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SUMMARY REPORT

Sea Level Rise Adaptation in Hawai'i Survey Results

LEAD AUTHORS

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IN PARTNERSHIP

The Pacific International Center for High
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Introduction

The Pacific International Center for High Technology Research (PICHTR) and the Hawai'i Philanthropy Forum developed a 2020 sea level rise adaptation survey to gather relevant information and to learn about the main concerns pertaining to sea level rise adaptation amid COVID-19. While dealing with the immediate challenges of COVID-19, we believe that we must also address the long-term impacts of climate change to support Hawai'i's economy and resiliency.

The looming effects of sea level rise will greatly impact all people and sectors across Hawai'i. The 2017 Hawai'i Sea Level Rise Vulnerability and Adaptation Report by the Hawai'i Climate Change Mitigation and Adaptation Commission recommended that we plan for 3.2 feet of sea level rise now and be ready to adjust that projection upward. At 3.2 feet of sea level rise the impacts would amount to well over \$19 billion in damages across the State due to 25,800 acres of land that would be deemed unusable and 6,500 structures located near the shoreline that would be compromised or lost. Moreover, 20,000 residents would be displaced and need new homes.

Keeping these impacts of sea level rise in mind, the main objective of this survey was to help us better understand and align our efforts to support actions that address the significant challenges that sea level rise is posing to our *aina*, our community and our way of living.

80%

of respondents are working on sea level rise adaptation initiatives

77%

of respondents believe sea level rise adaptation could support Hawai'i's economy

93%

of respondents believe sea level rise adaptation efforts are a medium to top priority

90%

of respondents believe there are sea level rise adaptation policy gaps in Hawai'i

Among the key findings from this survey:

- **80%** of respondents are working on sea level rise adaptation initiatives
- **77%** of respondents believe sea level rise adaptation could support Hawai'i's economy
- **93%** of respondents believe sea level rise adaptation efforts are a medium to top priority
- **90%** of respondents believe there are sea level rise adaptation policy gaps in Hawai'i
- A weak economy and lack of funding are top stressors impeding progress on sea level rise adaptation
- The top concern of sea level rise is coastal erosion and loss of land
- Political will, leadership, coordination amongst government agencies and the private sector, and swift action are key to tackling sea level rise adaptation
- To make progress on sea level rise adaptation there is a need for model policies and ordinances, financial assistance, access to best practices for coastal adaptation, and capacity building
- There is a need for more outreach and educational programs regarding sea level rise adaptation

Methodology

An online survey was conducted of cross-sector stakeholders in Hawai'i about sea level rise adaptation needs, challenges and opportunities in Hawai'i. Based on their professional background and expertise, 280 people were invited to participate in this survey using Survey Monkey, an online program to capture and analyze their responses. Multiple reminders were sent to participants. At the end, 72 people responded to the survey and provided 497 answers to open-ended questions and comments. Their answers and comments were categorized and grouped according to emerging themes.

The responses were categorized as follows:

Government Sector **25** respondents working in government

Education & Nonprofit Sectors **15** respondents working in education
6 respondents working in nonprofit organizations

The education and nonprofit sectors were grouped together as we perceived them as having a common interest in advancing the knowledge and understanding of the climate adaptation field while not having direct jurisdiction on the matter, different from government or private sector entities.

Multi-Sector **8** respondents working in more than one sector, including government, education and/or nonprofit sector

Private Sector **18** respondents in total:

- **5** respondents in utilities/energy
- **4** respondents in construction, machinery and homes
- **4** respondents in real estate
- **3** respondents in finance and financial services
- **1** respondent in insurance
- **1** respondent was unemployed

280

People were invited to participate in the survey

72

People responded to the survey

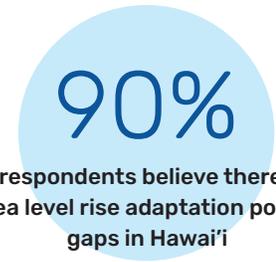
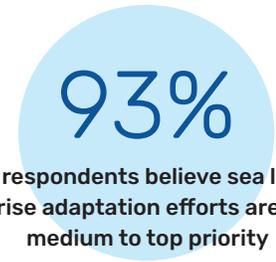
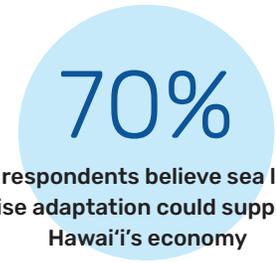
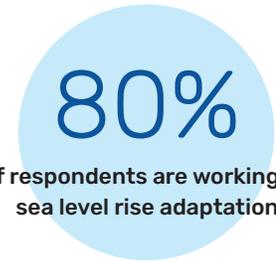
497

Answers were received in response to open-ended questions and comments

Aggregate Summary

In aggregate, the Hawai'i sea level rise survey yielded the following insights:

- **80%** of respondents are working on sea level rise adaptation initiatives
- **77%** of respondents believe sea level rise adaptation could support Hawai'i's economy
- **93%** of respondents believe sea level rise is a medium to top level priority
- **90%** of respondents believe there are sea level rise adaptation policy gaps in Hawai'i
- A weak economy and lack of funding are top stressors impeding progress on sea level rise adaptation
- The top concern pertaining to sea level rise is coastal erosion and loss of land



Sector Summary

In addition to many of the common findings across sectors, there were also key differences as noted below.

The degree of familiarity related to sea level rise impacts differed by sector:

1 Multi-Sector	88%
2 Government	86%
3 Education & Nonprofit	77%
4 Private Sector	63%

The percentage of respondents currently working on sea level rise adaptation initiatives differed by sector:

1 Government	92%
2 Multi-Sector	88%
3 Education & Nonprofit	81%
4 Private Sector	61%

The top resources that would help to make progress on sea level rise adaptation differed by sector:

- **Multi-Sector:** Access to best practices for coastal adaptation **62%**
- **Government:** Financial assistance **56%**
- **Education & Nonprofit:** Capacity building **52%**
- **Private Sector:** Model policies and ordinances **50%**

Policy Gaps

As noted in the aggregate summary on [page 4](#), 90% of respondents believe there are policy gaps related to sea level rise adaptation in Hawai'i. Specific policy gaps needed to account for sea level rise include:

- State mandate to incorporate sea level rise into all analysis, planning, programs, and projects
- A cohesive Statewide and/or County-specific adaptation plan
- Clear climate adaptation implementation responsibility and authority
- Updating the State Coastal Zone Management law
- Statewide policy on and reduction of coastal hardening (e.g. preventing sea walls)
- Updating shoreline setbacks (e.g. for Special Management Areas and repetitive loss areas)
- Managed retreat of coastal properties
- Real estate disclosures of vulnerable coastal properties
- Updating the U.S. Federal Emergency Management Agency (FEMA) Flood Maps and reducing the National Flood Insurance Program to prevent investment in hazardous areas
- Long-term climate adaptation funding
- An integrated approach for multiple jurisdictions and sectors to collaborate and align efforts

90%

of respondents believe there are sea level rise adaptation policy gaps in Hawai'i

A consistent theme amongst respondents was political will, leadership and coordination amongst government agencies and the private sector could facilitate more swift action toward tackling climate change adaptation

Adaptation and Hawai'i's Economy

A majority of respondents (77%) noted that sea level rise adaptation efforts could support Hawai'i's economy. Numerous respondents noted that the construction and engineering sectors would benefit from an investment in sea level rise adaptation. Respondents felt Hawai'i could serve as an incubator for new infrastructure and technology, and implement adaptation efforts to export best practices around the world.

The belief that sea level rise adaptation initiatives could support Hawai'i's economy differed between sectors. Over 80% of respondents from the government, education, and nonprofit sectors felt that sea level rise adaptation could support Hawai'i's economy. However, approximately 60% of respondents within the multi-sector and private sector groups felt that sea level rise adaptation could support Hawai'i's economy. Many of these respondents noted that Hawai'i's economy is complex and that while adaptation efforts would help, it would not be the main driver of Hawai'i's economy.

“The path forward will require communication and coordination across all sectors, new policies, long-term funding, and a commitment by public and private leadership.”

The Path Forward

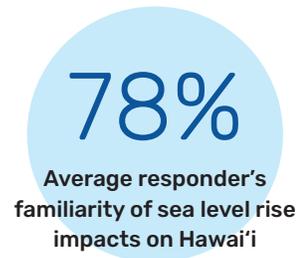
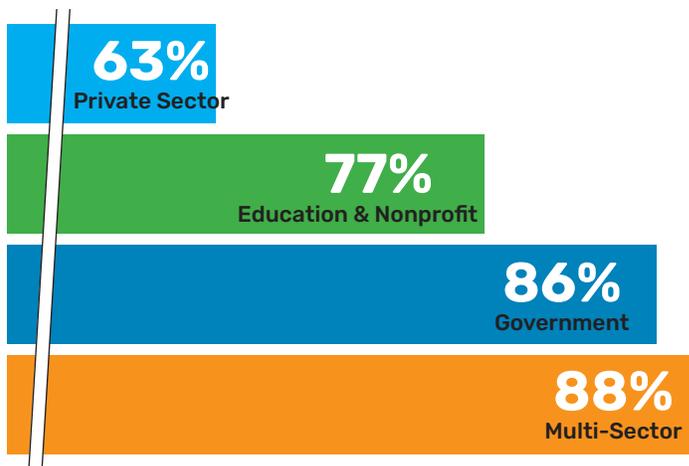
As many of the respondents noted, sea level rise and the environmental impacts of climate change are of great concern to Hawai'i. Unaddressed, the effect of sea level rise will affect our economy, especially the tourism sector, and lead to destruction of habitats, ecosystems, biodiversity and freshwater security. The path forward will require communication and coordination across all sectors, new policies, long-term funding, and a commitment by public and private leadership. Respondents noted the necessity of political will and leadership and highlighted a sense of urgency in dealing with the challenges of sea level rise across Hawai'i. Respondents also commented on the need for more outreach, best practices and educational programs regarding sea level rise adaptation.

Survey Data Results

Q3 How would you characterize your familiarity with sea level rise impacts on the state of Hawai'i?

72 ANSWERED
0 SKIPPED

FAMILIARITY OF SEA LEVEL RISE IMPACTS ON HAWAI'I BY SECTORS



Q4 Are you working on any sea level rise adaptation initiatives?

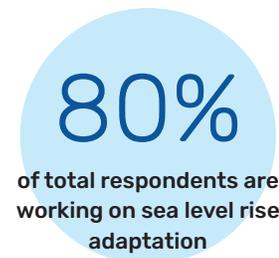
72 ANSWERED
0 SKIPPED

60

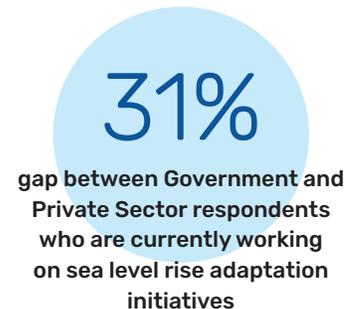
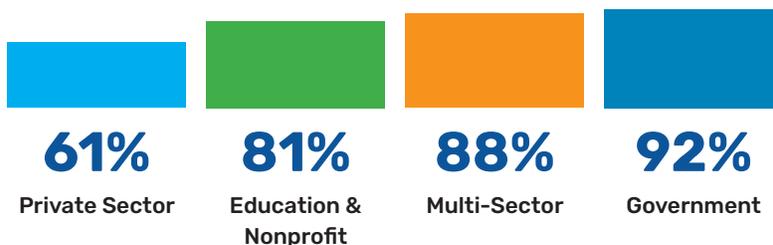
Respondents commented on their current work on sea level rise

Some highlights below:

- Authoring reports, doing research, modeling and mapping sea level rise impacts
- Developing coastal adaptation projects, legislation, governance frameworks

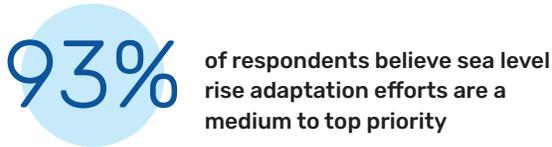


DIFFERENCES BETWEEN SECTORS WORKING ON SLR ADAPTATION INITIATIVES



Q5 How important are sea level rise adaptation efforts?

72 ANSWERED
0 SKIPPED

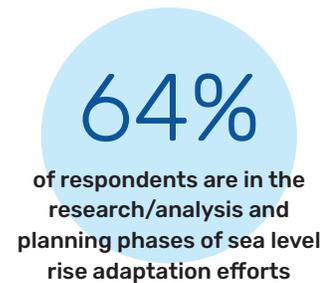
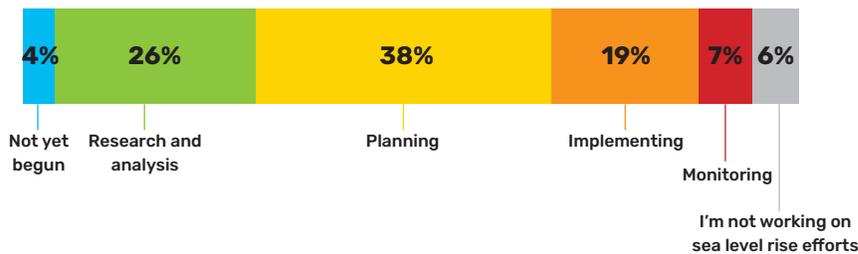


Q6 Which category best describes your organization's current phase in relation to sea level rise efforts?

72 ANSWERED
0 SKIPPED

PHASES THAT ORGANIZATIONS ARE CURRENTLY ACTIVE IN

AGGREGATE RESPONSES



TOP PHASE BY SECTOR

SECTOR	PHASE
Government	Planning
Education & Nonprofit	Research and Analysis
Multi-Sector	Implementing
Private Sector	Planning

Q7 What tools or resources, if any, are you currently utilizing in your work in relation to sea level rise?

60 ANSWERED
12 SKIPPED

60 respondents noted the following resources:

UH SOEST, Dr. Chip Fletcher, Climate Change Portal
<http://www.soest.hawaii.edu/coasts/>

Hawai'i Office of Planning's Report on Managed Retreat
<https://planning.hawaii.gov/czm/ormp/ormp-action-team-project-on-the-feasibility-of-managed-retreat-for-hawaii/>

Hawai'i Sea Level Rise Viewer
<https://seagrant.soest.hawaii.edu/hawaii-sea-level-rise-viewer/>

State of Hawai'i ArcGIS database
<http://planning.hawaii.gov/gis/download-gis-data/>

PacIOOS
<https://www.pacioos.hawaii.edu/>

Hawai'i Sea Level Rise Vulnerability and Adaptation Report
https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf

Climate Ready O'ahu Web Explorer
<http://cchnl.maps.arcgis.com/apps/View/index.html?appid=6694193a396f40fb87f78e98fbad7d73>

Wave Runup Modeling
[www.fema.gov > runup-version-20](http://www.fema.gov/runup-version-20)

NOAA Tide Predictions
https://tidesandcurrents.noaa.gov/tide_predictions.html?gid=1399

TERRA NASA Satellite Observations
<https://terra.nasa.gov/citizen-science/air-quality/part-ii-track-pollution-from-space>

Jupiter Intelligence
<https://jupiterintel.com/>

ASCE Codes and Standards
<https://www.asce.org/codes-and-standards/codes-and-standards/>

U.S. Geological Survey (USGS)
<https://www.usgs.gov/>

USGS Sea Level Change
https://www.usgs.gov/centers/whcm/science/sea-level-change?qt-science_center_objects=0#qt-science_center_objects

Pacific RISA
<https://www.pacificrisa.org/>

Department of Land and Natural Resources
<https://dlnr.hawaii.gov/>

Commission on Water and Resources Management
<https://dlnr.hawaii.gov/cwrm/>

Hawai'i Department of Transportation
https://hidot.hawaii.gov/highways/files/2019/09/State-of-Hawaii-Statewide-Coastal-Highway-Program-Report_Final_2019.pdf

Q8 What are the top 3 resources that would help make progress on sea level rise adaptation?

72 ANSWERED
0 SKIPPED



THE TOP RESOURCE THAT WOULD HELP TO MAKE PROGRESS ON SEA LEVEL RISE VARIED PER SECTOR

MULTI-SECTOR	Access to Best Practices for Coastal Adaptation 62%
GOVERNMENT	Financial Assistance 56%
EDUCATION & NONPROFIT	Capacity Building 52%
PRIVATE SECTOR	Model Policies and Ordinances 50%

Q9 What are the top 3 stressors in the next 3 years that may impede sea level rise adaptation?

72 ANSWERED
0 SKIPPED



There is agreement across sectors that a weak economy is the top stressor that may impede sea level rise adaptation. Insufficient funding and local government resource constraints may be side-effects of a weak economy

Q10 Are any policy gaps related to sea level rise adaptation in the State of Hawai'i? If Yes, please describe 1-3 top policy gaps that you believe are most important in addressing sea level rise in Hawai'i

69 ANSWERED
3 SKIPPED

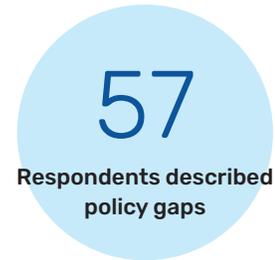
- **90%** of respondents believe there are sea level rise adaptation policy gaps in Hawai'i
- **57** respondents described policy gaps
- The importance of establishing county and state policies related to sea level rise adaptation were highlighted in many comments



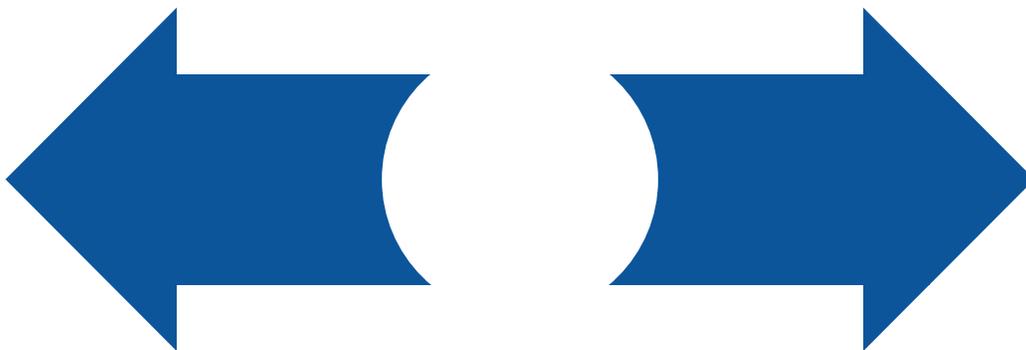
of respondents believe there are sea level rise adaptation policy gaps in Hawai'i

Respondents specific policy gaps needed to account for sea level rise include:

- State mandate to incorporate sea level rise into all planning, programs, and projects
- A cohesive Statewide and/or County-specific adaptation plan
- Clear climate adaptation implementation responsibility and authority
- Updating the State Coastal Zone Management law
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- Long-term climate adaptation funding
- An integrated approach for multiple jurisdictions and sectors to collaborate and align efforts



Respondents described policy gaps



Q11 What is needed to address the policy gaps you suggested in question 10?

53 ANSWERED
19 SKIPPED

Respondents consistently expressed the need for political will and leadership, and coordination across government agencies and the private sector in order to more swiftly address Hawai'i's sea level rise adaptation policy gaps noted in question 10.

Specific examples cited included:

- Executive government leadership that is committed to creating the legal framework that implements policies to address anticipated sea level rise impacts
- Executive government and legislative policy directives to measure and evaluate progress on sea level rise adaptation
- An executive order establishing clear authority and responsibility for climate adaptation and sea level rise, inclusive of allocation of resources and hiring new staff. Also, comprehensive and cross-training of staff is needed to foster a common interagency understanding
- Government and businesses working together to identify, address, fund and build innovative policies to address climate change impacts in Hawai'i
- Public advocacy at State Legislature and City Council
- Outreach and education, especially for those in positions of authority
- Long-term funding

Q12 What are the top 1-3 sea level rise adaptation initiatives that are most needed in the next 1-3 years?

58 ANSWERED
14 SKIPPED

Reflected across all sectors, the top sea level rise adaptation initiatives that are most needed in the next 1-3 years are:

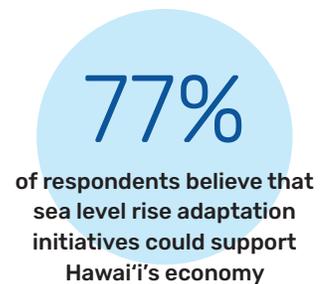
- Further planning including a Statewide resilience plan and analysis of risks to property with a strategy for coastal retreat
- Policy development and implementation in coastal adaptation, i.e. shoreline setback/retreat, beach protection and coastal transportation infrastructure upgrades
- State mandate for incorporating sea level rise into policies, projects and programs with benchmarks
- Securing long-term funding sources for sea level rise planning, implementation and infrastructure upgrades as well as funding to develop strategic public-private partnerships
- Notable in the Private Sector, shoreline “protective measures” were highlighted

Q13 Do you believe sea level rise adaptation initiatives could support Hawai'i's economy?

69 ANSWERED
3 SKIPPED

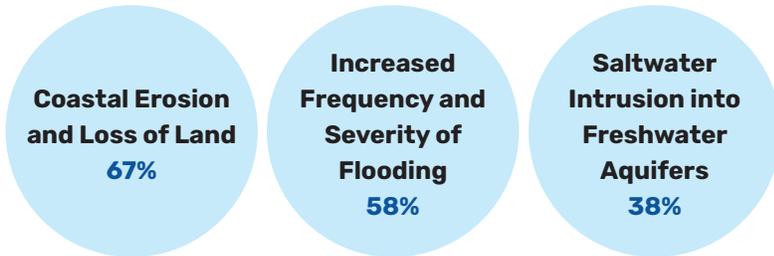
Overall, 77% of respondents believe that sea level rise adaptation initiatives could support Hawai'i's economy

- Job Creation in adaptation planning and implementation for sea level rise was most noted as a possible benefit to Hawai'i's economy
- Hawai'i could serve as an “incubator” for technology and infrastructure related to sea level rise adaptation efforts
- The construction industry could be boosted from sea level rise adaptation measures and redevelopment outside of hazard areas
- Beach protection as an adaptation initiative was noted as essential to preserving Hawai'i's tourism economy
- While over 80% of respondents from the government, education, and nonprofit sectors felt that sea level rise adaptation efforts could support Hawai'i's economy, only approximately 60% of respondents within the multi-sector and private sector groups felt that sea level rise adaptation initiatives could support Hawai'i's economy



Q14 What are the top 3 environmental impacts that you are most concerned about from Climate Change?

72 ANSWERED
0 SKIPPED



All sectors noted “Saltwater intrusion into freshwater aquifers” as third place with the exception of the private sector which noted “Private property damage or loss”

Q15 Do you have any other feedback for us related to opportunities to support Hawai‘i’s adaptation to sea level rise?

25 ANSWERED
47 SKIPPED



A sense of urgency was noted in many of the comments with the need for outreach and education to the community, policymakers, and industry to learn more about sea level rise in order to expand stakeholder involvement

ACKNOWLEDGEMENTS

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