

City of Cambridge

Purchasing Department

Cynthia H. Griffin
Purchasing Agent

To: All bidders
From: City of Cambridge
Date: January 24, 2012
Re: File No 5686- RFP for Services to Develop a Climate Change Vulnerability Assessment and Adaptation Plan for the City of Cambridge -Addendum No. 3

The Sign in Sheet from the Pre-proposal meeting held on Thursday, January 19, 2012 is attached.

The following questions were submitted and answered.

1. On page 1 of the RFP, it states in the next to last paragraph that the City has or will establish prior to negotiations a not-to-exceed fee. Has this fee been established?

Response: A fee has not been definitively established.

2. Does the City want a budget submitted with the proposal?

Response: No. Once a consultant has been selected following evaluation of the proposals, the budget will be negotiated. Please note that any mention of the applicant's fee in the proposal will subject the proposal to rejection.

3. What does the negotiation with the selected consultant cover?

Response: Both the scope of work and the price will be negotiated.

4. On page 7 of the RFP, it states the City expects to appoint a technical advisory committee. Will this committee be engaged throughout the project?

Response: The City expects to convene both an expert advisory panel and a technical advisory panel. The expert advisory panel will draw on local experts on climate change to help the City and the consultant review assumptions and the overall approach of the vulnerability assessment. It will probably not be engaged throughout the project, but this has not be definitely determined yet. The technical advisory committee will consist of stakeholders that need to be engaged in the assessment and adaptation planning due to their role in the local economy, ownership of critical infrastructure and assets, and potential role in adaptation activities. This committee will be engaged throughout the project.

5. The RFP requests recommendations; since consultant teams with multiple firms are expected, should recommendations be provided for firms across the team or only for the prime consultant?

Response: It is expected that references will be required for the prime consultant and for major sub-consultant firms associated with the proposal.



6. On page 14, a stakeholder and public engagement plan is listed as a deliverable. Will the consultant be expected to implement the plan as well during the project?

Response: Yes. The consultant will work with City staff to implement the plan. The division of labor will be determined during the project.

7. Does the City want the vulnerability assessment to take the entire 18 month project period identified in the RFP?

Response: If the assessment can be completed sooner, that would be desirable.

8. Page 4 refers to "selection criteria" and page 5 under section 10.2.1 the RFP refers to "evaluation criteria. Are these the same or different? Are there criteria against which the proposals will be judged?

Response: For the purposes of this offering "selection criteria" and "evaluation criteria" mean the same thing.

9. Does the City have an active "REMI" economic model license?

Response: No.

10. On page 11, item 8 under section 5, what is the "assessment of existing public health facilities and systems ..." expected to cover?

Response: It is expected that the chosen consultant will provide a broad analysis of existing facilities and systems, identifying those areas of most concern and through a process of further analysis, in conjunction with staff and panels, prioritize those areas in most need of attention from an adaptation perspective.

11. Is there an expectation that the due date for the RFP response will be extended again?

Response: The date for the submission of proposals is Thursday, February 16, 2012 @ 11:00 AM as referenced in Addendum No. 2.

12. How will Kleinfelder SEA/Montgomery Watson team work with the consultant for the vulnerability assessment and will they be paid from the assessment budget or separately?

Response: KSEA/MWH have provided hydraulic modeling services to the City for several years using the Infoworks model. These consultants have a degree of familiarity with the dynamics of a complicated municipal sewer, drain and combined sewer infrastructure and thus, when identifying vulnerabilities and addressing adaptation their contribution may be significant assistance. The relationship between KSE/MWH and the vulnerability assessment consultant will be worked out in the negotiation of the scope. If helpful KSE/MWH will be brought in under a separate contract which will be paid from a separate budget. KSE/MWH is not precluded from submitting a proposal on the vulnerability assessment.

13. Regarding the DSB application form, is there a DSB number to use in box 2a?

Response: No.

14. On page 4 under Selection Criteria, the RFP states that the applicant is required to state exceptions, if any, to the terms of the proposed agreement. Should those exceptions be included in the proposal?

Response: Proposers should include exceptions in their proposals. If selected, these exceptions will be considered during the negotiation.

15. The DSB 2011 Application Form calls for resumes from one person per discipline requested in the RFP. Are proposers prohibited from adding additional resumes?

Response: No.

16. How much has climate change been factored into the existing hydraulic models?

Response: The hydraulic model that has been used in the City heretofore is the Innowyze; unsteady state Infoworks Hydraulic Modeling Software. The City has been using this model or earlier versions of it since 2003/2004 to analyze and design stormwater management projects throughout the city to address flooding issues in areas of greatest vulnerability and to analyze and design Combined Sewer Overflow (CSO) control projects. Some limited Climate Change scenario simulations have been completed specific to river system changes in elevation, evaluating more intense short term rainfall events and reviewing the simulation results of what are presently considered rainfall events that are larger and less likely.

17. Given that ICLEI requires participation in their workgroup to review in detail their planning framework, can you either provide a description of the framework in enough detail to guide how this tool may be best implemented in the study or access to their site?

Response: Cambridge was one of the inaugural communities in the ICLEI Climate Resilient Communities Program. Our participation gives us access to technical assistance and information. The City is not under any obligation to ICLEI in terms of how we conduct the vulnerability assessment or plan for adaptation. It is the City's expectation that it will seek ICLEI's assistance during the project for technical advice and information where appropriate.

The RFP scope indicates the City's desire that the ADAPT tool be used in reviewing Cambridge's vulnerabilities. ICLEI has indicated that they will be able to give the City's selected consultant team access to the tool, but is not able to provide open access during the proposal process. They have made the user guide available, which is attached to this document. Proposals do not need to detail how the consultant team will utilize ADAPT. When a consultant team has been selected and under contract the City will review ADAPT with the consultants to determine its value and appropriate uses. The proposals should describe the approach that the consultant would take in identifying and assessing vulnerabilities.

18. Can you provide the list of names and affiliations of the current technical advisory committee that will be available as a resource through the project? It is our understanding this committee will be in addition to the stakeholder group of specialized expertise the City of Cambridge intends to pull together for this work.

Response: The technical advisory committee has not been selected at this time. The City has expectations of key stakeholders that it intends to invite. The City will also ask the consultant team for their suggestions following commencement of the project. The purpose of the committee is to engage key stakeholders who hold critical information; are responsible for key infrastructure or facilities; are major property owners; have legal or regulatory jurisdiction; represent vulnerable populations; and who otherwise need to be involved in planning for adaptation to climate change. The City expects to invite NSTAR, MIT, Harvard University, Massachusetts Department of Transportation, Massachusetts Department of Conservation & Recreation, Massachusetts Bay Transportation Authority, Cambridge Health Alliance, Mount Auburn Hospital, and Veolia among others.

19. Should we refer to this as Bid #5686 or Bid # 1685?

Response: Please refer to the Proposal as File No. 5686.

All other details remain the same.



CYNTHIA H. GRIFFIN
PURCHASING AGENT

ADDENDUM NO. 3

SIGN IN SHEET

PRE-PROPOSAL MEETING FOR RFP FOR ADAPTATION CLIMATE CHANGE

THURSDAY, JANUARY 19, 2012 @ 2:00 PM

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SIGN IN SHEET

PRE-PROPOSAL MEETING FOR RFP FOR ADAPTATION CLIMATE CHANGE

THURSDAY, JANUARY 19, 2012 @ 2:00 PM

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ADAPT

The Adaptation Database and Planning Tool

The Adaptation Database and Planning Tool (ADAPT) User Guide

Developed November 2010

By

ICLEI-Local Governments for Sustainability USA



Adaptation Database and Planning Tool (ADAPT) User Guide

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About the Adaptation Database and Planning Tool (ADAPT)

Adaptation to climate change involves adjustments to prepare for actual or expected climate conditions and the associated impacts, in a manner that reduces harm to lives, health, property, and ecosystems. Adaptation can be a sudden or gradual response. However, when communities plan ahead for climate change, they are able to find lowest-cost solutions, lessen future impacts, and maximize any beneficial opportunities that may exist from a changing climate.

This User Guide will help readers understand what it will take to become a climate resilient community, and provide communities with several processes for completing ICLEI's Five Milestones for Climate Adaptation, which form the core of ICLEI's Climate Resilient Communities™ program:

- **Milestone One:** Conduct a Climate Resiliency Study
- **Milestone Two:** Set Preparedness Goals
- **Milestone Three:** Develop a Climate Preparedness Plan
- **Milestone Four:** Publish and Implement Preparedness Plan
- **Milestone Five:** Monitor and Reevaluate Resiliency

This User Guide presents support materials to help local governments utilize the Adaptation Database and Planning Tool (ADAPT) to achieve the Five Milestones for Climate Adaptation. ADAPT is an online application that ICLEI developed with the assistance of more than 30 local governments.



ADAPT

The Adaptation Database and Planning Tool

ADAPT provides ICLEI members with access to a streamlined adaptation planning process and relevant information developed by cities across the nation, while simultaneously allowing users the ability to track information about their adaptation efforts. By building ADAPT into ICLEI's online data management portal, ICLEI is able to monitor, in real-time, the progress its members are making in adaptation efforts as well as their most immediate needs. This information will help ICLEI continually evolve its tools and form the additional resources, trainings, and partnerships needed to help local communities further build their resilience towards climate change.

This User Guide, hereafter referred to as the User Guide, contains instructions for how to utilize ADAPT and brief case studies on how other communities have undertaken adaptation efforts. ICLEI recognizes that some information related to adaptation planning, especially vulnerability, can at times be sensitive. ICLEI will therefore keep private all information users input within ADAPT and will only share information once ICLEI has received the explicit, written permission of the user. By uploading information to ADAPT, adaptation planners are expanding the national knowledge base on adaptation, thereby helping ICLEI and its partners ensure that local governments have the resources they need to effectively and efficiently prepare for climate change.

ICLEI and the Climate Resilient Communities Program

ICLEI-Local Governments for Sustainability (ICLEI) is an international association of more than 1,000 local governments worldwide and more than 600 in the United States that have made commitments to sustainability and climate protection. ICLEI, founded in 1990, strives to advance solutions to global climate change through cumulative local action. ICLEI provides technical and policy assistance, tools, training, climate expertise, information services and peer networking to help member local governments build capacity, share knowledge and implement sustainable development and climate protection at the local level.

In fall 2005, ICLEI launched its Climate Resilient Communities™ (CRC) Program with funding from the National Oceanic and Atmospheric Administration (NOAA) to help local governments throughout the United States improve their resiliency to climate change impacts. The CRC Program helps local governments implement strategies to protect their communities from the impacts and costs associated with climate change by walking them through a Five Milestone performance-based framework:



Participants in the CRC program learn to use tools and develop strategies that reduce hazards and manage vulnerabilities associated with existing and future changes in climate. The program also helps communities identify and pursue creative opportunities that arise from changing climate conditions. Early partners have included: Keene, New Hampshire; Fort Collins, Colorado; Anchorage, Alaska; Miami-Dade County, Florida; and Homer, Alaska. For more information on the ICLEI Climate Resilient Communities program, see www.iclei.org/adaptation.

Terminology

The following key terms are frequently used throughout the User Guide. Definitions are based on the [Intergovernmental Panel on Climate Change's \(IPCC\) 4th Assessment Report](#) and [Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments](#).

Action – A step or measure that a local government can take to increase resilience to a climate change impact.

Adaptive Capacity – The degree of built, natural, or human systems to accommodate changes in climate (including climate variability and climate extremes) with minimal potential damage or cost, or to take advantage of opportunities presented by climate change.

Climate Adaptation – Any measure or action that reduces vulnerability against actual or expected climate change effects.

Climate Mitigation – Any measure or activity taken to reduce greenhouse gas emissions.

Goal – What a local government wants to accomplish through preparedness actions.

Hazard Mitigation – Action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Impact – The effects of existing or forecasted changes in climate on built, natural, and human systems.

Maladaptation – Adjustment to climate conditions in a manner that is ultimately more harmful than helpful.

Resilience – The ability of a system to absorb disturbances while retaining the same basic structure and ways of functioning; the capacity to self-organize and rebound from stress and change.

Risk – The likelihood of an impact occurring (probability) and the consequence should that impact occur.

Sensitivity – The degree to which a built, natural, or human system is directly or indirectly affected by changes in climate conditions or specific climate change impacts. If a system is likely to be affected as a result of projected climate change, it should be considered sensitive to climate change.

Sustainability – long-term environmental, social, and economic vitality in communities; the capacity to meet current needs without compromising the needs of future generations.

Systems – Built, natural, and human networks, organisms, resources, services, assets, and infrastructure that benefit a community or region and could potentially be affected by climate change.

Vulnerability – Susceptibility of a system to harm from climate change impacts. Vulnerability is a function of a system's sensitivity to climate and the capacity of that system to adapt to climate changes. Systems that are sensitive to climate and less able to adapt to changes are generally considered to be vulnerable to climate change impacts.

Module One: Getting Started

Overview

There is more than one rationale for a community to begin an adaptation process - perhaps the community has successfully completed a climate change mitigation plan and is ready to take the next step in climate action planning; **or**, maybe the community is starting to develop a climate change mitigation or sustainability plan and recognizes the greater efficiency and additional benefits of integrating adaptation into the process; **or** maybe climate change action is not well supported in the community but there exists an opportunity to promote emergency preparedness and focus messaging on a recent natural disaster such as a severe storm, flooding, drought or wildfire. Regardless of your community's motivation, the User Guide and ADAPT are designed to assist your community in undertaking a thorough process to enhance your preparedness to climate change impacts

Chapter One of this guide and the "Getting Started" module of ADAPT are designed to help users start their climate adaptation activities by providing information, frameworks, and guidance that will allow them to explain and discuss with others in their community:

- What climate adaptation planning is;
- What major impacts are expected for their area; and
- Why it is important to plan for existing and future climate change impacts.

Leveraging this knowledge, users will create a climate preparedness team who will be instrumental in navigating through the remainder of the climate adaptation planning process. The remainder of this chapter walks users through the different components of successfully starting a climate adaptation effort, including:

1. [A First Look at Climate Impacts](#)
2. [Conducting an Existing Conditions Analysis](#)
3. [Drafting Opening Climate Statements](#)
4. [Spreading the Preparedness Message](#)
5. [Solidifying Commitment to Climate Adaptation](#)
6. [Building a Climate Preparedness Team and Developing a Team Charter](#)
7. [Selecting a Preparedness Team Chair and Holding First Preparedness team Meeting](#)

Step One: A First Look at Climate Impacts

One of the first steps in the climate adaptation process is understanding how you are currently vulnerable to climate impacts as well as how those vulnerabilities may change in the future. This information is critically important to help make the case for why your community needs to invest in climate adaptation planning.

Step One in ADAPT Module One will help users gain a preliminary, or "30,000 foot," level of understanding of the current and potential future impacts of climate change in their area. Later modules of ADAPT and chapters of the User Guide will assist with more precisely defining what local impacts can be expected and how to plan for them. At this stage, it is most important to identify a limited number of relevant impacts to discuss amongst stakeholders.

To help users compile a quick look at existing and potential future climate impacts, ICLEI has created a Climate Projection Tool. To use the Tool, users need only select their geographic region from the pull-down menu (i.e. Northeast, Southwest, etc.). The chart will auto-fill with a summary of current and projected future climate impacts for your region, drawn from [NOAA's 2009 Unified Synthesis Product: Global Climate Change Impacts in the United States](#) report.

After the chart populates with current and projected future impacts, review each impact and indicate which systems in your local government are vulnerable to the identified impact. Select the primary system from the “*system likely to be impacted*” column and then manually input any additional systems that are vulnerable to the identified climate impact into the “*additional systems likely to be impacted*” column.

Impact Description	Primary Sector Likely to be Impacted	Additional Sectors Likely to be Impacted	Relevant to my Community?
Average temperatures have increased throughout the region, with the largest changes occurring in winter months and over the northern states.	-None-		-None-
Relatively cold days are becoming less frequent and relatively hot days more frequent.			-None-
Precipitation also has increased over most of the area.			-None-
Temperatures are projected to continue to increase over this century, with larger changes expected under scenarios of higher heat-trapping emissions as compared to lower heat-trapping emissions.			-None-
Ongoing shifts in the region's population from rural areas to urban centers will interact with a changing climate, resulting in a variety of consequences.			-None-

Next, select the impacts that are already affecting your community and/or that you believe will be significant to your community in the future, and indicate them by selecting “yes” from the drop down menu in the “*relevant to my community*” column. Be sure to select impacts that you think are relevant

and will resonate with your local government and community. For example, if you are in a coastal community where increasing storm surge and salt water intrusion are already apparent, sea level rise might be an important effect to discuss with your colleagues; whereas if there is little agriculture in your area, agricultural impacts are not likely to be something you'll want to prioritize.

Current			
Impact Description	Primary Sector Likely to be Impacted	Additional Sectors Likely to be Impacted	Relevant to my Community?
Average temperatures have increased throughout the region, with the largest changes occurring in winter months and over the northern states.	Water Management		-None- -None- Yes No -None-
Relatively cold days are becoming less frequent and relatively hot days more frequent.	-None-		

Below the drop down menu is a section to manually input impacts not listed in the NOAA report that you know are of concern to your community. To manually input information, select the “Add Climate Impact” button. If you manually input information, be sure to include a reference so you can refer back to it as you continue with your preparedness activities.

Step 3 - Identify Additional Current and Projected Impacts

Click the link below, then add your own impacts to the table.

[Add Climate Impact](#)

Actions	Additional Climate Impacts (Existing and Expected)	Reference	Primary Sector Likely to be Impacted	Additional Sectors Likely to be Impacted	Relevant to My Community

Back Save and Exit Continue to Step 2

You will have the opportunity to explore and plan for local climate change impacts in greater detail later in the adaptation planning process. At this point, your objective is to select a limited number of impacts to build messages around to gain support for climate preparedness within your local government.

Additional sources of climate impacts information users may want to reference include:

- **United States Global Change Research Program (USGCRP):** <http://www.globalchange.gov/publications/reports/scientific-assessments>
- **Intergovernmental Panel on Climate Change (IPCC):** http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm
- **Union of Concerned Scientists (UCS):** http://www.ucsusa.org/publications/#Global_Warming
- **National Research Council (NRC):** <http://americasclimatechoices.org/>
- **American Association of State Climatologists (AASC):** <http://www.stateclimate.org/>
- **National Oceanic and Atmospheric Administration (NOAA) Climate Program Office and Regional Integrated Sciences and Assessments Program:** http://www.climate.noaa.gov/cpo_pa/risa/
- **NOAA Climate Service:** <http://www.noaa.gov/climate.html>
- **U.S. Geological Survey Office of Global Change:** http://www.usgs.gov/global_change/

Step Three: Draft Opening Climate Statements

Once relevant climate impacts have been identified and existing conditions studied, local governments can think about how to convey this information to others, and how to best frame and launch their climate adaptation initiative. For starters, engaging community expertise is essential. Instead of working in isolation, local climate leaders will achieve better results working with the broader community to identify what messaging will resonate best for a wide audience.

Using the general list of relevant impacts identified in the earlier section “A First Look at Impacts”, brainstorm and then hone statements about why the government and community should work to increase climate change resilience, and what you hope to achieve through the process. The statements should be clear and to the point; there will be opportunities to explore each more extensively as the adaptation process continues. Try to ensure that these statements focus on big-picture goals that align with the community vision for now and the future.

Step Three of the Getting Started Module of ADAPT provides a field where users can input their final opening climate statement. When preparing a draft opening statement, try to include the following components:

- Statement on relevant current and future impacts in your region and why your community should engage in adaptation planning;
- Statement on what you hope to achieve through adaptation planning; and
- Sub-goals for adaptation planning: specifics on which groups, systems, or resources will benefit from adaptation planning.

An example of an opening statement that incorporates each the above elements is:

Our community should engage in adaptation planning because we recognize that we are already experiencing impacts such as warmer temperatures, more severe storm surges, and salt water intrusion, and believe that there are actions we can take to reduce the negative impacts of these and other potential future impacts, such as sea level rise, changes to our water supply, public health effects, and more extreme heat events.

By engaging in adaptation planning, we hope to better anticipate and plan for these changes, and decrease climate-related risks to lives, health, property and ecosystems. In doing this, our community aims to accomplish the following goals:

- *Ensure future environmental quality or compliance (i.e. in light of greater risks in the future)*
- *Protect future economic development*
- *Make land use planning and zoning decisions that will be sustainable in the long-term*
- *Promote fiscal responsibility and risk management*
- *Protect capital investments*
- *Ensure adequate emergency response*
- *Make our water resources management more sustainable*
- *Protect public health*
- *Improve coastal zone and/or port management*
- *Improve ecosystem management*
- *Protect transportation infrastructure*

Step Four: Spread the Preparedness Message

With the potential impacts of climate change in the community understood and opening statements crafted, its time to start talking with people about why preparing for climate change is important. Outreach, when done correctly, can gain the support you need from both the community and local leaders. Three keys to successfully building this support are having the right message, the right messenger, and the right medium.

Identify the target audience

The first step in messaging is determining who your target audience is. Generally speaking, there are five audiences you will need to conduct outreach to:

- Internal (local government staff / officials)
- General Public
- Media
- Non-Profit Organizations
- Private Entities

For each of these target audiences, identify what specific organizations and/or people should be contacted and input this into the "Target Groups field".

ADAPT
The Adaptation Database and Planning Tool

Getting Started - Step 4. Spreading Preparedness Message

Back Save and Exit Continue to Step 5

This worksheet provides guidance on identifying a target audience and effective climate change "champions" - individuals or organizations instrumental in spreading the word about your climate efforts.

Communications

Add Audience

Actions	Audience	Target Groups	Potential Messenger (Climate Champion)	Potential Medium	Date of Outreach Activity
del	-None-			-None-	[11/14/2010]

-None-
Public Sector
Private Sector
Non-Profit Organizations
Media
Academic
Other

Back Save and Exit Continue to Step 5

Identify climate messenger

Next, select appropriate climate change "messengers" who can help you spread the message to your target audience. Climate change messengers are individuals or groups of people who are interested in joining the preparedness initiative and able to effectively spread the word to key target audiences. Examples of important climate messengers include: elected officials, religious community representatives, the private sector, neighborhood associations, educators, and news outlets. Note: it is rare for one person will be able to effectively communicate with all stakeholders in a given community – hence why having multiple messengers is important.

Actions	Audience	Target Groups	Potential Messenger (Climate Champion)	Potential Medium	Date of Outreach Activity
del	-None-				[11/14/2010]



Identify appropriate mediums to reach the target audience

Next, brainstorm the best possible methods for reaching and communicating with each of the target audiences you’ve identified. It’s important to note that not all people will be reached via one outreach medium so using multiple mediums and multiple messengers is an effective way to ensure your message reaches as many stakeholders as possible. The following are a list of suggested outreach mediums to help get your community started:

- Brown-bag lunch series
- Department meetings
- Scientific briefings
- Newsletters, fact sheets, utility inserts, and brochures
- Websites
- Public meetings
- Press release/public statements
- Media training events
- Events aimed at businesses and nongovernmental organizations
- Social media sites such as Twitter, Facebook, and Myspace

ADAPT has a list of common outreach mediums that users can select from. If users don’t see a communication medium that is appropriate for their target audience, they can select the “other” category and manually input the specific medium. For additional information on effective mediums and messengers to reach your target audience, see the [ICLEI Outreach and Communications Guide](#).

Actions	Audience	Target Groups	Potential Messenger (Climate Champion)	Potential Medium	Date of Outreach Activity
del	-None-			-None-	[11/14/2010]

- None-
- Brown-bag lunch series
- Department meetings
- Scientific briefings
- Newsletters, fact sheets, utility inserts, and brochures
- Websites
- Public meetings
- Press release/public statements
- Media training events
- Events aimed at businesses and non-governmental organizations
- Other



Remember: outreach is an ongoing effort and as the process evolves, continued engagement and utilization of experts within the community, government, in non-governmental organizations, at universities, and in professional associations will be essential.

Step Five: Solidify Commitment to Climate Adaptation

Actions up to this point include selecting climate change impacts, surveying staff, and selecting outreach messages on climate change adaptation planning. These efforts should provide a sense of the level of commitment that is appropriate and feasible for your local government. Some local governments may be able to pass a resolution and commence a comprehensive and very formal climate adaptation effort. Others may need to initially focus on literature review and reducing vulnerability to current climate impacts in one or two key systems, or departments, without making a formal commitment.

Regardless of your approach, your community can still make significant progress in building local resilience towards climate change. For those communities that are interested and able in passing a formal resolution on adaptation, ICLEI has provided a sample resolution in step five of the Getting Started Module of ADAPT that local communities can download, tailor, and then upload back to ICLEI once approved.

Step Six: Build Climate Preparedness Team and Develop Team Charter

Preparing your community for existing and future climate change impacts will require input and collaboration from a wide array of stakeholders. To help you ensure that the right people are involved in the climate adaptation process, ICLEI recommends forming a Climate Preparedness Team. This team will likely be a unique composition of individuals who have the knowledge, interest, and authority to help move your community forward with creating and implementing a climate preparedness plan. Climate change will affect many local government services, operations, and infrastructure, and as such it is important to have a Climate Preparedness Team composed of individuals from a cross-section of relevant departments and programs - including those likely to be impacted by climate change.

To help you determine who should be involved in your Climate Preparedness Team, consider the systems that you previously identified as being or likely to be impacted from climate change.

- Which internal departments or external stakeholders are responsible for managing these systems and impacts?

At a minimum, one or more representatives from each of the departments identified should be invited to join the preparedness team.

The specific make-up of your Climate Preparedness Team will depend on your local government's particular responsibilities, vulnerability to climate change, and relationships with the broader community. However, the following list of potential departments and external stakeholders should be considered. Ideally, a large number of the individuals that join the team should be in a position to make changes recommended by the collective team during the adaptation planning process.

Potential Departments to Include in Climate Change Preparedness Team

- Agriculture
- Coastal Zone Management
- Economic Development
- Emergency Management
- Finance and Budgeting
- Fire
- Flood Control
- Forestry and Forest Resources

- Insurance
- Legal
- Natural Resources and Environmental Protection
- Parks and Recreation
- Planning and Zoning

- Port and Harbor Management
- Public Health
- Storm-water Management
- Transportation
- Wastewater Treatment
- Water Supply

Potential Team Members from External Stakeholders

- Business Community
- Consultants
- Elected local boards
- Federal Agencies
- Local Universities
- Members of the Broader Community (Informal Community Leaders)
- Metropolitan Planning Organizations

- Native American Tribes
- Neighboring Governments
- NOAA RISA office
- Non-Profit Organizations
- Regional Planning Agencies
- Science Advisor(s)
- State Agencies
- Utilities

Once you have determined who will be invited to join your Climate Preparedness Team use ADAPT to document the departments, organizations and individuals in those departments to invite to participate in the preparedness team. Also indicate whether or not you think invited individuals would be a strong candidate for Preparedness Team Chair.

The screenshot shows the ADAPT software interface. At the top left, there is a button labeled "Add New Team Member" with a red arrow pointing to it. Below this is a table with the following columns: "Actions", "Department", "Name of Individual", "Reason for Inviting / Area of Expertise", "Accepted Participant", and "Potential Team Chairperson". The "Actions" column contains a "del" link. The "Department", "Name of Individual", and "Reason for Inviting / Area of Expertise" columns are empty text boxes. The "Accepted Participant" column is empty. The "Potential Team Chairperson" column contains a dropdown menu with the text "-None-" and a red arrow pointing to it.

Preparedness Team Charter

While building your Climate Preparedness Team, it will also be helpful to develop a draft Climate Preparedness Team charter. The team charter could be incorporated into an ordinance or resolution on adaptation before the formal team is assembled, or developed as a draft that the team can contribute to. When developing the charter, consider what the overall responsibilities, resources, and governance of the team will be. In general, a preparedness team will often have responsibility for reviewing all programs and services provided by the government, identifying those potentially vulnerable to climate change, and proposing strategies for increasing resilience.

Below are some specific questions to help think about the best way to structure your preparedness team. Input your responses to these questions directly into ADAPT.

- What is the specific charge of your preparedness team (research impacts, public education and policy development, or implementation of adaptation plan)?
- Is your preparedness team a permanent working group or a temporary team? Although in the short term most of the activity may focus on putting a plan together, the team may also be responsible for ensuring the plan is implemented over time.
- How much time does the preparedness team have to meet its charge (6 months, 1 year, until finished)?

- What deliverables are expected and of whom (summary of impacts, description of how these impacts could affect different departments/programs, preparedness plan, etc.)?
- What resources are required for the team to accomplish its work (financial, staff, etc.)? What resources are available?
- What authority does the team have to accomplish the aforementioned tasks (draft proposed legislation; review and revise operational plans; etc.)
- Will team decisions be made by consensus, through voting, or by decision of the team leader in conjunction with department heads?
- What are initial thoughts for who will lead the team?
- To whom is the team accountable?
- Do you want two teams - a senior-level team that coordinates overall preparedness activities, and a technical-level team that coordinates activities within individual departments? Or, do you want a single, interdepartmental team that handles all tasks?
- Consider transparency - will all meetings and recommendations be open to the public or will some aspects be kept internal? How will the team manage input from the public and other jurisdictions/governmental entities potentially affected by adaptation strategies?

Use ADAPT to track your responses to the aforementioned questions and to aggregate your responses and integrate them into your community's draft Preparedness Team Charter.

Using the space below, aggregate your responses to the above questions and create a draft charter that you can discuss at the first preparedness team meeting.

▼ Draft Preparedness Team Charter

Step Seven: Selecting a Preparedness Team Chair and Holding First Preparedness Team Meeting

Having a strong team leader or chairperson is a crucial step to ensure the overall success of the Climate Preparedness Team. A team leader may be the same as one of your climate messengers or may be someone completely different. Below are some characteristics that a preparedness team leader should possess:

- Solid understanding of local government's overall responsibilities and objectives
- Strong communicator - both with internal audiences and external audiences (public)
- Possess authority and technical familiarity to work with staff across the broad scope of government agencies
- Possess authority to require deliverables
- Centrally located
- Strong working relationship with government's leadership
- Strong working relationships with Department heads
- Basic understanding of climate change and climate change impacts is desirable (however this knowledge can be obtained later)
- Time available to commit to leading the preparedness team
- Strong managerial skills
- Ability to facilitate large meetings
- Well respected by colleagues

Take some time to think through whom in your local government and/or local community possess these characteristics. Input potential candidates into ADAPT, and use the ranking tool to help determine who would be an appropriate Preparedness Team Chair(s).

ADAPT

The Adaptation Database and Planning Tool

Getting Started - Step 7. Selecting Team Chair and 1st Meeting

Selecting a Preparedness Team Chair

Identify who in your local government would be strong preparedness team chairs.

Name	Understands Local Gov't Roles	Strong Communicator	Technical Competency	Has Authority	Centrally Located	Leadership Connections	Department Connections	Climate Change Knowledge	Available	Management Skills	Facilitator	Well Respected	Score (Out of 60)	Select Individual
Joe Smith	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>

Case Study: Spotlight on Miami-Dade County, Florida

An integrated approach yields innovative and feasible solutions

The Miami-Dade County Climate Change Advisory Task Force (CCATF) was formed in July 2006, via Ordinance 06-113, put forth by climate champion Commissioner Natacha Seijas. Chaired by Harvey Ruvlin, Miami-Dade County's Clerk of Courts and also long-time climate preparedness spokesman, the CCATF serves the Board of County Commissioners (the Board) by performing research and issuing recommendations for mitigation and adaptation measures. The CCATF is organized into 7 Committees:

- Climate Change Science
- Greenhouse Gas Reduction
- Built Environment Adaptation
- Natural Systems Adaptation
- Economic, Social, and Health
- Intergovernmental Affairs
- Steering Committee

The Steering Committee is comprised of all Chairs and Vice-Chairs of the various Committees, and coordinates and organizes the findings for discussion at full Task Force meetings. The Steering Committee is also in charge of considering public comment on the Task Force's initial recommendations. In total, the 25 appointed members of the CCATF and over 150 additional individuals participating at committee meetings, represent County departments, local and regional universities and planning organizations, local businesses, consultants, and the general public. Many are experts in climate science, resource management, planning, public policy, architecture, or major sectors related to government services. Combining leaders from the scientific, academic, and private sectors with County staff and department heads allows the CCATF to develop recommendations that are both innovative and feasible.

Further detail regarding each committee's mission, membership, and recommendations can be found at: <http://www.miamidade.gov/derm/climatechange/taskforce.asp>

Hold Preparedness Team Meeting

Now that you've identified all the people that should be on your initial climate change preparedness team and selected a team chair, it's time to prepare for and hold the first preparedness team meeting. Below is a sample agenda you can use for your initial meeting. Use ADAPT to finalize your first preparedness team meeting agenda and track the accomplishment of tasks associated with holding your first team meeting.

Draft Preparedness Team Agenda Items

- Welcome and roundtable introductions
- Purpose of Climate Preparedness Team
- Team charter, timelines, and deliverables
- Overview of climate change and major projected regional impacts
- Discussion on how the climate is already changing and impacts your community is already feeling
- Review definitions of key terminology and ensure they are understood

- Discuss connection between adaptation and mitigation (refer to [adaptation-mitigation synergies document](#))
- Establish relevant any sub-committees and assign roles
- Begin identifying how regional changes in climate will impact your community
- Begin identifying systems that are likely to be affected by projected climate change impacts
- Identify additional individuals, if any, that need to be involved in Preparedness Team
- Identify next steps: meeting schedule; agenda for next meeting; assign deliverables / action items due next meeting

First Preparedness Team Meeting

Next, prepare for and hold the first preparedness team meeting.

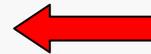
Below is a sample agenda for the first meeting of a climate preparedness team.

Task	Task Completed (Y/N)	Planned Completion Date
Send invitations to all team members	-None-	[11/14/2010]
Schedule first team meeting	-None-	[11/14/2010]
Secure meeting room and refreshments	-None-	[11/14/2010]
Create agenda for first team meeting (sample agenda provided below)	-None-	[11/14/2010]
Invite guest speakers	-None-	[11/14/2010]
Prepare appropriate handouts / background information for meeting	-None-	[11/14/2010]
Alert the media and draft a press release if relevant	-None-	[11/14/2010]
Schedule the second team meeting; announce at first meeting	-None-	[11/14/2010]

Below is a sample agenda for the first meeting of a climate preparedness team. Use this as a template to create your own agenda.

Sample Agenda

- *Welcome and Roundtable Introductions
- *Purpose of Preparedness Team
- *Team Charter, Timelines, and Deliverables
- *Overview of Climate Change and Major Projected Regional Impacts
- *Discussion and Next Steps



Remember to periodically reflect on whether the team's membership appropriately reflects the impacts of climate change that matter to your region. As your planning process continues through conducting a resiliency assessment, you may find that climate change will affect more systems or resources in your community than originally realized, meaning that additional team members may be needed. Periodically evaluating the match between team members, identified regional consequences of climate change, and potential response strategies will ensure the right personnel are in place for preparedness planning.

Congratulations!

You have successfully completed the 'Getting Started' module of ADAPT and the pre-Milestone phase of ICLEI's Climate Resilient Communities program. At this point, take a moment to celebrate your accomplishments: share your success with the public, surrounding municipalities, and ICLEI! Use this as an opportunity to build support and momentum for your next step: conducting a climate resiliency study.

Module Two: Conduct a Climate Resiliency Study

Overview

This chapter is designed to help communities conduct a climate resiliency study – Milestone One in ICLEI's Climate Resilient Communities program. A climate resiliency study includes identifying climate impacts and the associated levels of vulnerability for the various systems that exist within your local community. After working through the steps in this chapter, a community will understand how climate is and will be affecting the systems, resources, and assets valuable to your community and will have a prioritized list of key vulnerabilities to move forward with in their planning process.

To help you achieve the tasks identified in this chapter, a community will need to rely on the assistance of the Climate Preparedness Team. If you haven't already formed your Preparedness Team, please refer back to the Getting Started chapter for guidance on how to do this. Due to the importance of conducting a resiliency study, it is likely that this step will take a significant time commitment from your Preparedness Team and the municipal staff working on this project. However, users shouldn't be discouraged at the time necessary to accomplish this task, as the results from this analysis will help pave the way for your community to increase preparedness towards climate change.

In addition to this chapter, ADAPT Module Two: Resiliency Study, is specifically designed to walk users through the steps necessary to complete a climate resilience study. These steps include:

1. [Research Climate Change Projections](#)
2. [Identify Potential Impacts and Assess Sensitivity and Adaptive Capacity](#)
3. [Determine Vulnerability](#)
4. [Identify Key Vulnerabilities](#)

Step One: Research Climate Change Projections

The first step in conducting a resilience study you'll want to undertake with your Preparedness Team (or a sub-committee of Team members) is revisiting/reviewing regional information about how the climate is already changing as well as how it is expected to change in the future. This includes identifying the amount of change expected in climate, such as average temperature, precipitation, sea level rise, wind speeds, and extreme events that are projected in your area. The amount of change expected will typically be expressed as a range that could increase or decrease by a specified future date, relative to the average for a given baseline set of years. When identifying changes, to the extent possible, avoid using only one projection of future climate (e.g. 12 inches of sea level rise), and instead include a range (e.g. 10-16 inches of sea level rise by 2030 compared to 1980-1999 baseline levels).

Projections for certain climate changes, such as precipitation, may experience a range in the amount of expected change that includes both a potential decrease and increase, either due to uncertainty in the projection or due to seasonal variability, where one season is expected to see an increase and another season will see a decrease. Where possible, collect information about how climate will change by season, such as "average summer precipitation" and "average winter precipitation" instead of "average yearly precipitation".

Below is a list of climate science providers that you can use to locate climate change information for your region. Many of the scientific reports you are likely to uncover will also identify "climate change

impacts", such as additional deaths due to heat events, pest outbreaks, or loss of wetlands from sea level rise. These impacts are the result of changing climate conditions and should be recorded for use in Step Two.

- **United States Global Change Research Program (USGCRP):** <http://www.globalchange.gov/publications/reports/scientific-assessments>
- **Intergovernmental Panel on Climate Change (IPCC):** http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm
- **Union of Concerned Scientists (UCS):** http://www.ucsusa.org/publications/#Global_Warming
- **National Research Council (NRC):** <http://americasclimatechoices.org/>
- **American Association of State Climatologists (AASC):** <http://www.stateclimate.org/>
- **National Oceanic and Atmospheric Administration (NOAA) Climate Program Office and Regional Integrated Sciences and Assessments Program:** http://www.climate.noaa.gov/cpo_pa/risa/
- **NOAA Climate Service:** <http://www.noaa.gov/climate.html>
- **U.S. Geological Survey Office of Global Change:** http://www.usgs.gov/global_change/

When reviewing sources of scientific data, be wary of reading isolated studies and avoid including reports that have not been extensively peer-reviewed by top-level, credible scientists. In addition to the regional summaries provided by the sources above, you should contact nearby governments and universities, state climate change websites, state environmental agencies, and local community groups or non-profits that may either have scientific projections for your particular local area, or have compiled research on climate change that you can use.

As you are researching, you'll need to determine the planning horizon(s) appropriate for your community. ICLEI recommends considering three horizons: near-term, medium-term, and long-term. While researching climate change information, be sure to collect the following information:

- Name of changing climate condition
- Amount of expected change (expressed as a range), including baseline year(s) from which change is measured and the planning horizon year by which change will have occurred
- Geographical area for which the climate projection is relevant
- Greenhouse gas emissions scenario for which the projections is relevant
- The rate of change compared to past and current change
- Extent of variability (seasonal, El Nino, La Nina, etc.)
- Level of confidence
- Source of information

Below is an example of what this could look like this data may look like once input into ADAPT:

Add New Climate Condition							
Changing Climate Condition	Amount of Expected Change	Geographic Area	Greenhouse Gas Emissions Scenario	Rate of Change	Extent of Variability	Level of Confidence	
Del Example: Precipitation	Up to 20% less rainfall annually by 2050 (from 1980-1999 levels)	Southeast Florida	Low emissions scenario	More significant than previously experienced	Most likely manifesting itself in periods of high rainfall followed by periods of drought	High degree of confidence	

When attempting to conduct climate change research, consider using your Preparedness Team members, a volunteer, consultant, local government staff, or a university student. Climate projections

are rapidly becoming more advanced so your community’s process and overall success will benefit from staying as up-to-date on climate research as capacity allows.

Case Study: Spotlight on Homer, Alaska

Regional climate reports and University researchers help identify climate change impacts

The City of Homer analyzed scientific climate projections for Alaska from several well-respected sources, including: the U.S. Global Change Research Program (USGCRP), the Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC AR4), and the Alaska State Legislature’s Alaska Climate Impact Assessment Commission. Moreover, the City regularly communicates with researchers at the University of Alaska-Fairbanks Center for Climate Assessment and Policy, who are collaborating with additional scientists to further study regional and local climate change impacts and communicate results to policy makers. Homer also has a keen interest in research taking place through the National Estuary Research Reserve on the extent of isostatic rebound, the rise of land that was previously depressed by a retreating glacier, in Homer and throughout the Kachemak Bay estuary. Homer’s Climate Action Plan recommends that as local impacts become increasingly clear, adaptation plans be revisited and revised. For more info, visit: <http://www.ci.homer.ak.us/CLPL.pdf>

Step Two: Identify Potential Impacts, and Assess Sensitivity and Adaptive Capacity

Now that you have identified projected changes in climate, your next step is to identify the critical systems your government or community manages, plans, or makes regarding. Table 1 provides a list of common community systems.

Table 1: Common Community Systems

<ul style="list-style-type: none"> ● Aquatic ecosystems ● Agriculture ● Biodiversity ● Business ● Coastal zone management ● Community development ● Economic development ● Education ● Emergency management ● Energy management ● Environmental protection ● Fire prevention ● Flood control ● Forestry and forest services 	<ul style="list-style-type: none"> ● Housing ● Infrastructure ● Insurance ● Legal ● Natural resources ● Planning and zoning ● Port and harbor management ● Public health ● Recreation, open space, and parks ● Road operations and management ● Storm-water management ● Transportation ● Waste management ● Water resources
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Using ADAPT, identify which systems are pertinent to your community and add or delete systems until you have a complete list that is specific to your community.

Next, keeping in mind the climate projections that were previously identified, determine which systems either already are or are likely to be affected in the future by the changing climate conditions. Remember that several changing climate conditions may impact each system. For example, temperate and precipitation changes might affect a particular system in different ways, or the combination of these changes might create one cumulative impact. Select the affected systems in ADAPT.

Next, select the changing climate condition that is likely to affect the system in question by using the dropdown menu in ADAPT. Note, the dropdown menu will auto-populate with information that was input by your Climate Preparedness Team during Step One.

Add Affected System

Identified Climate Change Impacts						
System Potentially Impacted	Changing Climate Condition	Amount of Expected Change	Description of Potential Climate Change Impact	How Climate Conditions Currently Affect this System	Sensitivity: Degree to Which Impact Would Affect the System	Justification of R to Sensith
Del Agriculture	-None- Precipitation Sea Level Rise Temperature Temperature 2				-None-	
Del Agriculture	-None-				-None-	

Next, working with your Climate Preparedness Team and with specialists from each associated system, put focused time and effort into developing a comprehensive list of climate change impacts, that is, descriptions of how changing climate conditions will affect each system in your community. Remember to brainstorm *potential* impacts, even if you are not exactly sure the extent to which the changing climate condition will affect the system. Afterwards, you can more closely analyze the *sensitivity*, the degree to which the impact actually affects the system.

As part of this analysis, ICLEI recommends that communities conduct a review of all existing local planning documents, with an eye for how existing strategies may be vulnerable to existing and future changes in climate. Conducting this analysis now may also help communities determine where and when potential exists to integrate climate change and preparedness goals within existing community mechanisms.

Add Affected System

Identified Climate Change Impacts						
System Potentially Impacted	Changing Climate Condition	Amount of Expected Change	Description of Potential Climate Change Impact	How Climate Conditions Currently Affect this System	Sensitivity: Degree to Which Impact Would Affect the System	Justification of R to Sensith
Del Agriculture	-None-				-None-	
Del Agriculture	-None-				-None-	

Analyzing Sensitivity

Your next step is to conduct a sensitivity analysis. Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change (IPCC Working Group 2). To conduct a sensitivity analysis, answer the following questions for each impact and record your responses in ADAPT, module two, step two:

- How do climate conditions *currently* affect the system?
- How do non-climate factors (e.g. population changes) current create problems for, the system?
- To what degree will the system be exposed to the changing climate conditions?

Based on your responses, use the sensitivity levels listed below to determine the level of sensitivity each of your systems' faces towards the changing climate conditions. Input your results into ADAPT. Be sure to document why you've selected a particular sensitivity and include your justification in ADAPT.

- **S0:** System will not be exposed to and/or affected by the impact

- **S1:** System will be very minimally exposed to and/or affected by the impact
- **S2:** System will be somewhat exposed to and/or affected by the impact
- **S3:** System will be largely exposed to and/or affected by the impact
- **S4:** System will be greatly exposed and/or affected by the impact

Sensitivity Level Descriptions

Sensitivity Level Description	
S0	System will not be exposed to and/or affected by the impact
S1	System will be very minimally exposed to and/or affected by the impact
S2	System will be somewhat exposed to and/or affected by the impact
S3	System will be largely exposed to and/or affected by the impact
S4	System will be greatly exposed to and/or affected by the impact

Toggle Views

Identified Climate Change Impacts

System Potentially Impacted	Changing Climate Condition	Amount of Expected Change	Description of Potential Climate Change Impact	How Climate Conditions Currently Affect this System	Sensitivity: Degree to Which Impact Would Affect the System	Justification of Response to Sensitivity
Del Agriculture	-None-				-None-	
Del Agriculture	-None-				-None- S0 S1 S2 S3 S4	

Analyzing Adaptive Capacity

Next, you should determine the adaptive capacity of each system. To select the adaptive capacity field within ADAPT, select the “Adaptive Capacity” button on the Toggle Views field.

Toggle Views

Adaptive Capacity is defined as the ability of a system to adjust to climate change, to moderate potential damages, to cope with the consequences, or to take advantage of opportunities (IPCC Working Group 2). To examine adaptive capacity, answer the following questions:

- What processes already exist and what efforts are currently underway to help improve the system’s preparedness to changing climate conditions?
- Is the system flexible, or will the rate of climate change overwhelm the system's ability to adjust?
- What is the cost (\$) associated with accommodating or adjusting to the impact (if known)?

Based on your responses, use the following information to determine the level of adaptive capacity each of your systems’ faces towards the changing climate conditions.

- **AC1:** System will not be able to accommodate or adjust to impact

- **AC2:** System will be minimally able to accommodate or adjust to impact
- **AC3:** System will be somewhat able to accommodate or adjust to impact
- **AC4:** System will be mostly able to accommodate or adjust to impact
- **AC5:** System will be able to accommodate or adjust to impact in a beneficial way

Input your results into ADAPT. Be sure to document why you've selected a particular adaptive capacity and include your justification in ADAPT.

The screenshot shows the ADAPT software interface. At the top, there is a section titled 'Adaptive Capacity Level Descriptions' with a table listing levels AC0 through AC4 and their corresponding descriptions. Below this is a 'Toggle Views' section with buttons for 'Sensitivity' and 'Adaptive Capacity'. An 'Add Affected System' button is also present. The main section is titled 'Identified Climate Change Impacts' and contains a table with the following columns: 'System Potentially Impacted', 'Changing Climate Condition', 'Amount of Expected Change', 'What Processes Already Exist and What Efforts are Currently Underway That Will Help Improve the System's Preparedness to Climate Change?', 'Is the System Flexible, or Will the Rate of Climate Change Overwhelm the System's Capacity to Adjust', 'Cost' (\$) Associated with Accommodating or Adjusting to the Impact (if known)', and 'Adaptive Capacity Level'. The table has two rows of data, both with 'Agriculture' in the first column and '-None-' in the second. A red arrow points to the 'Amount of Expected Change' column. Another red arrow points to the 'Adaptive Capacity Level' dropdown menu, which is open and shows options: '-None-', AC0, AC1, AC2, AC3, and AC4.

Case Study: Spotlight on Chula Vista, CA

Guidance from ICLEI, San Diego Foundation, San Diego County, SAIC, and the State of California result in successful assessment of vulnerability and risk

In October 2009, the Chula Vista City Council directed their Climate Change Working Group (CCWG), which is comprised of residents, businesses, and community organization representatives, to generate adaptation strategies for the City. Since then, the group has held 12 formal meetings and a public forum, steadily working through an adaptation process that incorporated tips and presentations from ICLEI-Local Governments for Sustainability, the San Diego Foundation, the County of San Diego, the State of California, and the science and engineering consultants SAIC. Chula Vista's comprehensive process, which includes identifying relevant impacts for each system, conducting vulnerability and risk assessments, brainstorming strategies, and evaluating and prioritizing the results, is well documented on the Conservation & Environmental Services Department's climate change website.

To read the CCWG's Initial Risk Assessments and Evaluation Results, visit:

<http://www.chulavistaca.gov/clean/conservation/Climate/documents/AdaptationOptions-EvaluationDRAFTII.pdf>

To view presentations and notes from CCWG meetings on the planning process, visit:

<http://www.chulavistaca.gov/clean/conservation/Climate/ccwg1.asp>

Step Three: Determine Vulnerability

Vulnerability is a function of a system’s sensitivity to changes in climate and its ability to adapt to those changes. Your answers to the above questions related to sensitivity and adaptive capacity will help you determine the level of vulnerability each system faces towards the changing climate condition.

Using the matrix below, take the results of your sensitivity and adaptive capacity analysis and rank each impact as having either: Low Vulnerability (V1); Medium-Low Vulnerability (V2); Medium Vulnerability (V3); Medium-High Vulnerability (V4); High Vulnerability (V5); or Potential Opportunity (PO). Input your results into ADAPT, module two, step three.

Sensitivity and Adaptive Capacity Matrix for Determining Vulnerability Level

V1 = Low Vulnerability
 V2 = Medium-Low Vulnerability
 V3 = Medium Vulnerability
 V4 = Medium-High Vulnerability
 V5 = High Vulnerability
 PO = Potential Opportunity

		Sensitivity: Low to High				
		S0	S1	S2	S3	S4
Adaptive Capacity: Low to High	AC0	V2	V3	V4	V5	V5
	AC1	V1	V2	V3	V4	V5
	AC2	V1	V1	V2	V3	V4
	AC3	P0	V1	V1	V2	V3
	AC4	P0	P0	P0	V1	V2

An example of what this process will look like in ADAPT is provided below.

Determine Vulnerability Using Sensitivity and Adaptive Capacity

System Likely to be Impacted	Potential Climate Change Impact	Sensitivity Level	Adaptive Capacity Level	Vulnerability Level
Energy management	Increased energy demand for cooling homes could lead to power outages	S3	AC1	V4
Infrastructure	Severe damage to infrastructure from high wind speeds, flooding, and beach erosion	S4		V3
Transportation	Periods of more intense rainfall can lead to severe flooding which will close down roads and lead to economic losses for MDC and the region	S3	AC2	V3

Before moving on to your final step in Module Two: identifying key vulnerabilities, consider working with your Preparedness Team to evaluate the outcomes of the vulnerability analysis to make sure results are intuitive and reflective of local conditions.

Step Four: Selecting Key Vulnerabilities

While identifying all community vulnerabilities is important, it is likely that your community will need to prioritize which vulnerabilities to move forward with planning for. Step four provides guidance on how communities can take the results from step three and determine which vulnerabilities are 'key' vulnerabilities for your community. Those identified as key vulnerabilities will be those for which you will move forward with setting preparedness goals for (Module Three).

Below are seven key criteria identified by the Intergovernmental Panel on Climate Change (IPCC) as being important factors in determining key vulnerabilities. Users should review these criteria and use ADAPT to input responses to each criteria for each system identified as vulnerable to a changing climate condition.

Magnitude¹

Climate change impacts with a large magnitude are more likely to be selected as 'key' than those with limited effects. The magnitude of an impact is determined by its scale (e.g., the area or number of people affected) and its intensity (e.g., the degree of damage caused).

Some of the most widely used quantitative measures for climate impacts are monetary units such as welfare, income or revenue losses, costs of anticipating and adaptation to certain biophysical impacts such as a large sea-level rise, and estimates for people's willingness to pay to avoid certain climate impacts. Another aggregate non-monetary factor is the number of people affected by certain impacts such as food and water shortages, morbidity, and mortality from diseases, and forced migration. Climate impacts are also quantified in biophysical units, such as agricultural yield changes and species extinction numbers or rates. For some impacts, qualitative rankings of magnitude are more appropriate than quantitative ones. At the local level, determining, to the extent possible, the potential magnitude of impacts will help you determine key vulnerabilities.

Timing²

An impact, whether positive or negative, is more likely to be considered 'key' if it is expected to happen soon, rather than in the distant future. Impacts occurring in the distant future which are caused by nearer-term events (i.e. commitment), may also be considered 'key'. Another important aspect of timing is the rate at which impacts occur. In general, adverse impacts occurring suddenly (and surprisingly) would be perceived as more significant than the same impacts occurring gradually, as the potential for adaptation for both human and natural systems would be much more limited when impacts are sudden. Moreover, very rapid changes in non-linear systems can exacerbate other vulnerabilities (e.g. impacts on agriculture and nutrition can aggravate human vulnerability to disease), particularly where such rapid change curtails the ability of systems to prevent and prepare for particular kinds of impacts.

Persistence and Reversibility of Impact³

An impact is more likely to be considered 'key' if it is persistent or irreversible. Examples of impacts that could become 'key' due to persistence include the emergence of near-permanent drought conditions, intensified cycles of extreme flooding that were previously regarded as 'one-off' events, and changes in sea level rise.

¹ IPCC 2007: Impacts and Vulnerabilities Report

² IPCC 2007: Impacts and Vulnerabilities Report

³ IPCC 2007: Impacts and Vulnerabilities Report

Likelihood and Confidence of Impact Occurring⁴

Likelihood is the probability of an outcome having occurred or occurring in the future; confidence is the assessment that any statement about an outcome will prove correct. An impact characterized by high likelihood is more apt to be seen as ‘key’ than the same impact with a lower likelihood of occurrence. Since risk is defined as a consequence (impact) multiplied by its likelihood (probability) the higher the probably of occurrence of an impact, the higher its risk, and the more likely it would be considered ‘key’. An example table that assigns a likelihood score on a 1 to 5 scale is shown below.

Likelihood	Description	Recurrent Events	Single Event
5	Very Likely	Could occur several times per year	> 90% probability
4	Likely	May arise about once per year	Good chance; > 66% probability
3	Possible	May arise once in 10 years	About as likely as not; 33 to 66% probability
2	Unlikely	May arise once in 10 years to 25 years	Unlikely but not negligible; probability < 33%
1	Very unlikely	Unlikely during the next 25 years	< 10% probability

Potential for Adaptation⁵

To assess the potential harm or opportunities caused by climate change, the ability of individuals, groups, societies and nature to adapt to or ameliorate adverse impacts must be considered. The lower the availability and feasibility of effective adaptations, the more likely such impacts would be characterized as ‘key’ vulnerabilities.

The potential for adaptation to ameliorate the impacts of climate change differs between and within regions and systems. There is often considerable scope for adaptation in agriculture and in some other highly managed systems. There is much less scope for adaptation to some impacts of sea-level rise such as land loss in low-lying river deltas and there are no realistic options for preserving many endemic species in areas that become climatically unsuitable. Adaptation assessments need to consider not only the technical feasibility of certain adaptations but also the availability of required resources, the costs and side-effects of adaptation, the knowledge about those adaptations, their timeliness, the (dis-)incentives for adaptation actors to actually implement them, and their compatibility with individual or cultural preferences.

Distribution⁶

The distribution of climate change impacts across regions and populations raises important equity issues – including issues such as income, gender, and age, in addition to regional, national, and sectoral groupings. Impacts and vulnerabilities that are highly heterogeneous or which have significant distributional consequences are likely to have a greater change of being considered as ‘key’.

Importance of the Vulnerable System⁷

An important, though subjective, criterion for the identification of ‘key’ vulnerabilities is the importance of the vulnerable system. Various societies and peoples may value the significance of impacts and vulnerabilities on human and natural systems differently. For example, the transformation

⁴ IPCC 2007: Impacts and Vulnerabilities Report

⁵ IPCC 2007: Impacts and Vulnerabilities Report

⁶ IPCC 2007: Impacts and Vulnerabilities Report

⁷ IPCC 2007: Impacts and Vulnerabilities Report

of an existing natural ecosystem may be regarded as important if that ecosystem is the unique habitat of many endemic species or contains endangered charismatic species. On the other hand, if the livelihoods of many people depend crucially on the functioning of a system, this system may be regarded as more important than a similar system in an isolated area.

Congratulations!

You have successfully completed the 'Climate Resiliency' module of ADAPT and the Milestone One phase of ICLEI's Climate Resilient Communities program. At this point, take a moment to celebrate your accomplishments: share your success with the public, surrounding municipalities, and ICLEI! Use this as an opportunity to build support and momentum for your next step: setting preparedness goals.

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