CHANGING CLIMATE,

CHANGING COMMUNITIES:

Workbook for Municipal Climate Adaptation

·I·C·L·E·I·

Local Governments for Sustainability

INTRODUCTION

The seventeen worksheets contained within this workbook are meant to operationalize the methodology presented within the main guide. Their purpose is to provide highly engaging and visual tools that can be used by community's working through each of the five milestones. The tools contained within the worksheets range from basic conceptual mappings to more complex tables on assessing a community's vulnerability and the risks associated with climate change impacts.

The worksheets are an optional component of the guide that are meant to assist community's who would like additional resources at particular stages of the planning process. It may be the case that not all worksheets will be useful to each reader; it will be up to each user to determine which worksheets will be the most helpful. It should be noted that though the main Guide can stand alone and be used without the workbooks, in order to complete the worksheets the guide must be used and will likely require repeated referencing.

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

In some cases it may be helpful for community's using the worksheets to bring in an external facilitator as there may be instances where an impartial moderator would be helpful; alternatively a staff member could act as an impartial facilitator (for more suggestions on facilitating see the Tips for Facilitators section of the Information Annexes).

Time Commitments

It is difficult to allocate a set time for each of the worksheets as each community has differing capacity circumstances and structures. For the purpose of work planning we have assigned a time commitment scoring to each of the worksheet. The amount of hours expected to be spent on a given worksheet represents the total hours that will be required by participants.

Minimal (8 hours or less)
Nominal (8-16 hours)
Average (24-32 hours)
Significant (40-45 hours)
Substantial (Over 50 hours)

WORKSHEET 1
STAKEHOLDER IDENTIFICATION

PURPOSE	TO IDENTIFY KEY STAKEHOLDERS RELEVANT TO YOUR COMMUNITY'S ADAPTATION WORK
Resources Needs	✔ Adaptation Team time commitment – minimal ✔ Minimum 2-3 staff for brainstorming exercise – minimal time commitment
Output	A refined list of internal and external 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.

Spheres of Influence
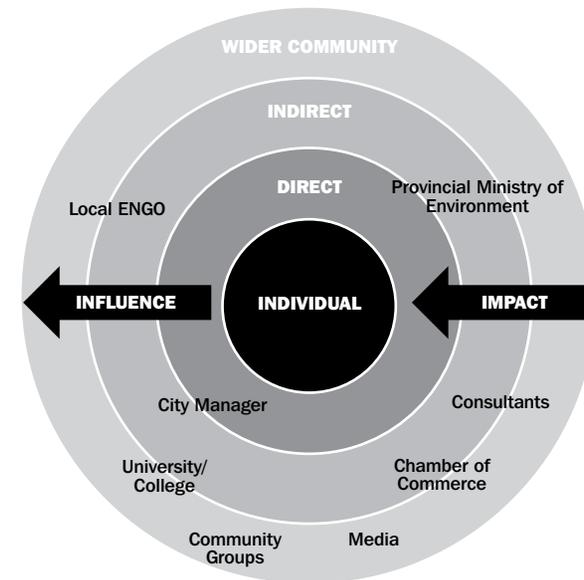
INSTRUCTIONS

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.

EXHIBIT 1.2

Possible Stakeholders

POSSIBLE STAKEHOLDERS	
• 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	• 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 in Exhibit 1.3 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.

EXHIBIT 1.3

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 the 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?

In addition to those stakeholders that you have identified, think about how you might encourage possible stakeholders to self identify themselves as interested parties to the process. It is possible to solicit participation through: public announcements (newspaper, radio, and television), invitations to existing climate change networks/groups, municipal website posting, or announcements at other community events.

As you work to engage a wide-range of stakeholders, it is important to also recognize the reality of stakeholder burnout. One possible way to overcome burnout is by limiting the demands you are putting onto identified individuals or groups. For example, you might limit meetings (i.e. once a quarter as opposed to monthly) or another option is to let stakeholders dictate the degree of their involvement – do they only want to be notified of important occasions or do they want to be present for information gathering, debate, and decision-making. Avoiding stakeholder burnout will help to ensure that the individuals/groups you have identified are committed to the process over the long-term.

In Worksheet 2 you will use this list of stakeholders to create your adaptation team. You will want to check back throughout the planning process to ensure that your list of stakeholders stays relevant and up to date.

WORKSHEET 2
BUILDING AND TASKING YOUR ADAPTATION TEAM

PURPOSE	TO BUILD AN ADAPTATION TEAM, ASSIGN A TEAM LEADER AND DEVELOP A TEAM MANDATE
Resources Needs	✔ Interested staff – nominal time commitment ✔ Facilitator (optional)
Output	A team mandate A team leader A team champion
How this fits with larger process	The team constitutes the foundation of expertise which will be drawn upon through-out your community's adaptation effort and will be responsible for maintaining momentum throughout each of the milestones. The team's creation also represents the first step towards initiating your community's internal capacity to adapt to the impacts of climate change.

When forming your adaptation team, try to ensure a diversity of expertise which draws from relevant departments or programs. This process can use the stakeholder identification activity done previously in Worksheet 1 and can include as many or as few individuals as is appropriate for your community. The team can be any mix of stakeholders (internal or external) that you, as a community, deem appropriate. Keep in mind the more people there are on the team, the more comprehensive your dialogue and resulting adaptation plan will be; however, scheduling and managing meetings can become increasingly difficult with many participants.

You should have a clear idea of relevant stakeholders from Worksheet 1; however the specific level of involvement of external stakeholders in the adaptation team will be dictated by the circumstances and dynamics of your community. One item to consider at this stage is having two teams: a core team consisting of mostly internal individuals and a secondary team consisting of external stakeholders that can be consulted at key points along the way. Likewise you can use the list of stakeholders developed in Worksheet 1 and bring in individual stakeholders with relevant expertise into Team meetings at key points.

The number and background of team members will vary. The team makeup that is appropriate for your community depends on the specific impacts likely to occur in your region; the infrastructure and policies that will be affected; and how your community intends to interact with other stakeholders and the public in preparing for climate change. This may change and evolve over time and team members can be added as needed. Exhibit 2.1 lists some potential participants to include on your adaptation team.

EXHIBIT 2.1

Potential Participants

DEPARTMENT	
Agriculture	Legal Services
Communications	Parks and Recreations
Economic Development, Culture and Tourism	Planning and Zoning
Energy	Police
Engineering	Public Health
Emergency Management	Transportation
Environment	Water
Finance and Administration	Waste
Fire Services	Coastal Zone Management
Housing	Port and Harbour Management

GROUPS	
Residents and Community	Non-profit Organizations
Neighbouring Communities	Networks
Business Community	Provincial and Federal Government
Scientific Advisors	Academic Institutions

INSTRUCTIONS

Using the list of potential Team members as a guide, record those individuals from departments or groups that should be included in your team. Be sure to include all the departments and/or organizations that might contribute positively to your community's adaptation work. As you create your team, also consider the organizational structure of your community as this will likely affect the structure of your adaptation team.

QUESTIONS TO CONSIDER WHILE CREATING YOUR ADAPTATION TEAM

- Is your adaptation team being established as a permanent working group?
- How much time does the team have to accomplish this task?
- What resources are available for the team to accomplish its work?
- What authority does the team have?
- To whom is the team accountable?

Be as specific as possible by including individual's names, divisions or sub-sectors in the list as necessary. As you will likely be completing this exercise with others, this list is easily transferable to white or chalk boards for group facilitation. Depending on who participates in this exercise, you may find that the group completing this worksheet may make up the final adaptation team. Contacting additional participants can be done via the issue briefs in Worksheet 4.

DEVELOPING A TEAM MANDATE [1]

Once you have created your community's adaptation team, you can now develop a team mandate. A mandate describes the authority of the adaptation team, its purpose (i.e. decision making, providing information, gathering information etc), and the time commitment required of team members. A clear and strong mandate will not only help the team with its work but will also give legitimacy to the work that is being carried out from an outside perspective. The answers to the questions above can be turned into such a mandate.

Sample team mandate:

The City of [Name] Adaptation Team was created by Council to research, draft and implement our community's Adaptation Plan. The Team is led by [Team Leader Name] the [Team Leader Title] for the City of [Name] .

Our purpose is to collect information on climate change impacts and offer expert advice to Council on the most credible, aggressive and economically viable options for adapting to climate change through the creation and implementation of our community's adaptation plan.

Team members must commit to monthly meetings for a minimum of 1.5 hours each in addition to project specific tasks to be determined by the group. The Adaptation Team, on behalf of the community at large, has committed to an ongoing process of monitoring and review for the duration of the project (approximately two years).

ASSIGNING A TEAM LEADER

With your adaptation team and mandate in place, you will need to assign someone as the team leader. This person will have the responsibility of assembling the team and leading its efforts. Given that your adaptation team will cross a variety of departments, it is important that the team leader be centrally located, has a good grasp of the community's concerns, and is able to communicate well with colleagues from other departments or divisions. The team leader should also have authority to work with staff members from all departments; though they will not be the direct manager of all team members they should have some authority to require deliverables from the departments represented on the team.

Now that you have created your adaptation team you may want to revisit your list of stakeholders to ensure that the list is still relevant and there aren't any key stakeholders missing.

SELECTING A CHAMPION

As outreach will play a major role in building and maintaining support for your adaptation effort, it is a good idea to identify an adaptation champion to lead such activities. Selecting an appropriate champion will help solidify the awareness and long-term commitment from your local government to the adaptation process. Your adaptation champion should commit to this process and to the responsibility of being the public spokesperson for the team to the community.

Potential champions include, but are not limited to, former (or current) elected officials, key business leaders, long-range planners, or other respected members of the community. It will generally be the case that your champion and team leader will be two different individuals. If, however, you feel that it is most appropriate for your community to have one individual that is both your adaptation team leader and champion this is another option.

WORKSHEET 3
A FIRST LOOK

PURPOSE	TO DETERMINE THE LEVEL OF UNDERSTANDING OF CLIMATE CHANGE IMPACTS, THE EXISTENCE OF ACTIONS WHICH ALREADY INCLUDE ADAPTATION AND ANY EXISTING PLANS OR POLICIES WHICH A CLIMATE CHANGE ADAPTATION PLAN COULD INFLUENCE
Resources Needs	✔ Adaptation Team – average time commitment ✔ Research intern or volunteer – average time commitment ✔ Facilitator (recommended)
Output	An initial list of climate change impacts, existing adaptation actions and any plans or policies relating to adaptation.
How this fits with larger process	This initial survey of climate change impacts, adaptation actions and relevant plans and policies provides a basis upon which more in depth research in Milestone Two can be developed. It is important to assess your community's existing knowledge and actions relating to climate change in order to appropriately tailor your future adaptation work. This is also an exercise is evaluating internal capacity. It is good to know where there is existing capacity within the community and those areas which require more direct planning.

PART 1: FIRST LOOK AT CLIMATE CHANGE IMPACTS

As part of your first look at adaptation, it is important to consider how climate change will affect the various systems (built, social, economic and natural systems) in your community. [For a full description of each system, refer to page 24 of the main guide]. This worksheet provides a way of examining the various impacts associated with each of the systems and recording the results in preparation for Milestone Two.

Some questions to get your team started include:

• What extreme weather events has your community already experienced? What were the impacts of those events?
• How well prepared is your community if such an event occurs again? Especially if such an event becomes more frequent or severe as a result of climate change?
• Based on your existing knowledge what climatic changes are the most likely to impact your community?
• Are there any opportunities associated with climate change that could arise for your community?

This initial brainstorming session offers an opportunity to lay the groundwork for identifying areas which will require further research in Milestone Two. You may wish use the basic question of *"How could climate change affect my region, and do these impacts pose a risk for my community?"* as a starting point for discussion.

Instructions

For each climatic change that you feel threatens your community (i.e. changes in water levels, precipitation, temperature, etc.) identify the impacts of that change for each of the four systems identified and record the associated impacts you've identified in the table on page 7. Note, that in many instances, there will be impacts that will have implications on a variety of systems. Be sure to identify any and/or all of the systems affected by the impact.

Impacts can range from the highly specific (e.g. increased instances of flooded basements causing mold growth) to the more general (e.g. spread of infectious disease due to increases in temperature). The specificity of impacts will be flushed out more in Milestone Two when you conduct more formal research, however it is important to be consistent with how you record impact statements. For now, record any impact which might be a threat to your community, keeping in mind that your team may need to refine the language once you have conducted more research.

We recommend using a brainstorming approach in identifying impacts as it encourages all participants to raise issues and provides opportunities to spark further discussion based on one idea. Following the usual rules of brainstorming, allow any and all input and suspend judgment during this activity to ensure as many issues as possible are raised. If an impact is even partially related to climate change it should be included here.

As you can see in Exhibit 3.1, there are two possible ways to use this table. The first option is to place an "X" for each of the identified impacts in one or all of the columns which represent the affected system(s). The second option is more intensive and requires you to explain how each system will be affected by the impact. Choosing to do a more, or less, comprehensive look at how climate change impacts affect systems will likely depend on the amount of experience your team has with this subject and staffing capacity. Whichever approach you use, it is important to remain consistent.

EXHIBIT 3.1

Recording Your First Look at Impacts

	IMPACT	BUILT	SOCIAL	ECONOMIC	NATURAL
Option 1	e.g. spread of infectious disease due to increases in temperature		X	X	X
	e.g. increased damage to infrastructure due to changes in freeze/thaw cycles	X	X	X	
Option 2	e.g. increased summer drought due to decreased precipitation	Water infrastructure may be damaged	Water supply may be compromised affecting drinking water	Damage to infrastructure has monetary consequences	Plants and animals may not be able to cope with limited water supply

PART 2: FIRST LOOK AT MUNICIPAL ACTIONS

Before delving into the research stage in Milestone Two, it will be helpful to take stock of existing adaptation actions within your community. You team may want to keep a list of actions that are already underway and even planned actions that might be relevant to the adaptation planning process. This will help your team evaluate where there are existing actions addressing climate change impacts, how other actions might be revised to accommodate for climate change, and where there is a need for more action.

Where actions exist that already address climatic impacts (but perhaps are not labelled as specifically responding to climate change) consider how that impact is likely to change in the future and how that action may require revisions to accommodate future impacts associated with climate change. As an example, consider emergency management and response actions, scheduled infrastructure maintenance, or public health outreach policies. As you look at these existing actions, keep the impacts you've brainstormed previously in mind: Do any of these existing actions address the impacts you've identified? Are there actions that can be amended to account for climate change impacts?

At this point, your team may only have a basic understanding of climate change impacts, however this exercise is not meant to be an in depth analysis. This is just a first look at the understanding you have now and will help your team later in Milestones Two and Three. Using Exhibit 3.2, record any existing actions that might be relevant to your adaptation work.

EXHIBIT 3.2

Recording Existing Actions

EXISTING ACTION	HOW THE ACTION RESPONDS TO WEATHER?	CONSIDERATIONS FOR CLIMATE CHANGE
e.g. cooling centers	Hot days require cooling centers for community residents without air conditioning	May need to establish more cooling centers to accommodate for increase frequency of hot days

PART 3: FIRST LOOK AT PLANS AND POLICIES

Similar to actions, there may be plans and policies within your community that already address adaptation but perhaps aren't labelled as an adaptation plan or policy. Look into the variety of plans that exist across departments (i.e. Transportation Master Plan, Cycling Master Plan, Environmental Master Plan, etc.), as well as any other strategic policy documents (i.e. Official Community Plan, Long-term Sustainability Visions, Strategic Plans, etc.) to take stock of what is in place and how adaptation might tie into it. Use Exhibit 3.3 to record any existing plan that might be relevant to your adaptation work.

EXHIBIT 3.3

Recording Existing Plans or Policies

EXISTING PLAN OR POLICY	IS THERE ANY DIRECT OR INDIRECT REFERENCE TO PLANNING FOR CLIMATE CHANGE?	HOW ADAPTATION MIGHT TIE INTO IT?
e.g. Official Community Plan	Yes	Using planning and land use management to reduce vulnerability to climate change and increase adaptive capacity

WORKSHEET 4
ISSUE BRIEFS

PURPOSE	TO CREATE AND DISTRIBUTE ISSUE BRIEFS FOR KEY STAKEHOLDERS
Resources Needs	✔ Adaptation Team – minimal time commitment
Output	An issue brief tailored for a specific individual or on a specific task.
How this fits with larger process	Issue briefs are a means by which to communicate with relevant stakeholders throughout each of the Milestones.

In the same way that building political support for your adaptation efforts is critical to its success, securing the support of staff from all departments is important to move forward on adaptation planning.

As climate change impacts will affect various stakeholders throughout the community making key stakeholders, staff, and other decision makers aware of the climate change impacts expected within their spheres of influence will help drive the process and help those individuals understand that measures taken early will help to reduce the community's vulnerability in the long term. Likewise it may help staff to realize that some of the work they are already engaged in also falls under adaptation planning - it may just be a matter of labelling it as a climate adaptation action or plan (recall parts II and III of Worksheet 3).

This worksheet introduces the process of communicating via issue briefs. Issue briefs are a way for your adaptation team can communicate with other departments and with other external stakeholders throughout the planning process. These briefs may go by another name in your community – framework documents, memos or interdepartmental communications – however they all accomplish the same goal of communicating an issue from one group to another. Whatever form it takes, an issue brief is an important tool for both internal and external communications.

Consider using issue briefs:

- To communicate interest to stakeholders;
- To check in with stakeholders at the end of each Milestone;
- When your team is developing adaptation actions;
- When you develop your community's adaptation plan;
- When you begin to implement adaptation actions; and
- When you begin your process of monitoring and review.

By communicating with stakeholders consistently throughout this process, you are ensuring a more transparent process (one of the cornerstones of good urban governance). This worksheet provides a sample issue brief that can be used to communicate to staff, Council and the community.

INSTRUCTIONS

You will have taken a first look at climate change impacts in the previous worksheet and will have also done a preliminary investigation of their effects on a variety of systems (built, natural, social, etc.). As such, you now have a basic understanding of what climate change impacts will be relevant to your community and can now communicate that understanding to relevant stakeholders.

As you develop these issue briefs, consider the importance of tailoring the message you are communicating to your audience. It is not recommended to use the same language in every brief as each stakeholder will respond differently to different messaging. For example, consider tailoring the briefs to those with a scientific background with science focused information and those to community groups with relevant information for the community.

Refer back to the list of stakeholders that you developed in Worksheet 1. Use issue briefs to communicate to those stakeholders about the importance of climate change impacts within their spheres of responsibility and how they might engage in this process.

When releasing issue briefs at this stage, be sure to communicate that your adaptation team is only at the beginning stages of a long-term planning process. It is important to stress to any audience, that the next stage in the process will be to carry out detailed research on climate change and its impacts for your community and to invite those that are interested to either get involved or to sign up for updates as they are available.

Sample Issue Brief

To:
From:
Date:
Subject:

Background	• Scientific backing - Global climate change. Use the Background Primer of this Guide to inform this content. • Expected climate changes for your region – use Annex One to complete this section. • Importance of local governments and adaptation planning
Impact	• Complete one issue brief for the key impacts you have identified – it is a good idea to use the most high profile impact; this could be the one that affects the most systems; one that is the most documented; or one that has already been experienced.
Department or Stakeholder	• List the key departments or stakeholders that should receive this issue brief
Considerations (i.e. impacts on social, economic, natural, and built systems)	• List the various systems (relevant to the departments or stakeholders above) that would be affected and how these will be impacted. NOTE: this issue brief is not meant to list the variety of actions that can be taken (those will be identified in Milestone Three) the key message in this issue brief should be to build support for the adaptation effort that the municipality will take on in order to investigate how these impacts can be best dealt with.
Next Steps	• List the next steps that the recipient can take, this could be to join the adaptation team, provide information, etc.

NOTES

WORKSHEET 5
SAMPLE COUNCIL RESOLUTION

PURPOSE	TO SECURE POLITICAL SUPPORT AND COMMITMENT FOR YOUR COMMUNITY'S ADAPTATION EFFORT
Resources Needs	✔ Adaptation Team – minimal time commitment ✔ Communications Expert – minimal time commitment
Output	A council resolution to present to Council at the end of Milestone One.
How this fits with larger process	By exposing local elected officials to key elements of your adaptation work, and including them at significant points, staff can ensure that their efforts will have political support in the long-term. In making a political commitment to the adaptation planning process, you are ensuring that this process will continue despite possible political changes in the community.

Adjacent is a sample council resolution your community can use as a template, or you may wish to develop one internally, in either instance, be sure to include key data that supports local action on climate change. The template relies on information contained within the *From Impacts to Adaptation: Canada in a Changing Climate 2007* report which can be found on the Natural Resource Canada website at http://adaptation.nrcan.gc.ca.

As your team develops a resolution for your community you may also want to consider:

• The provincial or territorial position on climate change and adaptation planning;
• How existing plans address climate change impacts and adaptation planning; and,
• How to involve internal and/or external stakeholders.

> **Consider This…** !
> **In addition to a Council resolution, your Adaptation Team may also want to consider creating a community charter to secure buy-in from the wider community and from key external stakeholders.**

City/Town/Region of _____, Province

Commitment to Creation of a Climate Adaptation Plan

WHEREAS, scientific consensus has developed that carbon dioxide (CO2) and other greenhouse gases released into the atmosphere have a profound effect on the Earth's climate; and

WHEREAS, the 2007 Fourth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) states that it is very likely that most of the observed increases in globally averaged temperatures since the mid-20th century are due to human-induced greenhouse gas emissions; and

WHEREAS, *From Impacts to Adaptation: Canada in a Changing Climate 2007* found that the impacts of climate change pose serious risk to physical, biological and social systems; and

WHEREAS, according to *From Impacts to Adaptation: Canada in a Changing Climate 2007*, climate change is one of the most pressing environmental challenges we are facing today; and

WHEREAS, *From Impacts to Adaptation: Canada in a Changing Climate 2007*, determined that adaptation is a necessary complement to the reduction of greenhouse gas emissions in addressing climate change; and

WHEREAS, *From Impacts to Adaptation: Canada in a Changing Climate 2007*, also determined that climate change will affect important human systems in Canada, especially those related to human health, settlements and welfare; and

WHEREAS, local government actions taken to prepare for climate change impacts provide multiple local benefits by building a more resilient economy, and by helping to reduce the physical impacts and costs to people, property and resources associated with a changing climate.

NOW THEREFORE, BE IT RESOLVED, that the City/Town/Region of _____, PROVINCE, will undertake the five milestones presented in *Changing Climate, Changing Cities* to prepare for the impacts of climate change, and specifically:

    1) Initiate an Adaptation Effort;
    2) Research Climate Change Impacts;
    3) Create an Adaptation Plan;
    4) Implement the Plan; and
    5) Monitor and Review the Plan.

BE IT FURTHER RESOLVED, that the City/Town/Region of _____, PROVINCE, will mandate an adaptation team to be responsible for researching scientific climate change projections, communicating climate change impacts, providing advice on preparing for and adapting to these impacts, and guiding the City/Town/Region of _____, PROVINCE, through adaptation milestones presented in *Changing Climate, Changing Cities*.

NOTES

WORKSHEET 6(a)
RECORDING CLIMATIC CHANGES

PURPOSE	TO RECORD RELEVANT CLIMATIC CHANGES
Resources Needs	✔ Adaptation Team – significant time commitment ✔ Research Volunteer or Consultant – average time commitment ✔ Facilitator not required
Output	A record of climatic changes that are expected to affect your community.
How this fits with larger process	The list of climatic changes will inform the identification of specific impacts for your community in Worksheet 6(b). The combined information constitutes the bulk of your research and will be used to assess vulnerability and risk in Worksheets 7 and 8.

GETTING STARTED

Exhibit 6a.1 provides a list of possible scientific sources which can be used to find data on expected climatic changes in your region. In addition, included in the information annexes are annotated resources, such as regionally-focused climate change reports, fact sheets, impacts listed by region, and websites which will help your team with research on both projected changes in regional climate and with identifying climate change impacts in Worksheet 6(b). Refer to these resources as needed.

Scientific Sources

ORGANIZATION	WEBSITE
• Intergovernmental Panel on Climate Change (IPCC)	http://www.ipcc.ch/publications_and_data/ publications_and_data_reports.htm#1
• Natural Resources Canada	http://www.nrcan.ca
• Environment Canada	http://www.ec.gc.ca
• Ouranos	http://www.ouranos.ca
• Canadian Climate Change Scenario Network	http://www.cccsn.ca
• Environmental Systems Research Institute Canada	http://www.esricanada.com/english/955.asp
• Pacific Climate Impacts Consortium	http://pacificclimate.org/
• Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR)	http://www.climateontario.ca

Note: When attempting to identify forecasted changes in climate, consider using your Adaptation Team members, a volunteer, consultant, other local government staff, or a summer student.

INSTRUCTIONS

The first step in this process is to identify the climatic variables, such as average temperature or precipitation, that are projected to change in your region (or the amount of change that occurs by a specified future date, relative to the average for a range of years in the past). The "expected change" is often expressed as a range of increase or decrease. Often, using a range helps to document any uncertainty in the projection or seasonal variability (where one season is expected to see an increase and another season will see a decrease). Where possible, define the climatic change clearly so as to avoid statements which indicate both an increase and a decrease. For example, define "average summer precipitation" and "average winter precipitation" instead of "average yearly precipitation" in cases where the seasonal variability results in both increases and decreases.

Exhibit 6a.2 provides a table to record the climatic changes that are expected to change in your region. Be sure to record all climatic changes that will affect your community when you re-create this table.

Note: It is important to source information appropriately; in the final column include all of the relevant bibliographic information for each resource.

MILESTONE 2: RESEARCH

EXHIBIT 6a.2

Sample Climatic Change Table

CHANGING CLIMATIC CONDITION	GEOGRAPHIC AREA	RANGE OF EXPECTED CHANGE BY A SPECIFIC DATE (repeat for near, mid, and long-term)	COMPARING RATE OF CHANGE TO PAST AND CURRENT CONDITIONS	EXTENT OF SEASONAL VARIABILITY	DEGREE OF CONFIDENCE OF DATA SOURCE	SOURCE(S)
Increased Temperature	Prairies	1.5°C increase from 1895-2000 average by 2020 5°C increase from 1895-2000 average by 2050 5.5°C increase from 1895-2000 average by 2080	Projected warming to 2020 is similar to regional warming observed during the 20th century. By the 2020s, average temperature could be higher than most of those experienced during the 20th century.	Slightly more warming in winter and spring	High as information came from a government body	Sauchyn, D. and Kulshreshtha, S. (2008): Prairies; in From Impacts to Adaptation: Canada in a Change Climate 2007, edited by D.S. Lemmen, F.J. Warren, J. Lacroix and E. Bush

NOTES

_____

_____

_____

_____

_____

_____

CHANGING CLIMATE, CHANGING COMMUNITIES Municipal Climate Adaptation Guide and Workbook **13**

WORKSHEET 6(b)
REFINING IMPACTS AND IDENTIFYING SERVICE AREAS

PURPOSE	TO REFINE IMPACT STATEMENTS AND IDENTIFY THE SERVICES AREAS RELEVANT TO EACH IMPACT
Resources Needs	✔ Department Heads (those not already on Adaptation Team) – nominal time commitment ✔ Adaptation Team – significant time commitment ✔ Key stakeholders (those not already on Adaptation Team) – nominal time commitment
Output	A comprehensive list of climate change impacts and their relevance to specific service areas within your community.
How this fits with larger process	The refined list of impacts and the identified service areas will be used to conduct a vulnerability assessment (Worksheet 7) and will also help with the risk assessment (Worksheet 8).

PART 1 – REFINING IMPACTS

Based on the climatic changes identified in Worksheet 6(a), identify what impact those changes will have on your community. Your team can refine the impacts that were identified in the brainstorming activity in Worksheet 3 by using the research from Worksheet 6a. Earlier, the scale of the impact statements you identified was less relevant; however it is now important to decide on the scale that you will use. Whether your team decides to have high level or very specific impact statements it is important to try and maintain consistency among those statements.

If your team is finding it difficult to determine appropriate impact statements, consider the following questions:

1) What is the climatic change you are looking at?

2) What is the outcome of that change?

3) What are the impacts associated with that outcome?

Sample

1) Decreased Precipitation

2) Summer Drought

3) Increased demand on water supply

Once you've answered these questions, you should have arrived at an impact (i.e. increased demand on water supply due to summer drought). A description of an impact includes an identification of the 'someone' or 'something' that will be impacted, the specific way it will be impacted, and the reason the impact may occur. For example, "summer drought" is not a strong climate change impact; but "increased demand on water supply due to summer drought" would be. Notice how the latter description answers all of the "what", "why" and "how" questions, and that the impact is a result of changes to climate conditions, namely precipitation. Be as specific as you can, including whatever level of detail you research can provide.

Once your team has refined its impacts, apply a *common sense test* to check whether the impact statement will be understood by everyone who reads it.

PART 2 – RECORDING IMPACTS STATEMENT

For each impact, consider the relevant service areas and how the function of each might be affected by the impact. **A service area** refers to the areas in which a government or community delivers, manages, plans, or makes policy. See the table below for a list of some possible service areas.

EXHIBIT 6b.1

Examples of Service Areas

Agricultural Services	Forestry And Forest Service's
Biodiversity	Housing Services
Coastal Zone Management	Insurance
Community Development	Legal Services
Corporate Services	Natural Resources
Culture And Tourism	Parks And Recreation
Economic Development	Planning And Zoning
Emergency Management	Port And Harbour Management
Emergency Response	Police
Energy Management	Public Health
Engineering	Stormwater Management
Environment	Transportation
Fire Services	Water
Finance	Waste Management
Flood Control	

This list should be tailored to your community; depending on its make up, one service area may be made up of multiple items listed above. Identify the service areas that are relevant for your community and include these across the top of the table below. Multiple service areas may be affected by one impact, so be sure to identify all that will be impacted. Create a table for each of the climatic changes and list the relevant impacts down the left hand side and your community's service areas across the top.

As you consider how climate change impacts will affect your community and how it functions, it is important to differentiate between the key service areas that will be affected and those areas which are important to keep in mind but which aren't the primary area to be affected. In the table below, identify which service areas will be affected either directly (with an "X") or indirectly (with an "O").

After you have completed your research and these tables (for each climatic change identified) take a moment to review them, make sure that the list of impacts is as comprehensive as possible. If you come up with any additional impacts, add these to the tables. After completing this, you will have a comprehensive list of climate change impacts and their relevance to specific service areas within your geographic location. This process of identifying service areas will be useful when completing your vulnerability assessments as you will need to assess the vulnerability of specific service areas to a given impact.

CLIMATIC CHANGE
Decreased Precipitation in Summer

	Agricultural Services	Biodiversity	Coastal Zone Management	Corporate Services	Culture and Tourism	Engineering	Environment	Fire Services	Housing	Parks and Recreation	Planning and Zoning	Port and Harbour Management	Public Health	Water	Waste Management
Increased demand on water supply due to summer drought	X	O	O	X	O	X	X	X	O	X	O	O	X	X	O
Increased irrigation needs due to decreased water supply	X	O		X			X			X			X	X	

CLIMATIC CHANGE
Increased Temperatures in Summer

	Agricultural Services	Biodiversity	Corporate Services	Economic Development	Culture and Tourism	Energy Services	Emergency Management	Fire Services	Environment	Forestry and Forestry Services	Housing	Parks and Recreation	Parks and Recreation	Public Health	Water	Waste Management
Increased demand on energy due to increased cooling needs in summer			X	O	O	X	X				X		O	X	O	
May experience longer growing seasons which increases potential to double crop	X	X	X	O	O			X	X		X		O			

Increased Frequency of Extreme Events

	Agricultural Services	Coastal Zone Management	Corporate Services	Engineering	Emergency Management	Environment	Engineering	Fire Services	Parks and Recreation	Police	Port and Harbour Management	Public Health	Water	Waste Management
Contamination of streams and/or lakes due to sewer overflow	X	X	X	O		X	X		X		O	X	X	X
increased frequency of illness or death among vulnerable populations due to extreme heat			X		X			O		X		X		

WORKSHEET 7
VULNERABILITY ASSESSMENT

PURPOSE	TO ASSESS THE VULNERABILITY OF A SERVICE AREA TO A CLIMATE CHANGE IMPACT
Resources Needs	✔ Department Heads (those not already on Adaptation Team) – nominal time commitment ✔ Key stakeholders (those not already on Adaptation Team) – nominal time commitment ✔ Adaptation Team – substantial time commitment
Output	List of impacts sorted according to the vulnerability identified.
Linkage to wider methodology	The vulnerability assessment acts as a filter for the upcoming risk assessment exercise. By determining the vulnerability of each impact, you can conduct a risk assessment for only those impacts to which your community has a high vulnerability. The values assigned for adaptive capacity can also be used as a basic baseline measurement for assessing the effectiveness of adaptation actions in Milestone Five.

Vulnerability refers to the susceptibility of a given service area to harm arising from climate change impacts. It is a function of a service area's sensitivity to climate and its capacity to adapt to climate change.

This worksheet will go through the process of assessing the sensitivity of the service areas you have identified; it will also help you to determine their adaptive capacity and based on those factors their vulnerability to the effects of climate change. It will be a large task to carry out the vulnerability assessment for all of the impacts identified in worksheet 6(b), however, this step is a precursor for Worksheet 8, risk assessment wherein only the impacts defined as highly vulnerable will be assessed in terms of risk.

INSTRUCTIONS
Referring to the list of impacts in worksheet 6(b), extract all the service areas which will be directly affected by that impact (those identified with an "X"). Your team should conduct a vulnerability assessment of each service area to the impacts that have been identified.

EXHIBIT 7.1
Example Impact and Directly Affected Service Areas

IMPACT	SERVICE AREAS	
Increased demand on water supply due to summer drought	Agricultural Services Corporate Services Engineering	Environment Parks and Recreation Public Health Water
Contamination of streams and/or lakes due to sewer overflow	Agricultural Services Coastal Zone Management Corporate Services Environment	Engineering Parks and Recreation Public Health Water Waste Management
Increased demand on energy due to increased cooling needs in summer	Corporate Services Energy Services Emergency Management	Housing Public Health

Part 1: Sensitivity Assessment
To conduct a sensitivity assessment, your Adaptation Team should look at each identified impact and assess, to the extent possible, if changing climate conditions will significantly affect the functionality of a given service area. For example, if your electricity grid is already at maximum capacity and increased summer temperatures are likely to drive homeowners to increase air conditioning - thereby increasing their demand on the grid - then the service area of *energy services* is sensitive to changes in temperature. Generally, if the functionality of a service area is likely to be affected as a result of projected climate change, it should be considered sensitive to climate change.

In order to assess the service areas sensitivity to an impact:

- Determine which climatic changes affect the impact in question;
- Identify how the service area is affected by these changes.
- Assess whether the service area is subject to any existing stress and whether the impact will exacerbate that stress.
- Assign a value (out of 5) representing the sensitivity of the service area to the climate change impact. See Exhibit 7.3 for a 1 – 5 Sensitivity Scale. Exhibit 7.2 assesses the sensitivity of three sample impacts and service areas: water, environment, and energy services.

Timeline: In order to appropriately assess the sensitivity of a particular service area to an impact, you should determine a timeline (i.e. determining the sensitivity of a service area over the next 25 years). The timeline criterion can be adjusted according to the needs of your community as it may be relevant to consider how this assessment fits into broader municipal plans e.g. 100 year sustainability plan, 30 year official plan, etc.

NOTE: The sensitivity assessment can also be used to evaluate the sensitivity of your community to events that have occurred in the past. Consider a previous extreme weather event (ice storm, heavy rain event, etc.) and apply the same questions. This provides an opportunity to integrate your community's past sensitivities into the planning process.

EXHIBIT 7.2

Sensitivity Assessment

SENSITIVITY ASSESSMENT			
Impact	Increased demand on water supply due to summer drought	Contamination of streams and/or lakes due to sewer overflow	Increased demand on energy due to increased cooling needs in summer
Service Area	**Water Supply**	**Environment**	**Energy Services**
Which climatic changes affect the functioning of this service area?	1. Temperature (warmer temperatures expected across all seasons under all climate change scenarios, especially during summer months) 2. Precipitation (less rain in summer and snow in winter)	1. Precipitation (more rain in summer and snow in winter)	1. Temperature (warmer temperatures expected across all seasons under all climate change scenarios, especially during summer months)
How would the service area be affected by these changes today?	1. Warm winter and spring temperatures lead to lower snowpack and earlier snowmelt, increasing summer drought 2. Warmer summer temperatures increase evaporation rates and demand on water 3. Lower winter precipitation lowers winter snowpack, reducing water supply	1. Increased rainfall in summer and quantities of melting snow in spring causes sewers to overflow into streams and/or lakes, contaminating marine ecosystems with domestic waste 2. Large flow variations between wet and dry weather can cause contamination issues	1. Increased number of hot days in summer months leading to increased demand for cooling centers 2. Increased temperatures leading to increased household use of air-conditioning
Is the service area subject to any existing stress?	Water shortages have occurred in the past during particularly hot summers	Decreasing marine ecosystem habitat due to urban development	Electricity grid is already at maximum capacity
If the impact occurs, will it affect the functionality of the service area?	Yes – Increased summer drought will increase the frequency of water shortages during the summer months Yes – Functionality will become unmanageable (S5)	If the already limited water area is contaminated by domestic waste, plant and animal species will be subject to increased pressure which may affect their longevity (S3) Yes - Functionality will get worse (S4)	Increased summer temperatures are likely to drive homeowners to increase air cooling – thereby increasing pressure on energy supplies (S4) Yes – Functionality will get worse (S4))

EXHIBIT 7.3

Sensitivity Scale

If the impact occurs, will it affect the functionality of the service area?				
No – Functionality will stay the same (S1)	Unlikely – Functionality will likely stay the same (S2)	Yes – Functionality is likely to get worse (S3)	Yes – Functionality will get worse (S4)	Yes – Functionality will become unmanageable (S5)

Note: It is unlikely that the functionality of a service area will stay the same; however it may not change dramatically depending on the timeline used.

Part 2: Adaptive Capacity

The next step in determining vulnerability is to identify the adaptive capacity of a given service area. In addition to sensitivity, assessing vulnerability requires consideration of the main stressors, both climatic and non-climatic, on a region, as well as the socioeconomic influences on adaptive capacity.[2] Adaptive capacity refers to the ability of built, natural, or human systems to accommodate to changes in climate (including climate variability and climate extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. Inherent in the analysis of adaptive capacity is the assumption that systems can accommodate to changes in climate with minimal damage and cost. Those systems that are unable to are those with a low adaptive capacity.

To measure adaptive capacity, consider the projected impacts for your community and assess how those impacts will affect the systems in your service areas using the key determinants listed below. Also consider the extent to which current plans, policies and regulations account for the indentified set of climate variables and their future changes. By increasing adaptive capacity, a systems vulnerability to current and future climate change impacts is reduced.

Use the information from your sensitivity assessment to frame the linkages between the climatic change, the effect on the service area and whether that service area can adapt. Based on that information, your team can assess the ability of the service area to accommodate these changes with little or no cost or disruption. Consider the key determinants listed above and use the 1 – 5 Adaptive Capacity Scale in Exhibit 7.5 to assign a value to represent the adaptive capacity of the service area and be sure to explain the reason for that assigned value.

Exhibit 7.4 assesses the adaptive capacity of three sample impacts and service areas: water, environment, and energy.

EXHIBIT 7.4

Adaptive Capacity

Adaptive Capacity			
Impact	Increased demand on water supply due to summer drought	Contamination of streams and/or lakes due to sewer overflow	Increased demand on energy due to increased cooling needs in summer
Service Area	Water Supply	Environment	Energy Services
Can the service area adjust to the projected impact with minimal cost and disruption?	No – Will require substantial costs ($$$$$) and staff intervention (AC1)	No – Will require significant costs ($$$$) and staff intervention (AC2)	No – Will require significant costs ($$$$) and staff intervention (AC4)
Explain Response	Unable to "adapt" snowpack to warmer temperatures; limited options for expanding water supply and summer demand is already greater than supply.	Unable to adapt with minimum cost and disruption due to the costs and scale of operation required to clean up streams and/or lakes.	Able to adapt with minimal disruption and cost as many solutions are educational and knowledge based.

EXHIBIT 7.5

Adaptive Capacity Scale

Can the service area adjust to the projected impact with minimal cost and disruption?				
No – Will require substantial costs ($$$$$) and staff intervention (AC1)	No – Will require significant costs ($$$$) and staff intervention (AC2)	Maybe – Will require some costs ($$$) and staff interventions (AC3)	Yes – But will require some slight costs ($$) and staff intervention (AC4)	Yes – No to little costs ($) and staff intervention are necessary (AC5)

Once you have completed implementation as per Milestone Four, you will want to reassess your adaptive capacity in relation to each impact to determine the success of your adaptation actions.

Part 3: Vulnerability

Using the sensitivity and adaptive capacity ratings allocated for each impact and service area, vulnerability can then be assigned to each service area. Use the matrix (Exhibit 7.6) to determine the vulnerability of each service area to the impact identified and record the impacts according to their vulnerability rating in Exhibit 7.7 (Note: sensitivity ratings are across the top and the adaptive capacity ratings are down the left hand side).

EXHIBIT 7.6

Sensitivity and Adaptive Capacity Matrix

	S1	S2	S3	S4	S5
AC1	V2	V2	V4	V5	V5
AC2	V2	V2	V3	V4	V5
AC3	V2	V2	V3	V4	V4
AC4	V1	V2	V2	V3	V3
AC5	V1	V1	V2	V3	V3

V1 = Low Vulnerability
V2 = Medium-Low Vulnerability
V3 = Medium Vulnerability
V4 = Medium-High Vulnerability
V5 = High Vulnerability

- Those impacts with high sensitivity (S4 and S5) and low adaptive capacity (AC1 and AC2) are highly vulnerable (V5 and V4);
- Those with low sensitivity (S1 and S2) and high adaptive capacity (AC5 and AC4) have low vulnerability; and
- Those that have that have both high sensitivity (S4 and S5) and high adaptive capacity (AC5 and AC4) – or low sensitivity (S1 or S2) and low adaptive capacity (AC1 and AC2) have medium vulnerability (V3).

EXHIBIT 7.7

Vulnerability Ratings

High Vulnerability (S5 – AC1) = **V5**		Medium-High Vulnerability (S4 – AC2) = **V4**		Medium Vulnerability (S3 – AC2 or S3-AC3) = **V3**		Medium-Low Vulnerability (S2 – AC3 or S2-AC 2) = **V2**		Low Vulnerability (S1 – AC5) = **V1**	
Impact	Service Area	Impact	Service Area	Impact	Service Area	Impact	Service Area	Impact	Service Area
Increased demand on water supply due to summer drought	Water Supply	Contamination of streams and/or lakes due to sewer overflow	Environment	Increased demand on energy due to increased cooling needs in summer	Energy				

In worksheet 8, Risk Assessment, you will be evaluating the risk of all the impacts that are in the left-hand columns in the table above as these represent the most pressing concerns for your community. Once you have reached Milestone 5, *Monitor and Review*, your team will re-evaluate where your community's vulnerabilities lie and will have the opportunity to address the remaining vulnerabilities (those in the right-hand columns).

WORKSHEET 8
RISK ASSESSMENT

PURPOSE	TO ASSIGN RISK TO CLIMATE CHANGE IMPACTS WHICH CAN THEN BE PRIORITIZED ACCORDING TO THE LEVEL OF RISK THEY POSE TO THE COMMUNITY
Resources Needs	✔ Adaptation Team – significant time commitment ✔ Key staff or stakeholders (as needed) – nominal time commitment ✔ Facilitator recommended, though not necessarily external
Output	List of prioritized impacts based on assessment of risk.[3]
Linkage to wider methodology	Prioritized risks will help the adaptation team to move forward on developing adaptation options and actions. The risk assessment is also an excellent communication tool to "sell" certain adaptation options to Council and the wider community.

As identified in the main guide and glossary, risk is a function of the consequence of an impact and the likelihood of its occurrence or more simply,

risk = likelihood x consequence

Depending on the size of your adaptation team, it may be helpful to bring in stakeholders and/or department heads for input on the risk assessment process if their functions are not already represented on your adaptation team (e.g. someone from the conservation authority, the local transit system, environmental protection authority, etc). Alternatively, your team may want to delegate the responsibility of conducting a risk assessment to relevant working groups within departments if the capacity or expertise required to conduct a thorough assessment is not contained within the adaptation team itself.

INSTRUCTIONS

Likelihood
To determine likelihood you will have to consider whether the impact is recurring or a single event (for example: increased demand on water supply is a recurrent impact, whereas as damage to engineered infrastructure from an extreme weather event is a single event).

For each impact, assign a likelihood rating from 1 to 5 using the scale in Exhibit 8.1; you can record this rating in Exhibit 8.3.

Likelihood Rating

LIKELIHOOD RATING	RECURRENT IMPACT	SINGLE EVENT
Almost Certain 5	Could occur several times per year	More likely than not- probability greater than 50%
Likely 4	May arise about once per year	As likely as not – 50/50 chance
Possible 3	May arise once in 10 years	Less likely than not but still appreciable – probability less than 50% but still quite high
Unlikely 2	May arise once in 10 years to 25 years	Unlikely but not negligible – probability low but noticeably greater than zero
Rare 1	Unlikely during the next 25 years	Negligible – probability very small, close to zero

Consequence
Consequence refers to the known or estimated consequences (to public safety, local economy & growth, community & lifestyle, environment & sustainability, and public administration) of a particular impact and likelihood is the probability of the projected impact occurring.

For each impact, use Exhibit 8.2 to ascertain its consequence. Record the numbers assigned for each criterion (public safety, local economy, community, etc.) in Exhibit 8.3; you will then add these together to ascertain the total consequence rating for a particular impact.

EXHIBIT 8.2

Consequence Criteria

CONSEQUENCE RATING	CRITERIA				
	Public Health & Safety	**Local economy & growth**	**Community & lifestyle**	**Environment & sustainability**	**Public administration**
Catastrophic	Large numbers of serious injuries or loss of lives	Regional decline leading to wide-spread business failure, loss of employment and hardship	The region would be seen as very unattractive, moribund and unable to support its community	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage	Public administration would fall into decay and cease to be effective
	5	5	5	5	5
Major	Isolated instances of serious injuries or loss of life	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth	Severe and widespread decline in services and quality of life within the community	Severe loss of environmental amenity and a danger of continuing environmental damage	Public administration would struggle to remain effective and would be seen to be in danger of failing completely
	4	4	4	4	4
Moderate	Small number of injuries	Significant general reduction in economic performance relative to current forecasts	General appreciable decline in services	Isolated but significant instances of environmental damage that might be reversed with intensive efforts	Public administration would be under severe pressure on several fronts
	3	3	3	3	3
Minor	Serious near misses or minor injuries	Individually significant but isolated areas of reduction in economic performance relative to current forecasts	Isolated but noticeable examples of decline in services	Minor instances of environmental damage that could be reversed	Isolated instances of public administration being under severe pressure
	2	2	2	2	2
Negligible	Appearance of a threat but no actual harm	Minor shortfall relative to current forecasts	There would be minor areas in which the region was unable to maintain its current services	No environmental damage	There would be minor instances of public administration being under more than usual stress but it could be managed
	1	1	1	1	1

INTERPRETATION

Place each of the high vulnerability impacts from Worksheet 7 along the top of the Exhibit below. Having used the consequence scale (Exhibit 8.2), record the consequence rating for each area. To determine the overall consequence rating, add all of the values for each consequence criteria and record the total. Once you have calculated the total consequence rating, use the likelihood rating based on Exhibit 8.1. Multiplying the total consequence rating and the likelihood rating, ascertain the risk level for each impact.

EXHIBIT 8.3

Risk Score for Impacts

		Increased demand on water supply due to summer drought	Contamination of streams and/or lakes due to sewer overflow	
CONSEQUENCE RATING	PUBLIC SAFETY /5	3	3	
	LOCAL ECONOMY AND GROWTH /5	2	2	
	COMMUNITY AND LIFESTYLE /5	3	4	
	ENVIRONMENT AND SUSTAINBILITY /5	3	4	
	PUBLIC ADMINIS-TRATION /5	3	3	
	CONSEQUENCE TOTAL /25 (A)	**14**	**17**	
LIKELIHOOD RATING	/5 (B)	4	3	
RISK SCORE	**= A X B /125**	**56**	**51**	

Once you have the total risk score for each impact, use the risk spectrum (Exhibit 8.4) to organize each impact in the table according to the risk score. Place the extreme risks in the first rows and subsequent risks in the following rows.

EXHIBIT 8.4

Risk Spectrum

| 5-20 Very-Low | 21-35 Low | 36-50 Medium-Low | 51-65 Medium | 66-80 Medium-High | 81-95 High | 96-110 Very-High | 111-125 Extreme |

Be aware that although you will have a numerical risk ranking for each impact, a numerical ranking may overstate the accuracy of the perception of risk more than a qualitative statement would.

The interpretation of the risk levels, broadly speaking, is as follows:

- **Extreme** risks demand urgent attention at the most senior level and cannot be simply accepted as a part of routine operations without executive sanction.
- **High** risks are the most severe that can be accepted as part of routine operations without executive sanction but they will be the responsibility of the most senior operational management and reported upon at the executive level.
- **Medium** risks can be expected to form part of routine operations but they will be explicitly assigned to relevant managers for actions, maintained under review and reported upon at senior management levels.
- **Low** risks will be maintained under review but it is expected that existing controls will be sufficient and no further action will be required to treat them unless they become more severe.

Consider This…
It is important to consider the full spectrum of risks identified as you may find that by tackling some of those items that are labeled low risk you prevent them from becoming high risks in the future.

Once you have completed the table and organized the rows according to their risk scores, your team may want to consider re-securing the support from your stakeholders as you can now inform them about the most pressing risks and discuss how to move forward (revisiting the issue briefs from Worksheet 4 may be helpful with this exercise).

In theory it is possible to apply a risk score for opportunities but the language of consequence and risk does not necessarily fit this sort of discussion. However, it is important to prioritize the likelihood of opportunities to make sure that your community takes advantage of the benefits associated with those opportunities. You can record the likelihood of opportunities separately or use the table (in Exhibit 8.5) and fill in the likelihood of each positive impact (or opportunity).

Consider This…
Having completed a thorough vulnerability and risk assessment, your team may now want to consider mapping out the risks spatially for your community (e.g. GIS Mapping).

EXHIBIT 8.5

Recording Opportunities

IMPACT	LIKELIHOOD
Longer growing seasons, increasing potential to double crop.	Likely

WORKSHEET 9
SETTING GOALS AND OBJECTIVES

PURPOSE	TO ESTABLISH AND VISION AND DEVELOP GOALS AND OBJECTIVES
Resources Needs	✔ Adaptation Team – average time commitment ✔ Key staff or stakeholders (as needed) – minimal time commitment
Output	Community adaptation vision, goals and objectives.
Linkage to wider methodology	The goals and objectives will help your team develop specific actions in Worksheet 10. They can also be used in Milestone Five to determine the success of the adaptation plan (i.e. whether goals and objectives have been met).

ESTABLISHING A CLIMATE ADAPTATION VISION

Establishing a vision is a way for your community to integrate your adaptation goals into the wider vision of your community. Though not a necessary requirement for adaptation planning, it can be a useful exercise and may help your community to set specific adaptation goals and objectives later on.

A vision is a statement that expresses where your community wants to be in the future. For local governments embarking on an adaptation planning process, a vision can help to establish what an adaptive community looks like. By articulating where you would like to see your community in the future, your team and your community will have something to refer back to throughout your adaptation effort.

A vision statement also acts as a call to action and can be a catalyst to inspire change. Ideally, it should incorporate the values that are important to your community while also communicating the purpose and intended outcome of your climate adaptation plan.

There are a few key questions to consider while establishing your vision:

- What are you trying to accomplish with your climate change adaptation plan?
- What does a well adapted community look like to you?
- What sort of climate change impacts will affect your region?
- Who is your target audience: council, stakeholders, and/or citizens?
- Will this be a key public document?

Of course, if your team is struggling with developing a vision, do not let yourselves get stymied at this stage. It is enough to adopt the following simple vision:

Our Community, the _____ of _____ will become more adaptive to a changing climate.

SETTING GOALS AND OBJECTIVES

Goals

Once you have completed your vision, your team can now develop adaptation goals. Goals should be phrased in reference to the climatic changes that are threatening your community. They will act as high level intentions which your community will strive towards. Goals are general statements about the expectations of a program or plan, such as:

- *Increasing public awareness of increased temperatures and their projected impacts on our community.*
- *Increasing technical capacity to prepare for the impacts of increased precipitation in winter.*

If you do not want to list climatic changes in your goals, you may want to use more guiding goals, such as:

- *Increasing adaptive capacity of built, natural and human systems in our community.*

Be careful using guiding goals, as it may be difficult to distinguish between these more broad goal statements and your community's adaptation vision.

Objectives

Having identified community goals, your team can begin to set specific objectives. Objectives refer to the ways in which your community intends to overcome the impacts that have been identified (in Worksheet 6b) and represent the path towards achieving your wider vision. Some objectives might be specific, while others might be broad and thus more challenging to measure.

Remember that adaptation objectives will vary from one community to another based on a variety of factors, including: types and magnitude of projected climatic changes and impacts; level of support for adaptation efforts; and service areas on which your community has direct influence.

When trying to draft objectives, you may want to consider rephrasing each impact description with the intention of improving the affected service area in a way that eliminates or lessens the severity of the impact.

Some examples of such objectives include:

- *Expand and diversify water supply;*
- *Increased drought preparedness;*
- *Reduce shoreline erosion;*
- *Reduce the impact of extreme heat events;*
- *Reduce flooding and erosion impacts on infrastructure ;*
- *Improving energy conservation;*
- *Lower the ecological footprint of existing buildings;*
- *Engage energy providers to enhance local renewable energy generation opportunities;*
- *Support the local agricultural economy; and*
- *Protect local habitats and migration routes.*

Targets

To the extent possible, identify what your objective is striving to accomplish using targets. Targets can be set as a defined timeframe (e.g. develop a downtown food co-op by 2015 or designate reliable shelters for cold/warm extreme weather events by 2012) and/or relevant numerical standards to measure progress (e.g. improving energy conservation by 25% or increase local food production by 20%). Keep in mind that numerical standards will likely only be possible in cases where baseline data is available (i.e. energy use prior to an adaptation action). In some instances, baseline inventories from Milestone One of the *Partners for Climate Protection* program can be used to supply this information.

See Worksheet 12 for more information and guidance on using indicators and baselines.

NOTES

WORKSHEET 10
IDENTIFYING ADAPTATION OPTIONS

PURPOSE	TO IDENTIFY ADAPTATION OPTIONS AND RELEVANT SERVICE AREAS
Resources Needs	✔ Adaptation Team – average time commitment ✔ Key staff or stakeholders (as needed) – nominal time commitment
Output	A list of adaptation options and the associated service areas.
Linkage to wider methodology	The options that are identified here will be refined through an assessment of drivers and constraints in Worksheet 11; this process will help establish a final list of actions which can be planned out in Worksheet 13.

This worksheet will help your team create a list of adaptation options. It is important to list any actions that might improve your community's adaptive capacity here; consider this exercise as a 'wish list' of possible actions. This list will then be refined through an assessment of drivers and constraints in Worksheet 11. Although some options may seem impractical, it is still important to include them as you may discover drivers which might help overcome any initial barriers.

Adaptation Options may be any combination of the following:

- **Modifying policies, plans, practices and procedures:** Existing by-laws, codes, regulations, policies, development plans, and operating practices may have to be modified in order to adapt for climate change impacts.
- **Building new or upgrading existing infrastructure:** Examples of this include expanding stormwater collection systems, expanding wastewater treatment capacity, increasing bridge heights or strengthening levees.
- **Improving community awareness and public education:** To generate support for adaptation efforts your municipality will likely need to use outreach and education actions. These can also be useful to effect voluntary change at the individual level, such as water or energy conservation.
- **Varying and/or diversifying your options:** By developing "safeguards" against climate change impacts you can increase the preparedness of your community. Examples can include: diversifying your community's economic base to move away from sources that will be negatively affected by climate change (i.e. coastal recreation);

developing new groundwater sources to expand water supply; or diversifying your energy supply to include renewable energy to both help mitigate climate change impacts and reduce demand from the electric grid during heat waves.

As you develop your options, keep in mind that these actions should not only address the climate change impacts which your community is facing, but should do so in a sustainable manner. Specifically, they should not impede any wider sustainability efforts.

Pre-cursors to Action

Actions have tangible results which should lead to improvements in adaptive capacity; however it is also important to identify pre-cursors to action which are the steps that need to be taken to enable the implementation of an action. Consider a research study for example, it may be necessary to conduct research in cases where there is a lack of information however the research itself does not make your community more adaptive. The research informs the adaptation action which will then ultimately increase your community's adaptive capacity and reduce vulnerability to an impact.

Precursors to actions may include a wide range of strategies and will likely involve a combination of the following:

- **Establishing partnerships with other communities and government levels:** Climate change impacts do not fall neatly within jurisdictional boundaries. Adapting to climate change will require collaboration (with other local governments, federal and provincial departments, non-profit organizations, and the private sector). Such partnerships may be a way to secure funding, identify best practices or other resources which will help to create, implement and sustain adaptation actions.
- **Carrying out or commissioning of research studies:** In cases where there is a lack of information to develop appropriate actions, one option would be to commission (or carry out) research on the particular climatic change or impact. Examples of research include: studies on sea-level rise and its projected impacts on a specific part of the coastline; research on the implications of heat-waves on vulnerable populations; or a review on the effects of climate change on a variety of development options.

Any pre-cursors to action can also be included in your list of adaptation options or can be linked with specific actions where appropriate.

INSTRUCTIONS

Using the prioritized list of impacts (based on risk scores) from Worksheet 8, your team can now identify options to address each impact. There are a variety of approaches that can be taken to develop this list:

1) By service area, listing all the relevant impacts and options for each service area;
2) By climatic changes, such as sea level rise, increased temperature, precipitation or extreme events; or
3) By impact (see example below), listing each impact then identifying options and relevant service areas.

Choosing an approach will depend on the time, financial resources, and number of staff available in your community. We recommend option 3, however this process can be tailored to your community as you see fit. Use the table below to record your team's list of impacts, options and relevant service areas.

EXHIBIT 10.1

Adaptation Options

IMPACT	OPTION	RELEVANT SERVICE AREAS
Increased demand on water supply due to summer drought	Diversify water supply sources	Water Emergency Response Public Health Communication
	Implement conservation measures	Water Public Health Communications
	Increase drought preparedness	Emergency Response Water Public Health

If your community has had difficulty in the past with buy-in from senior staff not already involved in the planning process, it may be valuable to communicate with them once your team has developed a list of options for addressing the highest risk impacts and likewise again as you refine the list of options in Worksheet 11 through identifying any drivers and constraints.

NOTES

WORKSHEET 11
DRIVERS AND CONSTRAINTS

PURPOSE	TO REFINE YOUR LIST OF ADAPTATION OPTIONS AND DEVELOP A FINALIZED LIST OF FEASIBLE ADAPTATION ACTIONS
Resources Needs	✔ Adaptation Team – significant time commitment ✔ Key staff or stakeholders (as needed) – nominal time commitment ✔ Experts in relevant departments or fields of study (as needed) ✔ Facilitator recommended, though not necessarily external (see Facilitation Tips in Information Annexes)
Output	Finalized list of adaptation actions.
Linkage to wider methodology	You will use the final list of adaptation actions to draft your plan.

This worksheet will help to identify possible drivers and constraints for the implementation of adaptation actions. The purpose of this worksheet is to refine your team's initial list of adaptation options to create a finalized list of tangible adaptation actions. To include a drivers and constraints section in the final adaptation plan is up to the discretion of the team, however, considering these factors while developing your actions will be helpful in setting timelines, allocating costs, and assigning staff responsibilities.

Having identified adaptation options, in Worksheet 9, you will need to consider what factors may influence their implementation (These factors may be scientific, social, operational, environmental or financial).

In many cases, the *drivers* of an action will be the co-benefits and opportunities which would result from the implementation of that action. For example, the availability of a grant from the federal government to replace aging road infrastructure (using permeable materials) might spur action on this front.

Constraints, on the other hand, are the issues (or perceived issues) that may prevent actions from being implemented. Consider the following questions as you examine possible constraints and ways to overcome them:

- Do you have enough scientific information?
- How much support (financial, personnel, infrastructure) do you have? Where might you find what you don't currently have?
- Is the option possible within your community's policy context – does your authority have the power to change the policies that are influenced by climate change?
- Who has the authority in your local government to enact adaptation actions? Are they already involved in the planning process?
- Do you have sufficient support from council to carry out an option?
- How would a change in political leadership alter the implementation of an option?
- Who will you need to convince that action needs to happen now?
- How much time do you need to develop and implement each option?
- What resources do you have already? What else might you need? Are these internally or externally available?
- How will the environment be impacted? Is this impact positive or negative?
- Will the option have implications for mitigation activities?

These questions are designed to take you through a structured process to identify resources and mechanisms for identifying and overcoming constraints. You can refer to the list of possible constraints and possible ways to overcome them from Annex Three to inform the content of the chart below.

EXHIBIT 11.1

Factors that may influence implementation

DRIVERS	CONSTRAINTS
• The release of new/relevant studies or guidelines • Funding opportunities • Availability of staff • Political leadership / support • Appropriate messaging • Available external resources • Consequences of inaction (increased risk levels) • Benefits of action (increasing adaptive capacity) • Co-benefits (immediate and long term) • A weather event (i.e. flooding, heat wave) • Partnerships • Provincial or territorial legislation	• Lack of available information • Cost • Staff capacity • Number of service areas involved • Silo thinking • Lack of messaging • Need for external resources • Lack of agreement on severity and timing of climate change impacts. • Political will • Competing or short timelines • Effects on mitigation activities • Provincial or territorial legislation

INSTRUCTIONS

Using the adaptation options listed for each impact in Worksheet 10; develop a concept map (see Exhibit 11.2 below). Using the information on drivers and constraints in the Information Annexes, identify the possible constraints and drivers for each option on the map. You'll notice that depending on the circumstances constraints can act as drivers and vice-versa (i.e. political will for an action might drive that action, while limited political will may act as a constraint). The particular conditions within your community will dictate whether something is a driver or a constraint.

After you have completed a concept map for each option, look at all of the constraints and drivers that you have identified. Take note of the top five drivers and the top five constraints that appear most frequently. Fill out the chart in Exhibit 11.3 for each of the five most common constraints and Exhibit 11.4 for each of the five most common drivers.
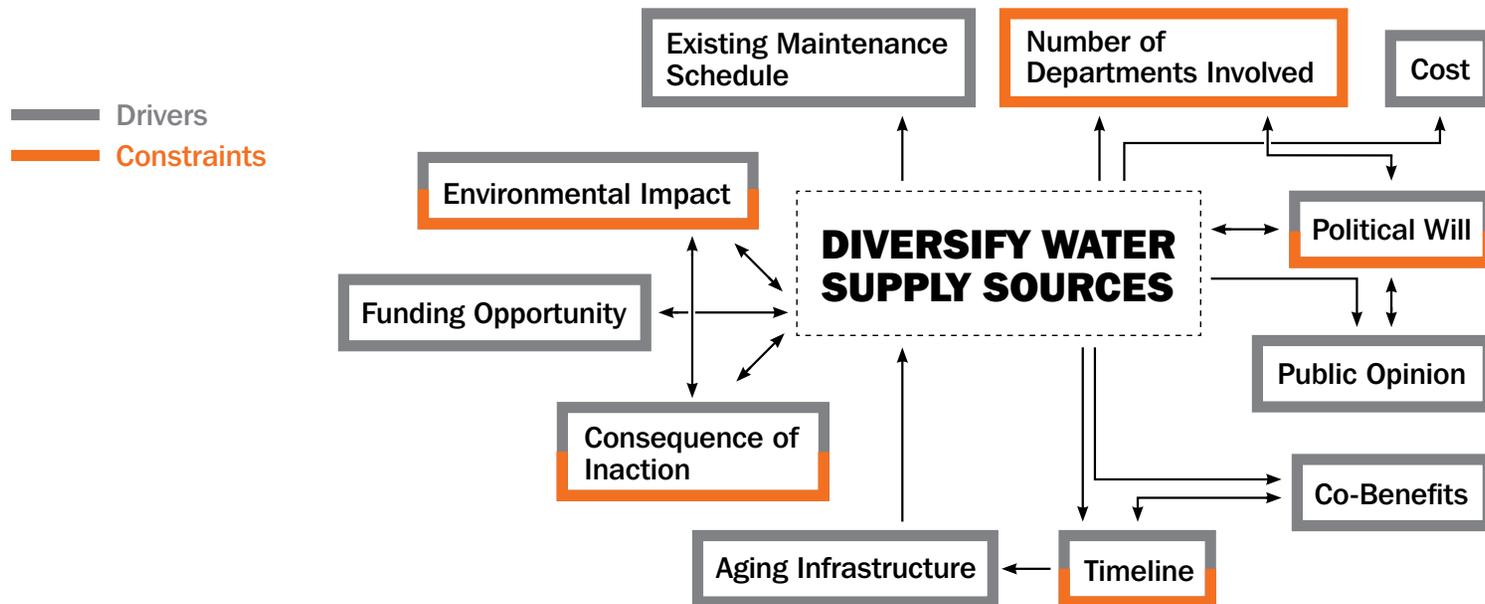
EXHIBIT 11.2

Sample Concept Map

EXHIBIT 11.3

Constraints

CONSTRAINTS	CONSTRAINT 1	CONSTRAINT 2	CONSTRAINT 3	CONSTRAINT 4	CONSTRAINT 5
1. What is the nature of the constraint?					
2. What resources are needed to overcome that constraint? Be as specific as possible (e.g. time, money, knowledge).					
3. Do you know of any resource that already exists that could help you overcome this constraint (i.e. drivers)? If so what is it and how would it meet your need?					
4. Who has knowledge (or other resources) that would be valuable in regard to overcoming this constraint? Consider the nature of the constraint (e.g. scientific, social, operational)					
5. What is the best way to access (someone with that) knowledge? (e.g. verbally, in a guide, electronically)					
6. Other comments					

EXHIBIT 11.4

Drivers

DRIVERS	DRIVER 1	DRIVER 2	DRIVER 3	DRIVER 4	DRIVER 5
1. What is the nature of the driver?					
2. How might this driver help to overcome other constraints? Be as specific as possible					
3. Are there any significant timelines associated with this driver?					
4. Other comments					

Table adapted from CCP Australia Adaptation Initiative – Local Government Climate Change Adaptation Toolkit (2008)

Once you have outlined the drivers and constraints for each adaptation option, go back and refine your list of options based on this information. You may find that some of the identified drivers will help to overcome constraints. Be sure to take this into consideration as you refine your list of adaptation options. Using this information create a final list of adaptation actions. This list will be the basis of the remaining planning process.

WORKSHEET 12
INDICATORS AND BASELINE DATA

PURPOSE	TO DEFINE A SET OF INDICATORS IN ORDER TO ESTABLISH A BASELINE
Resources Needs	✔ Adaptation Team – significant time commitment ✔ Key staff or stakeholders (as needed) – minimal time commitment ✔ Research help (i.e. summer student, academic placement, etc.)
Output	This worksheet provides the foundation upon which a future assessment of the adaptive capacity of your community will be based. With an established set of indicators, your team will create a baseline. Both the specific indicators relevant to particular actions and the baseline will be used when drafting your adaptation plan and will be referred back to in Milestone Five to measure the progress and effectiveness of each adaptation action.
Linkage to wider methodology	This set of indicators will be used again in Milestone Five to evaluate the progress being made on implementation and the level of effectiveness of each adaptation action against the baseline set now.

While developing your adaptation plan, you should establish a set of indicators that can be used to create a baseline against which the effectiveness of your adaptation actions can be measured. These indicators can also help assess how your community's vulnerabilities are changing based on implemented actions and whether these actions increase or decrease your adaptive capacity or sensitivity to climate change impacts. Keep in mind, if your team is not able to establish a comprehensive baseline prior to the creation of an adaptation plan, you may have a less accurate portrayal of the progress and effectiveness of your adaptation actions.

Establishing Baseline Data

Adaptation baseline data provides a record of a community's current condition as it relates to vulnerability and risk. In order to create a baseline, your team will need to identify a set of indicators which can be used to assess and record your community's current conditions.

Indicators should be precise, clear and easy to understand. As there may already be some indictors which are used in your community that indirectly relate to adaptation, prior to developing more indicators your team should assess your community's familiarity with indicators broadly and their current use in policies and actions that contribute to adaptation so as to avoid duplication or indicator overload.[4]

The comprehensiveness of the indicators that your team develops will determine the degree to which the effectiveness of the actions that have been implemented can be measured in Milestone Five. For more detail on the kind of information that will be used to determine progress on implementation and the effectiveness of adaptation actions refer to the section on tracking progress in Milestone Five in the main guide.

The process of establishing baseline data can range from being exhaustive (touching on sensitivities, adaptive capacity, exposure, etc.) to cursory (selecting only one or two sample indicators). Keep in mind that the more information that is gathered at this stage, the better equipped your community will be to communicate the successes of your adaptation actions later in Milestone Five. Collecting baseline data is also a good opportunity to utilize the help of students, volunteers and/or interns.

> **Some of the challenges of developing adaptation indicators include:**
> - Often indicators are outcome based, however due to the nature of adaptation this approach may not have the degree of flexibility that is required;
> - It can be difficult to distinguish between an increase in adaptive capacity due to adaptation actions or an increase in adaptive capacity due to the natural course of sectoral development; and
> - It is possible that if not assessed comprehensively, actions may not be seen as effective if indicators have not been properly allocated or defined.

Instructions

Using the list of indicators below (Exhibit 12.1) as a guide, create a list of indicators for each of your adaptation actions using any combination of qualitative or quantitative indicators.

EXHIBIT 12.1

Possible Indicators by Service Area

SERVICE AREAS	INDICATORS
Planning and Zoning	• Total land area in flood risk zone • Utilized river bed area(km)/total land area(km) • Proportion of low lying coastal areas (in km) (altitudes below 1m) • Proportion of drought vulnerable area (i.e. km_2 agricultural land area/total land area (km_2)) • Average number of permeable and non-permeable surface area (m_2) in permitted developments • Ecologically sensitive area (i.e. area (km_2) of habitat of endangered species, or tidal wetland areas (km_2))
Communications	• Existence and regular use of ongoing forums for sharing information on climate change impacts • Existence of surveys to track requests for adaptation (i.e. heat-risk) related publications • Existence and regular use of ongoing forums for sharing information on climate change impacts • Number of people attending public meetings on adaptation • Tracking "hits" on community-sponsored or community-run webpage's
Public Health	• Number of patients with respiratory disease/total population • Number of patients with vector-borne disease/total population • Proportion of elderly population living alone (in %) • Proportion of people living in poverty (in %) • Proportion of population over 65 (in %) • Population density (i.e. total population/total land area km_2) • Availability of medical facilities (i.e. population/# of hospital beds; hospital workers/total population; public health center employees/total population; number of general hospitals)
Transportation	• Proportion of transportation and supply facilities
Environment	• Average temperature at assigned community hotspots
Engineering	• Proportion of industrial park area/total land area km_2
Housing	• Proportion of housing units older than 30 years/total housing units • Proportion of housing and development permitted in flood risk or vulnerable areas
Economic development, culture and tourism	• Gross Regional Domestic Product (GRDP) • Economic growth (i.e. GRDP growth rate over five years) • Fiscal independence (i.e. local tax + non tax revenue/general account budget)
Parks and Recreation	• Park area (km_2) per capita • Average increase / decrease of green space and trees (i.e. square feet, meters or kilometres)
Water	• River improvement (i.e. river improvement length (km)/improvement needed (km)) • % of population with access to clean drinking water • Capacity of sewage treatment systems compared to quantity of total sewage • Use of groundwater/available groundwater

As your adaptation team continues to develop specific actions, it is likely that those actions will have more specific indicators than are listed here. Be sure to generate an appropriate list of indicators that reflects the actions that your team has developed.

The indicators that are identified in this worksheet can also be used to determine whether your community has achieved its adaptation objectives. Particularly for those objectives with specific targets, indicators can be used to assess the degree to which those targets have been achieved by creating a baseline to compare against.

In cases where action specific indicators are unavailable the level of your community's vulnerability prior to the implementation of an action, and the level of vulnerability after an action has been implemented can be used to determine progress on implementation and the effectiveness of your adaptation actions. The table in Exhibit 12.2 provides additional determinants of adaptive capacity which can be used to supplement a vulnerability assessment when establishing a baseline.

EXHIBIT 12.2

Determinants of Adaptive Capacity

SERVICE AREAS	INDICATORS
Social Capital	• Climate related public-private partnerships • Citizen's capacity on climate change (i.e. citizen's actions, education and/or campaigns for emergency management, proportion of people with health education) • Sense of community (i.e. number of volunteers or volunteer commitment specific to emergency management or climate change)
Institutional Capacity	• Political leadership (i.e. political leaders concerned with climate change and emergency management) • Prevention systems (i.e. delivery systems for disaster relief, warning systems) • Staff for adaptation actions (i.e. public officials per capita, convalescence care) • Level of climate change policy or emergency management policy

WORKSHEET 13
DRAFTING AN ACTION PLAN

PURPOSE	TO ASSIST IN IDENTIFYING TIMELINES FOR ACTIONS, ASSOCIATED COSTS, RESPONSIBLE DEPARTMENTS AND OTHER RESOURCES NEEDED TO DRAFT AN ACTION PLAN
Resources Needs	✔ Key staff or stakeholders (as needed) – nominal time commitment ✔ Adaptation Team – significant time commitment ✔ Facilitator as necessary (depending on the contentiousness of drafting the plan)
Output	Draft Adaptation Action Plan.
Linkage to wider methodology	It is at this stage where all the time spent researching, analysing and developing appropriate actions will come together in a formal adaptation plan. This plan will become the backbone of your team's adaptation work and will serve as both a landmark for your community and a point of reference as you monitor your progress through to Milestone Five and beyond.

The actions that have been identified after having completed Worksheet 11 will make-up the bulk of your community's adaptation plan. In order to move from a list of actions to a more formalized action plan you will need to identify timelines for action, costs, lead departments as well as other relevant departments, other resources (external support, tools, financing etc.) and any necessary pre-cursors to action. By combining these with your action list, you will have a basis for your draft action plan.

Table 13.1 suggests a way to organize proposed actions. For each action it is important to identify:

- A lead department – this will be the department charged with implementing the action;
- Other relevant department(s) – any other departments that should be involved with planning and/or implementation;
- Timeline –start and end dates; short, medium or long-term timelines; immediate or ongoing actions etc;
- Costs – are the costs variable/fixed, significant;
- Funding – can this be funded by an existing budget, through third-party funding, future budgets;
- Indicators –what is the baseline information you need to measure the action against; (Refer to Indicators from Worksheet 12)

- Pre-cursors to action – what steps need to be taken to enable the implementation of an action (i.e. research studies, establishing partnerships etc); (Use the pre-cursors to actions from Worksheet 10 as a starting point); and
- Other – what other factors are important to consider for this action (potential barriers, etc.)

At this point, it is important to make sure that the actions that are being indentified not only address the climate change impacts that your community is facing, but that in doing so they do not impede any wider mitigation or sustainability efforts already under way.

EXHIBIT 13.1

Sample Action Table by Impact

Impact:	[insert impact]
Action 1	[insert action]
Lead department	[Identify the primary department that will implement the action]
Relevant departments	[List any other departments that may be involved in the implementation process]
Timeline	[Establish a timeline e.g. short, medium or long term]
Costs	[Identify costs e.g. $$$$ /year*]
Funding	[Specify funding source e.g. existing operating budget]
Indicator	[e.g. number of culverts replaced]
Baseline data required	[e.g. number and age of culverts]
Pre-cursors	[List any steps which need to take place prior to implementing the action]
Other	[Anything else that needs to be included]

Action 2	[insert action]
Lead department	
Relevant departments	
Timeline	
Costs	
Funding	
Indicator	
Baseline data required	
Pre-cursors	
Other	

Action 3	[insert action]
Lead department	
Relevant departments	
Timeline	
Costs	
Funding	
Indicator	
Baseline data required	
Pre-cursors	
Other	

Once your team has a draft action plan, you may want to consider communicating with senior departments heads, directors and other staff within the community on the status of the overall plan and involve the lead departments with the development of the final action plan and implementation timeline.

Implementation Timeline

The creation of an implementation timeline is the backbone for the implementation milestone (Milestone Four). Note that although it is included here as part of the planning process, it could also be used as an implementation tool and be created in the first steps of Milestone Four.

Earlier your adaptation team identified an estimated time to implement and/or complete each action; these timelines should now be finalized and compiled to create an overall implementation schedule. This schedule will track each action and associated tasks/sub-tasks, and will include a calendar of when each action is to be implemented (including the lead department, financing requirements, etc.). A comprehensive implementation schedule will help later to monitor what progress is being made on the adaptation plan. Keep in mind that the purpose of the implementation schedule is not to prioritize or rank adaptation actions but rather provides a tool for planning the implementation of each action. Also note that the implementation schedule will likely cover an extensive period of time as all adaptation actions, from immediate to ongoing, should be included.

In an implementation schedule, be sure to create and assign designated times to monitor and review the actions. This step will ensure your actions are based on the most relevant and up-to-date information available and are not having unintended consequences or are based on inaccurate risk assessments. If contextual changes exist, consider whether they are significant and whether they require action. Should implementation fall behind schedule, identify opportunities to either bring your community back on schedule or revise the adaptation action plan.

As you create an implementation schedule for each action allow enough time to fully implement it. Be practical - keep in mind that other responsibilities will continue and be sure to account for existing processes and responsibilities, future administrative, technical and political changes, council and staff turnover, and other issues you might face as you implement your plan. Also, include time in your implementation schedule for stakeholder review and input.[5]

Also keep in mind that as you implement each action it will be important to monitor lessons learned. These lessons will help both to celebrate successes (particular actions that worked and showed immediate benefits to the community) and also actions that proved to be more challenging and/or perhaps mal-adaptive.

Note: Individual departmental workplans for the responsible departments will have to be modified to include new actions specific; the implementation timeline need not include such a degree of specificity.

FINAL REVIEW

It may be helpful to consider what should be included in the final version of the plan. The following is a list of elements that we recommend to be included:

- *Acknowledgements* – thank you to stakeholders, adaptation team, council, etc.
- *Mayors/Council Commitment*
- *Executive Summary*
- *Glossary* – key terms that may assist the reader.
- *Introduction*
- *Background and Context* – What is climate change? Why was this process undertaken? Why is it important
- *Impacts & Issues* – What impacts are projected for the community? What are the risks?
- *Vision Statement* – A call to action for your community
- *Goals and Objectives* – What are the objectives for achieving the vision? What are our targets for measuring these?
- *Actions* – actions, costing, financing, responsibilities, timeline, monitoring & review
- *Implementation schedule* – a timeline by action with a defined date and responsible departments.
- *Additional Information* – references, sources of information, etc.

WORKSHEET 14
PRESS RELEASE TEMPLATE

PURPOSE	TO COMMUNICATE THE INITIATION OF AN ADAPTATION EFFORT AND/ OR THE COMPLETION OF YOUR COMMUNITY'S ADAPTATION PLAN
Resources Needs	✔ Adaptation Team – minimal time commitment ✔ Communications or media staff from within the community
Output	A press release outlining your community's plan for increasing its adaptive capacity and/or how far your community has come in increasing its adaptive capacity (as well as any next steps).
Linkage to wider methodology	It is important to maintain a dialogue with the wider community. A press release is one way in which to get information on your community's ongoing adaptation work to local media and by extension to the general public. This press release can be used at the beginning of your community's adaptation effort, accompanying the passing of a council resolution, to inform the wider community of the commitment to this process, and/or upon the completion of the adaptation plan.

Below is a press release template which can be used to:

1) Communicate a commitment to an ongoing adaptation effort (Milestone One) or
2) Communicate the completion of your community's adaptation plan (Milestone Three).

Be sure to fill in the specifics of your community's adaptation effort in the space provided. Of course, your community may have internal mechanisms for creating press releases, these can be used in place of this worksheet.

[Community Logo]

FOR IMMEDIATE RELEASE

Contact: [Insert name]
Phone Number: [Insert Phone Number]
Email: [Insert email address]
Date: [Insert date]

Initiating a Climate Change Adaptation effort in [YOUR COMMUNITY]

Canadian communities are becoming increasingly vulnerable to a range of climate change impacts including rising temperatures, more frequent and intense storms and sea level rise. Recognizing that current greenhouse gas (GHG) concentrations in the atmosphere are already having an impact on the Earth's climate, climate change adaptation is necessary to moderate harm. While neither adaptation nor mitigation actions alone can prevent significant climate change impacts, taken together they form a comprehensive climate change response strategy that will prepare communities for the impacts of climate change that are underway while working to avoid harmful future affects.

Acknowledging these risks, **[YOUR COMMUNITY]** has begun to take steps to prepare for the existing and future affects associated with a changing climate by [**initiating an adaptation planning effort OR creating an adaptation plan**]. As municipalities are the level of government closest to residents, they are on the front lines of responding to the impacts of climate change. Our position as a local authority allows for the development of a locally tailored adaptation plan that can have measurable results in improving our local adaptive capacity.

[INCLUDE THE SPECIFICS OF YOUR COMMUNITY'S ADAPTATION EFFORT HERE]

If announcing a commitment to adaptation planning include information on: your community's adaptation team (i.e. name, team members); the political support enabling this process to move forward; the purpose of the adaptation plan (i.e. to address a specific impact or risk); the intended outcome of the plan (i.e. reducing the vulnerability of your community and increasing its adaptive capacity); and next steps.

If announcing the completion of your adaptation plan include information on: the title of the plan; the support (e.g. financial, political etc) which made the plan possible; any partnerships that were developed throughout the process; the intended purpose of

the plan (i.e. reducing the vulnerability of your community and increasing its adaptive capacity); some indication of the implementation schedule of the plan; how the plan is mean to decrease the vulnerability of your residents; and next steps.

By taking practical steps early, we are reducing future climate change related risks in **[YOUR COMMUNITY].**

NOTES

WORKSHEET 15
ALLOCATING IMPLEMENTATION TOOLS

PURPOSE	TO ALLOCATE THE APPROPRIATE IMPLEMENTATION TOOLS FOR PARTICULAR ADAPTATION ACTIONS
Resources Needs	✔ Department Heads (those not already on Adaptation Team) – minimal time commitment ✔ Adaptation Team – average time commitment ✔ Key stakeholders (those not already on Adaptation Team) – nominal time commitment
Output	One or more implementation tools for each adaptation action.
Linkage to wider methodology	Implementation tools are the basis through which your community will move from planning to doing. Choosing appropriate implementation tools will help to ensure that you are reaching the widest audience and making the greatest impact.

This worksheet looks at the implementation tools that have been suggested in the main guide and will help your team identify which tools are the most applicable for each defined action. The primary tools identified are pilots, internal communication, external communication, marketing and training.

EXAMPLE

Due to your community's vulnerability and concern about storm water runoff, your adaptation team has decided that the most desirable action is to encourage residents to replace non-permeable driveways with permeable ones. There are a variety of implementation tools which could be used to implement this action.

Consider the following four options: pilot projects, marketing, external communications, training, and internal communications. The column on the left represents the specific implementation tool while the columns on the right list considerations for each.

EXHIBIT 15.1

Sample Implementation Tools for Increasing Permeable Driveways

IMPLEMENTATION TOOL	PROS	CONS
Pilot Project e.g. neighbourhood specific incentive based initiative to encourage individuals in that neighbourhood to replace driveways	• Incentives make it more likely to guarantee uptake • Can determine the potential success of an action if it were to be expanded to a broader scale	• Costly • Reach a small number of people • May not be replicable in other communities
Marketing e.g. advertising and social marketing campaigns for replacing driveways	• Potentially reaches a wider audience • Can be tailored to specific audiences (i.e. existing knowledge, early adopters, etc.)	• Can be costly • Difficult to determine what the best social marketing mechanisms are • Difficult to guarantee uptake
External Communication e.g. press release and small pamphlets on benefits of replacing driveways	• Minimal costs • Reaches a wide audience (i.e. entire community)	• Very difficult to guarantee update
Internal Communication e.g. issue briefs directed at staff and Council	• Minimal costs • Can be used as a pre-cursor to garner support from staff and council to implement action on a broader scale	• Only reaches a small internal audience
Training e.g. training workshops for staff or elected officials	• Provides specific training relevant to actions • Creates a dialogue which can improve the actions in the long run	• May be difficult to solicit participants • Could be costly

As your team evaluates the value and applicability of each implementation tool for specific actions, consider:

- What staff will need to be involved if this tool were to be used?
- How many resources can be allocated to the implementation of this action?
- What audience is the tool geared towards?
- What audience does the action need to reach?
- Is the tool already being used in another form? If so, can it be used "as is" or with slight modification?
- Is the tool intended for short or long term use? Does this reflect the timeline of the action?
- Consider your local government's action mechanisms and how these can be utilized to drive the implementation of adaptation actions.

EXERCISE

In order to identify which implementation tool would be the most applicable for a specific action, your team can recreate the table above. Consider all of the possible implementation tools and using the questions outlined above list the tools that could potentially be used to implement that action. Use a similar exercise of examining the 'pros and cons' of each tool in order to determine which tool is most fitting for that particular action.

The purpose of this worksheet is to help your team decide which tool is most suited for a particular action. Note that it may not be the case that only one implementation tool is relevant to a particular action (in the example above a pilot project would have to be accompanied by external communication and/or marketing to be effective).

NOTES

WORKSHEET 16
UPDATING THE PLAN

PURPOSE	TO UPDATE YOUR COMMUNITY'S ADAPTATION PLAN BASED ON NEW LOCAL CONDITIONS, OPPORTUNITIES AND/OR NEW INFORMATION
Resources Needs	✔ Adaptation Team – average time commitment
Output	An updated Adaptation Plan.
Linkage to wider methodology	At this point in Milestone Five you team has the formal opportunity to update your adaptation plan, although it is likely that many of the actions that were included in the final plan have been revised as part of their implementation, it is important to assess new information, review assumptions and update your action plan at this time.

This worksheet provides your team with a checklist of items to consider when drafting the update to the adaptation plan.

CHECKLIST

- ✔ Create an issue brief outlining accomplishments to date and next steps.
- ✔ Renew the commitment of your adaptation team.
- ✔ Create a list of actions that were not implemented in the first round. Identify the reasons that implementation did not move forward? Did a shift in vulnerabilities cause a re-ordering of actions? Were there insurmountable constraints that hindered implementation? Have conditions changed enough to enable implementation now?
- ✔ Refer back to the vulnerability assessment - the impacts of medium-low vulnerability can now be addressed as you update the plan.
- ✔ Conduct a risk assessment for medium-low vulnerabilities.
- ✔ Identify adaptation options and actions to address the new impacts.
- ✔ Communicate successes.
- ✔ For each action consider the relevant indicators, drivers, and constraints. There may be elements that weren't considered the first time around.
- ✔ Update, or establish, a baseline. Use the indicators that have been identified to do this.
- ✔ Re-evaluate your community's vision, targets and goals. Assess whether they are still relevant or if they need to be updated to reflect the actions that have been taken or will be taken.
- ✔ Assess funding opportunities – Are there any new opportunities? Are previous funding sources still available?
- ✔ Update the implementation schedule to reflect new adaptation actions.
- ✔ Revise your current adaptation plan to account for the new items that have been added and any previous items that have been readdressed.

WORKSHEET 17
COMMUNICATING ACCOMPLISHMENTS

PURPOSE	TO DEVELOP A COMMUNICATION STRATEGY AND COMMUNICATE WITH THE WIDER COMMUNITY ON THE ADAPTATION EFFORTS OF YOUR TEAM
Resources Needs	✔ Adaptation Team ✔ Communications staff from within the corporation
Output	A comprehensive communications strategy.
Linkage to wider methodology	This is the final stage of the five-milestones. Communicating accomplishments is an important step to acknowledge the work of your Adaptation Team and the stakeholders involved.

The way in which you celebrate and communicate the accomplishments of your adaptation effort will be dictated by the kind of plan your community has created (i.e. a departmental plan, a municipal operations plan etc). There are a variety of communication methods that can be employed including a community event, a press release, issue briefs, reporting, etc. Exhibit 17.1 presents a look at several communications options and rates the pros and cons of each.

Be sure to identify future plans and next steps with regard to adaptation within your community in any of the methods you employ.

DEVELOPING A COMMUNICATIONS STRATEGY

Defining a communication strategy is something that is best done in a group as you can pool your collective skills and expertise. Gather your adaptation team, and any key stakeholders with specialized expertise in this field, to develop your communication strategy.

It is best to keep things simple. Consider the following questions:

1) What elements of the adaptation plan need to be made known?
2) What was the objective of the plan?
3) What groups or individuals would be interested in this information?
4) What are the needs of these groups? What elements of the adaptation plan would they be most interested in?
5) What communication tools do you want to use to target these groups? (Consider the communication methods listed below and the implementation tools listed in Worksheet 14)
6) What is your timeframe?
7) What financial and human resources do you have available to you? [6]

Once you have identified the key elements of the adaptation plan that need to be communicated, who it should be communicated to, the timeline in which to accomplish this communication, and what financial and human resources are available to you, you can create a message for each of the identified audiences.

EXHIBIT 17.1

Methods for Communicating Accomplishments

COMMUNICATION METHOD	PROS	CONS
Community Event e.g. an "Adaptation Week", launch even, or awards ceremony	• More likely to get participation • Provides an opportunity for community involvement • High profile	• Costly • May only reach a small number of people
Press Release e.g. a public announcement on the accomplishments of the adaptation plan	• Minimal costs • Reaches a wide audience (i.e. entire community)	• Difficult to ensure that it is read • Low profile – not celebratory
Issue Brief e.g. interdepartmental memo on the accomplishments of the adaptation plan	• Minimal costs • Reaches all arms of the corporate structure • Could create internal awareness of adaptation issues and spur interdepartmental involvement	• Only reaches a small internal audience • May not appropriately represent the scale of the adaptation effort
Reporting e.g. annual progress report on adaptation plan and implementation efforts or community website update or feature	• Documents progress in a formal way • Minimal costs	• Only reaches a small, mostly internal audience • Is not accessible to wider audience

ENDNOTES

1. Note that the order of selecting a team leader and identifying a mandate can be changed as per your preference.
2. Warren, F.J. and Egginton, P.A. (2008): Background Information; In *From Impacts to Adaptation: Canada in a Changing Climate 2007*, (ed.) D.S. Lemmen, F.J. Warren, J. Lacroix and E. Bush; Government of Canada, Ottawa, ON, p. 27-56
3. These risk assessment scenario charts have been adapted from *Climate Change Impacts & Risk Management: A Guide for Business and Government* © Commonwealth of Australia 2006 and *A Risk Management Approach to Adaptation Decision-making* from Ontario Centre for Climate Impacts and Adaptation Resources
4. Harley, M. et al. (2008) *Climate Change Vulnerabilities and Adaptation Indicators*. Accessed June 24, 2010 from http://air-climate.eionet.europa.eu/docs/ETCACC_TP_2008_9_CCvuln_adapt_indicators.pdf
5. Partners for Climate Protection (2008) Five-Milestone Framework for Reducing Greenhouse Gas Emissions. Accessible at: http://www.sustainablecommunities.fcm.ca/files/Capacity_Building_-_PCP/PCP_Resources/PCPFiveMilestoneFramework-e.pdf
6. International Development Research Center (IDRC), (2010). Developing a Communications Strategy. Accessed June 14, 2010 from http://www.idrc.ca/uploads/user-S/11606746331Sheet01_CommStrategy.pdf