

Preparing for the Future: Climate Change and the Monterey Bay Shoreline

Summary Report for Participants

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OCEAN
SOLUTIONS



Report

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Cover photo by Brad Damitz



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Executive Summary

MIKE FOX

Climate change currently affects communities around the globe. In the Monterey Bay region, a number of communities are integrating climate change adaptation in local planning processes while others are just beginning to grapple with this important issue. To facilitate adaptation to climate change in the Monterey Bay region, the Monterey Bay National Marine Sanctuary (MBNMS) and Center for Ocean Solutions (COS) convened regional decision makers at a one-day workshop, titled “Preparing for the Future: Climate Change and the Monterey Bay Shoreline.”

Held on December 6, 2011, the event was the first Monterey Bay region-wide gathering on climate change adaptation. More than 90 people attended from cities and municipalities in Santa Cruz and Monterey Counties, representing city and county staff, state and federal governments, research institutions and non-profit organizations. They heard from featured experts and participated in breakout group sessions.

The workshop demonstrated to participants that past experience with storms and strong El Niño conditions provide the Monterey Bay region with concrete examples of what increased sea level and storm intensity may mean for the area’s future. Sea level, coastal erosion, coastal inundation, salt water intrusion, and storm and wave damage will increase in frequency and intensity from climate change. Because most changes won’t happen overnight, communities have time to prepare.

Examples of climate change adaptation plans from government jurisdictions around the country were shared at the workshop. Adaptation planning is conceptually simple but becomes complex in practice, often requiring difficult and contentious choices. Successful case studies provide lessons for navigating these difficult waters and suggest the importance of building and maintaining a strong team, incorporating the most up to date and relevant scientific information and engaging the public throughout the process.

Jurisdictions in this region have similar needs for successful adaptation planning, including public support, resources (staff time and funding), localized data, private sector engagement, political support and increased regional coordination. Fortunately, the region can access many resources now to support adaptation planning, such as tested decision support and planning tools, numerous local scientific institutions, and online resources and guides that are regionally applicable.

Workshop goals for participants were to:

- Begin Monterey Bay region-wide discussion and collaboration on climate change adaptation
- Understand the latest research on climate change impacts to the Monterey Bay coastline
- Gain a basic understanding of the typical climate change adaptation planning process
- Witness how communities in the Monterey Bay area are already planning for climate change
- Learn about grant opportunities and other resources (tools, assistance) available to support climate change adaptation planning
- Have the opportunity to develop new collaborations and partnerships in climate change adaptation planning

During the workshop, the following themes emerged:

- If Monterey Bay communities start now, they will have time to prepare for the impacts of climate change on their coast. Past storms provide examples of the range of impacts to expect from changes in sea level and storminess as a result of climate change
- A range of tools and resources currently exists for climate change adaptation planning
- Uncertainty in local projections is unavoidable so communities should not wait for perfect information to begin adaptation planning
- There are very real and difficult barriers to making progress in climate change adaptation, including lack of resources, unprecedented regulatory challenges, low perceived public support, and limited local data; yet by working collaboratively it is possible to overcome these challenges

During the workshop, participants expressed the following needs and ideas:

- A range of limitations and opportunities exists to successfully incorporate climate change adaptation into current planning processes
- State and federal agency permitting requirements influence local planning agencies and can either limit or drive action toward climate change adaptation
- Local planners and decision makers want localized data and projections, especially regarding sea level rise
- Climate change preparations will benefit from increasing and deepening regional collaborations among local governments, scientific institutions and non-profit organizations
- Developing and using a regionally consistent set of projections for sea level rise and coastal erosion that can be applied during planning and permitting processes would be useful

During the workshop, participants recommended the following next steps for the region (discussed in detail in Section VI):

- Improve understanding of local impacts of climate change and develop actionable recommendations for moving forward
- Design and implement a governance structure for the Monterey Bay region that could aid and coordinate climate change adaptation and related activities
- Continue the discussion initiated at the workshop by building a regional network of people interested in or working on climate change adaptation
- Expand the scope of stakeholder involvement to include in-person discussions and engage coastal business owners, landowners and the general public
- Create a technical advisory group on climate change adaptation for the region
- Actively use the Internet as a way to connect and educate the regional community
- Jointly apply for funding to support coastal climate change adaptation work in the region
- Develop climate change projection data at a scale fine enough to use for local planning
- Consider a public engagement campaign to help increase awareness about the need for climate adaptation planning and preparation



MIKE FOX

I. Background

The geographic scope for this workshop and the background materials is the Monterey Bay coastline in Monterey and Santa Cruz counties.

Climate change currently affects communities around the globe. In the Monterey Bay region, a number of communities are independently integrating climate change considerations in local planning processes while others are just beginning to grapple with this important issue. To facilitate a discussion on how to best prepare coastal communities in the Monterey Bay region to adapt to the impacts of climate change, the Monterey Bay National Marine Sanctuary (MBNMS) and Center for Ocean Solutions (COS) convened regional decision makers at a one-day workshop titled “Preparing for the Future: Climate Change and the Monterey Bay Shoreline.”

Held on December 6, 2011, this event was the first Monterey Bay region-wide discussion on climate change adaptation. More than 90 people attended from cities and municipalities in Santa Cruz and Monterey Counties, representing city and county staff, state and federal governments, research institutions and non-profit organizations.

In a year-long collaborative process, MBNMS and COS partnered with NOAA Coastal Services Center, California Coastal Commission, City of Santa Cruz, Central and Northern California Ocean Observing System, Local Governments for Sustainability (ICLEI) and ESA-PWA to design the workshop. Background materials generated for the event include a summary of the science on sea level rise and storms, and a synthesis of climate change adaptation guides. The two subsections that follow describe the scientific background and summarize the adaptation planning process. Background information on the workshop preparation process is found in Appendix A.

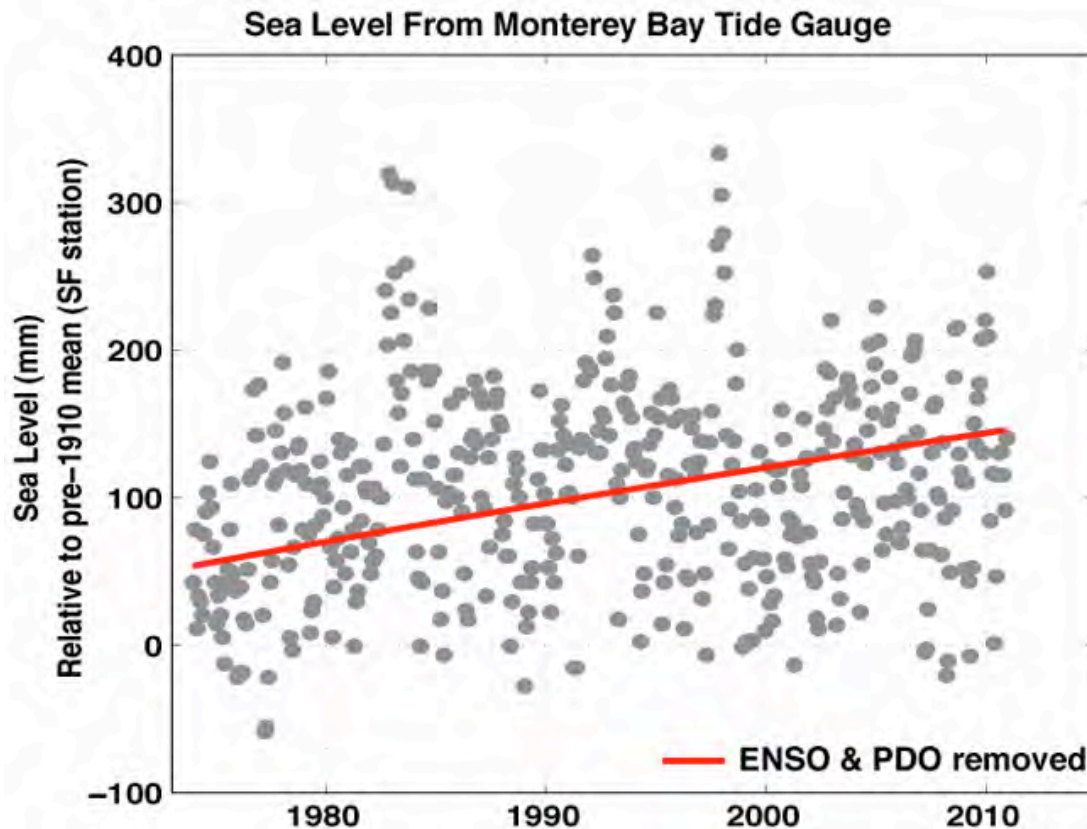


Figure 1. Sea level from the Monterey Bay Tide Gauge. Monterey has experienced a consistent rise in sea level on the order of 2-3 mm/yr (0.07-0.1 in/yr) for the past 35 years. Monthly records of sea level from the Monterey Bay tide gauge are shown from 1976 to 2010.

A. Scientific Background

Coastal impacts associated with sea level rise are widespread and diverse. Impacts of concern for the Monterey Bay region include: increased coastal erosion, coastal inundation, storm and wave damage, and salt water intrusion. Collectively, these impacts threaten infrastructure, development, marine and coastal ecosystems, and the general welfare of the communities around Monterey Bay. Monterey Bay has variable coastal geology, and as a result, different regions will experience different types and magnitudes of impacts. For example, portions of the sandy beaches and dunes of southern Monterey Bay are currently eroding at some of the highest rates in California, while the low-lying land and large flood plains in the central portion of the Bay make those areas particularly susceptible to inundation. Some socioeconomic and ecological impacts of sea level rise (e.g., beach loss and infrastructure damage) are readily apparent, but others, like the potential loss

of groundwater reserves to saltwater intrusion and the flooding of coastal estuaries like Elkhorn Slough are not as well understood. Given the diverse and significant nature of these impacts, the development and implementation of local and regional adaptation plans is an important first step in reducing economic, social and environmental impacts of sea level rise.

Sea level rose approximately seven inches (18 cm) over the past century (1900–2005)¹ along most of the California coast. The local tide gauge at Monterey dates back to 1973 (compared to the San Francisco gauge dating from 1855), but even during this short time period, a trend of sea level rise is evident at the rate of approximately 0.05 inches per year (Figure 1). Due to local oceanographic conditions, sea level in central California was relatively stable or even declining over the past

¹ Cayan, D., Bromirski, P., Hayhoe, K., Tyree, M., Dettinger, M., & Flick, R. (2008). Climate change projections of sea level extremes along the California coast. *Climatic Change*, 87(0), 57-73.

several decades. However, when regional climate patterns that drive local sea level trends shift, the coast will very likely experience a rise in sea level corresponding to, or even exceeding, the mean global rate of sea level rise.²

Currently, the state of California is using estimates of global sea level rise produced by Ramstorf 2007³ and Cayan et al. 2008⁴ for coastal adaptation planning purposes under Executive Order S-13-08. These projections suggest possible sea level rise of approximately 14 inches (36 cm) by 2050 and up to approximately 55 inches (140 cm) by 2100.

B. Climate Adaptation

Adaptation planning for climate change is a risk management strategy that helps communities to understand and prepare for the impacts of climate change on local assets. Although climate change

California has experienced a rise in sea level of approximately seven inches (18 cm) over the past century (1900 – 2005).

adaptation planning processes have been described in multiple ways⁵, these descriptions share common elements and process steps. Climate change adaptation planning is not meant to place additional burden on already overworked and underfunded sectors. While adaptation planning can be a stand-alone process, it can also be incorporated into existing planning processes and applied at any level—regional, county, city or agency planning. Given multiple ways to implement climate change adaptation planning and the broad nature of the generic process (Figure 2), it is important to learn from those who have already attempted to apply these steps in real world scenarios.

² See, e.g., Rahmstorf, S. (2007). A Semi-Empirical Approach to Projecting Future Sea-Level Rise. *Science*, 315(5810), 368-370; Cayan, D., Bromirski, P., Hayhoe, K., Tyree, M., Dettinger, M., & Flick, R. (2008). Climate change projections of sea level extremes along the California coast. *Climatic Change*, 87(0), 57-73; and Largier, J., Cheng, B. S., Higgason, K. D., & editors. (2010). *Climate Change Impacts: Gulf of the Farallones and Cordell Bank National Marine Sanctuaries*.

³ Rahmstorf, S. (2007). A Semi-Empirical Approach to Projecting Future Sea-Level Rise. *Science*, 315(5810), 368-370.

⁴ Cayan, D., Bromirski, P., Hayhoe, K., Tyree, M., Dettinger, M., & Flick, R. (2008). Climate change projections of sea level extremes along the California coast. *Climatic Change*, 87(0), 57-73.

⁵ See for example: National Research Council's *America's Climate Choices: Panel on Adapting to the Impacts of Climate Change* (<http://www.nap.edu/catalog/12783.html>); USAID's *Adapting to Coastal Climate Change, A guidebook for development planners* (pdf.usaid.gov/pdf_docs/PNADO614.pdf); ICLEI's *Preparing for Climate Change, A Guidebook for Local, Regional and State Governments*; NOAA's Office of Ocean and Coastal Resource Management's *Adapting to Climate Change: A Planning Guide for State Coastal Managers* (<http://coastalmanagement.noaa.gov/climate/adaptation.html>)



Figure 2. Climate change adaptation planning process steps.



II. Proceedings



BRYNN HOOTON-KAUFMAN

A. Overview of Presentations

All presentations are available at:

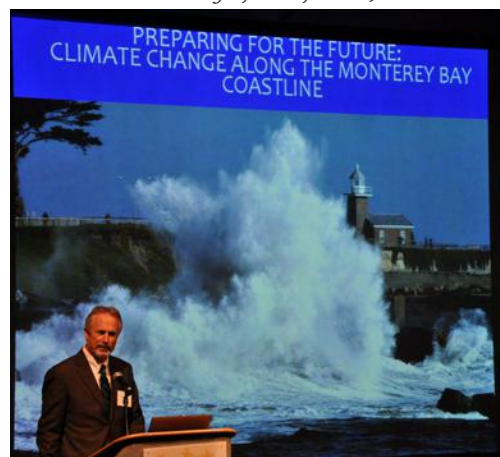
<http://centerforoceansolutions.com/preparingforthefuture>

Keynote speaker Dr. Gary Griggs, Director of the Institute of Marine Sciences at University of California, Santa Cruz gave a scientific overview of expected climate change impacts in the Monterey Bay region, focusing on sea level rise and storms. A panel discussion on climate change adaptation case studies followed Dr. Griggs' keynote. California Coastal Commission Executive Director Charles Lester moderated the panel.

Scientific Overview

Dr. Gary Griggs *Director, Institute of Marine Sciences at University of California, Santa Cruz*
“Sea Level Rise and Coastal Storms: Local Impacts to the Monterey Bay Region”

Strong El Niño conditions and storms of the past are a preview of what increased sea level and storm intensity might mean for Monterey Bay in the future. Impacts that the region has already experienced on a short time scale (sea level rise, flooding, damage to coastal development and infrastructure) will occur more frequently as a result of climate change. Because most changes will not happen overnight, the Monterey Bay region has time to prepare.



Dr. Griggs' take-home messages:

- We have three choices for how we respond to climate change: mitigation, adaptation and suffering. We are going to do some of each. The question is, what will the mix be? The more adaptation we do, the less mitigation and suffering we will experience.
- The events we can expect in the future are similar to those we have experienced in the past; floods, droughts, coastal storm damage and erosion. The difference is that events in the future will most likely occur more frequently and be more severe.
- In the Monterey Bay region, future El Niño events with elevated sea levels and large storm waves will have far greater impacts on the shoreline, coastal infrastructure and development than sea level rise itself over at least the next 40-50 years, or until sea levels rise approximately 18 inches above present levels.

Panel Discussion on Climate Change Adaptation Case Studies



Moderator: Charles Lester *Executive Director, California Coastal Commission*

Government jurisdictions around the country, including in the Monterey Bay region, have begun to develop climate change adaptation plans. A panel presented some of these experiences as case studies. Panelists included representatives from the Southern Monterey Bay Coastal Erosion Working Group, who illustrated a methodology for how to assess vulnerability and risk; the City of Santa Cruz, who discussed how to build a strong planning team; and King County, Washington, who reviewed their completed process.

Panelists:

Brad Damitz *Environmental Policy Specialist, Monterey Bay National Marine Sanctuary, representing Southern Monterey Bay Coastal Erosion Working Group (SMBCEWG)*

Damitz' presentation highlighted the need to work collaboratively using the best available scientific data to gain a better understanding of potential future location-specific impacts to develop appropriate adaptation responses for each region.

Damitz' take home messages:

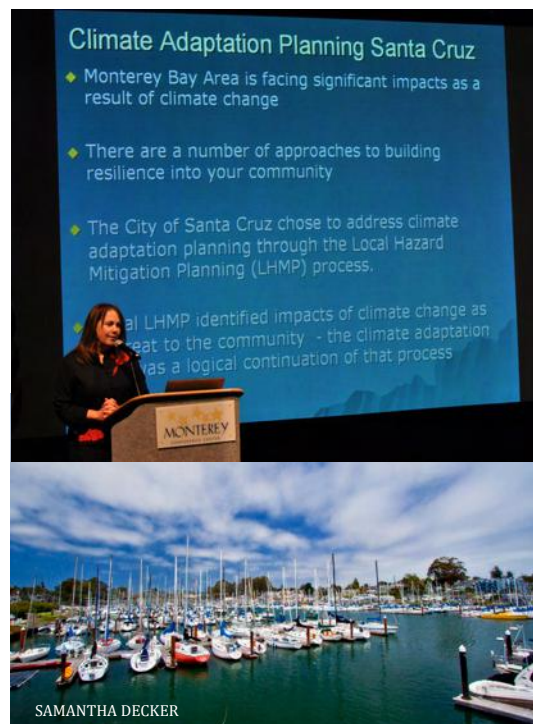
- A large portion of Monterey Bay's shoreline is experiencing coastal erosion which is expected to accelerate due to sea level rise
- By its very nature, adaptation planning requires some difficult and contentious choices
- Use the best available science to inform these difficult decisions
- In order to effectively plan for coastal climate change impacts, it is necessary to identify and assess a comprehensive range of potential actions to gain a better understanding of the true costs and benefits of each scenario

Cathlin Atchison *Project Manager, City of Santa Cruz Department of Public Works*

Atchison presented her work on the City of Santa Cruz's Climate Adaptation Plan.

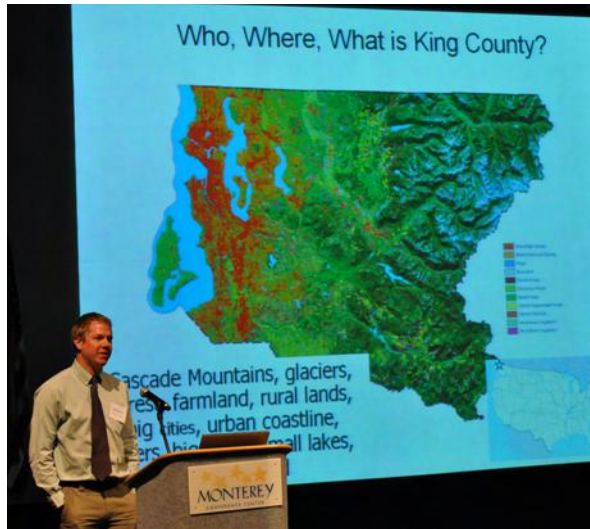
Atchison's take-home messages:

- Build a strong team, including staff, community members and scientific advisors
- Establish a timeline and benchmarks
- Build the plan using the most current climate science information
- Encourage public participation throughout the process, and understand how to communicate climate change impact information
- Be persistent - follow up! Not everyone appreciates the importance of this type of planning
- Establish an ongoing monitoring, review and update process and methodology to qualitatively and quantitatively evaluate implementation of actions



Matt Kuharic Senior Climate Change Specialist, King County, Washington

Kuharic presented on work completed in King County and offered several lessons from a region that has already undertaken countywide adaptation planning and implementation efforts.



Kuharic's take home messages:

- Initiate a climate planning effort
 - Listen to the science
 - Scope the impacts to your sectors
 - Build support – and build a team
 - Identify planning areas most affected by climate change
- Conduct a climate resiliency study
- Set goals and develop your plan
- Implement your plan
- Measure progress

Additional information on our case studies can be found at our website: climatechangemontereybay.org



B. Overview of Breakout Session One

The purpose of Breakout Session One was to engage in small group discussions to process the information presented during the morning presentations and to integrate information on sea level rise, storms and other climate change impacts into current work and planning. Workshop participants were divided into seven breakout groups to begin networking and sharing information on adaptation planning. Participants in each breakout group identified how well and in what capacity they were able to integrate climate change information into their work (if at all), what resources they used to help them integrate climate change information into their work and what needs they have in order to be successful in a climate change adaptation planning process. Participants were also asked to identify what helped (catalysts/drivers) or hindered (barriers) their progress along an adaptation planning spectrum.

To elicit this information, participants were asked about their effort to incorporate climate change impact into their work, placing it on a spectrum ranging from “not thinking about it” to “incorporating it” when answering the following questions:

- Where are you along the spectrum?
- If you are “incorporating it,” what are you doing?
- If you are not thinking about climate change, or are thinking about it but not addressing it:
 - Why not? What would help you move further down the spectrum?
- If you are currently planning for or addressing climate change:
 - How and why did you go about doing this? What prompted the action?
 - What resources have you found helpful for your work?



The answers to these questions were captured in the note-taking template seen in Figure 3.

C. Overview of Breakout Session Two

The second breakout session brought together people from various backgrounds around a common interest to spark new ideas, solutions and collaborations. After reviewing participants’ responses to the pre-workshop survey, small groups discussed the following topics in Breakout Session Two:

- Incorporating science and research from local institutions into local decision making
- Policy and legislative options for climate change adaptation
- Coastal infrastructure
- Protecting coastal natural habitat
- Sea level rise projections and planning despite uncertainty
- Regional coordination

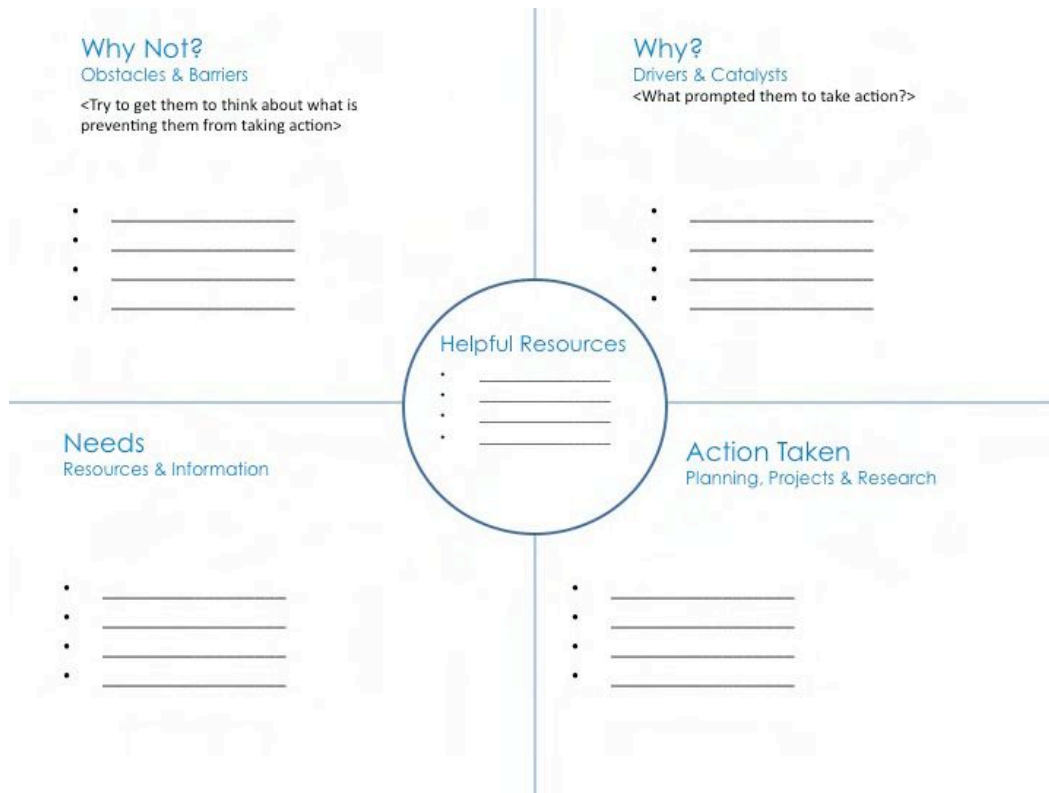
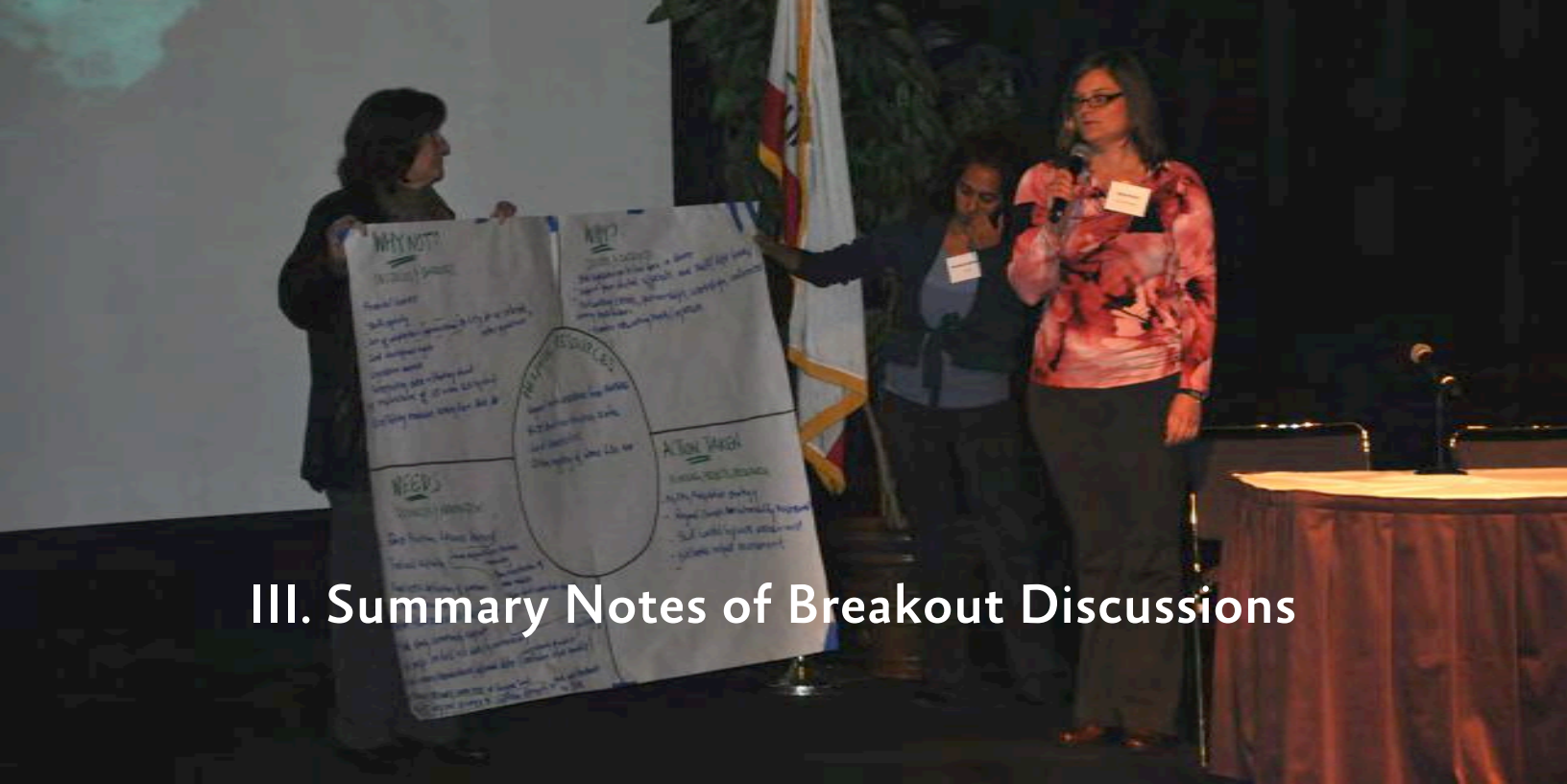


Figure 3. Note-taking template for Breakout Session One



III. Summary Notes of Breakout Discussions

The following section summarizes the findings of the two afternoon breakout sessions. Section A provides notes from Breakout Session One, which solicited much information. Section B provides notes from Breakout Session Two, which by design was more of a problem-solving dialogue and less an opportunity to gather information.

A. Breakout Session One: Getting Started with Adaptation Planning

During the first breakout session, groups of participants discussed the morning presentations and how to integrate information on sea level rise, storms and other climate change impacts into their current work and planning. Participants in each breakout group identified how well and in what capacity they were able to integrate climate change information into their work (if at all), what resources they used to integrate climate change information into their work and what they need to be successful in a climate change adaptation planning process. To help elicit this information, participants were also asked to identify what helped (catalysts/drivers) or hindered (barriers) their progress along an adaptation planning spectrum.

Notes from Breakout Session One are organized within this section under the following headings:

- *Climate Change Adaptation Spectrum*
Summarizes participants' self-ranking from "not incorporating climate change into my work" to "incorporating climate change into my work"
- *Barriers*
Explores why some participants did not incorporate climate change into their work
- *Catalysts/drivers*
Examines why some participants are incorporating climate change into their work
- *Action on Adapting to Sea Level Rise or Storms in Monterey Bay Region*
Provides a snapshot of adaptation action in and around Monterey Bay
- *Resources for Adaptation Planning*
Lists resources identified by participants as useful while undergoing adaptation planning
- *Regional Needs for Successful Adaptation Planning*

Compiles participants' needs to enable movement towards actively incorporating climate change into their work

Climate Change Adaptation Spectrum

The adaptation process graphic, "Climate Change Impacts and Your Work," was used as an introduction to Breakout Session One (see Figure 4). Participants placed themselves along this spectrum. The five categories on climate adaptation include: Not Thinking About It; Starting To Think About It; Trying to Figure Out How; Trying To, But Having Trouble; and, Incorporating It. In general, most participants have thought about the issue of sea level rise and attempted to incorporate it into their work but faced challenges doing so.

Approximately one quarter of participants indicated that they are successfully incorporating climate change impacts into their work. The broad spectrum of answers was the basis for a rich discussion and exchange of information regarding useful resources and unfulfilled needs for success.

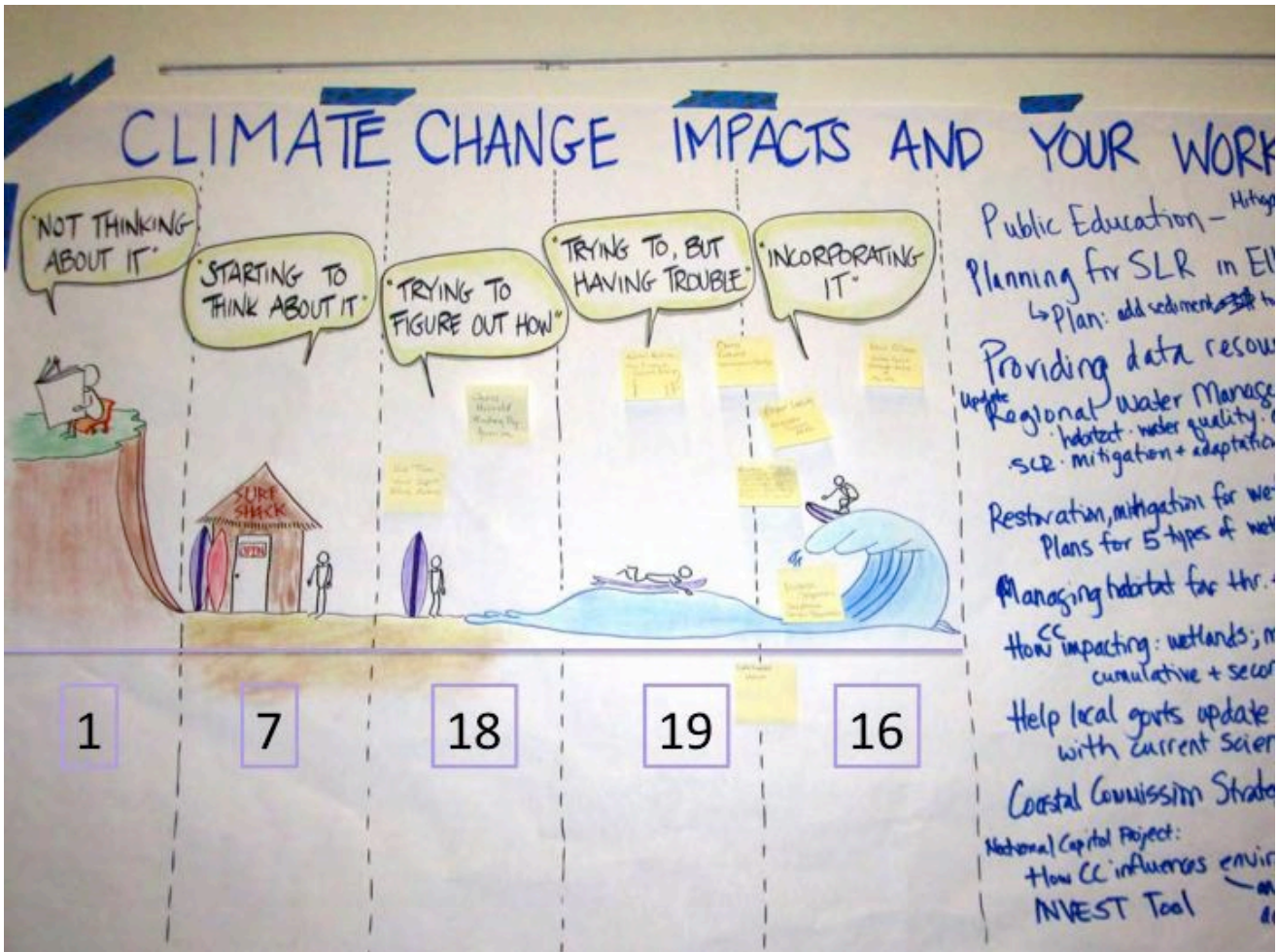


Figure 4. To kick-off Breakout Session One, participants placed themselves in this graphic along the "Climate Change Impacts and Your Work" spectrum from "Not Thinking About It" on the left to "Incorporating It" on the right. The numbers represent the combined number of responses from all breakout groups



Barriers

Barriers are obstacles that can be overcome given sufficient resources and effort. The barriers to progressing along the climate change adaptation spectrum from “Not Thinking About It” to “Incorporating It” identified by participants included:

- Lack of public support for and understanding of the issue
- Staff time consumed with existing work
- No mandate or regulations to support climate adaptation
- Lack of data and predictions at the local scale hinder progress
- Ramifications and impacts of climate change are overwhelming, making it hard to know how to start
- Unclear approach to working with private coastal landowners
- Lack of coordination and sometimes conflicting regulations
- Lack of political support

Catalysts and Drivers

Participants identified specific reasons they were able to make progress and feel successful in climate change adaptation planning. These desirable characteristics of an environment conducive to climate change adaptation planning include the following:

- Public support grows as a result of repeated extreme weather events (e.g., flooding) and a growing body of scientific literature
- Federal Emergency Management Agency (FEMA) shifted its strategy from recovery dollars to mitigation dollars, providing an opportunity to fund climate change adaptation work through local hazard mitigation planning
- State level action provides support through legislation (e.g., AB 32) and guidance (e.g., State of California Sea Level Rise Interim Guidance, Oct 2010)
- Political and institutional support

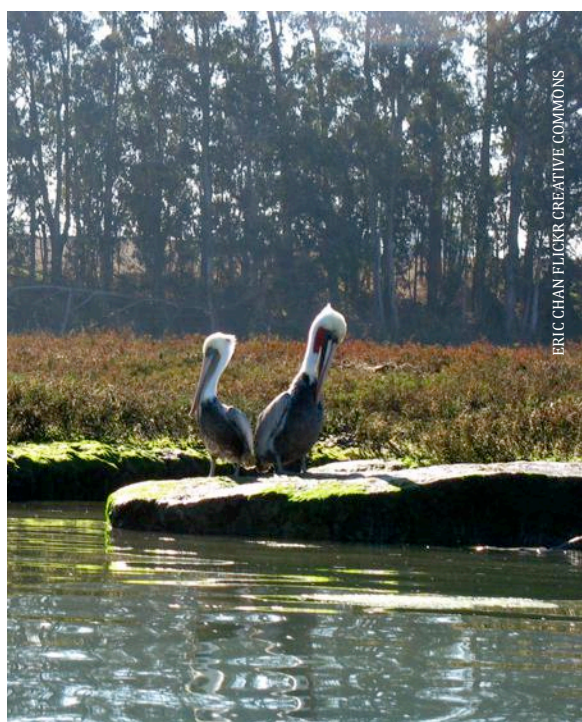


Action on Adapting to Sea Level Rise or Storms in the Monterey Bay Region

This section provides a snapshot of regional planning activities to address sea level rise and changes in storminess as a result of climate change. Click on each heading for the direct link. All of these activities will be posted to the website <http://climatechangemontereybay.org> where they will be updated as the activities progress or as new projects emerge.

[Elkhorn Slough National Estuarine Research Reserve](#)

About half (1,000 acres) of the historic tidal marsh in Elkhorn Slough has been lost since 1870 due largely to diking and draining, while 150 additional acres died over the past 60 years because of excess inundation. Tidal marsh dieback is anticipated to accelerate with sea level rise. Without action, an estimated 500 more acres are predicted to disappear in the next 50 years. To increase the extent and the sustainability of tidal marsh in Elkhorn Slough in the face of climate change, the Elkhorn Slough Foundation plans to restore 17 acres of tidal salt marsh in Elkhorn Slough by 2015.



[Conservation Blueprint: An Assessment and Recommendations from the Land Trust of Santa Cruz County](#)

The *Conservation Blueprint: An Assessment and Recommendations from the Land Trust of Santa Cruz County* outlines a number of goals, strategies and actions to protect biodiversity, water resources, agriculture and working lands, and healthy communities. The *Blueprint* describes in narrative and table form the many anticipated impacts to biodiversity and water resources associated with climate change. It also outlines a variety of strategies to improve resilience to climate change. The *Blueprint* team also conducted geographic information system (GIS) analyses to identify potential climate change refugia in order to integrate them into landscape-scale conservation strategies.

[Southern Monterey Bay Coastal Erosion Workgroup and Sediment Management Plan](#)

The Southern Monterey Bay Coastal Erosion Workgroup (SMBCEW) was established to make recommendations on and facilitate the development of a regional adaptation planning approach addressing coastal hazards associated with erosion and sea level rise along the shoreline between Moss Landing Harbor and Wharf II in Monterey. The SMBCEW is a multidisciplinary stakeholder advisory group comprised of representatives from federal, state and local agencies, local municipalities, academia, conservation organizations, elected officials and other stakeholders. The goals of the SMBCEW are to: (1) compile and analyze existing information on erosion rates and geomorphology in the region and identify corresponding critical erosion areas, including threats to private and public structures within the southern Monterey Bay region; (2) identify and assess the complete range of options available for responding to erosion in the region; and (3) based upon the above analyses, develop a proactive and comprehensive regional shoreline management plan.

[Coastal Regional Sediment Management Plan for Southern Monterey Bay](#)

The Southern Monterey Bay Coastal Sediment Management Plan, developed in 2008, was the first coastal regional sediment management plan completed in California. The California Coastal Sediment Management Workgroup (CSMW) sponsored and funded this plan through the Association of Monterey Bay Area Governments (AMBAG). The plan compiled the best existing information on coastal processes, erosion rates and geomorphology. It identified sources of sediment that could be used in nourishment projects to reduce erosion hazards and evaluated the traditional cost benefits of various scales of nourishment projects, including the potential recreational benefits. The plan also evaluated some of the regulatory and permitting framework involved in managing sediment within southern Monterey Bay. Development of a Coastal Regional Sediment Management Plan for the Santa Cruz littoral cell, covering northern Monterey Bay, will begin in 2012.

[City of Santa Cruz Climate Adaptation Plan](#)

The City of Santa Cruz recognized the threat from impacts of climate change in its 2007 Local Hazard Mitigation Plan (LHMP). With the help of a FEMA grant, the City developed a Climate Adaptation Plan (Plan) as an update to the LHMP, enabling decision makers to view decisions through a climate lens to develop a more sustainable and resilient community. A Climate Adaptation Team collaborated with University of California at Santa Cruz (UCSC) scientists Dr. Gary Griggs and Dr. Brent Haddad on a Vulnerability Study to provide a basic understanding of the community's vulnerabilities to the impacts of climate change. The Climate Adaptation Team used the Vulnerability Study to develop goals, objectives and actions to build adaptive capacity into policies, programs and infrastructure. The Plan was approved and adopted by the City Council on December 13, 2011, providing a framework to incorporate the best available climate science, information about community vulnerabilities and new adaptation technologies to inform current and future

decisions. In 2012, the City will begin implementing the Plan.

[City of Monterey Harbor and Marina](#)

The City of Monterey Harbor and Marina currently implement certain adaptation planning actions through the use of best management practices intended to address increased sea level rise and storm intensity. These actions include the following:

- The City has adopted minimum standards and requirements for mooring gear and annual inspections of vessel moorings by passing a comprehensive ordinance. The mooring field is located in an area that is subject to episodes of strong surge, and it is anticipated that these surge conditions will worsen in the future due to climate change.
- When the Marina was rebuilt, pilings were increased in length by 2.5 feet to address future sea level rise.
- On November 1 each year, the City creates a temporary berm out of beach sand on the beach near Wharf II, designed to reduce the likelihood that storm surge could reach Del Monte Avenue.



[Moss Landing Community Plan](#)

The Moss Landing Community Plan is under development, which has created an opportunity to

incorporate information on sea level rise. To date, the County has held numerous stakeholder meetings and developed a draft plan that contains language requiring the preparation of a comprehensive erosion plan.

[Santa Cruz Integrated Regional Water Management Plan](#)

The Santa Cruz Integrated Regional Water Management Plan is currently being updated and will address climate change in two ways. First, the U.S. Geological Survey is downscaling global climate change models to analyze potential changes to rainfall, runoff and recharge. Second, Center for Ocean Solutions, Natural Capital Project and The Nature Conservancy are working to conduct a coastal vulnerability analysis on both infrastructure and natural resources.

[California Coastal Commission Climate Adaptation Efforts](#)

Since its inception nearly 40 years ago, the California Coastal Commission (CCC) has been alert to changes in climate and the impacts that it could have on the California coast. The California Coastal Act provides the Commission with the direction and authority to address impacts from changes in climate and sea level.

To integrate climate change into the agency's work, CCC staff has taken a number of actions, including preparing reports and presentations on

the implications of sea level rise on the California coast, forming an internal Climate Change Task Force to tackle emerging climate change issues and understand the science, briefing the Commission on climate change efforts and participating in statewide climate efforts. CCC staff has also worked with some local governments to incorporate climate change into Local Coastal Program amendments and coastal development permits where applicable. Examples of ways that CCC permits address impacts from sea level rise include:

- Adding estimates of future sea level rise into calculations of bluff retreat calculations and stability assessments
- Requiring new development, including shoreline protection structures, to evaluate potential impacts from sea level rise using best available science
- Ensuring flood protection measures address impacts from the combination of sea level rise, tsunamis and storm surge

[City of Monterey Waterfront Master Plan](#)

The Waterfront Master Plan includes a program (Program C.4. Develop multi-phased mitigation plan for sea level rise/coastal erosion) that requires the City to address coastal erosion and sea level rise within the Waterfront Master Plan Planning Area. Specifically, all new waterfront construction is to be designed and located to survive a 100-year flood.



Resources for Adaptation Planning

The resources participants highlighted as particularly useful are outlined below in the following four categories: (1) online clearinghouses and data sources, (2) tools and technical assistance, (3) policy guidance and model plans and (4) funding sources. Each workshop participant received a binder that included a list of resources and a list of funding opportunities that were prepared prior to the workshop. The binder included some but not all of the resources listed below. Complete lists of resources and funding opportunities that incorporate any new resources identified during the workshop can be found in Appendix B and C, and online at climatechangemontereybay.org

Online Clearinghouses and Data Sources

Workshop participants identified numerous online resources to access data available for the Monterey Bay region. The sites and sources are below.

- [CalAdapt](#) is an easy to use website with local climate change projections, interactive maps and charts, links to recent reports and frequently asked questions about climate change for the State of California.
- [California Coastal Mapping Program](#) is a comprehensive effort to combine seafloor mapping data with shoreline data to create seamless onshore-offshore maps of California's coastline
- [Climate Adaptation Knowledge Exchange \(CAKE\)](#) provides an up-to-date virtual library, case studies and a directory of people and organizations related to climate change adaptation. A joint project of Island Press and EcoAdapt, CAKE is aimed at building a shared knowledge base for managing natural systems in the face of rapid climate change.
- [Monterey Bay Aquarium Research Institute \(MBARI\) OASIS Mooring Data](#) includes data collected by MBARI's mooring and cruise operations, such as real-time data on wind direction, wave height, air temperature, salinity, humidity and other ocean and weather-related data. (OASIS is the Ocean Acquisition System for Interdisciplinary Science.)
- [Our Coast-Our Future](#) is a partnership between the Gulf of the Farallones National Marine Sanctuary, PRBO Conservation Science, U.S. Geological Survey and the National Park Service to help address the effects of sea level rise and storm hazards from Half Moon Bay to Bodega Head through the collaborative project, "Our Coast-Our Future: Planning for Sea Level Rise and Storm Hazards Along the Bay Area's Outer Coast." A parallel effort involving the San Francisco Bay National Estuarine Research Reserve is looking inside the Bay.
- [Santa Cruz County Conservation Blueprint](#) includes local data and maps for Santa Cruz County on land use, habitats, aquatic systems, potential climate change refugia, water supplies and more with an online GIS database that will be available soon.

Tools and Technical Assistance for Adaptation Planning

There are a growing number of tools available to assist managers with the technical aspects of climate change planning. Below are tools identified by participants.

- [Association of Monterey Bay Area Governments \(AMBAG\)](#) provides assistance with regional collaboration and problem solving, and has staff available to help organize regional climate adaptation efforts.
- [Coastal Regional Sediment Management Working Groups and Plans](#) focus on regional strategies to manage sediment imbalances specific to discrete portions of the California coast.
- [CRAMM](#) is a risk assessment tool that can be applied to a wide range of systems and processes.
- [ICLEI- Local Governments for Sustainability](#) provides support to local governments for sustainability and climate action planning, implementation and evaluation. The USA and Canada ICLEI offices have completed step-by-step guidebooks for adaptation planning, and these guides are currently in use by many local governments.
 - US: <http://ces.washington.edu/cig/fpt/planning/guidebook/gateway.php>
 - Canada: <http://www.iclei.org/index.php?id=11710>
- [InVEST](#) is a scenario assessment tool that can be used to evaluate how a variety of climate variables (e.g., sea surface temperature, sea level rise) and adaptation strategies will affect a wide range of benefits people receive from nature.
- **Local Universities** in the Monterey Bay area, including UC Santa Cruz, Monterey Institute of International Studies, Hopkins Marine Station and Moss Landing Marine Laboratories are available to provide resources and technical assistance to local governments.
- [National Weather Service](#) provides data on weather observations, current conditions and forecasts, weather-related hazards, and local climate data and resources.



Policy Guidance and Model Plans

Participants identified the following list of policies and plans.

- [California Climate Adaptation Strategy](#) (2009) is a first-of-its-kind multi-sector strategy to guide California’s climate change adaptation efforts.



- **California Coastal Conservancy Climate Change Policy** describes concerns about climate change impacts, identifies legislative and policy directives that call for the Conservancy to address the impacts, and describes strategies and actions the Conservancy will use to address climate change.
- [California Coastal Conservancy Project Selection Criteria](#) require evaluation and minimization of risk from sea level rise.
- **Department of Water Resources (DWR) Climate Adaptation Actions:**
 - [California Water Plan Update](#) (2009) evaluates multiple scenarios of future climate conditions and expressly incorporates uncertainty, risk and sustainability.
 - [Climate Change Handbook for Regional Water Management](#) (2011) provides a framework for considering climate change in water management planning. The handbook was developed cooperatively by DWR, U.S. Environmental Protection Agency, Resources Legacy Fund and U.S. Army Corps of Engineers.
- [FEMA mitigation planning resources](#) provides “how-to” guides, best practices and guidelines to help local governments mitigate hazards and meet FEMA’s requirements. Includes information on understanding risks, identifying hazards, estimating losses, developing a mitigation plan and using cost-benefit review in mitigation planning.
- [Ocean Protection Council Interim Sea Level Rise Guidance](#) provides guidance for incorporating sea-level rise projections into planning and decision making for projects in California.
- **City of Santa Cruz Climate Change Plans:**
 - [Climate Action Plan](#) outlines the actions the City of Santa Cruz will take over the next 10 years to reduce greenhouse gasses by 30%.
 - [Climate Adaptation Plan](#) uses the best available climate science to identify the City's most significant potential climate change risks and vulnerabilities, and defines 41 actions to guide "current and future decision makers in protecting our natural and

built environment, our residents and visitors, our economic base, and our quality of life," according to the Plan summary. The Plan was approved on December 13, 2011.⁶

- [Local Hazard Mitigation Plan](#) was completed in 2007 and specifically identified the impacts of climate change as a threat to the Santa Cruz community in a section titled "Global Warming Policies (Action Item #C7)". The Climate Adaptation Plan and Climate Action Plan implement these policies.

Funding Sources

Numerous funding resources are outlined in a document provided in the workshop materials and included below as Appendix C. Participants identified the following two additional resources.

- [FEMA Hazard Mitigation Assistance](#) provides grant funding to local governments to protect life and property from hazards, and reduce the likelihood of disasters occurring in the future. Local governments are eligible to apply for these funds after they have completed a Local Hazard Mitigation Plan. Funds are available for hazard recovery plans and pre-disaster mitigation, as well as flood mitigation assistance and repetitive flood claims.
- [Cool California Funding Wizard](#) is a user-friendly tool to identify grants for environmental projects.



Regional Needs for Successful Adaptation Planning

Participants' common needs for successful adaptation planning in the Monterey Bay region are described below.

Funding: There is a lack of funding for wetland restoration, conservation projects and infrastructure modifications that reduce future risks. Because public infrastructure managers currently operate in a triage mode, it is difficult to obtain funding for projects that mitigate future risks. A mandate or a catastrophic event would help managers to dedicate funds toward major climate adaptation projects, such as moving critical facilities out of the flood plain.

Data: Local planners, resource conservationists and public works managers need climate change projection data at a scale fine enough to use for local planning.

Technical assistance: Managers need assistance with cost-benefit analyses that compare the outcomes of projects and policies that include adaptation measures to those without. These analyses would help managers justify the costs of adaptation planning.

Increased sense of urgency: Barriers to adaptation planning in the Monterey Bay

community include a lack of political will and a lack of urgency among the public to address climate change. A public engagement campaign could increase awareness about the need for climate adaptation planning; a simple, proactive approach with the underlying message, 'Let's make good things happen' rather than, 'Let's stop bad things from happening' would likely be most effective.

Increased coordination and collaboration:

Increased coordination and collaboration are ways to overcome barriers to climate adaptation planning such as limited time and funding. By enabling jurisdictions to share relevant findings, they can avoid duplication and use limited resources more efficiently. By coordinating, rather than competing, in efforts to secure funding, the Monterey Bay area can submit stronger funding applications. Finally, because climate change and its impacts do not recognize jurisdictional boundaries, responses and preparedness actions will be more effective if done on a regional scale.

B. Breakout Session Two: Regional Solutions Networking Gallery

The purpose of this session was to create a platform for further conversation and a space for people across disciplines to meet and brainstorm solutions or approaches for topic areas that are important to them. Workshop participants self-selected into groups. The group findings and recommended actions, and potential solutions are provided for each breakout group topic below.

Incorporating Science and Research from Local Institutions into Local Decision Making

Participants discussed ways to improve connections between research institutions and local government by ensuring scientists answer questions that are important to local policy makers. Improved collaboration between scientists and decision makers requires clear communication, the ability to use existing data

sets, access to expert groups and a collaborative process or forum for addressing issues.

Potential solution: Participants recommended creating a regional entity to bridge the gap between scientists and decision makers. The regional entity would initiate a dialog between groups, facilitate the process and help synthesize the data for decision makers. In addition, this entity can help to develop collaborations across

researchers, decision makers and NGOs to leverage all available assets (financial, data, human and other) and to include local communities in the process.

Policy and Legislative Options for Climate Change Adaptation

This breakout discussion covered a variety of topics including funding, climate considerations in planning documents, the State of California as a leader in climate adaptation planning, silo-busting and regional governance. The discussion of available funding focused on use of SB 375 grants to support local governments and the Coastal Commission to amend Local Coastal Programs. The group also discussed the benefits and costs of requiring a climate change element in local governments' General Plans as opposed to stand-alone Climate Action Plans. Participants noted that California has an opportunity to lead the way in climate adaptation planning by developing Climate Adaptation Plans for state-owned lands. The group discussed models for personnel sharing across agencies in order to ensure each agency has necessary technical expertise, understands how partner agencies do business and can break down the silos in which agencies currently operate. Finally, participants discussed the role and models for regional governance in facilitating climate adaptation planning in the Monterey Bay region.

Potential solutions: Participants recommended creating a regional governance entity to facilitate climate adaptation planning in the Monterey Bay region. In addition, participants suggested creating a mechanism or structure that would make it easy to share personnel and expertise across agencies and departments to leverage limited staff resources.

Coastal Infrastructure

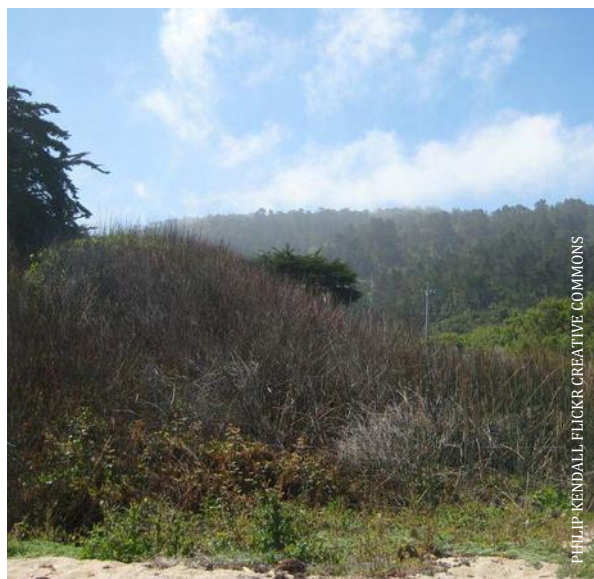
This group discussed potential impacts to coastal infrastructure from climate change and possible solutions to reduce the impacts. Some of the issues identified as affecting Monterey Bay coastal infrastructure included: infiltration of sea water into storm drains and wastewater treatment plants during high water events; erosion of public roads along the shoreline; loss of sandy beaches; and

continued armoring of shorelines to protect property at risk of shoreline erosion and flooding.

Potential Solutions: First, the participants recommended that coastal management agencies act proactively, rather than reactively, to reduce coastal hazards and minimize the need for emergency permits to armor the shoreline. Coastal management agencies, property owners and other stakeholders could work collaboratively to identify infrastructure that is at risk and then develop a management solution before there is an emergency situation that requires armoring. The second recommendation was to limit all future shoreline armoring, although this may not be politically feasible in California. Third, the participants recommended establishing standard erosion and sea level rise rates that could be used for permitting purposes in order to streamline consideration of sea level rise and erosion in the permitting process.

Protecting Coastal Natural Habitat

This group identified numerous regional and local efforts underway to protect and restore natural habitats of the Central Coast. Many of these efforts have been successful in protecting habitats from development and from adjacent human impacts. These protection strategies do not currently take into account the various changes that these habitats will face due to climate change. Impacts from sea level rise will affect



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current management of estuarine systems like Elkhorn Slough and will pose impacts to brackish water and coastal freshwater wetlands through inundation. Additionally, current water resource management infrastructure is not designed to address higher sea levels.

Participants felt that current water resource management practices and environmental resource management strategies are not equipped to deal with the projected changes in rainfall patterns, sea level elevation and storm surge intensity. Further, current state and federal environmental regulatory policies are not conducive to adaptive management strategies that could allow coastal resources to evolve as climate changes (i.e., from fresh water to salt water, from intertidal marsh to subtidal mud flat). Therefore, current regulatory practices and management efforts are focused on protecting and conserving existing environmental resources and do not provide adaptive strategies to support natural ecological adaptation and migration of plant and animal communities. Resource managers will need to work together and with the regulatory authorities to define environmental adaptation strategies that support a natural ecological response to changes in climate variables.

Potential solution: Participants will work together to identify grant funding opportunities to complete a regional Climate Vulnerability and Adaptation planning effort.

Sea Level Rise Projections and Planning Despite Uncertainty

This breakout group focused on projects around Monterey Bay that may aid in sea level rise projections and planning. Examples of these projects include:

- local erosion and inundation studies (e.g., the FEMA study by Dr. Gary Griggs)
- specific jurisdictional climate vulnerability assessments (e.g., City of Santa Cruz)
- development of ecological vulnerability tools (e.g., Elkhorn Slough)
- an upcoming regional Monterey Bay study (work led by ESA/PWA)

- LiDAR elevational data sets and research projects investigating decadal ocean oscillations (e.g., Monterey Bay Aquarium Research Institute)
- inclusion of local demographic and stakeholder information into projections, scenarios and planning horizons

While the group felt restricted by the amount of uncertainty associated with sea level rise projections, it was clear from this discussion that uncertainty will always exist. Understandably, planners would like specific numbers to aid in decisions regarding scope and the allocation of resources; indeed, it was noted that in some cases, planning has been delayed by waiting for more certainty.

Many of the variables used in projections, including elevation, rate of sea level rise, wave height and intensity, and conditions of flood defenses contain a level of uncertainty. A discussion ensued regarding ways to reduce uncertainty in the calculations. Rather than expressing uncertainty in the amount of sea level rise, the uncertainty could be expressed in the timeframe the sea level rise is expected. For example, “Two meters of sea level rise is expected between 2050 – 2100” rather than “Two to four meters of sea level is expected by 2100.” In this manner, a more concrete number could be used for planning purposes with the actual year of impact being the unknown component. Additionally, spatial aggregation of multiple variables (waves, sea level rise, erosion, etc.) over a range of planning horizons was suggested as a way to illustrate uncertainty. The goal is to provide enough certainty to allow for successful grant proposals and decision making regarding sea level rise. Finally, a consensus on the range of projections was requested for use in public education and outreach, as well as a systematic approach to identify coastal hazards from which all of the jurisdictions could draw.

Potential solution: Develop a) a regional scientific working group to recommend the range of projections to use locally and b) a regional approach to identify coastal hazards in response to the regional projections.

Regional Coordination

This breakout group discussed the benefits of and obstacles to regional coordination, existing resources for coordination and the next steps needed to establish a successful effort.

Participants identified benefits of regional coordination including increased funding opportunities, grant success and the ability to share data and resources that create more cost-effective, efficient work. Obstacles mentioned by the group included the difficulty of working across a range of stakeholder groups and counties that have different needs and concerns. Participants also mentioned that contradictory state mandates cause confusion and make it difficult to coordinate at the local level. Additionally, the lack of focus on adaptation in Assembly Bill 32 (Global Warming Solutions Act of 2006) and Senate Bill 375 (Sustainable Communities and Climate Protection Act of 2008) hinder local adaptation efforts.

The Monterey Bay region has some existing

resources (staff time and funding) to facilitate regional coordination around adaptation planning. The Association of Monterey Bay Area Governments has experience convening groups, interpreting data, drafting planning language, and implementing policies and programs, and has graduate students available to help with data collection and research. Previous Monterey Bay experience with FEMA regional planning can be applicable to this effort. An additional resource is the energy and enthusiasm of the conference participants to meet again. The participants are interested in continuing the climate adaptation dialog and are eager to ensure that the efforts initiated at the conference are continued.

Potential solutions: a) Identify a regional lead for this effort, and b) define the specific goals of a regional adaptation coordination effort, such as the specific outcomes desired, the steps required to meet these outcomes and the resources needed to achieve these goals.





VI. Next Steps and Recommendations

As a result of breakout group and plenary discussions during the one-day “Preparing for the Future” workshop, the following seven action items emerged as next steps and recommendations for the region:

1. To address the need for more localized data and information, develop a *regional scientific working group* to a) provide the best possible sea level rise and storminess scenarios for the Monterey Bay area and b) develop recommendations for moving forward despite inherent uncertainty in climate change projections.
2. To address multiple barriers, create a mechanism for *regional coordination* to leverage resources, jointly apply for funding and identify opportunities for collaboration. Possible next steps include:
 - a. Identify a lead for this effort
 - b. Define the specific goals of a regional adaptation coordination effort, such as the specific outcomes desired, the steps required to meet these outcomes and the resources needed to achieve these goals
 - c. Develop a working group to research and recommend a governance structure for the Monterey Bay region that aids and coordinates climate change related activities for the region
 - d. Research lessons learned by existing regional governance structures (Joint Venture Silicon Valley, Southeast Florida Regional Climate Change Compact, Adapting to Climate Change in the Caribbean Compact) to inform design of a governance structure for the Monterey Bay region
3. Continue to *foster a regional network and educate this region* on coastal climate change adaptation

- a. Host brown bag seminars on topics of interest (e.g., insurance, building architectural advancements)
 - b. Provide professional development and training (e.g., decision support tools, climate change adaptation communication)
4. *Expand the discussion* to include and engage coastal businesses, industry, landowners and the general public - all critical partners in climate change adaptation.
5. Create a *technical advisory group* to bridge the gap between scientists and decision makers. The advisory group can facilitate interactions between the two groups and help synthesize the data for decision makers. In addition, this group can help to develop collaborations across researchers, decision makers and nongovernmental organizations to leverage all available assets (financial, data, human and other) and to include local communities in the process.
 - a. Reach out to regional scientific groups already in place to assess interest, such as the Monterey Bay National Marine Sanctuary Research Advisory Panel and the Monterey Bay Crescent Ocean Research Consortium
6. To enhance collaboration and access to information, *improve the online presence* of climate change adaptation resources in Monterey Bay. Specific next steps may include:
 - a. Further develop climatechangemontereybay.org to be of more use
 - b. Include an online database of climate change adaptation actions around Monterey Bay
 - c. Create a listserv for interested parties to stay up to date on trainings, funding availability, actions and brown bag seminars
7. *Seek joint funding* to support a regional climate change adaptation effort.
 - a. Participants will work together to identify grant funding opportunities to complete a regional Climate Vulnerability and Adaptation planning effort. Point person: Ross Clark, City of Santa Cruz and Central Coast Wetlands Group





V. Appendices

A. Workshop Design Background

To ensure the Preparing for the Future workshop met participants' needs, MBNMS and GOS staff conducted preliminary in-person interviews with city mayors, managers and planners from coastal cities and counties. We engaged in conversations to better understand their pressing issues and concerns, their understanding of and attitudes towards climate change, and their ability to plan for climate change. The information gathered from these interviews helped to structure the agenda (see Appendix D) and prepare materials (see climatechangemontereybay.org).

After the pre-workshop interviews and many discussions with the workshop design team, the goals of the workshop were identified as following:

- Begin Monterey Bay region-wide discussion and collaboration on climate change adaptation
- Understand the latest research on climate change impacts to the Monterey Bay coastline
- Gain a basic understanding of the typical climate change adaptation planning process
- Witness how communities in the Monterey Bay area are already planning for climate change
- Learn about grant opportunities and other resources (tools, assistance) available to support climate change adaptation planning
- Have the opportunity to develop new collaborations and partnerships in climate change adaptation planning

The design team generated an agenda to achieve these goals and respond to participants' express interests by using a pre-workshop registration survey. Survey results revealed that participants wanted to:

- Share information on local projections for sea level rise and increased storminess
- Learn from communities that have successfully made progress with adaptation planning
- Brainstorm and collaborate with others working in similar positions in local jurisdictions outside the region

The agenda, therefore, included a scientific briefing, case study presentations and ample time for smaller breakout discussions.

Because half of the workshop was spent in breakout sessions, it was important to involve skilled facilitators and note takers with each group. Prior to the workshop, note-taking templates were created to assist in capturing important information from participants and reporting back to the entire group in plenary. In addition, every facilitator and note-taker was required to attend a training session to understand their role during the breakout session and to become familiar with the templates and the purpose of each discussion.

B. Climate Change Adaptation Planning References

The following list of climate change and adaptation planning resources was compiled for the *Preparing for the Future* workshop. It is a list of useful documents, tools and other resources relevant for adaptation planning processes in the Monterey Bay area. This selection is not an exhaustive list—numerous other good resources are currently available and many more will become available in the future. These sources were reviewed and selected because they are of a high quality, accurate, relevant for use in the Monterey Bay area, and are available online for free. (Updated 18 January 2012).

Climate Change Information Clearinghouse Websites

- ***State of California Climate Change Portal***
www.climatechange.ca.gov
- ***California Coastal Mapping Program***
<http://www.opc.ca.gov/2010/01/mapping-californias-coastal-areas/>

New high-resolution coastal elevation data sets are available to support the production of maps for coastal management applications such as assessment of vulnerability from severe storms, sea-level rise and coastal erosion. The data was collected using LiDAR, a state-of-the-art remote sensing technology, in conjunction with high resolution aerial photography. LiDAR data are currently available online for the entire coastline, with digital elevation models and aerial photographs expected to be available by the end of March.

- ***NOAA Coastal Services Center Coastal Climate Adaptation Website:***
<http://collaborate.csc.noaa.gov/climateadaptation/default.aspx>
- ***NOAA Climate Services Online Climate Portal:***
<http://www.climate.gov>
- ***U.S. Environmental Protection Agency (EPA) Climate Change Website:***
www.epa.gov/climatechange/index.html
- ***U.S. Department of Transportation—Transportation and Climate Change Portal:***
<http://climate.dot.gov/impacts-adaptations/planning.html>
- ***Water Research Foundation Climate Change Clearinghouse:***
www.theclimatechangeclearinghouse.org
- ***Climate Adaptation Knowledge Exchange (CAKEX):***
<http://www.cakex.org/virtual-library>
- ***ICLEI—Local Governments for Sustainability USA:***
http://www.icleiusa.org/climate_and_energy/Climate_Adaptation_Guidance/free-climate-adaptation-resources

Climate Change Adaptation Planning Guides and Resources

- ***Adapting to Climate Change: A Planning Guide for State Coastal Managers.*** National Oceanic and Atmospheric Administration (NOAA). (2010). NOAA Office of Ocean and Coastal Resource Management.
Available at: <http://coastalmanagement.noaa.gov/climate/adaptation.html>
- ***Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments.*** Climate Impacts Group (CIG) (2007). Centre for Science in the Earth System, Joint Institute for the Study of the Atmosphere and Ocean, University of Washington and King County, Washington in association with IGLEI - Local Governments for Sustainability.
Available at: <http://www.cses.washington.edu/db/pdf/snoveretalgb574.pdf>.
- ***2009 California Climate Adaptation Strategy.*** A report to the Governor of the State of California in Response to Executive Order S-13-2008
Available at: www.climatechange.ca.gov/adaptation/index.html.
- ***Synthesis of Adaptation Options for Coastal Areas.*** U.S. EPA (2009). Washington, DC, U.S. Environmental Protection Agency, Climate Ready Estuaries Program. EPA 430-F-08-024, January 2009.
Available at: http://epa.gov/cre/downloads/CRE_Synthesis_1.09.pdf
- ***Climate change hits home: Adaptation strategies for the San Francisco Bay Area.*** (2011). SPUR Report.
Available at: www.spur.org/files/SPUR_ClimateChangeHitsHome.pdf
- ***The State of Marine and Coastal Adaptation in North America: A Synthesis of Emerging Ideas.*** (2011).
Available at: <http://ecoadapt.org/documents/marine-adaptation-report.pdf>
- ***Cal-adapt: A web-based Tool for Climate Change Adaptation:***
<http://cal-adapt.org/>

Climate Change Science and Impacts

- ***U.S. EPA Basic Climate Change Information (includes fact sheets and FAQs):***
<http://www.epa.gov/climatechange/basicinfo.html>
- ***Climate Change 2007: Synthesis Report. Summary for Policymakers.*** IPCC. (2007) This paper provides an integrated view of climate change as the final part of the IPCC's Fourth Assessment Report (AR4).
Available at: www.ipcc.ch/publications_and_data/ar4/syr/en/spm.html
- ***Climate Change 101: Understanding and Responding to Global Climate Change.*** Published by the Pew Center on Global Climate Change and the Pew Center on the States.
Available at: www.pewclimate.org/docUploads/climate101-fullbook_0.pdf

- ***Understanding and Responding to Climate Change.*** Highlights of National Academies Reports, 2008 Edition.
Available at: http://dels-old.nas.edu/dels/rpt_briefs/climate_change_2008_final.pdf
- ***Climate Change Impacts: Gulf of the Farallones and Cordell Bank National Marine Sanctuaries.*** Largier, J., Cheng, B. S., Higgason, K. D., & editors. (2010)
Available at:
http://sanctuaries.noaa.gov/science/conservation/pdfs/gf_cbnms_climate_report.pdf
- ***Climate change 101: Adaptation Preparing for a Warming World***
Available at www.pewclimate.org/docUploads/Adaptation_o.pdf

Climate Change Adaptation Planning Case Studies

- ***Incorporating Adaptation to Climate Change in Pinole's General Plan Update.***
Available at: www.bcdc.ca.gov/planning/climate_change/AdaptPinoleCS.pdf
- ***The City of Berkeley Builds Resilience by Addressing Climate Change Mitigation and Adaptation in its Climate Action Plan.***
Available at: www.bcdc.ca.gov/planning/climate_change/AdaptBerkeleyCS.pdf
- ***City of London's climate change adaptation strategy. Managing risks and increasing resilience: The mayor's climate change adaptation strategy.*** (2011).
Available at: www.london.gov.uk/sites/default/files/Adaptation-oct11.pdf
- ***Cities Preparing for Climate Change.*** The Clean Air Partnership. (2007).
Available at: www.nerrs.noaa.gov/doc/pdf/training/cities_preparing.pdf
- ***San Francisquito Creek Joint Powers Authority Factors Future Sea Level Rise into Coordinated, Watershed-Level Flood Protection.*** Available at:
http://www.bcdc.ca.gov/planning/climate_change/SfcjpaCaseStudy.pdf
- ***Addressing Sea Level Rise for the Treasure Island Development Project.*** Available at:
http://risingtides.csc.noaa.gov/documents/Treasure_Island_Case_Study.pdf

Sea Level Rise and Shoreline Management Resources

- ***Adaptation Tool Kit: Sea-Level Rise and Coastal Land Use: How Governments Can Use Land-Use Practices to Adapt to Sea-Level Rise.*** Grannis, Jennifer (October 2011)
www.georgetownclimate.org/sites/default/files/Adaptation_Tool_Kit_SLR.pdf
- ***The Impacts of Sea-level Rise on the California Coast.*** The Pacific Institute. (2009)
Available at: http://www.pacinst.org/reports/sea_level_rise
- ***Preparing California for a Changing Climate.*** Prepared by the Public Policy Institute of California. (2008)
Available at: www.ppic.org/main/publication.asp?i=755

- **Rolling Easements.** Titus, James G. (June 2011)
Available at: www.epa.gov/cre/downloads/rollingeasementsprimer.pdf
- **USGS National Assessment of Shoreline Change Project.**
Available at: <http://coastal.er.usgs.gov/shoreline-change/>
- **Local Land Use Response to Sea Level Rise.** Prepared by the Land Use Law Center, Pace University School of Law For The Nature Conservancy on Long Island
www.csc.noaa.gov/digitalcoast/inundation/_pdf/Pace_Final_Report.pdf
- **Sea Level off California: Rising or Falling?** Ramp, S., Chavez, F. P., & Breaker, L. (2009) Central and Northern California Coastal Ocean Observing System (CENCOOS).
Available at: www.cencoos.org/sections/conditions/climate_change.shtml
- **No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access Along the California Coast.** Caldwell, Meg and Segall, Craig Holt (2007) Ecology Law Quarterly, 34(2), 533-578.
Available at: www.boalt.org/elq/documents/elq34-2-09-caldwell-2007-0910.pdf
- **California Coastal Sediment Management Workgroup Spatial Data Website:**
<http://coastalsediment.resources.ca.gov>
- **Strategies for managing sea level rise.** Urbanist. (November 2009)
Available at:
www.spur.org/publications/library/report/strategiesformanagingsealevelrise_110109
- **Littoral cells, sand budgets, and beaches: understanding California's shoreline.** Patsch, K. and Griggs, G. (2006) Institute of Marine Sciences, University of California, Santa Cruz.
Available at: www.dbw.ca.gov/csmw/PDF/LittoralDrift.pdf
- **Development of sand budgets for California's major littoral cells.** Patsch, K. and Griggs, G. (2007)
Available at: www.dbw.ca.gov/CSMW/pdf/Sand_Budgets_Major_Littoral_Cells.pdf
- **Natural Capital Project's InVEST:** a scenario assessment tool that can be used to ask how a variety of climate variables (e.g., sea surface temperature, sea level rise) and adaptation strategies will affect a wide range of benefits people get from nature. Available at: <http://www.naturalcapitalproject.org>
- **CRAMM:** a risk assessment tool that can be applied to a wide range of systems and processes. Available at: <http://www.cramm.com/>

Monterey Bay Area Resources

- **Coastal Regional Sediment Management Plan for the Southern Monterey Bay.** PWA. (2008).
Available at: www.dbw.ca.gov/csmw/pdf/SMontereyBay_CRSMMP_3Nov2008_ALL_rev_04

[0411.pdf](#)

- *Monterey Bay Aquarium Research Institute OASIS Mooring Data*
<http://www.mbari.org/oasis/>
- *MBNMS Resource Management Issues: Coastal Armoring.* NOAA's Monterey Bay National Marine Sanctuary website.
<http://montereybay.noaa.gov/resourcepro/resmanissues/coastal.html>.
- *The Impacts of Coastal Protection Structures in California's Monterey Bay National Marine Sanctuary.* Stamski, B. (2006)
<http://montereybay.noaa.gov/resourcepro/resmanissues/pdf/022305armoring.pdf>
- *Are "Stable Shorelines" and "Broad Beaches" Mutually Exclusive Management Goals Along Southern Monterey Bay?* Smith, D.P, Gref, K., and Hofmann, A. (2005) The Watershed Institute, California State University Monterey Bay, Publication No. WI-2005-09, 46 pp.
<http://montereybay.noaa.gov/resourcepro/resmanissues/pdf/052505ccows.pdf>
- *City of Santa Cruz Climate Action Program*
www.cityofsantacruz.com/index.aspx?page=1108
- *City of Santa Cruz Local Hazard Mitigation Plan*
www.cityofsantacruz.com/index.aspx?page=1117
- *Santa Cruz County Conservation Blue Print (Land Trust of Santa Cruz County)*
<http://www.landtrustsantacruz.org/blueprint/>
- *USGS Pleasure Point Study*
<http://walrus.wr.usgs.gov/research/projects/pleasurept.html>

Relevant Agencies and Organizations

- *Association of Monterey Bay Area Governments (AMBAG)*
<http://ambag.org>
- *ICLEI—Local Governments for Sustainability*
www.iclei.org
- *Intergovernmental Panel on Climate Change (IPCC)*
www.ipcc.ch
- *California Coastal Sediment Management Workgroup*
www.dbw.ca.gov/GSMW/default.aspx
- *California's Beach Erosion Control Program*
<http://dbw.ca.gov/environmental/beach.aspx>

- *California Coastal Commission*
www.coastal.ca.gov
- *California State Coastal Conservancy*
<http://www.scc.ca.gov>
- *National Weather Service*
<http://www.nws.noaa.gov/climate/index.php?wfo=mtr>
- *Local universities:* universities in the Monterey Bay area, including UC Santa Cruz, Monterey Institute of International Studies, Hopkins Marine Station and Moss Landing Marine Laboratories, are available to provide resources and technical assistance to local governments.

C. Climate Change Adaptation Funding Opportunities

These opportunities represent a snapshot of potential funding opportunities to support climate change in the Monterey Bay area. Future grant opportunities are contingent upon funding appropriations. (Updated 18 January 2012.)

Foundations and NGOs

Alfred P. Sloan Foundation

Funding is aimed to support science, technology, engineering and math research that benefits the scientific communities and increases the public understanding of relevant and complex scientific issues.

Eligibility: Does not grant to individuals

Website: <http://www.sloan.org/apply/page/2>

Deadline: N/A

Additional notes: Letters of inquiry must be submitted before application accepted.

Kresge Foundation, Climate Change Adaptation Grants

The foundation seeks to address the impacts of climate change by helping build the field of climate change adaptation. It supports place-based climate adaptation strategy development, and the development and implementation of climate-wise policies and practice. It will also support projects working on renewable energy and other special initiatives.

Eligibility: U.S.-based 501(c)(3) organizations and their Canadian equivalents, government entities

Website: <http://www.kresge.org/programs/environment>

Deadline: N/A

Additional notes: The foundation primarily accepts grant requests by invitation but preliminary applications can be submitted.

Moore Foundation, Environmental/Marine Conservation

The foundation focuses its efforts on long-term support of a small number of initiatives and standalone grants that pursue measurable conservation outcomes on a broad scale.

Eligibility: Not specified

Website: <http://www.moore.org/environment.aspx>

Deadline: N/A

Additional notes: The Foundation does not accept unsolicited proposals. Foundation staff research organizations as potential contributors to fill specific niches and achieve the outcomes within the Foundation's program areas.

Surdna Foundation

Program areas of interest that the Foundation will fund are sustainable environments, strong local economies, thriving cultures, community revitalization and effective citizenry. Previous grants have helped city planners incorporate climate change into planning practices and helped benefit coastal protection.

Eligibility: Nonprofit organizations must generally have a valid tax exemption status under Section 501(c)(3) of the Internal Revenue Code and be classified as a public charity and not as a "private foundation"

Maximum funding: 3 consecutive years of funding

Website: <http://www.surdna.org/grants/grants-overview.html>

Deadline: There are no formal deadlines to apply for funding. The Surdna Foundation accepts applications on an ongoing basis. However, grants are approved three times per year: in February, May and September. Requests must arrive three to four months in advance of staff review.

The William and Flora Hewlett Foundation, Western Conservation

Provides support for conservation efforts across the American West aiming to preserve land, fresh water resources, increasing energy efficiency and reducing carbon emissions.

Eligibility: Not specified

Website: <http://www.hewlett.org/programs/environment-program/western-conservation>

Deadline: N/A

Additional notes: Applicants must first submit a letter of inquiry. Proposals accepted by invitation only.

California Wildlands Fund, Grassroots Fund

Provides support for conservationists advocating for the permanent protection of intact wildlands on both public and private lands in order to help preserve California's wilderness and native biological diversity.

Eligibility: Those who can answer YES to all the following questions:

- 1) Are you or your organization devoted to protecting and preserving wildlands and open space in California?
- 2) Are you or your organization based in a California community?
- 3) Is your organization's budget \$100,000 or less?
- 4) Does your organization have a 501(c)(3) status or 501(c)(4) status from the Internal Revenue Service, or is it a sponsored project of a 501(c)(3) organization?
- 5) If you are an individual, are you affiliated with a 501(c)(3) or 501(c)(4) organization?

Maximum funding: \$5,000

Website: <http://www.calwildlandsfund.org/guidelines.cfm>

Deadline: Next deadline: December 16, 2011 for the winter quarter review

Additional notes: There are non-emergency and emergency requests. Emergency requests must meet both of the following two requirements:

- 1) Need to produce product within four months to influence a specified decision making deadline or other important turning point or opportunity.
- 2) Organization does not have apparent access to other funding resources.

The Resources Legacy Fund, California Coastal and Marine Initiative Grant Program

The California Coastal and Marine Initiative (CCMI) seeks to bring about ecosystem-based conservation of coastal and marine resources in California through more effective statewide policies and programs. The goal is to restore California's coastal and ocean ecosystems so that they once again support abundant and diverse populations of fish and other marine wildlife, and can sustain the many ways in which people can benefit from them.

Eligibility: Not specified

Maximum funding: \$50,000 grants are quarterly awarded; lower amounts are given out on an ongoing basis.

Website: <http://www.resourceslegacyfund.org/images/pdfs/CCMI LOI Guidelines.pdf>

Deadline: Not specified

Additional notes: Applicants must first submit a letter of inquiry to be reviewed before full proposals are accepted.

Wildlife Conservation Society, Climate Adaptation Fund

Grants will support wildlife adaptation projects that are designed to implement landscape-scale strategic habitat conservation plans and achieve the following types of results:

- 1) Demonstrate land management techniques to assist wildlife adaptation to climate change
- 2) Protect or expand core habitat areas
- 3) Create new protected areas or change land use designations to secure intact habitat
- 4) Assure connectivity for wildlife between core habitat areas
- 5) Protect keystone species at risk from the impacts of climate change

Eligibility: U.S. based non-profit conservation organizations with approved IRS 501(c)(3) status

Maximum funding: \$50,000-\$250,000 (per project)

Cost sharing: 1:1 minimum matching required

Website: <http://www.wcsnorthamerica.com/ClimateAdaptationFund/tabid/4813/Default.aspx>

Deadline: 2012 RFP not yet announced

Federal Opportunities

EPA, Water: Beach Grants

BEACH Act grants are awarded to eligible coastal and Great Lakes states, territories and tribes to develop and implement beach monitoring and notification programs.

Eligibility: Coastal states, territories and tribes with recreational waters next to beaches or similar points of access used by the public

Maximum funding: \$9,900,000 (total program funding)

Website: http://water.epa.gov/grants_funding/beachgrants/

Deadline: Not specified

U.S. Department of Agriculture, National Resources Conservation Service, Landscape Planning: Watershed Protection and Flood Prevention

Assistance for projects to improve, protect, develop and utilize the land and water resources within watersheds.

Eligibility: Authorized projects must include: 1) public sponsorship, 2) up to 250,000 acres and 3) benefits that are directly related to agriculture, including rural communities, that are at least 20 percent of the total benefits of the project.

Website: <http://www.nrcs.usda.gov/programs/watershed/>

Deadline: Not specified

U.S. Fish & Wildlife Service, Coastal Impact Assistance Program (CIAP)

The purpose of the program is to disburse funding to eligible producing states and coastal political subdivisions for the purpose of conservation, protection or restoration of coastal areas including wetlands; mitigation of damage to fish, wildlife or natural resources; planning assistance and the administrative costs of complying with these objectives; implementation of a federally-approved marine, coastal or comprehensive conservation management plan; and mitigation of the impact of outer Continental Shelf activities through funding of onshore infrastructure projects and public service needs.

Eligibility: California counties/cities: Alameda, Contra Costa, Los Angeles, Marin, Monterey, Napa, Orange, San Diego, City of San Francisco, County of San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Ventura.

Maximum funding: \$500,000,000 (total program funding)

Website: <http://resources.ca.gov/ocean/GIAP.html>

Deadline: 12/31/2013

EPA, Catalog of Federal Funding Sources for Watershed Protection

A searchable database of financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects.

Eligibility, Funding, etc.: Varies

Website: <http://cfpub.epa.gov/fedfund/index.cfm>

EPA, Drinking Water State Revolving Fund

CWSRF programs provided more than \$5 billion annually in recent years to fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management.

Eligibility: Not specified

Cost sharing: Low-interest loans, not grants

Website: http://water.epa.gov/grants_funding/dwsrf/index.cfm

Deadline: Not specified

U.S. Army Corps of Engineers, Continuing Authorities Program: Snagging and Clearing for Flood Control

Work under this authority provides for local protection from flooding by channel clearing and excavation, with limited embankment construction by use of materials from the clearing operation only.

Eligibility: Not specified

Maximum Funding: \$500,000 (per project)

Cost sharing: 65% federal/35% non-federal

Website: http://www.sac.usace.army.mil/?action=programs.continuing_authorities_program-a

Deadline: Not specified

U.S. Army Corps of Engineers, Continuing Authorities Program: Emergency Streambank and Shoreline Protection

Allows emergency stream-bank and shoreline protection to prevent damage to public facilities, such as roads, bridges, hospitals, schools and water/sewage treatment plants.

Eligibility: Not specified

Maximum funding: \$1,000,000 (per project)

Cost sharing: 65% federal/35% non-federal

Website: http://www.sac.usace.army.mil/?action=programs.continuing_authorities_program

Deadline: Not specified

U.S. Army Corps of Engineers, Continuing Authorities Program: Hurricane and Storm Damage Reduction

Provides for protection or restoration of public shorelines by the construction of revetments, groins and jetties, and may also include periodic sand replenishment.

Eligibility: Not specified

Maximum funding: \$3,000,000 (per project)

Cost sharing: 65% federal/35% non-federal

Website: http://www.sac.usace.army.mil/?action=programs.continuing_authorities_program

Deadline: Not specified

U.S. Army Corps of Engineers, Continuing Authorities Program: Small Beach Erosion Control Projects

To develop and construct small beach erosion control projects. A potential project must provide benefits other than for the purposes of recreation, such as beach stabilization to reduce flooding or provide protection to public facilities.

Eligibility: Not specified

Maximum funding: \$3,000,000 (per project)

Cost sharing: The sponsor is required to contribute up to 50 percent of the total project costs for the protection of shorelines owned by public agencies, and for privately owned shorelines where significant public benefit can be demonstrated.

Website: <http://www.nab.usace.army.mil/whatwedo/civwks/cap.htm>

Deadline: Not specified

Additional notes: Formal assurance of local cooperation must be furnished by the sponsoring agency, as defined in the letter of request

U.S. Army Corps of Engineers, Continuing Authorities Program: Small Flood Control Projects

Work under this authority provides for local protection from flooding by the construction or improvement of flood control works such as levees, channels and dams. Non-structural alternatives are also considered and may include measures such as installation of flood warning systems, raising and/or flood proofing of structures, and relocation of flood prone facilities.

Eligibility: Not specified

Maximum funding: \$7,000,000 (per project)

Cost sharing: Feasibility study costs over \$100,000 are shared equally w/non-federal sponsor. Final design (plans and specifications) and construction costs are 65% Federal, 35% non-Federal.

Website: http://www.sac.usace.army.mil/?action=programs.continuing_authorities_program

Deadline: Not specified

Additional notes: Requires local government sponsor agency to assume costs above award and long-term maintenance

U.S. Army Corps of Engineers, Continuing Authorities Program: Aquatic Ecosystem Restoration

Work under this authority may carry out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest and are cost-effective.

Eligibility: Not specified

Maximum funding: \$5,000,000 (per project)

Cost sharing: 65% federal/35% non-federal

Website: http://www.sac.usace.army.mil/?action=programs.continuing_authorities_program#a

Deadline: Not specified

U.S. Army Corps of Engineers, Continuing Authorities Program: Beneficial Uses of Dredge Material

Provides authority to use dredged material from new or existing Federal projects to protect, restore, or create aquatic and ecologically related habitats, including wetlands

Eligibility: Not specified

Cost sharing: 75% fed/25% non-federal

Website: http://www.sac.usace.army.mil/?action=programs.continuing_authorities_program-a

Deadline: Not specified

U.S. Department of Agriculture, U.S. Forest Service, Urban and Community Forestry Program

Assistance to plan for, establish, manage and protect trees, green spaces and associate natural resources in and adjacent to developed areas.

Eligibility: Any U.S. non-Federal organization, operating within the United States or its territories, may apply for the Challenge Cost-Share grant. While collaboration with Federal agencies is encouraged, a Federal agency may not receive funding or be used as match to the Federal funds being requested. (Conflict of interest issues will be addressed appropriately.) Individuals or private land are not eligible.

Maximum funding: \$900,000

Cost sharing: 50/50 matching required (match may include in-kind donations, volunteer assistance, and private and public (non-federal) monetary contributions)

Website: <http://www.fs.fed.us/ucf/nucfac.html-grants>

Additional notes: Only supports urban and community forestry projects that have national or multi-state application and impact.

U.S. Department of Defense, Protection of Essential Highways, Highway Bridge Approaches, and Public Works

To provide bank protection of highways, highway bridges, essential public works, churches, hospitals, schools and other nonprofit public services endangered by flood-caused erosion.

Eligibility: States, political subdivisions of States or other responsible local agencies established under State law with full authority and ability to undertake necessary legal and financial responsibilities.

Maximum funding: \$1,000,000

Cost sharing: Nonfederal sponsor must share in project costs, including cash and lands, easements, rights-of-way; utility relocations; hold and save the United States free from damages; and maintain the project at local cost after completion.

Website:

<https://www.cfda.gov/?s=program&mode=form&tab=step1&id=7ba50e5ed3a412dce7c6187479c96a84>

Deadline: Not specified

Additional notes: Pre-application coordination is required. An environmental impact assessment is required for this program. This program is eligible for coverage under E.O. 12372, "Intergovernmental Review of Federal Programs." An applicant should consult the office or official designated as the single point of contact in his or her State for more information on the process the State requires to be followed in applying for assistance, if the State has selected the program for review.

U.S. Fish and Wildlife Service, Endangered Species Program

The Cooperative Endangered Species Conservation Fund provides grants for a wide array of voluntary conservation projects for candidate, proposed and listed species. The program provides funding to States and Territories for species and habitat conservation actions on non-Federal lands.

Eligibility: Participation is only available to State agencies that have a current cooperative agreement with the Secretary of the Interior. However, individuals or groups (for example land conservancies, cities, counties, community organizations or conservation organizations) may work with a State agency that has a cooperative agreement on conservation efforts that are mutually beneficial, as a subgrantee.

Cost sharing: 25% minimum cost share (cash or in-kind contribution)

Website: <http://fws.gov/endangered/grants/>

Deadline: 1/27/2012

NOAA, Climate Program Office, Climate and Societal Interactions (CSI) Program

Supporting outreach, education and research that enhance the capacity of socioeconomic sectors to respond to and plan for climate change. CSI research and capacity building activities address several societal challenges articulated in the context of the climate adaptation and mitigation objective of the NOAA Next Generation Strategic Plan (NGSP), including i) water resources; ii) coastal resilience; iii) marine ecosystems; and iv) weather and extreme events.

Eligibility: Not specified

Maximum funding: \$6.5 million anticipated to be available in FY12 for new projects. Projects should be primarily in the \$50,000 - \$120,000/year range.

Website: http://www.cpo.noaa.gov/cpo_pa/

Deadline: Not specified

Additional notes: CSI's current programs include the following:

- 1) Regional Integrated Science and Assessments (RISA)
- 2) Sectoral Applications Research Program (SARP)
- 3) National Integrated Drought Information System (NIDIS)
- 4) Coastal and Ocean Climate Applications (COCA)
- 5) Transition of Research Applications to Climate Services (TRACS)

NOAA, National Ocean Service Office of Ocean and Coastal Resource Management, National Estuarine Research Reserve

Assistance for development, research, education and operation within National Estuarine Research Reserves.

Eligibility: Not specified

Website: <http://nerrs.noaa.gov>

Deadline: Not specified

Additional notes: Graduate research fellowships available

NSF, Environmental Sustainability

This program supports research in the areas of industrial ecology, green engineering, ecology engineering and earth systems engineering. Climate change adaptation is included within the earth systems engineering program. Research should be based on engineering principles.

Eligibility: A graduate student must be involved in engineering research.

Maximum funding: Average annual award is \$100,000

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501027

Deadline: 2/17/2012

NSF, Science, Engineering, and Education for Sustainability (SEES): Ocean Acidification (OA) NSF 12-500

The goal of this solicitation is to understand a) the geochemistry and biogeochemistry of ocean acidification; b) how ocean acidification interacts with biological and physical processes at the organismal level, and how such interactions impact the structure and function of ecosystems; and c) how the earth system history informs our understanding of the effects of ocean acidification on the present day and future ocean. Research efforts are likely to include global community sustainability, sustainable energy, modeling, vulnerability, resilience, and sensitivity to regional change, and public engagement. This program is expected to extend into FY15.

Eligibility: Not specified

Maximum funding: \$10,000,000 (total program funding, 10-15 expected awards)

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707

Deadline: 1/6/2012

NSF, Science, Engineering, and Education for Sustainability (SEES): Sustainable Energy Pathways (SEP) NSF 11-590

A program to address the challenge of building a sustainable future through promoting research and education. This program is expected to extend into federal FY15. Research efforts are likely to include global community sustainability, sustainable energy, modeling, vulnerability, resilience, and sensitivity to regional change, and public engagement.

Eligibility: Universities, colleges and non-profit non-academic organizations

Maximum funding: \$34,000,000 is expected for the FY2012 competition, pending availability of funds (15-20 awards).

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504690&org=ENG&from=home

Deadline: 2/1/2012

U.S. Army Corps of Engineers, Planning Assistance to States

The program can encompass many types of studies, dealing with water resources issues. Types of studies conducted in recent years under the program include the following:

- Water Supply and Demand Studies
- Water Quality Studies
- Environmental Conservation/Restoration Studies
- Wetlands Evaluation Studies
- Dam Safety/Failure Studies
- Flood Damage Reduction Studies
- Flood Plain Management Studies
- Coastal Zone Management/Protection Studies
- Harbor/Port Studies

Eligibility: State, local government and tribal officials

Maximum funding: Individual studies, of which there may be more than one per State or Tribe per year, generally cost \$25,000 to \$75,000.

Cost sharing: These studies are cost shared equally between federal and non-federal

Website: <http://www.usace.army.mil/CECW/PlanningCOP/Documents/library/pas.pdf>

Deadline: Not Specified

Additional notes: Contact local ACE office with a letter of request (example can be found here: <http://www.nww.army.mil/html/pub/ap/facts/sec22.pdf>)

State Opportunities

California Coastal Conservancy, Conservancy Grants

The Coastal Conservancy may fund property acquisition and project planning, design and/or construction in accordance with Division 21 of the Public Resources Code (available at <http://scc.ca.gov/about/enabling-legislation/>). Projects should meet the goals and objectives in the Conservancy's Strategic Plan (listed in Exhibit B), and be consistent with the purposes of the funding source, typically bond funds (see Exhibit C for Proposition 84 priorities: Proposition 84 is the source of the majority of the Conservancy's current funding).

Eligibility: Public agencies and nonprofit organizations that qualify under Section 501(c)(3)

Website: <http://scc.ca.gov/category/grants/>

Deadline: Continuous submission

California Department of Boating and Waterways, Public Beach Restoration

Under the California Public Beach Restoration Act funding will support: beach restoration, nourishment, sediment transport and feasibility studies.

Eligibility: Not specified

Website: <http://www.dbw.ca.gov/Environmental/Beach.aspx>

Deadline: Not specified

Additional notes: No RFP listed. Contact Program Director: Kim Sterrett (916) 263-8157

California Department of Boating and Waterways, Beach Erosion Control

For the study of beach erosion processes and methods of control and stabilization.

Eligibility: Not specified

Website: <http://www.dbw.ca.gov/Environmental/Beach.aspx>

Deadline: Not specified

Additional notes: No RFP listed. Contact Program Director: Kim Sterrett (916) 263-8157

California Sea Grant, California Ocean Protection Council: Focused research and outreach initiative

The California Sea Grant College Program will allocate OPC funding to a single research, application and outreach initiative in an area relevant to state resource management needs in the following areas: Climate Change, Coastal and Marine Spatial Planning, Land-Based Management, Industrial Use of the Ocean and Sustainable Fisheries Management.

Eligibility: The initiative team must consist of a multidisciplinary assemblage of principle investigators (PIs) whose diverse backgrounds serve to benefit the goals of the initiative.

Maximum Funding: \$720,000

Cost sharing: At least 50% cash or in-kind services

Website: <http://www-csgc.ucsd.edu/FUNDING/APPLYING/PRELIMINARY/IndxPrelim.html>

Deadline: Not specified

Additional notes: To submit to the OPC solicitation, you must first contact Jim Eckman or Shauna Oh at sgproposal@ucsd.edu or 858-534-4440 to discuss ideas and intent to submit. After this, a specific preliminary proposal submission form will be sent to the applicant via email. Do not use the online form.

Cool California Funding Wizard

A search tool to identify grants, rebates, tax credits and other financial assistance for particular environmentally-related projects.

Website: <http://www.coolcalifornia.org/funding-wizard-home>

Closed Opportunities*

* The deadlines for the following have passed. However, they are listed here because there may be opportunities in the future, dependent on future appropriations.

California Landscape Conservation Cooperative, Decision Support for Climate Adaptation

The California Landscape Conservation Cooperative (CA LCC) is a science-management partnership among agencies, non-governmental organizations and other entities working to inform and promote integrated science, natural resource management and conservation to address impacts of climate change and other stressors within and across ecosystems.

Eligibility: Not specified

Max Funding: \$850,000 total (individual projects \$10,000-100,000)

Website: <http://californialcc.org/>

Contacts: Rebecca Fris, CA LCC Science Coordinator, 916-414-6558 (Rebecca_Fris@fws.gov) or Tom Suchanek, USGS, 916-278-9573 (TSuchanek@usgs.gov).

Deadline: Closed

California Sea Grant

California Sea Grant continues to move in strategic directions for 2010-2013, focusing on the following integrated themes: healthy coastal and marine ecosystems, resilient coastal communities, new technologies and products, safe and sustainable seafood supply, effective response to climate change.

Eligibility: Not specified

Maximum funding: \$100,000

Website: <http://www.csgc.ucsd.edu/FUNDING/APPLYING/PRELIMINARY/IndxPrelim.html>

Deadline: Closed

EPA, Extreme Event Impacts on Air Quality and Water Quality with a Changing Global Climate

This program seeks applications proposing the development of assessments, tools and techniques, and demonstration of innovative technologies for providing information and capacity to adequately prepare for climate-induced changes in extreme events in the context of air and water quality management. A goal of this RFA is to seek a better understanding of the hazards (the extreme events) and to establish ways for climate scientists, impact assessment modelers, air and water quality managers, and other stakeholders to co-produce information necessary to form sound policy in relation to extreme events and their impact on air and water quality under a changing climate.

Eligibility: Public nonprofit institutions/organizations (includes public institutions of higher education and hospitals) and private nonprofit institutions/organizations (includes private institutions of higher education and hospitals) located in the U.S., state and local governments, Federally Recognized Indian Tribal Governments, and U.S. territories or possessions are eligible to apply.

Maximum Funding: \$750,000

Website: http://www.epa.gov/ncer/rfa/2011/2011_star_extremeevent.html

Deadline: Closed

EPA, Wetlands Program Development Grants

WPDGs provide an opportunity to conduct projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys and studies relating to the causes, effects, extent, prevention, reduction and elimination of water pollution. While WPDGs can continue to be used by recipients to build and refine any element of a comprehensive wetland program, priority will be given to funding projects that address the three priority areas identified by EPA: developing a comprehensive monitoring and assessment program; improving the effectiveness of compensatory mitigation; and refining the protection of vulnerable wetlands and aquatic resources.

Eligibility: States, Tribes, local governments (S/T/LGs), interstate associations, intertribal consortia and national non-profit, non-governmental organizations are eligible.

Website: http://water.epa.gov/grants_funding/wetlands/grantguidelines/index.cfm

Deadline: Closed

Additional notes: California belongs to US EPA Region 9 (AZ, CA, HI, NV, AS, GU)

Program contact: Suzanne Marr
75 Hawthorne Street, MC WTR-3
San Francisco, CA 94105
Phone: 415-972-3468
E-mail: marr.suzanne@epa.gov

FEMA, Community Assistance Program State Support Services Element (CAP-SSSE)

To provide financial and technical assistance to communities in the National Flood Insurance Program (NFIP) and evaluate community performance in implementing NFIP floodplain management activities.

Eligibility: States

Cost Sharing: 25% matching required

Website: http://www.fema.gov/plan/prevent/floodplain/fema_cap-ssse.shtm

Deadline: Closed

FEMA, Hazard Mitigation Assistance

To provide funding for mitigation activities that act to reduce disaster losses while protecting life and property from future damages. There are five programs: hazard mitigation grant program, pre-disaster mitigation, flood mitigation assistance, repetitive flood claims and severe repetitive loss.

Eligibility: States/Tribes/Territories that, in turn, provide subgrants to local governments and communities.

Website: <http://www.fema.gov/government/grant/hma/index>

Deadline: 12/2/2011 at 3:00 p.m. EST

Additional notes: Non-profits are only eligible for the hazard mitigation grants

NOAA Coastal Services Center, Broad Agency Announcement

To support research on restoration and conservation of ocean and coastal resources, understanding climate variability and enhancing society's potential for adaptation and mitigation.

Eligibility, Funding, etc: Varies

Deadline: Closed

NOAA, Sea Grant Community Climate Adaptation Initiative 2011

NOAA Sea Grant expects to make available up to \$1,000,000 for a national competition to fund climate adaptation efforts for federal FY2012-2013 as part of an overall plan to enhance climate adaptation in coastal communities.

Eligibility: Sea Grant College Programs, Sea Grant Institutional Programs, the Guam Sea Grant Project and the Lake Champlain Sea Grant Project. A given proposal may involve two or more Sea Grant programs working in collaboration but may not exceed \$100,000 in federal funds per Sea Grant program. Other interested parties are encouraged to work with the Sea Grant programs in their region to explore opportunities for partnering.

Maximum funding: \$100,000

Cost sharing: Matching funds required

Website: <http://www.grants.gov/search/search.do?mode=VIEW&oppId=103673>

Deadline: Closed

NSF, Science, Engineering, and Education for Sustainability (SEES): Water, Sustainability and Climate NSF 11-551

The goal of the WSC program is to enable new interdisciplinary paradigms in water research, which broadly integrate across the biological sciences, geosciences, engineering and social sciences to address water systems in their entirety.

Eligibility: Universities, colleges, non-profit non-academic organizations, for-profit organizations and other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs)

Maximum funding: Approximately \$31,000,000 is expected for the FY2012 competition, pending availability of funds (12-26 awards).

Website: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503452

Deadline: Closed

Additional notes: Three categories of awards are anticipated for this solicitation. Category 1 Awards: small exploratory or incubation grants to develop teams, identify sites, hold workshops and develop plans for establishment or operation of a study site or modeling effort (1-2 yrs, for up to \$150,000). Category 2 Awards: place-based observational and modeling studies, up to five years in duration and for a maximum of \$5 million for each award. Category 3 Awards: synthesis, modeling and integration grants that will use existing data to integrate and synthesize across watershed and groundwater sites (project duration of 3-5 years for a maximum of \$1.5 million for each award).

U.S. Dept. of Commerce - NOAA - National Marine Fisheries Service, Office of Habitat Conservation, Community-Based Restoration Program: National and Regional Partnership Grants

Funding available for multi-year national and regional habitat restoration partnerships that will result in implementation of a wide range of habitat restoration projects - from locally driven, hands-on projects that emphasize stewardship to mid-scale, watershed-scale projects that yield significant ecological and socioeconomic benefits.

Eligibility: Not specified

Maximum funding: Approximately \$10 million is available annually and typical partnership awards will range from \$500,000 to \$1 million per year.

Website: <http://www.habitat.noaa.gov/funding/partnerships.html>

Deadline: Closed. Next announcement expected June 2012

NOAA National Marine Fisheries Service, Estuary Habitat Restoration Program

On behalf of the Estuary Habitat Restoration Council, NOAA Fisheries Service is soliciting proposals for estuary habitat restoration projects. The Council seeks projects that achieve cost-effective restoration while promoting partnerships among agencies and between public and private sectors.

Eligibility: Not specified

Maximum funding: Awards expected to range between \$100,000 and \$1 million

Website: <http://www.era.noaa.gov/information/funding.html>

Deadline: Closed

NOAA National Ocean Service, Office of Ocean and Coastal Resource Management, Coastal and Estuarine Land Conservation Program

The Coastal and Estuarine Land Conservation Program (CELCP) was authorized "for the purposes of protecting important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural, undeveloped, or recreational state to other uses." This announcement solicits proposals for land acquisition projects (fee simple interest or conservation easements) that can be completed within 18 months from the start date of the award and that have the purpose of protecting important coastal and estuarine areas.

Eligibility: Not specified

Maximum funding: \$3,000,000

Website:

<http://www07.grants.gov/search/search.do;jsessionid=n8N2NRLNcFDd9ZQ4713GS41bBLzjvyyd2Sg32hoKpQ5thVy1lQsc!-698752146?oppId=62773&mode=VIEW>

Deadline: Closed

NOAA National Ocean Service, Office of Ocean and Coastal Resource Management, Coastal Zone Management Administration Awards

For implementation and enhancement of state coastal management programs that seek to preserve, protect, develop and enhance the coastal zone.

Eligibility: Not specified

Website: <http://coastalmanagement.noaa.gov/land/>

Deadline: Closed

U.S. Department of Commerce, Economic Development Administration, Economic Adjustment Assistance Program

Assistance for communities experiencing adverse economic changes that may occur suddenly or over time - possible results of climate change are impacts to fisheries or loss of tourism revenue.

Eligibility: State governments, county governments, city governments, public and state controlled institutions of higher education Native American tribal governments, nonprofits having a 501(c)(3) status with the IRS, other than institutions of higher education, nonprofits that do not have a 501(c)(3) status with the IRS, other than institutions of higher education, private institutions of higher education.

Website: <http://www.eda.gov/AboutEDA/Programs.xml>

Deadline: Closed

U.S. Fish and Wildlife Service, Coastal Program

The U.S. Fish and Wildlife Service welcomes participation in the Coastal Program. If the applicant is interested in exploring the possibility of pursuing a cooperative agreement for habitat assessment, protection and/or restoration; conservation planning and design; species and habitat inventory and monitoring; outreach and education; or simply receiving technical assistance.

Eligibility: Not specified

Website:

<http://www07.grants.gov/search/search.do;jsessionid=n8N2NRLNcFDd9ZQ4713GS41bBLzjvyyd2Sg32hoKpQ5thVy1lQsc!-698752146?oppId=58453&mode=VIEW>

Deadline: Closed

Additional notes: Contact your local Coastal Program coordinator. A listing of all Coastal Program coordinators is available at: <http://www.fws.gov/coastal/contactUs.html>

U.S. Fish and Wildlife Service, North American Wetlands Conservation Act

The standard grants program supports projects in Canada, the United States and Mexico that involve long-term protection, restoration and/or enhancement of wetlands and associated uplands habitats. The small grants program supports the same type of projects and adheres to the same selection criteria and administrative guidelines as the U.S. Standard Grants Program. However, project activities are usually smaller in scope and involve fewer project dollars. Funding priority is given to grantees or partners new to the Act's Grants Program.

Eligibility: Not specified

Maximum funding: \$75,000

Cost sharing: 50% matching required

Website: <http://www.fws.gov/birdhabitat/grants/NAWCA>

Deadline: Closed

U.S. Fish and Wildlife Service, National Coastal Wetlands Conservation Grant Program

Assistance for acquisition, restoration, management or enhancement of coastal wetlands.

Eligibility: Coastal states

Maximum funding: \$1,000,000

Cost Sharing: 50% matching required

Website: <http://www.fws.gov/coastal/coastalgrants/>

Deadline: Closed

D. Agenda

Monterey Climate Change Adaptation Workshop
December 6, 2011 | 8:30am-5:00pm
Monterey Conference Center, Steinbeck Forum, One Portola Plaza

Goals:

- Begin Monterey Bay region-wide discussion and collaboration on climate change adaptation
- Understand the latest research on climate change impacts to the Monterey Bay coastline
- Have a basic understanding of the climate change adaptation planning process
- Gain an understanding of how communities in Monterey Bay area are planning for climate change
- Learn about grant opportunities and other resources (tools, assistance available) to support climate change adaptation planning
- Be provided with the opportunity to develop new collaborations and partnerships that will assist in climate change adaptation planning

8:30 – 9:00 **Participant Registration**
Light breakfast

9:00 – 9:15 **Welcome**
Paul Michel, Superintendent, Monterey Bay National Marine Sanctuary
Meg Caldwell, Executive Director, Center for Ocean Solutions

9:15- 10:30 **Keynote Presentation and Discussion**
Sea Level Rise and Coastal Storms: Local Impacts to the Monterey Bay Region
Dr. Gary Griggs, Distinguished Professor of Earth and Planetary Sciences,
Director
Institute of Marine Sciences, UC Santa Cruz

10:30-10:45 Break (snacks provided)

10:45-12:00 **Preparing for the Future: Case Studies and Strategies**
Moderated by Charles Lester, Executive Director, California Coastal Commission
Panelists:
Brad Damitz, Southern Monterey Bay Coastal Erosion Working Group
Cathlin Atchison, City of Santa Cruz
Matt Kuharic, King County, Washington

12:00-12:45 **Lunch (provided on site)**

1:00-2:45 **Breakout Session 1: Getting Started with Adaptation Planning**

2:45-3:00 **Break (snacks provided)**

3:00-4:15 **Regional Solutions Networking Gallery**

4:15-4:45 **Regional Solutions and Approaches: Gallery Outcomes**

4:45-5:00 **Closing**

6:30 PM **Reception at Monterey Bay Aquarium**

E. Participants

Last	First	Title	Affiliation	City
Abeles	Adina	Director, Education and Training	Center for Ocean Solutions	Monterey
Amador	Nadia	Associate Planner	County of Monterey Planning Department	Salinas
Arkema	Katie	Marine ecologist	The Natural Capital Project	Seattle
Atchison	Cathlin	Project Manager, Public Works	City of Santa Cruz	Capitola
Buikema	Barbara	General Manager	Carmel Area Wastewater District	Carmel
Butler	Katie	Coastal Planner, Monterey County Region	California Coastal Commission	Santa Cruz
Caldwell	Meg	Executive Director	Center for Ocean Solutions	Stanford
Capps	Nicole	Mgmt Support Specialist	Monterey Bay National Marine Sanctuary	Monterey
Carlson	David	Resource Planner	County of Santa Cruz Planning Department	Santa Cruz
Chapman	Trish	Central Coast Regional Manager	California Coastal Conservancy	Oakland
Chaves	Pilar	Environmental Programs Assistant	City of Pacific Grove	Pacific Grove
Christensen	Thomas	Riparian Projects Coordinator	Monterey Peninsula Water Management District	Monterey
Clark	Ross	CC Action Coordinator/ Climate Action Program	City of Santa Cruz	Santa Cruz
Coburn	Chris	Water Resources Analyst	Santa Cruz County	Santa Cruz
Cole	Kim	Principal Planner	City of Monterey	Monterey
Corwin	Terry	Executive Director	Land Trust of Santa Cruz County	Santa Cruz

Last	First	Title	Affiliation	City
Couch	Rachel	Project Manager	California Coastal Conservancy	Santa Barbara
Crowder	Larry	Science Director	Center for Ocean Solutions	Monterey
Damitz	Brad	Environmental Policy Specialist	Monterey Bay National Marine Sanctuary	San Rafael
Dettle	Mark	Director of Public Works	City of Santa Cruz	Santa Cruz
Dodge	Daniel	Mayor	City of Watsonville	Watsonville
Dondero	George	Executive Director	Santa Cruz County Regional Transportation Commission	Santa Cruz
Douros	Bill	West Coast Regional Director	NOAA Office of National Marine Sanctuaries	Monterey
Erickson	Ashley	Law & Policy Fellow	Center for Ocean Solutions	Stanford
Ewing	Lesley	Senior Coastal Engineer	California Coastal Commission	San Francisco
Flynn	Carolyn	LHMP Coordinator	City of Capitola	Capitola
Fox	Michael	COS Research Intern	Center for Ocean Solutions	Moss Landing
Freeman	Matt	Director of Conservation	Land Trust of Santa Cruz County	Santa Cruz
Gaffney	Kaitilin	Program Director	Ocean Conservancy	Santa Cruz
Grace	Jean		City of Carmel	Carmel
Griggs	Gary	Professor and Director Institute of Marine Sciences	UCSC	Santa Cruz
Grimmer	Karen	Deputy Superintendent	Monterey Bay National Marine Sanctuary	Monterey
Grove	Tami	CCC Statewide Development and Transportation Liaison	California Coastal Commission	Santa Cruz

Last	First	Title	Affiliation	City
Haertel	Garrett	Engineer	MRWPCA	Salinas
Hampson	Larry	Engineer	Monterey Peninsula Water Management District	Monterey
Hardgrave	Sarah	Environmental Programs Manager	City of Pacific Grove	Pacific Grove
Harrold	Chris	Director of Conservation Research	Monterey Bay Aquarium	Monterey
Hartge	Eric	Research Analyst	Center for Ocean Solutions	Stanford
Hayes	Dawn	Education & Outreach Coordinator	Monterey Bay National Marine Sanctuary	Monterey
Hazen	Lucie	Research Analyst	Center for Ocean Solutions	Monterey
Hooton	Brynn	Science Communication Intern	Center for Ocean Solutions	Monterey
Hunt	Brad	Program Manager	The Otter Project	Monterey
Hunt	John	Deputy Superintendent	Monterey Bay National Marine Sanctuary	Monterey
Jespersion	Michelle	Federal Programs Manager	California Coastal Commission	San Francisco
Kellner	Laurel	Coastal Analyst	California Coastal Commission	San Francisco
Kerkering	Heather	Program Manager	MBARI	Moss Landing
Kittinger	Jack	Early Career Social Science Fellow	Center for Ocean Solutions	Monterey
Kuharic	Matt	Senior Climate Change Specialist	King County, WA	Seattle
Largay	Bryan	Tidal Wetland Project Director	Elkhorn Slough Foundation	Watsonville
Lester	Charles	Executive Director	California Coastal Commission	San Francisco

Last	First	Title	Affiliation	City
Levine	Paia	Planning Department	Santa Cruz County	Santa Cruz
Long	Dennis	Executive Director	Monterey Bay Sanctuary Foundation	Monterey
Lunde	Becky	West Coast Regional Coordinator	NOAA Coastal Services Center	Oakland
Matarazzo	Steve	City Manager	City of Sand City	Sand City
McCormick	Michael	Senior Planner	Governor's Office of Planning and Research	Sacramento
Michel	Paul	Sanctuary Superintendent	Monterey Bay National Marine Sanctuary	Monterey
Moser	Susi	Social Science Researcher	Stanford, COS	Santa Cruz
Newkirk	Sarah	Coastal Project Director	The Nature Conservancy	Monterey
O'Connor	Kevin	Project Manager	Central Coast Wetlands Group	Moss Landing
Osario	Luis	Senior Planner	Monterey County Resource Management Agency	Monterey
Paduan	Jeffrey	Professor and Chair, Dept. of Oceanography	Naval Post Graduate School	Monterey
Papendick	Hilary	NOAA Coastal Fellow	California Coastal Commission	San Francisco
Prahler	Erin	Legal Fellow	Center for Ocean Solutions	Stanford
Reade	Sidney	Emergency services planner	Monterey County	Salinas
Reeves	Tom	City Engineer	City of Monterey	Monterey
Revell	David	Senior Coastal Geomorphologist	ESA PWA	Santa Cruz
Robinson	Daniel	Planner	California Coastal Commission	Santa Cruz
Rosenfeld	Leslie	Program Director	CeNCOOS	Moss Landing

Last	First	Title	Affiliation	City
Rupnow	Jennifer	Regional Program Manager	Ecology Action	Santa Cruz
Russell	Elizabeth	Special Projects Manager	Association of Monterey Bay Area Governments	Marina
Ryan	Sierra	Program Coordinator/ MLML Research Associate	Central Coast Wetlands Group	Moss Landing
Safranek	Jim		Santa Cruz County Environmental Health Service	Santa Cruz
Scheiblaue	Steve	Harbormaster	Monterey Harbor	Monterey
Scorse	Jason	Professor	Monterey Institute	Monterey
Sentieri	Chris	Special Projects Associate	AMBAG	Moss Landing
Sexauer	Todd	Planning Department	Santa Cruz County	Santa Cruz
Shaughnessy	Gwen	Climate Adaptation Specialist	NOAA Coastal Services Center	Oakland
Smith	Doug	Professor	Cal State Monterey Bay	Seaside
Smyth	Rebecca	Regional Division Chief	NOAA Coastal Services Center	Oakland
Solick	Robert	Principal Management Analyst	City of Santa Cruz	Santa Cruz
Spencer	Craig	Associate Planner	Monterey County	Salinas
Sudhalkar	Amruta	Program Officer	ICLEI	Oakland
Szymanis	Theresa	Planning Services Manager	City of Marina	Marina
Taber	Vicki	Natural Resources Specialist	NSA Monterey	Monterey
Thornton	Ed	Professor Emeritus	Naval Post Graduate School	Monterey
Van Arsdol	Don	Professor Emeritus	University of Southern California	Pebble Beach

Last	First	Title	Affiliation	City
Watson	Mike	Coastal Planner, Monterey County Region	California Coastal Commission	Santa Cruz
Westman	Susan	Interim Community Development Director	City of Capitola	Capitola
Woodson	Brock	Research Scientist/ coastal oceanography	Stanford, COS	Stanford
Wotan	Tricia	Associate Planner	City of Monterey	Monterey
Zeller	Michael	Associate Transportation Planner	Transportation Agency of Monterey County	Salinas