

Preparing for Climate Change ICLEI Canada Guide and Workbook



ACT Conference 2010
14 December 2010
Ewa Jackson

● Climate ≠ Weather!

What's wrong with this image?



Climate is not the same as with weather.


 **Climate ≠ Weather!**

Weather is the state of the atmosphere at a **particular time and place.**

Climate is how the atmosphere behaves over **long periods of time.**



- Increased annual and seasonal temperature

- Increased annual precipitation

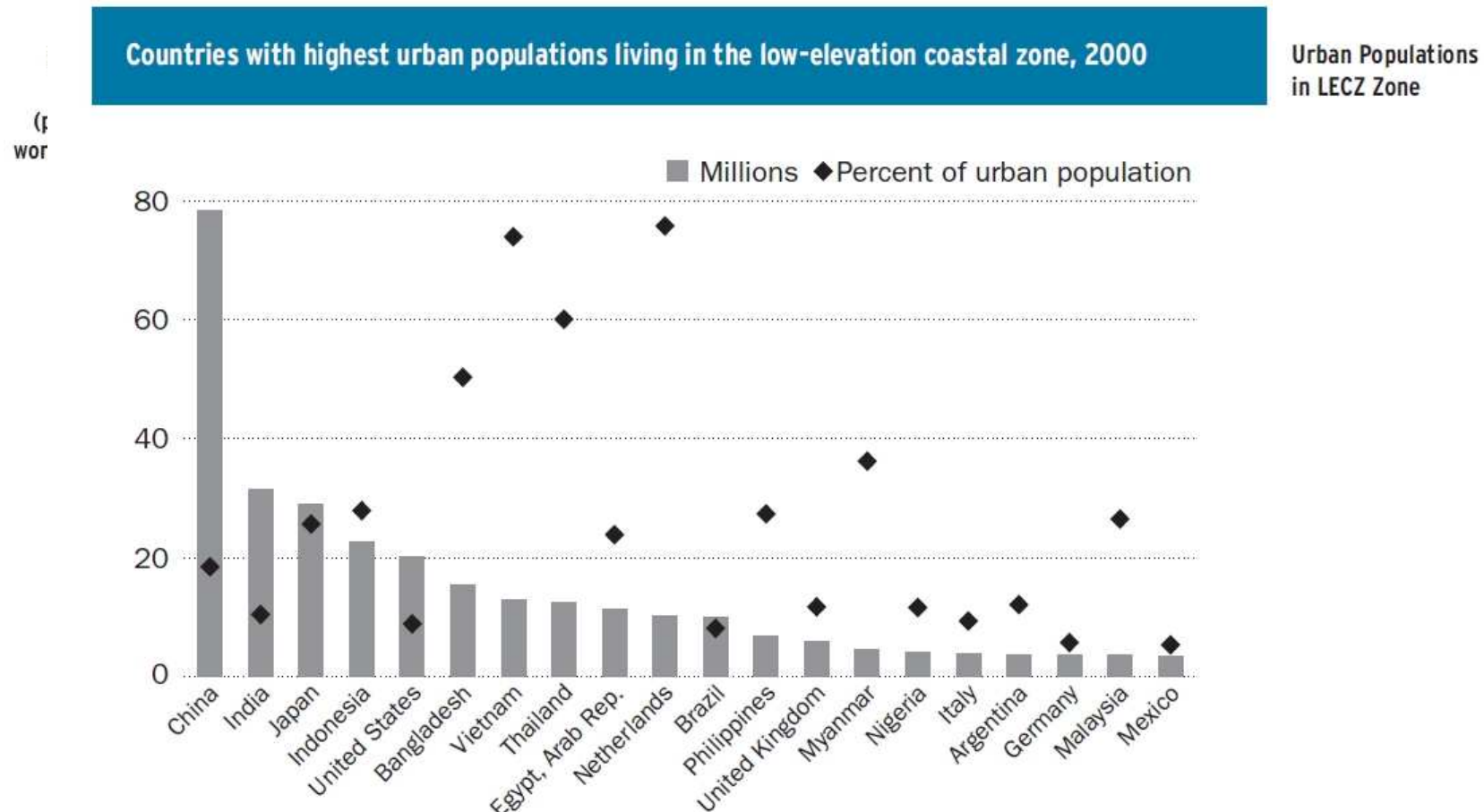
- Increased frequency and intensity of extreme events

- Increased water temperatures

- Changes in water levels



Why Cities?



- In Europe, 70% of the largest cities have areas that are particularly vulnerable to rising sea level and CO2, and most of these cities less than 10 miles from the US sea level.

● How can cities adapt?



● What are Canadian Communities Doing?

- City of Toronto
- City of Kamloops
- City of Edmonton
- Ville de Sept Îles
- City of London
- Municipal Corporation of Delta
- District of Saanich
- Quebec City
- City of Iqaluit
- Hamlet of Le Goulet
- City of Halifax
- Town of Annapolis Royal
- Peel Region



ICLEI's Adaptation Efforts Worldwide

Changing Climate, Changing
Communities: Guide and
Workbook for Climate Adaptation
Adaptation Initiative
Canadian Secretariat

CHAMP – Local Responses to CC
Committee of Regions Project
Vulnerability Indicators Brochure
European Secretariat

Resilient Cities Congress
Mayors Adaptation Forum
UNISDR Making Cities Resilient Campaign
World Secretariat

Vulnerability Pilot Project
South East Secretariat

Planning for Climate
Change
Climate Resilient
Communities Program
US Office

Five-city SSA Network
Africa Secretariat

Testing ACCCRN in Three
Indian Cities
Coastal City Adaptation Plans
South Asia Secretariat

Adaptation Toolkit
Adaptive & Resilient
Communities
ACCCRN
CCP Integrated Action
Integrated Climate Action
Indonesia
ICLEI Oceania

·I·C·L·E·I
Local
Governments
for Sustainability

**CHANGING
CLIMATE,**

**CHANGING
COMMUNITIES:**

Guide and Workbook for Municipal Climate Adaptation

·I·C·L·E·I
Local
Governments
for Sustainability

·I·C·L·E·I
Local
Governments
for Sustainability

**CHANGING
CLIMATE,**

**CHANGING
COMMUNITIES:**

**CHANGING
CLIMATE,**
**CHANGING
COMMUNITIES:**

Information Annexes and Materials



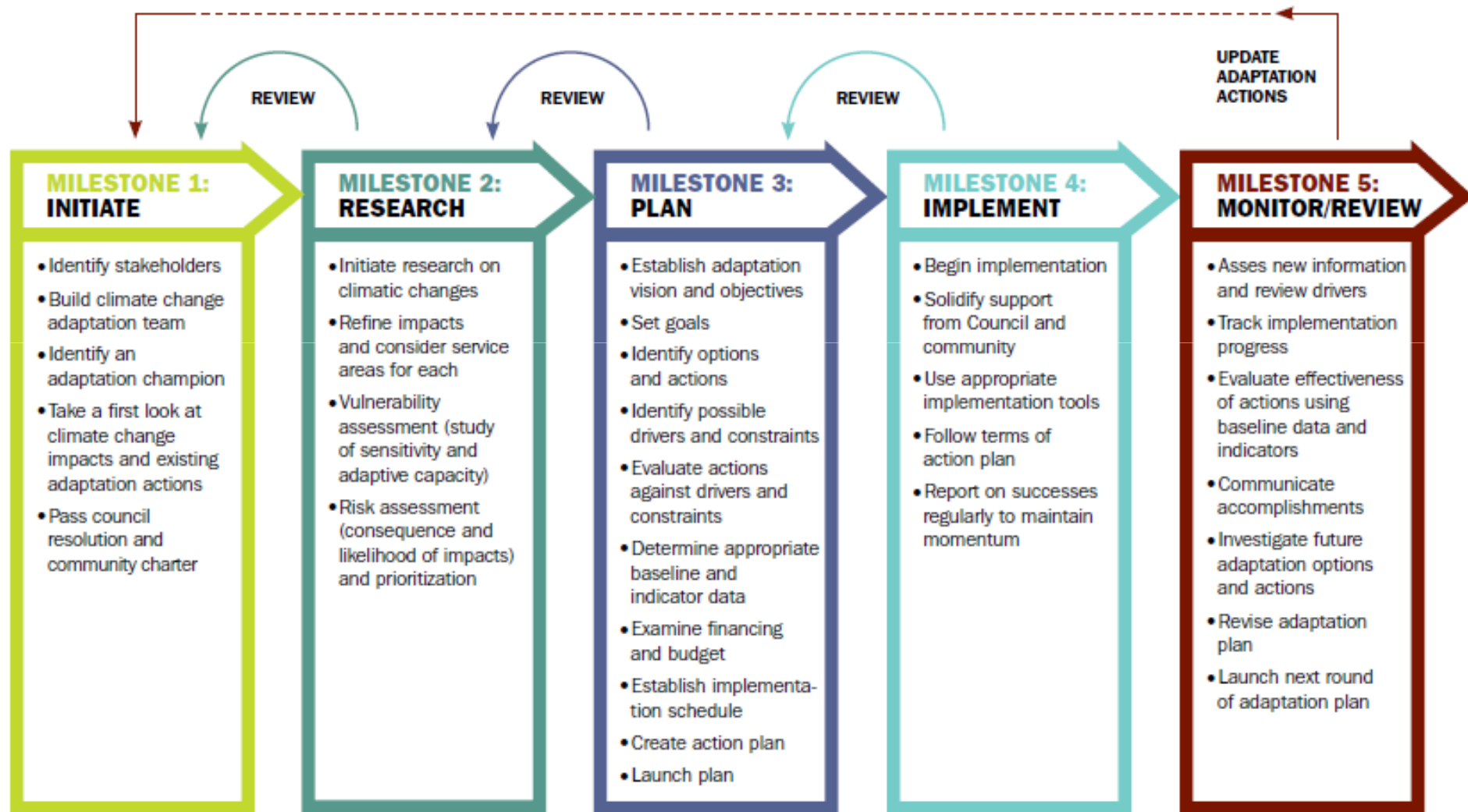
Workbook for Municipal Climate Adaptation

To download:
www.iclei.org/canada

Basic Milestone Methodology



Milestone Methodology



Chapter 1: Climate Change Primer

Four key messages:

- 1) Introduction to adaptation
- 2) Global climate change & climate change in Canada
- 3) Importance of local government action
- 4) Local government action mechanisms

CLIMATE CHANGE PRIMER

INTRODUCTION TO ADAPTATION

Climate change is already being felt in towns and cities across the country. Canadian communities are becoming increasingly vulnerable to a range of impacts including rising temperatures, more frequent and intense storms and sea level rise. Municipal services and infrastructure are increasingly being affected by these events.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that the window for climate change is now “decisive” and that most of the observed temperature increase since the mid-1970s and the century has been caused by human greenhouse gas emissions. There is much evidence that rapid warming around the world, including glaciers, ice sheets and sea level rise, melting permafrost, changing growing seasons and shifting snow cover.

Across Canada, warmer temperatures have spurred the migration of invasive plants and pests, species, birds, insects and glaciers, and increased sea level rise among vulnerable populations. While all of these are affecting Canada to some extent, extreme weather events, including ice storms, floods, and severe fires.

While only a fraction of the increase in climate in Canada is expected to be extreme, many opportunities for increasing resilience, increasing risk of flooding, drought, storm surge, disease and various other impacts. While there are some of the national changes, it is important to note that regions of the country will be impacted differently by climate change.



Mitigation measures are designed to reduce the extent of greenhouse gas (GHG) emissions to climate change and are meant to counter long-term trends. Reducing GHG emissions is the most important way to limit the magnitude and timing of impacts to the world's climate, climate change adaptation is necessary to minimize harmful and unwanted opportunities. However, Canada's municipalities have already undertaken climate change efforts with a goal to work and more successfully reduce their emissions. However, with the increasing effects of climate change occurring rapidly, municipalities are beginning to realize their vulnerability to the changes that are a reality underway and to develop responses that protect their citizens and their economies. While risk reduction strategies are critical to the prevention of climate change impacts, action taken to reduce GHG emissions can prevent climate change impacts and help prepare communities for the climate impacts already under way or that are more than likely.

Mitigation is necessary to reduce the rate and magnitude of climate change, while adaptation is essential to reduce the damage from climate change that cannot be avoided.

ADAPTATION to climate change can include any activity that reduces the negative impacts of climate change and/or takes advantage of new opportunities that may be presented. This includes activities that are taken before impacts are observed (proactive) and after impacts have been felt (reactive). Both anticipatory and reactive adaptation can be planned (i.e. the result of deliberate policy decisions), and reactive adaptation can also occur spontaneously. In most circumstances, anticipatory adaptations will incur lower long-term costs and be more effective than reactive adaptations. Successful adaptation does not mean that negative impacts will not occur, only that they will be less severe than would be the case if no adaptation occurred.”

IPCC (2007) Working Group II: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007

IPCC (2007) Working Group II: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007

GLOBAL CLIMATE CHANGE

During the past century, the global climate has grown warmer. Increased temperatures have been accompanied by a number of other observed changes in the global climate (Table 1-1). Reports indicate that the average Northern Hemisphere temperature during the past 50 years has been higher than in any other time during the past 1,000 years.

TABLE 1-1
Observed change in surface air and water conditions

Parameter	Observed	Estimated
Air temperature	Increased 0.7°C Increased 0.2°C per decade since 1979	1998-2000 See Box 1-2 (page)
Surface temperature	Increased in depth of 3000 m	
Sea level	Rise 1.8 millimetres since 1993	See Table 1-2 (page) See Table 1-3 (page)
Sea ice	Declined	See Table 1-4 (page)
Mountain glaciers	Retreating overall	See Table 1-5 (page)
Arctic sea ice extent	Decreased 1.7% per decade since 1979	See Table 1-6 (page)
Permafrost extent	Decreased by roughly 1%	See Table 1-7 (page)
Heavy precipitation events	Increased in frequency	
Droughts	Increased in severity and duration	See Table 1-8 (page)
Heat waves	Increased in frequency	
Tropical cyclones	Increased in severity	See Table 1-9 (page)

During the past two decades, the IPCC estimates that average global temperatures will increase by 0.2°C per decade. Even in the more optimistic scenario, the IPCC warns that by 2050, the average global temperature will rise 1.5°C per decade, which is expected to be the most likely scenario. The greatest warming is expected to occur over land and in high northern latitudes, in places such as Canada. Higher temperatures will be accompanied by continued retreats in snow cover and ice, and an increase in permafrost loss. In addition, increasing evaporation, which has been projected to be 10% of surface water, in the summer will lead to more severe droughts, while winter precipitation will be slightly wetter than normal. Precipitation is also expected to increase in winter months.

CLIMATE CHANGE AND CANADA

In Canada, over the past few years, climate change has resulted in increased temperatures across the country, changes in precipitation patterns, and sea level rise. Increasing temperatures and changes in precipitation patterns are expected to have a range of impacts on many physical and biological systems, such as ice sheets and glaciers, permafrost, and plants and animals. In addition, there is an increase in the occurrence of heat waves, droughts, heavy snowfall, coastal erosion, and other climate-related hazards due to the rise in sea level rise.

Do Your Part...

- Informal Climate Change and Resilience
- Five Aspects of Adaptation: Canada in a Changing Climate, Natural Resources Canada

Temperatures

On average, Canada has warmed by more than 1°C since 1979, a clear warming trend in spring, summer, and the global average. All regions of Canada have experienced warming, with the greatest temperature increases now seen in the Yukon and Northwest Territories. In the most recent assessment, Canada is expected to warm 1°C by 2050 and 4°C by 2100. In addition, Canada is expected to experience more extreme weathering and heat waves, with a 1°C increase in the frequency of extreme weathering events and a 2°C increase in the frequency of extreme weathering events. In addition, there is a 1°C increase in the frequency of extreme weathering events in the Atlantic, Pacific, and high Arctic regions. In Northwest Canada, winter temperatures are expected to increase by 1°C by 2050 and 2°C by 2100.

Precipitation

Canada has, on average, become wetter during the past half-century, with an average precipitation increase of 10% per decade. This increase is expected to continue, with the largest percentage increase in precipitation now occurring in the high Arctic (10-15%), while parts of Southern Canada generally in the Prairies, may see a decrease (1-2%) or even a decrease in precipitation in some areas. With respect to precipitation, most of Southern Canada, except the western part, which has seen an increase in precipitation, has experienced significant increases in summer and winter precipitation. In contrast, Northern and Central Canada and Southern Canada have regions with significant increases in precipitation in spring and autumn.

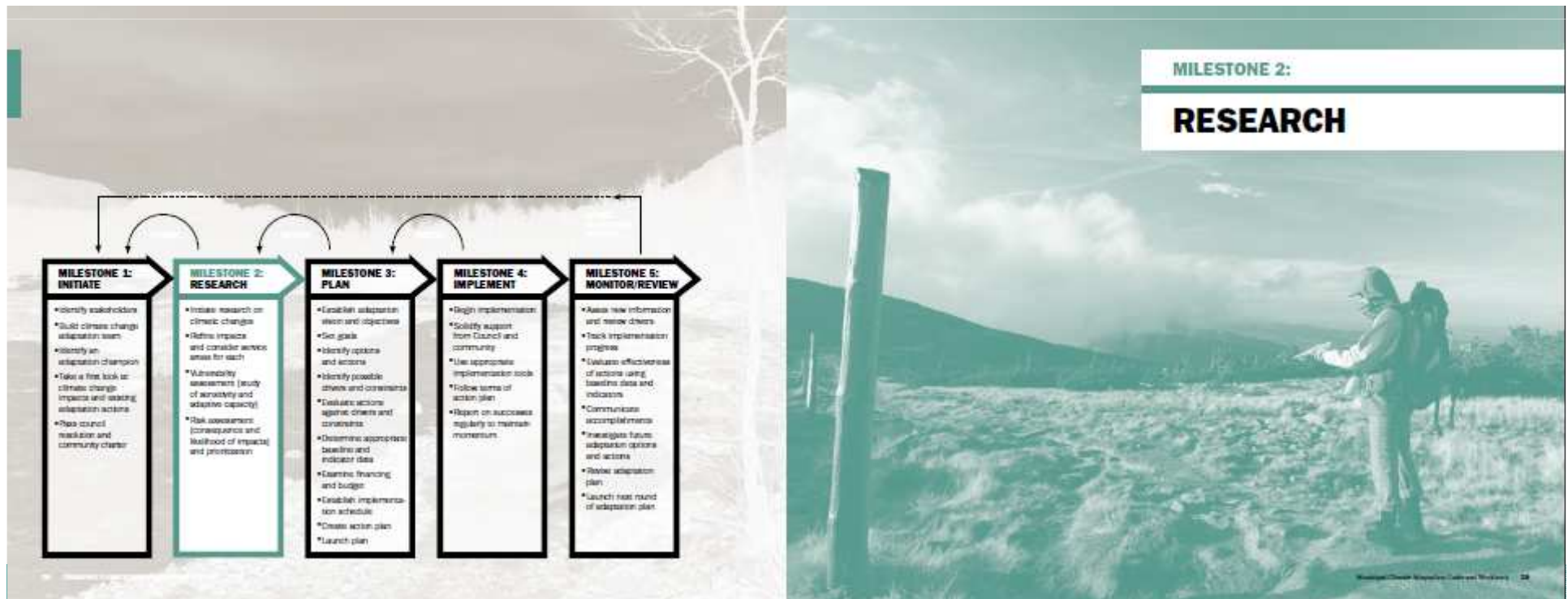
Milestone One: Initiate

- 1) Identify possible stakeholders and build climate change adaptation team;
- 2) Select adaptation champion;
- 3) First looks at climate change impacts;
- 4) List of existing municipal actions to improve adaptive capacity and municipal plans and activities that could include adaptation; and
- 5) Council resolution to solidfy commitment.



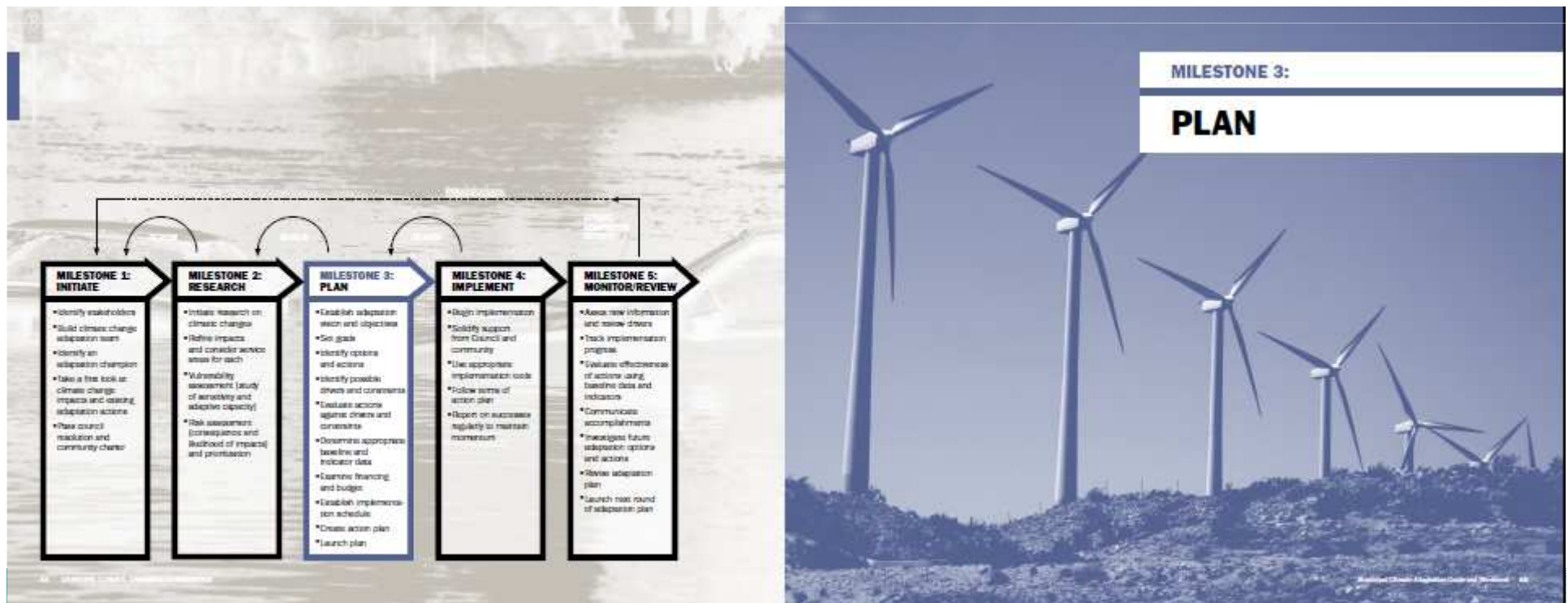
Milestone Two: Research

- 1) List of impact statements and the service areas that will be affected;
- 2) A vulnerability assessment (made up of both a sensitivity and an adaptive capacity assessement);
- 3) A risk assessment (looking at the impacts identified as having high vulnerability); and
- 4) A prioritized list of impacts.



Milestone Three: Plan

- 1) Vision statement;
- 2) Adaptation goals and objectives;
- 3) List of adaptation actions (having looked at drivers/constraints, baselines/indicators, finance/budgeting);
- 4) Draft adaptation plan and implementation schedule; and
- 5) Final adaptation plan and policy integration options.



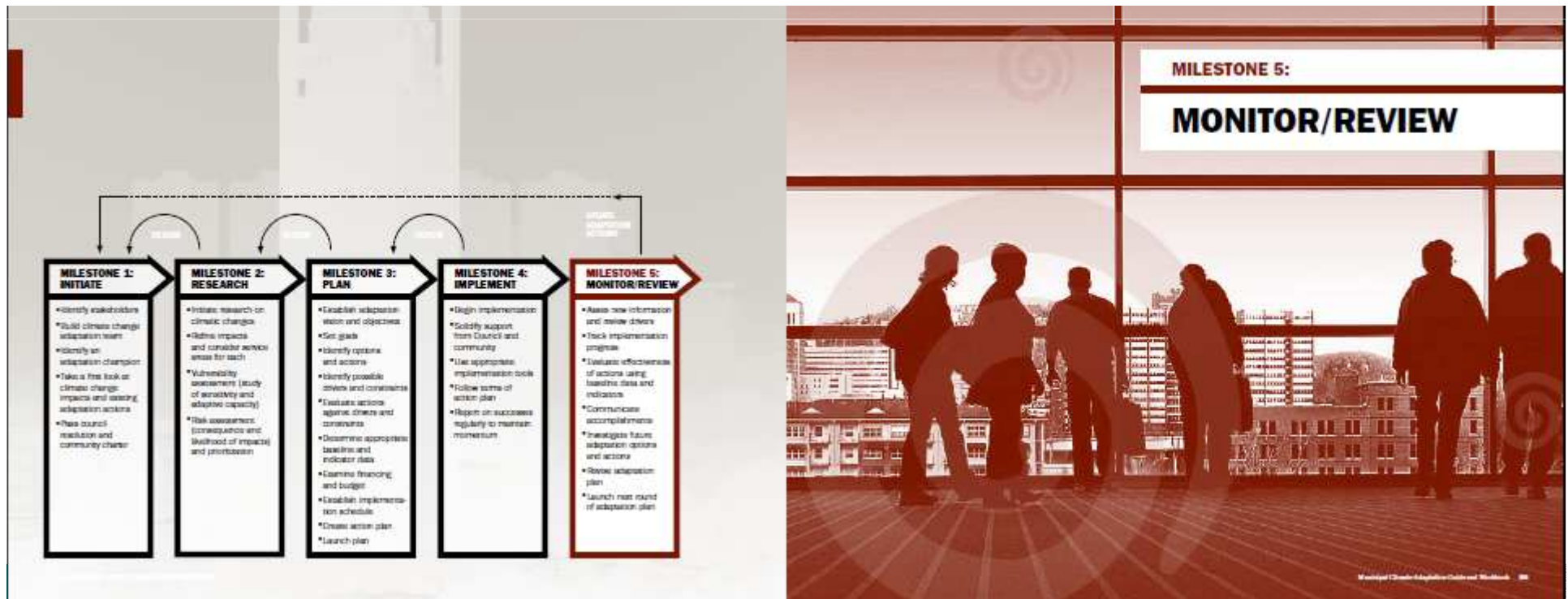
Milestone Four: Implement

- 1) Support and approval from staff and Council;
- 2) Identified implementation tools; and
- 3) Solidified community engagements and partnership opportunities.



Milestone Five: Monitor/Review

- 1) Review of scientific information;
- 2) Monitoring of progress on implementation;
- 3) Review of effectiveness of actions (based on baseline data and indicators);
- 4) Updated action plan; and
- 5) Communication of accomplishments.



CHANGING CLIMATE,

CHANGING COMMUNITIES:



Workbook for Municipal Climate Adaptation


 **Worksheets Included:**

WORKSHEET 1	Stakeholder Identification
WORKSHEET 2	Building an Adaptation Team
WORKSHEET 3	Taking a First Look
WORKSHEET 4	Using Issue Briefs
WORKSHEET 5	Sample Council Resolution
WORKSHEET 6(a)	Recording Climatic Changes
WORKSHEET 6(b)	Refining Impact Statements and Identifying Service Areas
WORKSHEET 7	Conducting a Vulnerability Assessment
WORKSHEET 8	Conducting a Risk Assessment
WORKSHEET 9	Establishing a Vision and Setting Goals and Objectives
WORKSHEET 10	Identifying Adaptation Options
WORKSHEET 11	Identifying Drivers and Constraints
WORKSHEET 12	Using Indicators and Creating a Baseline
WORKSHEET 13	Drafting an Adaptation Plan
WORKSHEET 14	Press Release Template
WORKSHEET 15	Using and Allocating Implementation Tools
WORKSHEET 16	Updating your Adaptation Plan
WORKSHEET 17	Communicating Accomplishments



Sample Worksheet

WORKSHEET 1 STAKEHOLDER IDENTIFICATION

PURPOSE	TO IDENTIFY KEY STAKEHOLDERS RELEVANT TO YOUR COMMUNITY'S ADAPTATION WORK
Resources Needs	<ul style="list-style-type: none"> ✓ Adaptation Team time commitment – minimal ✓ Minimum 2-3 staff for brainstorming exercise – minimal time commitment
Output	A refined list of informal and formal stakeholders.
How this fits with larger process	This stakeholder identification process establishes a foundation for future communication and input from stakeholders. This list of stakeholders will also inform the building of your community's adaptation team.

INTRODUCTION

Completing a stakeholder identification exercise can assist in identifying the necessary participants to include in a climate adaptation planning process. The stakeholders identified may be individuals or groups you want to have on your adaptation team (see Worksheet 2) or who you might want to engage throughout the process, for example as part of your research effort or marketing strategy.

The first step in identifying stakeholders is to look at your community's *spheres of influence*. This exercise can help to identify who your community is accountable to and who it can learn from. Exhibit 1.1 illustrates this idea:

- The circle at the centre of the diagram represents the person (or department) tasked with initiating the adaptation planning effort in the community; this sphere represents the area that you have the most control and responsibility over.
- The next layer includes the departments, organizations, or individuals with which you have a direct relationship or partnership. It is important that the groups in this layer have common goals and/or a shared purpose, but over which you may or may not have direct control.
- The next layer includes those individuals or organizations that have indirect effects on the work you do, perhaps through loose or informal relationships, but where you have even less control than with those in the previous circle.
- The final outermost layer represents the wider community over which you have minimal control but should remain included (or acknowledged) in this initial stage.

It is important to note that as you get closer to the centre sphere your direct influence or control increases and as you move out from the center your ability to impact the external circles decreases. Also consider that stakeholders may move between the different spheres as your adaptation work progresses.

EXHIBIT 1.1

Spheres of Influence



INSTRUCTIONS

Bring a few colleagues together and as a group begin brainstorming potential stakeholders. Place yourself or your department in the centre of the diagram and work your way outwards. Exhibit 1.2 lists possible stakeholders that can be relevant to your adaptation effort.



INSTRUCTIONS

Bring a few colleagues together and as a group begin brainstorming potential stakeholders. Place yourself or your department in the centre of the diagram and work your way outwards. Exhibit 1.2 lists possible stakeholders that can be relevant to your adaptation effort.

EXHIBIT 1.2

Possible Stakeholders

POSSIBLE STAKEHOLDERS	
<ul style="list-style-type: none"> • Other municipal departments – staff and department heads (engineering, parks & recreation, corporate services, legal, public health, emergency response, finance, etc.) • City Manager or CAO • Mayor and Council • City operations contractors • Utilities • Other levels of government (federal, provincial, territorial, regional) • Residents • Agricultural community • First Nations groups • Housing authority • School boards • Local universities, colleges or other knowledge institutions 	<ul style="list-style-type: none"> • Non-Governmental Organizations • Local businesses • Media • Community groups • Local neighbourhood associations • Consultants • Public transit authorities • Large industry representatives • Developers • Social policy groups • Hospitals • Port authority • Coast guard • Airport authority • Chamber of Commerce

To complete the table below use the spheres of influence idea and consider who you have the most influence over and whose actions would have the greatest impact on your adaptation work. Likewise, based on your existing knowledge of how the effects of climate change will impact your community, consider which stakeholders you would want to engage.

Specifically:

- What information do you need with regard to understanding and acting on a climate change impact? Who has (or has access to) this information?
- What are the areas that you have influence over? Is there anyone who can help you use that influence?
- Who are the individual stakeholders that you can influence and where do they fit within the spheres?

Once you have taken some time to consider these questions fill in the table below with the stakeholders you have identified as having a direct relationship with, an indirect relationship, or those which fall into the wider community. Keep in mind their placement in either the direct, indirect, or wider spheres may change throughout the process. Consider those stakeholders that would be most useful to engage, including those that you do not already have a relationship with. At this time, leave the last two columns blank.

Direct Stakeholders	Indirect Stakeholders	Wider Community	On adaptation team (Y / N)	If not for team, how to include in list (be specific)

Once you have filled out the table, take a look at the stakeholders that you have identified. Consider:

- How might each stakeholder contribute to the planning process?
- Is there anyone in your list that you do not already have a relationship with?
- What about those people and organizations in wider community (the outer circle), do you already engage them? Is it possible to engage them more closely?
- If not, are there particular barriers in place that may prevent the development of a relationship or dialogue with these or other stakeholders?

Take some time to fill in any gaps. In the last column consider those stakeholders whom you have identified but do not intend to have on your team; record how these stakeholders will contribute to your community's adaptation effort and what stage(s) they should be involved in.

Think about how you will engage and communicate with the various stakeholders you have identified. For example, the issue briefs in Worksheet 4 can be used to communicate information and seek input from internal stakeholders. Likewise, consider when you will be contacting the various stakeholders identified – is it immediate (as part of the research phase) or further down the road to help identify adaptation options or for implementation?

Information Annexes

- 1) Annotated resource checklists (over 85 in total);
- 2) List of adaptation options;
- 3) Project climatic changes by region;

TITLE:	Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity
AUTHOR(S):	Jacinthe Seguin and Peter Berry
TYPE OF DOCUMENT:	General resource
PUBLICATION DATE:	2008
GEOGRAPHIC SCOPE:	Canada wide
ABSTRACT:	<p>The report provides a synthesis of knowledge on how the health of Canadians is affected by the climate today, and what lies ahead under future climate change. Through an examination of key health issues of concern, along with two regional assessments (the province of Quebec and Canada's North), it develops a baseline of evidence concerning the relationship between a changing climate and direct as well as indirect impacts on health. A framework for analyzing adaptive capacity is presented, along with an exploration of how governments, communities and individuals are drawing on current capacity to address and mitigate the effect of climate on health. Each chapter makes recommendations for future action and identifies key knowledge gaps to direct future research in support of adaptation to protect the health of Canadians.</p> <p>This study is meant to compliment <i>From Impacts to Adaptation: Canada in a Changing Climate 2007</i> by providing decision makers with an integrated perspective on existing vulnerability to the potential health impacts of climate change, and insights on how risks can be reduced by increase adaptive capacity.</p>
KEY FINDINGS:	<p>The following are key conclusions from this assessment of risks to health from climate change.</p> <ul style="list-style-type: none"> • Climate change scenarios project an increased risk of extreme weather and other climate-related events in Canada such as floods, drought, forest fires and heat waves—all of which increase health risks to Canadians.




Go to Excel Workbooks

● ICLEI's Adaptation Message to Local Governments

- Understand what adaptation is;
- Realize that adaptation and mitigation are not mutually exclusive;
- Know what you are adapting to;
- Prepare for those impacts;
- Realize there is no 'one size fits all' approach;
- Adaptation planning is not a new process and should be integrated with existing efforts; and
- Anticipatory planning is more effective than reactive planning



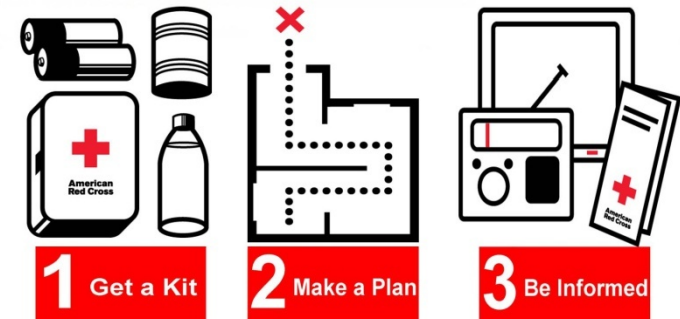
Thank you!

Questions?



Be Red Cross Ready

Get a Kit. Make a Plan. Be Informed.



Ewa Jackson
Acting Director, ICLEI Canada
+1-647-728-4387
ewa.jackson@iclei.org

