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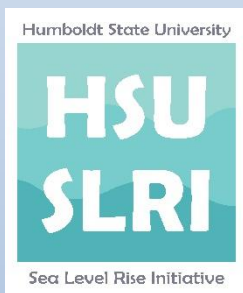
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Regional Coordination of Sea Level Rise Adaptation Planning on Humboldt Bay: results from a survey of coastal professionals



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Executive Summary

Humboldt State University researchers and Humboldt County Long Range Planning staff partnered to develop and implement a survey of coastal professionals connected to Humboldt Bay in order to gain insights into their knowledge, attitudes, and perceptions of sea level rise (SLR) and their preferences for various coordination strategies. A key goal of the study was to use this information to inform the development of options for SLR adaptation planning in the Humboldt Bay region that will foster a cooperative and coordinated regional approach.

This report outlines the methods and results of an online survey conducted from May to June 2021 which obtained responses from 107 coastal professionals on topics related to their current SLR planning experiences, perceived barriers to coordination, and ideas for future regional-level planning and adaptation. Each question asked in the survey is presented with a figure of the results based on percentage of responses as well as a descriptive text interpretation. Additional detail from the figures can be found in accompanying tables.

Overall, respondents perceived SLR as an issue that is already impacting the Humboldt Bay region. A vast majority of respondents generally agreed that coordination of SLR planning and adaptation was needed. Generally, less than 55% of respondents indicated that their agency or organization has collaborated and engaged in SLR activities with other agencies/organizations on Humboldt Bay within the last four years. The most agreed upon barriers to regional SLR planning and adaptation were a lack of funding and a lack of staff availability. Other potential barriers to regional coordination included the perception that stakeholders disagree on actions needed to address SLR and the perception that differences in stakeholder values will inhibit agreement in choosing adaptation options. Generally, respondents indicated that both public outreach and incorporation of environmental justice considerations had not been efficient or sufficient and needed improvement. Most of the potential future SLR projects and programs identified in the survey were prioritized as high or essential by the majority of survey respondents; the only effort prioritized as low or not a priority was the development of regional projects aimed at the development or enhancement of man-made physical barriers.

Introduction

Humboldt Bay is experiencing the fastest rate of relative sea level rise in California and is likely to experience severe SLR flooding within the next two decades (Laird, 2015; Patton, Williams, Anderson, & Leroy, 2017). The Humboldt Bay shoreline is governed by a patchwork of entities with different missions and jurisdictions and coordination of sea level rise (SLR) planning will be critical because hydrologic areas and flooding from tidal waters can cross political boundaries. Developing an effective coordination strategy will require an understanding of the social dynamics among coastal professionals and planners connected to the Humboldt Bay system.

Researchers from Humboldt State University partnered with staff from the County of Humboldt Planning and Building Department - Long Range Planning to develop and implement a survey of coastal professionals connected to Humboldt Bay in order to gain insights into their knowledge, attitudes, and perceptions of sea level rise and their preferences for various coordination strategies.

Findings from this survey have informed two different efforts. First, the findings have been incorporated into an HSU Master's Thesis by Kristen Orth-Gordinier titled: "Social science research to help advance regional coordination and collaboration of sea level rise adaptation and planning on Humboldt Bay." This thesis combines findings from the survey with information from semi-structured interviews with coastal professionals and a review of sea level rise documents to produce findings and recommendations related to sea level rise coordination on Humboldt Bay.

Second, the survey data will also inform Humboldt County's Humboldt Bay Sea Level Rise Planning Feasibility Study. The goal of this project is to develop options for sea level rise adaptation planning in the Humboldt Bay region that will foster a cooperative and coordinated regional approach to the identification, funding, and implementation of various sea level rise adaptation policies, strategies, and measures with resulting regulatory and financial benefits.

This joint survey effort highlights the possibilities for collaborations between local government and academic institutions to develop rigorous, applied research that can inform effective planning and adaptation. Through this partnership, local government and academia were each able to bring their strengths to the table to design a survey approach that was sound, relevant, and spoke to community needs.

Methodology

Surveys are often used to measure stakeholder's values or "mental models," and are especially helpful in understanding their past experiences with and perceptions of SLR (Thomas, Pidgeon, Whitmarsh, & Ballinger, 2015). The standardization of questions can provide researchers with specific quantifiable information that can be compared across participants (Newing, 2011). This method was chosen by the project team in order to collect input from a large number of people in a short timeframe. It also provided a means to capture a representative sample of views among coastal professionals operating in the Humboldt Bay region.

Target Population

Survey participants generally met the definition of “Coastal Professionals” used in the 2016 California Coastal Adaptation Needs Assessment: “...individuals involved in California coastal resource management, conservation, and protection from coastal hazards.” This includes “...planners, resource managers, public works engineers, transportation managers, emergency response managers, public health officials, harbor managers, port commissioners, and elected officials, as well as representatives of environmental organizations working on coastal issues, private-sector consultancies, and officials at farm bureaus. Public sector respondents were drawn from the local, regional, state, and federal levels (Moser, Finzi Hart, Newton Mann, Sadrpour, & Grifman, 2018).” Randomization was not used because participants needed to have a moderate-high relative level of knowledge in SLR planning and conditions on Humboldt Bay. Participants were recruited through email, asked to voluntarily participate in this study, and no incentives were provided. Nonrandom sampling and self-selection could introduce areas of bias. We sought to reduce this bias by developing broad and inclusive lists of potential participants and by sending several follow-up emails reminding and encouraging participation.

Survey Design

This survey was designed in coordination with the County of Humboldt’s Regional SLR Coordination & Regulatory Framework Feasibility Study which started in late 2020 in order to directly inform their study. Survey questions were drawn from relevant literature, other climate change related surveys conducted in California, and interviews conducted with Humboldt Bay coastal professionals by Kristen Orth-Gordinier for her graduate thesis research at HSU. Draft surveys were reviewed by multiple local professionals for relevance and clarity. Once the survey instrument was developed, the research team obtained HSU Institutional Review Board approval for this project (Protocol #20-148). All participants were provided a consent form at the beginning of the survey and could only participate if they consented to the terms described (see Appendix A for consent form and survey).

In mid-May invitations were sent to request participation in the study via a SurveyMonkey email collector. If an email bounced or was blocked, followed up occurred via email with a survey link. After two weeks another email was sent with the survey link to invitees who had not responded, to account for SurveyMonkey emails potentially being directed to spam/quarantine folders. To increase participation, reminder emails were sent each week either via SurveyMonkey or email and a research team member attended public meetings to introduce the survey during public comment periods. Some participants emailed the team with recommendations on additional participants and in most cases, the team would send a survey link to those individuals within a couple days of the recommendation. The survey was closed after approximately one month when the stakeholder representation and response rate was acceptable.

Survey Response & Completion Rate

Email invitations were sent to 297 potential survey participants and 140 people responded to the survey. Upon closure of the survey, 33 sets of responses were deemed “incomplete” and removed from the data set because the respondents completed less than 30% of the questions. Therefore, responses from 107 respondents were utilized for this report. The response rate was then calculated by the number of complete and partial responses. The revised survey response rate was 36%.

$$\text{response rate} = \frac{\text{total responses} - \text{responses less than 30\% complete}}{\text{total contacted}}$$

The average completion time according to Survey Monkey was 23 minutes and 35 seconds. On average, respondents answered approximately 81% of the questions. Only about 12% of respondents answered less than 60% of the questions. Of those respondents who answered less than 60% of the questions, 50% either “never or rarely” professionally work with SLR topics, while 30% “occasionally” work with SLR topics and 20% “moderately or worked a great deal” with SLR topics. One respondent commented in a short answer box, “I’m probably not a great selection to contact.”

Analysis & Reporting

Survey data was downloaded from SurveyMonkey as an excel file. After incomplete responses were removed from the dataset, response affiliations were updated by stakeholder category. Stakeholder categories were developed by the project team, however a second question asked respondents to self-identify their agency or organization. If needed, the project team updated responses by re-categorizing them into consistent stakeholder groups based on the self-identified agency/organization. This would also allow for additional analysis to be conducted based on specific agencies if the sample size was large enough ($n > 3$). Analysis done at the specific agency level may not represent an official view of the agency/organization respondents work for and therefore should not be treated as such. Results for each survey question are presented by a figure based on percentage of responses as well as a descriptive text interpretation. Figures were made in Microsoft excel (version 2107) and R Core Team (version 2019). Statistics were run in Microsoft excel (version 2107) and R Core Team (version 2019).

Respondents

Survey participants were asked a series of questions about themselves and their involvement and general thoughts about SLR-related work in order to collect demographic and topic-experience information.

Respondent Demographics

The average respondent was a white college-educated male, 45 years of age or older. The vast majority of respondents were Caucasian, European American, or White (78%) while 4% of respondents were American Indian, Alaskan Native, or Native American which was the next most represented race/ethnicity (Figure 1). Fifty-one percent of respondents were 45 years old or older and 80% had either a Bachelor’s or Post-graduate (Master/PhD) degree (Figure 2 and Figure 3). Of the demographic questions, approximately 12-14% of participants chose “prefer not to answer” or did not answer the questions.

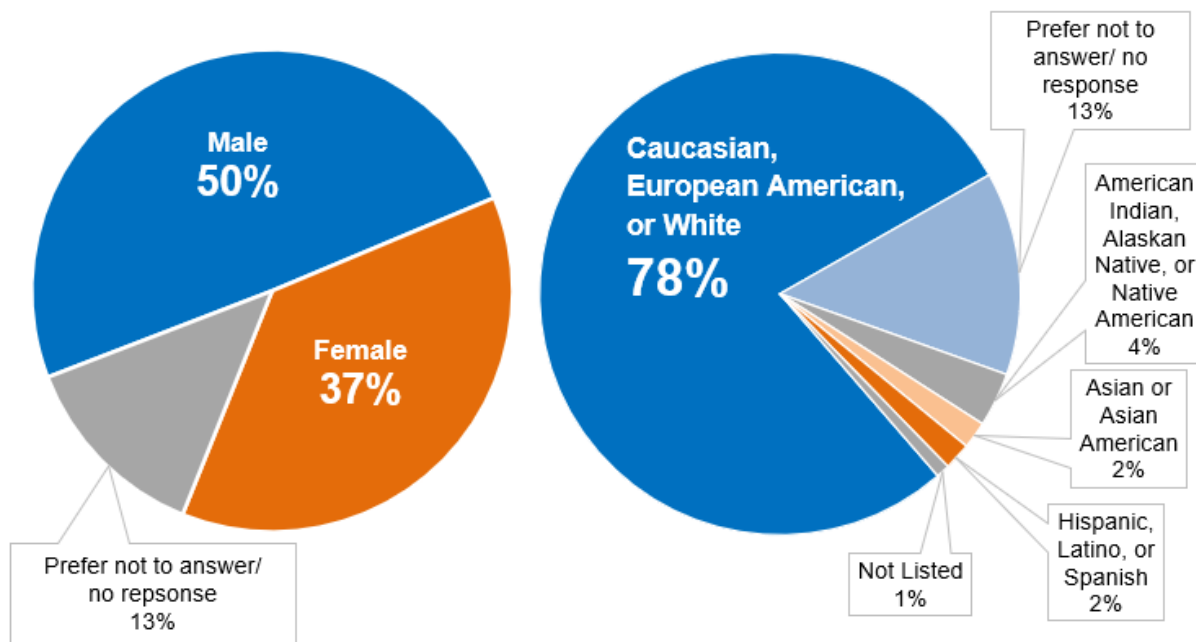


Figure 1: Respondent gender (left) and race/ethnicity (right). No respondents identified as genderqueer or non-binary. No respondents identified as genderqueer or non-binary. No respondents identified as African American or Black, Middle Eastern or North African, and Native Hawaiian or Other Pacific islander. Gender identities or race/ethnicities with no responses are not presented on these figures. For the race/ethnicity question n=110, this is higher than the total number of respondents due to the option to choose multiple answers for this question.

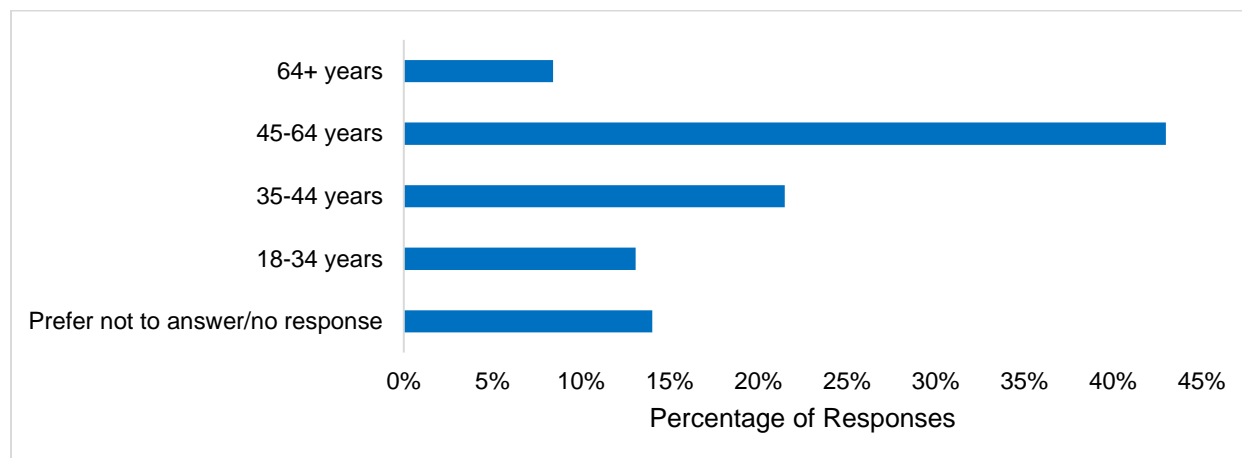


Figure 2: Respondent age (n=107).

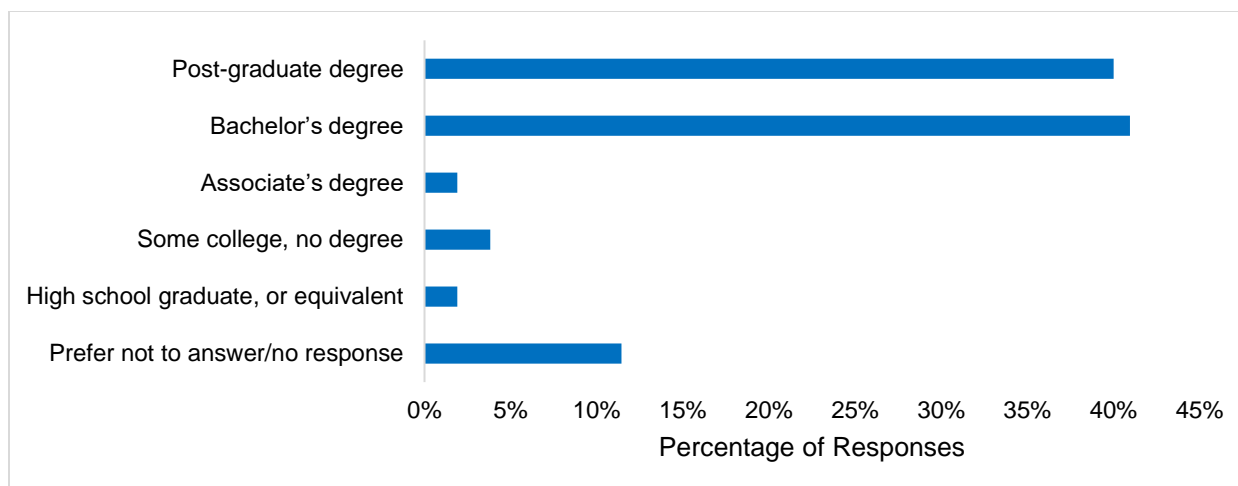


Figure 3: Respondent level of education (n=107).

Respondent Characteristics

Respondents represented 11 stakeholder categories and 47 agencies/organizations (Table 1). State government was the most represented (25 respondents), followed by city, non-government organizations (NGO) and private sector consultants (12 respondents each). The only stakeholder category not chosen by a respondent was “Agricultural Industry,” however some respondents who are affiliated with government entities that represent agricultural stakeholders and interests did participate in this survey and were categorized by their state or local affiliation. Some respondents have multiple roles within the community and self-identified two affiliated agencies/organizations (i.e., a specific state government and a specific local government). Their responses are reported with the Stakeholder Group they chose when responding to the survey, even if it did not match both self-identified entities.

Table 1: Number of respondents per stakeholder category and self-identified agency/organization that respondents work for or are associated with.

Stakeholder Group	Specific Agency/Organization	Number of Respondents
Academia/Research		7
	California Sea Grant Extension	
	Humboldt State University	
	San Francisco State University	
City Government		12
	City of Arcata	
	City of Eureka	
County Government		5
	Humboldt County	
Federal Government		4
	Bureau of Land Management	
	US Fish & Wildlife Service	

US Department of Agriculture-Natural Resources Conservation Service	
Infrastructure/Service Provider/Community Services District (CSD) (e.g., roads, water, sewer, gas, electric)	9
Humboldt Bay Municipal Water District	
Humboldt CSD	
Manila CSD	
Peninsula CSD	
Vero Networks	
Non-Government Organization	12
Coalition for Responsible Transportation Priorities	
Friends of the Arcata Marsh	
Friends of the Dunes	
Friends of Elk River	
Humboldt Baykeeper	
Redwood Community Action Agency	
Redwood Region Audubon	
Surfrider Foundation	
Timber Heritage Association	
Private Sector Consultant	12
GHD	
Greenway Partners	
H. T. Harvey & Associates	
ICF	
Michael Love & Associates, Inc.	
Northern Hydrology & Engineering	
Stillwater Sciences	
Regional District or Association or Special District (e.g., Harbor District, etc.)	9
Humboldt Bay Harbor, Recreation and Conservation District	
Humboldt County Association of Governments	
Redwood Coast Energy Authority	
State Government	25
California Coastal Commission	
California Department of Fish & Wildlife	
California Geological Survey	
California State Coastal Conservancy	
Caltrans	
Humboldt County Resource Conservation District	
North Coast Regional Water Quality Control Board	
Office of Planning and Research	
State Lands Commission	
Trade/Business/Industry Group	4
Coldwell Banker Sellers Realty	
Hog Island Oyster Co.	
Humboldt Association of Realtors	

Tribal Government	7
Blue Lake Rancheria	
Wiyot Tribe	
Other	1

Elected officials made up a small amount of respondents (16%); however, represented most local Stakeholder Groups that have elected officials including City Government, County Government, Tribal Government, Regional/Special Districts, and Infrastructure Service Provider/CSDs.

Respondents had varying degrees of professional experience and involvement with SLR-related work (Figure 4). Approximately 8% of respondents had never done related work and had no years of professional experience. Alternatively, almost 50% were involved with SLR-related work moderately (monthly) to a great deal (weekly, daily) and 60% had more than 5 years of experience. Overall, survey respondents were likely fairly knowledgeable on this topic, as suggested by these levels of involvement and experience.

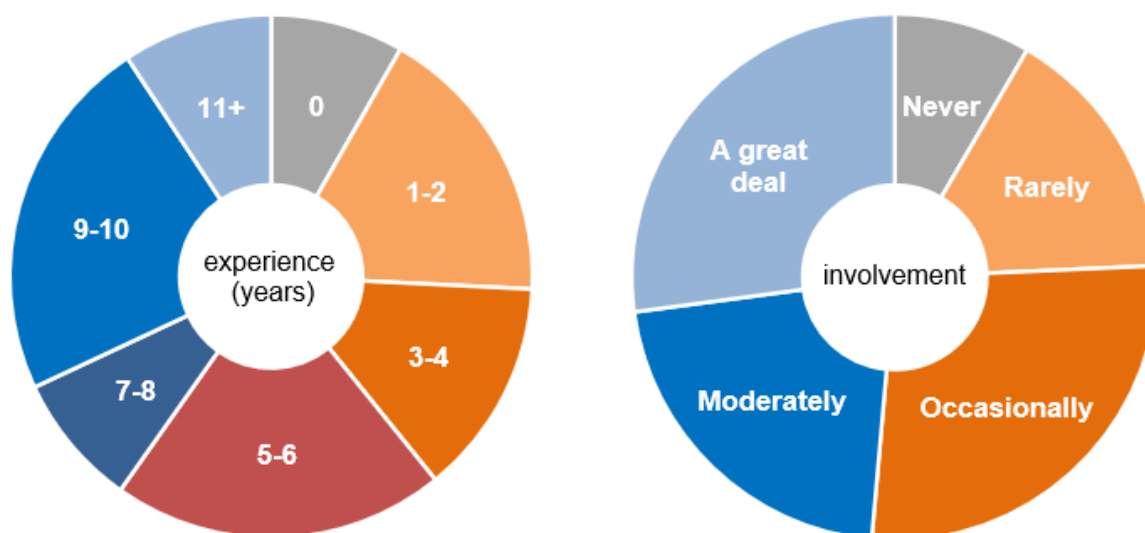


Figure 4: Respondents' years of professional experience (left, n=97) and frequency of involvement (right, n=107) with SLR-related work. Frequencies were quantified as: never (no involvement), rarely (1 time or less per year), occasionally (2-11 times per year), moderately (monthly), a great deal (daily, weekly).

Feelings About Performing SLR-Related Work

The survey of coastal professionals also contained a series of questions related to their “feelings about performing SLR-related work.” Figure 5 and Table 2, shows the results from those questions. The two most agreed with statements were regarding feeling worried about future impacts of planning decisions and feeling personally worried about SLR. The majority of respondents found SLR work engaging and fulfilling. Fifty-four percent of respondents were discouraged by a lack of forward movement of SLR adaptation actions, while 41% were inspired by the amount of work the Humboldt Bay region has already accomplished. Almost the same number of respondents agreed as disagreed that addressing SLR adds significantly to their workload. Less than 25% of respondents agreed with statements about their work being overwhelming due to technical complexity, uncomfortable due to the uncertainty associated with SLR, or feeling unprepared and therefore less confident.

Table 2: Respondents’ level of agreement regarding various statements about performing SLR-related work.

	Percentage of Respondents				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am worried about how our SLR planning decisions will impact future generations.	1%	6%	12%	49%	31%
I am personally quite worried about SLR.	0%	10%	14%	38%	38%
I find SLR work engaging and fulfilling.	1%	4%	28%	45%	22%
I am discouraged by our lack of forward movement of SLR adaptation actions.	3%	17%	26%	35%	19%
I am inspired by how much work the Humboldt Bay region has accomplished.	2%	14%	43%	30%	12%
Having to address SLR in what I do means a big additional workload.	2%	30%	36%	25%	7%
The technical complexity of SLR science is overwhelming.	6%	37%	32%	20%	4%
The uncertainty associated with SLR makes me uncomfortable.	14%	40%	24%	17%	4%
I don’t know what to do to prepare for SLR, so I feel less confident in my work.	17%	44%	24%	13%	2%

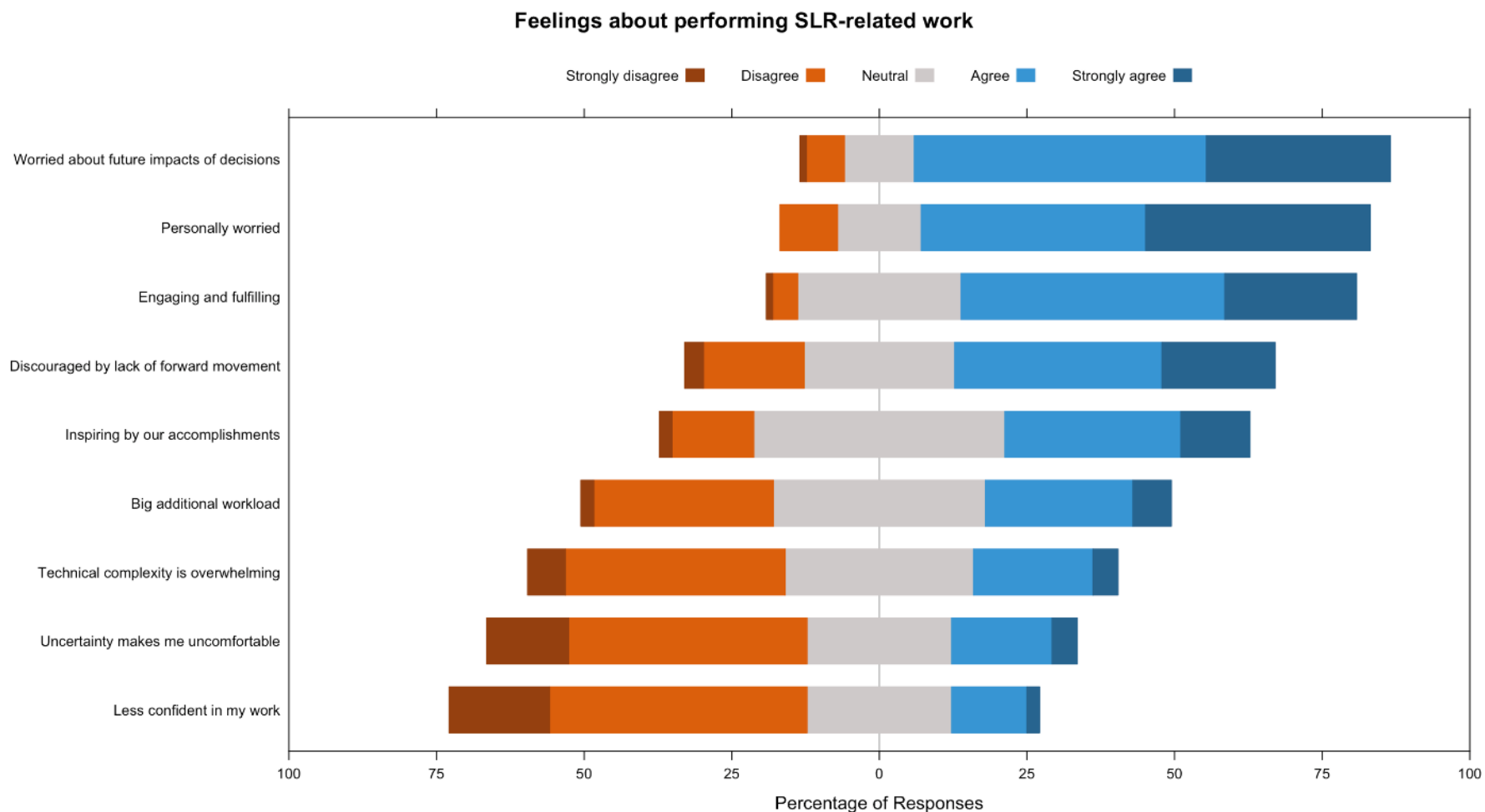


Figure 5: Respondents' level of agreement regarding various statements about performing SLR-related work (n=92-94).

Perceptions of SLR

The coastal professional survey included a question about expectations of when SLR will impact the region. This question was replicated in a public survey about SLR released by Humboldt County in the summer of 2021. The public survey was developed by Humboldt County Long Range Planning staff, with input from this HSU team, with the intention of gathering baseline information on public perceptions of SLR risks and expectations of planning for SLR around Humboldt Bay. Results from both surveys are compared in Figure 6. The majority of both groups of respondents thought that SLR was already impacting the Humboldt Bay region (public 46%; professional 71%). This generally suggests that people in the Humboldt Bay region believe that SLR could be an immediate issue. Compared to the public, coastal professionals are slightly more likely to view it as an immediate risk.

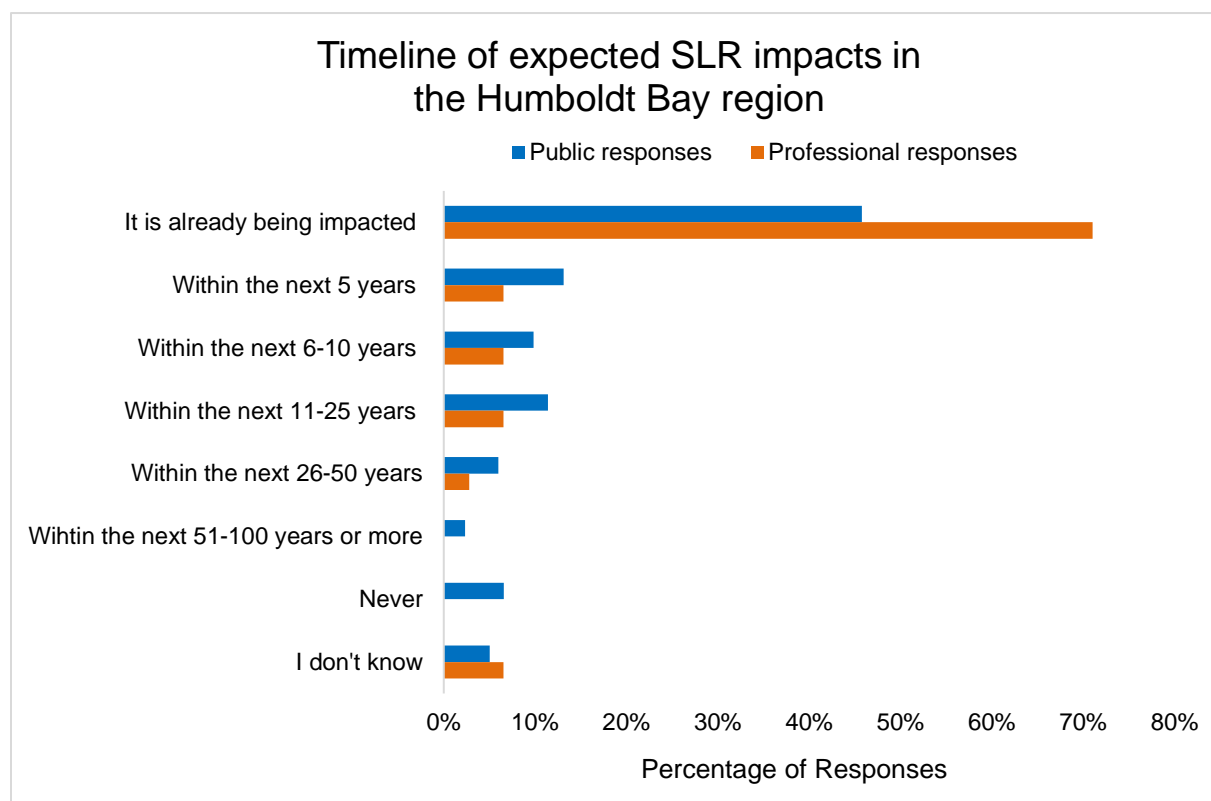


Figure 6: Comparison of expectations from public (n=577) and coastal professional (n=107) respondents of when SLR might impact the Humboldt Bay region. (Public survey data from 2021 Humboldt County Planning and Building Department Public Survey).

Current SLR Planning Efforts

Respondents were asked if their agency/organization is using a specific timeline and/or projection for their SLR planning or advocacy work. If they were, two follow up questions were asked about specifically what those timelines and/or projections were as well as what sources their projection guidance came from. If their agency/organization was not using specific timelines and/or projections, participants were asked why.

Almost 60% of respondents were not using specific timelines/projections (Figure 7). Respondents who answered a short open-ended question about why they were not using specific guidelines (n=60) included that guidance wasn't relevant to their organization (either due to a different mission/role or they rely on other partners for that information such as state government or permit agencies), their organization was complacent and therefore not planning for SLR, it was something they would "deal with in the future," or there was limited data availability to make those decisions. Some respondents reported that a change in leadership or organizational structure hindered their SLR planning processes or that they were dealing with a lack of resources, including being "beyond our collective bandwidth" as volunteers. Some respondents noted that they chose "no" because they were unsure if they had specific guidance or because they were currently in the process of planning or just started those discussions. In addition to those reasons, some respondents noted that their agency/organization was using a strategy different than planning with timelines and/or projections. Some strategies included focusing on risk tolerances, using elevation/inundation levels rather than timelines, considering different scenarios or ranges of projections/timelines, or using the best available science depending on the project/location/goals.

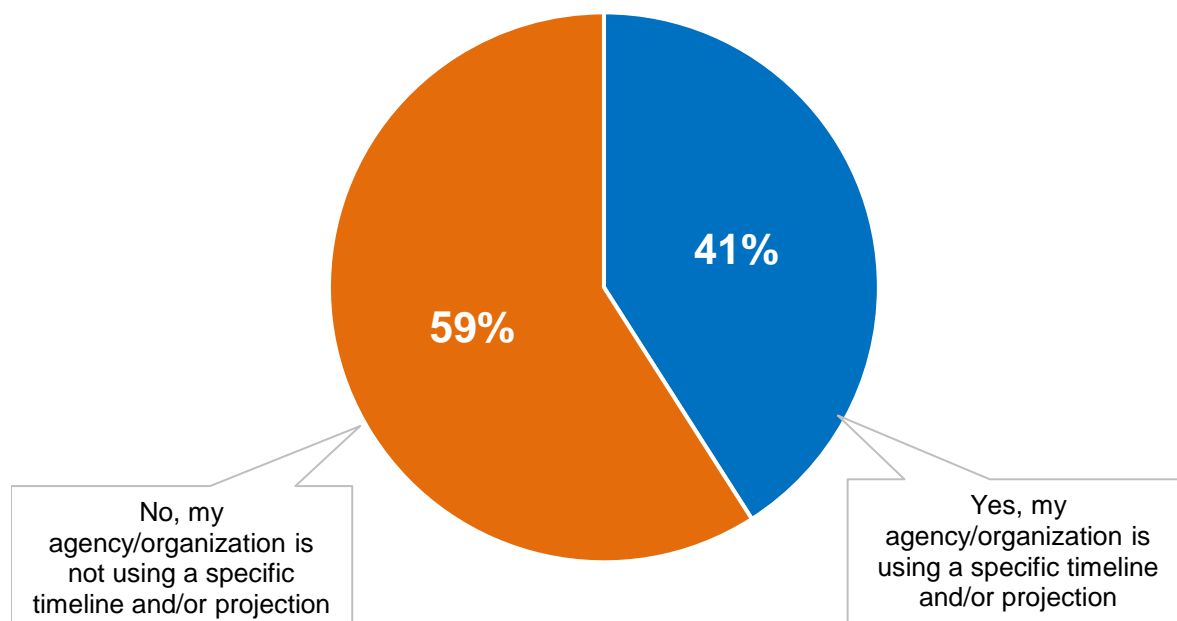


Figure 7: Percentage of respondents whose agency/organization is or is not using specific timelines and/or projections for SLR planning or advocacy (n=105).

Approximately 40% of respondents noted that their agency/organization was using specific timelines/projections (Figure 7). Answers ranged from 1.6 feet by 2040, 1.9-3.5 feet by 2050, 3.3 feet by 2057, 3-3.3 feet by 2016, 4-12 feet by 2070, 2.7-10.9 feet by 2120, and 20 feet by 2120. Respondents were given the option via a fill in the blank to provide additional details about the source of their SLR projections and the most common responses were: (1) projections came from local planning documents and vulnerability assessments (n=16); (2) their organization used OPC SLR guidance (n=16); (3) they used other state-level documents (n=3); and (4) and some were not sure specifically where their timelines/projections came from (n=3).

Figure 8 below shows the breakdown of responses about organizational use of SLR projections based on broad stakeholder categories. The data show variation within each stakeholder category, and even within each agency/organization. In other words, respondents associated the same organization sometimes had differing responses about whether their organization used a specific SLR projection or timeline. While this could illustrate inconsistencies within a group, it is possible this reflects normal differences between departments (i.e., Long-term Planning and Engineering) or that stakeholder groups consist of agencies that require difference focuses (i.e., State Government: CA Department of Fish & Wildlife or Caltrans). Although sample sizes were small, there seemed to be some differences within stakeholder groups and specific agencies. For example, in County Government three respondents chose no and two chose yes, in City Government (with minimal difference between the two cities) three respondents chose no and eight chose yes, and of respondents who were affiliated with Caltrans, four responded no and seven responded yes. The stakeholder groups of Federal Government (n=4), Infrastructure/Service Provider/CSDs (n=5), and Business/Industry Groups (n=4) were the only respondents to all respond that their entity is not using a specific timeline or projection.

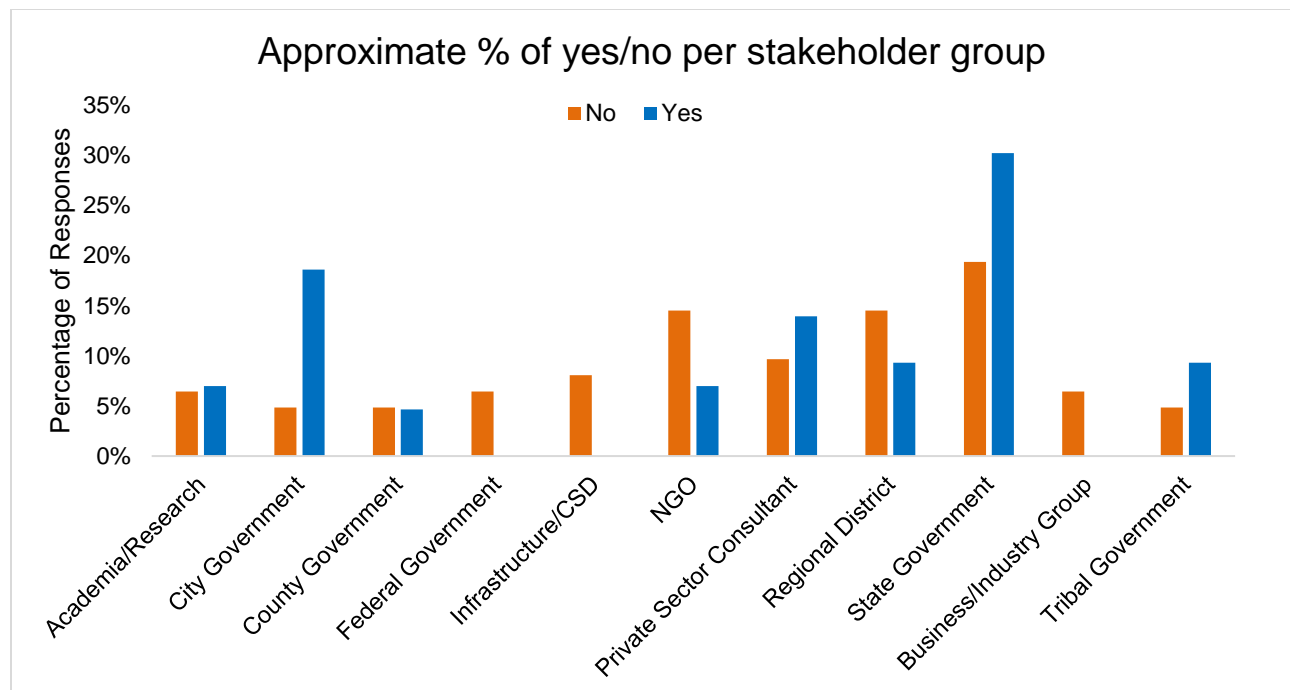


Figure 8: Breakdown of number of respondents who reported that their agency did (yes) or did not (no) use a specific projection or timeline for their SLR planning (n=105).

Level of engagement and interest in collaborative activities

Stakeholders were asked to indicate which activities their agency/organization collaborated and engaged in with other agencies/organizations in reference to sea level rise (SLR) on Humboldt Bay within the last four years (Figure 9 and Table 3). "SLR-related" activities could include projects, studies, or work where SLR is not the only focus, such as multi-benefit projects that consider SLR as well as infrastructure protection, habitat enhancement, flood control, public access, education, etc.

When asked about what collaborative activities their agency or organization is currently involved in, the mostly commonly reported activities included: sharing information about your organization's SLR activities with other agencies and organizations (55% engaged; 30% not engaged); attending regular SLR planning or technical meetings hosted by another entity (51% engaged; 38% not engaged); and carrying out joint SLR studies with other entities or organizations (44% engaged; 42% not engaged). The least commonly reported collaborative activities were coordinating with other entities regarding environmental justice and equity considerations related to SLR (19% engaged; 65% not engaged); hosting regular SLR planning or technical meetings (25% engaged; 55% not engaged); and coordinating with other entities to streamline permitting processes related to SLR adaptation (28% engaged; 54% not engaged).

If respondents indicated their agency/organization was not engaged in one or more of the listed collaborative activities, they were asked to rank their agency's/organization's potential level of interest in future engagement (Figure 10 and Table 4). The most interest (92%) was indicated for implementing joint projects. Additionally, 87% were interested in coordinating equity and environmental justice considerations, which is the effort that currently has the least engagement. Respondents were the least interested (28%) in contributing funding.

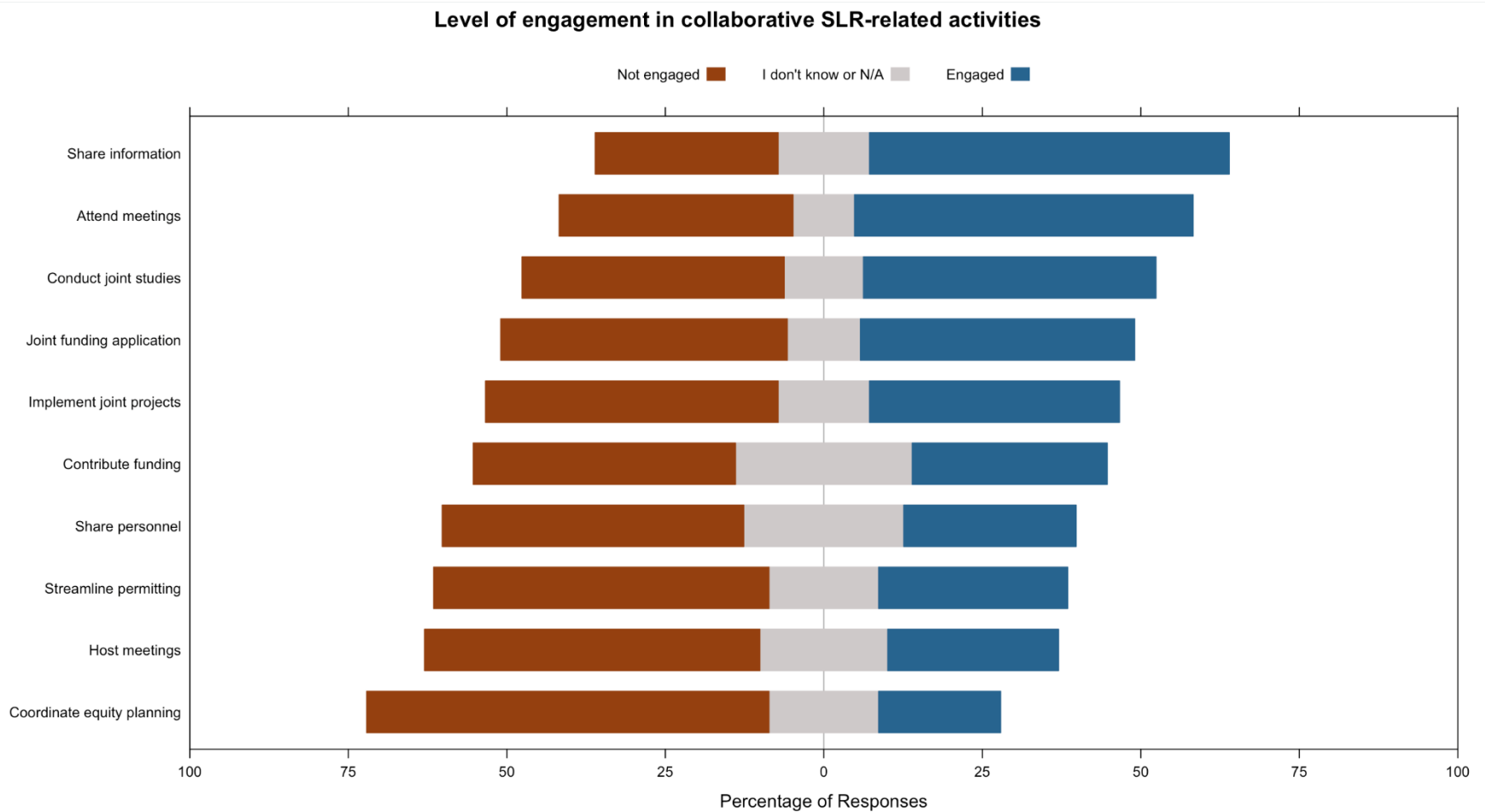


Figure 9: Level of engagement in collaborative SLR-related activities (n=105-106).

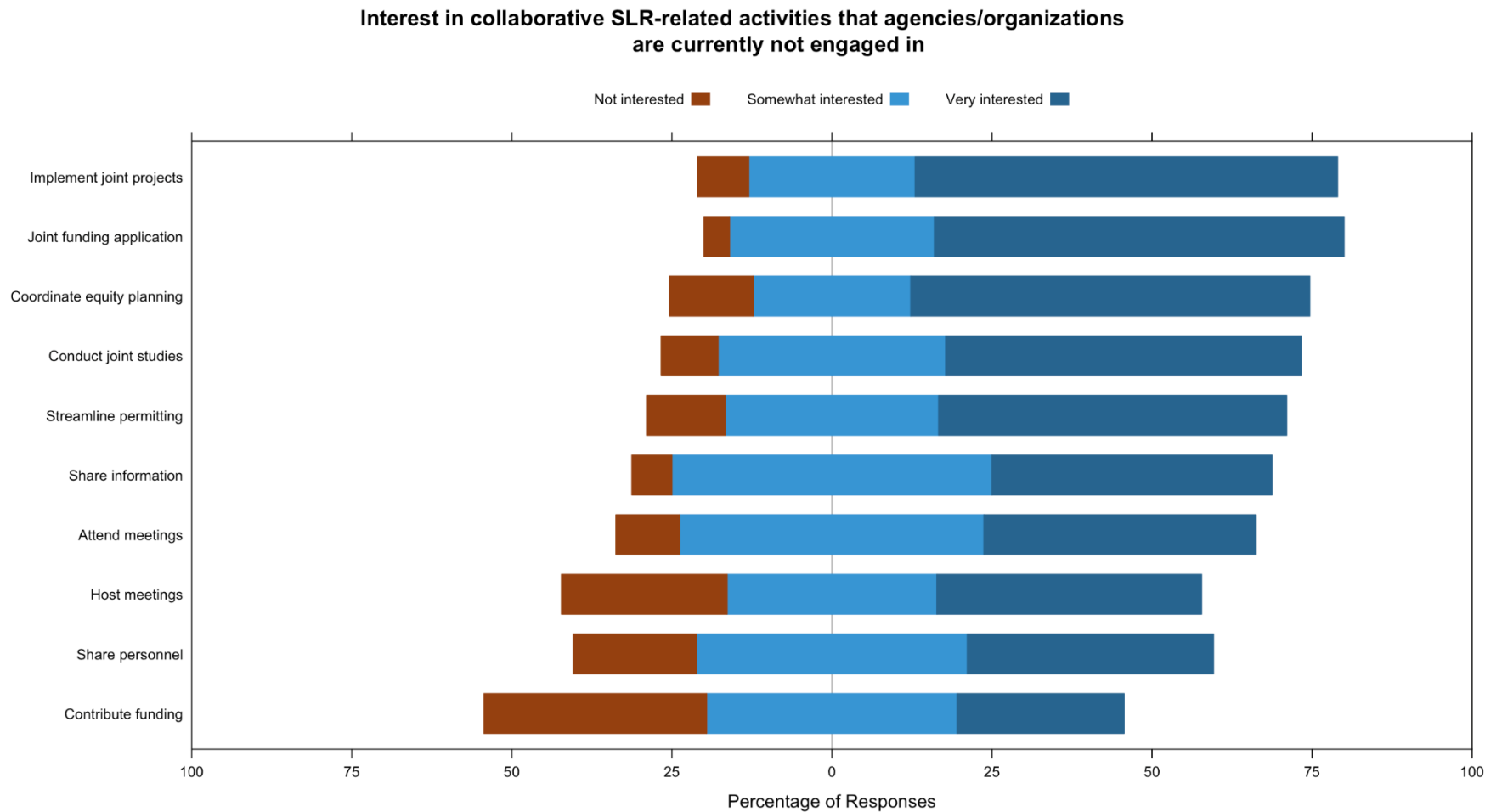


Figure 10: Level of interest in activities not currently engaged in (n=105-106).

Table 3: Level of engagement in collaborative SLR-related activities.

	Percentage of Responses		
	Engaged	Not Engaged	I don't know or N/A
Sharing information about your organization's SLR policies, projects, and/or research with other agencies/organizations	55%	30%	15%
Attending regular SLR planning or technical meetings hosted by another agency/organization	51%	38%	10%
Carrying out SLR studies that inform multiple agencies/organizations	44%	42%	13%
Collaborating with other agencies/organizations to apply for and/or secure SLR-related project funding through grants or other sources	42%	47%	11%
Implementing SLR-related projects with other agencies/organizations	38%	47%	15%
Contributing funding towards SLR-related projects that benefit multiple agencies/organizations	29%	43%	27%
Coordinating with other agencies/organization to help streamline permitting processes related to SLR adaptation (e.g., programmatic permit, joint permit application)	28%	54%	18%
Sharing personnel with other agencies/organizations for SLR-related work	26%	50%	25%
Hosting regular SLR planning or technical meetings and inviting other agency/organization to attend	25%	55%	20%
Coordinating with agencies/organizations regarding equity and environmental justice considerations into SLR planning	19%	65%	16%

Table 4: Interest in collaborative SLR-related activities that respondents' agencies/organizations were currently not engaged in.

	Percentage of Responses		
	Very Interested	Somewhat Interested	Not Interested
Implementing SLR-related projects with other agencies/organizations	66%	26%	8%
Collaborating with other agencies/organizations to apply for and/or secure SLR-related project funding through grants or other sources	64%	32%	4%
Coordinating with agencies/organizations regarding equity and environmental justice considerations into SLR planning	62%	25%	13%
Carrying out SLR studies that inform multiple agencies/organizations	56%	36%	9%
Coordinating with other agencies/organization to help streamline permitting processes related to SLR adaptation (e.g., programmatic permit, joint permit application)	54%	33%	12%
Sharing information about your organization's SLR policies, projects, and/or research with other agencies/organizations	44%	50%	6%

Attending regular SLR planning or technical meetings hosted by another agency/organization	43%	48%	10%
Hosting regular SLR planning or technical meetings and inviting other agency/organization to attend	41%	33%	26%
Sharing personnel with other agencies/organizations for SLR-related work	38%	42%	19%
Contributing funding towards SLR-related projects that benefit multiple agencies/organizations	26%	39%	35%

Respondents were provided a space in the survey to type any other thoughts about types of coordination their agency/organization is involved with or interested in. The following are typed responses from respondents:

Additional engagement in coordination activities reported by respondents included:

- Currently, County Environmental Services is leading an effort and technical working group to identify possible natural shoreline infrastructure projects to address rising sea levels.
- Creating a mitigation bank dedicated to offset impacts from SLR adaptation and renewable energy/carbon neutrality type projects.
- Our agency is involved in multi-modal project development that highlights key pieces of our infrastructure that could require retrofits for sea level rise concerns. Where applicable costs/scope are added to the projects developed to address sea level rise concerns.
- Our main involvement with sea-level rise planning in the area (and statewide) has been through AB 691 (2013), legislation that requires local trustees of granted state lands to submit sea level rise assessments to the State Lands Commission, detailing vulnerability and adaptation plans for public trust lands and assets. The Humboldt Bay Harbor District and the City of Eureka are both AB 691 trustees. We are also a part of a unique partnership with the CA Coastal Commission to enhance coordination surrounding the public trust and sea-level rise and we have developed a case study on Humboldt Bay to identify how we can work in the region to improve coordination around these issues.
- Community outreach
- Land use planning and regulation, providing grants, but not project implementation
- Work cooperatively with landowners
- We run the Integrated Climate Adaptation and Resiliency Program, which serves as a hub for state agency work in this space. Through our Technical Advisory Council, we also try to ensure that state resources are useful for helping advance local climate adaptation implementation.
- [consolidation of infrastructure] working towards consolidated sewer system to replace on-site systems, as an adaptation to sea level rise.
- Coordination through NSF proposal with other entities, institutions, and community and tribal partners.
- HSU SLR Initiative
- HSU SLR Special Interest Group
- Humboldt County SLR Technical Advisory Team
- Caltrans CAIP
- Local energy infrastructure relocation / reorganization due to SLR and groundwater inundation of anchor electric power plant site; SLR and other threats to nuclear waste repository at Humboldt Bay; general SLR issues, including zoning and

building/infrastructure decision-making that centers SLR and groundwater table increases.

Other comments about interests included:

- SLR activities have taken somewhat of a back seat to other projects in the last couple years but are very interested in partnering with the County, State, and local landowners to develop programmatic planning and permitting in an effort to address plans and permitted projects in the Humboldt Bay Region.
- We are interested in and researching the coordination of a regional approach to SLR planning and adaptation in the Humboldt Bay region. Regarding permitting streamlining, we believe that is important, but are not yet at a point in our planning process to implement this approach. Cooperation from the Coastal Commission to implement a consistent and unified approach to addressing the impacts of SLR is critical.
- We want to expand our engagement with neighboring coastal tribes.
- While we are aware of sea level rise and the danger to the levees, we have not evaluated its impact on access to our transmission system and other facilities are above the rise predicted.
- Adequate funding for projects addressing SLR-vulnerable infrastructure has yet to materialize so providing funds to other agencies would be secondary to addressing our own most at-risk locations that could result in isolation of already disadvantaged communities.
- A region-wide approach to this issue would be appropriate from the local, county, state and federal and private levels.

Two respondents noted some uncertainty with their answers:

- New to the entity therefore not sure of SLR activities
- It is also possible that I am not involved with or aware of what all functions of my department are doing.

Regional Coordination

The County's Feasibility Study is evaluating the feasibility of multiple sea level rise (SLR) regional coordination options. Respondents were asked what their initial support was for five potential strategies for regional coordination of SLR planning (Table 5 and Figure 11). Options ranged from those that would maintain the status quo to those that would take a lot of change and effort to implement:

- No regional planning should occur, local jurisdictions should individually respond to SLR as they see fit.
- Engage in the sharing of information and coordinated planning with other organizations through working groups with no formal agreement or commitment (e.g., an initiative).
- Create a formal collaborative partnership between existing agencies and stakeholders to address SLR (e.g., Memorandum of Understanding, Memorandum of Agreement, Joint Powers Authority).
- Empower or retool an existing regional agency (e.g., Harbor District, Humboldt County Association of Governments, Humboldt County, Humboldt County Flood Control District, etc.) to serve as a lead agency to coordinate and address regional SLR.
- Establish a new regional authority to address SLR (e.g., Joint Powers Association, Special District).

Currently in SLR planning efforts, most Humboldt Bay stakeholders are using "informal coordination" through various meetings and no formal agreements, outside of specific project contracts, are established for regional planning efforts. The last large scale coordination effort, the Adaptation Planning Working Group that ended in 2015 due to a lack of funds, would be considered by this survey to be informal collaboration since there was no formal agreement between participating stakeholders. The creation of a formal collaborative partnership was the most supported, with 79% of respondents favoring this option. A majority of respondents also favored empowering an existing regional authority (65%) and engaging in informal coordination (55%). Respondents had the most neutral responses (35%) for establishing a new regional authority, which may be due to the uncertainty around what such a large change would entail. According to this survey, over 60% of respondents strongly opposed and another 25% somewhat opposed the idea that no regional planning should occur. Additional ideas expressed in the open-ended question included the development of a multi-agency task force to identify action items for areas across jurisdictions and to develop MOUs to outline budgets and timelines for those areas, as well as to consider the political aspects of what agency is up to the job and will not create resentment from other agencies.

Table 5: Level of support for potential SLR coordination planning options.

	Percentage of Respondents				
	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor
Create a formal collaborative partnership	0%	4%	17%	33%	46%
Empower or retool an existing regional	2%	12%	22%	46%	18%
Engage informal coordination	5%	15%	25%	33%	22%
Establish a new regional authority	9%	11%	35%	28%	18%
No regional planning should occur	62%	26%	9%	2%	2%

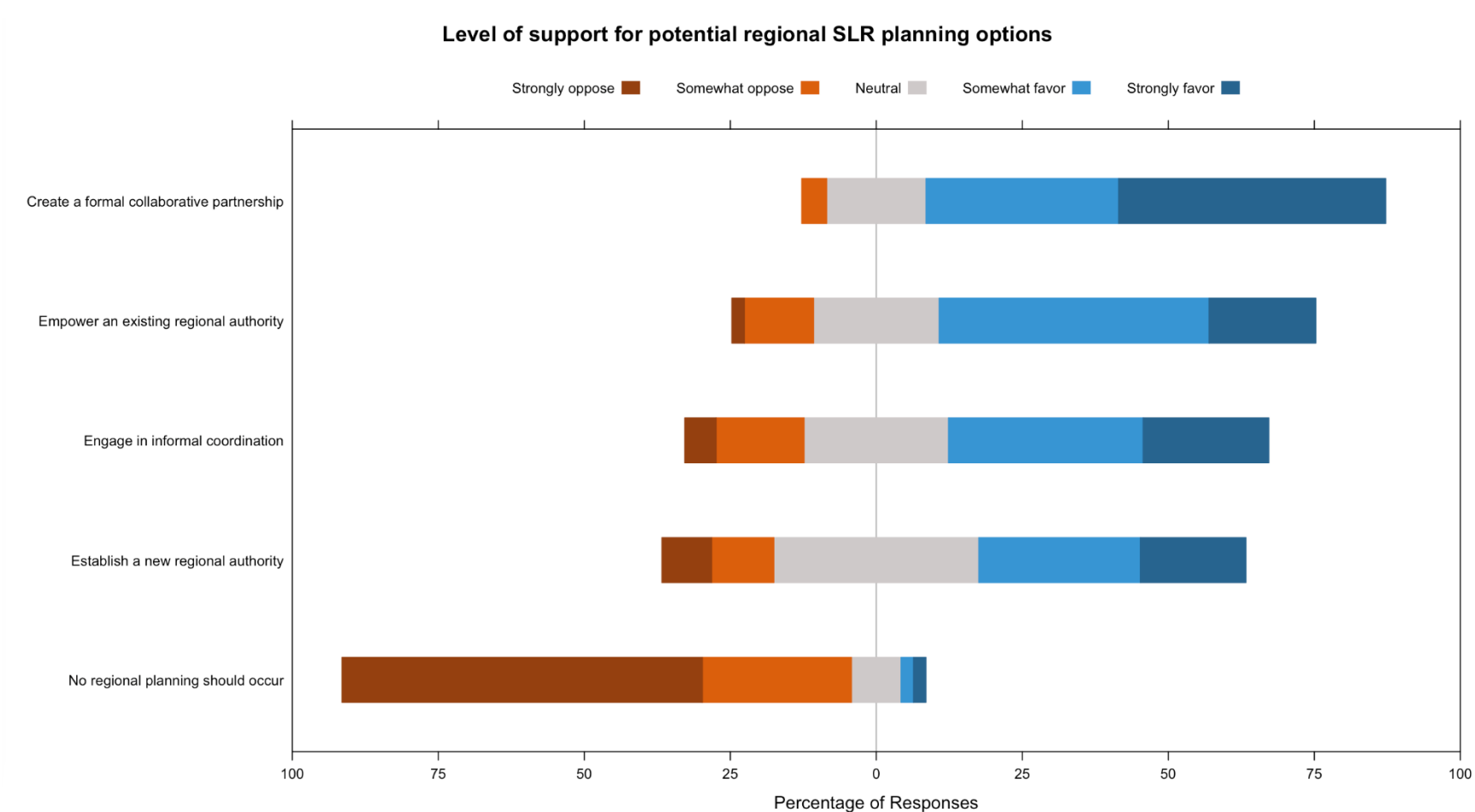


Figure 11: Survey respondents' initial support or opposition for various strategies for regional coordination of SLR planning (n=93-94).

To collect more information of types of potential regional collaboration efforts, respondents were asked four additional questions about planning control, level of involvement of their agency/organization, time of planning, and spatial scale of planning.

The vast majority of respondents (64%) preferred the planning authority to include a mix of local-and-state control, while 19% preferred local-only control and 14% preferred state-only control (Figure 12). Only 4% of respondents thought the planning authority should lie between state-and-federal or federal-only. On average, the stakeholder groups that tended to favor more local control included Tribal Government, County Government, Regional Districts, Consultants, and Academia. The average answer from City Government leaned closer to state control. No stakeholder group's average answer indicated preference for state-only or federal-only control.

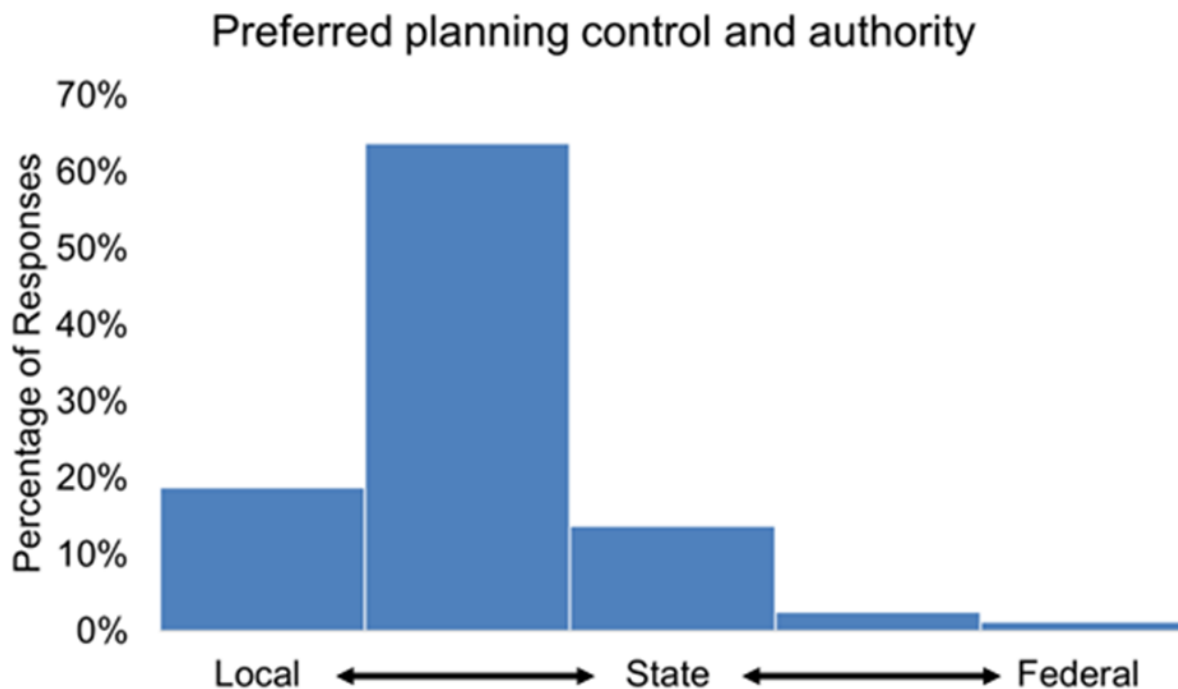


Figure 12: Survey respondents' preference for what level of government should hold the majority of the planning control and authority (n=80).

As indicated in Figure 13, most respondents indicated that their agency/organization should participate (55%) or should be involved in a mix of participation and leading (26%). Only 12% indicated they should either be rarely involved or not involved. Stakeholder groups whose average answers indicated their involvement should lie between participation-and-no involvement included Infrastructure/Service Providers, Business/Industry Groups, NGOs, and Consultants. The average answers of the stakeholder groups of Federal Government, City Government, State Government, Tribal Government, and Academia all indicated a solid preference in participating. County Government and the Harbor District (when separated from other Regional/Special Districts) indicated an average preference between participating and leading. Only 7% of respondents indicated a preference to lead a regional SLR planning effort and on average, no stakeholder group indicated a desire to lead.

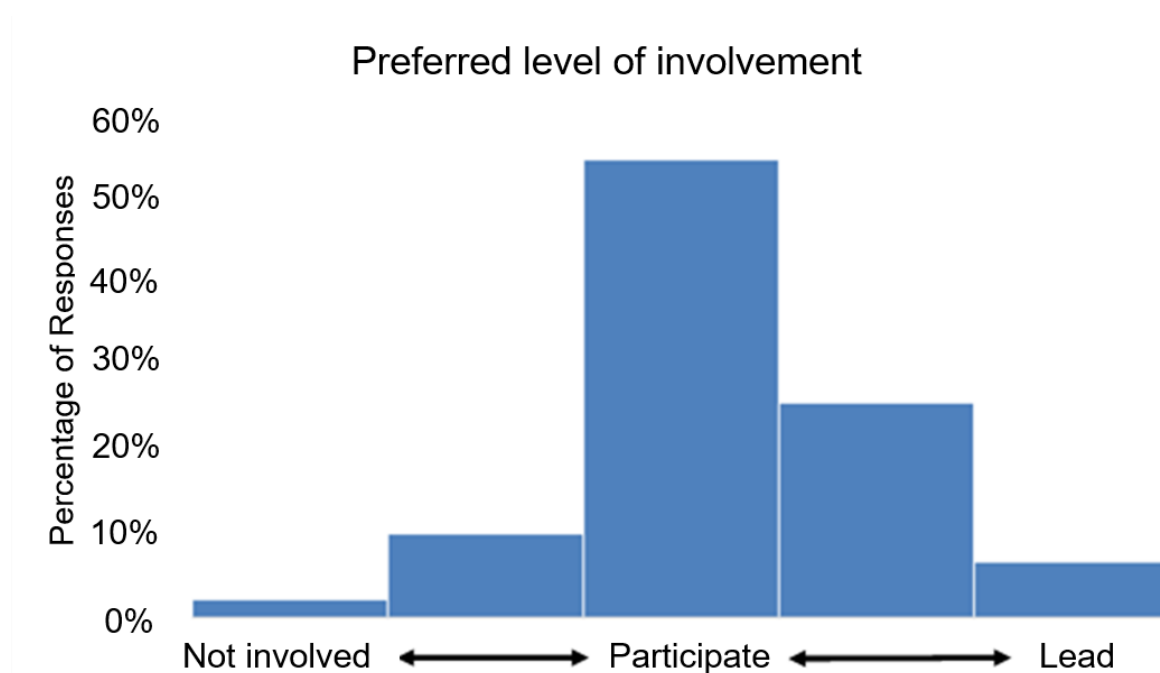


Figure 13: Preferred level of involvement of survey respondent's agency/organization in regional SLR planning effort (n=89).

Respondents were provided a space in the survey to type any other thoughts on how to regionally coordinate SLR planning and adaptation. The following typed responses related to the SLR planning coordination structure, involvement, and leadership.

- Coordination is essential. I don't know enough about the politics to know whether an existing agency is (a) up to the job; (b) will not create resentment from other agencies.
- I think empowering and existing JPA or making a new one would be wise to coordinate SLR planning.
- There needs to be a multi-agency task force to identify action items across jurisdictions and MOU's signed to give each agency in the region tasks to develop budgets and timelines.
- Individual Cities should lead their own planning/adaptation efforts. Humboldt County RCD can lead planning in all other areas.
- Early project planning and local agency involvement.
- We really need planning and coordination at all levels and a view on the long-term future to be effective.

Figure 14 shows the respondent results indicating what spatial scale they think regional coordination should mainly focus. Thirty-seven percent of survey respondents thought it should be either focused on a watershed unit or other unit that is smaller than the entire bay and 62% of respondents thought regional coordination should occur on a bay-wide scale.

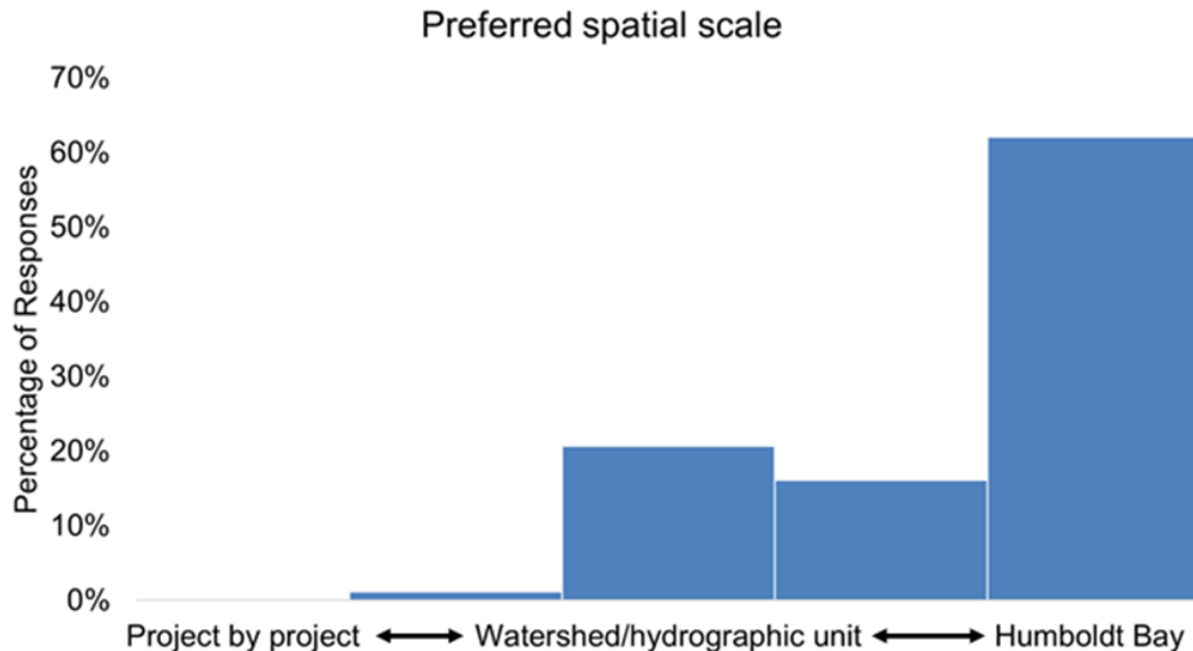


Figure 14: Survey respondents' preferred spatial scale to focus regional SLR coordination efforts (n=87).

Respondents were provided a space in the survey to type any other thoughts on how to regionally coordinate SLR planning and adaptation. The following responses related to the spatial scale of planning.

- Needs to include the Humboldt Bay watersheds, plus all of Humboldt Bay.
- Bioregional and neighborhood forums of organization should be prioritized.
- Engage the public to determine priority areas. Utilized the King Tide initiative Photo Project to rank priority areas with public input.
- A mitigation banks works on hydrologic units to establish service areas of the bank; therefore, the watershed of the entire Humboldt Bay would be included.
- Can't overlook the impact of shoreline activities on how waves propagate around the bay. In the near term, wave induced erosion, that results from poorly thought-out shore protection, will do more damage than chronic sea level rise...and is already happening.

Respondents were also asked about what timescale they thought regional coordination should mainly focus on addressing. As shown in Figure 15, 45% of respondents thought it should focus on the mid-term. Approximately 26% thought coordination efforts should focus on the short- to mid-term and 29% responded efforts should focus on the mid- to long-term.

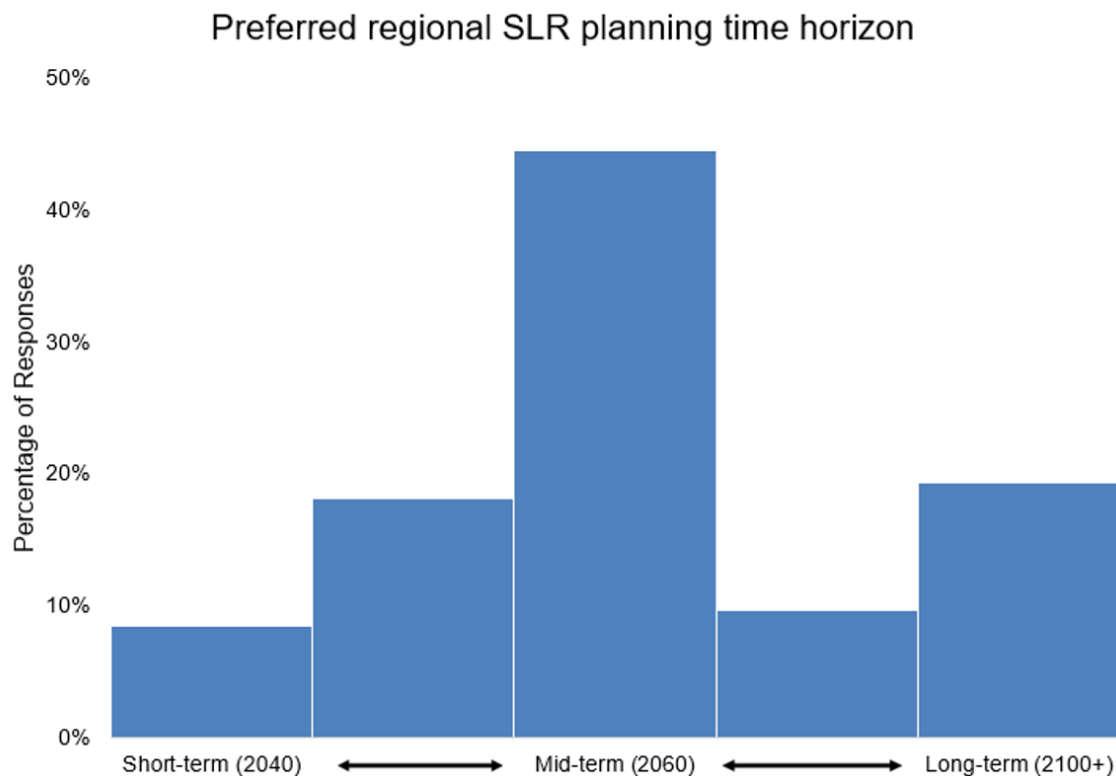


Figure 15: Survey respondents' preferred regional SLR planning time horizon (n=83).

Respondents were provided a space in the survey to type any other thoughts on how to regionally coordinate SLR planning and adaptation. The following typed responses related to the temporal scale of planning

- Consider SLR an emergency.
- We already have some ability to address the short term through project-by-project coordination. To provide a seamless response with little wasted resources/effort, aim for the long-term solution and work to get there on a step-by-step basis.
- I think that regional coordination should have a dual focus on short and long-term planning with a goal of phased adaptation overtime based on SLR triggers.
- While I selected short-term focus for regional coordination, SLR planning needs to also include mid-term and long-term. The idea is to do what we can to protect assets in the short-term while determining what needs to happen in the mid- and long-term.
- I think that any large civil type project undertaken in the next 5 years will likely have a life expectancy of 30-50 years (roads/windfarms/ports) so the planning range need to at least go as far as those projects life service spans... ~2075 min.

Barriers to regional coordination and SLR adaptation planning

Coastal professionals were asked a series of questions related to potential barriers to SLR adaptation and regional coordination. Survey respondents could rate their level of agreement with each statement about sea level rise (SLR) planning (coordination, funding, public engagement, general stakeholder engagement, and the participant's primary organization) on Humboldt Bay. Respondents were provided with a "not applicable (N/A)" choice if the statement was not applicable to their agency/organization. In an open-ended text space at the end of this series of questions, respondents were provided an opportunity to add any other thoughts. Some respondents used the space to describe why they chose neutral for some statements.

Explanations included:

- We are in the process of outreach and learning more about what the public and stakeholders think.
- I am answering for my agency and feel that response may warrant neutral. I have personal opinions that are not neutral but don't feel that's the nature of this survey response structure.
- Some of these I was more ambivalent than neutral. These are difficult questions to unpack, there's a fair amount of nuance being lost, maybe some listening sessions with key players would be helpful.

As shown in Figure 16 and Table 6, when asked if SLR planning success will require coordination between local governments, Tribes, management agencies, and the public, 95% agreed or strongly agreed. When asked if the current governmental/institutional structure is sufficient for addressing SLR, 50% of respondents disagreed/strongly disagreed. On the topic of whether there is clear communication between regional stakeholders related to SLR planning, 18% agreed/strongly agreed and 40% disagreed/strongly disagreed. Thirty-eight percent of respondents indicated that they trust the stakeholders they need to work with.

When asked if all the right stakeholders are currently involved in SLR planning conversations, only 5% of respondents agreed and 57% were neutral (Figure 16). A follow up fill in the blank question requested that respondents write in any groups, organizations, sectors, or types of people that they think have been missing or not sufficiently included in SLR-related planning and activities on Humboldt Bay. Common responses about who has been missing included: private property owners, residents, taxpayers, and business owners. Slightly less frequently, respondents noted that disadvantaged and environmental justice communities, Tribes, and communities highly vulnerable to SLR should be more included in SLR planning efforts. A few respondents mentioned specific land/asset managers, community services districts, and public interest/user groups such as environmental groups. The most frequent industry noted as needing increased involvement in SLR planning was the agricultural community; however, fishing, cannabis, construction/development, banking, and insurance industries were also mentioned.

Additionally, respondents were asked a series of questions about their perceptions on risks, actions, and values related to SLR (Figure 16). Respondents were fairly evenly split between agreeing (32%), feeling neutral (32%), and disagreeing (34%) that stakeholders agree on risks posed by SLR. Furthermore, very few respondents (11%) agreed that stakeholders agree on the actions needed to address SLR. Most respondents (53%) felt that stakeholders did not agree on the necessary actions. Forty-eight percent of survey respondents also perceived that stakeholders' conflicting values and preferences could hinder agreement in selecting adaptation strategies.

Level of agreement regarding coordination of SLR planning

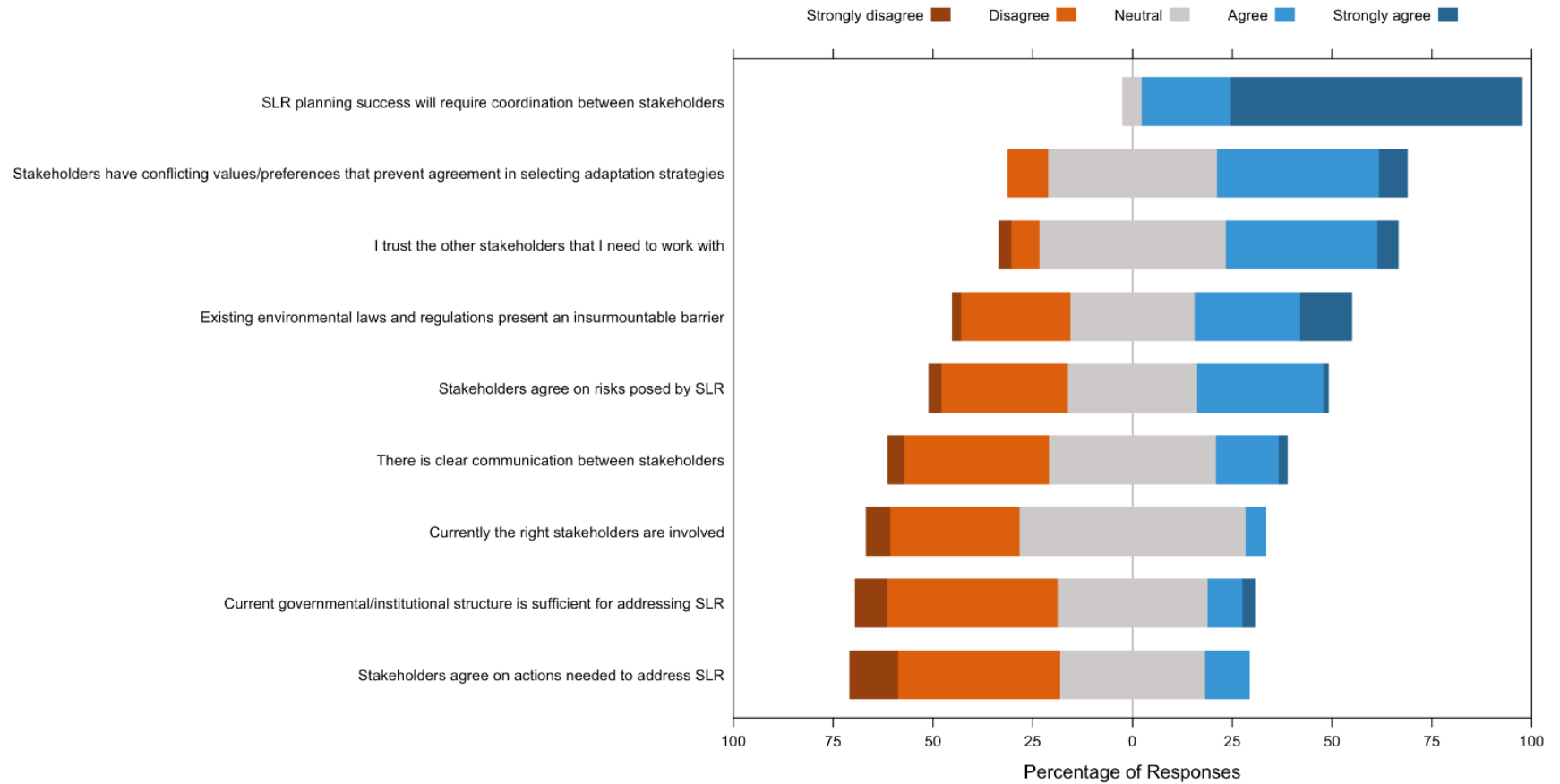


Figure 16: Level of agreement regarding coordination of SLR planning (n=100-103).

Table 6: Level of agreement regarding coordination of SLR planning.

	Percentage of Responses					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
SLR planning will only be successful if local governments, Tribes, management agencies, and the public work together and coordinate on SLR planning activities.	0%	0%	5%	22%	73%	0%
Stakeholders have conflicting values/preferences that do not allow for agreement in selecting adaptation strategies.	0%	10%	43%	41%	7%	0%
I trust the other agencies/ organizations that I need to work with in order to accomplish SLR planning.	3%	7%	47%	38%	5%	0%
Existing environmental laws and regulations present an insurmountable barrier/obstacle to SLR adaptation.	2%	27%	31%	26%	13%	0%
Humboldt Bay stakeholders generally agree on risks posed by SLR.	3%	32%	33%	32%	1%	0%
There is clear communication between agencies/organizations about their SLR planning efforts.	4%	36%	42%	16%	2%	0%
Currently in regional conversations about SLR, all the right stakeholders are in the room.	6%	32%	57%	5%	0%	0%
The current governmental/institutional structure is sufficient for addressing SLR impacts and concerns on Humboldt Bay.	8%	43%	38%	9%	3%	0%
Humboldt Bay stakeholders generally agree on the actions that are needed to address SLR.	12%	41%	37%	11%	0%	0%

Respondents were asked a series of questions related to their perceptions of the agency/organization they work for (Figure 17 and Table 7). Respondents were provided with a “N/A” choice if the statement was not applicable to their agency/organization; between 5-15% of respondents chose “N/A” for all questions in this series. The majority of respondents agreed (56% agreed/strongly agreed; 13% disagreed/strongly disagreed) that their agency or organization’s leadership was prioritizing SLR adaptation planning.

More respondents disagreed than agreed (47% disagreed/strongly disagreed; 25% agreed/strongly agreed) that it was hard for their agency/organization to leave the status quo in order to plan for a different future. Slightly more respondents agreed than disagreed (33% agreed/strongly agreed; 25% neutral; 28% disagreed/strongly disagreed). Forty percent of respondents agreed their agency/organization had enough information to begin implementing SLR adaptation plans, while just 23% disagreed. More respondents disagreed than agreed (31% disagreed/strongly disagreed; 23% agreed/strongly agreed) with the statement that their agency/organization’s planning is held up and contingent on key decisions being made by other agencies/organizations

Table 7: Level of agreement regarding SLR planning within respondents' agencies/organizations.

	Percentage of Responses					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
Leadership within my agency/organization is making SLR adaptation planning a priority.	1%	12%	27%	34%	22%	5%
My agency/organization has enough data/information now to begin implementing sea level rise adaptation plans and activities.	3%	20%	25%	29%	11%	13%
My agency/organization currently has more pressing issues that take priority over SLR planning.	5%	23%	32%	27%	6%	8%
My agency/organization is kept waiting to plan for SLR until key decisions are made by other agencies/organizations.	6%	25%	32%	21%	2%	15%
It has been hard for my agency/organization to leave the status quo in order to plan for a different future (with potentially higher sea levels).	11%	36%	18%	21%	4%	11%

Level of agreement regarding SLR planning within participants' agencies/organizations

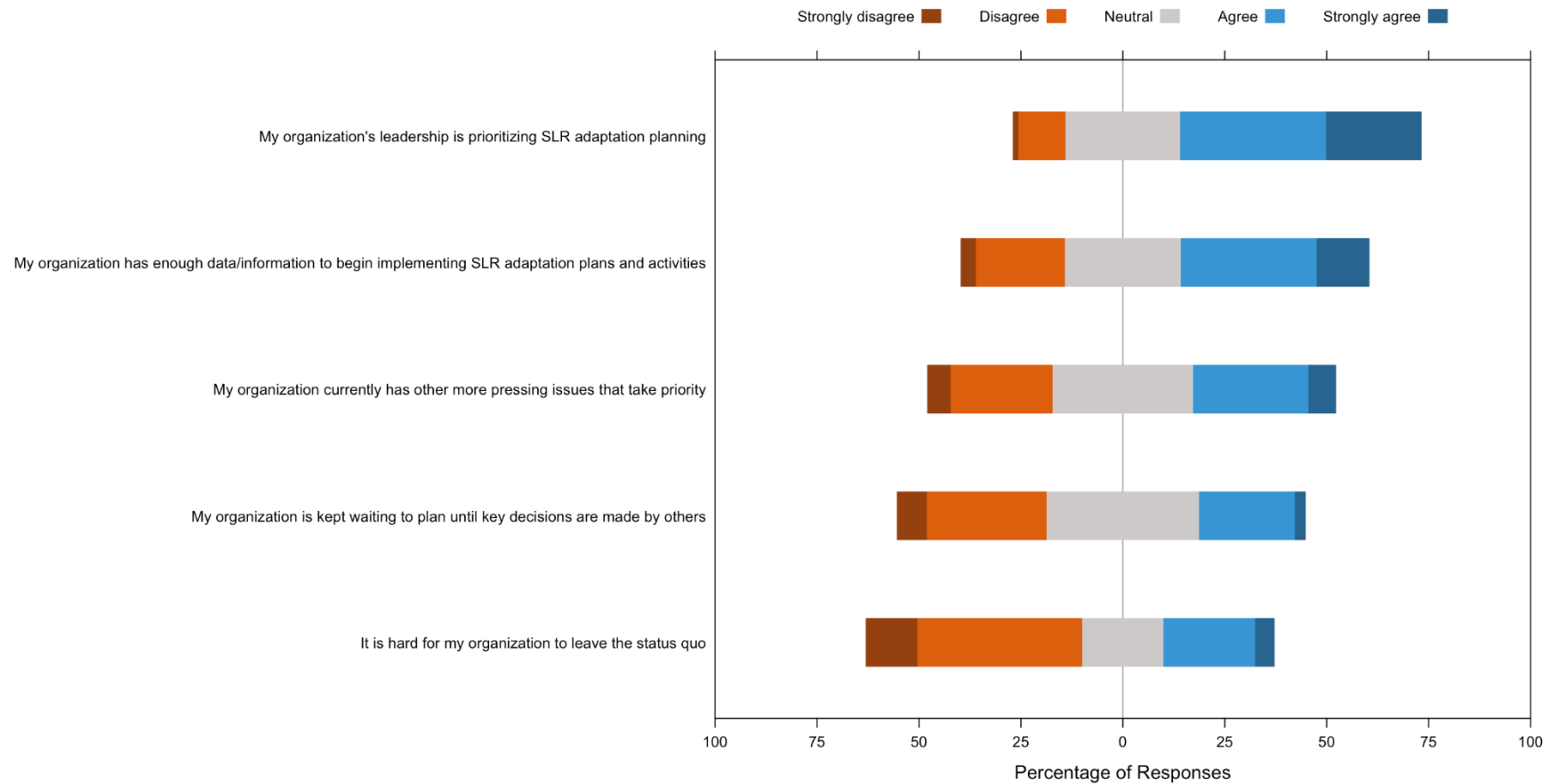


Figure 17: Level of agreement regarding SLR planning within respondents' agencies/organizations (n=101).

In regards to levels of agreements and disagreement about funding SLR planning, most respondents did not agree that the region is getting enough support from State or Federal sources and did not think their agency/organization had enough funding or staff resources for sufficient planning efforts (Figure 18 and Table 8).

Table 8: Level of agreement regarding funding of SLR planning.

	Percentage of Respondents					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
The Humboldt Bay region is getting sufficient support from the State of California to do SLR planning and adaptation work.	10%	33%	50%	6%	1%	0%
The Humboldt Bay region is getting sufficient support from the federal government to do SLR planning and adaptation work.	15%	35%	44%	6%	1%	0%
My agency/organization has sufficient staff resources to dedicate to SLR planning activities.	25%	46%	16%	13%	0%	0%
My agency/organization has enough funding to engage in SLR planning as much as we would like.	32%	36%	27%	4%	1%	0%

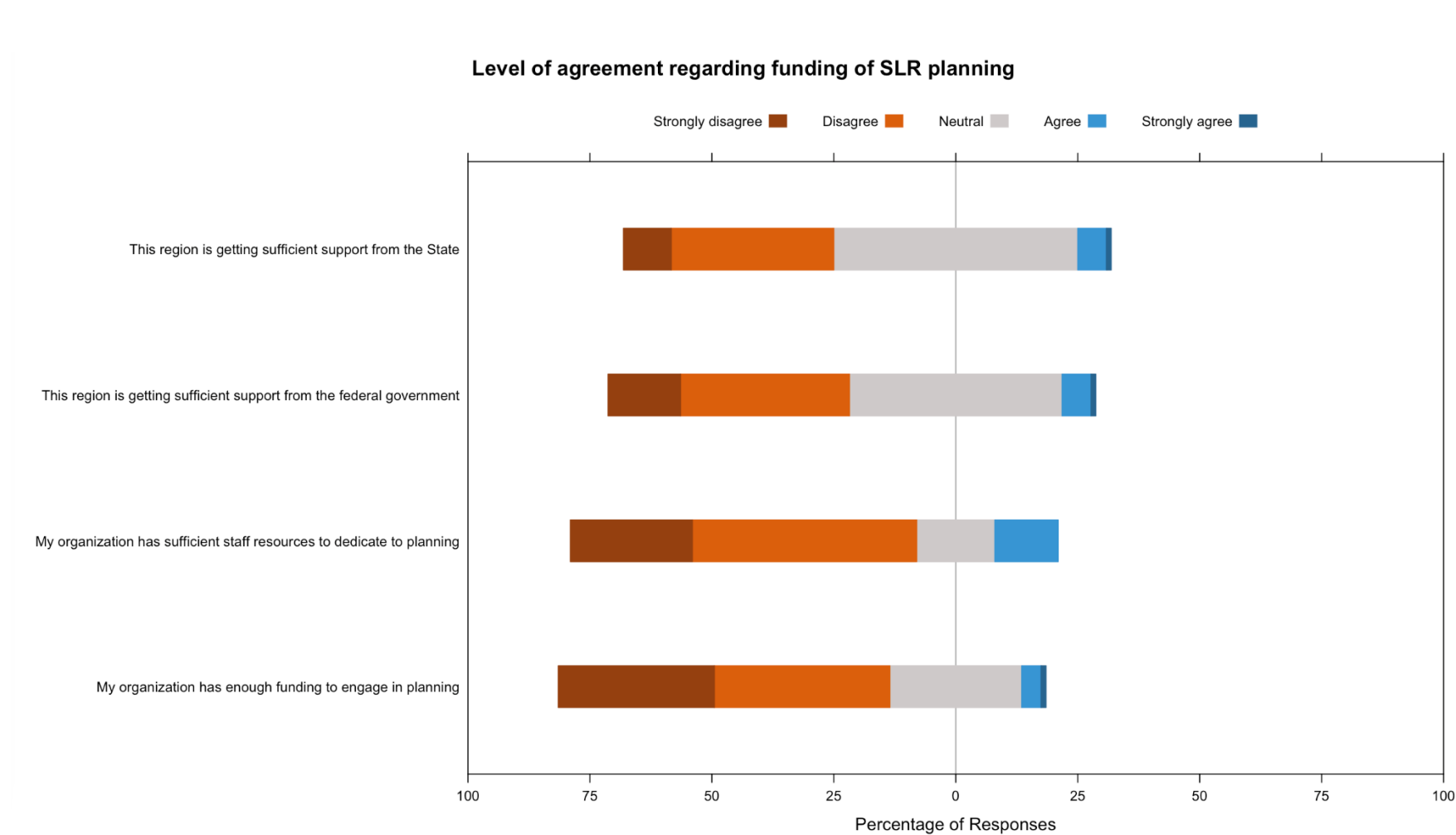


Figure 18: Level of agreement regarding funding of SLR planning (n=100-102).

We asked survey respondents to rate their level of agreement with four statements about public engagement in SLR planning in the Humboldt Bay region (Figure 19 and Table 9). Forty four percent of respondents either agreed or strongly agreed that members of the public are interested in policies and planning to address SLR (compared to 19% who disagreed). However, 45% of survey respondents disagreed or strongly disagreed that public engagement with residents and business owners has been effective in educating them about SLR impacts, 39% of respondents felt neutral, and 19% of respondents agreed public engagement has been effective. Additionally, on average, survey respondents felt neutral-disagreed that there has been sufficient effort to include vulnerable communities and businesses in SLR planning and decision making or that there has been sufficient incorporation of equity and social justice considerations. Only 4% of survey respondents agreed or strongly agreed that equity and social justice considerations have been sufficiently incorporated into SLR planning.

Table 9: Level of agreement regarding public engagement in SLR planning.

	Percentage of Respondents					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
Members of the public are clearly interested in policies and planning to address SLR in the Humboldt Bay region.	1%	18%	38%	34%	10%	0%
Public engagement with residents and business owners has been effective in educating them about SLR impacts.	10%	35%	36%	19%	0%	0%
There has been sufficient effort to include local communities, businesses, and residents that may be impacted by SLR in local SLR planning and decision making on Humboldt Bay to date.	11%	34%	38%	17%	1%	0%
SLR planning processes on Humboldt Bay to date have sufficiently incorporated equity and social justice considerations.	7%	35%	54%	3%	1%	0%

Level of agreement regarding public engagement in SLR planning

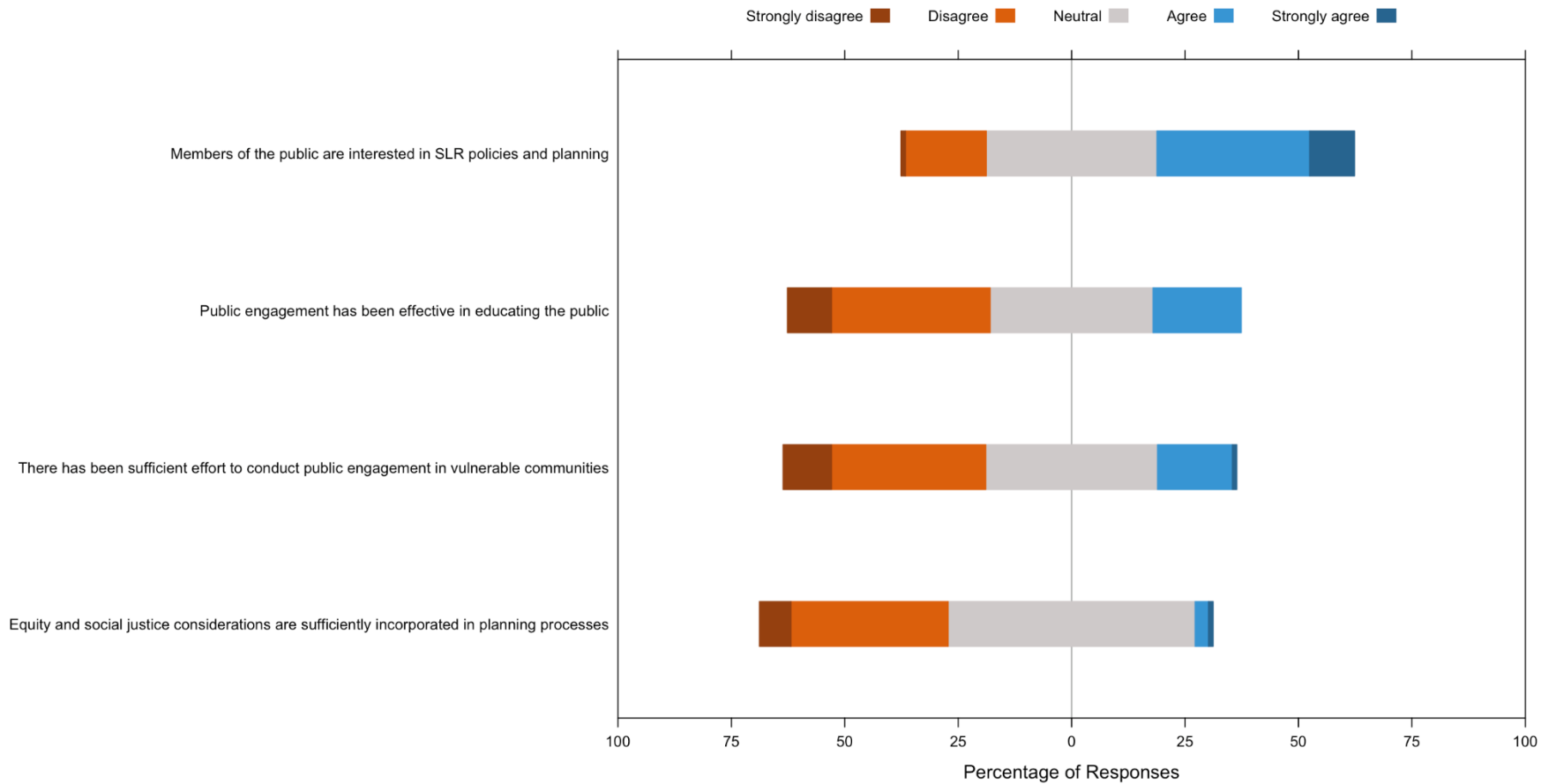


Figure 19: Level of agreement regarding public engagement in SLR planning (n=101-103).

Respondents were provided a space in the survey to type any other thoughts on SLR planning opportunities or challenges. The following are their typed responses:

- Collaboration is the key to overcoming any insurmountable barrier/obstacle to SLR adaptation.
- The dispersed jurisdictions around Humboldt Bay with no bay-wide organizing framework is a big challenge.
- Need to do regional SLR planning for HB.
- We need a list of action items. Everything is conceptual and vague right now. We can't successfully plan to do an unknown project.
- We should do everything that we can now to stop burning fossil fuels.
- Many local planners aren't taking a long enough view of SLR risks. They seem to be waiting until serious impacts occur to being planning to deal with them, but by then it will be too late.
- Current hurdles are preliminary project planning and not being able to fully identify scoping needs for adaptive measures since there is limited data to review and limited funding.
- There are many issues related to SLR and climate change that are still poorly understood, but we can be confident that sea level rise will alter the landscape of Humboldt Bay. I think any planning effort needs to incorporate these uncertainties but hiding from the science is not the answer.
- I think state government could do a lot more to incentivize better SLR planning and the Coastal Commission is trying with limited funding to bolster our Statewide Planning Unit so that they have the capacity to work with other state agencies towards that end. I think the local governments need help making this more of a priority and on regional collaboration.
- Lots of challenges. The Coastal Act has been pointed at as a barrier to SLR type activities. A central organizing entity seems needed, almost like a levee commission or something where wants and needs could be balanced. Harbor commission doesn't seem to have the capacity and not sure about the vision.
- A (non-profit) mitigation bank set-up like a land trust has very efficient regulatory pathways available, as well the ability to deal in "ecological currency" and equate an impact of an offshore open ocean environment with an onshore mitigation. Founding a mitigation bank now also provides a vehicle for advanced monitoring of potential impacts/habitats and assessment of impacts and viable routes of mitigation. A mitigation bank provides a regulatory and funding nexus that I see as essential to keep pace with the state and fed goals.
- Staffing and base supported funding will continue to be a challenge.
- It is hard to understand how much funding might be available/where to plan for retreat/where to plan for protection...seems like it would be good to get more engagement with Huffman, McGuire, Wood.
- Funding for periodic and sustained community engagement (meetings, education campaigns) in addition to government planning processes is key to help make difficult decisions in short timeframes.
- One of the main challenges to education and planning, in my opinion, is the disbelief in science that a large portion of our population seems to share.
- To be perfectly honest, when I read through the existing SLR planning documents for the region, I find them incredible dense and inaccessible. They contain an abundance of thorough and region-specific information, and I can tell lots of care and effort were put into them, but they are not super clear and helpful resources in my opinion. I would

suggest that future plans focus on communicating opportunities, challenges, needs more succinctly and with a broader, more general audience of stakeholders in mind so that decision-making could be based on a more collective understanding of the baseline science and options available.

- There is heavy mistrust between state agencies and private landowners when it comes to SLR. There is a very real fear that any SLR "adaptation" measures will lead to condemnation of land, or unconstitutional take of private property.
- This questionnaire assumes that government agencies and institutions will be the leading force in adapting to SLR. They will actually resist adaptation and will cling to their spheres of power. Only an informed and passionate citizenry will demand coordinated and effective action. Institutions that are controlled by real estate and moneyed interests will resist. They will hire people to conduct surveys.
- The lack of funding for public engagement has left these discussions in private meetings of experts and agency staff.
- I have not heard of any meetings to inform public about coordinated efforts to plan for impacts related to SLR or climate change.
- Include outreach and education in the planning so key messages can get shared with our next generation of critical thinkers, planners, economists and scientists.
- Private Landowners are key to assist in SLR. Most of these landowners are agricultural producers who have issues with governmental agencies. It is difficult to engage them in something like SLR where they distrust government, don't really believe in climate change, and are so busy they can't take time to come to a stakeholder meeting. Nonetheless, they are key to helping mitigate SLR.
- Many landowners would like to prevent inundation using the tools they have used in the past, such as dikes and levees. Many of these areas could be protected for a period of time if permits were regulatorily attainable and financially within reach. One solution suggested is some sort of programmatic plan and permitting that included mitigation. An agency or government, probably the county would need to hold and administer the process and programmatic permit.
- Funding and environmental prohibitions on filling coastal wetlands remain the biggest hurdles to addressing SLR. Plans, collaboration and agreements are great but without funding or env. clearances, there will be no forward progress.
- We need an expedited permitting process to implement SLR projects. We can't wait two years to obtain permits!
- We have to assume that the coastal act will not look the same in 30 years and begin to plan for solutions that will likely be permissible in the coastal act of the future, even though they are not permissible right now. For example, moving Fairhaven into the high dunes in 30 - 50 years. Not possible now, but I bet it will be when 2-3 feet of sea level has occurred statewide.
- Working within the CA Coastal Act, which needs updated, will be problematic

Prioritizations and Future Actions

Coastal professionals were asked to rate their level of prioritization for various sea level rise (SLR) planning efforts, public outreach efforts, and regional projects and programs on Humboldt Bay. Respondents could choose 'I don't know' (IDK) as a response; figures do not depict those responses, but they are captured in the tables. Two type-in answers addressed reasons for choosing IDK: "I don't know means I need more information to answer" and "While I have opinions on several of these I have responded 'I don't know' given that I'm responding for an agency."

All statements in Figure 20 and Table 10, except one, were identified as a high or essential priority by around 60% or more of respondents. The creation of an overarching regional SLR adaptation plan was a high or essential priority according to 80% of respondents. Incorporate equity and environmental justice considerations into planning was a high or essential priority according to 71% of respondents. Between 60-65% of respondents indicated activities that were a high or essential priority were developing a SLR hazard zone for consideration in development projects, developing regulatory solutions to allow for reuse of dredge spoils, addressing planning conflicts from state retained coastal development permitting authority, and completing updated SLR vulnerability assessments. For the development of a formal regional management or governing structure, 57% of respondents noted it was a high or essential priority and 23% of respondents noted it as a medium priority. Almost 50% of respondents identified the development of regulatory solutions to allow for wetland fill for SLR adaptation as a high or essential priority, while 8% thought it was not a priority, 5% indicated it was a low priority, and 18% responded that it was a medium priority.

Table 10: Prioritization of regional SLR planning efforts.

	Percentage of Respondents					
	Not a priority	Low priority	Medium priority	High priority	Essential priority	IDK
Create an overarching regional SLR adaptation plan	0%	4%	10%	39%	40%	6%
Incorporate equity and environmental justice considerations into planning	1%	11%	13%	37%	34%	4%
Complete updated SLR vulnerability assessments	4%	5%	24%	32%	29%	5%
Develop a SLR hazard zone for consideration in development projects	4%	4%	17%	35%	29%	10%
Develop regulatory solutions to allow for reuse of dredge spoils for SLR adaptation	2%	1%	16%	31%	34%	16%
Address planning conflicts from the Coastal Commission's retained coastal development permitting authority	3%	3%	12%	23%	41%	18%
Develop a formal regional management or governing structure	3%	6%	23%	29%	27%	11%
Develop regulatory solutions to allow for wetland fill for SLR adaptation	8%	5%	18%	25%	24%	19%

Prioritization of potential regional SLR planning efforts

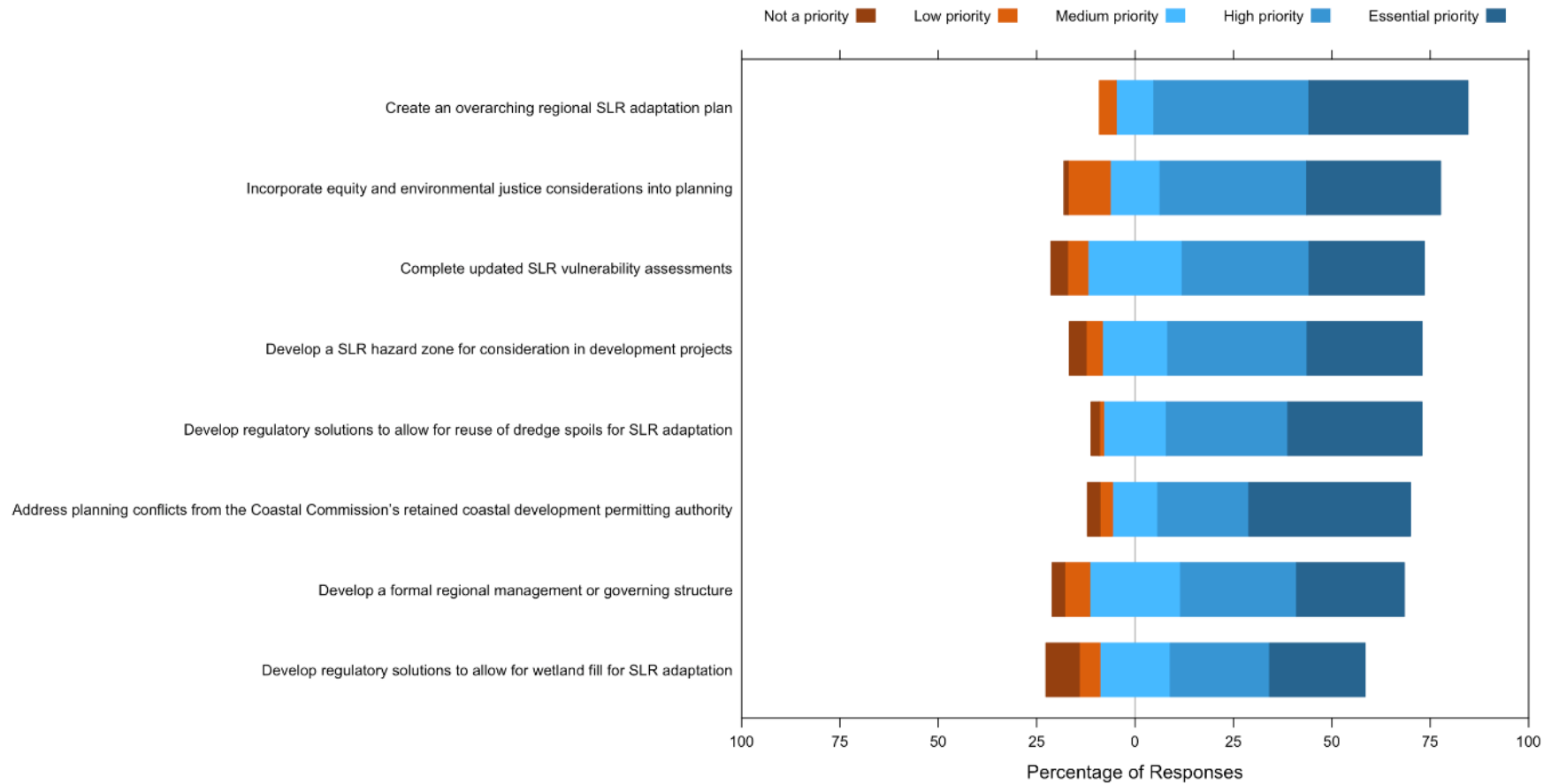


Figure 20: Prioritization of regional SLR planning efforts (n=94-96).

Figure 21 and Table 11 show results for five potential regional projects and programs. Ninety-seven percent of respondents indicated that the development of regional projects with natural physical barriers was a medium, high, or essential priority; no respondents indicated it was a low priority or not a priority. Over 40% of respondents indicated essential priorities included the development of a regional program for habitat restoration/enhancement and mitigation projects in vulnerable areas, development of projects aimed at remediating contaminated sites, and development of a plan for measured retreat and/or relocation. The statement with the most varied responses was regarding the development of projects aimed at the development/enhancement of man-made physical barriers.

Table 11: Prioritization of potential regional SLR projects and programs.

	Percentage of Respondents					
	Not a priority	Low priority	Medium priority	High priority	Essential priority	IDK
Develop regional projects aimed at the development/enhancement of natural physical barriers	0%	0%	6%	35%	55%	3%
Develop a regional program for habitat restoration/enhancement and mitigation projects in vulnerable areas	0%	4%	15%	37%	40%	3%
Develop projects aimed at remediating contaminated sites and pollutant sources that are vulnerable	0%	1%	23%	29%	43%	4%
Collaborate regionally to develop a plan for measured retreat and/or relocation	2%	4%	21%	21%	45%	6%
Develop regional projects aimed at the development/enhancement of man-made physical barriers	5%	27%	23%	24%	17%	3%

Prioritization of potential regional SLR projects and programs

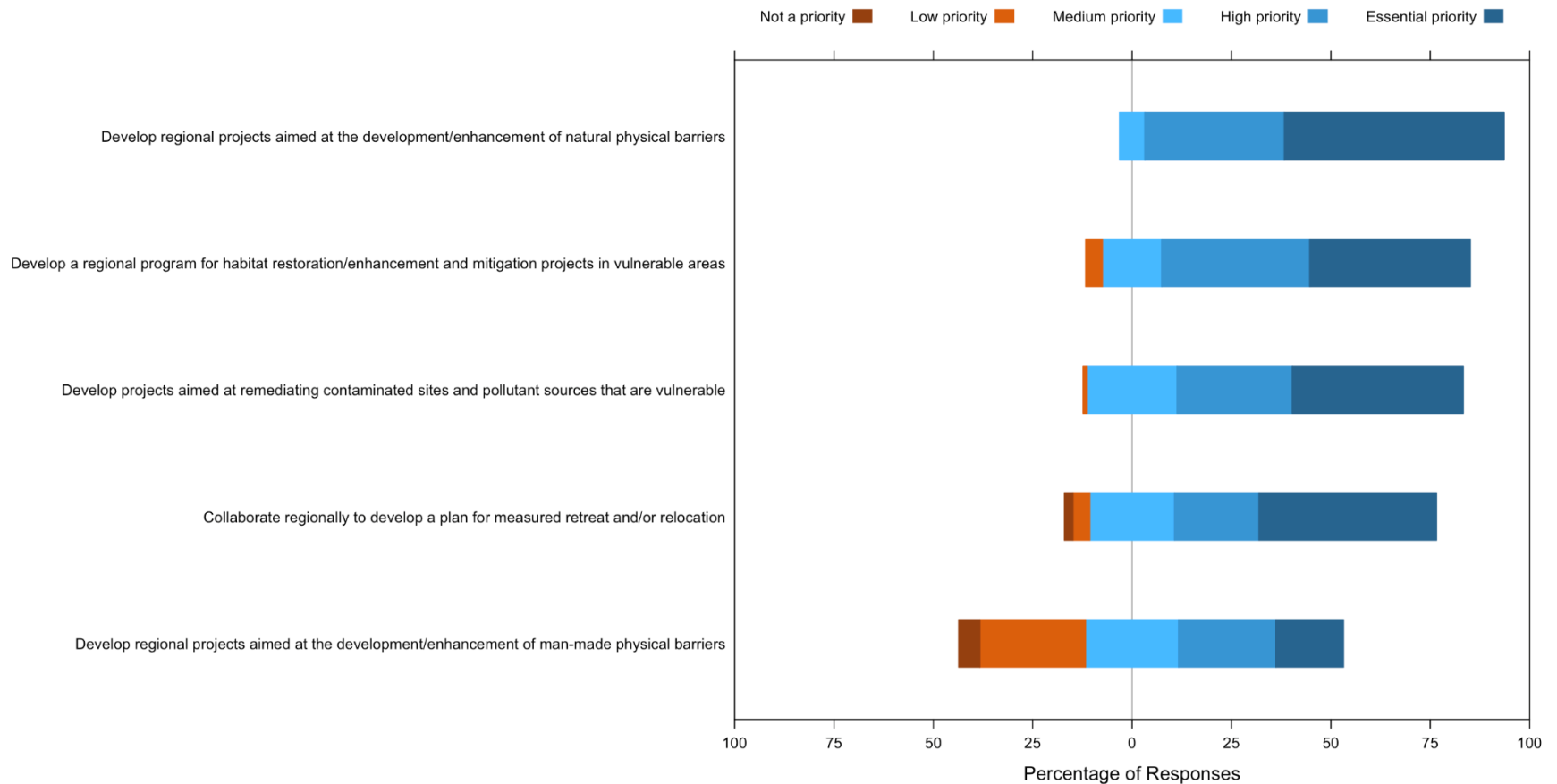


Figure 21: Prioritization of potential regional SLR projects and programs (n=93-94).

Respondents were provided a space in the survey to type any other thoughts on priorities for SLR planning approaches, programs, or projects. The following are responses from the survey:

- We should not be working on resilience projects that will only last a decade or two before they are over-topped.
- All these projects and programs need to be done at a regional scale.
- It's difficult to prioritize the above relative to one another, as the shoreline management needs of Humboldt Bay vary so broadly, not one single approach on the Bay scale is appropriate.
- Consider SLR an opportunity to build an ecologically based society
- Not sure what is meant by wetland fill, but the Humboldt County shoreline largely cannot be adapted to keep the ocean out, due to inundation from groundwater everywhere. Likely less expensive is to conduct managed retreat and use wetlands, estuaries, and other sea-front nature-based systems to buffer the impacts.
- I think that offshore wind/carbon neutrality and SLR are intrinsically bound. and I think that any SLR planning will/must assume/incorporate the presence and function of offshore wind in the adaptation.
- As I understand it, man-made physical barriers will not work in this region because SLR will cause groundwater table elevations to rise which are not feasible economically or operationally to mitigate with man-made physical barriers.
- Develop combined barrier/restoration/enhancement projects on agricultural land that was former tidal wetland areas
- Some nature-based methods will require pilot tests and/or demonstration projects
- I think we have some really great vulnerability assessments, and we need to focus now on addressing those vulnerabilities. There are regulatory pathways to reusing dredged spoils and filling for SLR adaptation.
- Use vulnerability assessments to prioritize essential infrastructure which are first to be at risk.
- The SLR inundation flood mapping completed for the Bay in 2015 needs to be updated with contemporary flood risk mapping methods. This should be top priority before any additional planning/policy making is advanced there are too many limitations with the current mapping.
- I generally don't support regulations. This is why I answered "not a priority" to develop a SLR hazard zone. However, I have advocated in my agency to do just this.
- Don't call it a hazard zone.
- I disagree with the concept of a hazard zone. We can discuss this, but the survey is not the place to go into it.
- Establish funding sources for SLR standalone projects.
- Fund regional planning efforts
- I would like to use the mitigation bank as a means of designing the measured retreat. We combine/prioritize elements of the topics/resources above and use the bank to develop the regions where the highest ecological gain (that is needed to offset impacts) is required/feasible/attainable. I think the mitigation banks allows for the cross jurisdictional targeted planning/design needed.

We asked survey respondents how they would prioritize various SLR public outreach efforts in the Humboldt Bay region, see Figure 22 and Table 12 for results. No respondent chose “not a priority” for the three public outreach strategies provided in the survey. On average, the highest priority strategy, with 81% of respondents saying it was a high or essential priority, was to create a public engagement process to identify community goals and actions for addressing SLR. Respondents also thought coordinating public outreach strategies to educate residents and business owners regarding SLR impacts and planning efforts was a high priority, with 76% saying it was a high or essential priority. The third strategy, to create a single regional information platform concerning the status of projects and research related to SLR was, on average, a medium-high priority, with 68% saying it was a high or essential priority.

Table 12: Respondent prioritization of public engagement strategies.

	Percentage of Respondents					
	Not a priority	Low priority	Medium priority	High priority	Essential priority	IDK
Create a single regional information sharing platform	0%	9%	23%	47%	16%	5%
Coordinate public outreach/education strategies	0%	2%	18%	48%	27%	4%
Create a public engagement process to identify community goals and actions	0%	3%	13%	42%	39%	3%

When provided with space to type additional comments, respondents commented on groups that should be engaged and other ideas to focus or improve public engagement. One respondent shared that they chose “low priority” for activities they felt have already been done. Additional responses included:

- Hire experienced organizers. Go beyond surveys and questionnaires.
- A regional approach will be difficult given diverse land use/management. Suggest planning/outreach occur at the sub-watershed level in areas hydrologically connected.
- Hold realtors to ethical disclosure standard.
- More public information on impacts of sea level rise over the next 100 years.
- There are already many online tools and regional information. Public outreach and engagement are critical priorities.
- One on one engagement with landowners so their input is directly captured into any future planning.
- Groups to engage
 - Specifically target potentially affected businesses; clarify that armoring is an option.
 - Include k12 admin/education and higher education demographics
 - Engage agricultural community

Prioritization of potential public outreach strategies

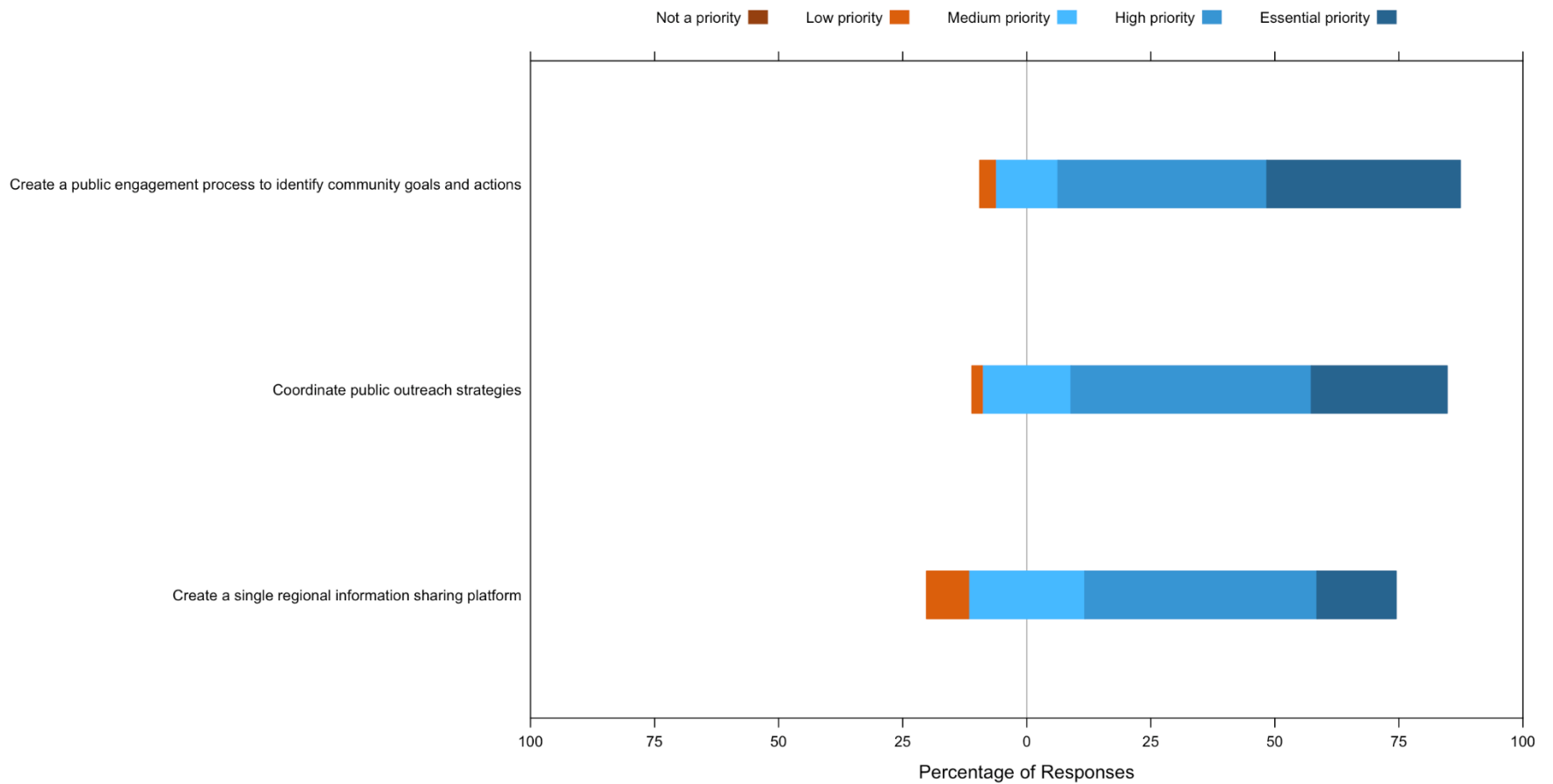


Figure 22: Respondent prioritization of public engagement strategies (n=94-95).

Funding

Coastal professionals and the public were asked to rate their level of support for various potential SLR funding strategies in their respective surveys. Strategies presented in both surveys were identical. In general, as shown in Figure 23/Table 13 and Figure 24, responses suggest that the vast majority of public and professional respondents support spending funds on SLR planning and adaptation (either a stand-alone project or within other projects). The most support was shown for the use of external grant funds when available, to pass state or federal laws or programs with mechanisms to fund SLR work, and to use of public funds for SLR adaptation projects on private lands that will protect both public and private assets. A slight majority supported passing a local tax measure to address SLR (public survey: 44% support and 31% oppose; coastal professional survey: 47% support and 18% oppose). Less support was shown for encouraging insurance companies to require upgrades on homes/businesses to reduce SLR risks as a condition of insurance. The least desirable options were to require individuals/businesses to pay for their own SLR protection to minimize local government costs or to increase funding for SLR protection by cutting other local programs and services.

Respondents provided additional ideas including modifying federal budgets to accommodate coastal adaptation funding, multi-benefit funding opportunities such as creating a regional mitigation bank or adding SLR considerations to proposed projects like road or trail improvements, and encouraging considerations of equity and the unequal funding burdens that certain taxes impose on poorer communities or individuals.

Table 13: Coastal Professional level of support for various funding strategies.

	Percentage of Respondents				
	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor
Utilize external grant funds when available	0%	1%	1%	31%	67%
Pass federal laws or programs with mechanisms to fund SLR work	1%	1%	15%	34%	49%
Pass state laws, programs, or bond measures with mechanisms to fund SLR work	1%	2%	15%	40%	41%
Utilize public funds for SLR adaptation projects on private lands that will protect both public and private assets	0%	7%	25%	47%	22%
Pass local tax measures to address SLR	8%	10%	35%	42%	5%
Encourage insurance companies to require upgrades on homes/businesses to reduce SLR risks as a condition of insurance	7%	20%	36%	28%	10%
Require individuals/businesses to pay for their own SLR protection to minimize local government costs	16%	29%	40%	14%	1%
Increase funding for SLR protection by cutting other local programs and services	36%	34%	27%	2%	1%
Funding should not be spent on SLR planning and adaptation work	86%	7%	5%	2%	0%

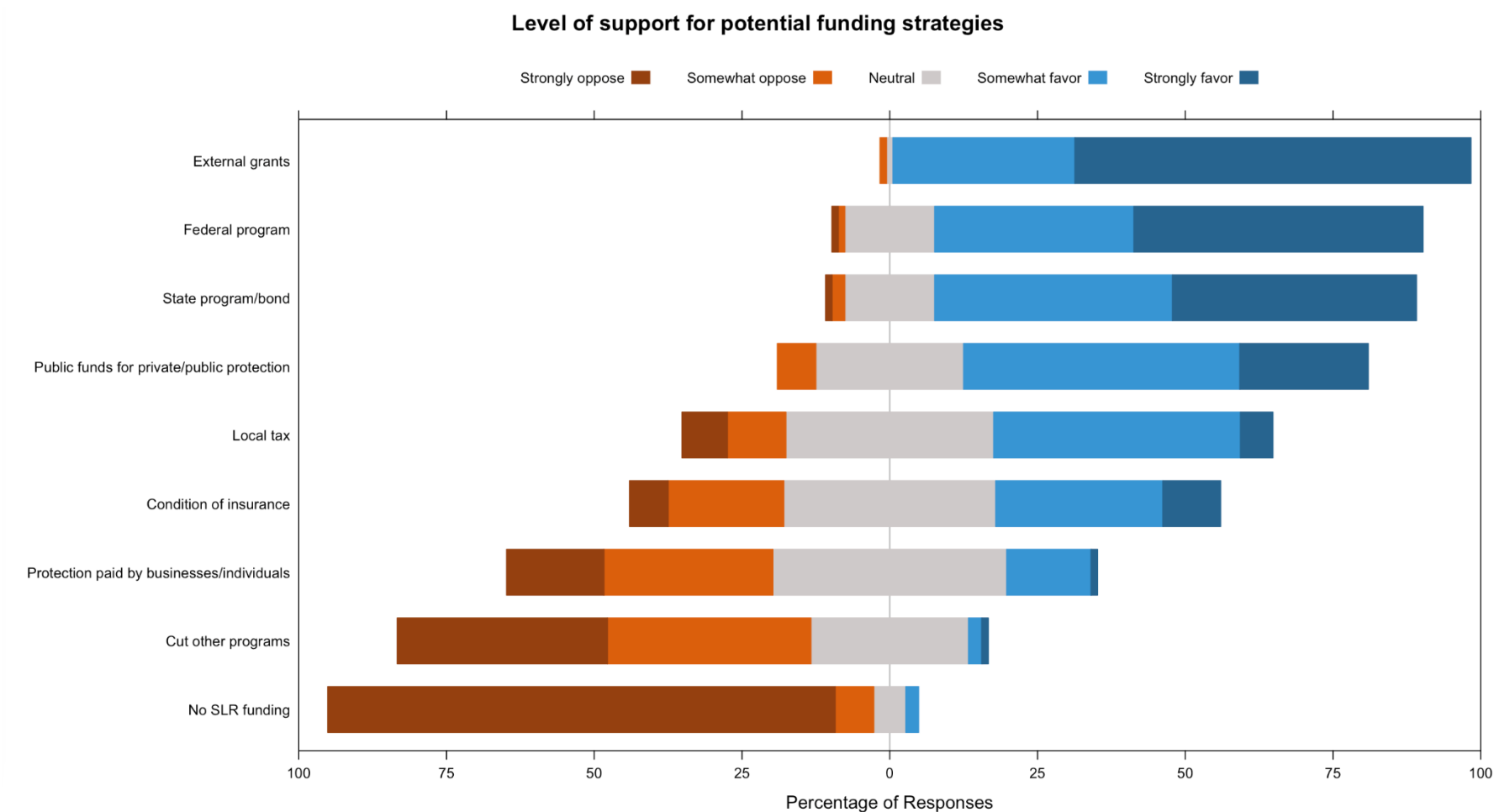


Figure 23: Coastal Professionals' level of support for various funding strategies (n=90-92).

Public Survey: Level of support for potential funding strategies

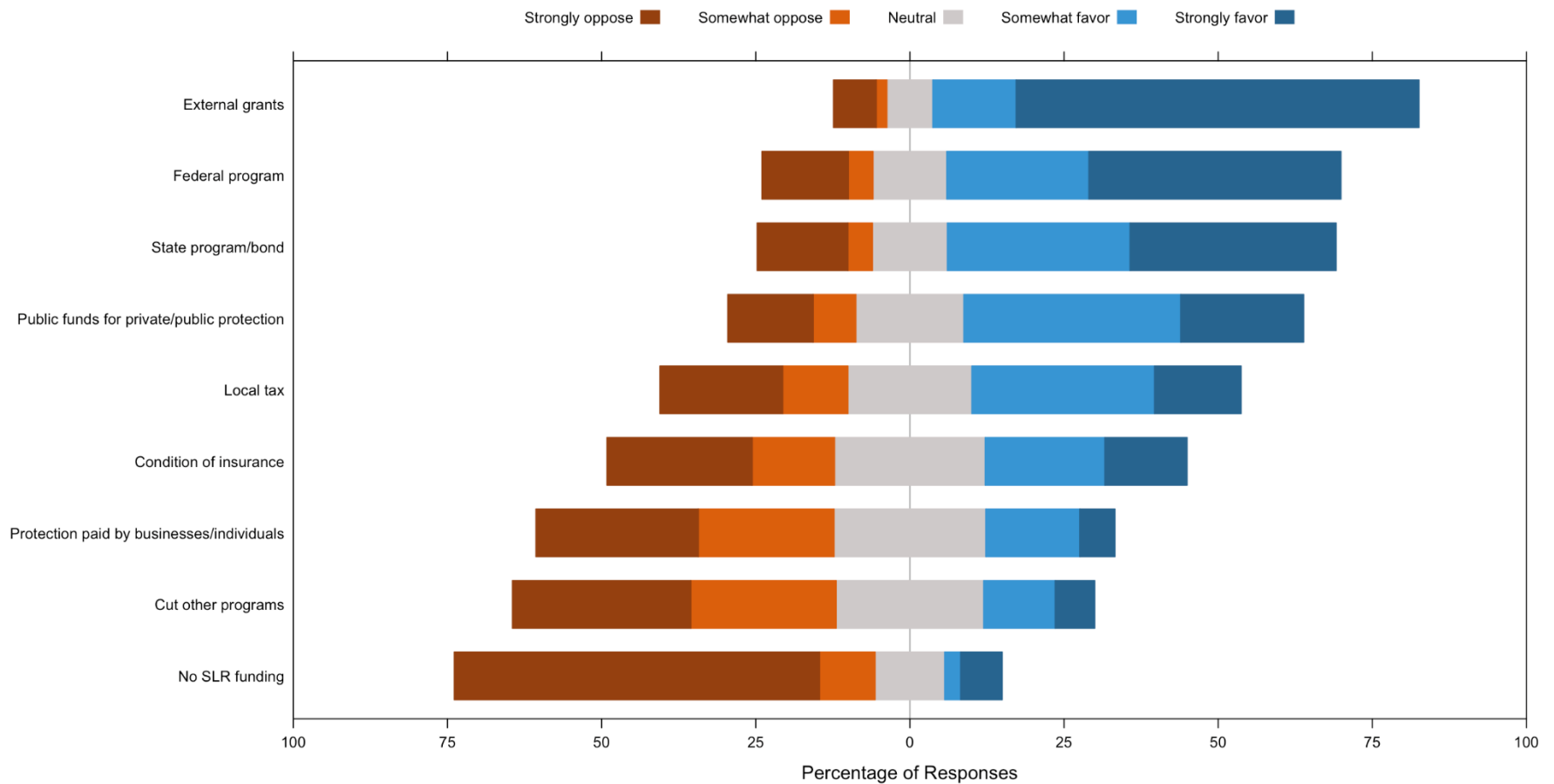


Figure 24: General public respondents' level of support for various funding strategies (n=533-547) (Public survey data from 2021 Humboldt County Planning and Building Department Public Survey).

References

- Humboldt County Planning and Building Department (2021). Research Survey on Regional Coordination of Sea Level Rise Adaptation Planning in the Humboldt Bay Region, Public Survey.
- Laird, A. (2015). *Humboldt Bay Sea Level Rise Adaptation Planning Project : Phase II Report*.
- Moser, S. C., Finzi Hart, J. A., Newton Mann, A., Sadrpour, N., & Grifman, P. (2018). *Growing Effort, Growing Challenge: Findings From the 2016 California Coastal Adaptation Needs Assessment Survey*. Retrieved from https://dornsife.usc.edu/assets/sites/291/docs/2016_Climate_Needs_Survey/2016_CA_Adaptation_Needs_Assessment_F.pdf
- Newing, H. (2011). Questionnaires. In *Conducting Research in Conservation: Social Science Methods and Practice* (p. Chapter 7).
- Patton, J. R., Williams, T. B., Anderson, J. K., & Leroy, T. H. (2017). *Tectonic land level changes and their contribution to sea-level rise, Humboldt Bay region, Northern California*. Retrieved from http://www.hbv.cascadiageo.org/HumBayVert/reports/USFWS/20170407/final_report_HBV_usfws_2017.pdf
- Thomas, M., Pidgeon, N., Whitmarsh, L., & Ballinger, R. (2015). Mental models of sea-level change: A mixed methods analysis on the Severn Estuary, UK. *Global Environmental Change*, 33, 71–82. <https://doi.org/10.1016/j.gloenvcha.2015.04.009>

Appendix A: Survey Instrument



Regional Coordination of Sea Level Rise Adaptation Planning on Humboldt Bay

Project Research Survey

PURPOSE OF THE PROJECT

Data is being collected by HSU Environmental Science & Management researchers and the County of Humboldt Planning and Building Department - Long Range Planning with the goal of exploring regional sea level rise planning in the Humboldt Bay region.

This survey data will inform Humboldt County's Humboldt Bay Sea Level Rise Planning Feasibility Study. The goal of this project is to develop options for sea level rise adaptation planning in the Humboldt Bay region that will foster a cooperative and coordinated regional approach to the identification, funding, and implementation of various sea level rise adaptation policies, strategies, and measures with resulting regulatory and financial benefits.

The data collected will also inform an HSU graduate student research project titled "Social science research to help advance regional coordination and collaboration of sea level rise adaptation and planning on Humboldt Bay." This study aims to understand people's knowledge, attitudes, perceptions, and expectations of sea level rise planning on Humboldt Bay.

Project Funders:

California Sea Grant College Program Grant and California Coastal Commission Local Coastal Program Grant

Informed Consent

What We Will Ask You To Do:

If you volunteer to participate, you will be asked to answer and submit this survey. Completing the survey will take approximately 20-30 minutes.

Risks and Benefits:

Risks to participating in the survey are minimal. There is some chance that research partners would be able to attribute answers to you based on your answers to demographic questions. You will not receive any direct benefits for your participation, but you will hopefully find it rewarding to share your knowledge. We hope that results from this survey could inform the development of more effective strategies for sea level rise planning in the region. There is no monetary or other incentive for your participation in this survey.

Confidentiality and Use of Information:

The HSU research team will be collecting the raw survey data. After receiving your answers, the HSU team will remove any names, contact information, and demographic data from dataset before sharing it with anyone else. Once that information has been stripped, data from the survey will be shared with the County of Humboldt Planning and Building Department - Long Range Planning for use in their Humboldt Bay Sea Level Rise Regional Planning Feasibility Study. Results from the survey could be used in future reports, publications, and presentations on the topic and incorporated into sea level rise planning efforts. Survey data that is stripped of additional identifying details, including the specific name of the organization where you work, may be made available to funders, the public, and other researchers.



Research records will be kept in a locked file cabinet or password protected server; only the HSU researchers will have access to the original records. The data will be maintained in a safe location and may be used for future research studies or distributed to another investigator for future research studies without additional informed consent from you.

Voluntary Participation:

Your participation in this survey is voluntary and you have the right to change your mind and withdraw at any time prior to submitting your answers to the survey questions. If you would like to withdraw your answers after their submission, please contact a member of the project team.

Contact Information:

If you have any questions about HSU's research project or this survey, please email or call Kristen Orth-Gordinier at kmo29@humboldt.edu or (808) 250-3644. Or you can contact Kristen's Faculty Advisor: Dr. Laurie Richmond at laurie.richmond@humboldt.edu or (707) 826-3202.

If you have questions about Humboldt County's Humboldt Bay Sea Level Rise Planning Feasibility Study, please contact Sarah Wickman at swickman@co.humboldt.ca.us

If you have any concerns with this survey or questions about your rights as a survey participant, contact the Institutional Review Board for the Protection of Human Subjects at irb@humboldt.edu or (707) 826-5165.

If you would like to know more about personal data collection from SurveyMonkey, see their Privacy Notice [here](#).

Please print this informed [consent form](#) and retain it for your future reference.

1. If you are at least 18 years of age and agree to voluntarily participate in this research as described, please check "I consent" below to begin the survey. Thank you for your participation in this research.
 - ☐ I consent
 - ☐ I do not consent

A Little About Yourself

2. Choose the category that best describes your primary agency/organization. (If you work for or represent multiple agencies/organizations, please choose a primary organization because we ask questions about your agency/organization later in this survey.)
 - ☐ City Government
 - ☐ County Government
 - ☐ State Government
 - ☐ Federal Government
 - ☐ Tribal Government
 - ☐ Infrastructure/Service Provider/Community Services District (e.g., roads, water, sewer, gas, electric)
 - ☐ Regional District or Association or Special District (e.g., Harbor District, etc.)



- ☐ Non-Government Organization
- ☐ Academia/Research
- ☐ Private Sector Consultant
- ☐ Trade/Business/Industry Group
- ☐ Agricultural Industry
- ☐ Other (please specify)

3. Please identify the specific agency/organization you work for or are associated with. (We understand the information you provide in this survey may not represent an official view of the agency/organization you work for and therefore will not be treated as such. However, answer this question will be especially helpful to build our understanding of local sea level rise planning efforts, as well as the needs of various stakeholders.)

• _____

4. Please indicate if you are an elected official.

- ☐ Yes
- ☐ No

5. When, if ever, do you think the Humboldt Bay region will start to be impacted by sea level rise?

- ☐ It is already being impacted
- ☐ Within the next 5 years
- ☐ Within the next 6-10 years
- ☐ Within the next 11-25 years
- ☐ Within the next 26-50 years
- ☐ Within the next 51-100 years or more
- ☐ Never
- ☐ I don't know

6. What is the frequency of your involvement in sea level rise (SLR) related work (e.g., SLR planning/policy, SLR research, SLR outreach/education, SLR adaptation implementation, etc.)?

- ☐ Never/Not involved in work
- ☐ Rarely involved (1 time or less per year)
- ☐ Occasionally involved (2-11 times per year)
- ☐ Moderately involved (monthly)
- ☐ A great deal/very involved (daily, weekly)

7. Please identify approximately how many years you have been involved with sea level rise work in a professional capacity.

- [scale in 1-year increments]:





Your Agency's/Organization's Sea Level Rise Coordination & Collaboration

8. Is your agency or organization using a specific timeline and/or projection for their SLR planning or advocacy?

- ☐ Yes
☐ No

If answer to Question 8 is "Yes"

9. Please fill in the blanks using the text boxes below: My agency/organization is planning for ____feet of SLR by the year ____.

- Feet of SLR: _____
- By what year: _____

10. Please state where this projection guidance comes from (i.e., Specific Local Studies, Ocean Protection Council, etc.):

- _____

If answer to Question 8 is "No"

11. If your agency/organization is NOT using a specific timeline and/or projection for SLR planning, please state why:

- _____

12. In the past 4 years, which of the following activities did your agency/organization collaborate and engage in with other agencies/organizations in reference to sea level rise (SLR) on Humboldt Bay? If you're not currently engaged, which collaborative activities do you think would be of interest for your agency/organization? ("SLR-related" activities could include projects, studies, or work where SLR is not the only focus, such as multi-benefit projects that consider SLR as well as infrastructure protection, habitat enhancement, flood control, public access, education, etc.)

Activity	Engaged	Not Engaged, Very Interested	Not Engaged, Somewhat Interested	Not Engaged, Not Interested	I don't know
Sharing information about your organization's SLR policies, projects, and/or research with other agencies/organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carrying out SLR studies that inform multiple agencies/organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinating with other agencies/organization to help streamline permitting processes related to SLR adaptation (e.g., programmatic permit, joint permit application)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Implementing SLR-related projects with other agencies/organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sharing personnel with other agencies/organizations for SLR-related work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaborating with other agencies/organizations to apply for and/or secure SLR-related project funding through grants or other sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contributing funding towards SLR-related projects that benefit multiple agencies/organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attending regular SLR planning or technical meetings hosted by another agency/organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hosting regular SLR planning or technical meetings and inviting other agency/organization to attend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinating with agencies/organizations regarding equity and environmental justice considerations into SLR planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Please type any additional comments below about types of coordination your agency/organization is involved with or interested in: _____

Your Opinions About Sea Level Rise Work:

The following five questions ask you to rate your level of agreement with statements about sea level rise (SLR) planning on Humboldt Bay.

14. Rate your level of agreement with the following statements about **coordination** of SLR planning on Humboldt Bay?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
SLR planning will only be successful if local governments, Tribes, management agencies, and the public work together and coordinate on SLR planning activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The current governmental/institutional structure is sufficient for addressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SLR impacts and concerns on Humboldt Bay.					
I trust the other agencies/organizations that I need to work with in order to accomplish SLR planning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is clear communication between agencies/organizations about their SLR planning efforts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing environmental laws and regulations present an insurmountable barrier/obstacle to SLR adaptation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Rate your level of agreement with the following statements about **your primary agency/organization** and SLR planning on Humboldt Bay?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
Leadership within my agency/organization is making SLR adaptation planning a priority.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My agency/organization has enough data/information now to begin implementing sea level rise adaptation plans and activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My agency/organization is kept waiting to plan for SLR until key decisions are made by other agencies/organizations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My agency/organization currently has more pressing issues that take priority over SLR planning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It has been hard for my agency/organization to leave the status quo in order to plan for a different future (with potentially higher sea levels).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Rate your level of agreement with the following statements about **funding** of SLR planning on Humboldt Bay?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My agency/organization has enough funding to engage in SLR planning as much as we would like.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My agency/organization has sufficient staff resources to dedicate to SLR planning activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Humboldt Bay region is getting sufficient support from the State of California to do SLR planning and adaptation work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Humboldt Bay region is getting sufficient support from the federal government to do SLR planning and adaptation work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Rate your level of agreement with the following statements about **public engagement** in SLR planning on Humboldt Bay?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Public engagement with residents and business owners has been effective in educating them about SLR impacts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There has been sufficient effort to include local communities, businesses, and residents that may be impacted by SLR in local SLR planning and decision making on Humboldt Bay to date.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Members of the public are clearly interested in policies and planning to address SLR in the Humboldt Bay region.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SLR planning processes on Humboldt Bay to date have sufficiently incorporated equity and social justice considerations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Rate your level of agreement with the following statements about general stakeholder engagement within SLR planning on Humboldt Bay?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Humboldt Bay stakeholders generally agree on risks posed by SLR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Humboldt Bay stakeholders generally agree on the actions that are needed to address SLR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stakeholders have conflicting values/preferences that do not allow for agreement in selecting adaptation strategies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Currently in regional conversations about SLR, all the right stakeholders are in the room.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Are there any groups, organizations, sectors, or types of people that you think have been missing or not sufficiently included in SLR-related planning and activities on Humboldt Bay? Please list.

- Type your answer(s) here: _____

20. If you have any additional comments on SLR planning opportunities or challenges, please type them here: _____

Regional Coordination Priorities & Future Actions

The following three questions ask about how you would prioritize various sea level rise (SLR) planning efforts, public outreach efforts, and regional projects and programs.

21. If you had to decide what regional SLR **planning efforts** should be implemented in the Humboldt Bay region, how would you prioritize each of the potential approaches listed below?

	Not a priority	Low priority	Medium priority	High priority	Essential priority	I don't know
Create an overarching regional SLR adaptation plan for Humboldt Bay.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a formal management or governing structure for working regionally across jurisdictions and organizations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Complete updated SLR vulnerability assessments for all areas around Humboldt Bay.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incorporate equity and environmental justice considerations into SLR planning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop regulatory solutions to allow for reuse of dredge spoils for SLR adaption projects such as living shorelines.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop regulatory solutions to allow for wetland fill for the purpose of SLR adaptation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Address planning conflicts resulting from the California Coastal Commission's retained coastal development permitting authority in Local Coastal Program areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a SLR hazard zone in which SLR impacts must be considered in all development projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: ____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. How would you prioritize the following SLR **public outreach efforts** in the Humboldt Bay region?

	Not a priority	Low priority	Medium priority	High priority	Essential priority	I don't know
Create a single regional information platform concerning the status of projects and research related to sea level rise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinate public outreach strategies to educate residents and business owners regarding SLR impacts and planning efforts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create a public engagement process to identify community goals and actions for addressing SLR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other: ____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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23. How would you prioritize the following sea SLR **projects and programs** in the Humboldt Bay region?

	Not a priority	Low priority	Medium priority	High priority	Essential priority	I don't know
Develop regional projects aimed at the development/enhancement of man-made physical barriers (sea walls, levees, etc.) to protect areas at risk from SLR flooding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop regional projects aimed at the development/enhancement of natural physical barriers (such as wetlands, sand dunes, living & natural shorelines) to protect areas at risk from SLR flooding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a regional program for habitat restoration/enhancement and mitigation projects in areas vulnerable to SLR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop projects aimed at remediating contaminated sites and pollutant sources that are vulnerable to SLR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaborate regionally to develop a plan for measured retreat and/or relocation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: ____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. The County's Feasibility Study will include an evaluation of the feasibility of multiple sea level rise (SLR) regional coordination options. Given what you know now, what is your initial support for various options for regional coordination of SLR planning?

	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor
No regional planning should occur, local jurisdictions should individually respond to SLR as they see fit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Engage in the sharing of information and coordinated planning with other organizations through working groups with no formal agreement or commitment (e.g., an initiative).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create a formal collaborative partnership between existing agencies and stakeholders to address sea level rise (e.g., Memorandum of Understanding, Memorandum of Agreement, Joint Powers Authority).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Empower or retool an existing regional agency (e.g., Harbor District, Humboldt County Association of Governments, Humboldt County, Humboldt County Flood Control District, etc.) to serve as a lead agency to coordinate and address regional sea level rise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Establish a new regional authority to address sea level rise and/or climate change (ex. Joint Powers Association, Special District).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Use the sliding scales below to provide more thoughts on what type of structure you think would be best for effective coordination of SLR planning for the Humboldt Bay region.

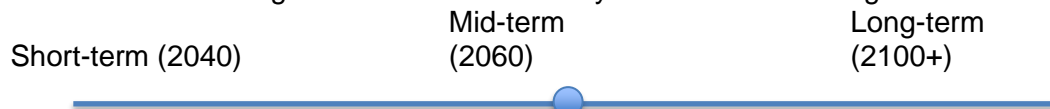
25. Where should the majority of the planning control and authority be?



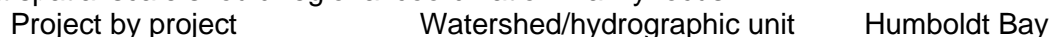
26. What level of involvement do you think your agency/organization should have in a regional SLR planning effort?



27. On what timescale should regional coordination mainly focus on addressing?



28. On what spatial scale should regional coordination mainly focus?



29. Please add any other thoughts on how to regionally coordinate SLR planning and adaptation: _____

30. How should SLR planning and adaptation (either a stand-alone project or within other projects) be funded? Indicate your level of support for the various potential funding mechanisms listed below:

	Strongly oppose	Somewhat oppose	Neutral	Somewhat favor	Strongly favor
Increase funding for SLR protection by cutting other local programs and services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utilize external grant funds when available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Encourage insurance companies to require upgrades on homes/businesses to reduce SLR risks as a condition of insurance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Require individuals/businesses to pay for their own SLR protection to minimize local government costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pass local tax measures to address SLR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pass state laws, programs, or bond measures with mechanisms to fund SLR work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pass federal laws or programs with mechanisms to fund SLR work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utilize public funds for SLR adaptation projects on private lands that will protect both public and private assets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Funding should not be spent on SLR planning and adaptation work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify): _____					

Your feelings about SLR and being involved in SLR-related work

31. Please rank your level of agreement with each statement about how you feel about performing SLR-related work

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I find SLR work engaging and fulfilling.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am personally quite worried about SLR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The technical complexity of SLR science is overwhelming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having to address SLR in what I do means a big additional workload.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The uncertainty associated with SLR makes me uncomfortable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't know what to do to prepare for SLR, so I feel less confident in my work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am worried about how our SLR planning decisions will impact future generations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am discouraged by our lack of forward movement of SLR adaptation actions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am inspired by how much work the Humboldt Bay region has accomplished.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Demographics

32. What is your age?

- ☐ 18-34 years
- ☐ 35-44 years
- ☐ 45-64 years
- ☐ Over 64 years
- ☐ Prefer not to answer

33. What gender do you identify with?

- ☐ Female



- ☐ Male
- ☐ Genderqueer
- ☐ Non-binary
- ☐ Prefer to self-identify: _____
- ☐ Prefer not to answer

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

- ☐ Less than 12th grade (no high school diploma)
- ☐ High school graduate, or equivalent
- ☐ Some college, no degree
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Post-graduate degree (Master/PhD)
- ☐ Prefer not to answer

35. What is your race or ethnicity? (*check all that apply*)

- ☐ African American or Black
- ☐ American Indian, Alaskan Native, or Native American
- ☐ Asian or Asian American
- ☐ Caucasian, European American, or White
- ☐ Hispanic, Latino, or Spanish
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or Other Pacific islander
- ☐ Not Listed (please specify): _____
- ☐ Prefer not to answer

Thank you for your participation in this research survey!

Please press "Done" to submit your answers.

36. If you would like, please provide your email address so we can remove you from our email follow-up list. Your email will not be associated with your survey responses:

- _____

Additional Project Information

For more information on Humboldt County's Humboldt Bay Sea Level Rise Regional Planning Feasibility Study please contact Sarah Wickman at swickman@co.humboldt.ca.us or 707-445-7541.

Click here [<http://humboldtslri.org/regional-coordination/>] for more information on the HSU research project "Social science research to help advance regional coordination and collaboration of sea level rise adaptation and planning on Humboldt Bay" or contact Kristen Orth-Gordinier at kmo29@humboldt.edu

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