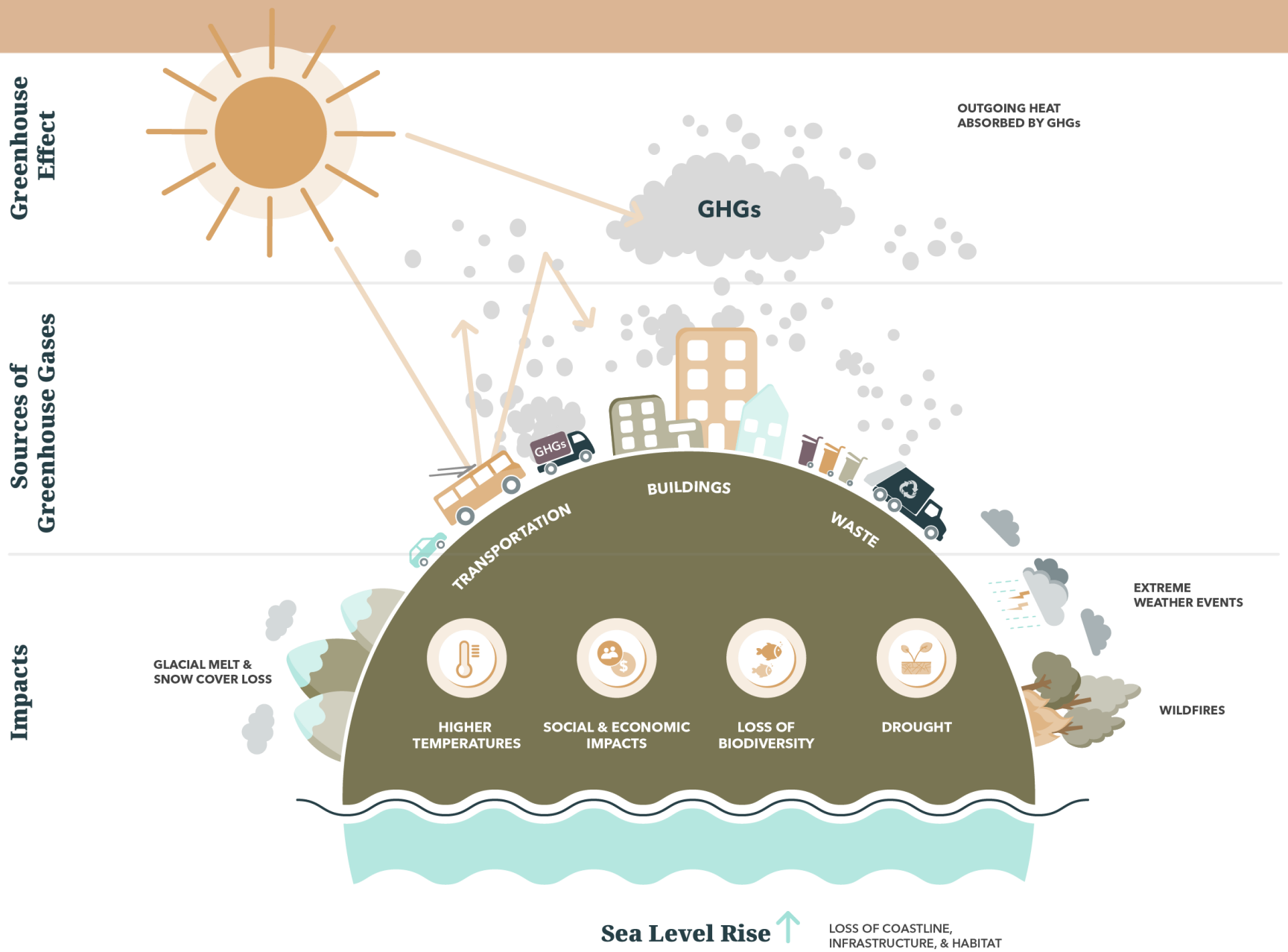

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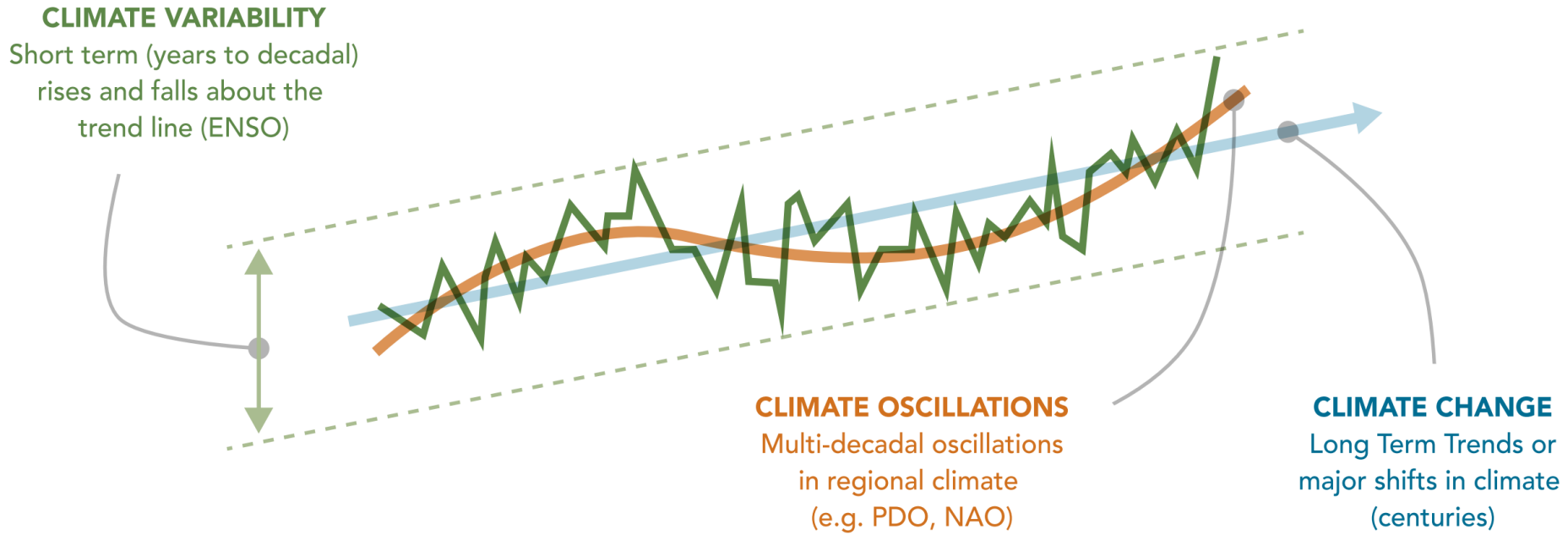
Climate Change 101

Natural Variability and Climate Change



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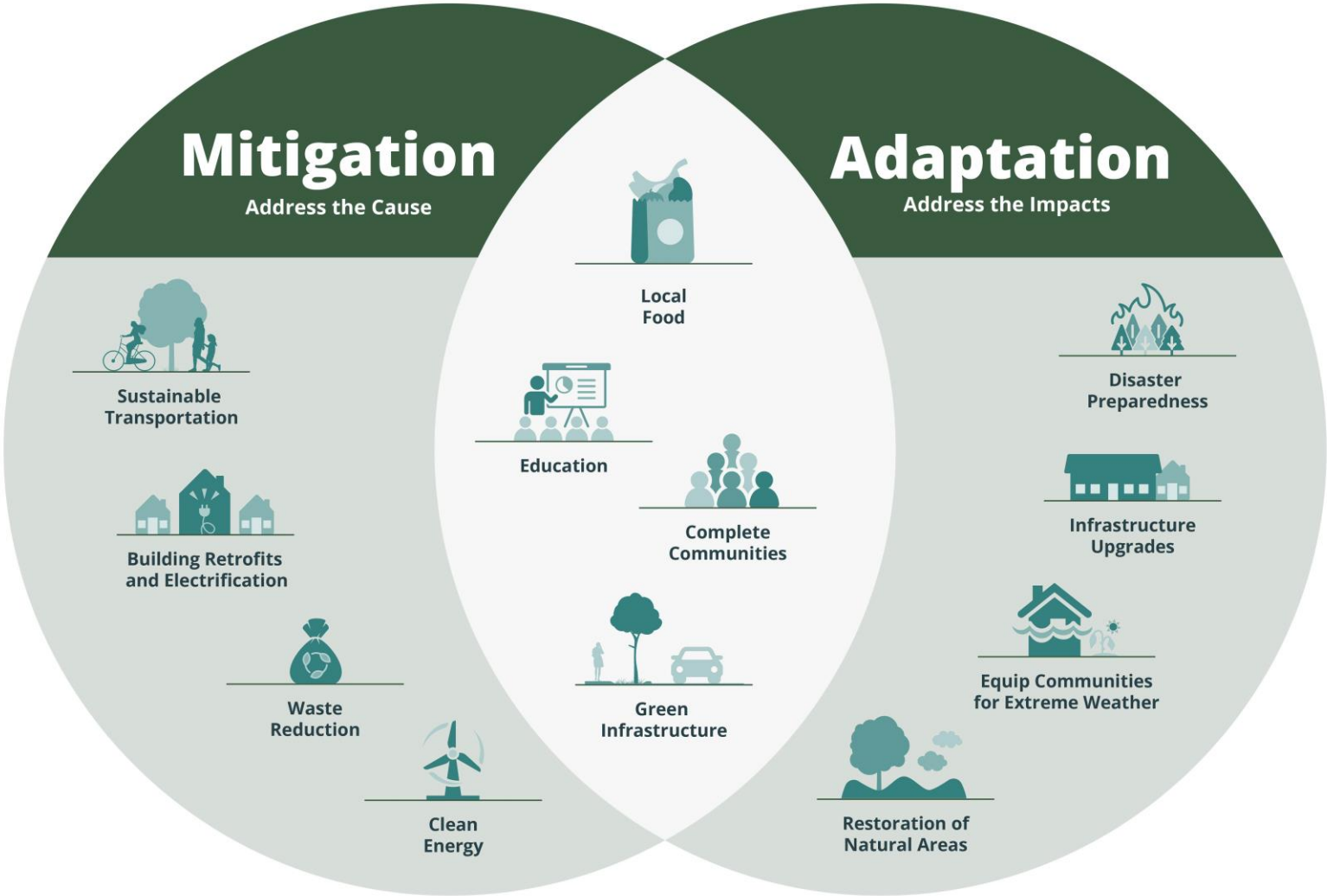

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WHAT DOES FOOD SECURITY LOOK LIKE FOR YOUR COMMUNITY?

Food Security Goals

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- Increase local food production
- Enhance food literacy
- Build capacity in communities
- Develop partnerships and food security networks
- Promote healthy eating and food preparation
- Create an understanding of local and Indigenous food production
- Support youth involvement and intergenerational sharing

Indigenous Food Sovereignty

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- IFS provides a restorative framework for policy reform in forestry, fisheries, rangeland, environmental conservation, health, agriculture, and rural and community development.
- Indigenous land ethic does not view the land and food system as a commodity to be bought and sold
- Food security is, in part, having access to traditional wild harvested foods.
- It is also access to fellow community members who are skilled in hunting, fishing, gardening, or edible plant harvesting.

Indigenous Food Sovereignty

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- **Sacred/divine sovereignty:** healthy, interdependent relationships with land/plants/animals
- **Participation:** maintaining traditional food strategies
- **Self determination:** addressing needs/freedom from corporate food production/distribution
- **Legislation and policy:** respecting traditional land and food systems
- The acquisition and consumption of food has a spiritual significance, as it relates to ceremony, whether memorialization of loved ones of celebratory feasts.
- Food security can only exist when the community has the knowledge to practice and preserve cultural food traditions and land-based foods are accessible.

Indigenous Food Sovereignty

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- Indigenous food systems include sociocultural meanings, acquisition/processing techniques, use, consumption, and nutritional consequences for people using the food
- Indigenous food has the potential to provide more health benefits than conventional market-based foods, also contributes to the facilitation of knowledge transfer and cultural resilience
- Indigenous foods are linked with identity and mental, physical, spiritual, and emotional health
- The role of hunting, fishing, and harvesting of Indigenous foods as an integral component to a complex and layered worldview including one’s relationships with, and responsibility to, the environment

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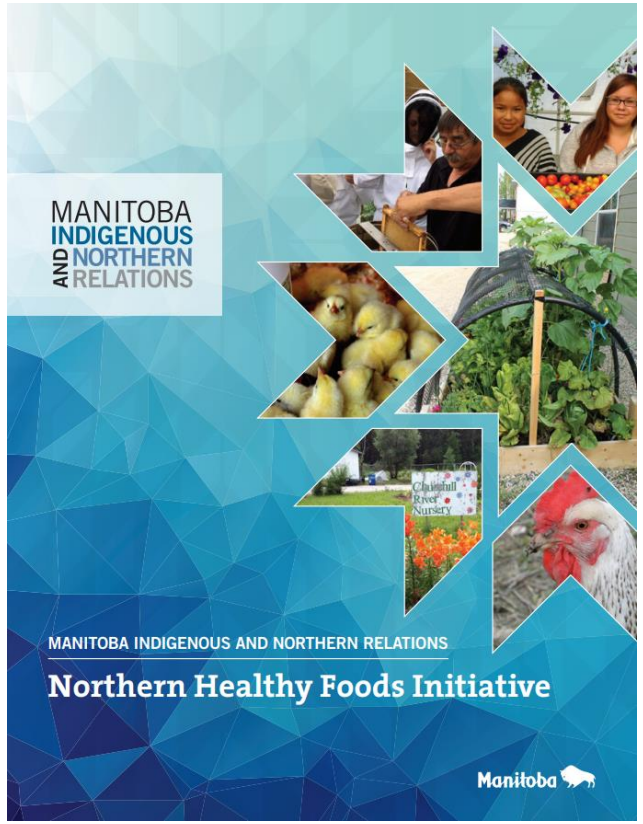
Examples of Existing NHFI Initiatives



- Capacity building: gardening, food preservation, on the land training
- Community gardens
- Greenhouses
- Logistics support
- Composting
- Self sufficiency + healthy foods
- Traditional foods

Climate Risk Assessments

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Step 1: Climate Hazard Assessment

Step 2: Impact Assessment

Step 3: Climate Risk Assessment

Why do a VRA?

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- To build community resilience to a changing climate
- To provide a location specific understanding of climate impacts and the risks they pose
- To design resilient and adaptive solutions for climate risks
- To help prioritize finite time and resources to where they have the most impact

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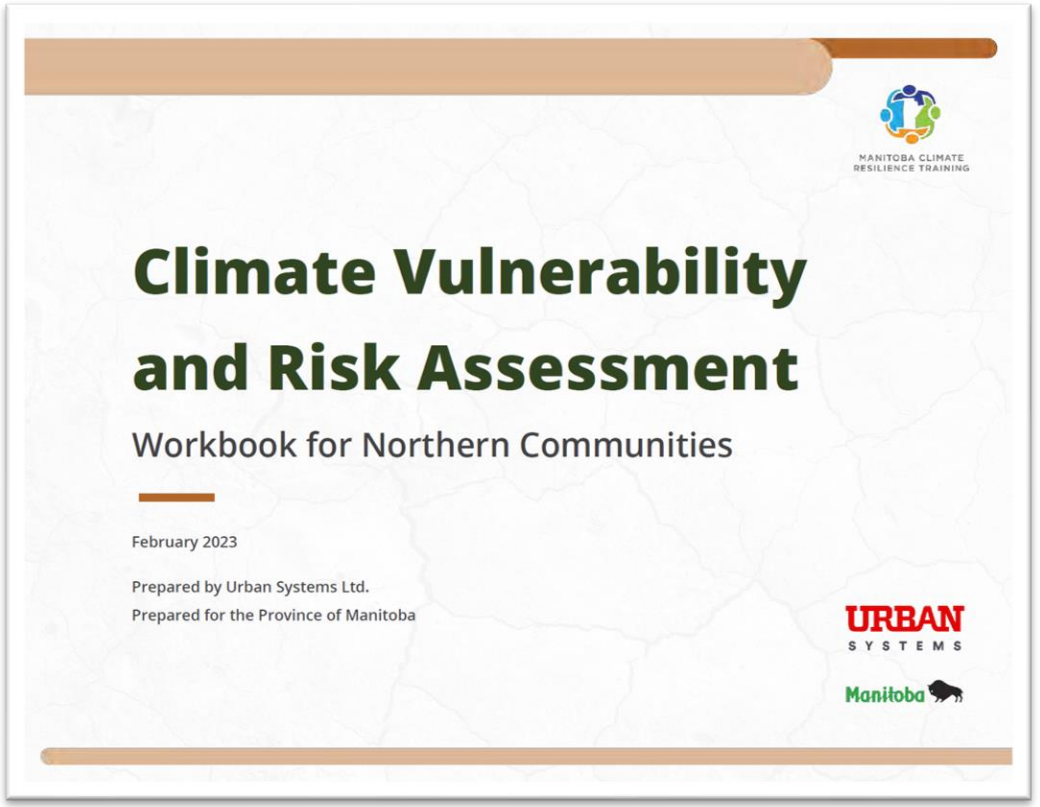
Workbook



Climate Risk Assessments

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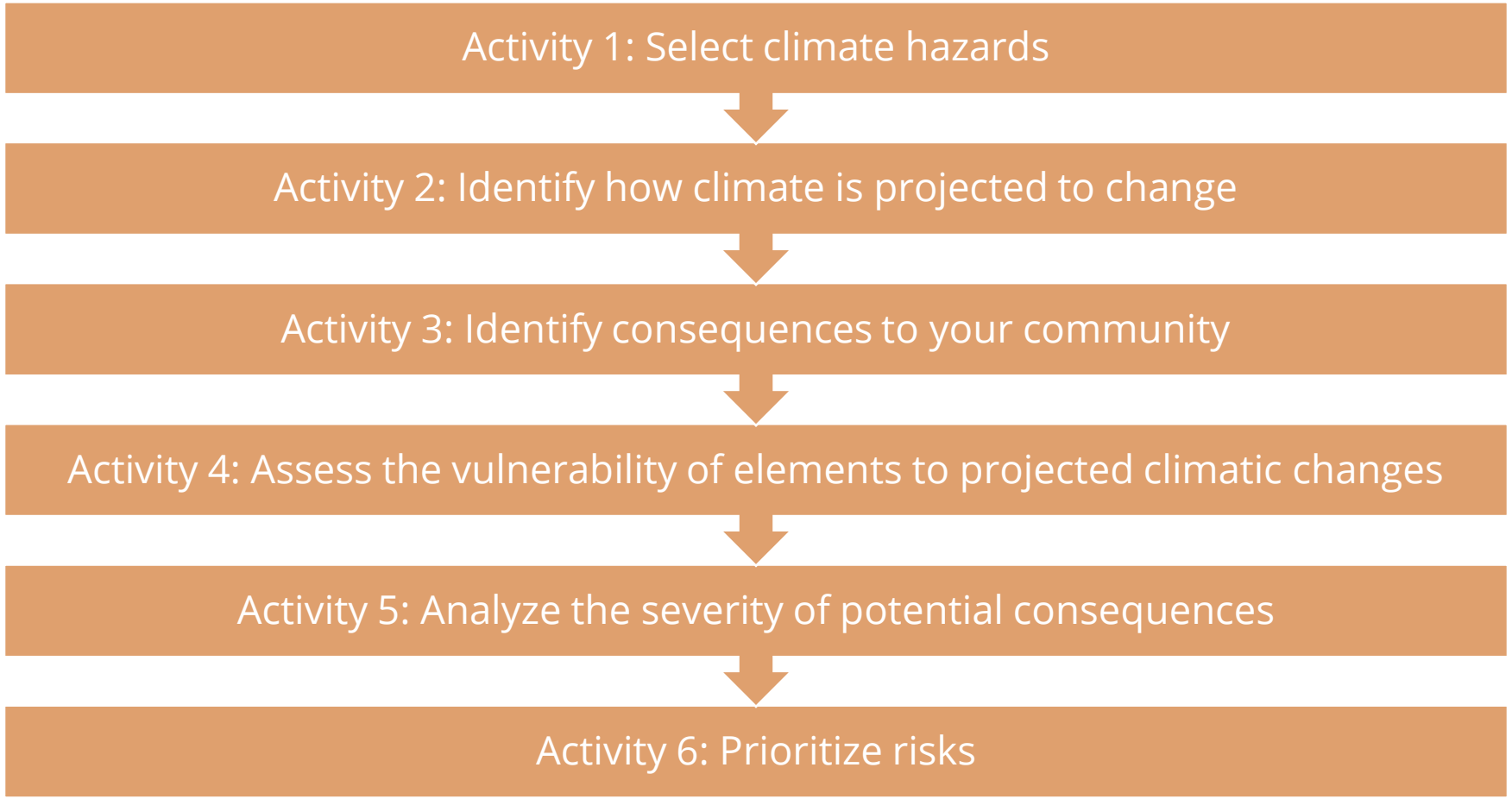

Climate Risk Assessments

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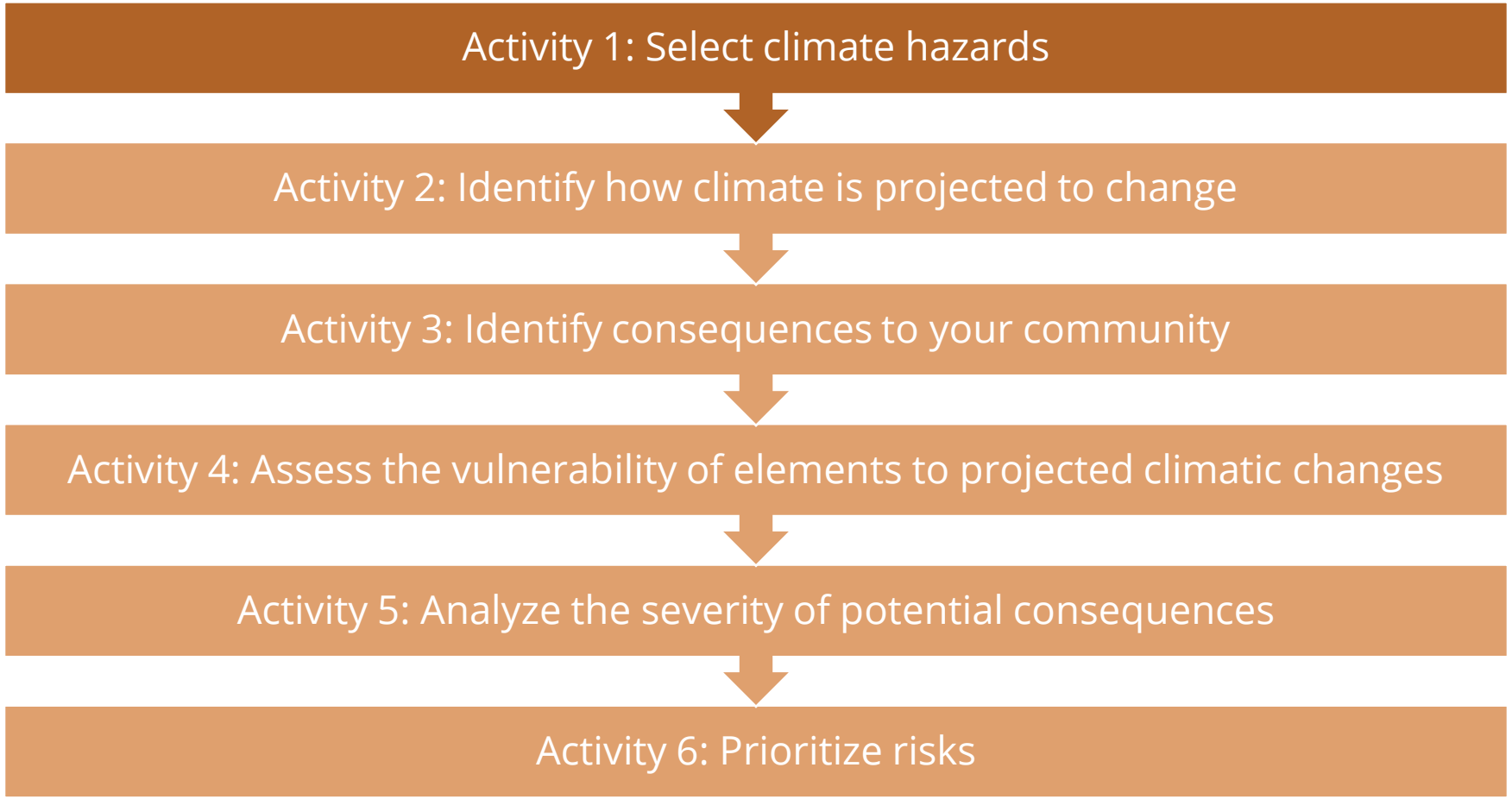

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Climate Hazards

Climate hazards are biophysical events or processes that can cause harm to human health, economies, infrastructure, and to natural resources and ecosystems

- Extreme Heat
- Extreme Cold
- Extreme Rainfall
- Drought
- Extreme Weather Events (storms)
- Extreme Wind
- Wildfire
- Freeze/thaw cycles
- Heavy Snowfall
- Landslides

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Activity 1

Select which hazard you want to focus on today:

- Extreme Heat
- Wildfire
- Extreme Rainfall
- Warmer Winters

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Activity 1

Hazard
Example: Wildfire

Activity 2

Variable	Near Term Projected Change	Long-Term Projected Change
ery Hot Days (+30C)	- Very hot days (+30C) are to increase to 8 by 2050	- Very hot days (+30C) are to increase to 19 by 2080

Activity 3

Consideration	Climate Consequences
Buildings and Infrastructure	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation

Activity 4

Sensitivity		Adaptive Capacity		Vulnerability Rating
Description	Rating	Description	Rating	
The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	2	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	2	High

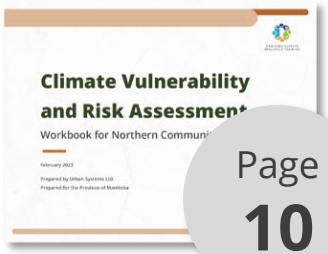
Activity 5

Consequence Level
Major - 3

Activity 6

Risk Level
High

CLIMATE HAZARD	CURRENT TREND(S)
Example: Wildfire	Community members, historical climate and weather data have observed an increase in the frequency and magnitude of wildfires. Increase in the damage (hectares burned, cost of rebuilding, firefighting efforts) and longer wildfire seasons (how many days on average) have been recorded.



Climate Risk Assessments

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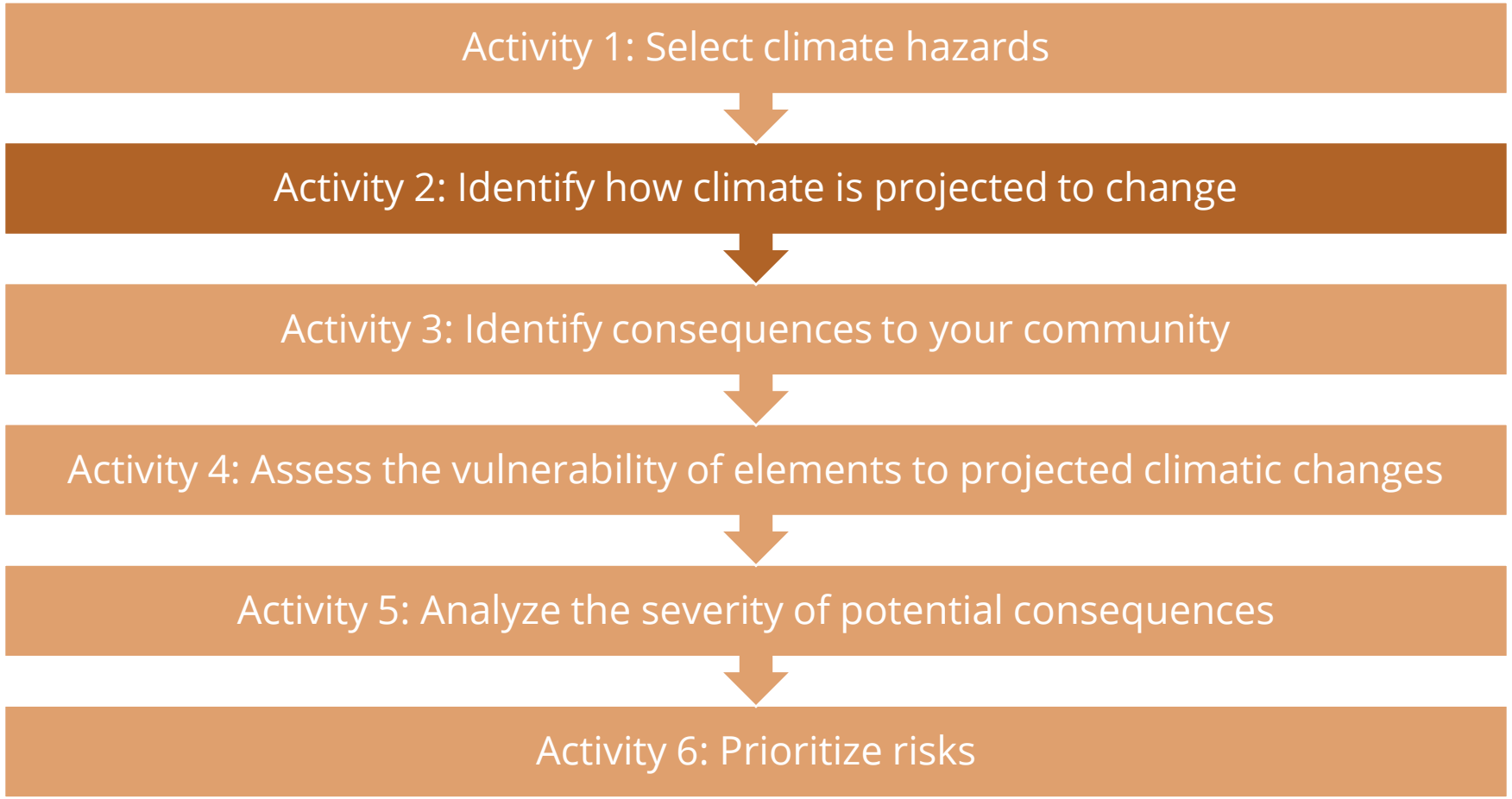

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Climate Variables

For each climate hazard, there are multiple variables that allow you to understand how the hazard will likely change

Climate Hazard: Drought

Variables:

- Very hot days (+30C)
- Precipitation
- Mean temperature during summer
- Dry days
- Warmest maximum temperature

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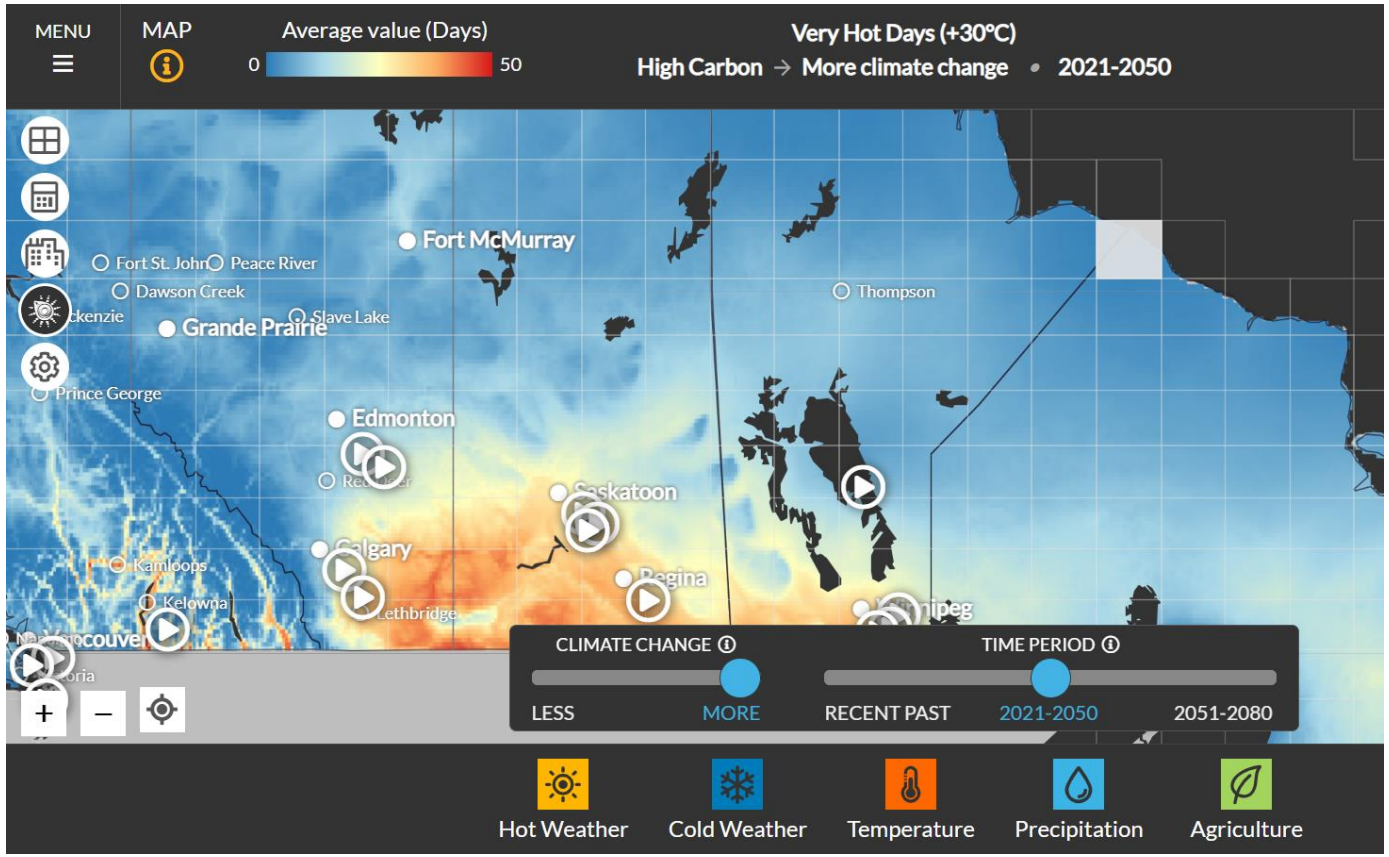
Climate Atlas of Canada

- National data portal and interactive tool which combines climate science, mapping, and storytelling
- Allows users to explore projected climate changes for many variables and indices



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Activity 2

Identify how your climate is projected to change

1. Look at climate reports and identify relevant climate variables
2. Identify how climate trends are projected to change with selected variables
3. Record results

Goal: Demonstrate how to use climate variables to understand how your community is expected to change over the century

Example Variables

Hazard	Variables (30 year averages)
Extreme Heat	Very hot days (+30C) Extremely hot days (+32C) Warmest maximum temperature
Wildfire	Summer Precipitation Mean Summer temperature Very hot days (+30C) Extremely hot days (+32C) Extremely hot days (+34C)
Extreme Rainfall	Precipitation (annual) Wet days (>10 mm) Max-1 day precipitation Max-5 day precipitation
Warmer Winters	Mean Temperature (Winter) Maximum Temperature (Winter) Minimum Temperature (Winter)

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Activity 1

Hazard
Example: Wildfire

Activity 2

Variable	Near Term Projected Change	Long-Term Projected Change
Very Hot Days (+30C)	- Very hot days (+30C) are to increase to 8 by 2050	- Very hot days (+30C) are to increase to 19 by 2080

Activity 3

Consideration	Climate Consequences
Buildings and Infrastructure	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation

Activity 4

Sensitivity		Adaptive Capacity		Vulnerability Rating
Description	Rating	Description	Rating	
The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides. River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	2	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	2	High

Activity 5

Consequence Level
Major - 3

Activity 6

Risk Level
High

CLIMATE HAZARD	CURRENT TREND(S)	NEAR TERM PROJECTED CHANGES (2021 – 2050)	LONG-TERM PROJECTED CHANGES (2051 – 2080)
Example: Wildfire	Community members, historical climate and weather data have observed an increase in the frequency and magnitude of wildfires.	- Precipitation during summer is to decrease by 11% - Very hot days (+30C) are to increase to 8 by 2050 - Very hot days (+30C) are to increase to 12 by 2080	- Mean temperature during summer is expected to increase to 30 C by 2080 - Extremely hot days (+34C) are to increase to 14 per year by 2080

Climate Risk Assessments

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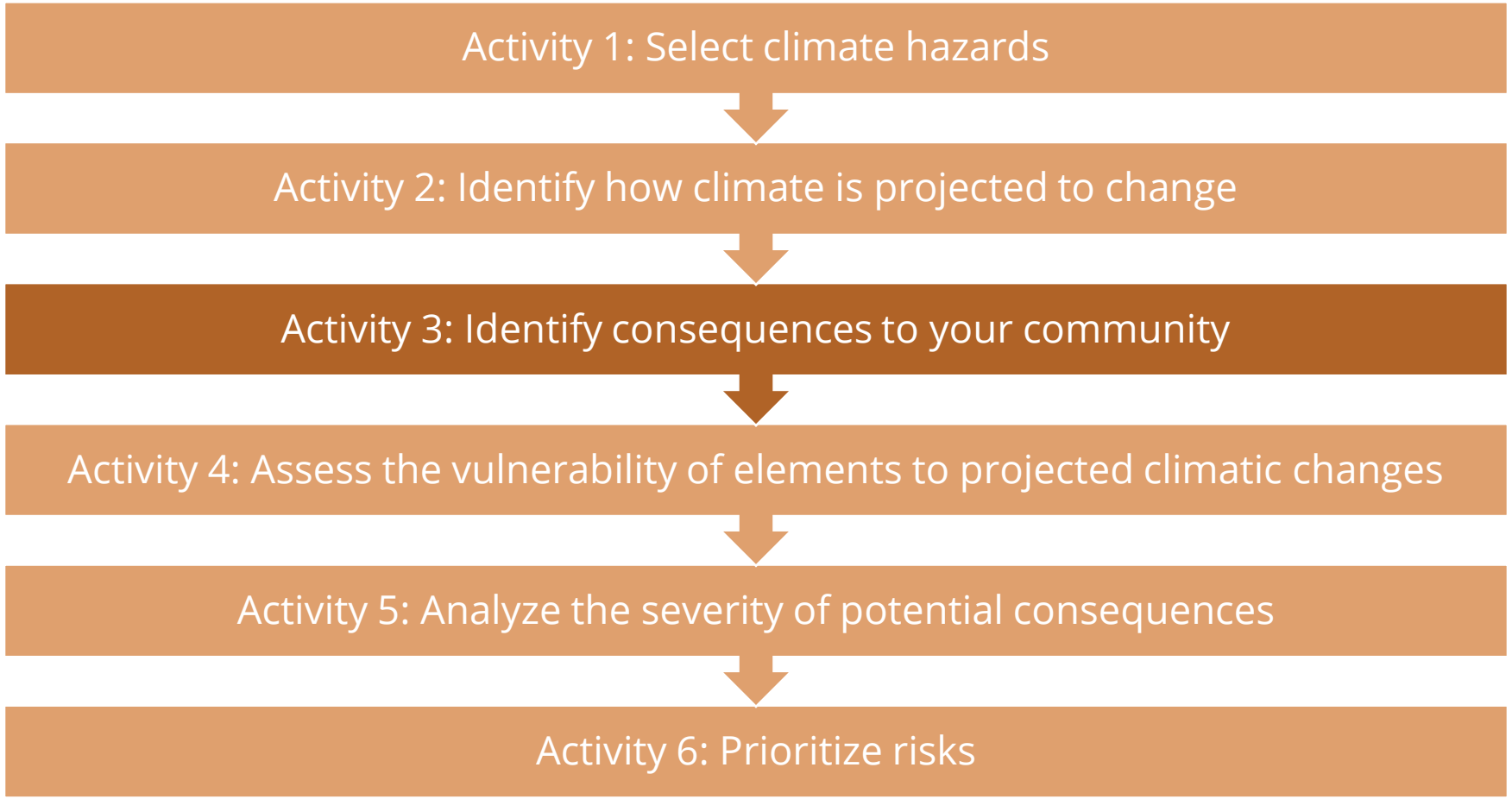

Climate Impacts and Consequences

Climate Hazard

(e.g. Wildfire)

Projected Changes

(e.g. increasing summer temperature, decreasing precipitation)

Climate Impacts

(e.g. crop failure/crop loss, supply chain disruption, decrease in wild game/hunting opportunities)

Potential Consequences

(e.g. decrease in local food yields, access to community severed, loss of transported goods/foods, economic loss)

How does climate change affect healthy foods and food security?

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- Changes in species availability + changing migration patterns
- Challenges in accessing harvesting areas
- Harvesting has become more difficult
- Increased financial costs (of hunting, food, harvesting, trapping or fishing, lost time and effort)
- Food borne illnesses
- Winter roads become less reliable causing communities to rely on expensive food
- Destruction of existing food systems and food poverty
- Land-based knowledge systems are challenged

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Activity 3

Identify consequences to your community

Consequence Considerations:

- Public health and safety
- Food security
- Buildings and infrastructure
- Local economy
- Financial and legal
- Natural environment
- Local service and operations

Goal: Help you identify how the climate hazards are expected to impact your community

Tips for developing an inventory of consequences

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Questions to keep in mind:

1. What occurs because of a specific hazard?
2. What are the effects of these hazards on human and natural systems?

Case Study: Fisher River Cree Nation (2019)

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Impacts of climate change:

- Maintenance of their food traditions, including the access and quality of their traditional foods.
- Knowledge keepers spoke about the increasing prevalence of pollution
- Water, land, and forest degradation
- Decline in land and water animal populations
- The negative role and effect of flooding/disasters in reducing both individual and communal food availability.
- Declining animal health due to pollution

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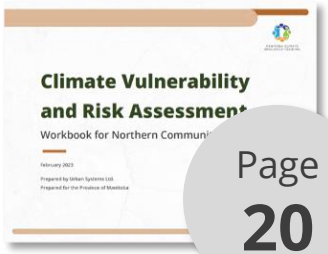
Activity 1	Activity 2		
Hazard	Variable	Near Term Projected Change	Long-Term Projected Change
Example: Wildfire	Very Hot Days (+30C)	- Very hot days (+30C) are to increase to 8 by 2050	- Very hot days (+30C) are to increase to 19 by 2080

Activity 3		Activity 4					Activity 5	Activity 6
Consideration	Climate Consequences	Sensitivity		Adaptive Capacity		Vulnerability Rating	Consequence Level	Risk Level
		Description	Rating	Description	Rating			
Food Security	Lower yields from community gardens/local food initiatives, disruptions in supply chain, impaired access to community	Community Garden #2 is particularly susceptible to this hazard as it is surrounded by vegetation	3	No firebreaks exist between community garden #2 and the forest	3	High	Major - 3	High

CLIMATE HAZARD	ELEMENT(S)	CLIMATE RISK (CONSEQUENCES)
Wildfire	Local Economy	Losses incurred due to wildfire will place an increased financial burden on business owners
	Buildings and Infrastructure	Wildfire may cause damage to community buildings and affect critical services
	Natural Environment	Lower yields from community gardens/local food initiatives, disruptions in supply chain



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BREAK

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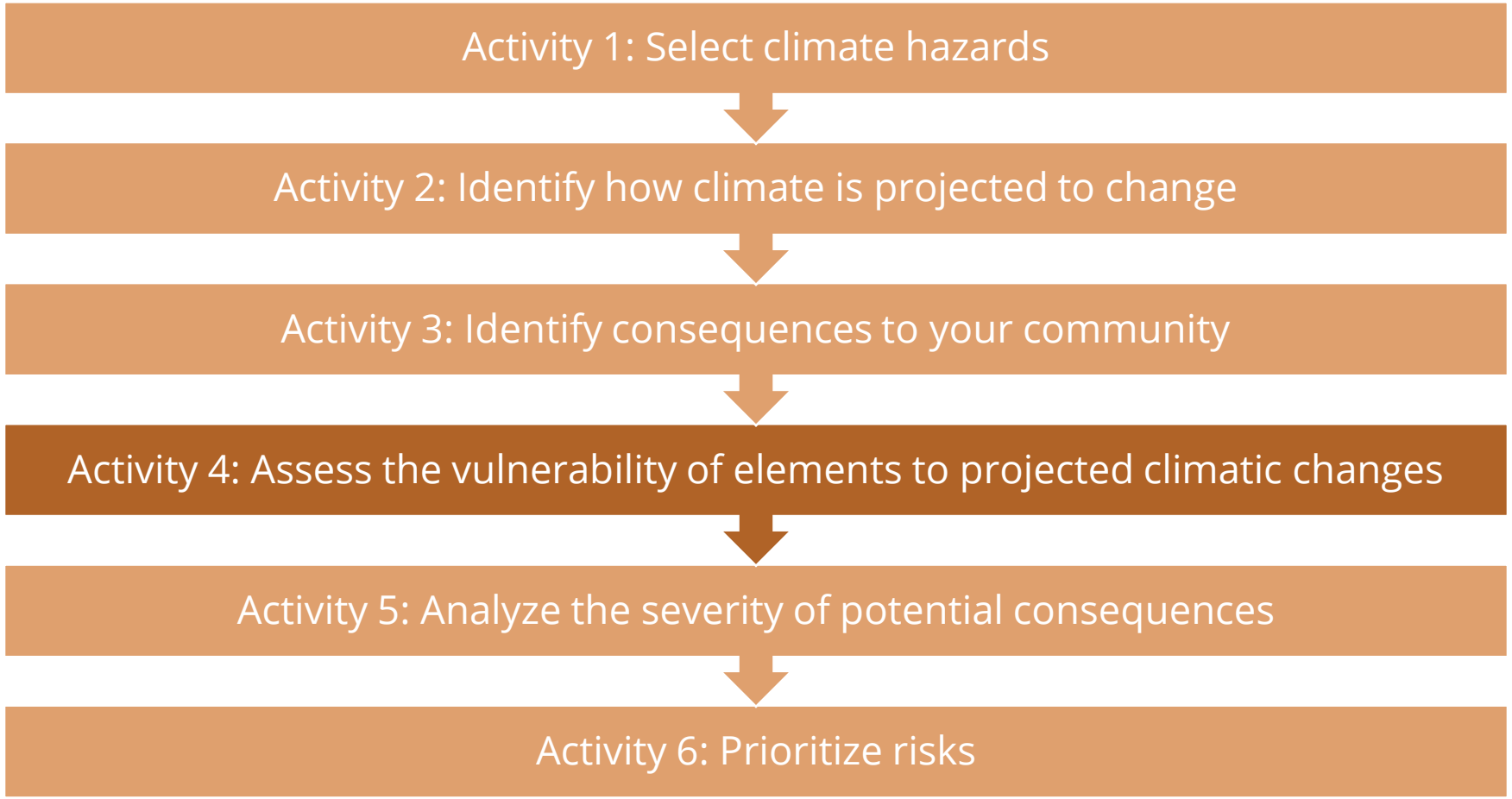
Climate Risk Assessments



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Sensitivity

The degree to which an element could be affected by a specific climate-related hazard.

+

Adaptive Capacity

How easily an element at risk can adapt when exposed to climate hazard(s).

Vulnerability

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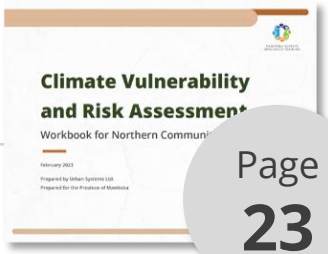
Sensitivity

If the impact occurs, will it affect functionality (the ability of the system / asset / group of people to serve its purpose or provide the use it is designed for)?

SENSITIVITY RATING		DEFINITION
HIGH	3	Functionality will get worse
MEDIUM	2	Functionality is likely to get worse
LOW	1	Functionality will stay the same



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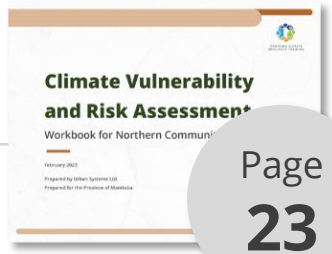
Adaptive Capacity

Can the system / asset / group of people adjust to the projected impact with minimal cost and disruption?

ADAPTIVE CAPACITY RATING		DEFINITION
HIGH	3	Will require substantial costs and intervention
MEDIUM	2	Will require some costs and intervention
LOW	1	Little to no costs or intervention necessary



Vulnerability Scale

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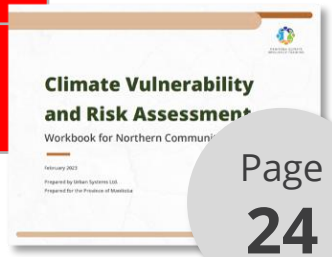
	Sensitivity	Low	Medium	High
Adaptive Capacity		**1**	**2**	**3**
Low	**1**	**V1**	**V2**	**V3**
Medium	**2**	**V2**	**V3**	**V4**
High	**3**	**V3**	**V3**	**V4**



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Vulnerability

VULNERABILITY RATING		DEFINITION
EXTREME	4	Extremely likely to be adversely affected, because the element, sector, group or asset is highly sensitive to a given hazard and has a low capacity to adapt.
HIGH	3	Highly likely to be adversely affected, because the element, sector, group or asset is highly sensitive to a given hazard and has a low capacity to adapt.
MODERATE	2	Moderately likely to be adversely affected, because the element, sector, group or asset is moderately sensitive to a given hazard and has a low or moderate capacity to adapt.
LOW	1	Low likelihood of being adversely affected, because the element, sector, group or asset has low sensitivity to a given hazard and has a high capacity to adapt.

Activity 4

Assess the vulnerability of elements to projected climatic changes

Questions to keep in mind:

1. How sensitive are community activities, assets, and services to changes in climate and changes in climate hazards?
2. What risk management measures are currently in place?
3. What is your community's ability to adjust, or take advantage of changes in climate and changes in climate hazards?

Goal: Help you understand your community's sensitivity and capacity to adapt to climate hazards

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Activity 1	Activity 2		
Hazard	Variable	Near Term Projected Change	Long-Term Projected Change
Example: Wildfire	Very Hot Days (+30C)	- Very hot days (+30C) are to increase to 8 by 2050	- Very hot days (+30C) are to increase to 19 by 2080

Activity 3		Activity 4					Activity 5	Activity 6
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		Description	Rating	Description	Rating			
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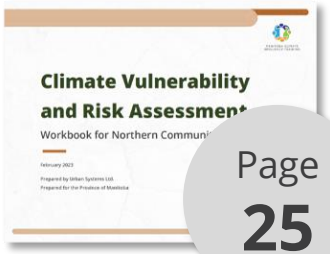
ELEMENT AT RISK							
CLIMATE HAZARD	PROJECTED	CONSEQUENCES	SENSITIVITY	SENSITIVITY RATING	ADAPTIVE CAPACITY	ADAPTIVE CAPACITY RATING	VULNERABILITY RATING
Wildfire	Precipitation during summer is to decrease by 11%, Very hot days (+30C) are to increase to 8 by 2050 and increase to 13 by 2080	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation or emergency access routes	The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	2	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	2	HIGH



Climate Risk Assessments

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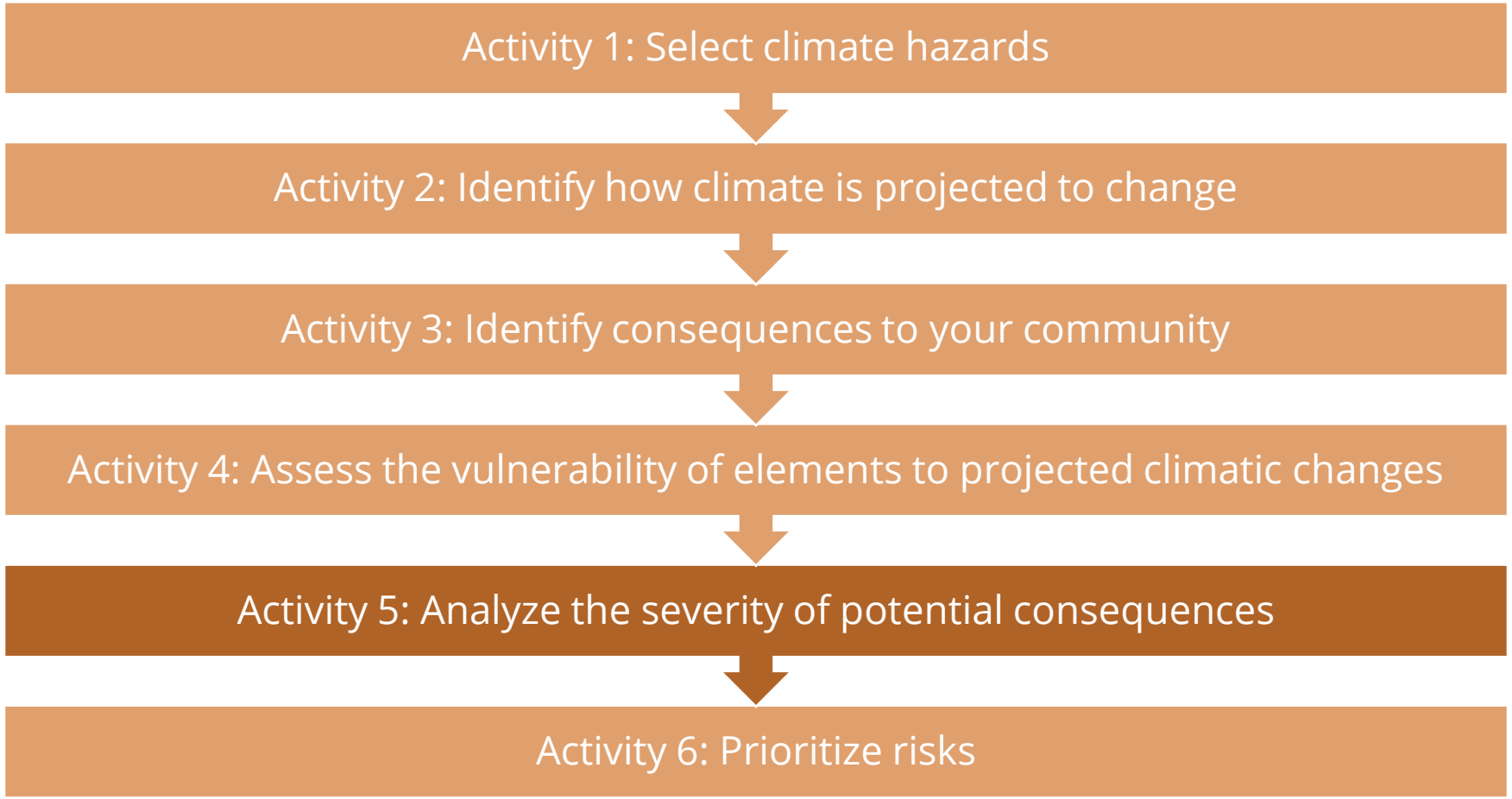

Consequence Rating

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CONSEQUENCE RATING		DEFINITION
EXTREME	4	Extreme impacts at the local and regional scale (non-acceptable) of very high importance to local operations and agencies to urgently address through adaptation.
MAJOR	3	Major impacts at the local and regional scale that are of high importance to local operations and agencies national agencies to quickly address through strategic adaptation actions.
MODERATE	2	Moderate impacts at the local and regional scale that are somewhat of importance to local operations and agencies to address through low cost or no-regret adaptation actions.
MINOR	1	No significant change in impact on the community, its people, and assets, and can be handled through business-as-usual processes or some local or regional impacts, with no specialised management required.

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Activity 5

Analyze the severity of potential consequences identified earlier for each climate hazard and assign consequence ratings

EXTREME	4
MAJOR	3
MODERATE	2
MINOR	1

Goal: Help you understand the severity of the potential consequences

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Activity 1

Activity 2

Hazard	Variable	Near Term Projected Change	Long-Term Projected Change
Example: Wildfire	Very Hot Days (+30C)	- Very hot days (+30C) are to increase to 8 by 2050	- Very hot days (+30C) are to increase to 19 by 2080

Activity 3

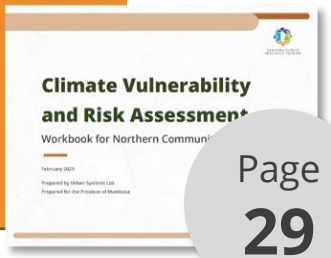
Activity 4

Activity 5

Activity 6

Consideration	Climate Consequences	Sensitivity		Adaptive Capacity		Vulnerability Rating	Consequence Level	Risk Level
		Description	Rating	Description	Rating			
Buildings and Infrastructure	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation	The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	2	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	2	High	Major - 3	High

CLIMATE HAZARD	PROJECTED	CONSEQUENCES	SENSITIVITY	SENSITIVITY RATING	ADAPTIVE CAPACITY	ADAPTIVE CAPACITY RATING	VULNERABILITY RATING	CONSEQUENCE LEVEL	CONSEQUENCE RATING
Wildfire	Precipitation during summer is to decrease by 11%, Very hot days (+30C) are to increase to 8 by 2050 and increase to 13 by 2080	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation or emergency access routes	The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	2	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	2	HIGH	MAJOR	3



Climate Risk Assessments

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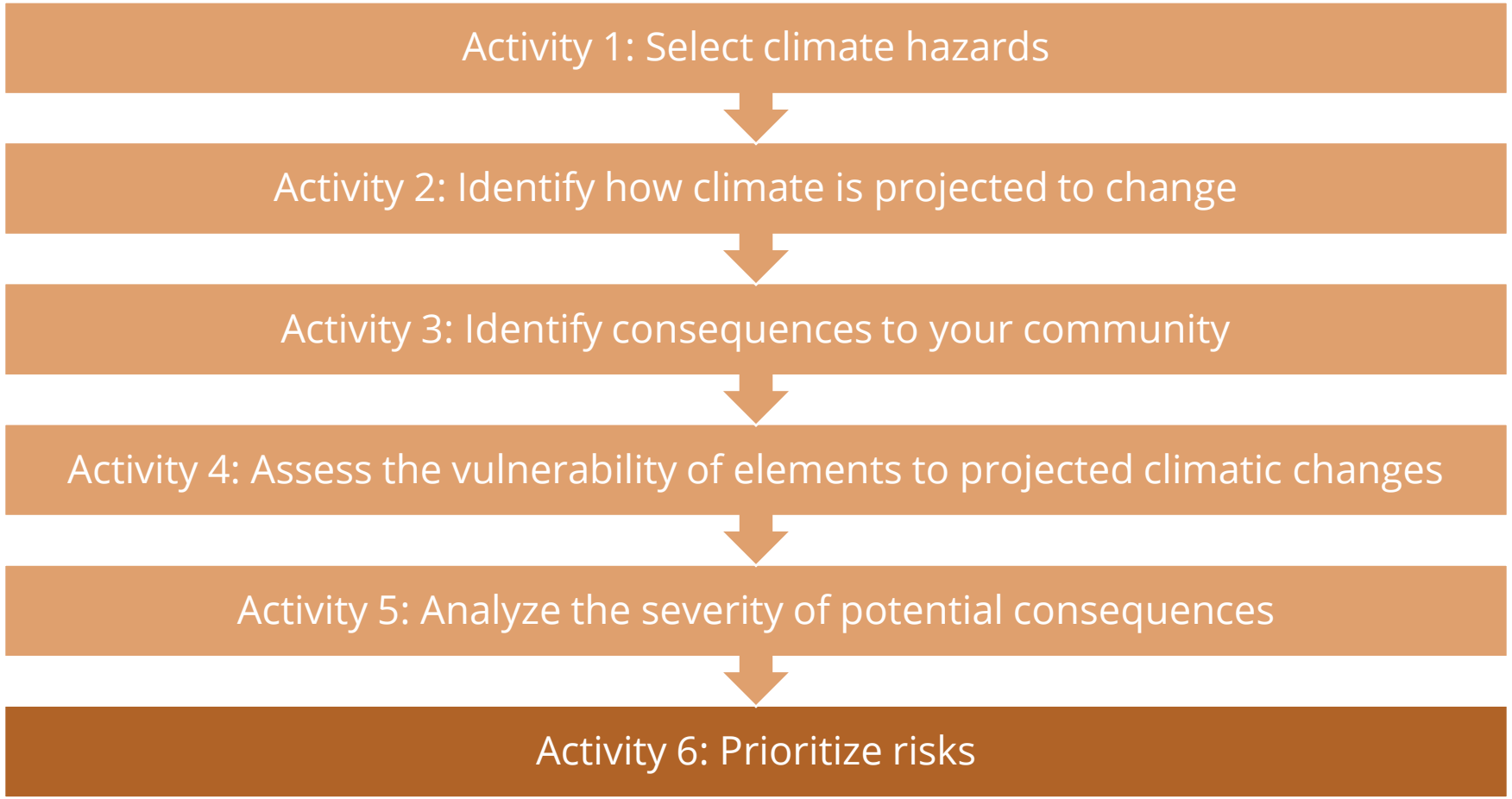

Activity 6

Prioritize risks in order to decide which risks to take forward into adaptation planning and response

HIGH RISK	Immediate actions must be developed.
MEDIUM RISK	Consider “low cost” and “no regret” adaptation options.
LOW RISK	Future action (to be monitored) either because of change in climate or change in community.
ACCEPTABLE RISK	More information needed.

Goal: Help you prioritize risks in order to start identifying adaptation actions

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Activity 1

Hazard
Example: Wildfire

Activity 2

Variable	Near Term Projected Change	Long-Term Projected Change
Very Hot Days (+30C)	- Very hot days (+30C) are to increase to 8 by 2050	- Very hot days (+30C) are to increase to 19 by 2080

Activity 3

Consideration	Climate Consequences
Buildings and Infrastructure	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation

Activity 4

Sensitivity		Adaptive Capacity		Vulnerability Rating
Description	Rating	Description	Rating	
The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	2	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	2	High

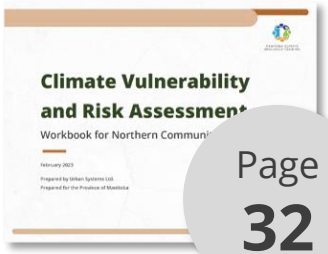
Activity 5

Consequence Level
Major - 3

Activity 6

Risk Level
High

ELEMENT AT RISK	BUILDINGS AND INFRASTRUCTURE						
CLIMATE HAZARD	PROJECTED	CONSEQUENCES	SENSITIVITY	ADAPTIVE CAPACITY	VULNERABILITY RATING	CONSEQUENCE LEVEL	RISK LEVEL
Example: Wildfire	Precipitation during summer is to decrease by 11%, Very hot days (+30C) are to increase to 8 by 2050	Wildfire may cause damage to community buildings (Town Hall, Fire Station #2 etc) and affect critical services like transportation or emergency access routes	The Town Hall is particularly susceptible to this hazard as it is fenced in by wildland vegetation on two sides River Road is sensitive to wildfire since it is one of the only 2 emergency access route for a subdevelopment and wildfires in the proximity may cut off evacuation efforts	There is a wildfire evacuation plan in place that designates Pineview Pass as an alternate emergency evacuation route in case River Road is cut off.	HIGH	MAJOR	HIGH RISK



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ADAPTATION MEASURES

Potential Adaptation Measures

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ADAPTATION MEASURES	WILDFIRE EXAMPLE
PHYSICAL INTERVENTIONS	Construction of firebreaks like fire-resistant chain-link fences
POLICY INTERVENTIONS	Encourage diversification of local food production through incentives, investigate the use of public lands for food production
HUMAN RESOURCES-FOCUSED INTERVENTIONS	Inform and encourage the community to participate in growing food locally (e.g. community gardens).
OPERATIONS AND MAINTENANCE-FOCUSED INTERVENTIONS	Ensuring FireSmart practices
NATURE-BASED SOLUTIONS	Restoration of natural firebreaks such as wetlands
INFORMATION-RELATED INTERVENTIONS	Public awareness campaigns regarding wildfire, easy to adopt behavioral changes to minimize chances of wildfire
RESEARCH-RELATED INTERVENTIONS	Understanding how indigenous fire management and traditional knowledge can be used to reduce consequences

IFS Barriers & Challenges

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- Less involvement in traditional practices
- Changes in lifestyle
- Environmental changes: flooding/disasters, pollution, land and forest degradation, water degradation, bad medicine (diseased animals)
- Store bought foods: unhealthy, expensive, frequently unavailable

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Activity 7 (Optional)

Identify potential adaptation measures for each of the prioritized climate risks identified in previous steps

Types of adaptation measures:

- Physical
- Policy
- Human Resources Focused
- Nature-Based Solutions
- Operations and Maintenance Focused
- Information Related
- Research Related

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HAZARD: Increasing Risk of Wildfire Due to Decreasing Summer Precipitation and Increasing Summer Temperatures	
PRIORITIZED CONSEQUENCE	**POTENTIAL ADAPTATION ACTION**
Building and Infrastructure	Have firesmart practices adopted throughout community, use fire resistant materials for new construction, have a firefighting plan, install sprinkler systems, have emergency evacuation plans
Local Economy	Ensure rebuilding policies are in place, make sure reconstruction and reimbursement channels are easy to access for affected parties, consider public education campaigns
Natural Environment	Consider having natural firebreaks for biodiverse ecosystems (restoring wetlands), have firefighting plans in place for woodland wildfires

HAZARD:	
PRIORITIZED CONSEQUENCE	**POTENTIAL ADAPTATION ACTION**
Food security	Firebreaks, early warning systems, climate hazard insurance

Case Study: Fisher River Cree Nation (2019)

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Opportunities for food security:

- Create change through the education system
- Create change through community education
- Work with land and community resources
- Promoting self-production
- Promotion of culture and identity (as a foundation to food)
- Create economic opportunities in community

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WHAT ARE SOME BARRIERS TO FOOD SECURITY IN YOUR COMMUNITY?

Indigenous Agricultural Practices

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- Agroforestry involves the deliberate maintenance and planting of trees to develop a microclimate that protects crops against extremes.
- Crop rotation is the practice of growing different crops on the same land so that no bed or plot sees the same crop in successive seasons.
- Mixed cropping, also known as intercropping, is a system of cropping in which farmers sow more than two crops at the same time.
- Polyculture systems involve growing many plants of different species in the same area, often in a way that imitates nature.
- Water harvesting is defined as the redirection and productive use of rainfall, involving a variety of methods to collect as much water as possible out of each rainfall.

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Food Security Adaptation Measures

- Equipping farmers with weather, fertilizer and conservation information and management practices
- Developing and distributing seeds that are tolerant to disease, heat and drought
- Decreasing community footprint and deforestation through innovations that enable growing with less land and water

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Food Security Adaptation Measures

- Unlocking finance for climate-smart solutions, especially for smaller communities, farms, businesses and entrepreneurs
- Making food systems climate-resilient by reducing postharvest loss and improving storage
- Adaptation of existing initiatives to account for the effect of climate change such as siting community gardens near water sources, tree fences etc.

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Food Security Adaptation Measures

- Integrating nutrition expertise into threat analyses, early warning systems and crisis response to protect nutrition among the most vulnerable, including women and children
- Investing in food safety research and technologies to reduce loss and waste of nutritious foods, maximize food production, and reduce climate impacts
- Addressing nutrition implications of climate on wild-sourced foods in policy

Food Security Adaptation Measures

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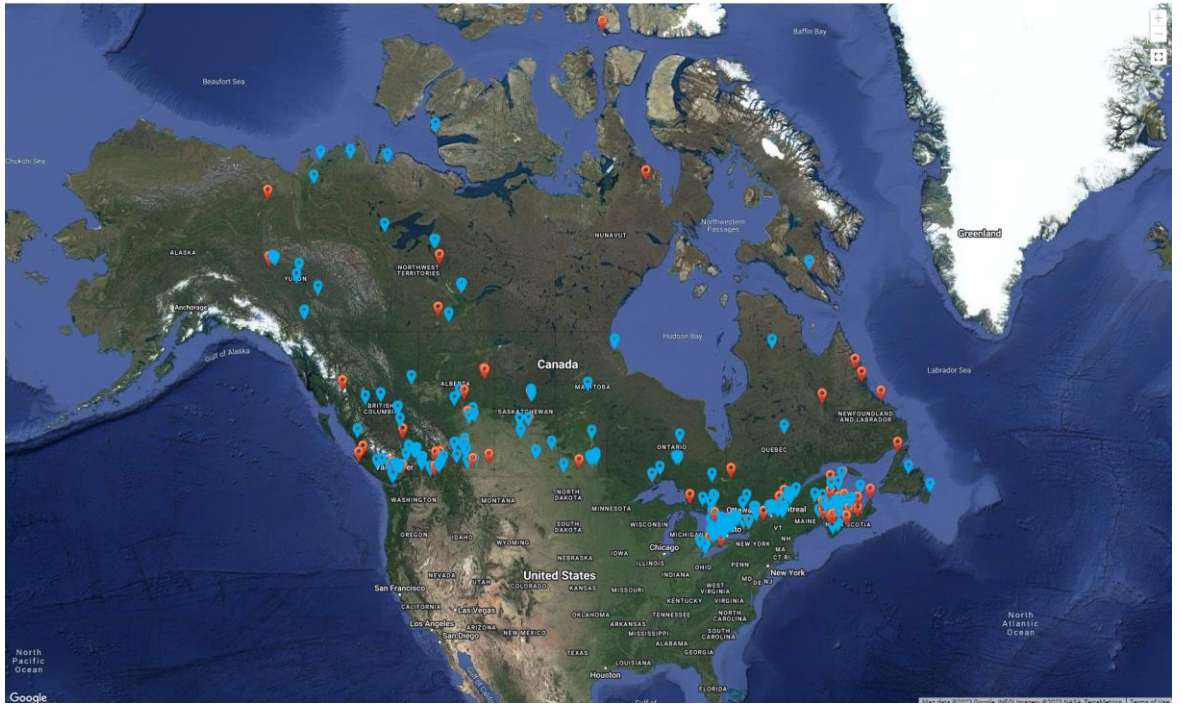
- Improving early warning systems to include access to data on climate hazards, helping institutions and governments proactively address risk, and take early action to reduce exposure and vulnerability to natural hazards;
- Investing in research to develop and improve agricultural insurance, microfinance and other tools that empower people to manage weather and climate risks and remain resilient

Climate Adaptation Case Study



- Map of Adaptation Actions includes case studies from across Canada
- Available at: www.changingclimate.ca/map/

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Funding Opportunities

Disaster Mitigation and Adaptation Fund

- Funder: Infrastructure Canada
- Deadline: **Currently Closed**
- Eligible infrastructure projects include new construction of public infrastructure and/or modification of existing public infrastructure that prevent, mitigate or protect against the impacts of climate change

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Funding Opportunities

Climate Change and Health Adaptation Program

- Funder: Government of Canada
- Deadline: **20th October 2023**
- Eligible projects include:
  - Traditional food security
  - Impacts of extreme weather events
  - Emergency preparedness
  - Mental health impacts of climate change on youth

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Funding Opportunities

First Nations Adapt Program

- Funder: NRCAN
- Deadline: No Deadline
- Eligible community development projects include:
  - Community climate change risk assessment
  - Collecting baseline information and integration of climate change projections
  - Performing winter road realignment studies
  - Flood mapping

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Funding Opportunities

Indigenous Community-Based Climate Monitoring Program:

- Funder: NRCan
- Deadline: No Deadline
- Eligible community development projects include:
  - Community Engagement
  - Youth communication/education
  - Climate Monitoring

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CONCLUSION

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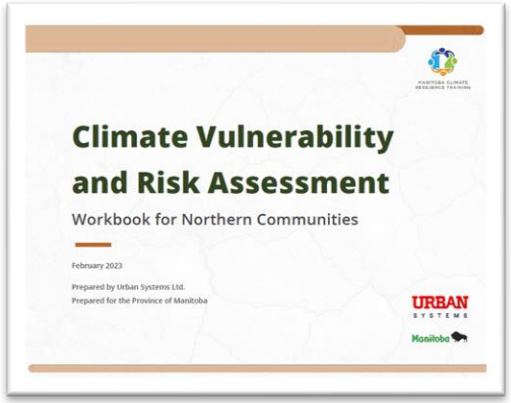
Follow-Up Services

We can provide support with developing your own Vulnerability and Risk Assessment using the workbook template



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Thank You!

Please complete an Exit Survey and leave the worksheets behind

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THANK YOU!