

# PLANNING FOR CHANGE: CLIMATE ADAPTATION SURVEY RESULTS, WASHINGTON STATE, 2014

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## EXECUTIVE SUMMARY

**T**his report details the results of a Sea Grant survey distributed statewide in Washington during August 2012. The survey assessed the role of coastal practitioners and elected officials in climate change adaptation, the hurdles they have encountered, and the quantity and quality of information they have on local climate change impacts. The report also identifies similarities and differences in the obstacles to climate adaptation faced by practitioners in the states of Washington, Oregon, and California. These findings will help fulfill the National Sea Grant Office's goal of identifying the types of information that local jurisdictions need to progress from understanding climate change to adapting to it.

The results suggest that coastal planners regard climate change as a significant threat and would welcome information about its local effects. Most respondents believe that all levels of government should plan for climate change, and that they themselves have a professional responsibility to do so. However, many acknowledge that local governments have a limited capacity to respond.

Most respondents are still coming to understand how climate change affects them, both directly and indirectly. A select few are planning and implementing adaptation strategies. Most are encountering multiple hurdles to climate adaptation and are seeking guidance as to how to address them.

## INTRODUCTION

In August 2012, Washington Sea Grant surveyed elected officials and coastal managers and planners belonging to the Shoreline and Coastal Planners Group 1 about their involvement in climate change adaptation (Figure 1). It asked what information on climate change respondents had access to, if they had begun planning for adaptation and, if so, what obstacles they had encountered. The results will be used to inform Sea Grant and other coastal practitioners about how to assist coastal planners in their preparations for the impacts of climate change.

The survey was conducted as part of an effort led by the National Sea Grant Office to understand the status of climate change adaptation in coastal communities. The Washington results will be used at the local and state levels and compared to results from similar surveys conducted in Oregon and California.

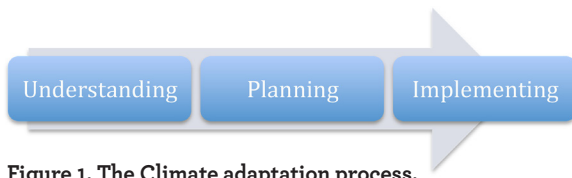


Figure 1. The Climate adaptation process.

## METHODOLOGY

The National Sea Grant Office crafted a survey to assess the status of climate change adaptation (Figure 1) in coastal communities and distributed it to regional Sea Grant programs throughout the United States. Washington Sea Grant distributed the survey in August 2012 to an email list of 339 Shoreline and Coastal Planners Group members as well as 14 additional elected officials identified by Washington Sea Grant staff. The survey received 103 responses (a 30 percent response rate) from the various sectors listed in Table 1.

Table 1. Survey respondents and their affiliated sectors.

Sectors	Number of Responses
Coastal Professionals/Public Sector Workers	46
Elected Officials	7
Engineers	3
Nongovernmental Organizational Representatives	3
Academics	3
Others	13
Skipped question	28
Total	103

## RESULTS

The survey’s results have been grouped under five general themes: understanding climate change, responding to climate change, mitigation and adaptation, hurdles to adaptation, and additional stressors on the community.

### Understanding Climate Change

Several survey questions assessed respondents’ understanding and awareness of climate change. These questions focused on their knowledge of local climate change impacts, the importance of climate change to their work, and the risks posed by a changing climate.

About one-third of respondents said they were very well informed about the local effects of climate change. Just over half said they were moderately informed about these effects, and only 3 percent reported that they were not at all informed. When respondents were asked if they thought the climate in their area was changing, an overwhelming majority (89 percent) said yes.

### Knowledge of Local Climate Change Impacts

Respondents were asked how climate change would affect conditions in their locales, including temperature, precipitation patterns, storm patterns, water supply, water quality, runoff, flooding, sea level rise, and the geographic ranges of land and marine species. As Figure 2 shows, the majority of respondents believe that climate change will likely cause increases in air, stream, and seawater temperatures. About two-thirds think runoff will likely increase with climate change, and 80 percent think flooding will increase. Seventy-two percent expect storms to become more frequent and intense.

Respondents’ perceptions of the effects of a changing climate on seasonal variations in precipitation and water supply are complex. The majority think summer water supplies will likely decrease. About two-thirds think rain will increase, but only 25 percent think snowfall will. Almost half think snowfall will likely decrease while wintertime water supplies increase.

The majority of respondents think the geographic ranges of land and marine species will shift as the climate changes. A large majority think algal blooms will likely increase. More than half think water quality will likely decline. More than three-quarters think sea level rise will likely accelerate with climate change.

### Climate Change and Importance to Work

The respondents were given a list of impacts and other factors associated with climate change and asked to rate the importance of each to their own work (Figure 3). They deemed most of these factors extremely important, and singled out shoreline change, ecosystem impacts, and sea level as the impacts that most affected their work.

<sup>1</sup> <http://wsg.washington.edu/wacoast/>

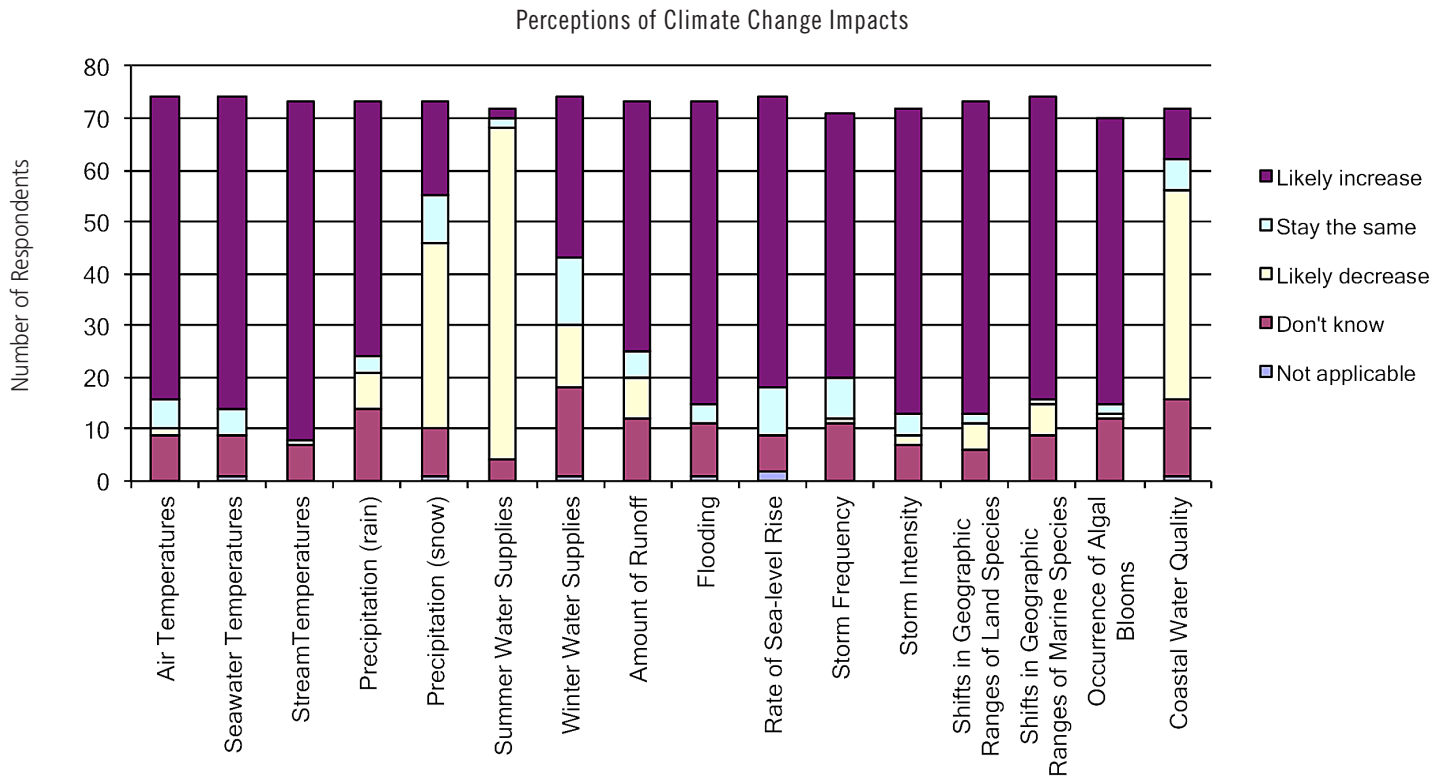


Figure 2. Perceived changes in local conditions as a result of climate change.

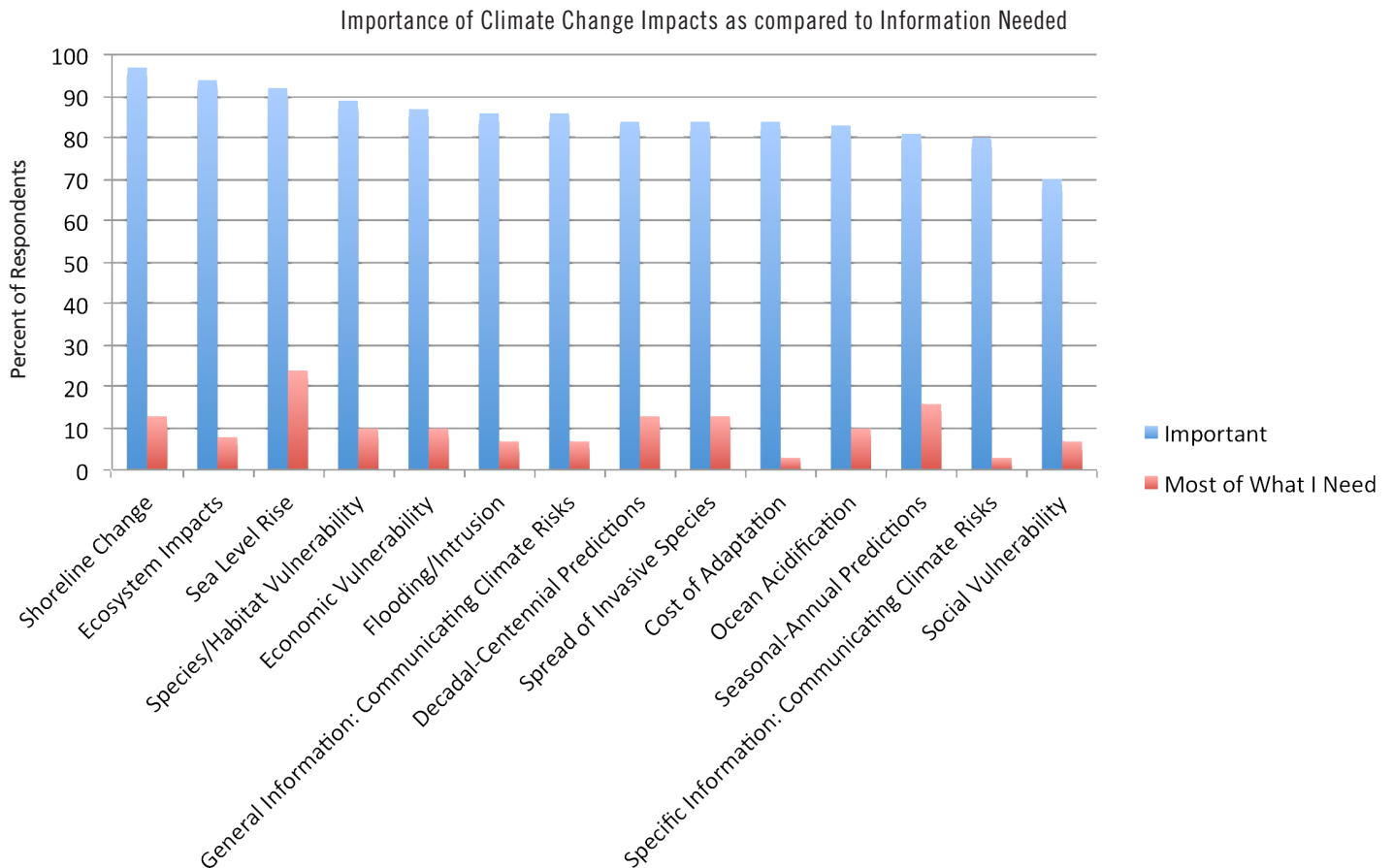


Figure 3: Respondents were asked to look at a list of examples of climate change information and rank the importance of each to their work as compared to how much information they have on each.

The respondents were also asked to indicate how much information they had about each local impact. Although they overwhelmingly rated these impacts as important, most said they had insufficient information about each, and, except in the case of sea level rise, fewer than 20 percent believe they have most of what they need.

### Risks Posed by a Changing Climate

Respondents were asked to name up to five risks associated with changing climate in their areas. Risks were ranked according to the number of respondents who named it. These risks were grouped into four impact categories: weather changes, water impacts, ecological impacts, and social impacts. These categories were then ranked according to the total number of times respondents cited any of the risks within them (Figure 4). Weather-related risks included increased storm intensity and frequency, extreme weather events, changes in rainfall and seasonal precipitation patterns, increased erosion, poor air quality, and overall temperature rise. Potential water impacts included drought, sea level rise, reduced fresh water availability, ocean acidification, reduced water quality, altered wetland ecology and stream recharge, less snowpack and faster snow melt, glacial retreat, and higher water temperatures. Potential ecological impacts included loss of native species, more invasive species, new pathogens, altered community structure and distribution of ecological communities, food-web and trophic-level disturbances, changes in energy transfers and productivity, and altered natural processes. Social hazards cited included public health impacts, strains on infrastructure, more demand for energy and other resources, economic impacts, food insecurity and crop failure, and increases in fear, lack of action, and misinformation.

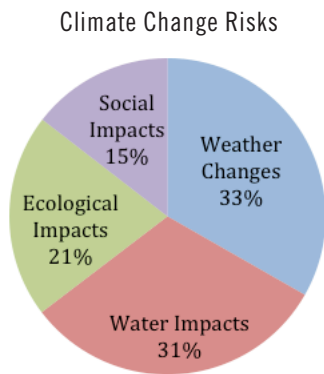


Figure 4. Climate change risks as reported by survey respondents when asked to identify up to five risks associated with a changing climate. Responses were categorized into social impacts, weather changes, water impacts, and ecological impacts in the percentages displayed above.

### Responding to Climate Change

Respondents were asked to identify who they think should initiate a response to the likely effects of climate change. As Figure 5 shows, “government” was the primary suggestion, with respondents split as to whether state or federal government, or both together in coordination with other organizations, should bear the burden. Either very few or none believed regional, county, municipal, or tribal governments or the private sector, NGOs, academia, or grassroots organizations should take responsibility.

While a strong majority of respondents agree or strongly agree that it is important for government to prepare for climate change, many also identified individual responsibility as important. Almost three-quarters agree that they have a professional responsibility to plan for climate change. Eighty-five percent believe that failing to plan for climate change would harm their communities.

Nearly half the respondents strongly agree that planning for climate change could be best done within a comprehensive risk-management plan. However, they diverge on the question of how their communities should prepare for the coastal effects of climate change. Over half think climate-related risks should be considered in all relevant decision making, but a third think only the most likely climate scenario should be considered. Small minorities think communities should only undertake actions that will be beneficial regardless of whether the climate changes, and that they should do nothing until they have better information.

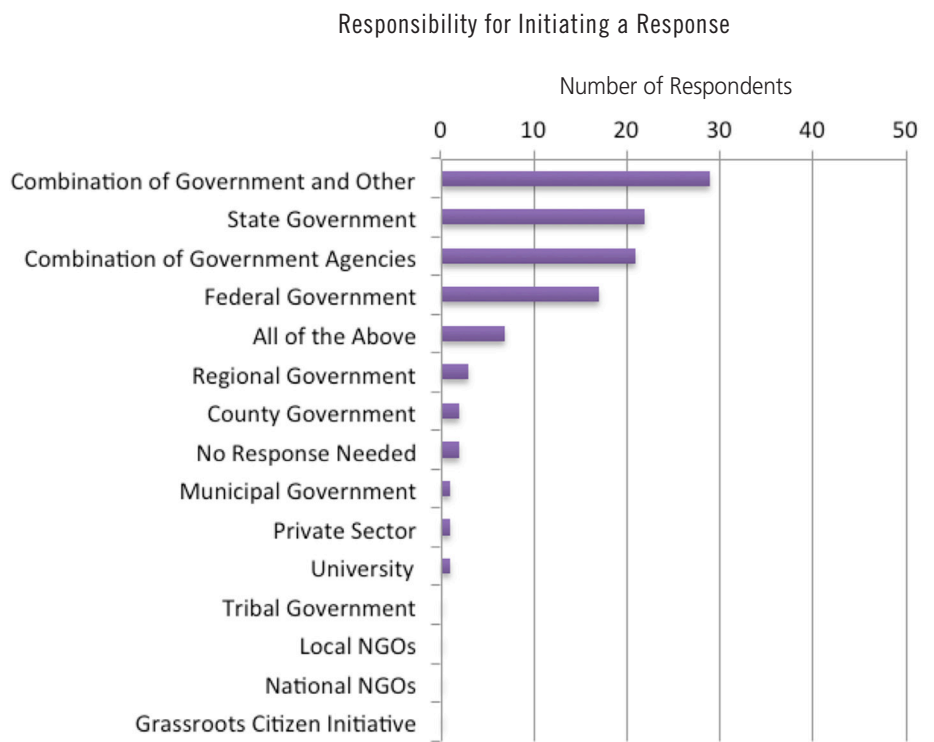


Figure 5: Who has responsibility for initiating a response to the impacts of climate change?

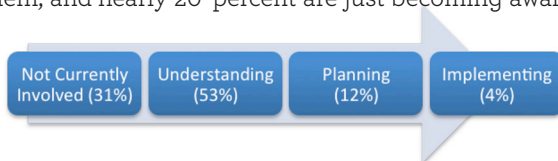
## Mitigation and Adaptation

Most of the survey was devoted to climate change adaptation. Respondents were asked how high a priority adaptation was for them, what or who prompted their involvement in planning for adaptation, and what in phase of the adaptation process they were currently.

The survey also asked about climate change mitigation, defined as the “reduction of greenhouse gas emissions from energy use or land use.” More than half the respondents view mitigation as a top or medium-high priority, and more than 70 percent view adaptation as a top or medium priority. The various drivers of adaptation are included in Table 2.

### The Adaptation Process

The survey asked respondents what phase of adaptation they were currently working on: understanding, planning, or implementation (Figure 6). More than half said they were in the understanding phase, a relatively early stage, defined in the survey as trying to understand the potential impacts of climate change and identify their own communities’ vulnerabilities. Of these respondents, 72 percent have started gathering information. Only 8.5 percent have completed an assessment of the problem, and nearly 20 percent are just becoming aware of it.



**Figure 6: Phases of the climate change adaptation process as listed in the survey.**

Only 12 percent of respondents had reached the stage of planning for adaptation, defined as assessing options for preparing for climate change and reducing its impacts. Seventy-three percent of respondents in this phase were brainstorming a range of options to prepare for and manage climate risks, while the remaining 27 percent had completed an assessment of potential responses. No one in this phase had selected a response plan with which to proceed.

Only three respondents had reached the implementation phase, in which communities put the strategies they have selected into practice and begun monitoring their performance. The strategies these three respondents have begun implementing included enhancing gravel berms landward of beaches, evaluating adaptive measures for new infrastructure, raising required building elevations and setbacks above the current minimums, reducing the amount of cement in concrete mixtures, and other resource-management measures, updating shoreline management policies and development regulations to allow for sea level rise, and protecting urban forests and urban agriculture.

### Hurdles to Adaptation

Respondents were asked to describe potential hurdles to adaptation and note whether they had “encountered,” “overcome,” or “not encountered” these obstacles (Figure 7, following page). An overwhelming majority had encountered each hurdle, but few had made progress toward overcoming them.

**Table 2: The survey asked respondents who or what prompted their involvement with climate change adaptation.**

Drivers of Adaptation	Response Percent
Regionally or Locally-Specific Information Showing Potential Impacts	21 percent
State-Level Climate Adaptation Strategy	18 percent
Update of General Plan, Local Coastal Plan, or Emergency Management Plan	18 percent
Personal Motivation to Address the Issue	18 percent
Legislative Mandate	8 percent
Supervisor’s Directive	6 percent
Development or Update of a Local Climate Action Plan	6 percent
Community Support or Encouragement	6 percent
A Recent Event	4 percent
Other Local Governments Providing Models for Adaptation Planning	4 percent
Direction/Mandate from City of County	2 percent
Funding Became Available	2 percent

## Comparisons Between Washington and Oregon

Because this survey was also distributed to Oregon coastal practitioners, comparisons can be drawn between the two states, especially concerning the hurdles they have encountered and the climate stressors that concern them (Figures 8,

9, and 10). The same hurdles tend to be prevalent in Washington and Oregon, but larger shares of Washington practitioners report encountering them, suggesting there may be more resistance to climate change adaptation in that state. Many more Washington respondents are concerned about population growth as a climate stressor.

Hurdles to the Adaptation Process

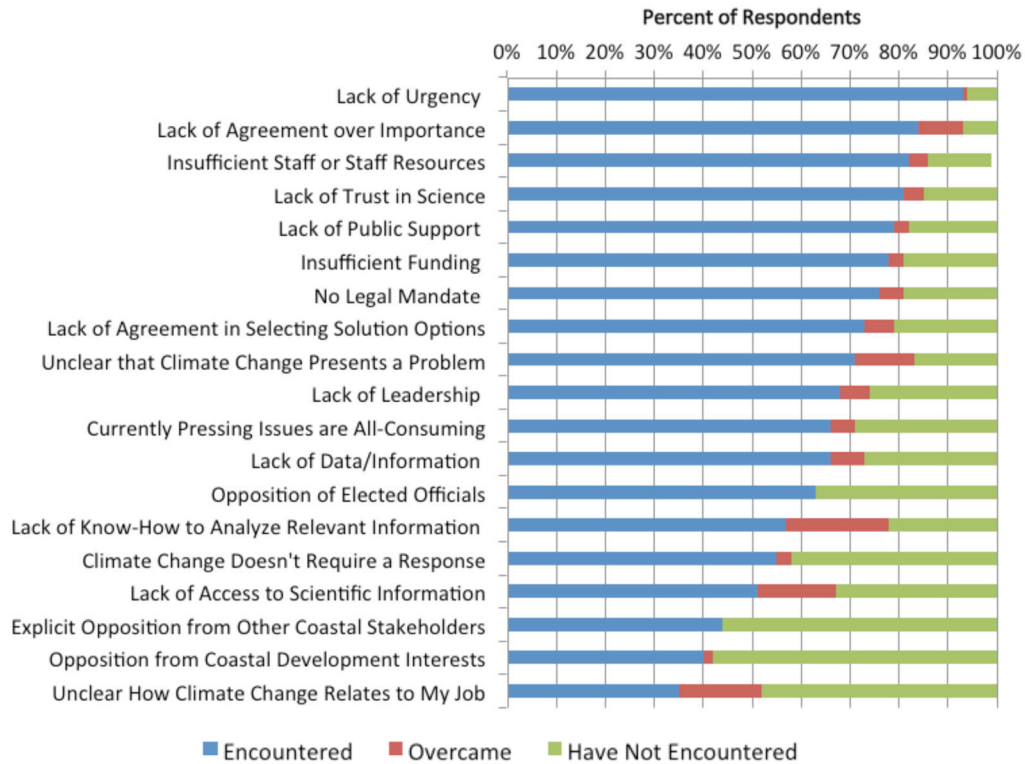


Figure 7: Hurdles to the adaptation process encountered by Washington respondents.

Comparison of Hurdles Encountered in Washington and Oregon

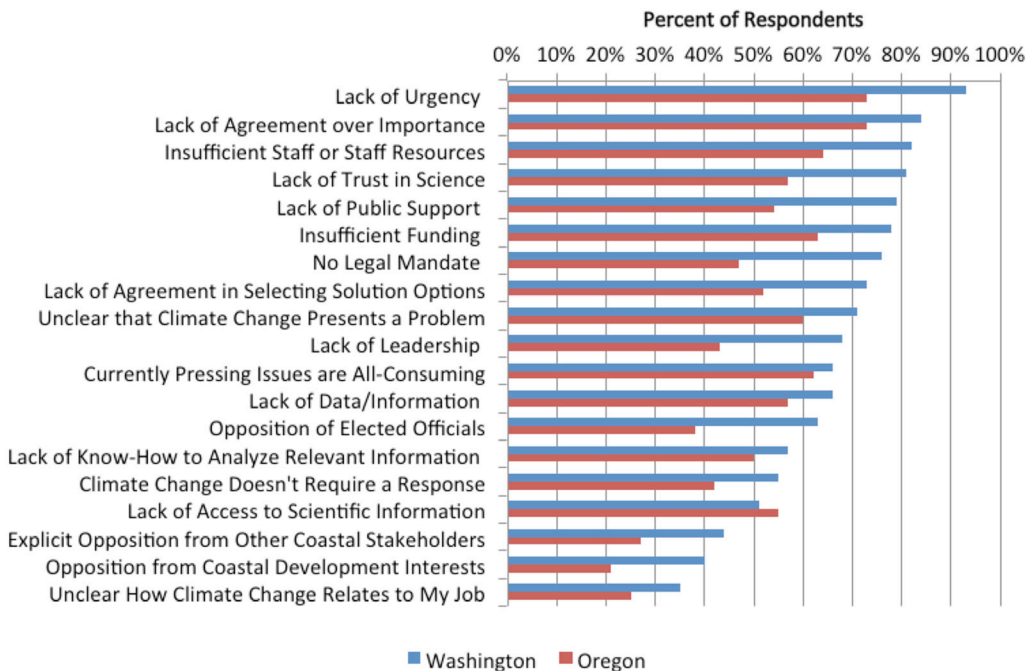


Figure 8. Washington and Oregon's largest hurdles are a lack of urgency about confronting climate impacts and lack of agreement over the importance of climate change impacts. California's largest hurdles are insufficient staff and resources and lack of funding (not shown).



### Hurdles Overcome in Washington and Oregon

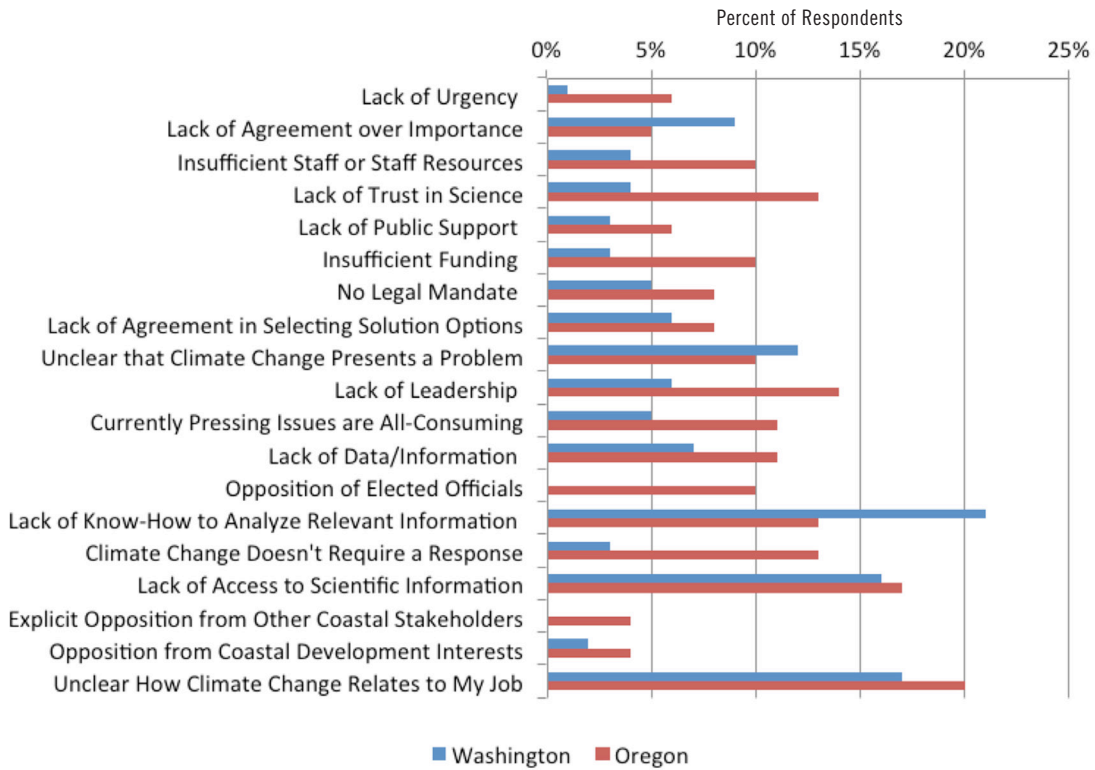


Figure 9: While Washington and Oregon have confronted similar hurdles, the hurdles overcome between the states differ.

### Concern about Local Potential Stressors in Washington and Oregon

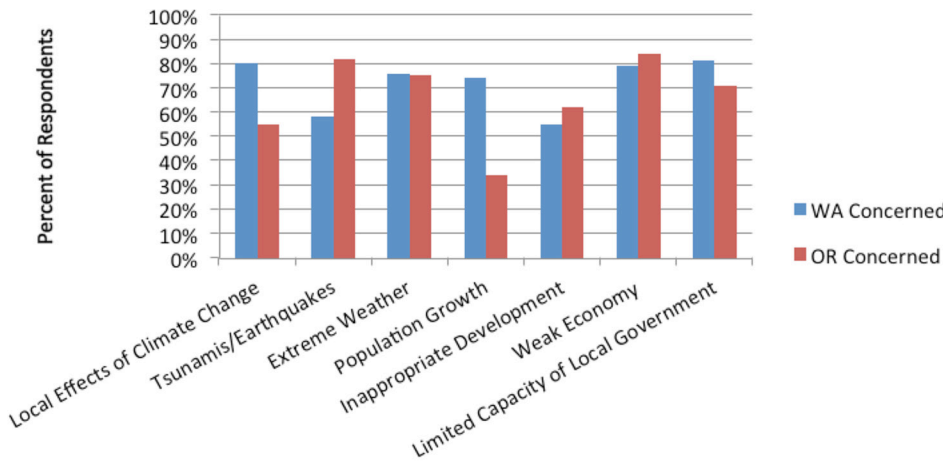


Figure 10. The specific drivers of concern over local potential stressors between Washington and Oregon respondents vary.

## DISCUSSION

The findings of this survey offer direction and support to Washington's coastal planners and city officials as they work to adapt to climate change. They show that what these practitioners need most to promote communities is more information, guidance on implementing adaptation strategies, and assistance in overcoming various hurdles.

Overall, coastal planners and decision makers believe they are informed about climate change and its effects, and they are sure that their local climate is changing. However, the majority do not have as much detailed information about local impacts as they would like. Possible reasons for this deficiency include the hurdles to accessing, analyzing, and trusting scientific information that many respondents identified. For those moved to promote climate change adaptation, the leading motivator was specific information on local climate effects. For example, "Sea Level Rise in the Coastal Waters of Washington State" (Mote, 2008), containing local sea level projections, proved more useful to communities at a local level than "Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future" (National Research Council, 2012), which provided projections on a larger scale.

The results suggest a consensus view that failing to plan for climate change would harm local communities. But despite this consensus, the hurdle that respondents faced most often was a lack of urgency regarding climate impacts. They believe that planning for climate change should be initiated by a government entity or combination of government entities, with a focus on adaptation. Washington's coastal planners seek guidance on how to move forward in the adaptation process; more specifically, how to move from understanding the issue to finding solutions and implementing them.

## CONCLUSION

The survey results show that lack of information is the reason so many respondents remain caught in the "understanding" phase, rather than moving on to planning and implementation. This suggests that devoting resources to gathering locally specific climate information would serve local jurisdictions well.

While most respondents would like to develop plans for adapting to climate change, the hurdles they identify show why they are not yet doing so. One potential way to address these hurdles is by providing guidance in the updating of established planning mechanisms; such updates are one motivator for climate adaptation planning that many respondents identified. Washington already has many different planning mechanisms in place that can incorporate climate change adaptation information, including shoreline master programs, hazard mitigation plans, critical area ordinances, and comprehensive plans, which are administered by various state and local agencies.

Another option is to develop a plan focused exclusively on climate adaptation. Either approach would not only help get more people in a particular community involved in the process but also function as an example to other communities.

Any guidance provided to local communities must address not just how to move through the adaptation phase, but how to overcome potential hurdles to adaptation. Local governments have a limited capacity to accomplish such a task. Stronger coordination at the state and federal levels is necessary to guide local governments through the climate adaptation process.

## AVAILABLE RESOURCES/ CURRENT ACTIONS

**W**ashington Sea Grant has a growing resilience program that aims to help coastal communities adapt to climate change. The following are examples of work either in progress or completed that relates to climate change and resilience in Washington State.

### CLIMATE CHANGE AND THE OLYMPIC COAST NATIONAL MARINE SANCTUARY: INTERPRETING POTENTIAL FUTURES

**Contact: Ian Miller, Coastal Hazards Specialist, Washington Sea Grant**

This report aims to assist managers and policy-makers on the regional and local scales prepare for and adapt, where possible, to climate-related changes.

[http://sanctuaries.noaa.gov/science/conservation/pdfs/ocnms\\_cca.pdf](http://sanctuaries.noaa.gov/science/conservation/pdfs/ocnms_cca.pdf)

### COASTAL HAZARDS RESILIENCE NETWORK

**Contact: Jamie Mooney, Coastal Resources Specialist, Washington Sea Grant**

Washington Sea Grant recently received NOAA funding to establish a coastal hazard resilience network in Washington State. The goals of the network are to foster collaboration and coordination across state agencies and to address coastal hazards, including climate change, in an integrated and comprehensive manner. The pilot project for the grant includes work in Grays Harbor and Pacific Counties with plans to extend to other coastal areas in Washington.

[wsg.washington.edu/resilience](http://wsg.washington.edu/resilience)

### NATIONAL DISASTER PREPAREDNESS TRAINING CENTER'S COASTAL FLOOD RISK REDUCTION

**Contact: Jamie Mooney, Coastal Resources Specialist, Washington Sea Grant**

Coastal Flood Risk Reduction is a performance level course designed to provide an introduction to flood risk-reduction opportunities within coastal communities. Participants learn about the traditional structural and non-structural mitigation approaches to reducing risk and the ways in which floodplain-management tools can strengthen recovery from flooding events and sea level rise, increasing resilience within coastal environments.

<https://ndptc.hawaii.edu/training/catalog/7>

### OCEAN ACIDIFICATION: FROM KNOWLEDGE TO ACTION. WASHINGTON STATE'S STRATEGIC RESPONSE

**Contact: Meg Chadsey, Ocean Acidification Specialist, Washington Sea Grant**

One result from the convening of the Ocean Acidification Blue Ribbon Panel is the state's strategic plan in addressing the acidification of coastal waters.

<https://fortress.wa.gov/ecy/publications/publications/1201015.pdf>

### SHORELINE AND COASTAL PLANNERS GROUP

**Contact: Nicole Faghin, Coastal Management Specialist, Washington Sea Grant**

The Shoreline and Coastal Planners Group is a group of coastal practitioners that meets three to four times a year to discuss relevant coastal management topics. Membership is voluntary and meetings and other applicable coastal management updates are announced via a listserv.

<http://www.wsg.washington.edu/wacoast/>

### Other Relevant Information

#### WASHINGTON DEPARTMENT OF ECOLOGY'S PREPARING FOR A CHANGING CLIMATE

The Washington Department of Ecology released a report in 2012 titled "Preparing for a Changing Climate: Washington State's Integration Climate Response Strategy." Developed by a working group of state agencies at the direction of the Legislature and Governor Chris Gregoire, this document aims to help state, tribal, and local governments, public and private organizations, and businesses and individuals prepare for a changing climate. The report outlines strategies for protecting human health, safeguarding infrastructure and transportation systems, improving water management, reducing losses to agriculture and forestry, protecting sensitive and vulnerable species, and supporting communities.

[http://www.ecy.wa.gov/climatechange/ipa\\_responsestrategy.htm#REPORT](http://www.ecy.wa.gov/climatechange/ipa_responsestrategy.htm#REPORT)

#### COASTAL TRAINING PROGRAM'S SEA LEVEL RISE ADAPTATION: OPPORTUNITIES FOR PLANNING IN WASHINGTON STATE

**Contact: Bobbak Talebi, Washington Department of Ecology and/or Cathy Angell, Coastal Training Program, Washington Department of Ecology**

This training is designed to take planners and coastal managers beyond the fundamental principles offered in the "Planning for Climate Change" curriculum by providing more detailed information to assist adaptation decision-making. The training will discuss recent sea level rise science in Washington; help communities determine the level of acceptable risk using sea level rise planning scenarios; incorporate exercises to communicate more effectively and build support for local action; and present examples of various adaptation strategies to inspire creative measures for making communities more resilient.

<http://www.coastaltraining-wa.org/Course-Catalog/Shoreline-And-Environmental-Laws-And-Administrativ/Sea-Level-Rise-Adaptation-Opportunities-for-Plann/71.aspx>

## *Resources Available*

### **TOOLS FOR COASTAL CLIMATE ADAPTATION PLANNING: A GUIDE FOR SELECTING TOOLS TO ASSIST WITH ECOSYSTEM-BASED CLIMATE PLANNING**

This guide provides information necessary for community planners and coastal natural resource managers to select appropriate tools for their climate-related planning and projects. From the Ecosystem-Based Management Tools Network and NatureServe.

<https://connect.natureserve.org/sites/default/files/documents/EBM-ClimateToolsGuide-FINAL.pdf>

## **ACKNOWLEDGEMENTS**

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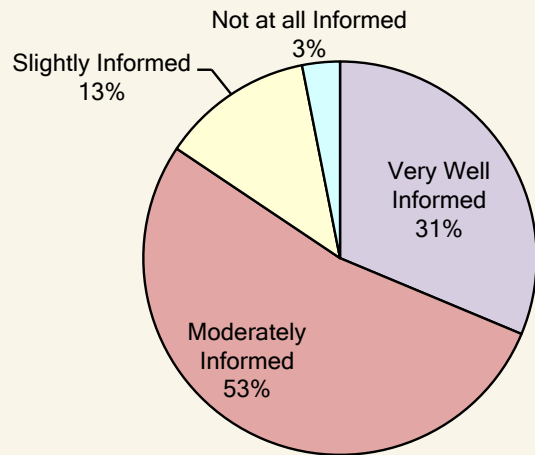
## **REFERENCES**

- Mote, P. et al. (2008) Sea level rise in the coastal waters of Washington State. University of Washington Climate Impacts Group and Washington Department of Ecology.
- National Research Council (2012) Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future. The National Academies Press, Washington, DC.

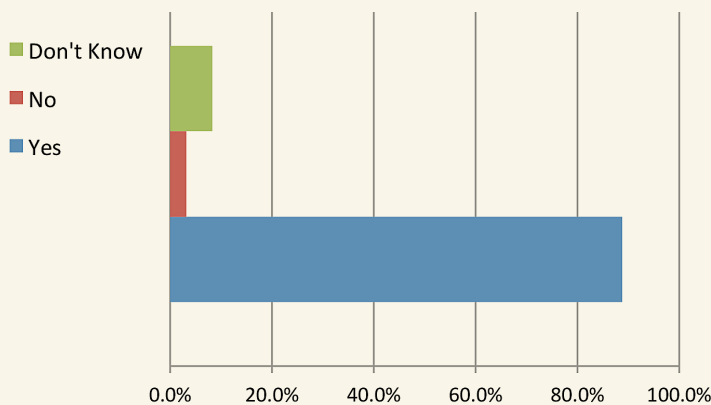
# APPENDIX

The appendix lists all the survey questions with a graphic that best depicts each result.

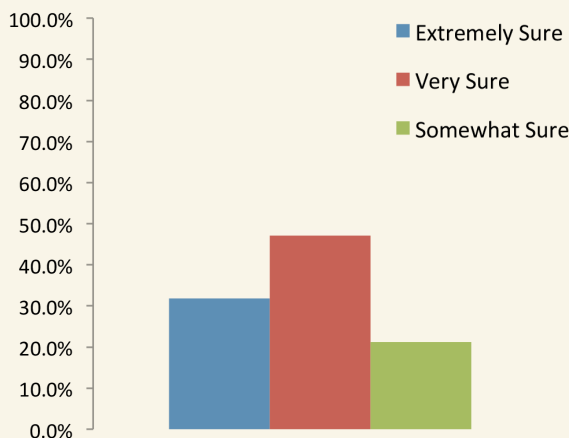
## 1. How well informed are you about the effects of a changing climate in your area?



## 2. Do you think the climate in your area is changing?



## 3. How sure are you that the climate in your area is changing?

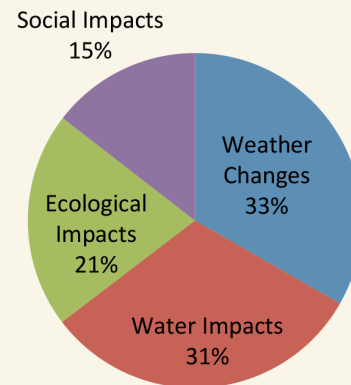


## 4. How sure are you that the climate in your area is NOT changing?

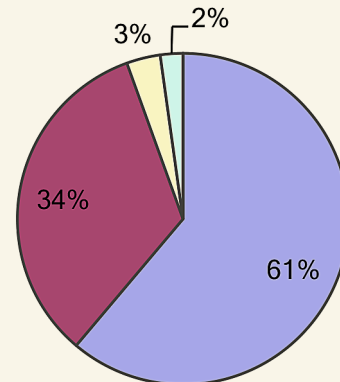
Answer Option	Response Percent	Response Count
Extremely Sure	0.0 percent	0
Very Sure	33.3 percent	1
Somewhat Sure	33.3 percent	1
Not at All Sure	33.3 percent	1

## 5. In your own words, express as many as five risks that you associate with a changing climate on your coast.

Amount of Times Climate Change Risks were Listed

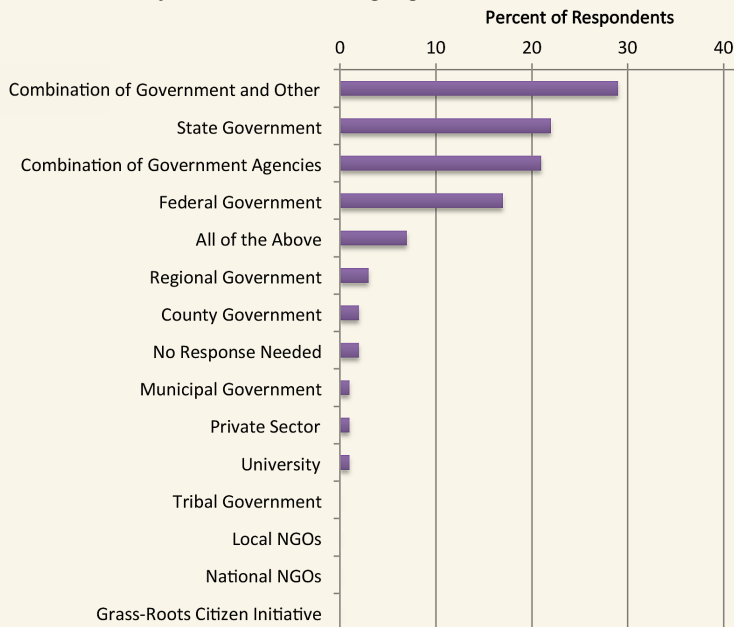


## 6. Which following statement best represents how you think your local community ought to respond to changes in coastal areas that might result from a changing climate?

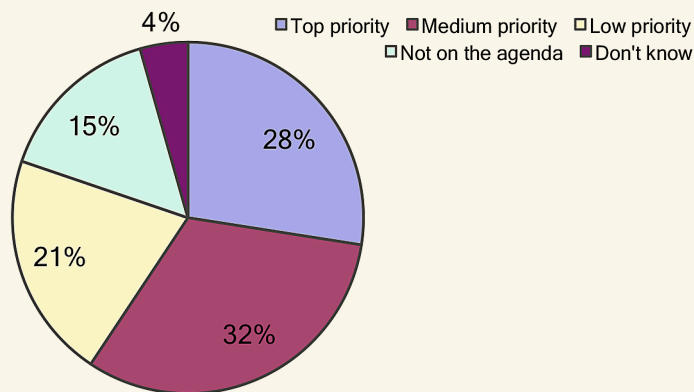


- We should consider potential climate-related effects in ALL relevant decisions.
- We should prepare for ONLY the most likely scenario based on the best available information.
- We should take only actions that will benefit us whether or not climate change occurs.
- We should wait to make any changes until we have better information.

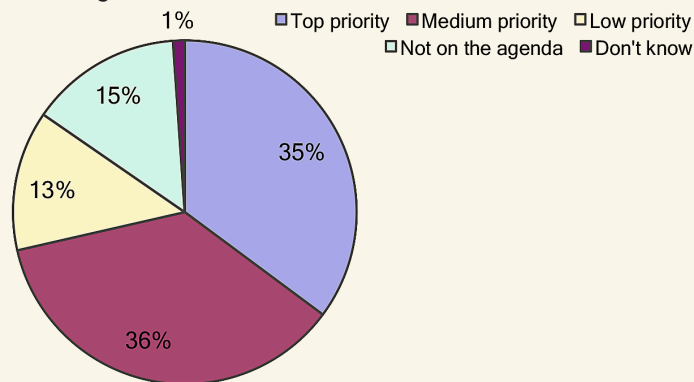
**7. In your opinion, who should initiate a local response to the likely effects of a changing climate?**



**8. Please rate how important it is in your work to address climate change through “mitigation,” the reduction of greenhouse gas emissions from energy use or land use.**



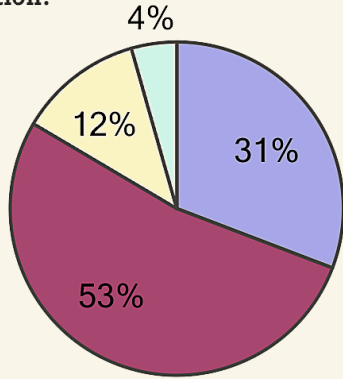
**9. Please rate how important it is in your work to address climate change through “adaptation,” efforts to plan or prepare for or manage the projected impacts of climate change.**



**10. If you are professionally involved in your community or region in climate “adaptation planning” (planning to adapt to the effects of climate change), what prompted your involvement?**

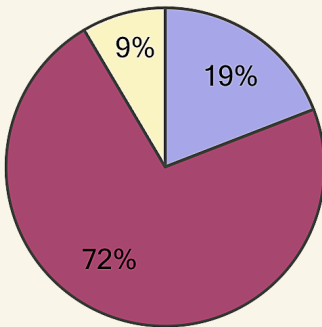
Drivers of Adaptation	Response Percent
I Am Not Currently Involved	34 percent
Regionally or Locally-Specific Information Showing Potential Impacts	21 percent
State-Level Climate Adaptation Strategy	18 percent
Update of General Plan, Local Coastal Plan, or Emergency Management Plan	18 percent
Personal Motivation to Address the Issue	18 percent
Legislative Mandate	8 percent
Supervisor's Directive	6 percent
Development or Update of a Local Climate Action Plan	6 percent
Community Support or Encouragement	6 percent
A Recent Event	4 percent
Other Local Governments Providing Models for Adaptation Planning	4 percent
Direction/Mandate from City of County	2 percent
Funding Became Available	2 percent

11. Which of the following best describes your current phase of climate change adaptation planning and implementation?



- NOT CURRENTLY INVOLVED at all in planning to adapt to the effects of climate change.
- UNDERSTANDING: We're in a relatively early stage, trying to understand what the potential impacts of climate change and our vulnerabilities are.
- PLANNING: We're in a more advanced stage, trying to assess what our options are to prepare for and reduce the risks from climate change.
- IMPLEMENTING: We're in a fairly advanced stage, starting to implement some identified adaptation options and monitoring how they're performing.

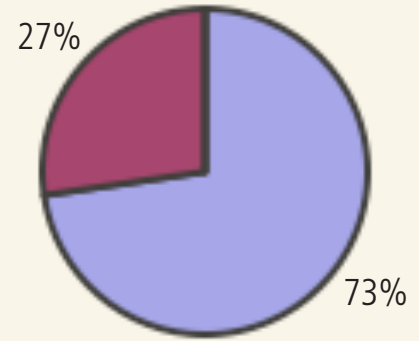
12. If in the "understanding" phase, please check the statement below that best describes where you are in this phase.



- We are just beginning to be aware of the problem.
- We have started to gather some information to better understand the problem.
- We have completed an assessment of the problem.

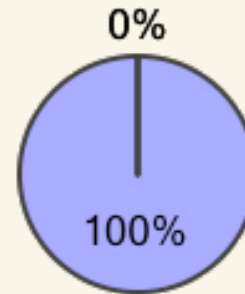
13. If in the "planning" phase, please check the statement below that best describes where you are in this phase.

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



14. If in the "implementing" phase, please check the statement below that best describes where you are in this phase.

- We have begun implementing the selected response options.
- We are monitoring how well the implemented responses are working out.
- We are evaluating and reassessing how well the implemented options are faring.

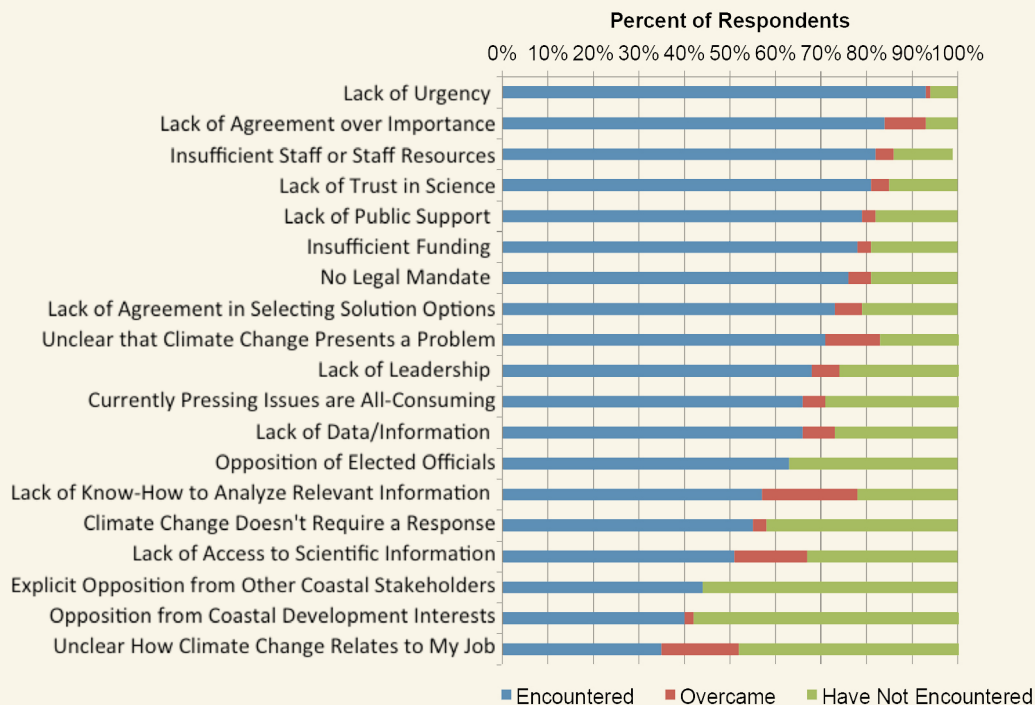


15. Please list a few of the climate change adaptation techniques that you are implementing.

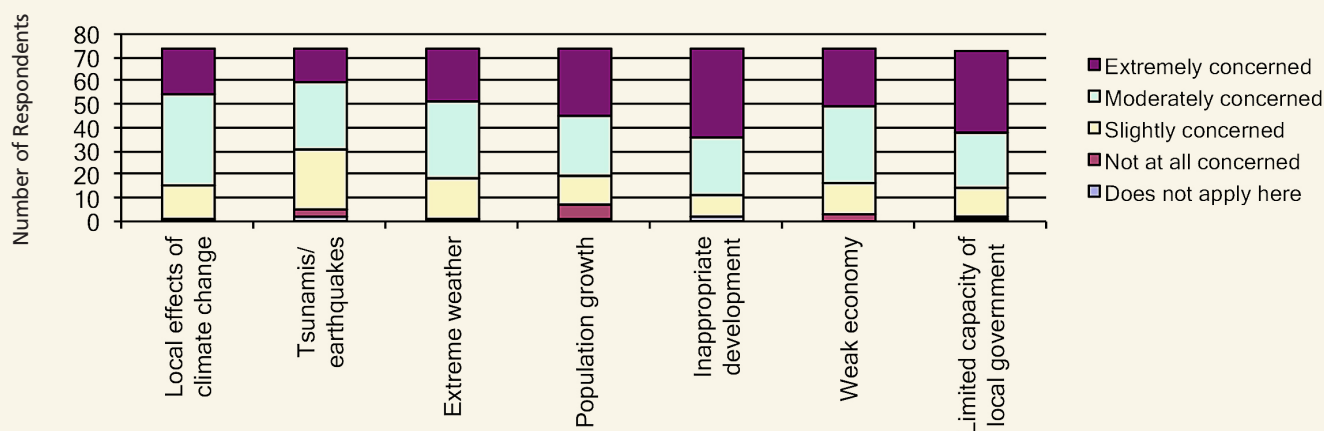
The respondents listed enhancing gravel berms landward of beaches, performing evaluations of adaptive measures for new infrastructure, increasing building elevations and setbacks above the current minimum, resource management like reducing the amount of cement in concrete mixtures, updating shoreline management policies and development regulations to include prospective sea level rise, and protection of urban forests and urban agriculture. Among the list were also strategies to decrease energy use and greenhouse gas emissions at the agency level; decrease vehicle miles traveled and transportation objectives; and supporting more infrastructure for bus, bike, and pedestrian travel.

16. As you've considered, or become involved in, climate adaptation planning, you may have encountered the following hurdles—defined as obstacles that can be overcome. For the items below, which may arise as hurdles, please consider the three listed possibilities and select the best one for each item.

### Hurdles to the Adaptation Process

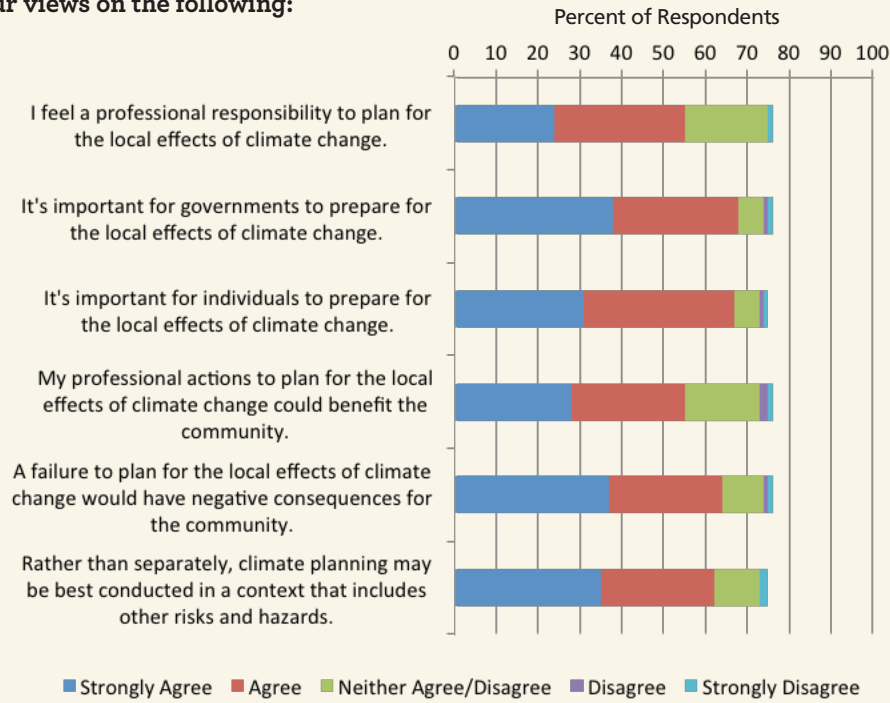


17. What is your personal level of concern about these potential stressors on your community during the next 10 years?

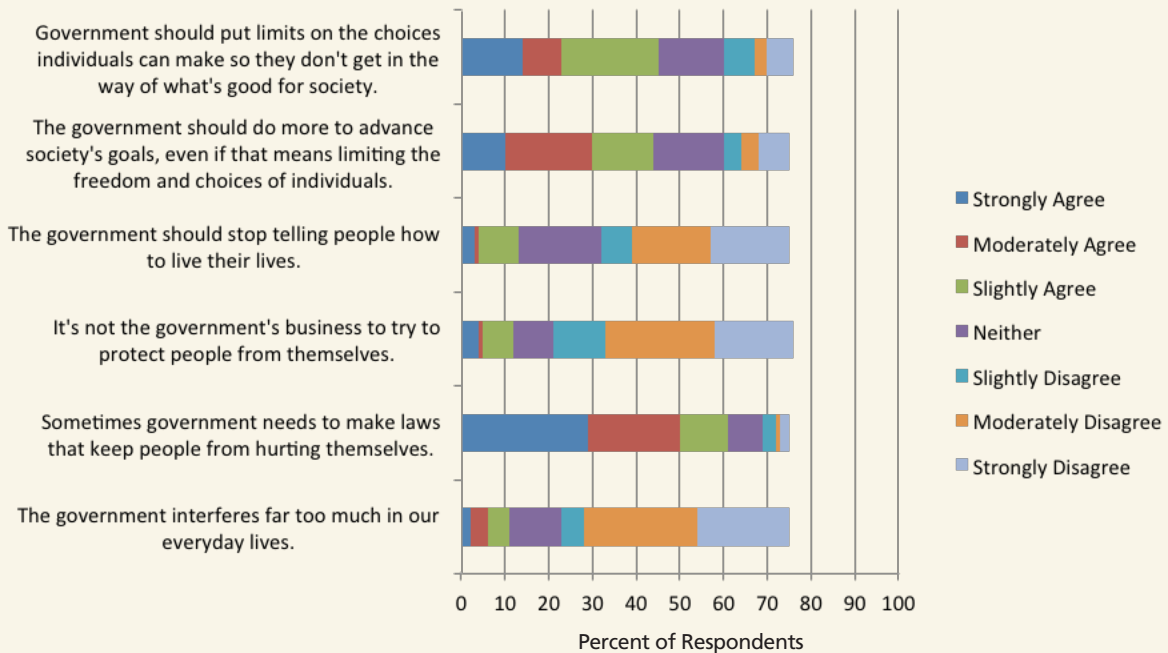




18. Please provide your views on the following:



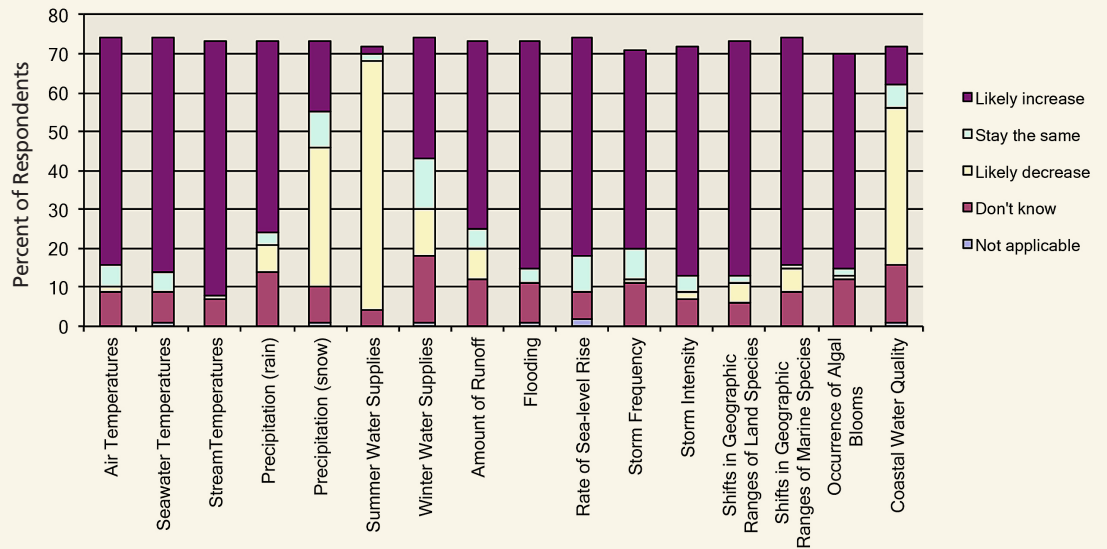
19. As individuals we're also members of society and represented by government. And whether—or how—to prepare for a changing climate potentially involves government decisions. We'd like to know your views on the proper role of government in your local context. In this context, how strongly do you agree or disagree with each of the following statements? (Please select one per row). Note: The statements are strongly worded to clearly represent different views.



20. We'd like to know about your work—elected, professional or volunteer—as it relates to the coast, the environment and your community. Please select the category and item that BEST matches your primary relevant profession or position.

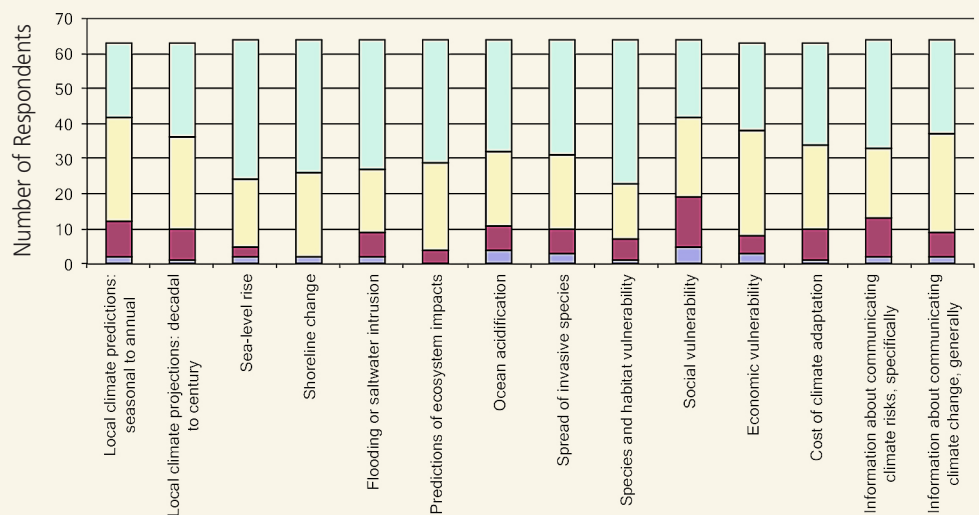
Work Sector	Specific Position				
Elected Official (7 Respondents)	City Council	Other	Mayor	County Comm.	Tribal Official
	2	2	1	1	1
Coastal Professional/Public Sector (46 Respondents)	Planner	Wildlife/Nat. Res. Dept.	Public Works/Trans.	Water Res. Mgr.	Other Volunteer
	22	11	4	2	2
	Permitting Officer	Wetland Mgr.	Town/City Mgr.	Community Dev. Dept.	Other Town/City
	1	1	1	1	1
Other Primary Work Affiliation (22 Respondents)	Other	Consulting Engineer	University	Local NGO	Nat'l/Int'l NGO
	13	3	3	2	1

21. How do you think climate change may affect the local conditions and features of the natural environment in your area? Even if you have not previously considered the potential effects of climate change on your community or region, please offer your best estimate.



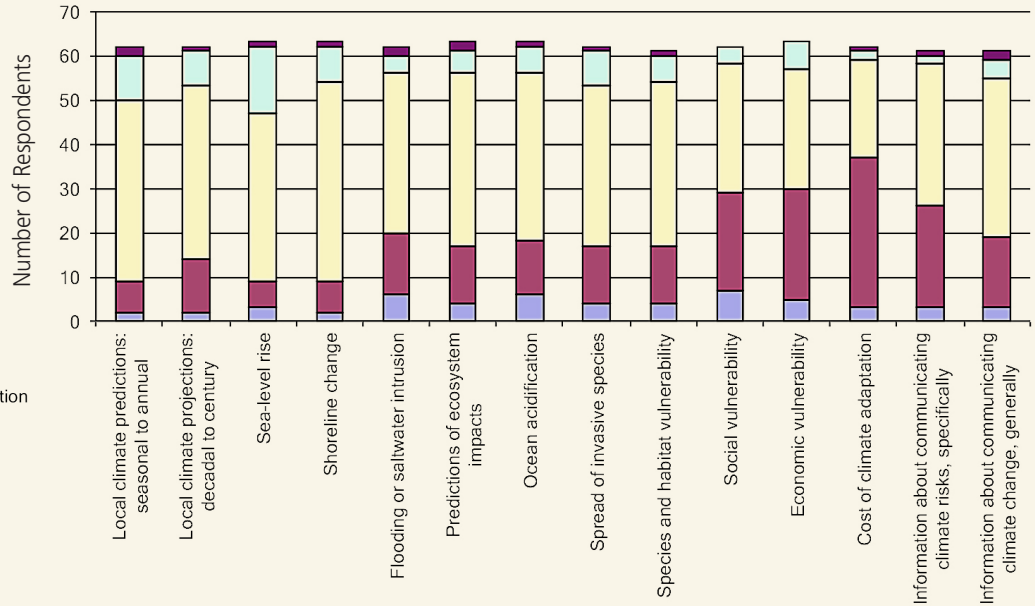
22. Please review the following examples of information as they relate to a locally changing climate. First, rate the importance of that type of information to your work.

Not at all Important   Slightly Important   Moderately Important   Extremely Important

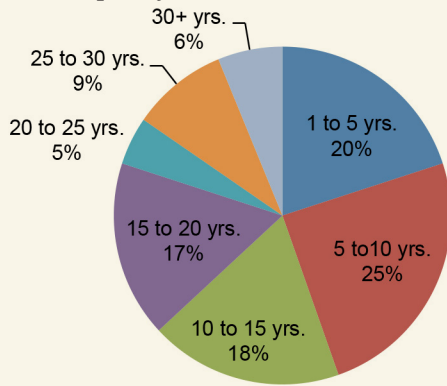


23. Again, review these same items of information as they relate to a locally changing climate. Now, indicate the amount of information you have on each item.

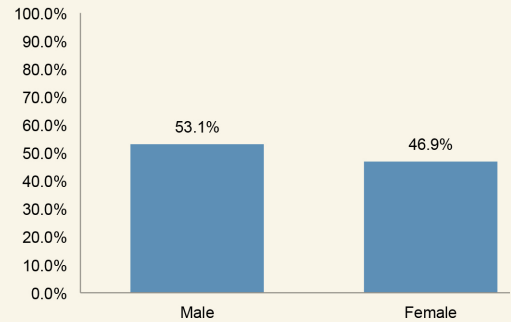
- All of what I need
- Most of what I need
- Some of what I need
- None of what I need
- Don't need this information



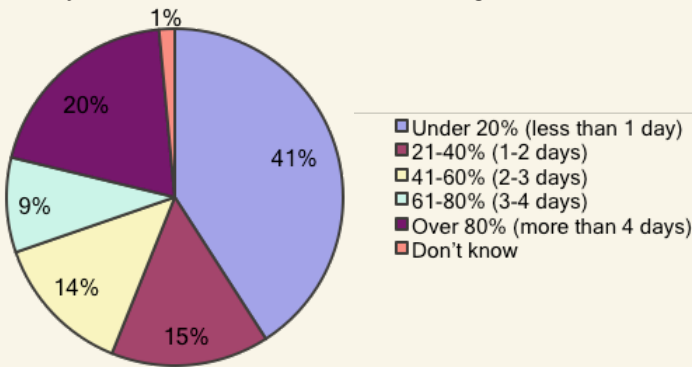
24. How many years have you served in your current organizational capacity?



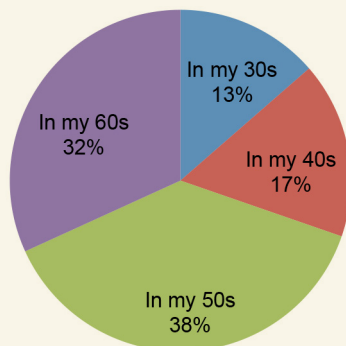
27. Your gender.



25. In an average week, approximately what percentage of your work deals with coastal management issues?

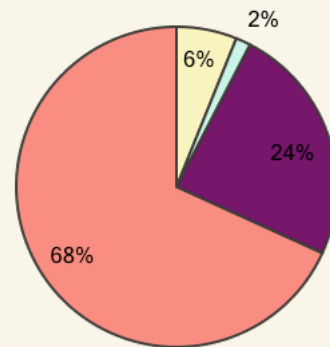


26. Your age.



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

- Less than 12th grade (no diploma)
- High school graduate or equivalent
- Some college, no degree
- Associate's degree
- Bachelor's degree
- Graduate or professional degree



29. Where does the majority of your relevant work and/or volunteer responsibilities take place? Please type the full state/county/city name below.

Washington's entire coast, including the Puget Sound, the Strait of Juan de Fuca, and the Olympic Peninsula were represented with this survey.



[www.wsg.washington.edu](http://www.wsg.washington.edu)

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Halvorsen E, Mooney J (2014)  
Planning for change: climate adaptation survey results,  
Washington State, 2013. Washington Sea Grant Technical Report  
WSG-TR 14-01, 20 pp.