

# Integrating Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned

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For the 2015 San Diego County Multi-Jurisdictional Hazard Mitigation Plan Update

February 2014

ICLEI- Local Governments for Sustainability USA



## Credits and Acknowledgements

This resource is prepared as part of an engagement between ICLEI and San Diego County, supported by The San Diego Foundation's Climate Initiative.

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## Introduction

ICLEI- Local Governments for Sustainability, in partnership with The San Diego Foundation and Scripps Institution of Oceanography, is providing technical assistance and stakeholder engagement around the incorporation of climate change impacts and adaptation in the 2015 update to the San Diego County Multi-Jurisdictional Hazard Mitigation Plan. ICLEI conducted case study and best practices research during the initial phase of the project to inform the design of training workshops and stakeholder engagement in later phases of the project. This research seeks to uncover approaches and best practices for integrating climate change adaptation and hazard mitigation planning.

This report first provides an overview of frameworks for hazard mitigation planning and climate adaptation and discusses their similarities and differences. Next, the report provides case studies on the few other communities across the country that have integrated climate adaptation and hazard mitigation planning. The cases highlight the approach that local governments have taken to integrate these two frameworks and what challenges and successes they encountered in the process. The purpose of these case studies is to draw lessons from these experiences that may inform the design of technical assistance and stakeholder engagement for the San Diego County Multi-Jurisdictional Hazard Mitigation Plan. Lastly, the report discusses how the State of California’s Hazard Mitigation Plan incorporates climate change impacts and adaptation.

## Overview of Hazard Mitigation Framework

According to the Federal Emergency Management Agency (FEMA), the purpose of hazard mitigation planning is to identify local policies and actions that can be implemented over the long term to reduce risk and future losses from hazards (2013, I-2). FEMA defines hazards as an emergency or disaster resulting from a natural disaster, or an accidental or man-caused event (2001, 58).

FEMA’s Local Hazard Mitigation Planning Handbook (2013) provides a nine step guidance framework for developing a hazard mitigation plan. Steps 1-3 involve the organization of the people and resources needed to complete the plan, steps 4-8 involve specific analyses and decisions required during the process, and task 9 covers implementation of the plan (2013, I-3). While the framework is graphically displayed as a linear process, FEMA guidance explains that the process is meant to be iterative, especially given the requirement for updating the plans every five years.



Figure 1: FEMA Framework for Hazard Mitigation Planning

Since ICLEI and Scripps will provide technical assistance around the risk analysis and mitigation strategy development, this section describes FEMA’s guidance on those steps in more detail. The steps of the risk assessment are:

- 1) **Describe hazards:** a description of the location, extent (strength, magnitude, duration), previous occurrences, and probability of future events. Can be described with narratives or maps.
- 2) **Identify community assets:** participating jurisdictions identify assets at risk to hazards, which can be anything that is important to the character and function of a community, such as people, economy, built environment, and natural environment.
- 3) **Analyze risks:** involves evaluating vulnerable assets, describing potential impacts, and estimating losses for each hazard. Risk can be expressed qualitatively (describe the types of impacts that might occur during a hazard event) or quantitatively.
- 4) **Summarize vulnerability:** involves summarizing the large amount of information generated in the previous steps so that the community can understand the most significant risks and vulnerabilities.

The mitigation strategy is composed of goals, objectives, actions, and a plan for implementation. FEMA defines a mitigation action as a “specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts” (2013). The primary types of mitigation actions to reduce long-term vulnerability include:

- Local plans and regulations
- Structure and infrastructure projects
- Natural systems protection, and
- Education and awareness programs

## Overview of Climate Adaptation Framework

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (2007). Planned adaptation, which is the focus of this report, is defined as adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state (IPCC, 2007). There is also autonomous adaptation, which is not a conscious response to climatic stimuli, but is triggered by changes in natural or human systems.

While there are many different frameworks for climate adaptation planning, this report highlights three. First, ICLEI’s framework is intended for local governments and is a planning process that starts with a leadership commitment and is based on a five milestone planning process adapted from the 2007 report “Preparing for Climate Change: A Guidebook for Local, Regional and State Governments. The five milestones are:

1. Initiate your Climate Resiliency Effort
2. Conduct a Climate Vulnerability Assessment
3. Set Preparedness Goals and Develop a Preparedness Plan
4. Implement Preparedness Plan
5. Measure and Re-evaluate Progress

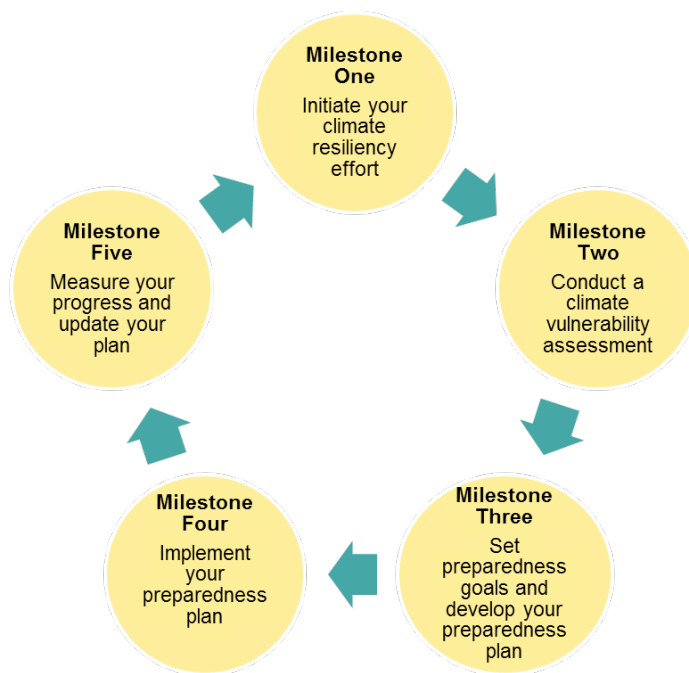


Figure 2: ICLEI 5 Milestone Framework

The National Academies of Science also published an adaptation framework in its 2010 report, “Adapting to the Impacts of Climate Change.” This framework is slightly different in that it specifically calls out a step for identifying opportunities for co-benefits across sectors as a way to enhance the benefits of adaptation options and garner more widespread support. In addition, the framework emphasizes frequent monitoring and reevaluation, which stems from the scientific uncertainty about the exact timing and severity of climate impacts and uncertainty about the performance of new and untested adaptation options.

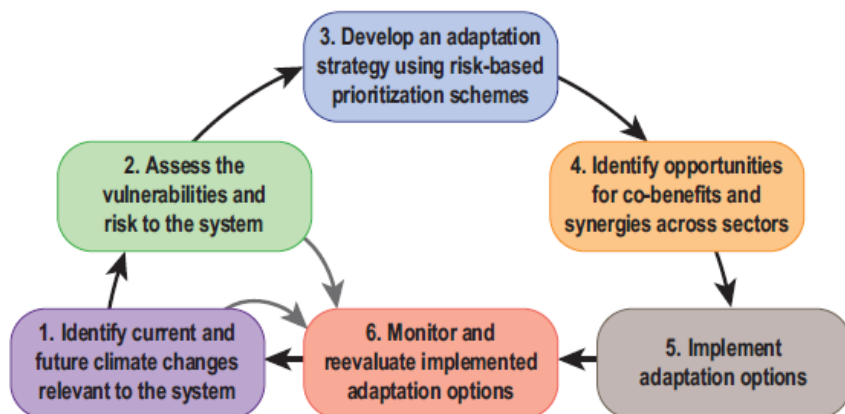


Figure 3: National Research Council Adaptation Framework

Lastly, the State of California also developed a framework for adaptation planning for local governments in its Adaptation Planning Guide (2012). Steps 1-5 are steps for conducting a vulnerability assessment. Steps 6-9 are steps for developing and implementing adaptation strategy. Compared to the previous two frameworks, the major difference in this framework is that it calls out the steps of the vulnerability assessment.

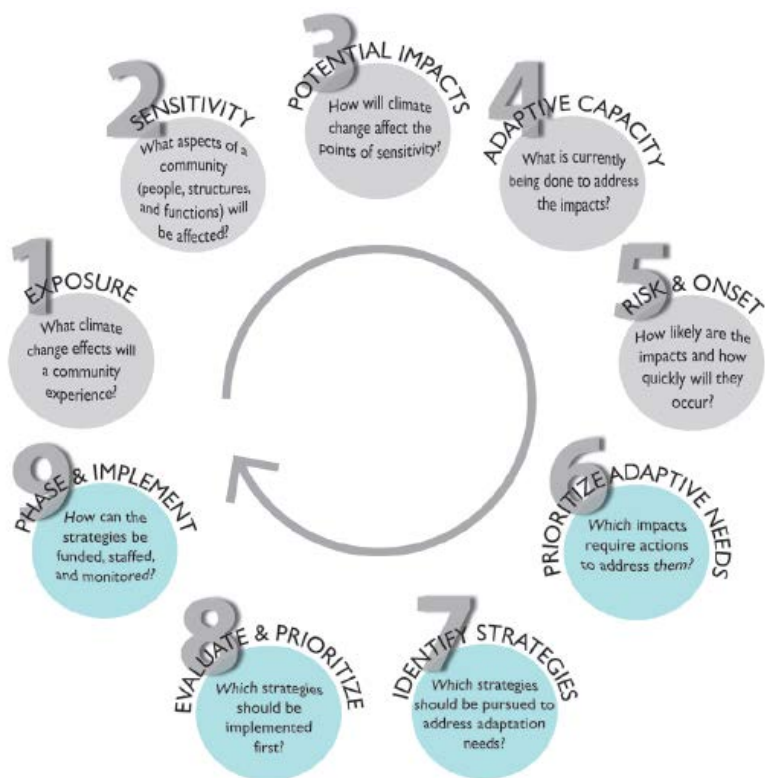
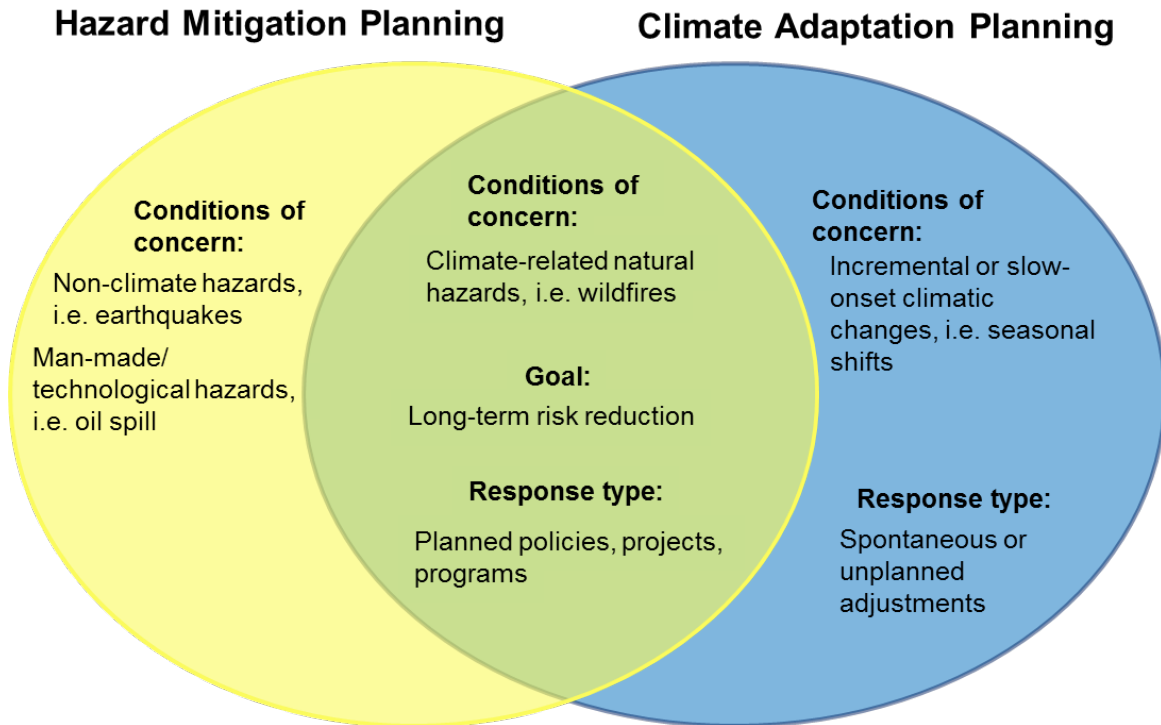


Figure 4: California Adaptation Planning Guide Framework

## Integration of Climate Adaptation and Hazard Mitigation

The practices of hazard mitigation and climate adaptation planning have a great deal in common. They are both largely about deliberative long-term actions in the built and natural environments that reduce harm from hazards. In addition, the frameworks are very similar with vulnerability and risk assessment underpinning the analysis. The diagram below illustrates some of the key similarities and differences in these two practices.



**Figure 5: The intersection of Hazard Mitigation and Climate Adaptation Planning**

Given the similarities, it is theoretically quite feasible to integrate these two frameworks. In fact, FEMA provides broad guidance on how climate change can be integrated into hazard mitigation plans in its 2013 guidance document.

“The planning team may decide to include a discussion of the impacts of climate change in the risk assessment. This is not required by Federal mitigation planning regulation, but can provide a better understanding of how risk may change in the future. Climate change in and of itself may not be a hazard, but it may change the characteristics of the hazards that currently affect the planning area. The planning team can include climate change as a separate section in the plan or within the descriptions of the existing hazards, such as severe storms, flooding, wildfire, and drought. Climate adaptation strategies, which are adjustments in natural or human systems to mitigate the impacts of a changing climate, may complement other hazard mitigation strategies.”

- FEMA Local Hazard Mitigation Planning Handbook, March 2013, Section 5-8

While hazard mitigation planning seeks to reduce harm from human, technological, and natural hazards, climate adaptation is focused on climate-related conditions and hazards. In addition, climate adaptation not only considers the impacts of particular events or disasters, but also examines the implication of slow-onset changes, such as changes in seasons. Thus, it is in the area of climate-related natural hazards, such as flooding, heat waves, and wildfires, that the integration of these two practices is most applicable.



## Key Differences

Despite the similarities between climate adaptation and hazard mitigation planning, it is worth highlighting some of the differences that may need to be reconciled when integrating these frameworks in a planning process. First, hazard mitigation planning has traditionally relied on analysis of historical events to characterize risk. On the other hand, climate adaptation employs projections of future conditions derived from global climate models to characterize risk. At the core of adaptation planning is the assumption that the climate is changing in such a way we cannot plan based on the climate of the past.

While FEMA provides general guidance that climate change can be included in the risk assessment, it does not currently provide specific guidance on how to integrate climate projections in the risk assessment process. Until FEMA provides more specific guidance, some of the key questions that planning teams may need to address when using climate projections in the risk assessment is the planning horizon (how far out into the future should risk be evaluated), how to deal with uncertainty, and the selection of emissions scenarios. Nevertheless, the use of climate change projections has the potential to provide considerable value in the risk assessment as it can provide a better understanding of how risks may be changing over time, and as a result, planners and emergency managers may also start to consider how their hazard mitigation strategies might change.

Secondly, adaptation planning tends to use long-term planning horizons. Adaptation plans often consider conditions in 2030, 2050 or even 2100. FEMA does not have official guidance on the planning horizon, but does use the word “long-term” in several places, even in the definition of hazard mitigation. In addition, FEMA guidance states that plans should consider future land use and development trends to ensure safe development (2013, 5-12). In theory, a long-term planning horizon is compatible with hazard mitigation planning, but the practice has tended to focus on shorter term planning horizons.

Lastly, each planning practice has its own set of terminology. It is important to be clear on terms and definitions during the planning process when integrating hazard mitigation and climate adaptation planning.

## Case Studies

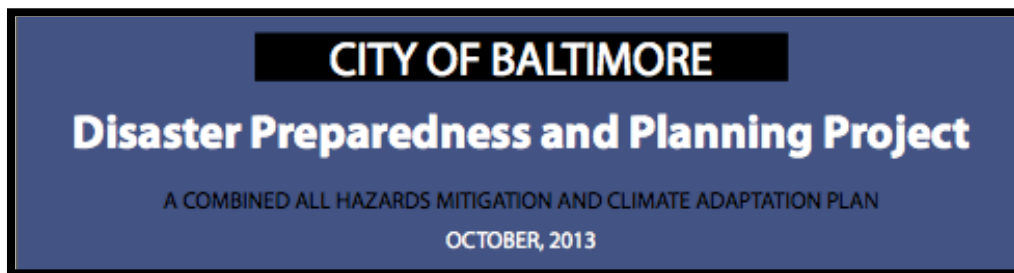
This section discusses cases studies of communities that have integrated climate adaptation and hazard mitigation planning. Drawing from planning documents and interviews with project managers, the cases describe the approach planners took to integration and the challenges and successes they encountered along the way. It is important to note that San Diego County is larger both in term of population and the number of jurisdictions than any of the case study communities. In fact, Barnstable County is the only multi-jurisdictional plan studied, and it included 6 local jurisdictions, whereas San Diego County includes 19. The lessons learned gleaned from these cases will have to be extrapolated to the San Diego County context, which is larger scale and perhaps more complex.

## City of Baltimore, MD

The City of Baltimore's Disaster Preparedness and Planning Project (DP3 for short) is an integrated local hazard mitigation plan and climate adaptation plan. The Baltimore Office of Sustainability led the planning effort from January to October 2013. The plan was carried out by the Office of Sustainability, with assistance from the Mayor's Office of Emergency Management (MOEM), Department of Public Works (DPW), Baltimore City Health Department (BCHD) and other city agencies that served on the advisory committee.

The planning process combined FEMA's hazard mitigation planning guidance with ICLEI's Five Milestone Adaptation Framework. More specifically, the project manager identified areas where the City could go above and beyond FEMA guidance to incorporate climate adaptation planning, which primarily occurred during hazard identification, risk modeling, and the vulnerability analysis. The steps of Baltimore's planning process are described in greater detail below:

1. **Hazard identification:** included profiles of current hazards and identifying projected changes in hazards as a result of climate change, particularly around sea level rise, precipitation variability, and extreme heat.
2. **Asset inventory:** included highly vulnerable populations, historic and cultural resources, economic elements, natural resources and recreation areas, and other important services.
3. **Modeling to identify risk:** involved spatial modeling of existing and projected hazards, including sea level rise.
4. **Vulnerability analysis of all assets** with exposure, sensitivity, and adaptive capacity: involved the use of a self-assessment tool adapted from NOAA Coastal Services Center for both agency directors and members of the community.
5. **Identify mitigation and adaptation actions:** involved working groups organized according to sectors (infrastructure, buildings, natural systems, and public services).
6. **Implementation plans:** included recommendations for stakeholder involvement and funding.



Kristin Baja, the lead Hazard Mitigation Planner, found that the discussion of climate change projections and their related impacts in the early phase of the project resulted in the inclusion of hazards that may not have been in the plan otherwise, such as air quality, and infectious diseases. For others considering including climate change projections in the risk assessment phase, she recommends identifying the climate projections to include in the plan, utilizing the most likely high, medium or low emissions

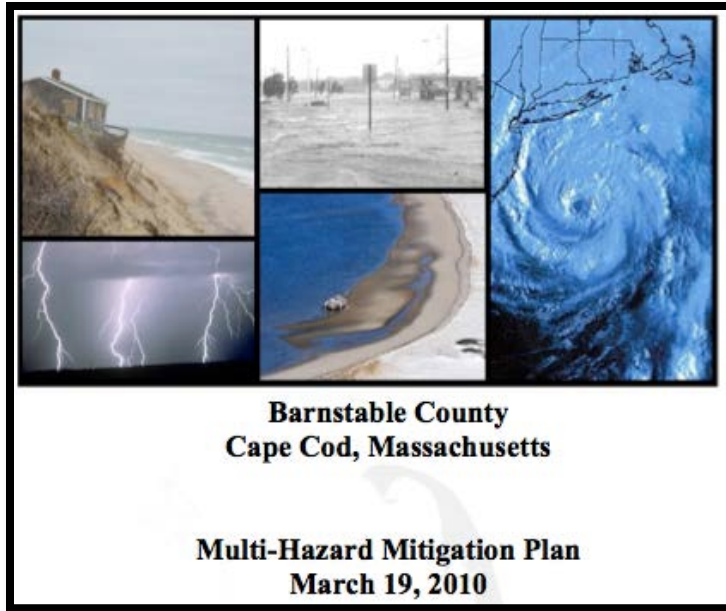
scenarios for the region. Diligence upfront about data management and decision making can reduce confusion and unproductive debates later down the road.

The project manager also decided to go above and beyond FEMA regulation in public outreach. The City held two town hall meetings and seven small community meetings with five focused on flooding and two on heat. In concert with mapping efforts, planners found that the public outreach helped them to gain public input, understanding and support and to better identify vulnerable communities and actions to help address those vulnerabilities. Ms. Baja considers integrating community feedback and involvement to be one of the strengths of their approach. Ms. Baja also presented to special interest groups within the community, such as the American Institute of Architects and the Baltimore Port Alliance. Throughout the process, Ms. Baja was careful to provide consistent messaging, repeating at every meeting why it's important to consider climate impacts and adaptation and explaining the benefits of no-regrets actions. While she concedes that it can get repetitive, she found the consistent messaging helped people consider and understand their own vulnerabilities to the impacts of climate change.

Ms. Baja also found it easier to organize the plan by sector rather than by hazard. Stakeholders broke into four subgroups: infrastructure, buildings, natural systems, and public services. This approach led to more comprehensive hazard mitigation and climate adaptation strategies, from food systems to grid resiliency. The subgroups allowed stakeholders to share their expertise, go into more depth, and identify specific strategies to pursue. Baltimore City's final plan includes 50 strategies and 231 actions. While the goal was not to have a large number of actions, the actions identified are very specific with lead actors and timeframes already identified. The City of Baltimore is now moving directly into the implementation phase, and will utilize their established subgroups as the foundation needed to carry out implementation.

### **Barnstable County, MA**

Barnstable County in Massachusetts consists of the 15 towns on Cape Cod. The Cape Cod Commission, a regional land use agency, took on the project of incorporating climate change into the County's Multi-Jurisdictional Hazard Mitigation Plan in 2009. They partnered with the Adaptation Network and Waquoit Bay National Estuarine Research Reserve for the climate science and education and outreach aspects of the project.



The Cape Cod Commission established a process whereby local jurisdictions sent a point person to the county-wide workshops and that person was responsible for carrying information between the county meetings and the local jurisdiction meetings. Ryan Bennet, the project manager, found that approach challenging as they lost the participation of some jurisdictions along the way. In addition, if the local jurisdiction representative was skeptical of addressing climate change in the plan, their local plan did not reflect climate change as a risk factor.

The primary method for incorporating climate change in the plan was dedicating one of their regional workshops to understanding the risks associated with climate change. The workshop presented the entire spectrum of climate impacts, such as drought, precipitation changes, and sea level rise. The Commission partnered with the Adaptation Network and local academics to incorporate climate projections for their region into the plan. At the time, downscaled climate projections were not readily available, so the climate science came primarily from regional reports at the Northeast scale.

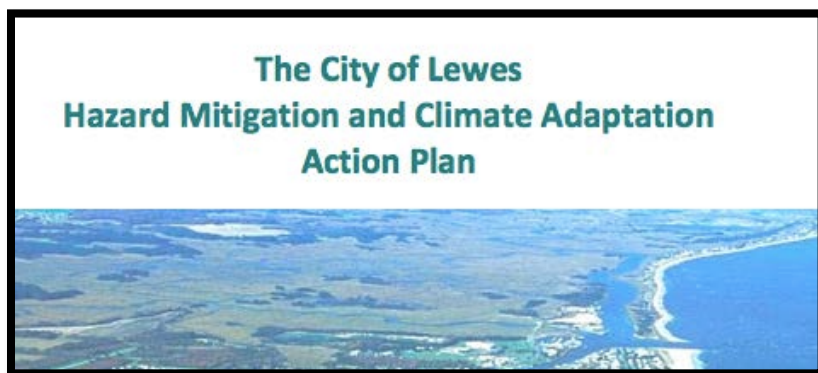
The Commission found that when the planning group went through the hazard identification process, the participants ranked events influenced by climate change, particularly sea level rise, as higher priorities because they were anticipating that risks will increase in the future. As a result, the plan focused on actions to mitigate erosion, storm surge, and coastal flooding, which are all exacerbated by sea-level rise.

With a grant from FEMA, The Cape Cod Commission is providing assistance on the creation or update of five local hazard mitigation plans in 2013-2014. As a result of their experience with the County Multi-Jurisdictional plan in 2009, they are doing a couple things differently. First, they now have a facilitator attending local planning meetings. They find this strategy to be more effective than relying on one point person to facilitate and bring information back and forth.

Secondly, during the 2009 plan, the Commission found that they did not have a broad enough spectrum of stakeholders participating at the local jurisdictional level. The local planning groups consisted of a town planner, a police or fire official, and in some cases an open space or conservation committee member. During the Commission's work in 2013, they decided to convene larger local planning committees, with stakeholders from a range of local departments including the board of health, natural resources & conservation, parks, public works, and floodplain managers. They found that including a larger circle of people elevated the discussion as people bring in more expertise and experience to help craft mitigation actions.

### **City of Lewes, DE**

Lewes is a small community of approximately 2,700 people located along the Delaware Bay and bordered by wetlands, creeks, beaches, and agricultural land. In 2011, with funding from NOAA and University of Delaware, Delaware Sea Grant partnered with ICLEI to deliver a pilot project to integrate climate adaptation and hazard mitigation planning. The result of the project was an action plan that will inform the City's comprehensive plan updates, building and zoning codes, and hazard mitigation planning practice, but is not an officially recognized hazard mitigation plan.



The project integrated ICLEI's 5 milestone framework and FEMA's hazard mitigation framework. This project occurred before FEMA issued any guidance on climate change in hazard mitigation planning, so the project managers found it important to have FEMA at the table, making sure they met the needs of FEMA review guidance.

To develop the plan, Delaware Sea Grant and ICLEI organized a series of workshops designed to build off each other. The outcomes from each of the workshops included:

- 1) Analysis of existing hazards and historical events
- 2) Integration of climate change impacts into hazards map to begin assessing how climate change could affect existing hazards

- 3) Identification of several key vulnerabilities: flood impacts to homes, property, and land use; flood impacts to city infrastructure; and impacts to water resources due to precipitation pattern changes, flooding, and salt water intrusion.
- 4) Selected hazard mitigation/adaptation actions to address vulnerabilities based on a ranking system
- 5) Created implementation plans

The primary method for integrating climate change impacts and adaptation activities in the plan was through Workshop #2, which presented how climate change affects existing hazards. During this workshop, Dr. Wendy Carey from Delaware Sea Grant presented a summary of the literature on climate change impacts for the region. According to the ICLEI project manager, Missy Stults, Dr. Carey is a very trusted local scientist, which helped lend credibility to the project. The planning group reviewed all potential hazards, but storm surge flooding and sea level rise became the focal point of discussion due to the potential severity of impacts for this low-lying coastal town.

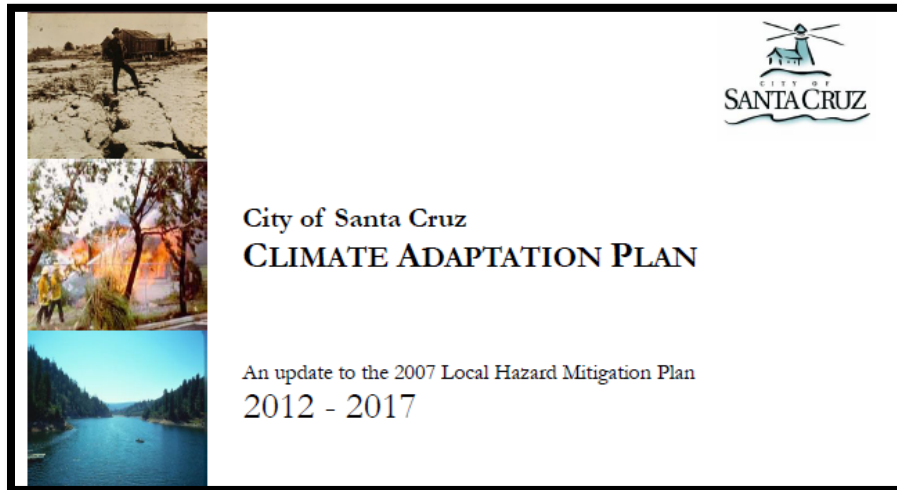
Ms. Stults found that this discussion of longer term climate change projections and their associated impacts led to the development of more robust mitigation strategies, particularly around managing flood risks, such as buying land and preparing people who live in high-risk areas. Dr. Carey also found that talking about climate change through a hazard mitigation planning lens made people feel more comfortable with the topic. They were already accustomed to thinking about and dealing with flood events and their associated impacts.

The planning group that attended these workshops was relatively large at about 40 people. Ms. Stults designed the workshops to be interactive and allowed for participants to be experts in their own way. Ms. Stults also found it important to do a terminology check at every meeting given the differences in the climate adaptation and hazard mitigation planning terminology. Dr. Wendy Carey of Delaware Sea Grant was impressed with resident, city staff, and elected official participation in the workshops. Both the demographics of the community, which includes an active and engaged citizenry, and support from the Mayor and City Manager contributed to the high levels of participation.

Although the process produced an action plan that is not an official hazard mitigation plan, one of the recommendations is that this plan is incorporated into the community's next hazard mitigation plan update. Another key outcome from this process is that the action plan remains active in the hands of the community's hazard mitigation team that continues to meet on a quarterly basis to discuss mitigation issues, including implementation, funding, and contact with the planning commission. The planning commission is open and receptive to incorporating the hazard mitigation/climate adaptation action plan strategies into the next updates of key planning and zoning documents. In addition, this plan was a key factor in Lewes obtaining a coastal management grant to improve community resiliency to sea level rise and flood risk through review of city codes and ordinances. With this funding, they were able to hire a consultant to evaluate current zoning/building codes and floodplain ordinances and where there may be areas for improvement.

## City of Santa Cruz, CA

The City of Santa Cruz developed a Climate Adaptation Plan that is included and integrated in the 2013 update to the Local Hazard Mitigation Plan (LHMP). In 2008, the City received a Pre-Disaster Mitigation Grant from FEMA to develop a climate adaptation plan and the City completed the plan in late 2011. The City originally intended for that plan to serve as their LHMP update, but upon review by the California State Office of Emergency Services, the City learned that it would not be sufficient as an LHMP update, because it did not address non-climate hazards, such as earthquakes and tsunamis. Instead, officials integrated the Climate Adaptation Plan into a broader LHMP update process, which occurred in 2012. More specifically, the City wove findings from the Climate Adaptation Plan's Vulnerability Study into the Hazard Mitigation Plan's Risk Assessment. In addition, the Adaptation Plan in its entirety is included in the LHMP as an appendix. The Public Works Department led both the Climate Adaptation Plan and LHMP update processes.



In order to apply the latest climate science in the Climate Adaptation Plan, the City of Santa Cruz used the FEMA grant funding to contract with Dr. Gary Griggs from UC Santa Cruz to conduct a "Vulnerability Study" that discusses the vulnerabilities associated with a wide range of climate-related impacts from sea level rise to wildfire to food availability. The City's internal adaptation team provided two rounds of feedback on the study. The vulnerability study then informed the development of adaptation strategies and actions. Dr. Griggs also presented the findings of the vulnerability assessment at public meetings and this information has become integral to some community groups.

According to project manager, Robert Solick, who serves as the City of Santa Cruz Emergency Operations Center Manager and as the Public Works Department Principal Management Analyst, one of the strengths of their approach was their ability to get decision makers involved in the planning process and get buy-in from high-level officials. He found it important to have this participation and buy-in as some of the hazard mitigation actions involve rethinking capital improvement programs and budgets for years to come. Mr. Solick was able to take advantage of a standing weekly "Managed Meeting" to make the case for high level participation in the hazard mitigation plan.

Mr. Solick found data management to be a challenging aspect to the planning process. Departments turned in data in different formats, which required a lot of time to put them into consistent formats. Thinking through data needs ahead of time and providing templates and guidance would be a time-saving strategy. In addition, Mr. Solick found it important to make the risk assessment information, such as maps, easily readable to a wide audience.

Mr. Solick found the incorporation of the Climate Adaptation Plan into the LHMP integral to having an enhanced understanding of risk and vulnerability and enhanced mitigation actions. If he could do it over again, however, he would have done the adaptation plan and hazard mitigation plan in parallel rather than one after the other to improve linkages and reduce redundancies.

### **Monterey County, CA**

Monterey County's Multi-Jurisdictional Hazard mitigation Plan update is currently under development so there are no lessons to share at the time of writing. However, the County Office of Emergency Services is partnering with NOAA Coastal Services Center to incorporate sea level rise in the plan using Digital Coast Tools. Through this experience, NOAA is developing a methodology that other communities can follow for using Digital Coast Tools in hazard mitigation planning.

Some of the key drivers of this planning process are the desire for an improvement in county's Community Rating System rating. In addition, emergency services officials would like to see local planning departments take greater ownership in the plan, particularly around the implementation of mitigation actions.

### **The State of California**

Not only is it useful to consider how other cities and counties across the county have approached integrating climate change and hazard mitigation planning, but it's also important to review the State of California's Hazard Mitigation Plan. In California, the State Office of Emergency Services is the first reviewer of local and multi-jurisdictional hazard mitigation plans before sending them to FEMA for approval. While local plans do not need to replicate the exact structure of the state plan, state reviewers are looking for consistency, particularly in regards to the hazards considered and the goals.

The 2013 Update to the State's Hazard Mitigation Plan includes climate change impacts and adaptation. Drawing on research published by the State of California, the plan describes climate change as an emerging risk factor and discusses the changes that California is already experiencing in temperature, sea levels, and precipitation. It also says that extreme weather events, such as heat waves wildfires, droughts, and floods are likely to be some of the earliest climate impacts experienced. Climate change is also incorporated into the risk assessment sections regarding floods and wildfires. In addition, there is a section devoted to weather and climate-related hazards that includes a discussion of how climate change may exacerbate these hazards.



FEMA guidance states that local hazard mitigation planners should review the hazards listed in the state plan to see if they are relevant in their local jurisdiction and use the same hazard names whenever appropriate (2006). Some of the hazards from the state plan that are omitted from the 2010 San Diego County plan that may merit consideration in this update are:

- Air pollution
- Sea level rise
- Droughts and water shortages
- Energy shortage and energy resiliency
- Extreme heat
- Insect pests and diseases

According to State Office of Emergency Services hazard mitigation plan reviewers, a critical piece of advice and best practice is to meticulously document the planning process, including sign-in sheets for every meeting and roles and responsibilities for the planning team and any stakeholder groups. The reviewers often have to send plans back to the local jurisdictions asking that this information be added to the planning document. The reviewers recommend using a spreadsheet with a checklist for the different roles that people play in planning groups and stakeholder groups.

## **Conclusion: Lessons for San Diego**

- Discussing climate change early in the risk assessment phase makes a lot of sense – it can influence the prioritization of hazards and the direction and character of mitigation strategies.
- Decide ahead of time on climate projections (timeframe, high or low scenarios etc.) and clearly document the rationale behind those decisions.
- It can be problematic to have a point person relaying climate change information from regional workshops to local planning groups where the hazard mitigation actions are largely developed. One possible solution is to build the capacity of local leads to effectively use the climate change information with their local planning groups. Alternatively, where resources are available, a facilitator familiar with the overall effort could travel to each local meeting to present the regional perspective.
- It is important to include a diverse group of people, including decision-makers, in local planning groups to draw upon their expertise in local vulnerabilities, mitigation strategy development, and implementation. Representatives from urban planning, public works, emergency management, natural resources/conservation, public health, economic development, and floodplain management are among those that should be included.
- Developing on-going channels of communication between the local hazard mitigation planning group and other local decision-making bodies, such as the Planning Commission, can help ensure that mitigation strategies are implemented.
- Be clear on terminology. Given that this is an official hazard mitigation plan update, ICLEI will use terminology associated with the hazard mitigation planning practice and FEMA guidance and provide clear definitions when incorporating concepts from climate adaptation planning.

- Meticulously document the planning process. ICLEI will provide a detailed report for each workshop that includes materials, presentation, and a list of attendees.

## Works Cited

California Governor's Office of Emergency Services, 2013. "California Multi-Hazard Mitigation Plan."

California Emergency Management Agency, 2012. "California Adaptation Planning Guide."

Cape Cod Commission, 2010. "Barnstable County, Cape Cod, Massachusetts Multi-Hazard Mitigation Plan."

City of Baltimore, 2013. "City of Baltimore Disaster Preparedness and Planning Project. A Combined All Hazards Mitigation and Climate Adaptation Plan."

City of Santa Cruz, 2012. "City of Santa Cruz Climate Adaptation Plan. An update to the 2007 Local Hazard Mitigation Plan."

Delaware Sea Grant Program, 2011. "The City Of Lewes Hazard Mitigation and Climate Adaptation Action Plan."

Federal Emergency Management Agency [FEMA], 2006. "Multi-Jurisdictional Mitigation Planning. State and Local Mitigation Planning How-To Guide Number Eight."

Federal Emergency Management Agency [FEMA], 2013. "Local Mitigation Planning Handbook."

Federal Emergency Management Agency [FEMA], 2001. "A Disaster Dictionary."

IPCC, 2007. "Fourth Assessment Report, Working Group II: Impacts, Adaptation and Vulnerability."

National Academy of Science, 2010. "Adapting to the Impacts of Climate Change."

Snover, A.K., L. Whitely Binder, J. Lopez, E. Willmott, J. Kay, D. Howell, and J. Simmonds. 2007. *Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments*. In associated with and published by ICLEI- Local Governments for Sustainability, Oakland, CA.

## List of Interviewees

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