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# ***Rising to the Challenge***

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Results of the 2011 California Coastal  
Adaptation Needs Assessment

## **Southern Region**

Compiled by Marika Schulhof

University of Southern California Sea Grant

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## ACKNOWLEDGEMENTS

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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.

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## REGIONAL SUB-REPORTS

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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>

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## REPORT CITATION

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*Southern Region Results:*

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*Statewide Report:*

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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**

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California Coastal Commission

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California Sea Grant College Program

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Gulf of Farallones National Marine Sanctuary

San Francisco Bay Conservation and Development Commission

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## 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.<sup>8</sup> 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.

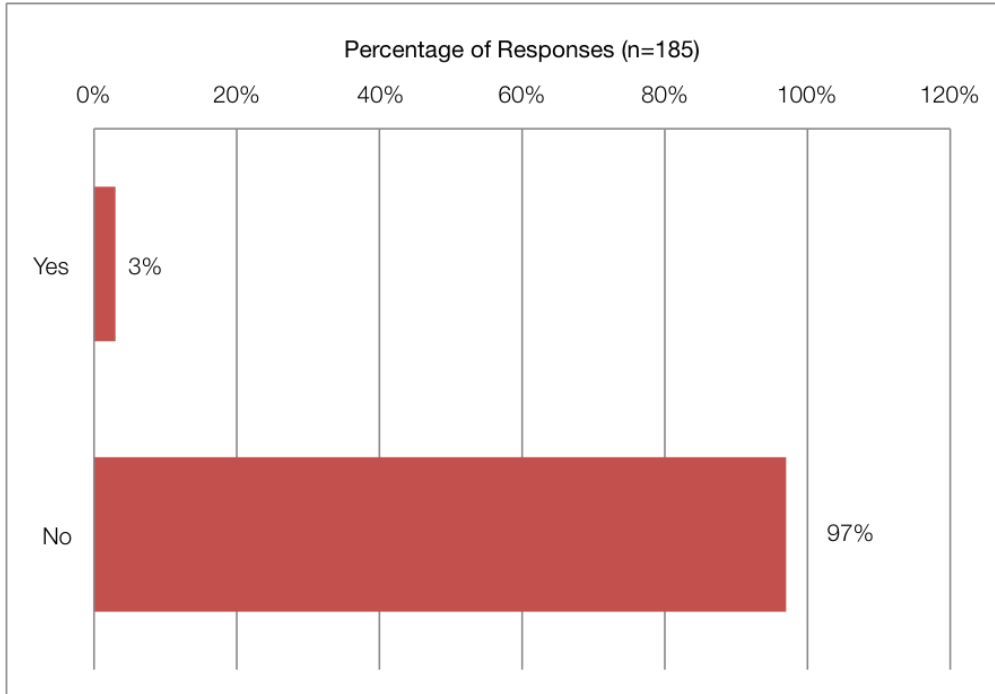


**Map 1.** Locations of respondents. The identity of survey respondents was kept anonymous unless they chose to provide their contact information. This map was developed using this contact information and is therefore not reflective of the respondent population as a whole. Rather, the map provides a glimpse of the geographic distribution of some of the survey respondents (n=59 of 594 survey respondents).

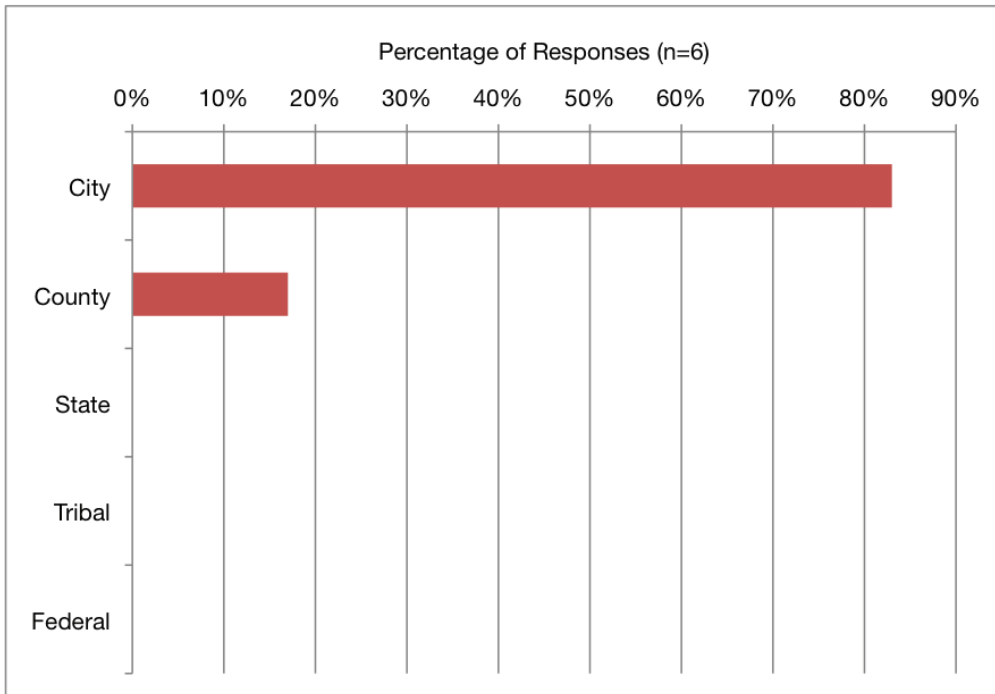
## PART 1: SURVEY POPULATION

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1. Please indicate if you are an elected official.



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

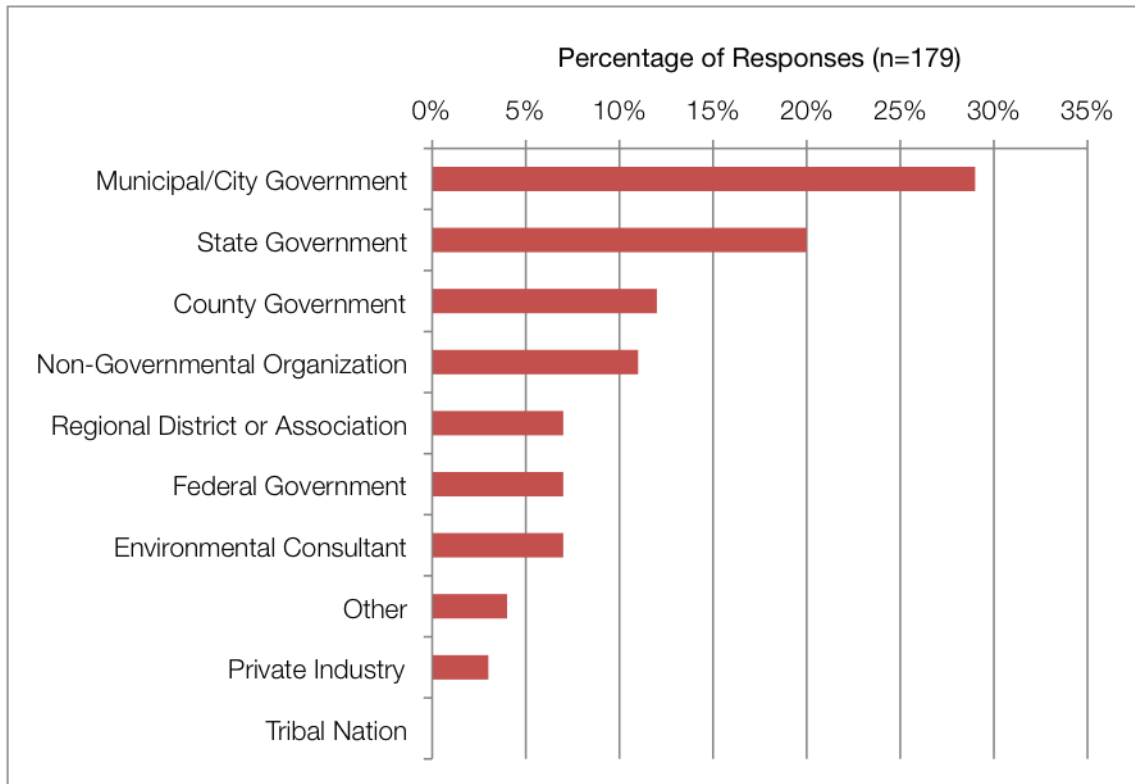


3. Please indicate in which elected office you serve.

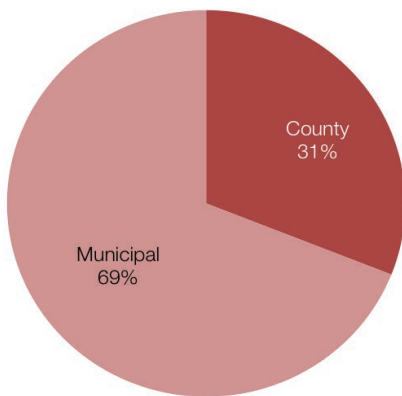
Elected Official Respondents

Councilmember (3)
County
City Council (2)

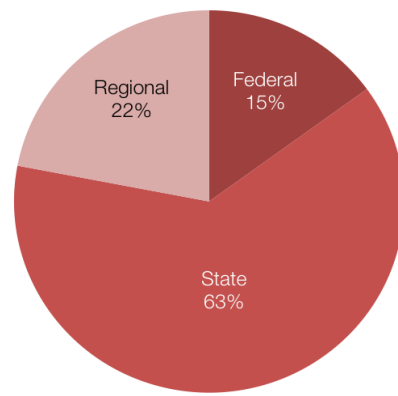
4. If you are not an elected official, please indicate the governmental/organizational sector in which you work.



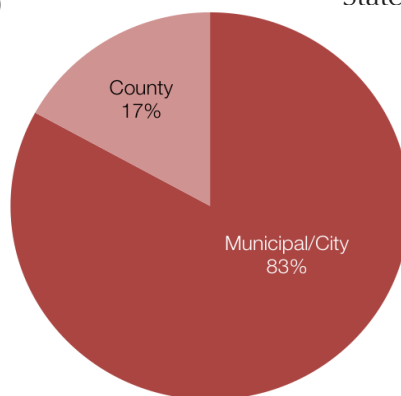
5. Please select your jurisdiction.



City/County Respondents (n=74)



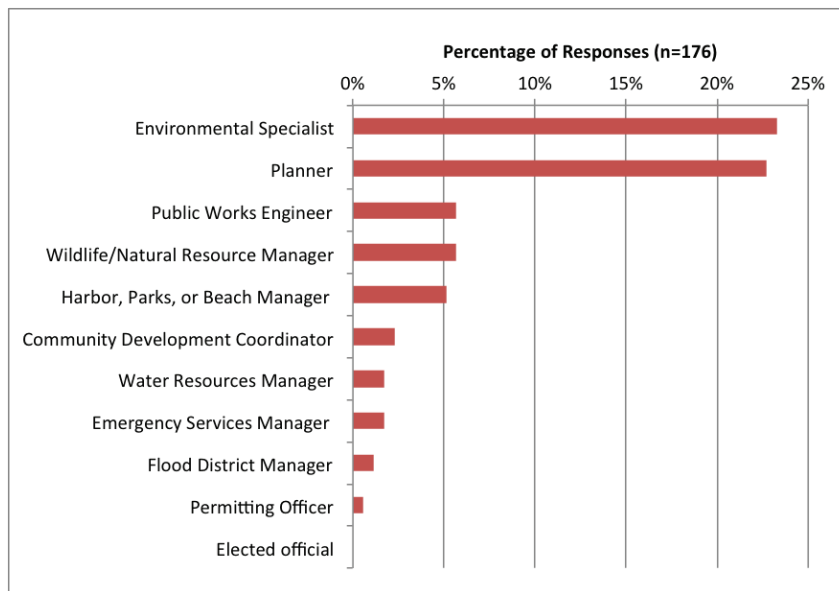
State/Regional/Federal Respondents (n=54)



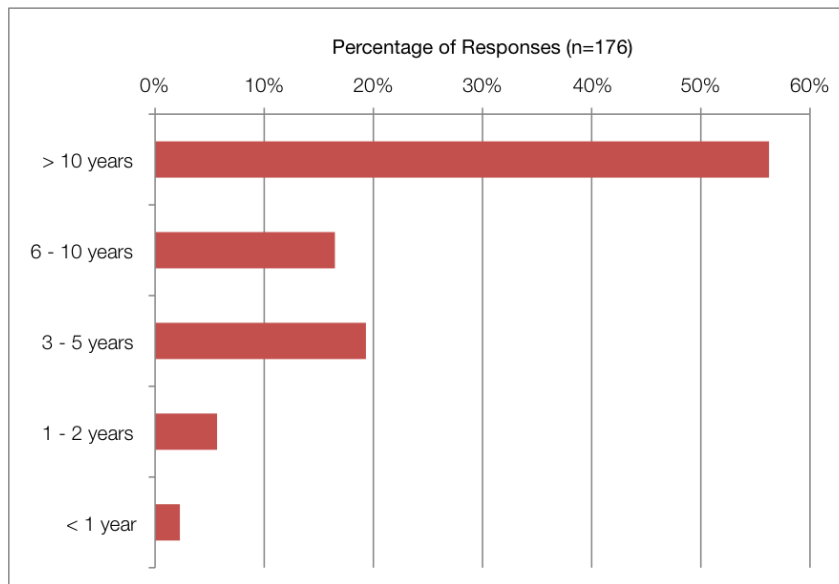
Elected Official Respondents (n=6)



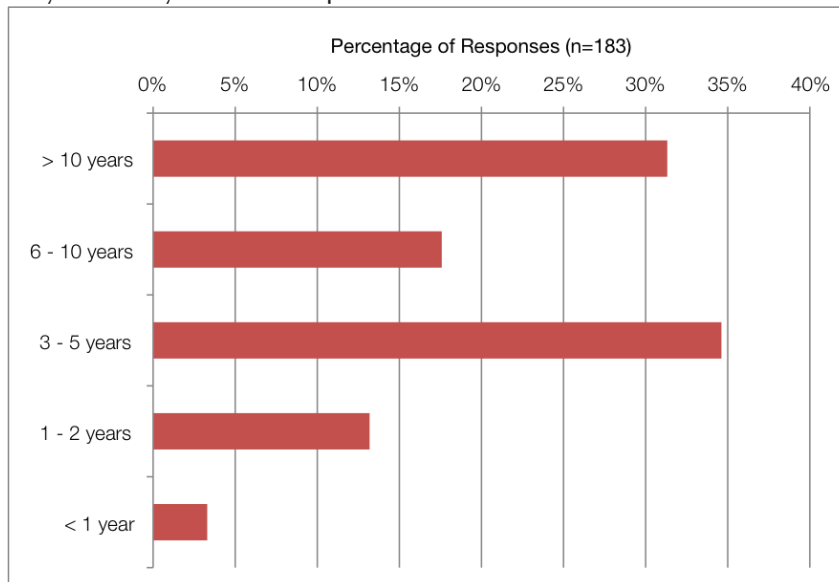
6. Please indicate what type of position you hold in your organization.



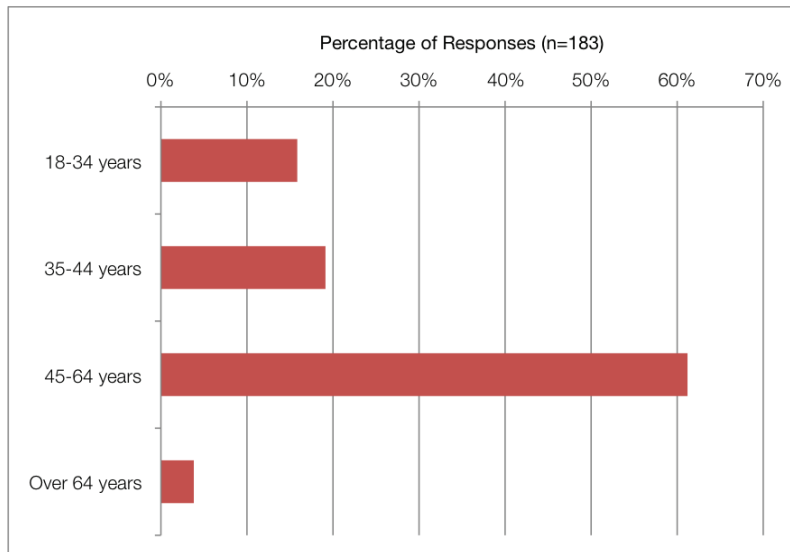
7a. How many years have you been employed by your organization?



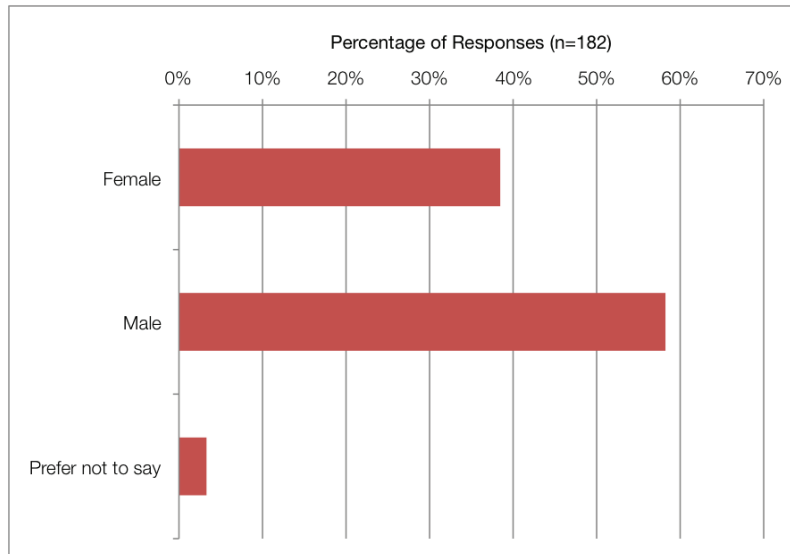
7b. How many years have you held your current position?



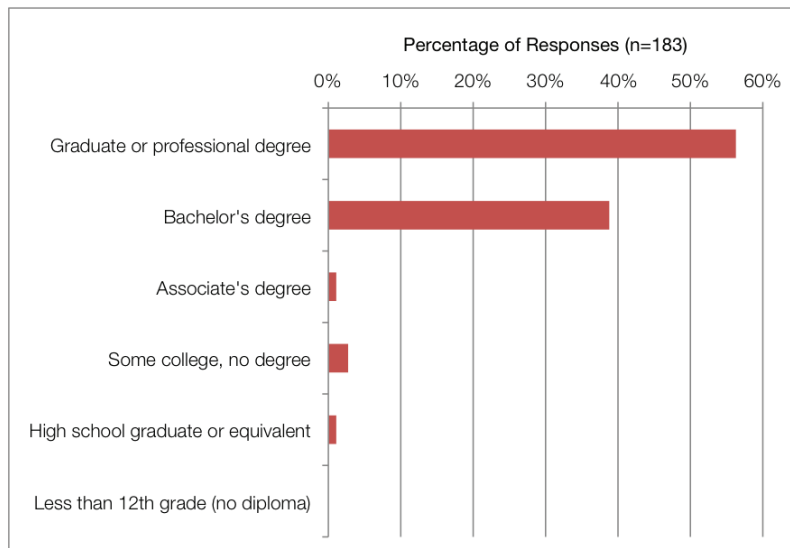
8. What is your age?



9. What is your gender?



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

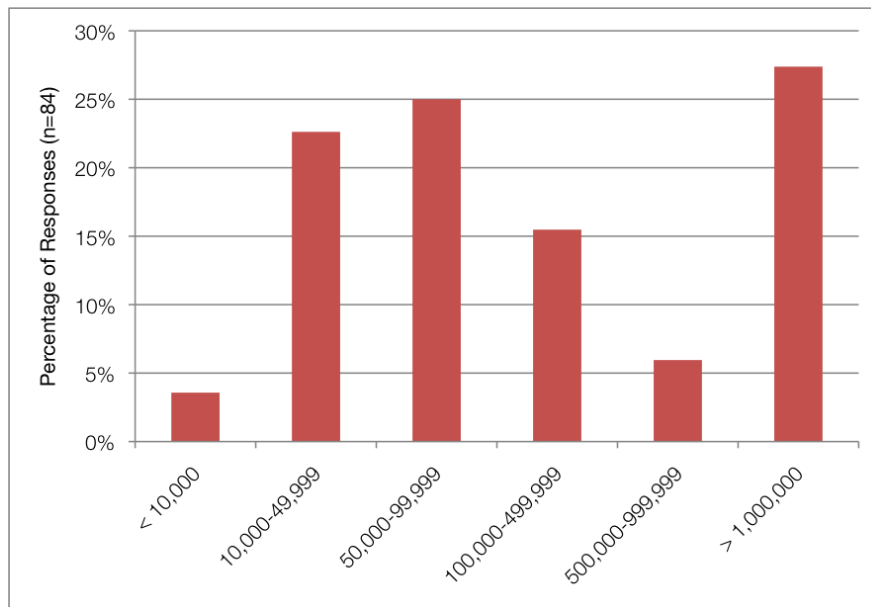


## PART II: CURRENT COASTAL MANAGEMENT CHALLENGES IN CALIFORNIA

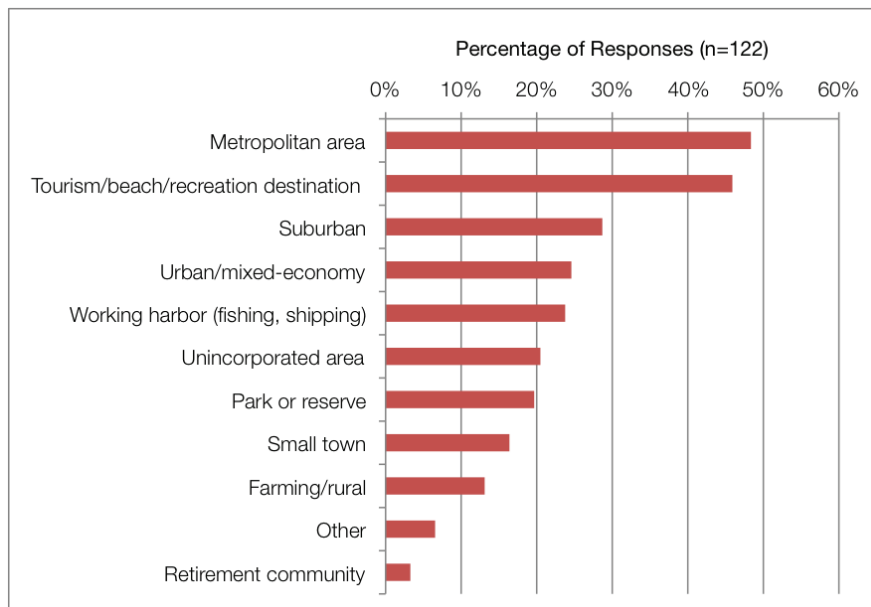
11. What is the approximate length of the shoreline that you manage or are concerned about in your work (ie., entire length of coastal waterfront, including ocean, bay, lagoon, and estuarine shorelines, within your jurisdictional limits)?

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

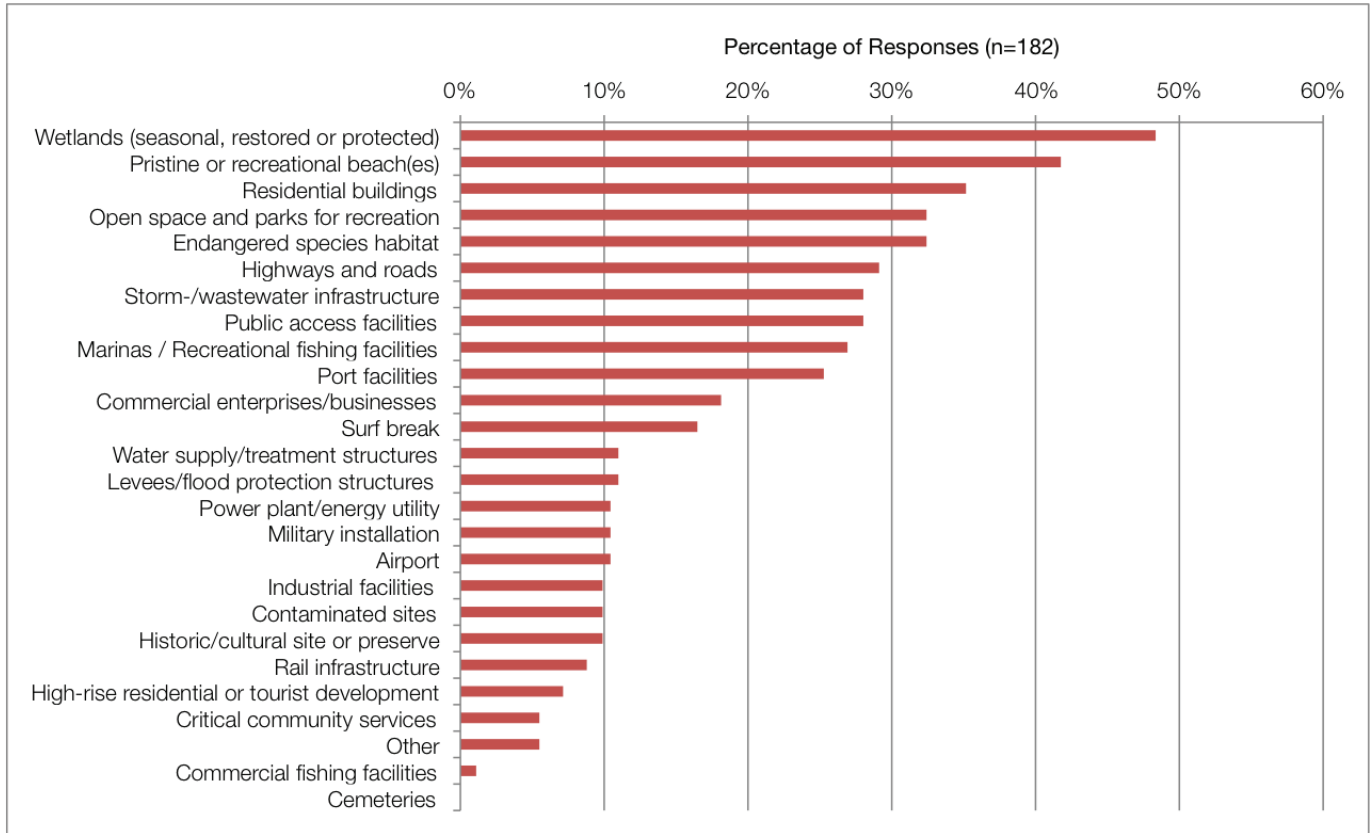
12. What is the approximate size of the population of the community in which you work?



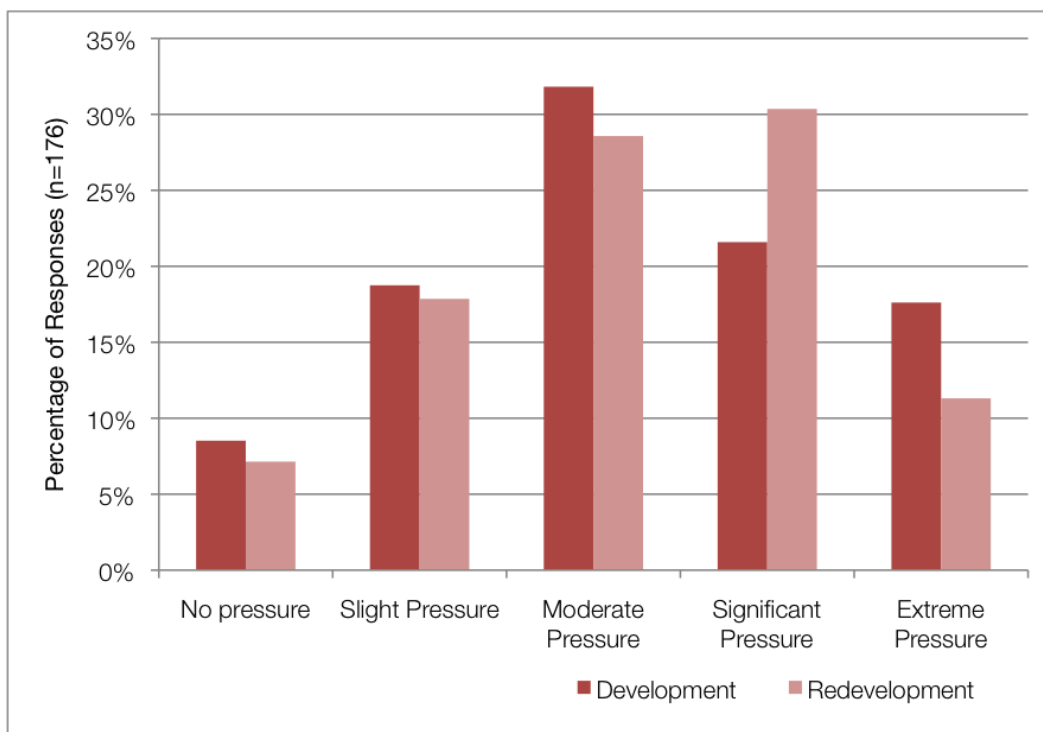
13. What characteristics best describe the community in which you work?



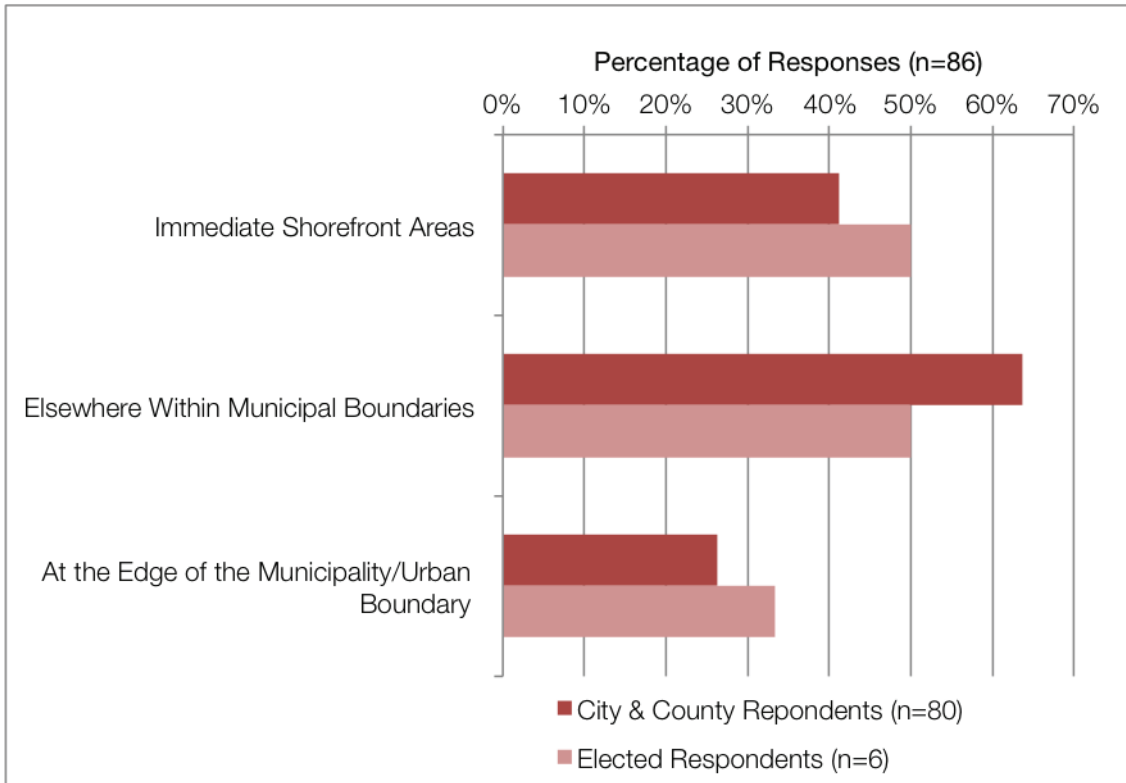
14. What are the predominant types of sensitive infrastructure, development, or habitats are located in the immediate shorefront areas (i.e., in the 100-year floodplain, along bluffs/cliffs) in the area that you manage? (Please select only the top 5)



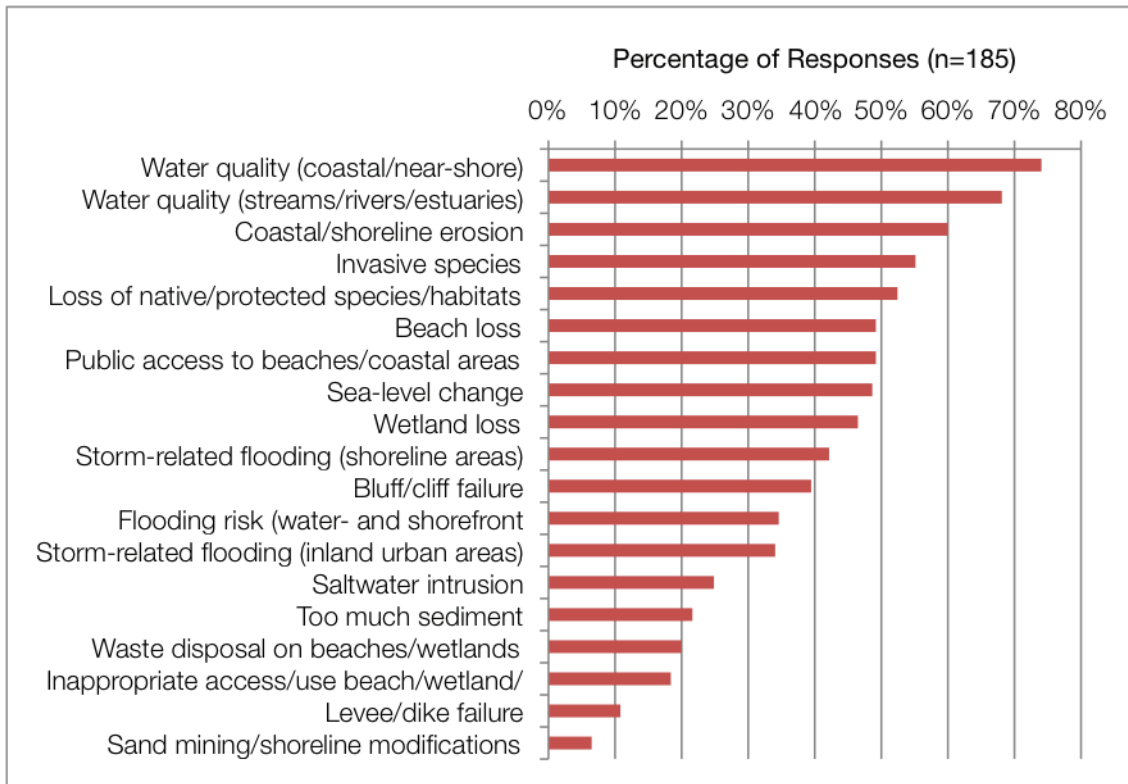
15. How would you describe the degree of development/redevelopment pressure occurring in your community or region?



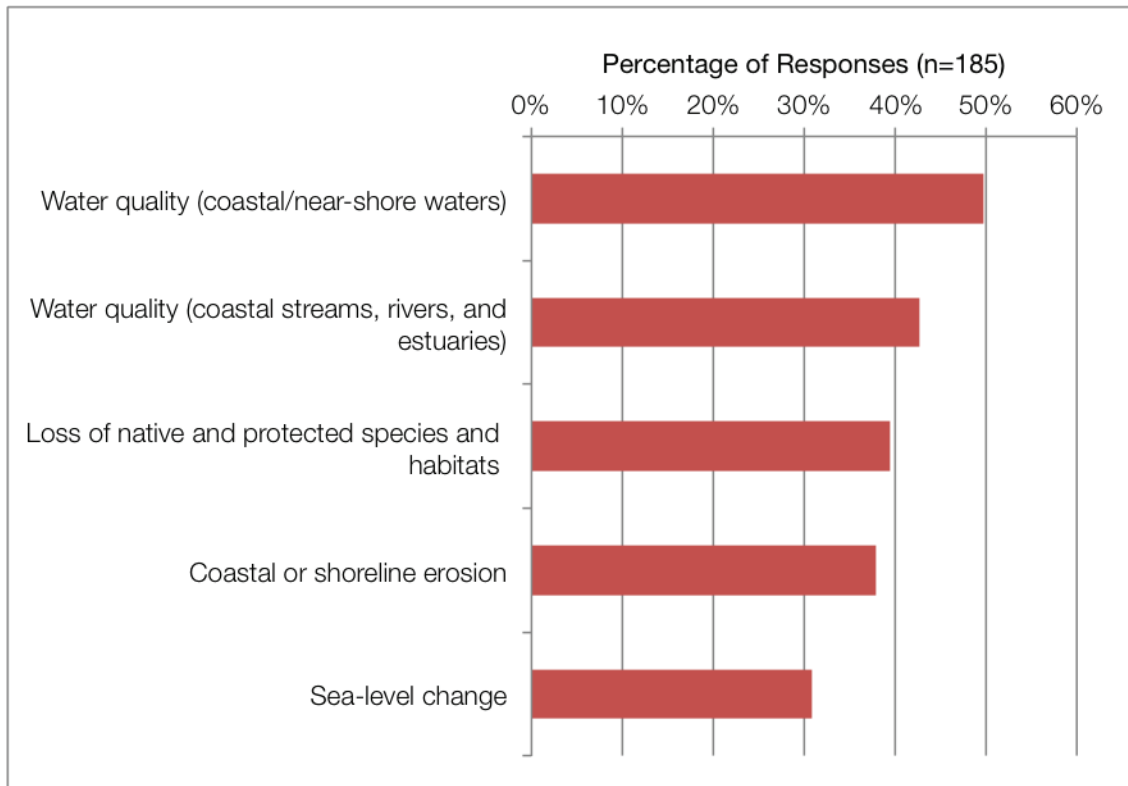
16. Where do you see the greatest development pressure at present?



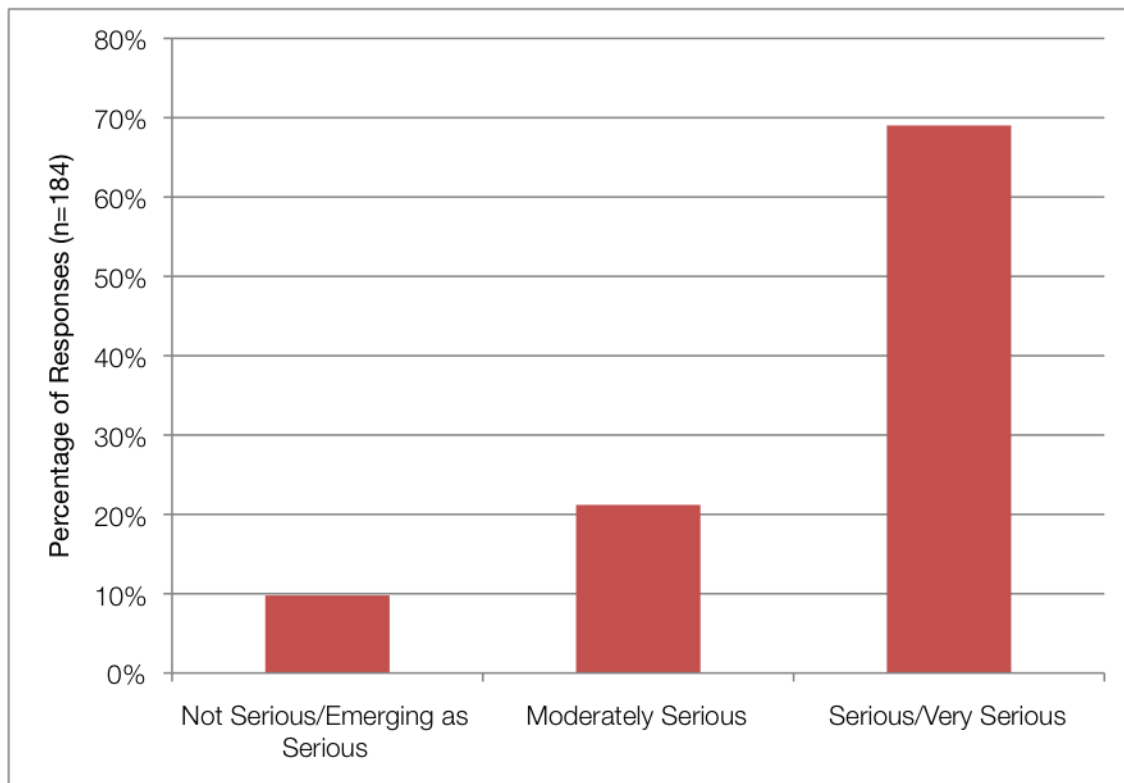
17. What type(s) of coastal management challenges does your community currently face?



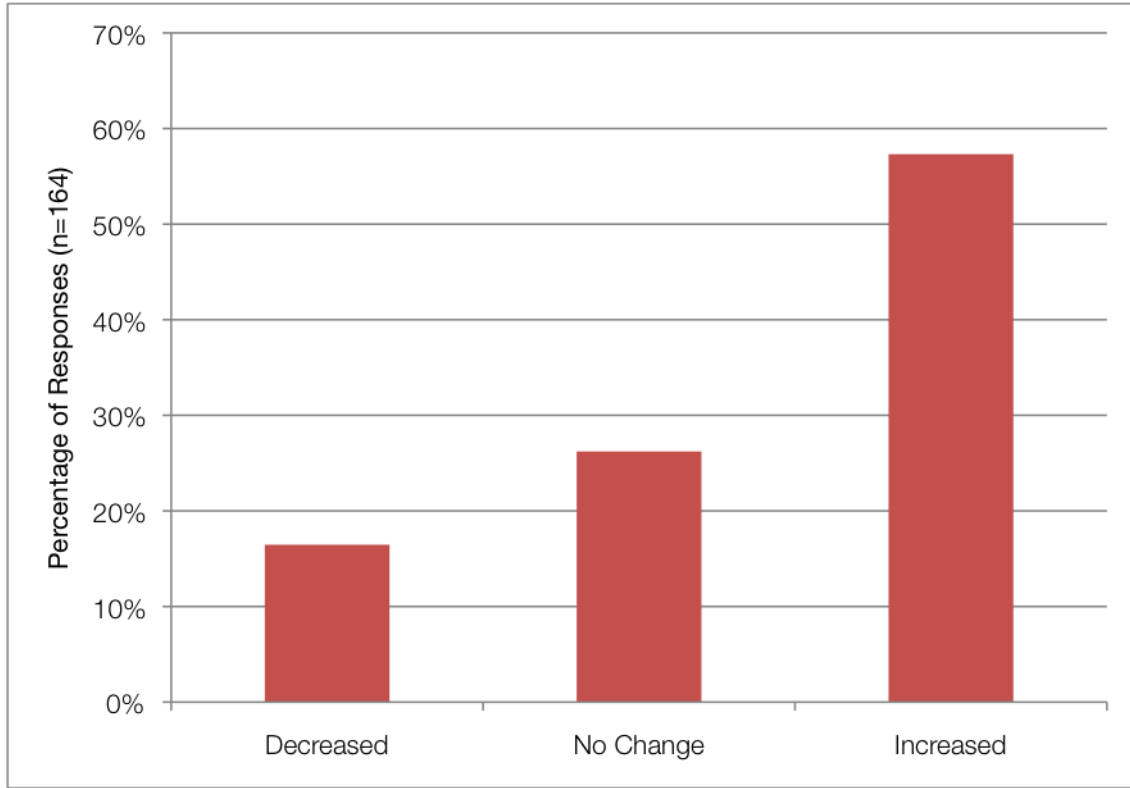
18. Of the challenges selected in Question 19, which do you consider the top five most challenging in your community at present?



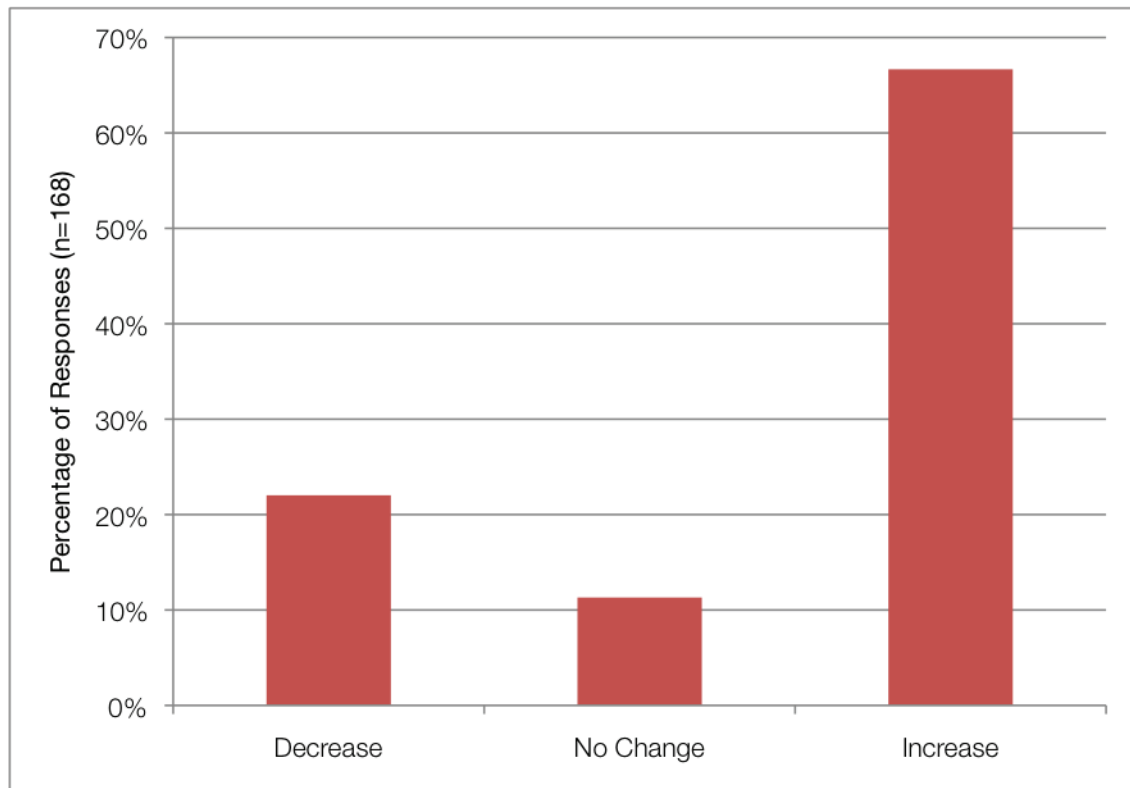
19. How severe would you consider this top coastal management challenge?



20a. How has the severity of this top management challenge changed in your community over the past 5 years?



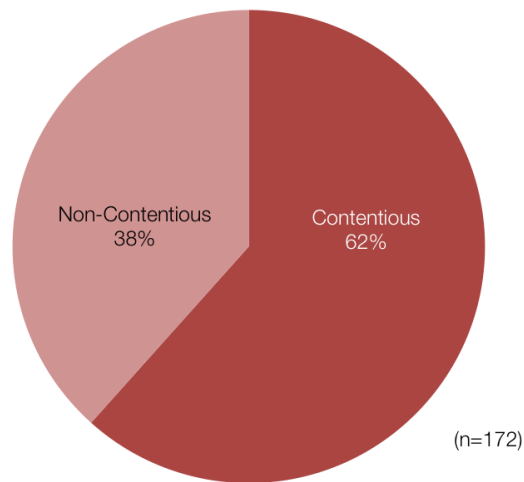
20b. How do you expect the severity of this top management challenge to have changed in your community in 5 years from now?



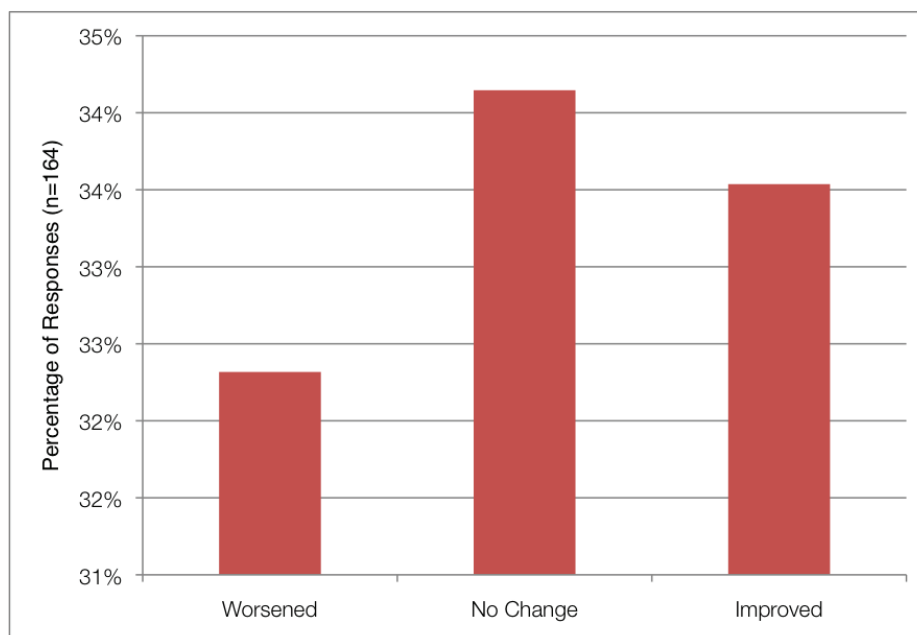
20c. Which are the top three groups of stakeholders involved in your top coastal management challenge?

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

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



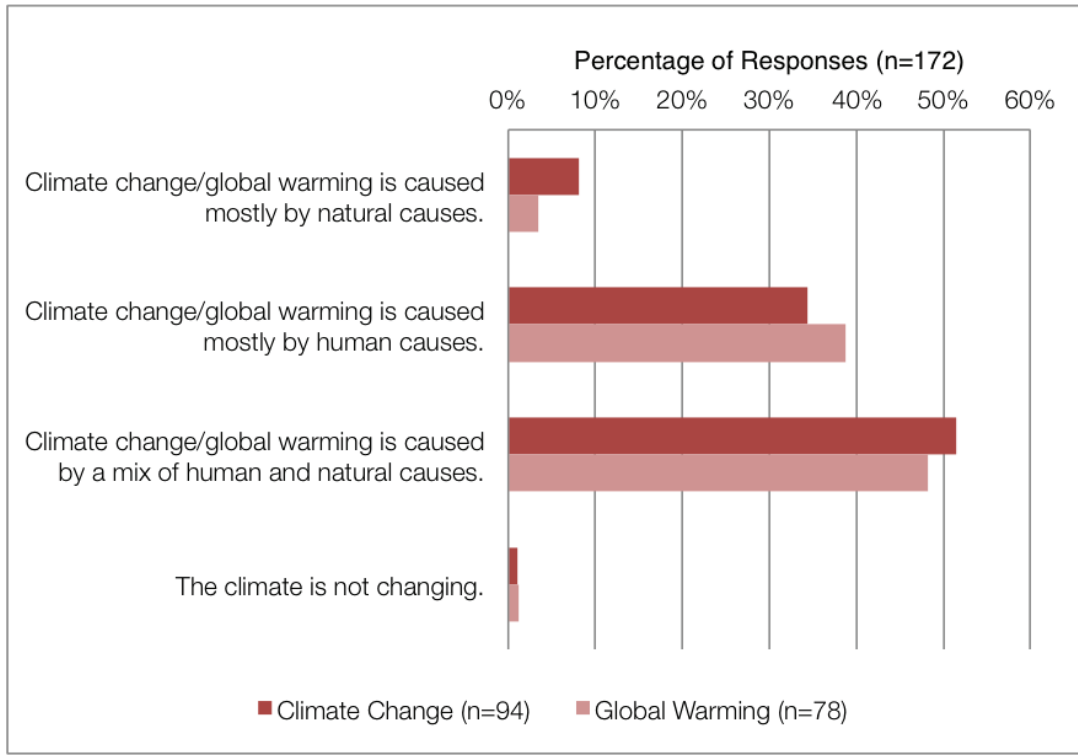
21b. How has the current political atmosphere around your top coastal management challenge changed over the past 5 years?



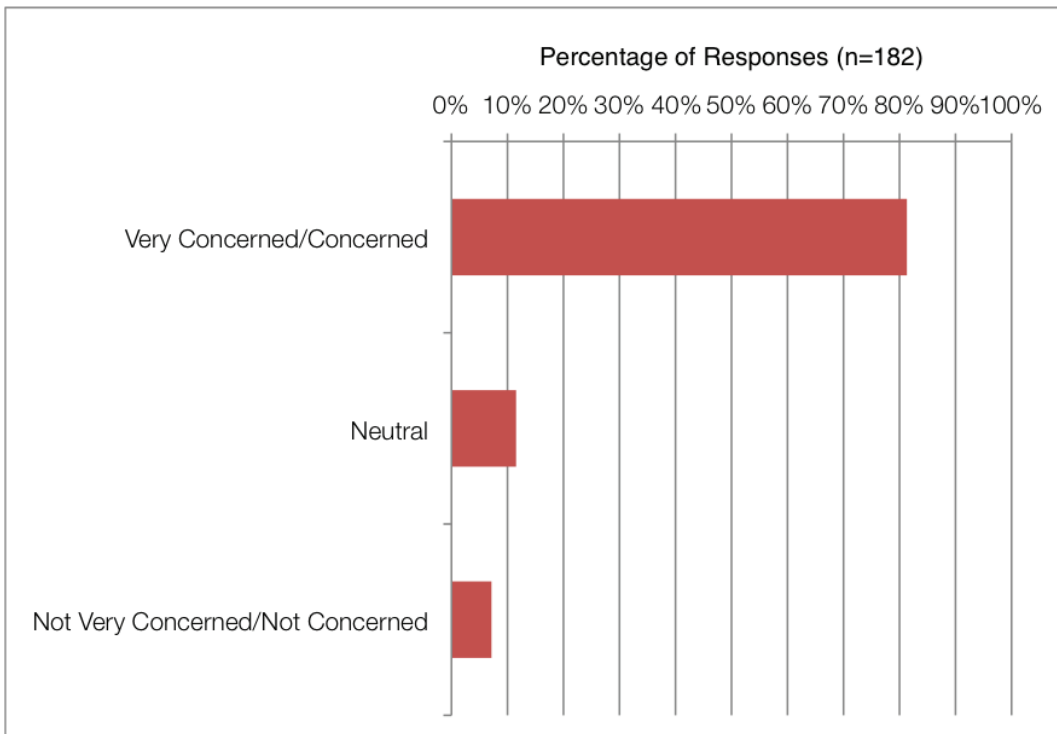


### PART III: COASTAL ADAPTATION TO CLIMATE CHANGE

22. Please indicate which of the following statements comes closest to your opinion of climate change or global warming.

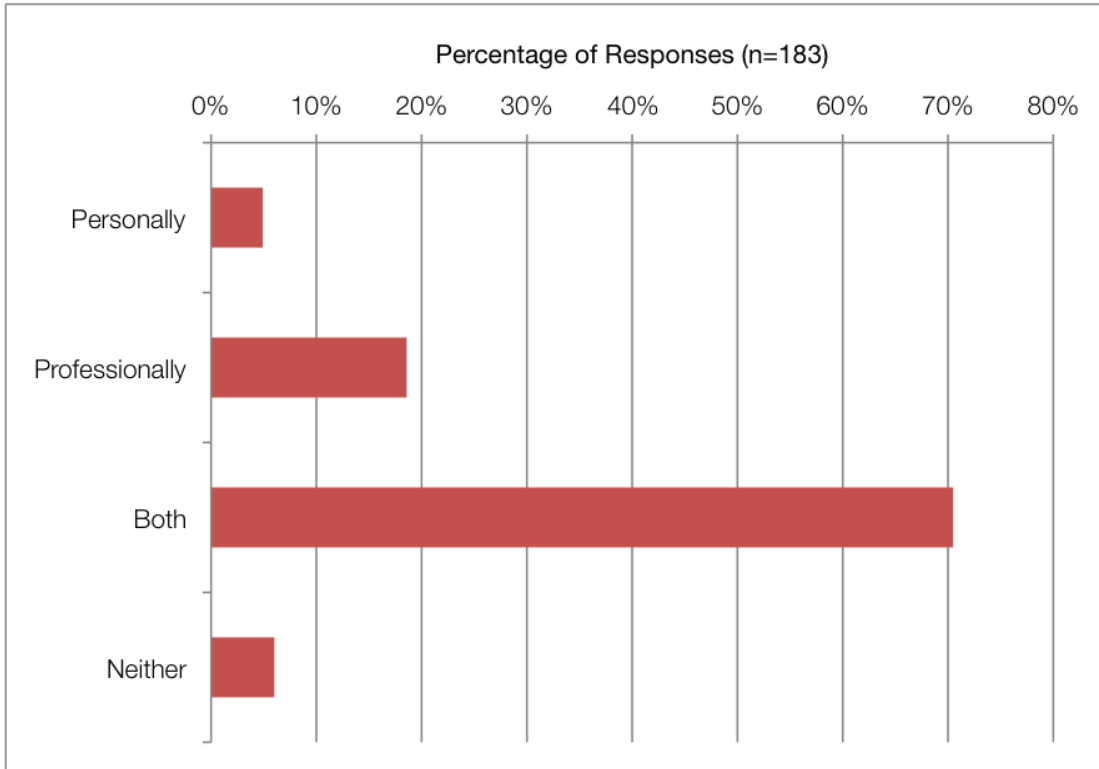


23. What is your personal level of concern about climate change/global warming?

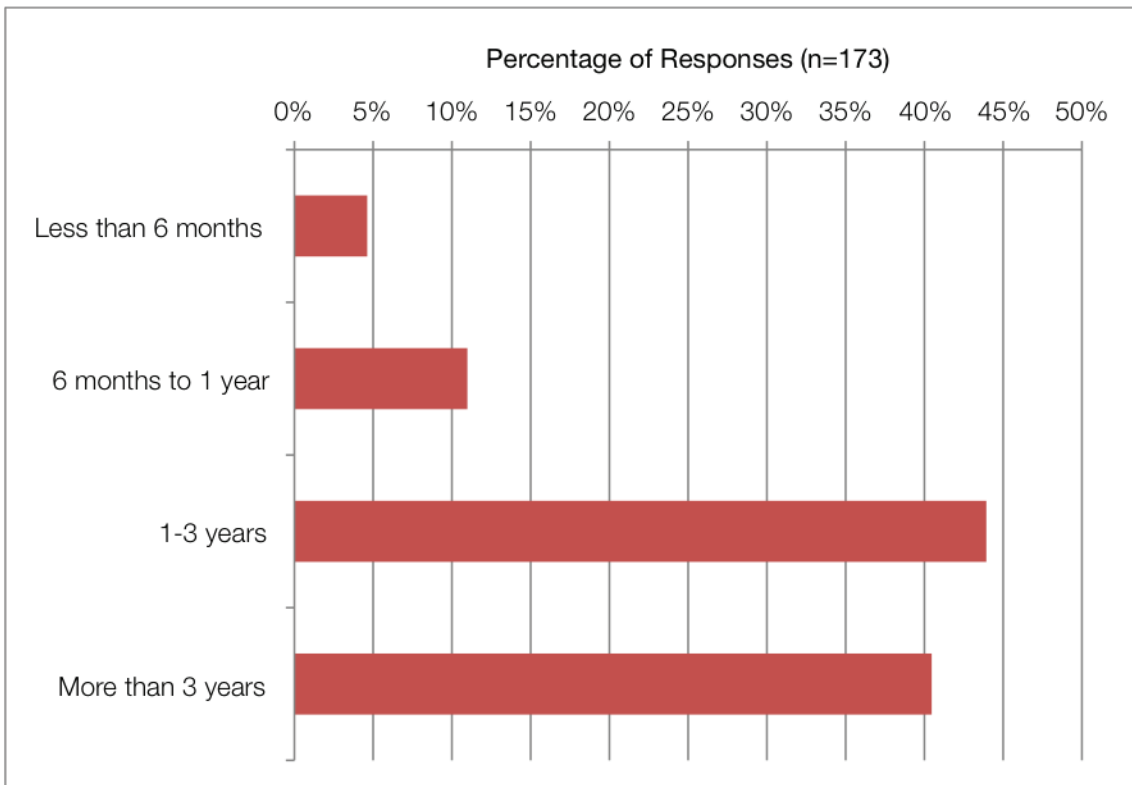


99 respondents received surveys using the term "climate change"  
85 respondents received surveys using the term "global warming"

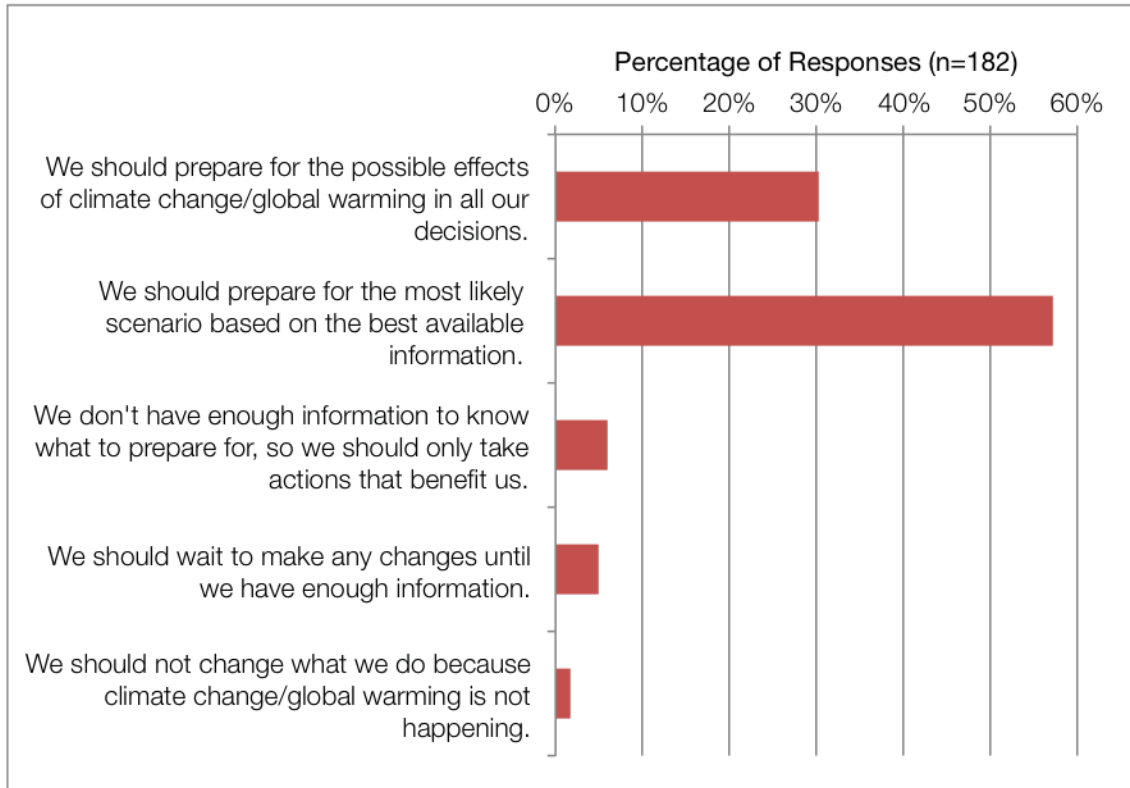
24a. Have you ever, personally or in your work, considered the potential impacts of climate change on your community or region?



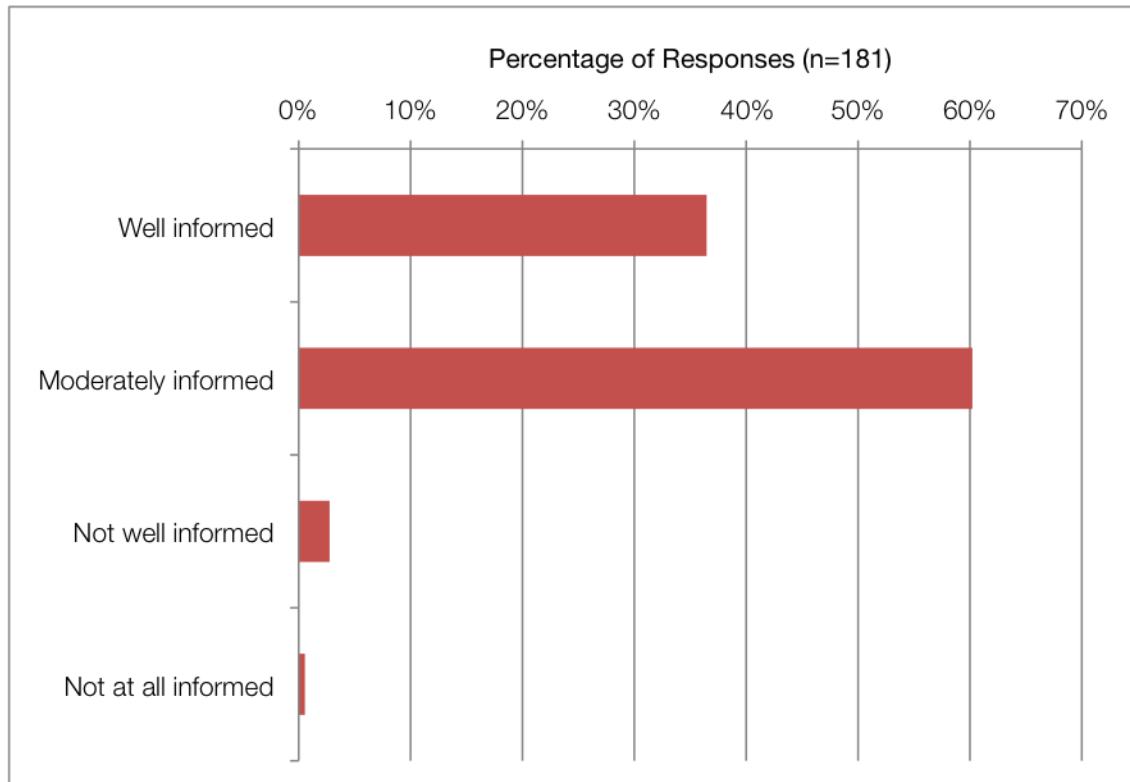
24b. If you have begun considering the impacts of climate change in your work, approximately how long have you done so?



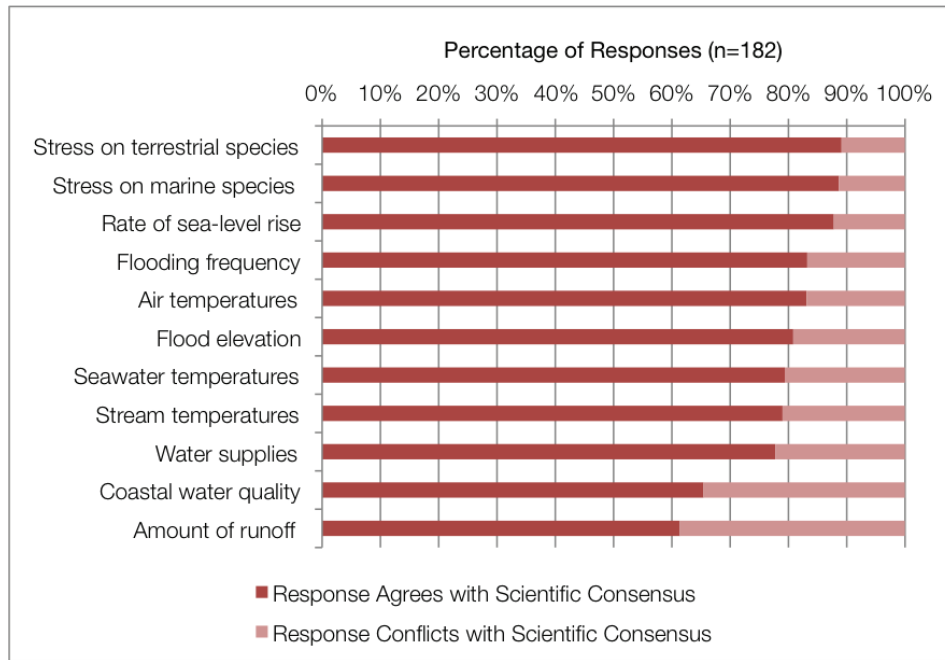
25. Which of the following statements best represents your attitude toward preparing for changes in coastal areas that might result from future climate change?



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



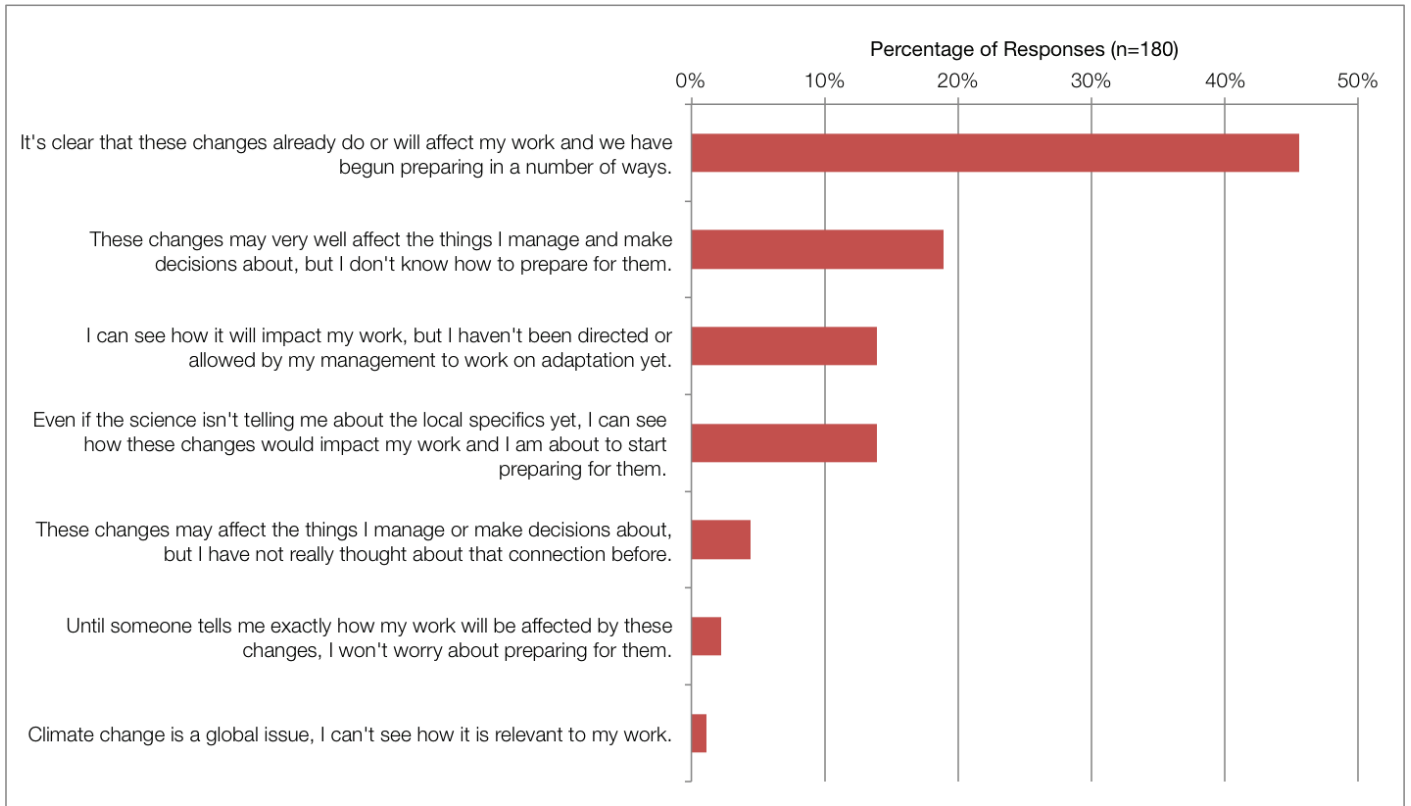
27. How do you think climate change may affect the local average conditions and natural environment in your region over the next 3 - 4 decades?



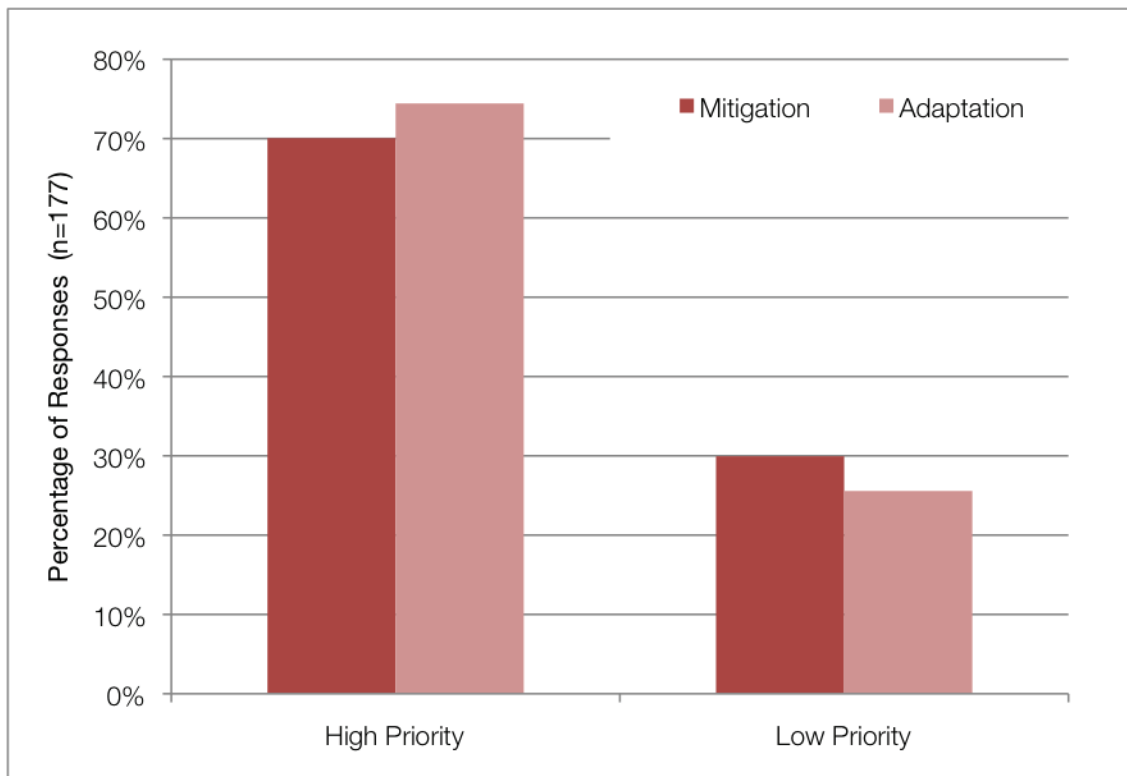
28. Table identifying scientific consensus for various climate change impacts based on analysis of Cayan et al. (2009).

Impact Area	Scientific Consensus
Air temperatures	Air temperatures will increase
Seawater temperatures	Seawater temperatures will increase
Stream temperatures	Stream temperatures will increase
Rain- and snowfall (precipitation)	Depends on region (question not included in analysis)
Water supplies	Water supplies will decrease
Amount of runoff	Amount of runoff will increase
Flooding frequency	Flooding frequency will increase
Flood elevation	Flood elevation will increase
Rate of sea level rise	Rate of sea-level rise will increase
Storm frequency	Still scientific debate (question not included in analysis)
Storm intensity	Still scientific debate (question not included in analysis)
Stress on terrestrial species	Stress will increase
Stress on marine species	Stress will increase
Occurrence of algae blooms	Still scientific debate (question not included in analysis)
Coastal water quality	Coastal water quality will decrease

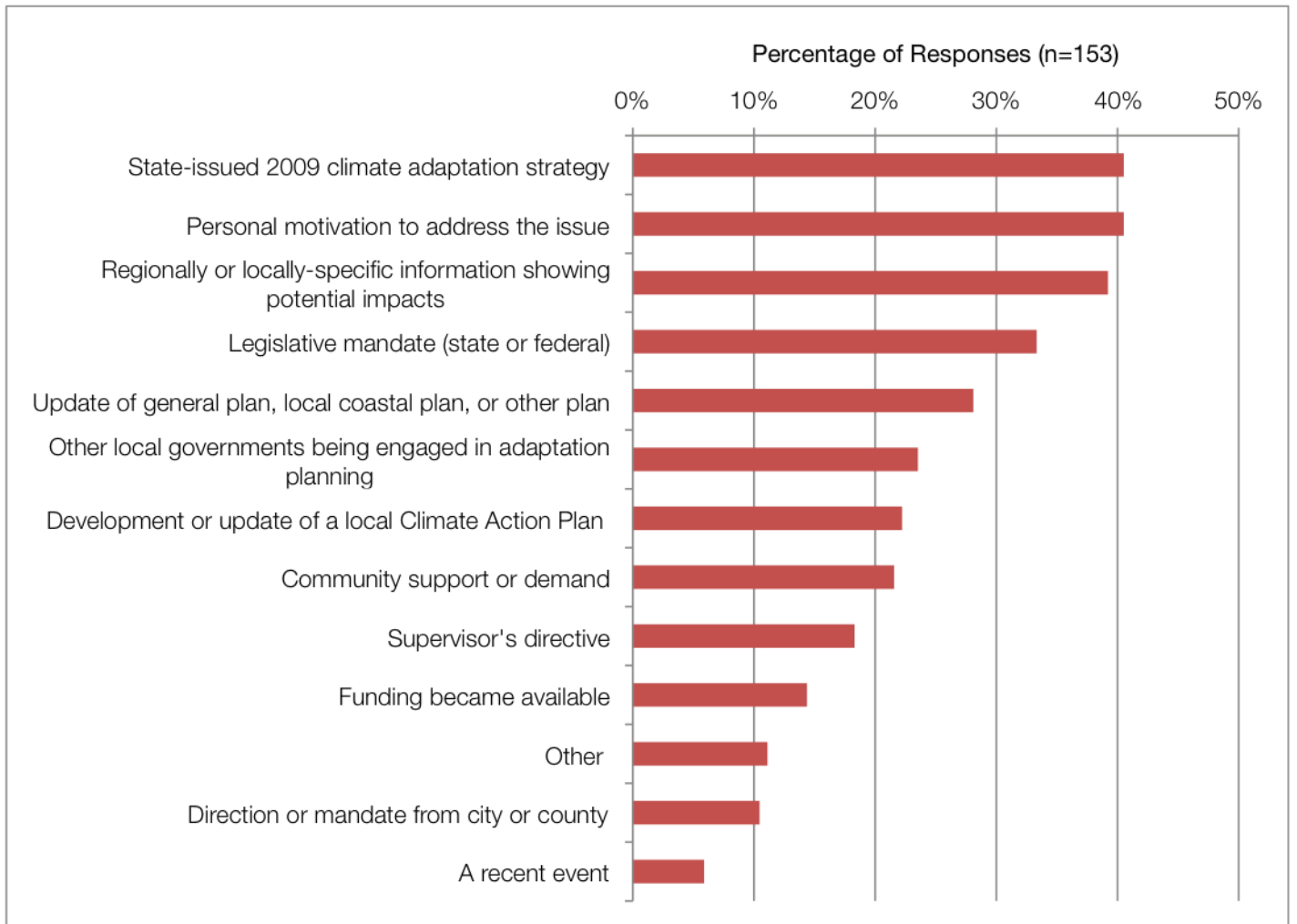
29. How do you think climate change could impact your work?



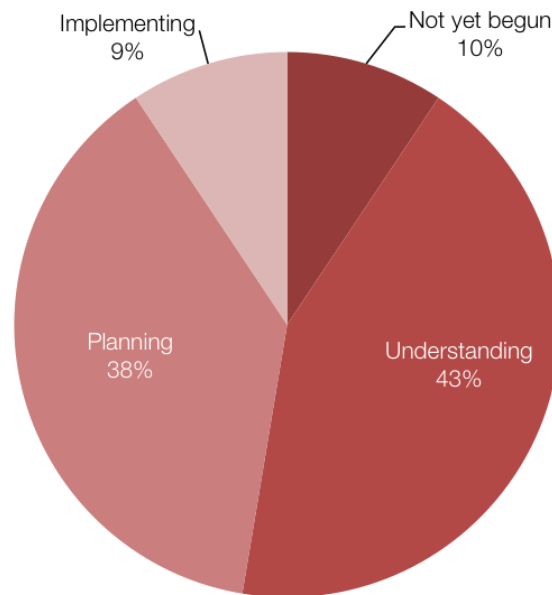
30. Please rate how important it is in your work to address climate change through (a) the reduction of greenhouse gas emissions from energy and land use (mitigation) and (b) efforts to plan and prepare for the projected impacts of climate change (adaptation).



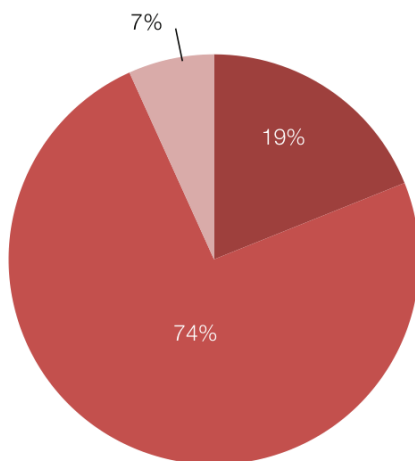
31. If you are engaged in, or contributing to, planning for climate change (adaptation) in your community or region at this time, what prompted your action?



32a. Which phase best describes your current phase of climate change planning and implementation?

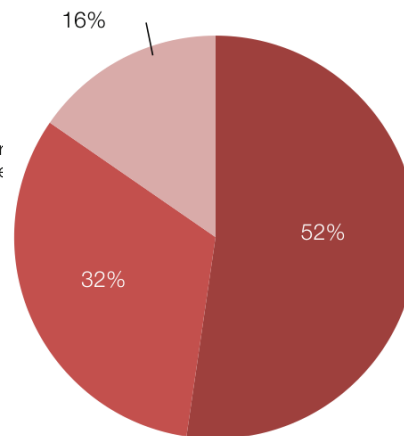


32b. Please provide more detail on your activities or contributions to this phase by selecting one of the statements below.



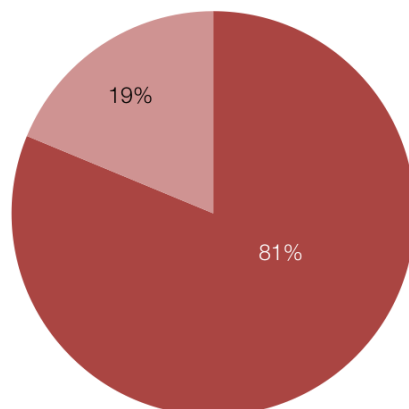
Understanding

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



Planning

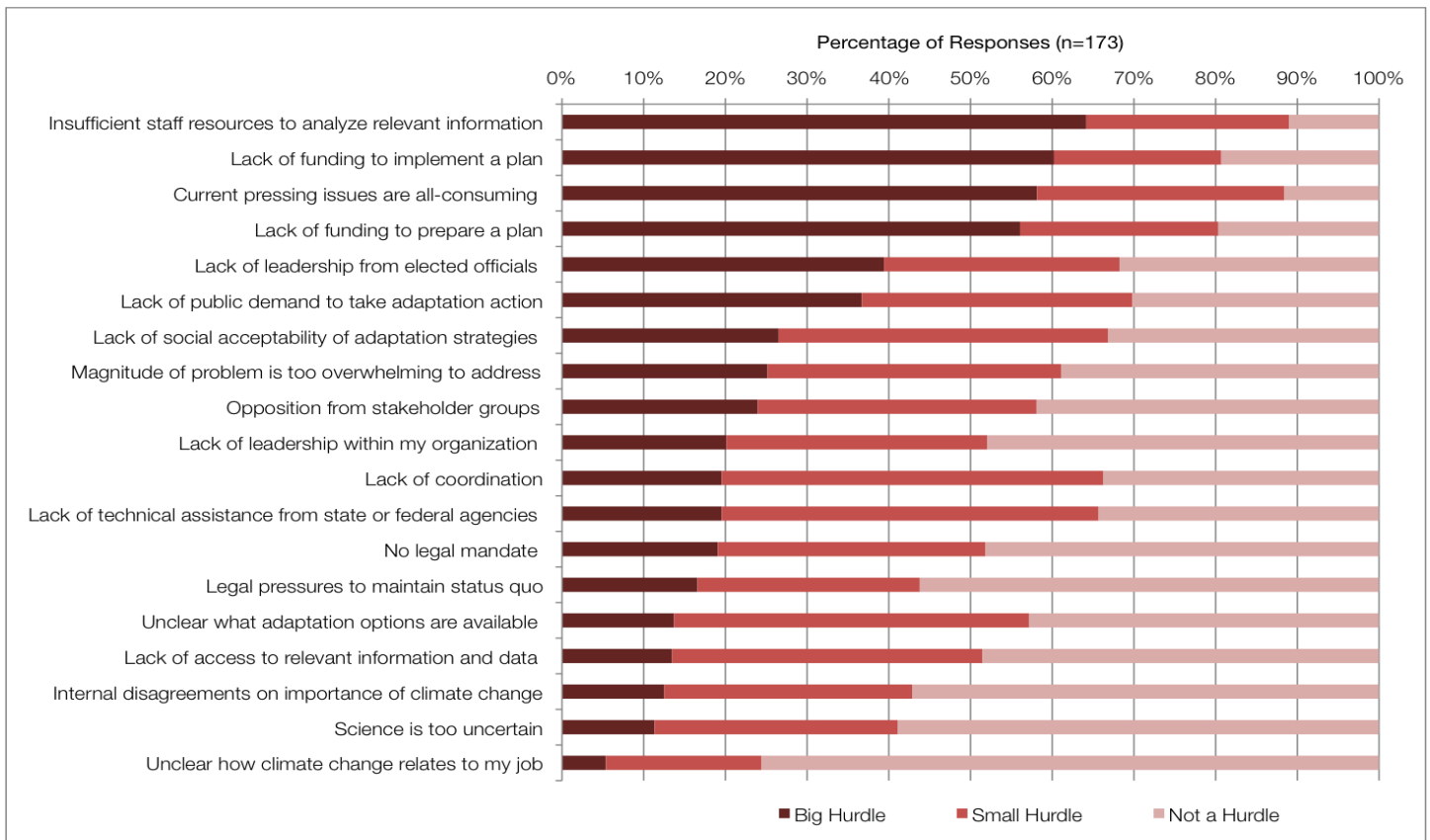
- We are brainstorming a range of options to prepare for and manage climate change risks.
- We have completed an assessment of potential response options.
- We have selected a subset of response options to move forward with.



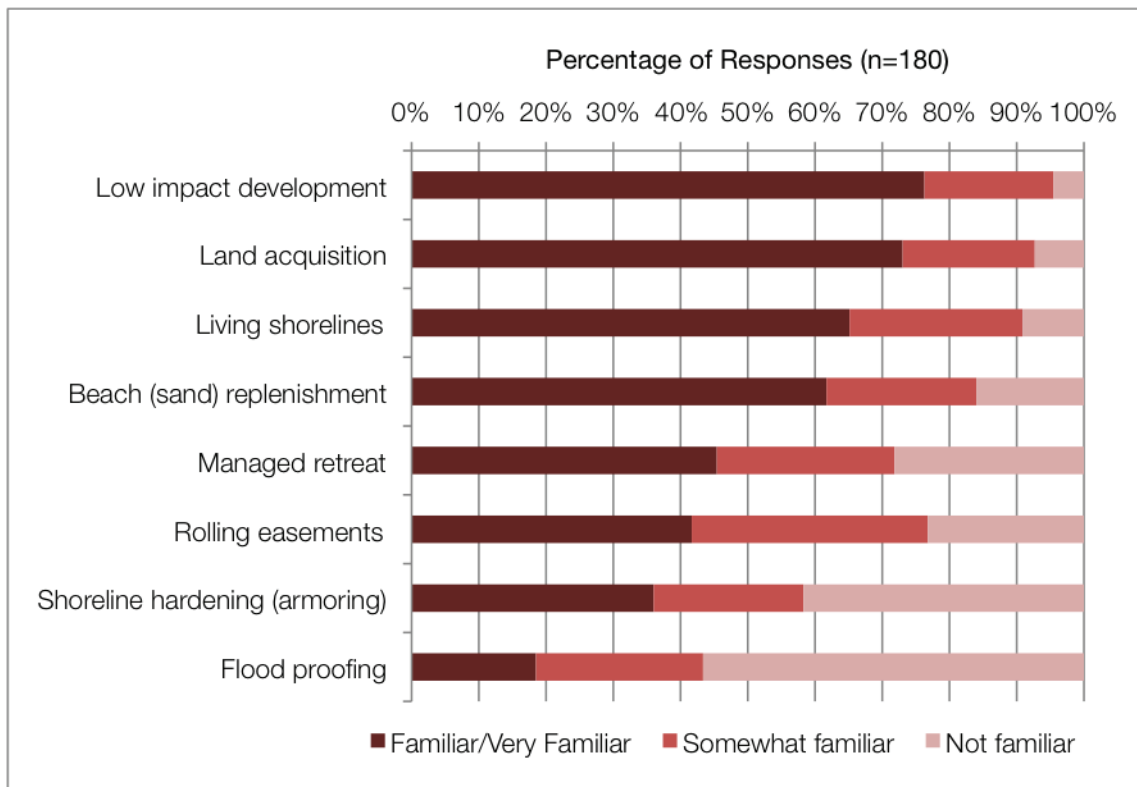
Implementing

- We have begun implementing the selected response options.
- 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?



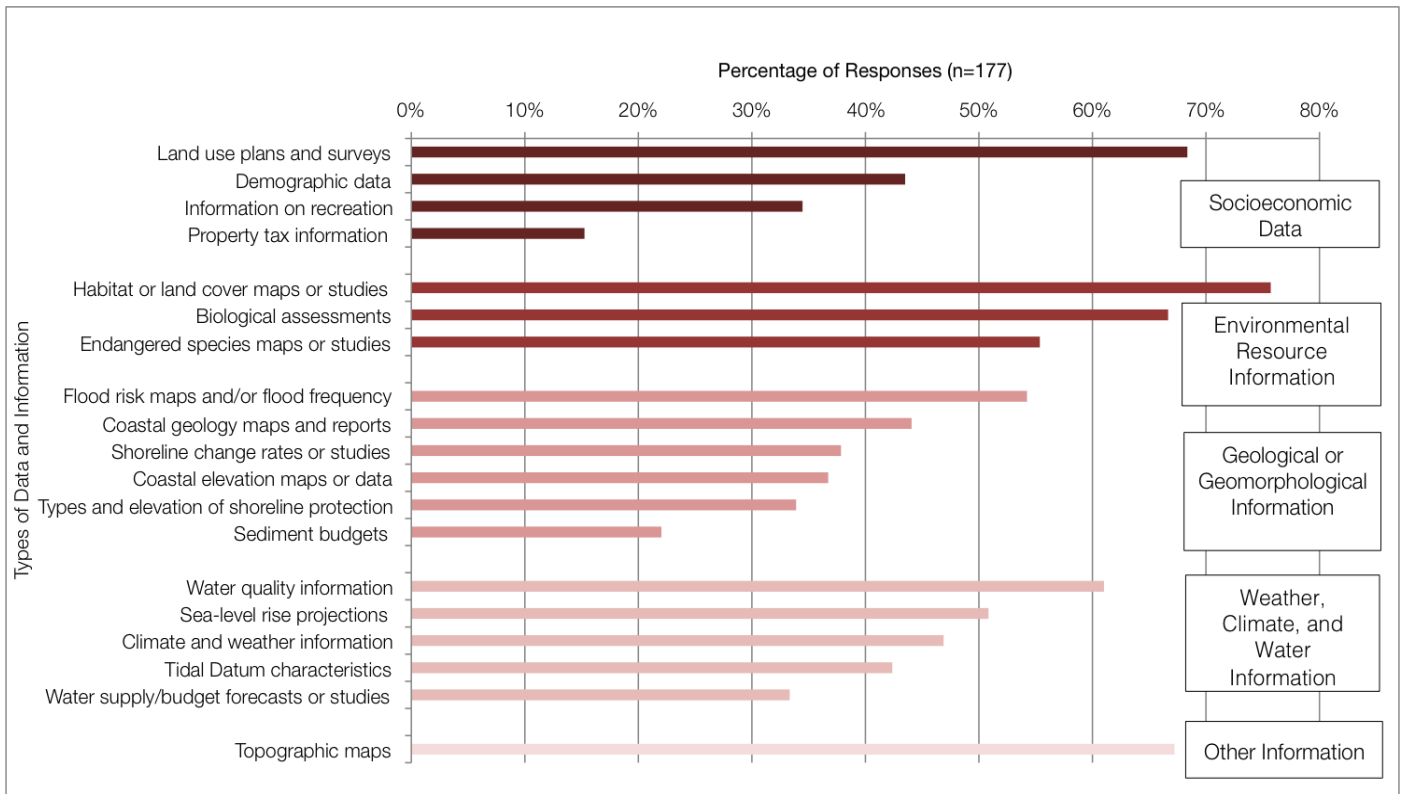
34. Please describe how familiar you are with each of the following coastal adaptation options.



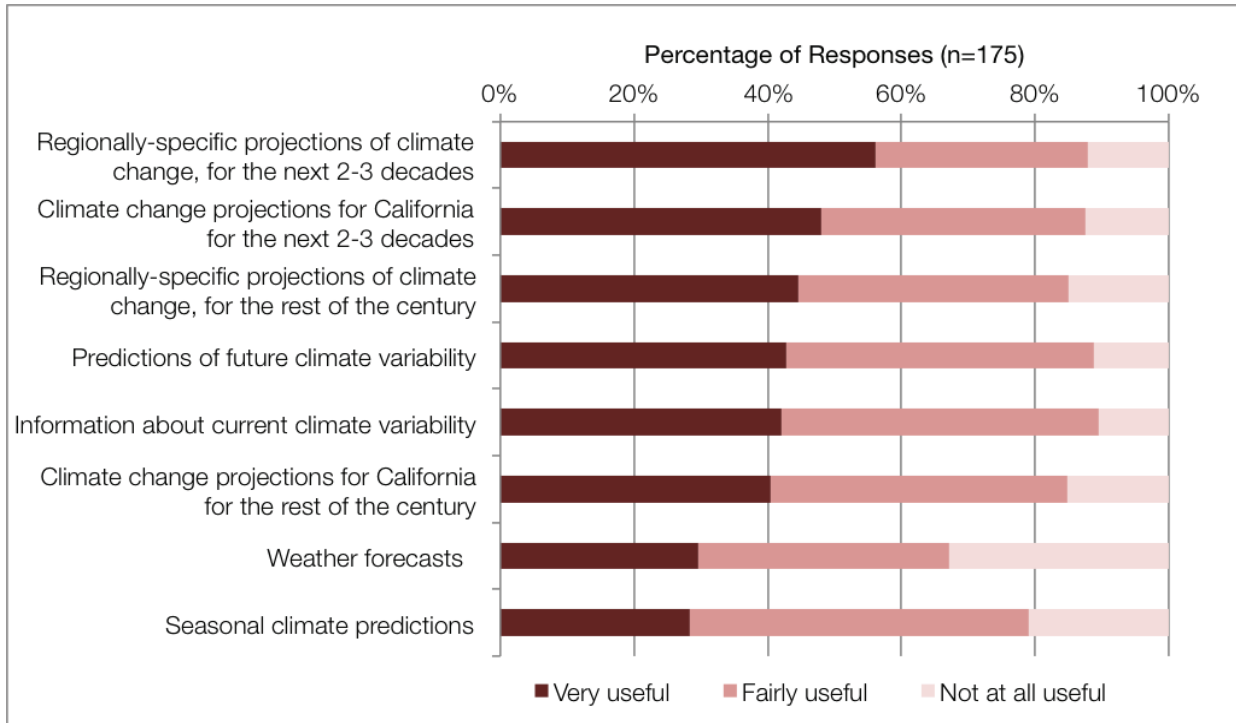


## PART IV: DATA AND INFORMATION NEEDS

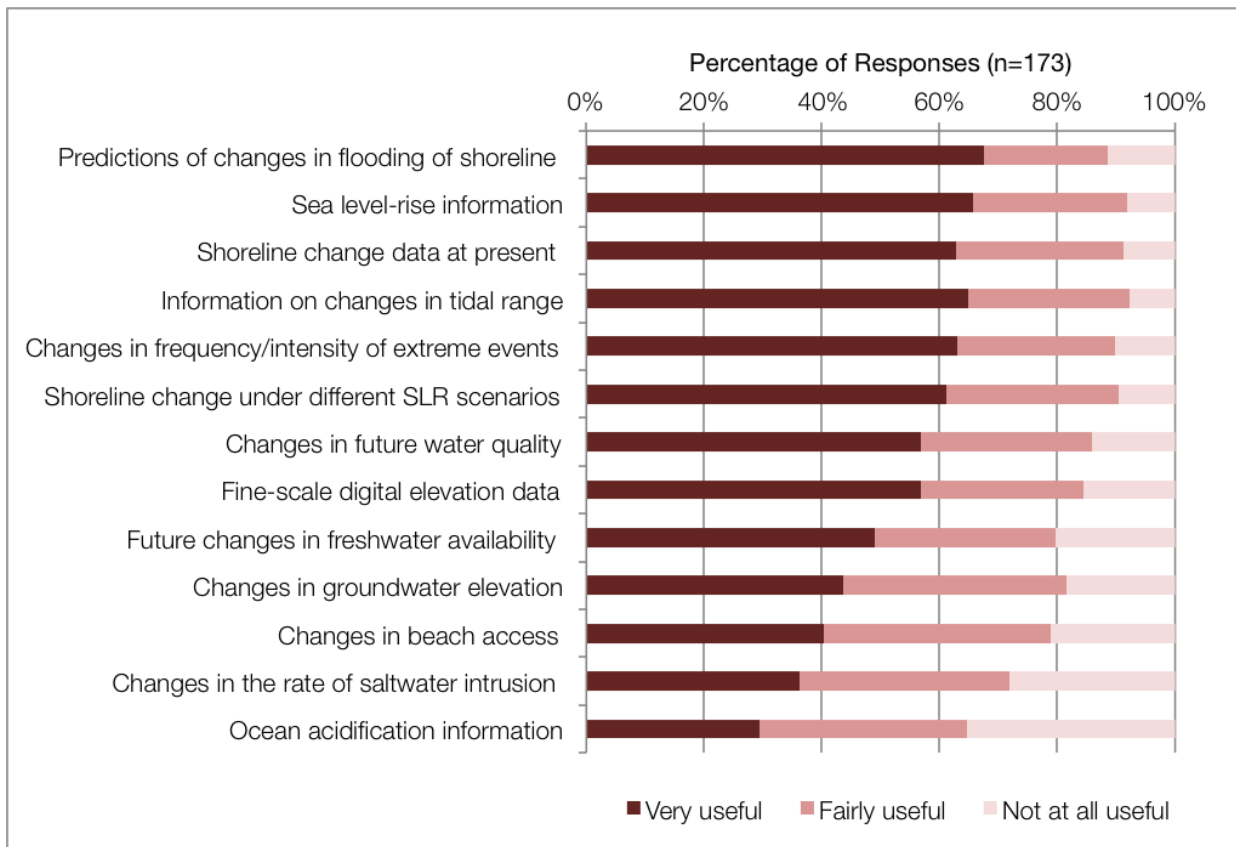
35. In order to carry out your daily job responsibilities, what data and information do you consult regularly?



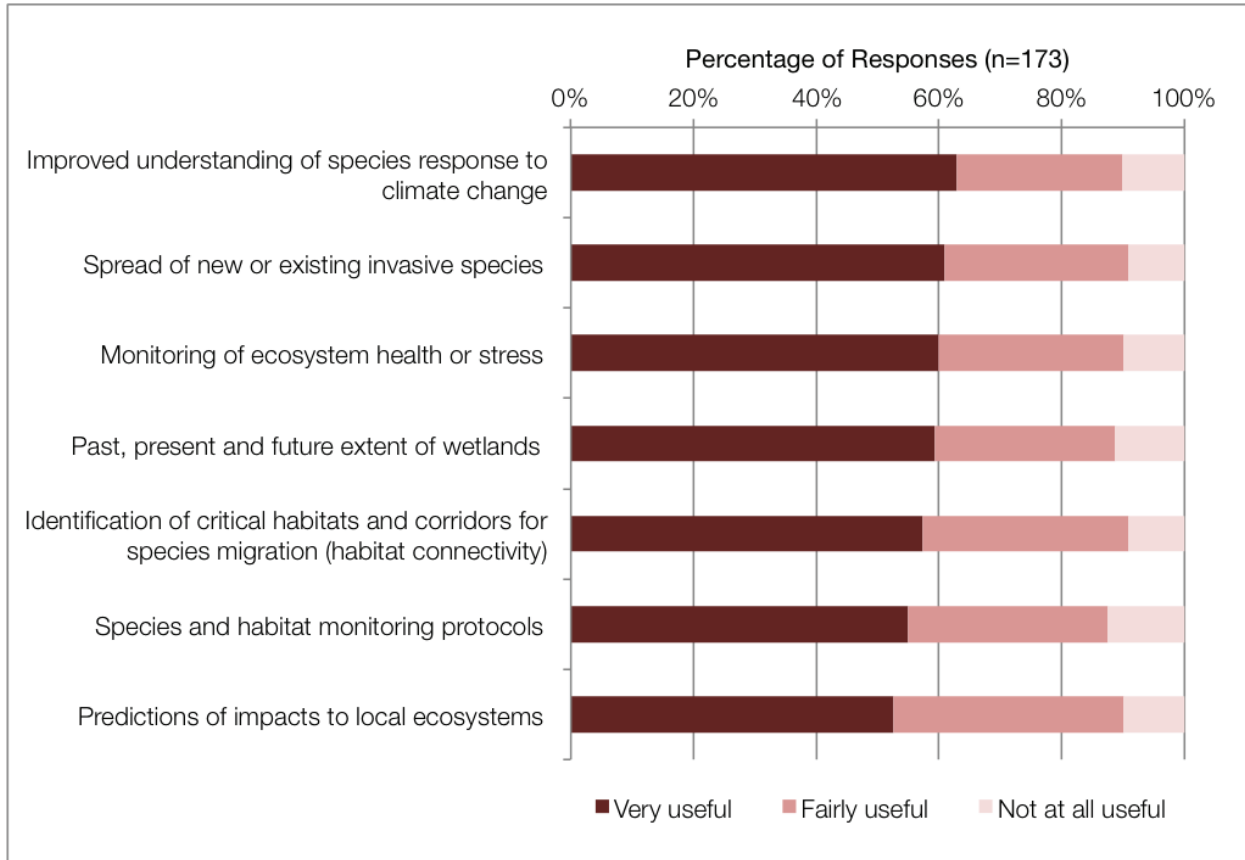
36a. In the work you do, please rate the usefulness of the following types of *weather and climate* information for assessing the risks from climate change to local coastal resources.



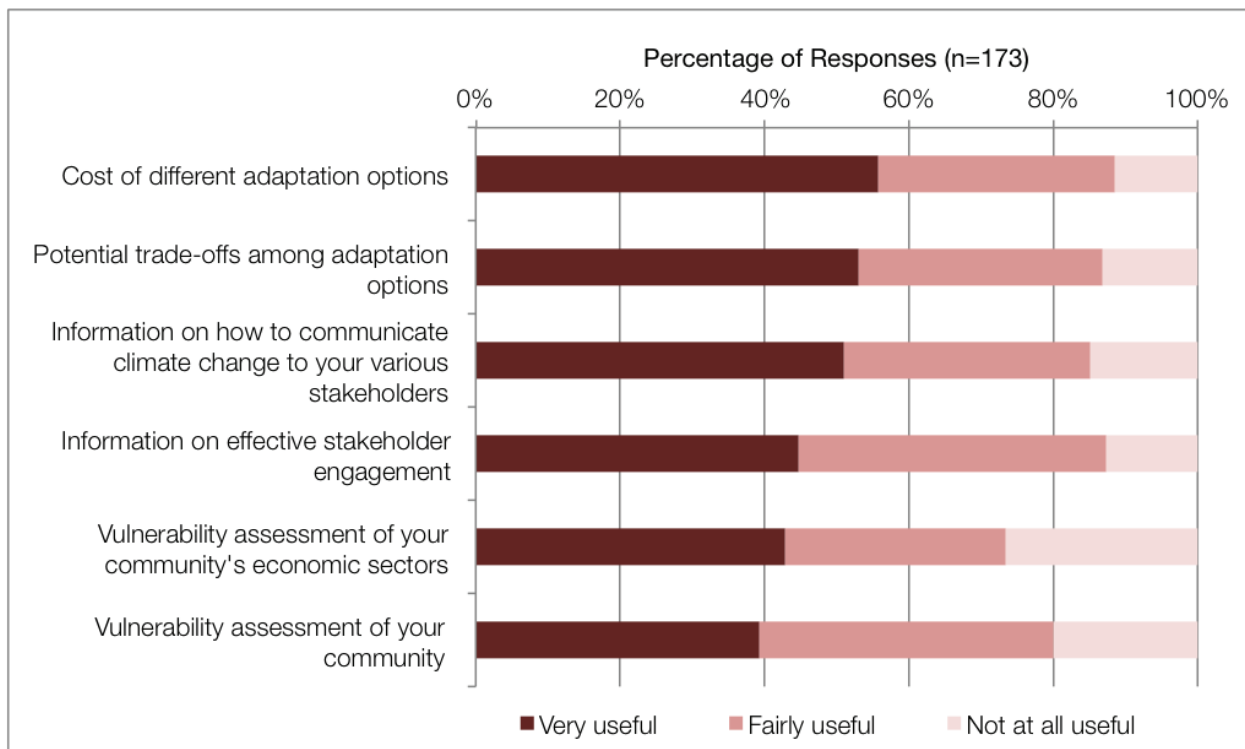
36b. In the work you do, please rate the usefulness of the following types of *physical information* for assessing the risks from climate change to local coastal resources.



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.



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.



37. Please identify three types of information for which you have the greatest need, but to which you currently do not have access.

City & County Respondents

Information Type #1	Information Type #2	Information Type #3
Potential flooding and drainage area	Wave run up	[No response]
None	[No response]	[No response]
Changes in temperature	Weather pattern changes	Rainfall measurements
Effect of climate change on biological systems	How climate change will impact fire hazard in wildland-urban interface	Availability of groundwater under climate change
Climate model scenarios	Sea level model scenarios	Effective mitigations
Specific weather predictions	Impact to habitat	Availability of funding
Examples of adaptation strategies	Local coastal sea level rise data	[No response]
Permitting processes and CEQA/NEPA compliance	[No response]	[No response]
Fine scale information	[No response]	[No response]
Local sea level projections	Funding sources	Best strategies
FEMA maps that include projected sea level rise.	A San Diego Bay projected astronomical high tide elevation for 2050 and 2100 in NAVD88.	A percent probability curve for the data in #1 and #2 .
Local climate change and physical change projections	Cost info for adaptation measures	Monitoring approaches
Future SLR estimates	Future ground water levels	[No response]
Sea level change	Coastal bluff erosion rates	Beach erosion rates
Workable Mitigation/Adaptation Strategies	Cost of Mitigation/Adaptation Strategies	Effect on biological resources
Accurate validated predictive water quality models	Low cost rapid bacteriological analytical methodology	[No response]
Population growth estimates	Transit modeling to determine desirability of freeway expansion	Coordination of regional strategies to implement climate adaptation
Detailed SLR predictions	[No response]	[No response]
Coastal current patterns	Pathogen identification in water	Ocean acidification
Local impacts of sea level rise	Local impacts of climate change	[No response]
Sea level rise along oceanfront	Oceanfront vulnerability	Oceanfront adaptation
Lidar	Sea level change projections	Rainfall change projections
Changes to hydrology	Techniques for Reservoir de-sedimentation	[No response]

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)

City& County Respondents (cont'd)

Information Type #1	Information Type #2	Information Type #3
Local coastal erosion envelopes above predicted sea level rise	effect of ocean acidification on local marine species	[No response]
Local shoreline erosion rates	Local sea level rise estimates	Local bluff erosion rates
Reliable and confirmed science on specific changes over the last 100 years, and rate of change.	Potential effect of small local adaptations.	[No response]
Climate change effects on agriculture	[No response]	[No response]
Understanding and planning for habitat changes and species migration	Coastal bluff erosion rates and implementing effective rolling easements	Effective coastal land use policies addressing climate adaptation
Oil Industry Practices	R	[No response]
Local tidal/sea level change models	Inundation models	Information on other municipalities' actions.
Sources and causes of pollution	Detailed maps of land imperviousness	[No response]
Fine scale elevation contours	Detailed (20'-40' scale) sea level rise inundation areas	[No response]
Honest, factual information on SLR	An honest assessment of the unintended consequences of government regulations precluding sediment from reaching the coastline	[No response]
Sea level rise predictions	Realistic water quality assessment information	[No response]
Future storm size	Future storm frequency	[No response]
Accurate water management data	Water use patterns	Historic water use data
Vulnerability assessment of your community (vulnerability includes exposure, sensitivity and adaptive capacity)	Vulnerability assessment of your community or region's economic sectors	Cost of different adaptation options
Regional maps identifying coastal infrastructure/structures at risk from sea level rise	Guidance for how to integrate sea level rise data into consideration of current coastal redevelopment/development projects	State guidance/requirements for coastal planning/development
Species identification	Species demographic maps	[No response]
Global GHG from vessels	Long range forecast water quality impacts of global warming	Information on invasive species response to increased
Latest GIS Data	Project tracking software	[No response]
Accurate coastal flood maps	Coastal high water info	Wave runup studies
Impact of sea level rise on the pacific side of Coronado	[No response]	[No response]

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)

State, Federal & Regional Respondents

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

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)

State, Federal & Regional Respondents (cont'd)

Information Type #1	Information Type #2	Information Type #3
Historic weather data	Weather patterns for the next 20 years	[No response]
Sea-level rise predictions	Coastal erosion predictions	[No response]
Detailed habitat maps	High accuracy elevations	Marine habitat & substrate
Changes identified via permit process	[No response]	[No response]
Predictions in change of habitat distribution	Adaptation approaches to ocean acidification	Cumulative analysis of current stressors and those imposed by climate change
Barrier beach dynamics with SLR	Sediment input vs. SLR	Carbon sequestration of marshes
Accurate ocean pH data	Interaction of deep ocean water on pH and DO at shelf depth	Role of various nutrient sources on DO and algal blooms
Sea level rise predictions	Coastal changes	Alternative strategies for mobility
Nearshore bathymetric data	Nearshore environmental resources data	GIS decision support tools
Countywide level vulnerability/risk assessment	County General Plan/LCP amendments incorporating adaptation	State legislation directing local jurisdictions to plan for adapting to potential climate impacts
Changing distribution of marine animals	[No response]	[No response]
Site-specific sea-level rise predictions	Accurate pH rates of change information	Analyses of long-term regional marine biological data

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

Information Type #1	Information Type #2	Information Type #3
Local rainfall predictions for the next 25 -100 years	Local information on how climate change may affect our storm water systems	How climate change will affect local patterns of storm water runoff patterns
Predicted atmospheric temperature increases along the coast -- estimates vary.	[No response]	[No response]
Accepted data on climate change	Maps for climate change predictions	Effects of climate change on coastal estuaries and how to manage for the effects
High-resolution imagery	LIDAR elevations	Climate predictions
Species response to climate change	Potential adaptation strategies	Land acquisition options
Accurate predictions of sea level	Accurate predictions of erosion	Relative cost of alternatives
Which govt agencies or companies have funding available for climate change planning	Which communities/organizations/companies are seriously pursuing assistance in developing adaptation strategies	[No response]
Specific regional projections of impacts	Specific regionally appropriate adaptation	[No response]
Extent of sea level rise	Nature of proposed mitigation measures	Cost of mitigation strategies
Scientific journals	[No response]	[No response]
Oceanographic data	Beach/coastal zone bathymetry, topography	Geo-referenced aerial photos
How to communicate about global warming	[No response]	[No response]
Cost of adaptation versus inaction	Engineered studies of future floods - FEMA maps	Habitat migration potential
Carbon sequestration potential for chaparral	Successful examples of ecosystem-based governance (watershed-based jurisdictions, etc.) that would apply to Southern California	Method and feasibility of revising water rights/groundwater adjudication
Cost benefit analysis of various adaptation options	Analysis of the most vulnerable communities in our region	Economic analysis from other regions
Water budget	Economic info	[No response]
Predicted tidal elevations in my region (san diego and orange county)	Suggested mitigations to build into coastal projects	Tools to better design estuary restorations incorporating new sea levels (leaving room for sea level to rise)
Projected dam safety and failure data	Sediment accumulation rates and projections in reservoirs and below dams	Invasive species sources and proliferation data
Land subsidence	Topographic	Temperature history



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)

Information Type #1	Information Type #2	Information Type #3
Accurate sea level rise predictions	Historical shoreline data	Historical coastal water quality data
Models for sea level changes for my region	Better biological assessments	Communication tools on climate change
Climate impacts on groundwater	Climate impacts on fresh water quality	[No response]
Future impacts	What impacts can be reduced if we get to 350 ppm	Maps of impacted areas with SLR
Topographic information at 1 ft contour intervals	Bathymetry at 1 ft contour intervals	[No response]

38. Briefly describe what limits your access to this information:

City & County Respondents

Limitations to information
None
Don't know where to look; not aware of any studies covering topics.
1. It's a global issue, but where does one start locally? 2. Funds for scientific research and mitigation testing.
Too many other competing priorities and lack of funding and resources
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.
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.
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.
Unavailable
1. FEMA does not issue flood maps with projected sea level rise, which is alot like driving by looking in the rearview mirror. 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. 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.
Limits of knowledge/expertise, money, time
Source and science
Cost of information acquisition, lack of authroization to obtain such informaiton, lack of knowledge of where such infomation may be found.
Do not know where to find this information.
Current state of scientific research and technology
None
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.
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.
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.
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.
Funding to hire consultant to perform adaptation study along oceanfront and river valley

38. Briefly describe what limits your access to this information (cont'd):

City & County Respondents (cont'd)

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

38. Briefly describe what limits your access to this information (cont'd):

State, Federal & Regional Respondents

Limitations to information
Too much information is widely available; often with contradictory summaries and/or recommendations. Dont know which information source to trust.
Don't know where to find it.
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)
Not aware that regional/local models of climate change have been developed for southern California
Either it is not put togehter yet, or I do not know where to find it.
NA
Time, funding, staffing vacancies
Funding and time. Lack of management focus.
Uses and evaluation of different use of coastal lands
science not available
data does not exist
There are no limits to getting information at my agency.
"#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 obseravations 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 cummulative 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)

Limitations to information
Sea level rise and coastal change work has been done but it has not yet reached the working ranks of transportation professionals and consequently no alternatives work has been done.
Funding
Not too many adopted County-level adaptation plans in CA yet, since no legislative mandate. BCDC, Commission still don't have adopted policies, which will guide local electeds and planning agencies.
Not routinely collected
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.

NGO, Private Industry & Environmental Consultant Respondents

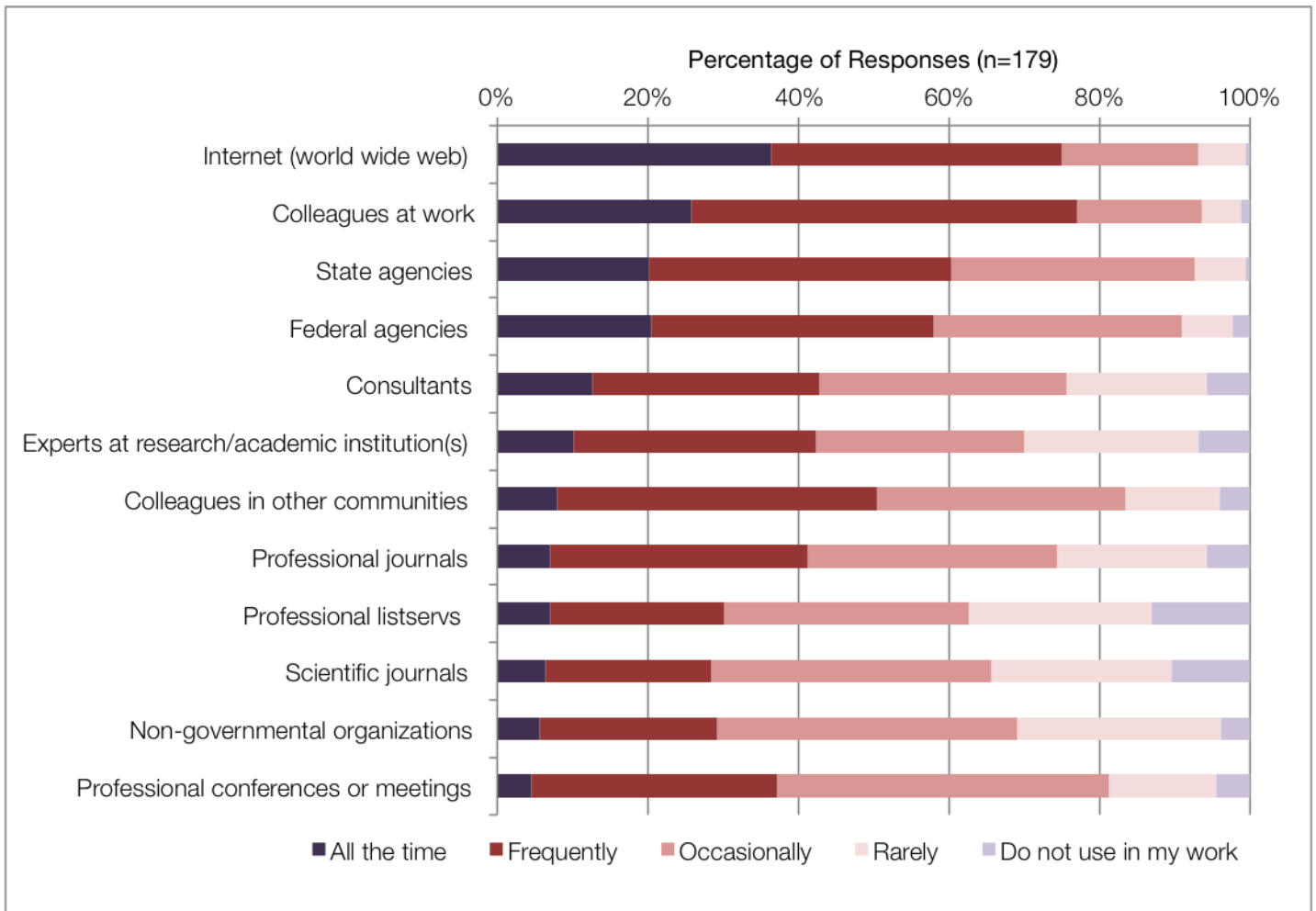
Limitations to information
I do not have the engineering knowledge to derive the information myself and I do not believe others have generated it for the San Diego region yet.
No clear scientific consensus.
Not know where the information lives.
Cost is the primary limitation.
Limited information exists, not well-organized or readily available
Scientific uncertainty.
Only becomes a priority to get the info if there is a potential profitable job that my company is likely to win.
Little scientific study seems to be occurring in smaller, rural areas.
Lack of publicly available, easy to obtain data (these are becoming available little by little)
Cost
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.
<ol style="list-style-type: none"> <li>1. I don't believe a clear analysis has been done on the issue.</li> <li>2. I've seen a few examples, but none that provide a template for So Cal.</li> <li>3. This is a highly contentious issue that most stakeholders shy away from.</li> </ol>
Difficulty in analyzing full scope of costs and benefits related to implementing adaptation options.
Does not exist
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).
Not enough research is being conducted and dam safety investigation and sedimentation rates in reservoirs is not assessing forecasted conditions.
Not available as the tidal datums, tidal predictions/measurements
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.

38. Briefly describe what limits your access to this information (cont'd):

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

Limitations to information
Mostly is time to gather, evaluate and incorporate this information to our daily work and planning processes. Also, some information does not currently exist (e.g., biological data on many species).
Aside from Sierra snowpack-driven water supply, a lot of the research on the effects of climate change on urban freshwater sources is just "not there yet" for such a refined scale. Some research on precipitation, etc at a very fine resolution is being done by Alex Hall out of UCLA and that will help greatly.
Time to research the best info out there
Cost

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

Organization #1	Organization #2	Organization #3
Internet	Other local agencies	Colleagues in other communities
Consultants	Consultants	Consultants
State RWQCB	Water agencies	Corps of Engineers
Coastal Commission information	Resource information relative to California	Regional agencies
San Diego Port District	San Diego Foundation	Consultants
CCCC	CARB	UC
ICLEI	OPR	APA
LGC	ILG	SEEC
UCSC	[No response]	[No response]
San Diego Foundation	Scripps Institution of Oceanography	Dr. James Hansen, Columbia University
CCSE	SD Foundation	SDSU/UCSD/Scripps coalition
ICLEI	San Diego Foundation	[No response]
ICLEI	CARB	Coastal Commission
ICLEI	CARB	California Climate Change Portal
Federal Agencies - EPA, NOAA	State agencies - Coastal Commission	NGOs like CoastKeeper
epa.gov	FEMA	FEMA
Local climate action plan	[No response]	[No response]
NOAA	[No response]	[No response]
Federal EPA	Federal CDC	LARC
California Natural Resources Agency	University of Washington's Climate Impacts Group	IPCC
Google	Academic Institutions	Research Institutions
ICLEI Local Governments for Sustainability	UCSD Scripps Institution of Oceanography	SDSU Graduate School of Public Health
NOAA	American Association of Port Authorities (AAPA)	California Coastal Commission
CalFire	NOAA	USFS
Global Green	Terry Hayes & Associates (Environmental consultant)	SCAG
San Diego Foundation	ICLEI	Scripps



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

Organization #1	Organization #2	Organization #3
BCDC	OPC	CA Climate change Research center
NOAA	USEPA	State of California
NOAA	USGS	DFG
California Dept. of Fish and Game	NOAA	California Coastal Conservancy
San Francisco Bay Conservation and Development Commission	NOAA	State of California
NOAA	Department of Fish and Game	Ocean Protection Council
ICLEI	EPA	California State Lands Commission
SANDAG	Coastal Commission	Department of Fish & Game
Federal Highway Administration (FHWA)	US Environmental Protection Agency (EPA)	San Diego Association of Governments (SANDAG)
NOAA	USCG	CA Department of Fish and Game
SCOOS and CenCOOS	SCCWRP	SWRCB
ICLEI	NOAA Coastal Training	Scripps UCSD
State of California policy	Coastal Commission requirements	NOAA fisheries guidance
NMFS	California Coastal Commission	US Fish and Wildlife Service
IPCC	State of California documents	NGO documents
USGS	NPS	DFG
University	Professional/trade groups	Consultants
Consultants	State - Coastal Conservancy & Commission	Fed - ACOE
USEPA	State Coastal Conservancy	United Nations
NMFS	FWS	CDFG
National Weather Service	CA OSPR	CA State Lands Commission
NOAA	[No response]	[No response]
NOAA	State of California	USGS
NOAA	Coastal Conservancy	NERR
USGS	CCC	EPA
PWA-ESA consultants	PRBO	USFWS/NOAA/Conservancy-OPC

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)

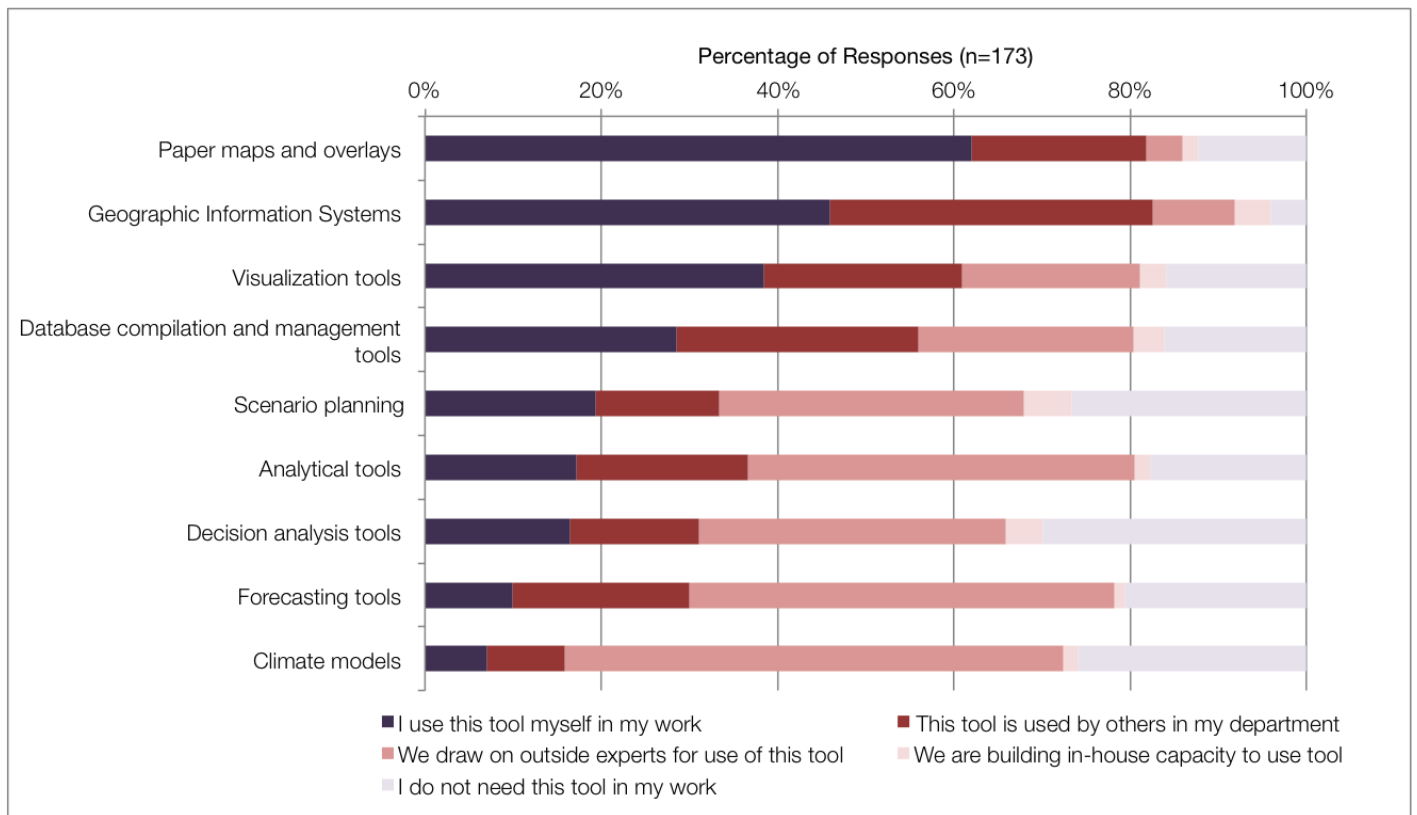
Elected Official Respondents

Organization #1	Organization #2	Organization #3
Surfrider Foundation	BEACON	National Sea Grant
State	Federal	County
Coastal Communities	Department of Fish and Game	[No response]

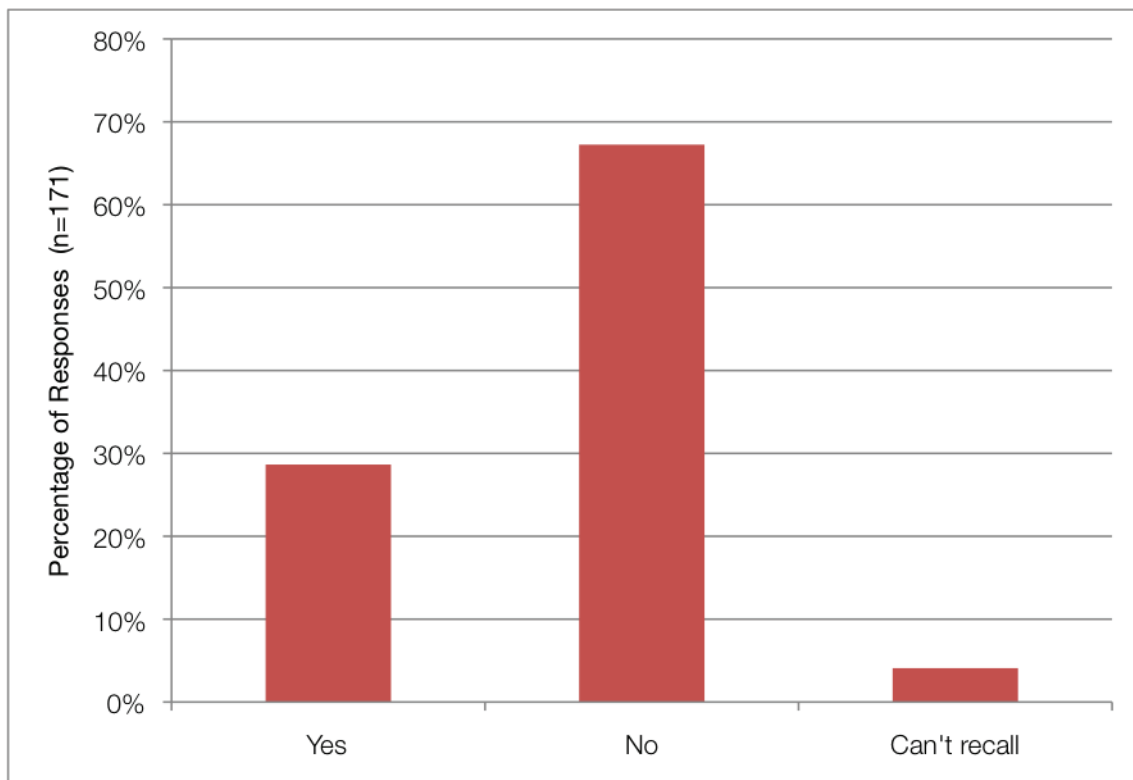
NGO, Private Industry & Environmental Consultant Respondents

Organization #1	Organization #2	Organization #3
NOAA (TRNERR)	Pacific Institute	ICLEI
San Diego Foundation Climate Study	[No response]	[No response]
USGS	OPC	Coastal Conservancy
State Coastal Conservancy	[No response]	[No response]
California Coastal CONservancy	USFWS	[No response]
California Coastal Commission	California Coastal Conservancy	USGS
adapation sources in the UK (where I was previously employed)	[No response]	[No response]
US Army Corps of Engineers	California Ocean Protection Council	California Coastal Conservancy
My own, ICLEI - Local Governments for Sustainability	NOAA	EPA
Natural Resources Defense Council	Pacific Institute	UCLA
ICLEI-Local Governments for Sustainability	Scripps Institution of Oceanography	State of California
USGS	American Rivers Inc.	UC Riverside Dam Removal Clearinghouse
NOAA	Stage Agencies on requirements	Local agencies
Navy	Port of San Diego	Engineering consultant
US Army COE	Local governmental groups	[No response]
Sierra Nevada Alliance	[No response]	[No response]
Scripps	UN committee	ARB
NOAA-NOS website	[No response]	[No response]

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):

City & County Respondents

Title/Topic	Approximate date	Location	Organization offering training
Planning for Climate Change	5/14/2010	Imperial Beach CA	TRNERR
Coastal smart growth	8/10/2010	Encinitas	NOAA
Impact on coastal operations of sea level rise	2009	Los Angeles	NOAA at conference
LARC conferences	Quarterly	Statewide	[No response]
Planning for Climate Change	4-Mar-09	Padilla Bay, WA	Washington Coastal Training Program, WA Sea Grant, UW, NOAA, WA Dept Ecology
ICLEI Climate Protection Network Adaptation Planning Framework	Mar-11	The San Diego Foundation	ICLEI
tools for assessing ghg emissions	2009	[No response]	[No response]
NEPA environmental certification training	Sep-11	Los Angeles	HUD
SB 375	Mar-09	Ontario	[No response]
Sea Level rise training	[No response]	[No response]	[No response]
AB 32 SB 375	[No response]	[No response]	Continuing BAR
[No response]	2009	[No response]	Tijuana Estuary Conservancy
Climate Change Mitigation and Adaptation	6/14-15/2010	Wilmington NC	The Coastal Society conference sessions
Climate Change	6/17/2010	Imperial Beach	NOAA
Same as above	2009?	[No response]	Coastal Commission workshop
Tijuana Estuary National Estuarine Research Reserve Adaptation Planning Stakeholder Working Group	Nov-10	Tijuana Estuary Visitor's Center	NOAA/ICLEI
Coastal development	Mar-10	Imperial Beach	Unsure
Green House Gag Study training	[No response]	[No response]	[No response]
[No response]	2009	[No response]	San Diego Foundation
Communicating Climate Change Adaptation	6/17/2010	Imperial Beach CA	TRNERR
Port of San Diego Climate Mitigation and Adaptation Planning - Overview of Adaptation Planning Process	May-11	Port of San Diego	Environs/ Port of San Diego
[No response]	2010	[No response]	ICLEI

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

Title/Topic	Approximate date	Location	Organization offering training
Climate Adaptation Planning	May-11	Imperial Beach, CA	Tijuana River National Estuarine Research Reserve
Climate Change Assessment Tools	[No response]	[No response]	Team Driven
Blueprint Planning Grants	Over last 4 years	Several	California Department of Transportation
Global Warming Conference	2009 ?	San Francisco	USGS/FWS
Climate Ready Estuary Workshop	July 2010	DC	EPA
Coastal Climate Change	2008	San Francisco	USFWS
Adaptation to Coastal Climate Change	Sep-10	San Francisco	[No response]
H2O Conference	2011	San Diego	CalCoast
Assessing Vulnerability to Climate Change: A Conservation Approach	23-May-11	San Diego	H2O Conf/SD NERR CTP
Pacific NW Climate conferences	2010	Portland	University of Washington
[No response]	[No response]	[No response]	NOAA
Climate Change Webinars	over last 3 years	several	Air Resources Board, EPA
Effects to seagrasses	2002	San Diego	MS
Sink or Swim: Workshop on Marsh Sustainability	Sept. 15, 2011	Oakland	SF NERR CTP
Climate adaptation training	2008	Seattle	University of Washington
Adaptation Basics	Sept. 2, 2010	Ventura	WRP Task Force - Bob Thiel (Coastal Conservancy)

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

Title/Topic	Approximate date	Location	Organization offering training
Communicating about Climate Change	Jun-10	TRNERR	NOAA Coastal Training Center
Seminar on Adaptation strategies	Oct-10	Hartford, CT	Land Trust Alliance
Assessing Vulnerability to Climate Change	May 23, 2011	San Diego	EBM Tools Network
Climate Change Projections for Impact Assessments	February 2011 (original presentation was 6/22/2009)	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>	USFWS
Risk & Uncertainty	2010	USACE	USACE
ICLEI - Sea level rise around San Diego Bay	Nov-10	Tijuana River National Estuarine Research Reserve	TRNERR/ICLEI/The San Diego Foundation
Salmonid Restoration Federation Conferences	2000-2011	Various	Salmonid Restoration Federation
Land Use	Apr-10	Encinitas, CA	[No response]
Adaptation plan	Jan-11	TJ Estuary	ICLEI
[No response]	Feb-11	imperial beach CA	sea level rising
[No response]	2006	Malibu	Greenhouse Network
Stakeholder's Advisory Group for the San Diego Bay Sea Level Rise Adaptation Planning	Nov-10	TRNERR	NOAA/ICLEI
Planning for Climate Change	Jun-10	Tijuana River National Estuarine Research Reserve	TRNERR/ICLEI/The San Diego Foundation/Dr. Suzanne Moser
Workshop on Sea Level Rise: Science, Predictions, and Stakeholder Planning	May-10	Scripps Institution of Oceanography, UCSD	UCSD

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

Challenges
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.
Data is limited, future projections are limited in accuracy, other issues are more pressing now.
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.
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.
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.
Air and Emissions sections of Initial Studies and in EIR preparation

State, Federal & Regional Respondents

Challenges
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.
Support of Administration with policy direction and funding
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.
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.

NGO, Private Industry & Environmental Consultant Respondents

Challenges
Implementing sea-level rise estimates into estuary restoration projects currently underway.
Haven't had the opportunity yet
No challenges encountered
Budget, lack of ability to do economic analysis of potential options. Public awareness about these issues.

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.

City & County Respondents

Suggestions
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 infrasture 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 costal 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 May, 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 anysis variable, one factor of many. Our daily work routine needs adopt in response to climate change by reducing factors contributiong 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)

Suggestions
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.
Include fire hazards and mitigation techniques
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.

State, Federal & Regional Respondents

Suggestions
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
A presentation of the most likely scenarios, across a broad range of impacts, and from a reliable source, would be helpful.
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?
More focused climate change modeling to assist regions in planning efforts.
True scientific research not tainted by personal bias or agendas. The exposure of radical environmental extremism agendas in regulatory agencies.
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.
Fund the regional coastal ocean observaton systems
Better research to quantify the relative impact of 1)Annual variations of solar energy output, 2) Volcanos, 3) Anthropogenic causes of climate change.
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.
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"
Ocean Acidification

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)

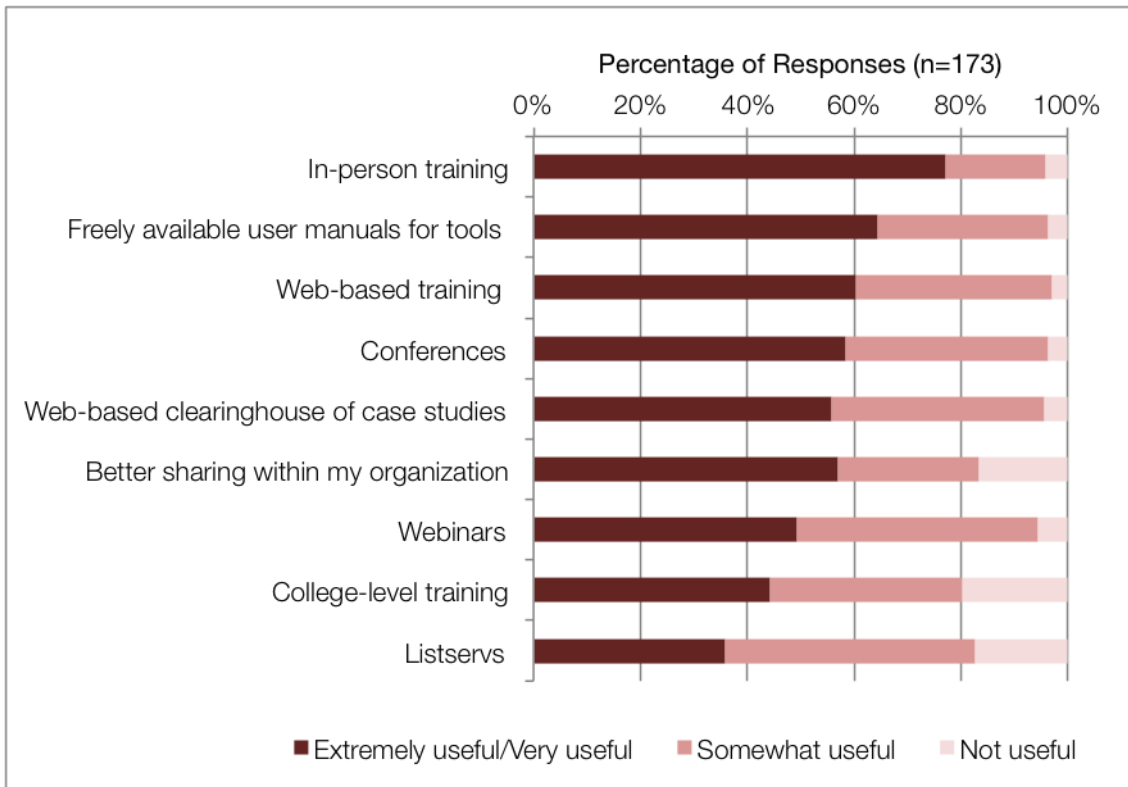
Suggestions
All state and federal agencies acknowledge there is significant problem, but the challenges seem so overwhelming, complex, and uncertain, that the permitting agencies maintain the status quo. Resource managers need to learn more about pragmatic approaches to adaptation and make use of existing tools and information a greater priority in their everyday tasks. Agency leadership needs to move beyond words to action.
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.
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 untapped resource of high quality data.

NGO, Private Industry & Environmental Consultant Respondents

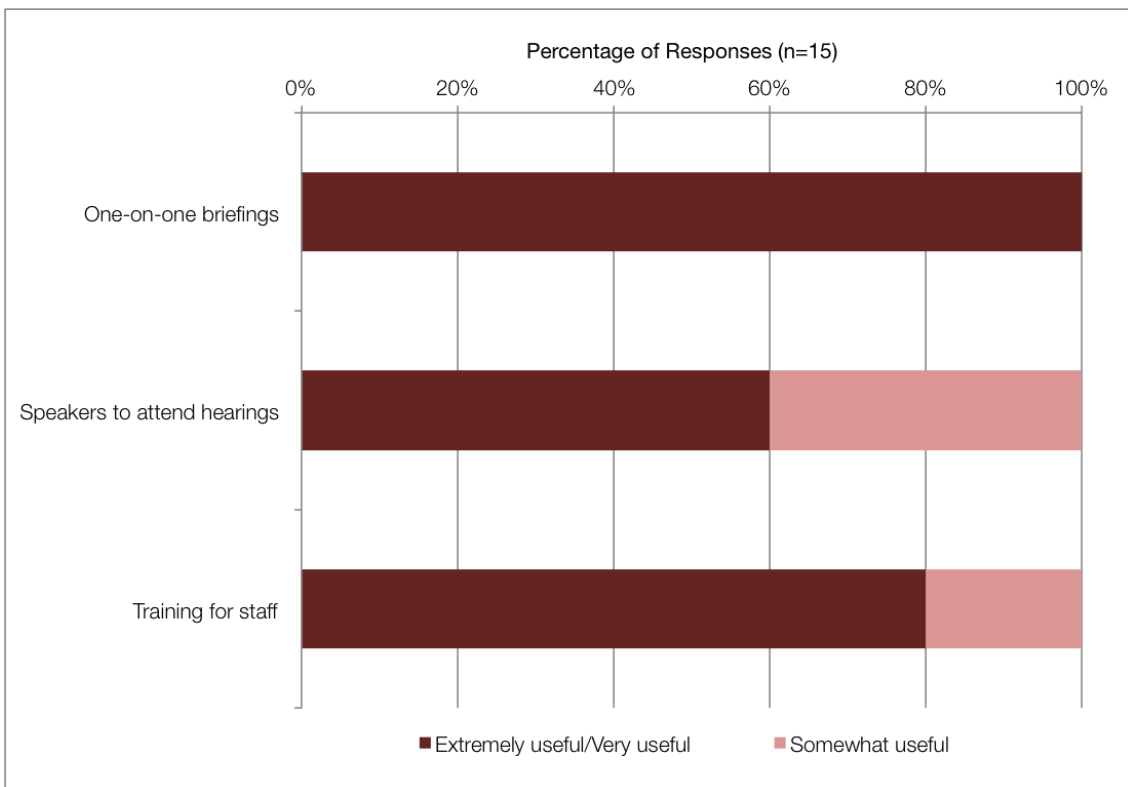
Suggestions
All of the downscaling efforts are excellent, keep 'em going. The type of effort especially that Hayhoe talks about in her presentation is particularly useful in bringing home the message, especially where some of the climate projections make population changes very likely (i.e., relocation from very hot areas)
Direct and indirect costs of adaptation strategies and not having adaptation strategies from coastal region to coastal region.
A compilation and summary of previously published research on changes in wave activity, both magnitude and frequency, in California.
I am concerned with regulatory compliance and monitoring.
Need science-policy nexus to direct decisionmakers
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.
More studies and research on available data.
Regional standardization of infrastructure design or replacement needs. E.g., how taller should piers/bulkheads be constructed. There seems to currently be large variation in this area (little consensus).
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)
Local models for climate change impacts would be very useful in communicating with stakeholders and in our planning processes.
Need a list of what others have done to protect wetlands from SLR and habitats from threats.
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.

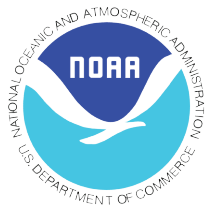
47. To make the most effective and efficient use of the available information and tools to support planning for climate change, please rate how useful each of the following opportunities to learn more about them would be to you.

All Respondents (Except Elected Officials)



Elected Officials





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