Rising to the Challenge

Results of the 2011 California Coastal Adaptation Needs Assessment

Southern Region

Compiled by Marika Schulhof
University of Southern California Sea Grant
ACKNOWLEDGEMENTS

We would like to thank, first and foremost, the 594 individuals who responded to this survey. The survey was initiated and developed in collaboration with 15 organizations based in California, who share an interest in the sustainable management and stewardship of the state's coastal and marine resources. We thank them for their participation, collaborative spirit, and for useful feedback on earlier drafts of the survey instrument and this analysis. We thank the six individuals who tested the 2011 survey instrument and provided critical feedback.

REGIONAL SUB-REPORTS

The data collected in the California Coastal Adaptation Needs Assessment were analyzed separately in regional sub-reports for the four coastal California regions surveyed: Northern, Bay Area/Delta, Central, and Southern. In the four regional sub-reports, graphs and charts were generated combining data for all respondent types in each region (city and county; state, federal and regional; elected officials; NGO; and private industry and environmental consultants). The regional analyses also include text responses, which were not included in the full report. The regional sub-reports can be accessed at: http://www.usc.edu/org/seagrant/research/survey.html

REPORT CITATION

Southern Region Results:

Statewide Report:

Author Affiliations
J. A. Finzi Hart and P. M. Grifman - University of Southern California Sea Grant
S. C. Moser - Susanne Moser Research & Consulting | Stanford University
A. Abeles - Center for Ocean Solutions, Stanford University
M.R. Myers and S. C. Schlosser - California Sea Grant College
J. A. Ekstrom - University of California, Berkeley | Natural Resources Defense Council

Report design and layout produced by Juliette A. Finzi Hart
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The National Sea Grant College Program is a national network of 32 programs dedicated to serving citizens in coastal communities throughout the Nation. Administered through the National Oceanic and Atmospheric Administration (NOAA), Sea Grant is the Agency’s primary university-based program dedicated to helping citizens utilize scientific information to support a vibrant economy while ensuring ecological sustainability.

The Center for Ocean Solutions (COS) is a collaboration among Stanford’s Woods Institute for the Environment and Hopkins Marine Station, the Monterey Bay Aquarium and the Monterey Bay Aquarium Research Institute. Across these institutions, COS draws from about 80 scholars, researchers and educators who work on coastal and ocean ecosystems in the natural, physical and social sciences. COS also works with experienced conservation practitioners and policy experts. Located at Stanford and in Monterey, California, COS is uniquely positioned to leverage expertise and develop practical solutions to the most urgent and important ocean conservation problems.
SURVEY COLLABORATIVE

California Coastal Commission

California Nevada Applications Program at the Scripps Institution of Oceanography, University of California, San Diego through the NOAA Regional Integrated Sciences and Assessment Program

California Ocean Protection Council

California Ocean Science Trust

California Sea Grant College Program

Center for Ocean Solutions, Stanford University

Coastal Services Center, National Oceanic and Atmospheric Administration

Gulf of Farallones National Marine Sanctuary

San Francisco Bay Conservation and Development Commission

San Francisco Bay National Estuarine Research Reserve

Southern California Coastal Ocean Observing Systems

Susanne Moser Research & Consulting

Tijuana River National Estuarine Research Reserve

University of California, Berkeley

University of Southern California Sea Grant
INTRODUCTION

With more than 1,100 miles of open ocean coastline and another 1,000 miles of shoreline along San Francisco Bay, and hundreds more miles of embayments, the range of coastal management challenges, as well as approaches to managing coastal climate change risks, is diverse. It was thus important to determine whether the survey respondents adequately represented California’s southern, central, northern and bay regions and the different types of coasts found in the state. Forty-three percent of respondents are from southern California, including Santa Barbara, Ventura, Los Angeles, Orange and San Diego counties. Thirty-seven percent of respondents work in the Bay/Delta Region, which includes the 12 counties of Sonoma, Napa, Solano, Sacramento, Marin, San Francisco, Contra Costa, Alameda, San Joaquin, Santa Clara, San Mateo, Santa Cruz.8 The remaining respondents are equally divided between counties in central California (12%, Monterey and San Luis Obispo) and northern California (12%, Del Norte, Humboldt, Mendocino, Sonoma). Notably, each coastal county is represented in the survey by at least one respondent (Map 1).

The survey population captured in our survey is thus representative of all California’s major coastal regions with the most populated coastal regions of the state (southern California and the San Francisco Bay region) most strongly represented by survey respondents. In terms of respondents’ job responsibilities, nearly three-quarters of participants are planners, environmental specialists, or wildlife/natural resource managers, while engineers, water resource managers, emergency or flood district managers and others make up the remaining portion. While obviously an uneven distribution, those most directly involved in long-term planning (such as for climate change) are well represented here. Moreover, this survey – contrary to its 2005/2006 predecessor – includes individuals from all levels of government, reflecting the complex nature of coastal management and adaptation planning. The only group clearly missing is Tribal communities, and more efforts need to be made in the future to reach that particular population. Based on this review, we conclude that survey responses are adequately representative of the state of affairs in California.
1. Please indicate if you are an elected official.

   ![Percentage of Responses graph](chart1)

   - Yes: 3%
   - No: 97%

2. If you responded that you are an elected official, please indicate the governmental/organizational sector in which you work.

   ![Percentage of Responses graph](chart2)

   - City: 80%
   - County: 15%
   - State: 0%
   - Tribal: 0%
   - Federal: 0%
3. Please indicate in which elected office you serve.

Elected Official Respondents

<table>
<thead>
<tr>
<th>Elected Office</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Councilmember</td>
<td>3</td>
</tr>
<tr>
<td>County</td>
<td></td>
</tr>
<tr>
<td>City Council</td>
<td>2</td>
</tr>
</tbody>
</table>
4. If you are not an elected official, please indicate the governmental/organizational sector in which you work.

5. Please select your jurisdiction.
6. Please indicate what type of position you hold in your organization.

![Position Type Bar Chart](chart1.png)

7a. How many years have you been employed by your organization?

![Years Employed Bar Chart](chart2.png)

7b. How many years have you held your current position?

![Years in Position Bar Chart](chart3.png)
8. What is your age?

![Age Distribution Graph]

9. What is your gender?

![Gender Distribution Graph]

10. What is the highest level of education you have completed?

![Education Level Distribution Graph]
11. What is the approximate length of the shoreline that you manage or are concerned about in your work (i.e., entire length of coastal waterfront, including ocean, bay, lagoon, and estuarine shorelines, within your jurisdictional limits)?

<table>
<thead>
<tr>
<th>Respondent Category</th>
<th>Mean (+/- Standard Deviation) (miles)</th>
<th>Median (miles)</th>
<th>Mode (miles)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>City/County</td>
<td>73 (270)</td>
<td>9</td>
<td>6</td>
<td>59</td>
</tr>
<tr>
<td>Regional/State/Federal</td>
<td>435 (583)</td>
<td>125</td>
<td>1100</td>
<td>44</td>
</tr>
<tr>
<td>Elected Officials</td>
<td>5 (6)</td>
<td>1.5</td>
<td>1.5</td>
<td>7</td>
</tr>
</tbody>
</table>

12. What is the approximate size of the population of the community in which you work?

13. What characteristics best describe the community in which you work?
14. What are the predominant types of sensitive infrastructure, development, or habitats are located in the immediate shorefront areas (i.e., in the 100-year floodplain, along bluffs/cliffs) in the area that you manage? (Please select only the top 5)

<table>
<thead>
<tr>
<th>Infrastructure/Development/Habitat</th>
<th>Percentage of Responses (n=182)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetlands (seasonal, restored or protected)</td>
<td>50%</td>
</tr>
<tr>
<td>Pristine or recreational beach(es)</td>
<td>40%</td>
</tr>
<tr>
<td>Residential buildings</td>
<td>30%</td>
</tr>
<tr>
<td>Open space and parks for recreation</td>
<td>20%</td>
</tr>
<tr>
<td>Endangered species habitat</td>
<td>20%</td>
</tr>
<tr>
<td>Highways and roads</td>
<td>20%</td>
</tr>
<tr>
<td>Storm-/wastewater infrastructure</td>
<td>20%</td>
</tr>
<tr>
<td>Public access facilities</td>
<td>20%</td>
</tr>
<tr>
<td>Marinas / Recreational fishing facilities</td>
<td>10%</td>
</tr>
<tr>
<td>Port facilities</td>
<td>10%</td>
</tr>
<tr>
<td>Commercial enterprises/businesses</td>
<td>10%</td>
</tr>
<tr>
<td>Surf break</td>
<td>10%</td>
</tr>
<tr>
<td>Water supply/treatment structures</td>
<td>10%</td>
</tr>
<tr>
<td>Levees/flood protection structures</td>
<td>10%</td>
</tr>
<tr>
<td>Power plant/energy utility</td>
<td>10%</td>
</tr>
<tr>
<td>Military installation</td>
<td>10%</td>
</tr>
<tr>
<td>Airport</td>
<td>10%</td>
</tr>
<tr>
<td>Industrial facilities</td>
<td>10%</td>
</tr>
<tr>
<td>Contaminated sites</td>
<td>10%</td>
</tr>
<tr>
<td>Historic/cultural site or preserve</td>
<td>10%</td>
</tr>
<tr>
<td>Rail infrastructure</td>
<td>10%</td>
</tr>
<tr>
<td>High-rise residential or tourist development</td>
<td>10%</td>
</tr>
<tr>
<td>Critical community services</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
</tr>
<tr>
<td>Commercial fishing facilities</td>
<td>10%</td>
</tr>
<tr>
<td>Cemeteries</td>
<td>10%</td>
</tr>
</tbody>
</table>

15. How would you describe the degree of development/redevelopment pressure occurring in your community or region?

<table>
<thead>
<tr>
<th>Pressure Level</th>
<th>No pressure</th>
<th>Slight Pressure</th>
<th>Moderate Pressure</th>
<th>Significant Pressure</th>
<th>Extreme Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>5%</td>
<td>10%</td>
<td>30%</td>
<td>30%</td>
<td>15%</td>
</tr>
</tbody>
</table>

- Development
- Redevelopment
16. Where do you see the greatest development pressure at present?

17. What type(s) of coastal management challenges does your community currently face?
18. Of the challenges selected in Question 19, which do you consider the top five most challenging in your community at present?

19. How severe would you consider this top coastal management challenge?
20a. How has the severity of this top management challenge changed in your community over the past 5 years?

![Bar graph showing changes over past 5 years]

20b. How do you expect the severity of this top management challenge to have changed in your community in 5 years from now?

![Bar graph showing expected changes in 5 years]
20c. Which are the top three groups of stakeholders involved in your top coastal management challenge?

<table>
<thead>
<tr>
<th>Respondent Type</th>
<th>Top Three Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>City/County</td>
<td>Environmental advocacy groups (n=51)</td>
</tr>
<tr>
<td></td>
<td>Local governments (n=50)</td>
</tr>
<tr>
<td></td>
<td>Recreational users (n=32)</td>
</tr>
<tr>
<td>Regional/State/Federal</td>
<td>State agencies/commissions (n=40)</td>
</tr>
<tr>
<td></td>
<td>Local governments (n=28)</td>
</tr>
<tr>
<td></td>
<td>Federal agencies/departments (n=27)</td>
</tr>
<tr>
<td>Elected</td>
<td>Local governments (n=4)</td>
</tr>
<tr>
<td></td>
<td>Environmental advocacy groups (n=3)</td>
</tr>
<tr>
<td></td>
<td>Federal agencies/departments; Recreational users (n=2)</td>
</tr>
<tr>
<td>NGOs</td>
<td>Environmental advocacy groups (n=21)</td>
</tr>
<tr>
<td></td>
<td>State agencies/commissions (n=16)</td>
</tr>
<tr>
<td></td>
<td>Local governments (n=14)</td>
</tr>
</tbody>
</table>

21a. How would you characterize the current political atmosphere around your top management challenge?

![Non-Contentious 38% Contentionous 62%](n=172)

21b. How has the current political atmosphere around your top coastal management challenge changed over the past 5 years?

![Percentage of Responses (n=164)](n=172)
22. Please indicate which of the following statements comes closest to your opinion of climate change or global warming.

![Bar chart showing responses to climate change or global warming]

- Climate change/global warming is caused mostly by natural causes.
- Climate change/global warming is caused mostly by human causes.
- Climate change/global warming is caused by a mix of human and natural causes.
- The climate is not changing.

![Bar chart showing percentage of responses (n=172)]

- Climate Change (n=94)
- Global Warming (n=78)

23. What is your personal level of concern about climate change/global warming?

![Bar chart showing percentage of responses (n=182)]

- Very Concerned/Concerned
- Neutral
- Not Very Concerned/Not Concerned

99 respondents received surveys using the term “climate change”
85 respondents received surveys using the term “global warming”
24a. Have you ever, personally or in your work, considered the potential impacts of climate change on your community or region?

![Percentage of Responses (n=183)]

24b. If you have begun considering the impacts of climate change in your work, approximately how long have you done so?

![Percentage of Responses (n=173)]
25. Which of the following statements best represents your attitude toward preparing for changes in coastal areas that might result from future climate change?

![Bar chart showing percentages of responses.]

- We should prepare for the possible effects of climate change/global warming in all our decisions.
- We should prepare for the most likely scenario based on the best available information.
- We don’t have enough information to know what to prepare for, so we should only take actions that benefit us.
- We should wait to make any changes until we have enough information.
- We should not change what we do because climate change/global warming is not happening.

26. How well informed do you feel you are about climate change?

![Bar chart showing percentages of responses.]

- Well informed
- Moderately informed
- Not well informed
- Not at all informed
27. How do you think climate change may affect the local average conditions and natural environment in your region over the next 3 - 4 decades?

28. Table identifying scientific consensus for various climate change impacts based on analysis of Cayan et al. (2009).

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Scientific Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air temperatures</td>
<td>Air temperatures will increase</td>
</tr>
<tr>
<td>Seawater temperatures</td>
<td>Seawater temperatures will increase</td>
</tr>
<tr>
<td>Stream temperatures</td>
<td>Stream temperatures will increase</td>
</tr>
<tr>
<td>Rain- and snowfall (precipitation)</td>
<td>Depends on region (question not included in analysis)</td>
</tr>
<tr>
<td>Water supplies</td>
<td>Water supplies will decrease</td>
</tr>
<tr>
<td>Amount of runoff</td>
<td>Amount of runoff will increase</td>
</tr>
<tr>
<td>Flooding frequency</td>
<td>Flooding frequency will increase</td>
</tr>
<tr>
<td>Flood elevation</td>
<td>Flood elevation will increase</td>
</tr>
<tr>
<td>Rate of sea level rise</td>
<td>Rate of sea-level rise will increase</td>
</tr>
<tr>
<td>Storm frequency</td>
<td>Still scientific debate (question not included in analysis)</td>
</tr>
<tr>
<td>Storm intensity</td>
<td>Still scientific debate (question not included in analysis)</td>
</tr>
<tr>
<td>Stress on terrestrial species</td>
<td>Stress will increase</td>
</tr>
<tr>
<td>Stress on marine species</td>
<td>Stress will increase</td>
</tr>
<tr>
<td>Occurrence of algae blooms</td>
<td>Still scientific debate (question not included in analysis)</td>
</tr>
<tr>
<td>Coastal water quality</td>
<td>Coastal water quality will decrease</td>
</tr>
</tbody>
</table>
29. How do you think climate change could impact your work?

30. Please rate how important it is in your work to address climate change through (a) the reduction of greenhouse gas emissions from energy and land use (mitigation) and (b) efforts to plan and prepare for the projected impacts of climate change (adaptation).
31. If you are engaged in, or contributing to, planning for climate change (adaptation) in your community or region at this time, what prompted your action?
32a. Which phase best describes your current phase of climate change planning and implementation?

![Pie chart showing phases of planning and implementation]

32b. Please provide more detail on your activities or contributions to this phase by selecting one of the statements below.

- Understanding
  - 74% We have not looked into it or are just beginning to become aware of the issue.
  - 19% We have started to gather some information to better understand the issue.
  - 7% We have completed an assessment of the issue.

- Planning
  - 52% We are brainstorming a range of options to prepare for and manage climate change risks.
  - 32% We have completed an assessment of potential response options.
  - 16% We have selected a subset of response options to move forward with.

- Implementing
  - 81% We have begun implementing the selected response options.
  - 19% We are evaluating and reassessing how well the implemented options are faring.
33. Whether or not your organization has already taken action to prepare for the possible impacts of climate change, how much of a hurdle has each of the following issues been in your efforts to date?

34. Please describe how familiar you are with each of the following coastal adaptation options.
35. In order to carry out your daily job responsibilities, what data and information do you consult regularly?

<table>
<thead>
<tr>
<th>Types of Data and Information</th>
<th>Percentage of Responses (n=177)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use plans and surveys</td>
<td>Socioeconomic Data</td>
</tr>
<tr>
<td>Demographic data</td>
<td></td>
</tr>
<tr>
<td>Information on recreation</td>
<td></td>
</tr>
<tr>
<td>Property tax information</td>
<td></td>
</tr>
<tr>
<td>Habitat or land cover maps or studies</td>
<td>Environmental Resource Information</td>
</tr>
<tr>
<td>Biological assessments</td>
<td></td>
</tr>
<tr>
<td>Endangered species maps or studies</td>
<td></td>
</tr>
<tr>
<td>Flood risk maps and/or flood frequency</td>
<td></td>
</tr>
<tr>
<td>Coastal geology maps and reports</td>
<td>Geological or Geomorphological Information</td>
</tr>
<tr>
<td>Shoreline change rates or studies</td>
<td></td>
</tr>
<tr>
<td>Coastal elevation maps or data</td>
<td></td>
</tr>
<tr>
<td>Types and elevation of shoreline protection</td>
<td></td>
</tr>
<tr>
<td>Sediment budgets</td>
<td></td>
</tr>
<tr>
<td>Water quality information</td>
<td>Weather, Climate, and Water Information</td>
</tr>
<tr>
<td>Sea-level rise projections</td>
<td></td>
</tr>
<tr>
<td>Climate and weather information</td>
<td></td>
</tr>
<tr>
<td>Tidal Datum characteristics</td>
<td></td>
</tr>
<tr>
<td>Water supply/budget forecasts or studies</td>
<td></td>
</tr>
<tr>
<td>Topographic maps</td>
<td>Other Information</td>
</tr>
</tbody>
</table>
36a. In the work you do, please rate the usefulness of the following types of weather and climate information for assessing the risks from climate change to local coastal resources.

36b. In the work you do, please rate the usefulness of the following types of physical information for assessing the risks from climate change to local coastal resources.
36c. In the work you do, please rate the usefulness of the following types of *biological information* for assessing the risks from climate change to local coastal resources.

![Biological Information Chart]

36d. In the work you do, please rate the usefulness of the following types of *socioeconomic* information for assessing the risks from climate change to local coastal resources.

![Socioeconomic Information Chart]
37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access.

<table>
<thead>
<tr>
<th>Information Type #1</th>
<th>Information Type #2</th>
<th>Information Type #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential flooding and drainage area</td>
<td>Wave run up</td>
<td>[No response]</td>
</tr>
<tr>
<td>None</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Changes in temperature</td>
<td>Weather pattern changes</td>
<td>Rainfall measurements</td>
</tr>
<tr>
<td>Effect of climate change on biological systems</td>
<td>How climate change will impact fire hazard in wildland-urban interface</td>
<td>Availability of groundwater under climate change</td>
</tr>
<tr>
<td>Climate model scenarios</td>
<td>Sea level model scenarios</td>
<td>Effective mitigations</td>
</tr>
<tr>
<td>Specific weather predictions</td>
<td>Impact to habitat</td>
<td>Availability of funding</td>
</tr>
<tr>
<td>Examples of adaptation strategies</td>
<td>Local coastal sea level rise data</td>
<td>[No response]</td>
</tr>
<tr>
<td>Permitting processes and CEQA/NEPA compliance</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Fine scale information</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Local sea level projections</td>
<td>Funding sources</td>
<td>Best strategies</td>
</tr>
<tr>
<td>FEMA maps that include projected sea level rise.</td>
<td>A San Diego Bay projected astronomical high tide elevation for 2050 and 2100 in NAVD88.</td>
<td>A percent probability curve for the data in #1 and #2 .</td>
</tr>
<tr>
<td>Local climate change and physical change projections</td>
<td>Cost info for adaptation measures</td>
<td>Monitoring approaches</td>
</tr>
<tr>
<td>Future SLR estimates</td>
<td>Future ground water levels</td>
<td>[No response]</td>
</tr>
<tr>
<td>Sea level change</td>
<td>Coastal bluff erosion rates</td>
<td>Beach erosion rates</td>
</tr>
<tr>
<td>Workable Mitigation/Adaptation Strategies</td>
<td>Cost of Mitigation/Adaptation Strategies</td>
<td>Effect on biological resources</td>
</tr>
<tr>
<td>Accurate validated predictive water quality models</td>
<td>Low cost rapid bacteriological analytical methodology</td>
<td>[No response]</td>
</tr>
<tr>
<td>Population growth estimates</td>
<td>Transit modeling to determine desirability of freeway expansion</td>
<td>Coordination of regional strategies to implement climate adaptation</td>
</tr>
<tr>
<td>Detailed SLR predictions</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Coastal current patterns</td>
<td>Pathogen identification in water</td>
<td>Ocean acidification</td>
</tr>
<tr>
<td>Local impacts of sea level rise</td>
<td>Local impacts of climate change</td>
<td>[No response]</td>
</tr>
<tr>
<td>Sea level rise along oceanfront</td>
<td>Oceanfront vulnerability</td>
<td>Oceanfront adaptation</td>
</tr>
<tr>
<td>Lidar</td>
<td>Sea level change projections</td>
<td>Rainfall change projections</td>
</tr>
<tr>
<td>Changes to hydrology</td>
<td>Techniques for Reservoir de-sedimentation</td>
<td>[No response]</td>
</tr>
</tbody>
</table>
37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access. (cont’d)

<table>
<thead>
<tr>
<th>Information Type #1</th>
<th>Information Type #2</th>
<th>Information Type #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local coastal erosion envelopes above predicted sea level rise</td>
<td>effect of ocean acidification on local marine species</td>
<td>[No response]</td>
</tr>
<tr>
<td>Local shoreline erosion rates</td>
<td>Local sea level rise estimates</td>
<td>Local bluff erosion rates</td>
</tr>
<tr>
<td>Reliable and confirmed science on specific changes over the last 100 years, and rate of change.</td>
<td>Potential effect of small local adaptations.</td>
<td>[No response]</td>
</tr>
<tr>
<td>Climate change effects on agriculture</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Understanding and planning for habitat changes and species migration</td>
<td>Coastal bluff erosion rates and implementing effective rolling easements</td>
<td>Effective coastal land use policies addressing climate adaptation</td>
</tr>
<tr>
<td>Oil Industry Practices</td>
<td>R</td>
<td>[No response]</td>
</tr>
<tr>
<td>Local tidal/sea level change models</td>
<td>Inundation models</td>
<td>Information on other municipalities’ actions.</td>
</tr>
<tr>
<td>Sources and causes of pollution</td>
<td>Detailed maps of land imperviousness</td>
<td>[No response]</td>
</tr>
<tr>
<td>Fine scale elevation contours</td>
<td>Detailed (20'-40' scale) sea level rise inundation areas</td>
<td>[No response]</td>
</tr>
<tr>
<td>Honest, factual information on SLR</td>
<td>An honest assessment of the unintended consequences of government regulations precluding sediment from reaching the coastline</td>
<td>[No response]</td>
</tr>
<tr>
<td>Sea level rise predictions</td>
<td>Realistic water quality assessment information</td>
<td>[No response]</td>
</tr>
<tr>
<td>Future storm size</td>
<td>Future storm frequency</td>
<td>[No response]</td>
</tr>
<tr>
<td>Accurate water management data</td>
<td>Water use patterns</td>
<td>Historic water use data</td>
</tr>
<tr>
<td>Vulnerability assessment of your community (vulnerability includes exposure, sensitivity and adaptive capacity)</td>
<td>Vulnerability assessment of your community or region’s economic sectors</td>
<td>Cost of different adaptation options</td>
</tr>
<tr>
<td>Regional maps identifying coastal infrastructure/structures at risk from sea level rise</td>
<td>Guidance for how to integrate sea level rise data into consideration of current coastal redevelopment/development projects</td>
<td>State guidance/requirements for coastal planning/development</td>
</tr>
<tr>
<td>Species identification</td>
<td>Species demographic maps</td>
<td>[No response]</td>
</tr>
<tr>
<td>Global GHG from vessels</td>
<td>Long range forecast water quality impacts of global warming</td>
<td>Information on invasive species response to increased</td>
</tr>
<tr>
<td>Latest GIS Data</td>
<td>Project tracking software</td>
<td>[No response]</td>
</tr>
<tr>
<td>Accurate coastal flood maps</td>
<td>Coastal high water info</td>
<td>Wave runup studies</td>
</tr>
<tr>
<td>Impact of sea level rise on the pacific side of Coronado</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
</tbody>
</table>
37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access. (cont’d)

<table>
<thead>
<tr>
<th>Information Type #1</th>
<th>Information Type #2</th>
<th>Information Type #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent of sea level rise</td>
<td>Cost of economic impact</td>
<td>Info on adaptation strategies</td>
</tr>
<tr>
<td>Wetland retreat information <em>(where the habitat will go as sea level rises)</em></td>
<td>Sedimentation ability to raise wetlands as sea level rises</td>
<td>[No response]</td>
</tr>
<tr>
<td>changes in sediment budget due to climate change</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Regional Climate Change Predictions</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Private land ownership maps</td>
<td>Database of all known occurring climate impacts to date</td>
<td>Species migration information</td>
</tr>
<tr>
<td>Coastal access plans</td>
<td>Beach/bluff erosion</td>
<td>Funding to support or sustain</td>
</tr>
<tr>
<td>Technical Strategies for Infrastructure design</td>
<td>Spatial Imagery and Analysis projecting real scenarios on the ground</td>
<td>Weather forecasting predictions for region</td>
</tr>
<tr>
<td>Existing and historical loss of coastal land</td>
<td>Projection loss of coastal land</td>
<td>Valuation of different uses of coastal lands</td>
</tr>
<tr>
<td>Local sea level projections</td>
<td>Possible impacts to local ecosystems</td>
<td>Projected climate change in area</td>
</tr>
<tr>
<td>Local precipitation predictions</td>
<td>Species responses to climate change</td>
<td>[No response]</td>
</tr>
<tr>
<td>Coastal ocean climatology</td>
<td>Ocean acidification</td>
<td>Time-series data</td>
</tr>
<tr>
<td>Latest research results</td>
<td>extreme event maps 2050</td>
<td>[No response]</td>
</tr>
<tr>
<td>Realistic rates of sea level rise</td>
<td>Coastal modeling of changes from sea level rise</td>
<td>Changes to climate in localized areas that result from climate change</td>
</tr>
<tr>
<td>Databases showing coastal projects, impacts, monitoring reports, compensation for habitat losses and other mitigation strategies statewide</td>
<td>Sea level rise and storm frequency</td>
<td>Pre and post construction shoreline and underwater monitoring of near-shore habitats and species that are already affected by other impacts such as water pollution</td>
</tr>
<tr>
<td>Unpermitted coastal development</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Funding</td>
<td>Commitment</td>
<td>Action</td>
</tr>
<tr>
<td>Physical information</td>
<td>Adaptation strategies</td>
<td>Mitigation strategies</td>
</tr>
<tr>
<td>Coastal species and habitats most vulnerable to climate change</td>
<td>information on the biological impacts of beach nourishment</td>
<td>Information isn’t the problem - time to assimilate info is the problem</td>
</tr>
<tr>
<td>Adaptation options</td>
<td>impacts on wastewater treatment facilities</td>
<td>[No response]</td>
</tr>
<tr>
<td>Microclimates</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Up to date sea level rise measurements.</td>
<td>Significance criteria for greenhouse gas emissions.</td>
<td>Mitigation strategies for reducing greenhouse gas emissions during construction.</td>
</tr>
</tbody>
</table>

---
37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access. (cont’d)

<table>
<thead>
<tr>
<th>Information Type #1</th>
<th>Information Type #2</th>
<th>Information Type #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic weather data</td>
<td>Weather patterns for the next 20 years</td>
<td>[No response]</td>
</tr>
<tr>
<td>Sea-level rise predictions</td>
<td>Coastal erosion predictions</td>
<td>[No response]</td>
</tr>
<tr>
<td>Detailed habitat maps</td>
<td>High accuracy elevations</td>
<td>Marine habitat &amp; substrate</td>
</tr>
<tr>
<td>Changes identified via permit process</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Predictions in change of habitat distribution</td>
<td>Adaptation approaches to ocean acidification</td>
<td>Cumulative analysis of current stressors and those imposed by climate change</td>
</tr>
<tr>
<td>Barrier beach dynamics with SLR</td>
<td>Sediment input vs. SLR</td>
<td>Carbon sequestration of marshes</td>
</tr>
<tr>
<td>Accurate ocean pH data</td>
<td>Interaction of deep ocean water on pH and DO at shelf depth</td>
<td>Role of various nutrient sources on DO and algal blooms</td>
</tr>
<tr>
<td>Sea level rise predictions</td>
<td>Coastal changes</td>
<td>Alternative stategies for mobility</td>
</tr>
<tr>
<td>Nearshore bathymetric data</td>
<td>Nearshore environmental resources data</td>
<td>GIS decision support tools</td>
</tr>
<tr>
<td>Countywide level vulnerability/risk assessment</td>
<td>County General Plan/LCP amendments incorporating adaptation</td>
<td>State legislation directing local jurisdictions to plan for adapting to potential climate impacts</td>
</tr>
<tr>
<td>Changing distribution of marine animals</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Site-specific sea-level rise predictions</td>
<td>Accurate pH rates of change information</td>
<td>Analyses of long-term regional marine biological data</td>
</tr>
</tbody>
</table>
37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access. (cont’d)

**NGO, Private Industry & Environmental Consultant Respondents**

<table>
<thead>
<tr>
<th>Information Type #1</th>
<th>Information Type #2</th>
<th>Information Type #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local rainfall predictions for the next 25 -100 years</td>
<td>Local information on how climate change may affect our storm water systems</td>
<td>How climate change will affect local patterns of storm water runoff patterns</td>
</tr>
<tr>
<td>Predicted atmospheric temperature increases along the coast -- estimates vary.</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Accepted data on climate change</td>
<td>Maps for climate change predictions</td>
<td>Effects of climate change on coastal estuaries and how to manage for the effects</td>
</tr>
<tr>
<td>High-resolution imagery</td>
<td>LIDAR elevations</td>
<td>Climate predictions</td>
</tr>
<tr>
<td>Species response to climate change</td>
<td>Potential adaptation strategies</td>
<td>Land acquisition options</td>
</tr>
<tr>
<td>Accurate predictions of sea level</td>
<td>Accurate predictions of erosion</td>
<td>Relative cost of alternatives</td>
</tr>
<tr>
<td>Which govt agencies or companies have funding available for climate change planning</td>
<td>Which communities/organizations/companies are seriously pursuing assistance in developing adaptation strategies</td>
<td>[No response]</td>
</tr>
<tr>
<td>Specific regional projections of impacts</td>
<td>Specific regionally appropriate adaptation</td>
<td>[No response]</td>
</tr>
<tr>
<td>Extent of sea level rise</td>
<td>Nature of proposed mitigation measures</td>
<td>Cost of mitigation strategies</td>
</tr>
<tr>
<td>Scientific journals</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Oceanographic data</td>
<td>Beach/coastal zone bathymetry, topography</td>
<td>Geo-referenced aerial photos</td>
</tr>
<tr>
<td>How to communicate about global warming</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Cost of adaptation versus inaction</td>
<td>Engineered studies of future floods - FEMA maps</td>
<td>Habitat migration potential</td>
</tr>
<tr>
<td>Carbon sequestration potential for chaparral</td>
<td>Successful examples of ecosystem-based governance (watershed-based jurisdictions, etc.) that would apply to Southern California</td>
<td>Method and feasibility of revising water rights/groundwater adjudication</td>
</tr>
<tr>
<td>Cost benefit analysis of various adaptation options</td>
<td>Analysis of the most vulnerable communities in our region</td>
<td>Economic analysis from other regions</td>
</tr>
<tr>
<td>Water budget</td>
<td>Economic info</td>
<td>[No response]</td>
</tr>
<tr>
<td>Predicted tidal elevations in my region (san diego and orange county)</td>
<td>Suggested mitigations to build into coastal projects</td>
<td>Tools to better design estuary restorations incorporating new sea levels (leaving room for sea level to rise)</td>
</tr>
<tr>
<td>Projected dam safety and failure data</td>
<td>Sediment accumulation rates and projections in reservoirs and below dams</td>
<td>Invasive species sources and proliferation data</td>
</tr>
<tr>
<td>Land subsidence</td>
<td>Topographic</td>
<td>Temperature history</td>
</tr>
</tbody>
</table>
37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access. (cont’d)

NGO, Private Industry & Environmental Consultant Respondents (cont’d)

<table>
<thead>
<tr>
<th>Information Type #1</th>
<th>Information Type #2</th>
<th>Information Type #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate sea level rise predictions</td>
<td>Historical shoreline data</td>
<td>Historical coastal water quality data</td>
</tr>
<tr>
<td>Models for sea level changes for my region</td>
<td>Better biological assessments</td>
<td>Communication tools on climate change</td>
</tr>
<tr>
<td>Climate impacts on groundwater</td>
<td>Climate impacts on fresh water quality</td>
<td>[No response]</td>
</tr>
<tr>
<td>Future impacts</td>
<td>What impacts can be reduced if we get to 350 ppm</td>
<td>Maps of impacted areas with SLR</td>
</tr>
<tr>
<td>Topographic information at 1 ft contour intervals</td>
<td>Bathymetry at 1 ft contour intervals</td>
<td>[No response]</td>
</tr>
</tbody>
</table>
38. Briefly describe what limits your access to this information:

<table>
<thead>
<tr>
<th>City &amp; County Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limitations to information</strong></td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Don’t know where to look; not aware of any studies covering topics.</td>
</tr>
<tr>
<td>1. It’s a global issue, but where does one start locally? 2. Funds for scientific research and mitigation testing.</td>
</tr>
<tr>
<td>Too many other competing priorities and lack of funding and resources</td>
</tr>
<tr>
<td>Time. This is a relatively new issue; as such, it seems that there is a lot of pioneering (or no pioneering) at a local level in this area. Much of this is a guessing game. As such, “time” is the limiting factor and conversely will benefit the thinking process. As cities move forward with this issue they will become more adept at understanding an adaptation strategy, the issues surrounding it, and the implications of such a strategy. At this time, it is difficult to even explain what an adaptation strategy might look like more less develop one.</td>
</tr>
<tr>
<td>Overzealous and overreaching application of the rules causes reluctance to comply or even to ask for assistance. Non-partisan assistance is not specific enough or too costly to get through the process. Once involved in the process, information required to comply may be costly to include with no real benefit to completing the project. No money is available to pay for planning and permitting.</td>
</tr>
<tr>
<td>I think it is more useful to approach stakeholders regarding specific effects of climate change. The overall topic is too big to work on effectively.</td>
</tr>
<tr>
<td><strong>Unavailable</strong></td>
</tr>
<tr>
<td>1. FEMA does not issue flood maps with projected sea level rise, which is alot like driving by looking in the rearview mirror.</td>
</tr>
<tr>
<td>2. Most marine studies are based on the mean high tide line, not NAVD88. This is a problem because the mean high tide line changes over time. We need a common datum (like NAVD88) from which we can all build on.</td>
</tr>
<tr>
<td>3. I’m not sure who would come up with the probability of a projected sealevel rise because NOAA would be defunded if they put their stamp on it but having a probability associated with a projected sea level rise would allow communities to make better decisions. Also, since mitigation measures may work it would be nice to get updates every 5 years.</td>
</tr>
<tr>
<td>Limits of knowledge/expertise, money, time</td>
</tr>
<tr>
<td><strong>Source and science</strong></td>
</tr>
<tr>
<td>Cost of information acquisition, lack of authorization to obtain such information, lack of knowledge of where such information may be found.</td>
</tr>
<tr>
<td>Do not know where to find this information.</td>
</tr>
<tr>
<td><strong>Current state of scientific research and technology</strong></td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>1. Overdependence on unreliable and unverifiable sources (SANDAG). 2. Modeling assumptions and underlying support data are not made available and are considered proprietary (SANDAG). 3. No effective regional approach to solving essentially the same problems in spite of numerous committees and talk-talk.</td>
</tr>
<tr>
<td>Need to provide 'general public' credibility to the science that make SLR predictions and related mapping; can be hard when SD tv weather men makes jokes about SLR and globabl climate change.</td>
</tr>
<tr>
<td>Technological limitations: Improving for current patterns, but still too limited. We currently identify indicator species, rather than pathogens. Ocean acidification information is becoming available, but is rudimentary.</td>
</tr>
<tr>
<td>I don't know that this detailed level of information has been developed as my city has not prepared a Climate Action Plan or Study.</td>
</tr>
<tr>
<td>Funding to hire consultant to perform adaptation study along oceanfront and river valley</td>
</tr>
</tbody>
</table>
38. Briefly describe what limits your access to this information (cont’d):

<table>
<thead>
<tr>
<th>Limitations to information</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is either not know, or not developed</td>
</tr>
<tr>
<td>1. It doesn't exist yet. We are working on getting it, but are limited by funding.</td>
</tr>
<tr>
<td>2. Initial studies have been conducted on common aquaculture species, but not important wild species.</td>
</tr>
<tr>
<td>Lack of site specific studies.</td>
</tr>
<tr>
<td>Time and the press of other issues.</td>
</tr>
<tr>
<td>Timing. County is in the early stages of exploring climate adaptation issues.</td>
</tr>
<tr>
<td>Time to research what's available to me, knowledge as to where that information resides in its most applicable format.</td>
</tr>
<tr>
<td>Not readily available.</td>
</tr>
<tr>
<td>Government intervention</td>
</tr>
<tr>
<td>1. Too many conflicting sources with no definitive numbers. We can't plan with WAGs.</td>
</tr>
<tr>
<td>2. Water quality rules are being written by politicians. It's always the issue of the week, month or year. The State RWQB does not base their rules on real science.</td>
</tr>
<tr>
<td>It doesn't exist, to the best of my knowledge.</td>
</tr>
<tr>
<td>Time to research the data. A climate change portal that links to other sites with related information would be helpful.</td>
</tr>
<tr>
<td>This information is not yet available for my region.</td>
</tr>
<tr>
<td>The data/guidance does not exist, to my knowledge.</td>
</tr>
<tr>
<td>1) Lack of staffing</td>
</tr>
<tr>
<td>2) Discrepancies in information amongst cooperating agencies</td>
</tr>
<tr>
<td>Funding</td>
</tr>
<tr>
<td>Federal government</td>
</tr>
<tr>
<td>No data available</td>
</tr>
</tbody>
</table>
38. Briefly describe what limits your access to this information (cont’d):

<table>
<thead>
<tr>
<th>State, Federal &amp; Regional Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limitations to information</strong></td>
</tr>
<tr>
<td>Too much information is widely available; often with contradictory summaries and/or recommendations. Don’t know which information source to trust.</td>
</tr>
<tr>
<td>Don’t know where to find it.</td>
</tr>
<tr>
<td>Limited to no studies have been done on impacts of climate change on sediment budgets (such as transport of sand to beaches by rivers; changes in beach width due to higher sea level)</td>
</tr>
<tr>
<td>Not aware that regional/local models of climate change have been developed for southern California</td>
</tr>
<tr>
<td>Either it is not put together yet, or I do not know where to find it.</td>
</tr>
<tr>
<td>NA</td>
</tr>
<tr>
<td>Time, funding, staffing vacancies</td>
</tr>
<tr>
<td>Funding and time. Lack of management focus.</td>
</tr>
<tr>
<td>Uses and evaluation of different use of coastal lands</td>
</tr>
<tr>
<td>Science not available</td>
</tr>
<tr>
<td>Data does not exist</td>
</tr>
<tr>
<td>There are no limits to getting information at my agency.</td>
</tr>
</tbody>
</table>
| "#1: long-term data sets not consolidated; no mandate to create regional/local climatology; 
  #2: current state of technology (e.g., measurement of pH) is highly variable and lacks precision; 
  #3: little funding for long-term observations of the coastal ocean by SCCOOS and CenCOOS" |
| Time to research and cost in subscribing |
| Studies all vary in predictions. Nobody knows exactly what will happen and when, so it is difficult to plan for everything. |
| The technology is not very well developed to have a good viewpoint on a regionwide basis. The existing databases (owned by cities and their consultants) are either not available to state agencies and/or non-existent in some cases. Data and references to studies are not usually provided on a specific location even though historical data is existing and references are available (state workers don’t have a lot of time to do research when the information can already be provided by the project proponents and/or the Army Corp. We need all the data and studies provided to us to review along with the project proposals and we need access to the databases in order to see prior project data in the same location or within the same vicinity and the information that would help us see cumulative impacts and vulnerable habitats of these areas. |
| No formalized data collection to locate all unpermitted coastal development. |
| Funding is not available, and is being cut more by the federal government |
| Not sure                               |
| Time                                   |
| Not much information available in the literature. |
| There is no solid data on the various microclimates. |
| Lack of consistent studies             |
| Work has generally not been done or not processed |
| Information has either not been compiled or workload precludes my ability to access and review |
| Lack of research in these areas        |
| Primarily the research or monitoring has not been performed in a comprehensive manner or with appropriate technology. |
38. Briefly describe what limits your access to this information (cont’d):

State, Federal & Regional Respondents (cont’d)

<table>
<thead>
<tr>
<th>Limitations to information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level rise and coastal change work has been done but it has not yet reached the working ranks of transpor-</td>
</tr>
<tr>
<td>Funding</td>
</tr>
<tr>
<td>Not too many adopted County-level adaptation plans in CA yet, since no legislative mandate. BCDC, Commis-</td>
</tr>
<tr>
<td>Not routinely collected</td>
</tr>
<tr>
<td>Time and priorities do not allow me to address these issues, though I see them coming on the horizon. A lack of managerial support to plan and prepare for global warming/climate change also plays a small role in preventing me (or my staff) from such efforts.</td>
</tr>
</tbody>
</table>

NGO, Private Industry & Environmental Consultant Respondents

<table>
<thead>
<tr>
<th>Limitations to information</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not have the engineering knowledge to derive the information myself and I do not believe others have generated it for the San Diego region yet.</td>
</tr>
<tr>
<td>No clear scientific consensus.</td>
</tr>
<tr>
<td>Not know where the information lives.</td>
</tr>
<tr>
<td>Cost is the primary limitation.</td>
</tr>
<tr>
<td>Limited information exists, not well-organized or readily available</td>
</tr>
<tr>
<td>Scientific uncertainty.</td>
</tr>
<tr>
<td>Only becomes a priority to get the info if there is a potential profitable job that my company is likely to win.</td>
</tr>
<tr>
<td>Little scientific study seems to be occuring in smaller, rural areas.</td>
</tr>
<tr>
<td>Lack of publicly available, easy to obtain data (these are becoming available little by little)</td>
</tr>
<tr>
<td>Cost</td>
</tr>
<tr>
<td>My work is focused on other areas, namely regulatory compliance so this entire survey is not directed to my core responsibilities and need for information.</td>
</tr>
<tr>
<td>1. I don't believe a clear analysis has been done on the issue.</td>
</tr>
<tr>
<td>2. I've seen a few examples, but none that provide a template for So Cal.</td>
</tr>
<tr>
<td>3. This is a highly contentious issue that most stakeholders shy away from.</td>
</tr>
<tr>
<td>Difficulty in analyzing full scope of costs and benefits related to implementing adaptation options.</td>
</tr>
<tr>
<td>Does not exist</td>
</tr>
<tr>
<td>Not readily available, no mandate from state or fed agencies to take into account when assessing environmental impacts of proposed projects. No references adopted, accepted, or frequently referred to by agencies for me to cite. Not time to do literature search for each project. Broad maps of projected sea level would be most helpful- in a format that the agencies accept and adopt as true (or scientifically sound).</td>
</tr>
<tr>
<td>Not enough research is being conducted and dam safety investigation and sedimentation rates in reservoirs is not assessing forecasted conditions.</td>
</tr>
<tr>
<td>Not available as the tidal datums, tidal predictions/measurements</td>
</tr>
<tr>
<td>Sea level rise predictions in California cover a very wide range historic shoreline data has only been collected over the past 50 years or so. Historic coastal water quality data is also relatively recent.</td>
</tr>
</tbody>
</table>
38. Briefly describe what limits your access to this information (cont’d):

NGO, Private Industry & Environmental Consultant Respondents (cont’d)

<table>
<thead>
<tr>
<th>Limitations to information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mostly is time to gather, evaluate and incorporate this information to our daily work and</td>
</tr>
<tr>
<td>planning processes. Also, some information does not currently exist (e.g., biological data</td>
</tr>
<tr>
<td>on many species).</td>
</tr>
<tr>
<td>Aside from Sierra snowpack-driven water supply, a lot of the research on the effects of</td>
</tr>
<tr>
<td>climate change on urban freshwater sources is just &quot;not there yet&quot; for such a refined</td>
</tr>
<tr>
<td>scale. Some research on precipitation, etc at a very fine resolution is being done by Alex</td>
</tr>
<tr>
<td>Hall out of UCLA and that will help greatly.</td>
</tr>
<tr>
<td>Time to research the best info out there</td>
</tr>
<tr>
<td>Cost</td>
</tr>
</tbody>
</table>
39. What sources do you typically consult to obtain the data and information you need for your work?
40. If you have begun working on adaptation-related projects, please list the three organizations that you have consulted most for information, tools, or other technical assistance.

**City & County Respondents**

<table>
<thead>
<tr>
<th>Organization #1</th>
<th>Organization #2</th>
<th>Organization #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>Other local agencies</td>
<td>Colleagues in other communities</td>
</tr>
<tr>
<td>Consultants</td>
<td>Consultants</td>
<td>Consultants</td>
</tr>
<tr>
<td>State RWQCB</td>
<td>Water agencies</td>
<td>Corps of Engineers</td>
</tr>
<tr>
<td>Coastal Commission information</td>
<td>Resource information relative to</td>
<td>Regional agencies</td>
</tr>
<tr>
<td></td>
<td>California</td>
<td></td>
</tr>
<tr>
<td>San Diego Port District</td>
<td>San Diego Foundation</td>
<td>Consultants</td>
</tr>
<tr>
<td>CCCC</td>
<td>CARB</td>
<td>UC</td>
</tr>
<tr>
<td>ICLEI</td>
<td>OPR</td>
<td>APA</td>
</tr>
<tr>
<td>LGC</td>
<td>ILG</td>
<td>SEEC</td>
</tr>
<tr>
<td>UCSC</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>San Diego Foundation</td>
<td>Scripps Institution of Oceanography</td>
<td>Dr. James Hansen, Columbia University</td>
</tr>
<tr>
<td>CCSE</td>
<td>SD Foundation</td>
<td>SDSU/UCSD/Scripps coalition</td>
</tr>
<tr>
<td>ICLEI</td>
<td>San Diego Foundation</td>
<td>[No response]</td>
</tr>
<tr>
<td>ICLEI</td>
<td>CARB</td>
<td>Coastal Commission</td>
</tr>
<tr>
<td>ICLEI</td>
<td>CARB</td>
<td>California Climate Change Portal</td>
</tr>
<tr>
<td>Federal Agencies - EPA, NOAA</td>
<td>State agencies - Coastal Commission</td>
<td>NGOs like CoastKeeper</td>
</tr>
<tr>
<td>epa.gov</td>
<td>FEMA</td>
<td>FEMA</td>
</tr>
<tr>
<td>Local climate action plan</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>NOAA</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Federal EPA</td>
<td>Federal CDC</td>
<td>LARC</td>
</tr>
<tr>
<td>California Natural Resources Agency</td>
<td>University of Washington's Climate</td>
<td>IPCC</td>
</tr>
<tr>
<td></td>
<td>Impacts Group</td>
<td></td>
</tr>
<tr>
<td>Google</td>
<td>Academic Institutions</td>
<td>Research Institutions</td>
</tr>
<tr>
<td>ICLEI Local Governments for Sustainability</td>
<td>UCSD Scripps Institution of Oceanography</td>
<td>SDSU Graduate School of Public Health</td>
</tr>
<tr>
<td>NOAA</td>
<td>American Association fo Port Authorities (AAPA)</td>
<td>California Coastal Commission</td>
</tr>
<tr>
<td>CalFire</td>
<td>NOAA</td>
<td>USFS</td>
</tr>
<tr>
<td>Global Green</td>
<td>Terry Hayes &amp; Associates (Environmental consultant)</td>
<td>SCAG</td>
</tr>
<tr>
<td>San Diego Foundation</td>
<td>ICLEI</td>
<td>Scripps</td>
</tr>
</tbody>
</table>
40. If you have begun working on adaptation-related projects, please list the three organizations that you have consulted most for information, tools, or other technical assistance. (cont’d)

State, Federal & Regional Respondents

<table>
<thead>
<tr>
<th>Organization #1</th>
<th>Organization #2</th>
<th>Organization #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCDC</td>
<td>OPC</td>
<td>CA Climate change Research center</td>
</tr>
<tr>
<td>NOAA</td>
<td>USEPA</td>
<td>State of California</td>
</tr>
<tr>
<td>NOAA</td>
<td>USGS</td>
<td>DFG</td>
</tr>
<tr>
<td>California Dept. of Fish and Game</td>
<td>NOAA</td>
<td>California Coastal Conservancy</td>
</tr>
<tr>
<td>San Francisco Bay Conservation and Development Commission</td>
<td>NOAA</td>
<td>State of California</td>
</tr>
<tr>
<td>NOAA</td>
<td>Department of Fish and Game</td>
<td>Ocean Protection Council</td>
</tr>
<tr>
<td>ICLEI</td>
<td>EPA</td>
<td>California State Lands Commission</td>
</tr>
<tr>
<td>SANDAG</td>
<td>Coastal Commission</td>
<td>Department of Fish &amp; Game</td>
</tr>
<tr>
<td>Federal Highway Administration (FHWA)</td>
<td>US Environmental Protection Agency (EPA)</td>
<td>San Diego Association of Governments (SANDAG)</td>
</tr>
<tr>
<td>NOAA</td>
<td>USCG</td>
<td>CA Department of Fish and Game</td>
</tr>
<tr>
<td>SCOOS and CenCOOS</td>
<td>SCCWRP</td>
<td>SWRCB</td>
</tr>
<tr>
<td>ICLEI</td>
<td>NOAA Coastal Training</td>
<td>Scripps UCSD</td>
</tr>
<tr>
<td>State of California policy</td>
<td>Coastal Commission requirements</td>
<td>NOAA fisheries guidance</td>
</tr>
<tr>
<td>NMFS</td>
<td>California Coastal Commission</td>
<td>US Fish and Wildlife Service</td>
</tr>
<tr>
<td>IPCC</td>
<td>State of California documents</td>
<td>NGO documents</td>
</tr>
<tr>
<td>USGS</td>
<td>NPS</td>
<td>DFG</td>
</tr>
<tr>
<td>University</td>
<td>Professional/trade groups</td>
<td>Consultants</td>
</tr>
<tr>
<td>Consultants</td>
<td>State - Coastal Conservancy &amp; Commission</td>
<td>Fed - ACOE</td>
</tr>
<tr>
<td>USEPA</td>
<td>State Coastal Conservancy</td>
<td>United Nations</td>
</tr>
<tr>
<td>NMFS</td>
<td>FWS</td>
<td>CDFG</td>
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<tr>
<td>National Weather Service</td>
<td>CA OSPR</td>
<td>CA State Lands Commission</td>
</tr>
<tr>
<td>NOAA</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>NOAA</td>
<td>State of California</td>
<td>USGS</td>
</tr>
<tr>
<td>NOAA</td>
<td>Coastal Conservancy</td>
<td>NERR</td>
</tr>
<tr>
<td>USGS</td>
<td>CCC</td>
<td>EPA</td>
</tr>
<tr>
<td>PWA-ESA consultants</td>
<td>PRBO</td>
<td>USFWS/NOAA/Conservancy-OPC</td>
</tr>
</tbody>
</table>
41. If you have begun working on adaptation-related projects, please list the three organizations that you have consulted most for information, tools, or other technical assistance. (cont’d)

**Elected Official Respondents**

<table>
<thead>
<tr>
<th>Organization #1</th>
<th>Organization #2</th>
<th>Organization #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surfrider Foundation</td>
<td>BEACON</td>
<td>National Sea Grant</td>
</tr>
<tr>
<td>State</td>
<td>Federal</td>
<td>County</td>
</tr>
<tr>
<td>Coastal Communities</td>
<td>Department of Fish and Game</td>
<td>[No response]</td>
</tr>
</tbody>
</table>

**NGO, Private Industry & Environmental Consultant Respondents**

<table>
<thead>
<tr>
<th>Organization #1</th>
<th>Organization #2</th>
<th>Organization #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAA (TRNERR)</td>
<td>PACific Institute</td>
<td>ICLEI</td>
</tr>
<tr>
<td>San Diego Foundation Climate Study</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>USGS</td>
<td>OPC</td>
<td>Coastal Conservancy</td>
</tr>
<tr>
<td>State Coastal Conservancy</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>California Coastal Conservancy</td>
<td>USFWS</td>
<td>[No response]</td>
</tr>
<tr>
<td>California Coastal Commission</td>
<td>California Coastal Conservancy</td>
<td>USGS</td>
</tr>
<tr>
<td>adaption sources in the UK (where I was previously employed)</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>US Army Corps of Engineers</td>
<td>California Ocean Protection Council</td>
<td>California Coastal Conservancy</td>
</tr>
<tr>
<td>My own, ICLEI - Local Governments for Sustainability</td>
<td>NOAA</td>
<td>EPA</td>
</tr>
<tr>
<td>Natural Resources Defense Council</td>
<td>Pacific Institute</td>
<td>UCLA</td>
</tr>
<tr>
<td>ICLEI-Local Governments for Sustainability</td>
<td>Scripps Institution of Oceanography</td>
<td>State of California</td>
</tr>
<tr>
<td>USGS</td>
<td>American Rivers Inc.</td>
<td>UC Riverside Dam Removal Clearinghouse</td>
</tr>
<tr>
<td>NOAA</td>
<td>Stage Agencies on requirements</td>
<td>Local agencies</td>
</tr>
<tr>
<td>Navy</td>
<td>Port of San Diego</td>
<td>Engineering consultant</td>
</tr>
<tr>
<td>US Army COE</td>
<td>Local governmental groups</td>
<td>[No response]</td>
</tr>
<tr>
<td>Sierra Nevada Alliance</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Scripps</td>
<td>UN committee</td>
<td>ARB</td>
</tr>
<tr>
<td>NOAA-NOS website</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
</tbody>
</table>
42. Please rate the use of the following information processing tools in your work.

43. Have you already participated in any formal training(s) on planning for climate change?
44. If yes, please describe which training(s) you attended (if you have attended more than three, please list the most recent):

<table>
<thead>
<tr>
<th>Title/Topic</th>
<th>Approximate date</th>
<th>Location</th>
<th>Organization offering training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning for Climate Change</td>
<td>5/14/2010</td>
<td>Imperial Beach CA</td>
<td>TRNERR</td>
</tr>
<tr>
<td>Coastal smart growth</td>
<td>8/10/2010</td>
<td>Encinitas</td>
<td>NOAA</td>
</tr>
<tr>
<td>Impact on coastal operations of sea level rise</td>
<td>2009</td>
<td>Los Angeles</td>
<td>NOAA at conference</td>
</tr>
<tr>
<td>LARC conferences</td>
<td>Quarterly</td>
<td>Statewide</td>
<td>[No response]</td>
</tr>
<tr>
<td>Planning for Climate Change</td>
<td>4-Mar-09</td>
<td>Padilla Bay, WA</td>
<td>Washington Coastal Training Program, WA Sea Grant, UW, NOAA, WA Dept Ecology</td>
</tr>
<tr>
<td>ICLEI Climate Protection Network Adaptation Planning Framework</td>
<td>Mar-11</td>
<td>The San Diego Foundation</td>
<td>ICLEI</td>
</tr>
<tr>
<td>tools for assessing ghg emissions</td>
<td>2009</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>NEPA environmental certification training</td>
<td>Sep-11</td>
<td>Los Angeles</td>
<td>HUD</td>
</tr>
<tr>
<td>SB 375</td>
<td>Mar-09</td>
<td>Ontario</td>
<td>[No response]</td>
</tr>
<tr>
<td>Sea Level rise training</td>
<td>[No response]</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>AB 32 SB 375</td>
<td>[No response]</td>
<td>[No response]</td>
<td>Continuing BAR</td>
</tr>
<tr>
<td>Climate Change Mitigation and Adaptation</td>
<td>6/14-15/2010</td>
<td>Wilmington NC</td>
<td>The Coastal Society conference sessions</td>
</tr>
<tr>
<td>Climate Change</td>
<td>6/17/2010</td>
<td>Imperial Beach</td>
<td>NOAA</td>
</tr>
<tr>
<td>Same as above</td>
<td>2009?</td>
<td>[No response]</td>
<td>Coastal Commission workshop</td>
</tr>
<tr>
<td>Tijuana Estuary National Estuarine Research Reserve Adaptation Planning Stakeholder Working Group</td>
<td>Nov-10</td>
<td>Tijuana Estuary Visitor's Center</td>
<td>NOAA/ICLEI</td>
</tr>
<tr>
<td>Coastal development</td>
<td>Mar-10</td>
<td>Imperial Beach</td>
<td>Unsure</td>
</tr>
<tr>
<td>Green House Gag Study training</td>
<td>[No response]</td>
<td>[No response]</td>
<td>[No response]</td>
</tr>
<tr>
<td>Communicating Climate Change Adaptation</td>
<td>6/17/2010</td>
<td>Imperial Beach CA</td>
<td>TRNERR</td>
</tr>
<tr>
<td>Port of San Diego Climate Mitigation and Adaptation Planning - Overview of Adaptation Planning Process</td>
<td>May-11</td>
<td>Port of San Diego</td>
<td>Environ/ Port of San Diego</td>
</tr>
</tbody>
</table>
44. If yes, please describe which training(s) you attended (if you have attended more than three, please list the most recent) (cont’d):

State, Federal & Regional Respondents

<table>
<thead>
<tr>
<th>Title/Topic</th>
<th>Approximate date</th>
<th>Location</th>
<th>Organization offering training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Adaptation Planning</td>
<td>May-11</td>
<td>Imperial Beach, CA</td>
<td>Tijuanna River National Estuarine Research Reserve</td>
</tr>
<tr>
<td>Climate Change Assessment Tools</td>
<td>[No response]</td>
<td>[No response]</td>
<td>Team Driven</td>
</tr>
<tr>
<td>Blueprint Planning Grants</td>
<td>Over last 4 years</td>
<td>Several</td>
<td>California Department of Transportation</td>
</tr>
<tr>
<td>Global Warming Conference</td>
<td>2009 ?</td>
<td>San Francisco</td>
<td>USGS/FWS</td>
</tr>
<tr>
<td>Climate Ready Estuary Workshop</td>
<td>July 2010</td>
<td>DC</td>
<td>EPA</td>
</tr>
<tr>
<td>Coastal Climate Change</td>
<td>2008</td>
<td>San Francisco</td>
<td>USFWS</td>
</tr>
<tr>
<td>Adaptation to Coastal Climate Change</td>
<td>Sep-10</td>
<td>San Francisco</td>
<td>[No response]</td>
</tr>
<tr>
<td>H2O Conference</td>
<td>2011</td>
<td>San Diego</td>
<td>CalCoast</td>
</tr>
<tr>
<td>Assessing Vulnerability to Climate Change: A Conservation Approach</td>
<td>23-May-11</td>
<td>San Diego</td>
<td>H2O Conf/SD NERR CTP</td>
</tr>
<tr>
<td>Pacific NW Climate conferences</td>
<td>2010</td>
<td>Portland</td>
<td>University of Washington</td>
</tr>
<tr>
<td>[No response]</td>
<td>[No response]</td>
<td>[No response]</td>
<td>NOAA</td>
</tr>
<tr>
<td>Climate Change Webinars</td>
<td>over last 3 years</td>
<td>several</td>
<td>Air Resources Board, EPA</td>
</tr>
<tr>
<td>Effects to seagrasses</td>
<td>2002</td>
<td>San Diego</td>
<td>MS</td>
</tr>
<tr>
<td>Sink or Swim: Workshop on Marsh Sustainability</td>
<td>Sept. 15, 2011</td>
<td>Oakland</td>
<td>SF NERR CTP</td>
</tr>
<tr>
<td>Climate adaptation training</td>
<td>2008</td>
<td>Seattle</td>
<td>University of Washington</td>
</tr>
<tr>
<td>Adaptation Basics</td>
<td>Sept. 2, 2010</td>
<td>Ventura</td>
<td>WRP Task Force - Bob Thiel (Coastal Conservancy)</td>
</tr>
</tbody>
</table>
44. If yes, please describe which training(s) you attended (if you have attended more than three, please list the most recent) (cont’d):

NGO, Private Industry & Environmental Consultant Respondents

<table>
<thead>
<tr>
<th>Title/Topic</th>
<th>Approximate date</th>
<th>Location</th>
<th>Organization offering training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicating about Climate Change</td>
<td>Jun-10</td>
<td>TRNERR</td>
<td>NOAA Coastal Training Center</td>
</tr>
<tr>
<td>Seminar on Adaptation strategies</td>
<td>Oct-10</td>
<td>Hartford, CT</td>
<td>Land Trust Alliance</td>
</tr>
<tr>
<td>Assessing Vulnerability to Climate Change</td>
<td>May 23, 2011</td>
<td>San Diego</td>
<td>EBM Tools Network</td>
</tr>
<tr>
<td>Climate Change Projections for Impact Assessments</td>
<td>February 2011 (original presentation was 6/22/2009)</td>
<td>webinar: <a href="http://training.fws.gov/CSP/Resources/climate_change/safeguarding_bc.html">http://training.fws.gov/CSP/Resources/climate_change/safeguarding_bc.html</a></td>
<td>USFWS</td>
</tr>
<tr>
<td>Risk &amp; Uncertainty</td>
<td>2010</td>
<td>USACE</td>
<td>USACE</td>
</tr>
<tr>
<td>ICLEI - Sea level rise around San Diego Bay</td>
<td>Nov-10</td>
<td>Tijuana River National Estuarine Research Reserve</td>
<td>TRNERR/ICLEI/The San Diego Foundation</td>
</tr>
<tr>
<td>Salmonid Restoration Federation Conferences</td>
<td>2000-2011</td>
<td>Various</td>
<td>Salmonid Restoration Federation</td>
</tr>
<tr>
<td>Land Use</td>
<td>Apr-10</td>
<td>Encinitas, CA</td>
<td>[No response]</td>
</tr>
<tr>
<td>Adaptation plan</td>
<td>Jan-11</td>
<td>TJ Estuary</td>
<td>ICLEI</td>
</tr>
<tr>
<td>[No response]</td>
<td>Feb-11</td>
<td>imperial beach CA</td>
<td>sea level rising</td>
</tr>
<tr>
<td>[No response]</td>
<td>2006</td>
<td>Malibu</td>
<td>Greenhouse Network</td>
</tr>
<tr>
<td>Stakeholder’s Advisory Group for the San Diego Bay Sea Level Rise Adaptation Planning</td>
<td>Nov-10</td>
<td>TRNERR</td>
<td>NOAA/ICLEI</td>
</tr>
<tr>
<td>Planning for Climate Change</td>
<td>Jun-10</td>
<td>Tijuana River National Estuarine Research Reserve</td>
<td>TRNERR/ICLEI/The San Diego Foundation/Dr. Suzanne Moser</td>
</tr>
<tr>
<td>Workshop on Sea Level Rise: Science, Predictions, and Stakeholder Planning</td>
<td>May-10</td>
<td>Scripps Institution of Oceanography, UCSD</td>
<td>UCSD</td>
</tr>
</tbody>
</table>
45. If you have had the opportunity to implement any skills, or used information, you obtained in the training, please describe any challenges you encountered in doing so.

### City & County Respondents

<table>
<thead>
<tr>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found that many other organizations in our county are already doing the types of programs offered in the workshops I attended at TRNERR. I need to find my niche.</td>
</tr>
<tr>
<td>Data is limited, future projections are limited in accuracy, other issues are more pressing now.</td>
</tr>
<tr>
<td>I've been the only person in my organization with knowledge on the subject, and I am relatively junior, so it has been difficult to engage the rest of my organization in initiating climate preparedness efforts.</td>
</tr>
<tr>
<td>Yes. We have incorporated what we have learned into the development of educational/outreach materials such as the Focus 2050 Study and community/local government presentations.</td>
</tr>
<tr>
<td>Implementing more conservation measures in the design of the redevelopment project I'm working on. (Jordan Downs Specific Plan in Watts). Would like to have seen more roof space used for solar energy capturing.</td>
</tr>
<tr>
<td>Air and Emissions sections of Initial Studies and in EIR preparation</td>
</tr>
</tbody>
</table>

### State, Federal & Regional Respondents

<table>
<thead>
<tr>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>A big challenge is engaging other departments and staff within the organization on the need and importance of climate change planning. There is limited recognition that climate change planning will affect every aspect of our business.</td>
</tr>
<tr>
<td>Support of Administration with policy direction and funding</td>
</tr>
<tr>
<td>Air Quality is a pertinent part of Climate Change and sustainability and therefore, just keeping up with all of the information is a major challenge.</td>
</tr>
<tr>
<td>I am challenged by trying to transfer basic or technical knowledge to folks who have varying degrees of knowledge about adaptation planning. Lots of information out there, but not sure how to choose which to use to be most relevant to a given situation.</td>
</tr>
</tbody>
</table>

### NGO, Private Industry & Environmental Consultant Respondents

<table>
<thead>
<tr>
<th>Challenges</th>
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<tr>
<td>Implementing sea-level rise estimates into estuary restoration projects currently underway.</td>
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<tr>
<td>Haven't had the opportunity yet</td>
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<tr>
<td>No challenges encountered</td>
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<tr>
<td>Budget, lack of ability to do economic analysis of potential options. Public awareness about these issues.</td>
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46. If you have one or more specific suggestions for climate change or adaptation-related research that would assist you in planning and preparing for climate change, please list them here.

<table>
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<tr>
<th>City &amp; County Respondents</th>
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<tr>
<td><strong>Suggestions</strong></td>
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- Understand impact on localized flooding
  It might be helpful to have a listing of best practices on this issue for local communities. I have seen some large regional reports, but it is difficult to pull out of these reports the essentials for a local coastal jurisdiction.

- How to determine which specific climate change impacts and which mitigation and adaptation strategies would be appropriate for a given community of interest.

- How do we compensate landowners to not rebuild in or pay for relocation of infrastructure outside the areas taken over by the ocean?
  Since local municipalities issue grading permits we have a fiduciary duty to protect health and welfare of our citizens in the near and long term. Many ideas such as coastal retreat make sense in a philosophical sense but practically, whoever owns property on the beach will lose it and the next inland neighbor will have the new shoreline for awhile. Post Katrina, it is obvious that seawalls are a myth of security therefore, the best approach, in my opinion, is to place an overlay zone on the affected area with the requirement to raise the pad elevation upon redevelopment. If raising the pad is cost prohibitive, the market will dictate that it is time to let the ocean take it over. Research that allows developers to understand with a high probability (regionally specific, like San Diego Bay, Mission Bay, San Francisco bay) what the highest high tide will be in 50 and 100 years is the most critical information you can provide.

- Climate change is a life-cycle cost analysis variable, one factor of many.
  Our daily work routine needs adopt in response to climate change by reducing factors contributing to it, and by mitigation and adaptation to its impacts.

- Provide all existing data on sea level & climate changes already observed.

- Regional toolboxes, or standardized approaches to SLR to enhance the technical voices that are being drowned out by non-technical audiences and voices who put ‘economy’ and status quo ahead of strategic change based on science and data vs. perception and emotion.

- I think it would be helpful if small cities could team up with other cities or the county in their region, or nearby counties, to create a team approach to planning for climate change. My small city does not have the resources needed to do this on our own nor do we see that our efforts would make enough of a difference to be worthwhile if things aren’t changing elsewhere and on a much larger scale.

- Vulnerability assessment and adaptation strategies for sea level rise along oceanfront
  To address issues of increased intensity of storms on the sedimentation of reservoirs, as well as the impact of dams retention of sediment on downstream habitat and beach replenishment. Development of analysis and a model approach to moving sediment downstream would help in these multiple objectives.

- Climate change will impact marine algae, invertebrates, fish and mammals, as well as the humans that rely upon them. This aspect of climate change is often considered secondary to what will happen in the coastal zone.

- However, information about changes in the nearshore marine environment will be very helpful for me to assist with planning and preparing for global warming.

- Eliminate the politics from the science
  Establish a clearinghouse for vetted studies and reports so we can all access the same information and make better decisions.

- What do we expect to happen?
  We are a port authority, so our primary concern is how vulnerable our infrastructure and operations may be to projected climate change impacts, particularly sea level rise.
46. If you have one or more specific suggestions for climate change or adaptation-related research that would assist you in planning and preparing for climate change, please list them here. (cont’d)

City & County Respondents (cont’d)

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<tr>
<td>It would be good to have more research available that assesses the threats from SLR on coastal ecosystems/water quality, as well as more research to comparatively (on a cost-benefit basis) assesses various options for the protection of coastal ecosystems/shorelines.</td>
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<tr>
<td>Include fire hazards and mitigation techniques</td>
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<tr>
<td>Legislature needs to back more initiatives for developing and expanding light-rail commuter lines, and Transportation Oriented Districts with affordable housing, mixed-incomes, and mixed uses.</td>
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State, Federal & Regional Respondents

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<tr>
<td>More people to acknowledge that climate change has been going on all along and it didn't just start ten years ago when people started talking about it. It's also a very global issue and I don't think governments at any level are attempting to see the big picture of whether spending millions of dollars to just do something is really wise in the bigger scheme of things, particularly if one large volcano blast would change the landscape and climate for our generation and the next few at least</td>
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<tr>
<td>A presentation of the most likely scenarios, across a broad range of impacts, and from a reliable source, would be helpful.</td>
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<tr>
<td>There is a need to assess the issue of recreational beaches needing to migrate as sea level rises; how will they migrate; impacts to recreational uses; need new parking lots? impacts to surfing areas? changes in sediment budgets?</td>
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<tr>
<td>More focused climate change modeling to assist regions in planning efforts.</td>
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<td>True scientific research not tainted by personal bias or agendas. The exposure of radical environmental extremism agendas in regulatory agencies.</td>
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<tr>
<td>Provide basic data and analysis for existing and historical conditions. Provide projections for likely future outcomes. Provide uses and evaluation tools/models to place appropriate values on potential losses of those value.</td>
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<tr>
<td>Fund the regional coastal ocean observation systems</td>
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<tr>
<td>Better research to quantify the relative impact of 1)Annual variations of solar energy output, 2) Volcanos, 3) Anthropogenic causes of climate change.</td>
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<tr>
<td>Setting up a database analyzing specific coastal areas and regions statewide and what is being done in those places and all data and information sharing would be good if that is not already in the works.</td>
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<tr>
<td>Research that identifies the most vulnerable coastal species and habitats. Research that examines where we are likely to lose beaches and what functions will be lost as a result - Research on the ecological value of beaches. Research identifying where wetlands have the opportunity to migrate&quot;</td>
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<tr>
<td>Ocean Acidification</td>
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46. If you have one or more specific suggestions for climate change or adaptation-related research that would assist you in planning and preparing for climate change, please list them here. (cont’d)

State, Federal & Regional Respondents (cont’d)

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<tr>
<td>All state and federal agencies acknowledge there is significant problem, but the challenges seem so overwhelming, complex, and uncertain, that the permitting agencies maintain the status quo. Resource managers need to learn more about pragmatic approaches to adaptation and make use of existing tools and information a greater priority in their everyday tasks. Agency leadership needs to move beyond words to action.</td>
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<tr>
<td>Portal of information organized by likely user groups: local planners; local land resource managers; state land resource managers; general public; elected officials; Could also group by region, habitat type; coastal or inland; urban or rural; models, tools and outputs; research by topic/threat, sector, etc.</td>
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<tr>
<td>Many municipalities and districts who operate publically owned wastewater treatment works have long-term data from near shore coastal water quality and biological monitoring programs. Some date back to the 1970s. These data could (and should) be used to by researchers to investigate changes through time in relation to large scale oceanographic events. Staff at these individual municipalities/districts often do not have the opportunity, mandate, resources, or expertise to perform such integrated analyses. They represent an uptapped resource of high quality data.</td>
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NGO, Private Industry & Environmental Consultant Respondents

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<td>All of the downscaling efforts are excellent, keep 'em going. The type of effort especially that Hayhoe talks about in her presentation is particularly useful in bringing home the message, especially where some of the climate projections make population changes very likely (i.e., relocation from very hot areas)</td>
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<tr>
<td>Direct and indirect costs of adaptation strategies and not having adaptation strategies from coastal region to coastal region.</td>
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<td>A compilation and summary of previously published research on changes in wave activity, both magnitude and frequency, in California.</td>
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<td>I am concerned with regulatory compliance and monitoring.</td>
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<td>Need science-policy nexus to direct decisionmakers</td>
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<td>Studies that project freshwater availability and demand over the next 50-100 years along with sedimentation rates in reservoirs and dam safety conditions. More studies and support for removing obsolete dams and replacing this antiquated and destructive technology with newer technologies such as groundwater recharge, recycled water used, water conservation technology, off-stream water storage, urban and agricultural water efficiency, and low cost/low energy use/low environmental impact desalination technology.</td>
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<tr>
<td>More studies and research on avilable data.</td>
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<td>Regional standardization of infrastructure design or replacment needs. E.g., how taller should piers/bulkheads be constructed. There seems to currently be large variation in this area (little consensus).</td>
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<tr>
<td>Explanation for the lack of accelerated actual sea level rise vs. the dire projections that have not yet been realized (2 mm per year presently and historically vs. 55 inches of rise by 2010)</td>
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<tr>
<td>Local models for climate change impacts would be very useful in communicating with stakeholders and in our planning processes.</td>
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<tr>
<td>Need a list of what others have done to protect wetlands from SLR and habitats from threats.</td>
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<tr>
<td>Regulatory requirements and regulatory agency timelines are very prohibitive/constraining and time-consuming. A major overhaul of the regulatory process would help make projects, including those related to coastal adaptation, much more feasible.</td>
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</table>
47. To make the most effective and efficient use of the available information and tools to support planning for climate change, please rate how useful each of the following opportunities to learn more about them would be to you.

All Respondents (Except Elected Officials)

Elected Officials