

PERCEPTION OF VULNERABILITY RELATING TO SEA LEVEL RISE
AND CLIMATE CHANGE IN ISLAND COMMUNITIES: INSIGHTS FROM
HAWAI'I

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DEDICATION

Dedicated to the residents of O'ahu and Maui.

A heart warmed mahalo for their honest responses and time to participate in this study.

May we all continue to thrive in this special place and learn to love and adapt to future changes.

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ABSTRACT

Almost 700 residents from four coastal communities on the islands of Maui and O'ahu, Hawai'i completed surveys that examined their perceptions, knowledge, and attitude towards climate change and sea level rise. Overall, perceptions did not vary with geographic location or socioeconomic status, but reflected residents' perceptions of personal vulnerability to sea level rise. Residents who felt they were vulnerable to sea level rise had different perceptions from those who did not feel vulnerable. Those who felt that the threat to their home was in the near future (0-30 years) had different perceptions than those who felt the threat was longer term (40+ years). Perceived vulnerability was not significantly correlated with measures of individuals' physical exposure to sea level rise and is anticipated to be a complex variable, worthy of further study. Personal perception of vulnerability only touches the surface of understanding motivations, beliefs, and other factors that may influence change in adaptive behaviors and facilitate actions to implement protective measures. Community leaders addressing or implementing adaptation or mitigation policies should provide information and resources that raise people's level of personal perceived vulnerability to sea level rise to a realistic and accurate level and strengthening community resilience.

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INTRODUCTION

Global and local climate variability, including increasing temperatures of our air and water, is impacting upon our natural ecosystems and built infrastructure (Mimura et al., 2006; Keener et al., 2012; Mimura et al., 2007). The impacts of a changing climate include regional modifications to precipitation, flooding, animal migration, coral reef health, fresh water resources, patterns of emergent natural disasters, and food security (Keener et al., 2012). In addition to coping with these broad impacts, globally many coastal communities are seeking to understand the specific effects of sea level rise (SLR) on their local ecosystems and critical infrastructure. Small islands, including those of the State of Hawai'i, are at serious risk from accelerating SLR and associated acute natural hazards, including flooding and erosion that are amplified by climate change (CC) (Global Climate Change Impacts in the United States, 2009). Many of these risks result from the simple fact that many islands have a limited area of land suitable to re-locate critical infrastructure and built environment within the near coastal area.

Understanding how island residents perceive and understand these emergent and changing hazards is an important step towards reducing threats of SLR via education and outreach, adoption of appropriate mitigation or adaptation policies, and understanding how communities define and respond to risk. Using survey data from four communities in the State of Hawai'i, this study examined how individuals' and communities' perceptions and attitudes relating to CC, with a focus on SLR, vary and factors that may affect those differences. Understanding how perceptions differ will help focus adaptation, mitigation, and campaigns to modify residents' perceptions and motivate behavioral change.

There is a significant amount of research on perceptions, beliefs, and behaviors during sudden onset (acute) natural hazards, (e.g., tsunamis, earthquakes, flooding, tornadoes) which have definable onsets and ending with varying amount of warning time prior to the event. There is less research, however, on perceptions, beliefs, and behaviors related to chronic, or slow onset hazards such as SLR, which are harder to compartmentalize into discreet individual events. Due to large differences in characteristics of acute versus

chronic natural hazards, one expects that there will be differences in perceptions of vulnerability to them and how these perceptions affect individual's behaviors. This study is a first step toward measuring perceptions of SLR in Hawai'i, one of the chronic hazards that communities already face as the global climate is changing.

BACKGROUND

The shift in global oceanic and atmospheric temperatures will change the frequency and intensity of both acute and chronic hazard events and introduce new hazards to communities that may not have been affected previously (Mimura et al., 2007; Barnett 2003; Keener et al., 2012). Chronic hazards are often harder to evaluate as the effects are gradual and often lack a defined start or end. Such hazards include those related to SLR, coral bleaching and degradation, drought, salt water intrusion, and introduction of invasive species. Changes in relative sea level are attributed to a combination of both short- and long-term climate phenomena and localized vertical land movement. Local and regional SLR rates can differ greatly from global averages due to these factors. Climatic phenomena modulate SLR via the expansion of ocean water as it warms due to global temperature increases and from addition of water to the oceans from the melting of glaciers (Marra et al., 2012). Regional or localized vertical land movement is related to tectonic and volcanic activity and elastic rebound, one cause of this is due to the large loading that is removed when a glacier melts.

Understanding the impacts and science of CC and SLR is not a problem unique to physical scientists and land-use planners. It is now generally expected that CC, and SLR especially, will impact most sectors of society on a daily basis in the near future, including tourism, transportation, commerce, water supply and sanitation, and agriculture (Mimura et al., 2007; Barnett 2003; Keener et al., 2012). Economic and health-related impacts are just as important as the physical impacts of SLR. For example, tourism brought in \$12.6 billion in revenue for the State of Hawai'i in 2011 and \$46.6 million per day in 2013 (Hawai'i Tourism Authority, 2011, 2013). It is estimated that the loss of Waikiki beach to erosion could cost the state \$2 billion in annual spending from tourists (Waikiki Improvement Association, 2008).

These economic threats remind us that SLR is a community problem and physical scientists need to work with social scientists, planners, decision makers, government agencies, utility entities, and communities directly, in an effort to minimize economic and safety risks. Understanding the factors shaping popular perceptions and using social

science in collaboration with physical science will be essential as communities promote and shape adaptive behavior.

Social science methodologies have been used globally to understand public perceptions of risk and vulnerability during natural disasters, and have mainly focused on sudden-onset and short-lived, acute hazards such as flooding, hurricanes and typhoons or earthquakes. These studies have given greater understanding to the physical scientist and disaster management community of the ways that individuals and families understand threats, prepare for them, and take action when a warning or an evacuation or sheltering notice is issued. Understanding the public's reactions and attitudes toward hazard events have prompted powerful outreach and marketing campaigns that have saved many lives. An example of this is the widely known slogan in the United States, "turn around, don't drown," used by the National Oceanic and Atmospheric Administration National Weather Service in campaigning to reduce flood-related deaths. Anecdotal evidence has shown that since the start of the campaign, the number of deaths during flood events is stabilizing despite an increase in number of flood events (Carr 2012; Easton 2011).

While the science and disaster management communities have been working together to understand attitudes, beliefs, and behaviors related to these sudden-onset natural disasters, there is less understanding about perceptions and behaviors relating to slow-onset problems such as SLR. Documentation and understanding of individual's reactions and behaviors in the large volume of literature related to rapid-onset natural disasters are unlikely to apply to slow onset events such as SLR. The physical characteristics, duration, warning information, and understanding of an event like a tropical storm or hurricane and those of SLR are fundamentally different; consequently, it is reasonable to assume that many specific lessons learned from the former may not apply to the latter.

Understanding and identifying the risk and quantifying the potential rise of the ocean in Hawai'i and throughout the Pacific are complex tasks. This complexity is due to the local, regional, and global variations that can arise due to tidal and storm patterns, seasonal and annual/decadal fluctuations, local land motion; differences in SLR recording techniques; and differences in predictive numerical models (Marra et al., 2012; Barnett 2001). Unfortunately for residents of coastal areas, including Hawai'i, all data and

predictive models to date indicate that the sea level has and will continue to rise (Marra et al., 2012). For example, regional and localized sea level can rise significantly in the Pacific during El Nino Southern Oscillation (ENSO) events, up to 10 to 20 centimeters as noted by Marra et al. (2012).

Globally, IPCC (2013) estimates that SLR measured between 1901 and 2010 averaged 1.7 mm/year, although that rate jumped to 3.2 mm/year between 1993 and 2010. This trend confirms that on a global level, the rate of SLR appears to be accelerating. Using average monthly sea level data from tide stations, Honolulu (O'ahu) has an average rate of SLR of 1.5mm/year (averaged from 1905 to 2006) over 100 years. Kahalui (Maui) has seen an increase of 2.3 mm/year (averaged from 1947 to 2006) (National Ocean Service, 2013). Local variability is caused by variations in vertical ground movement. For example, Honolulu harbor data indicate that the land is moving upward at a rate of 0.46 mm/year (Woopelmann et al, 2007).

Even changes this small can be detrimental to the water system and coastal infrastructure as evidenced in the western Pacific where an estimated \$1.5 million in damages to agriculture and infrastructure were incurred in December of 2008 due to a season of extremely high tide and sea level rise (Wannier, 2011). In the winter of 2013/2014 strong swells and erosion damaged beach front houses in the Sunset Beach area of O'ahu (Cocke, 2014). Such major economic damage due to inundation events in the Pacific will only get worse and more frequent with the predicted continued rise in sea levels (Fletcher and Richmond, 2009). The observations suggest it is only a matter of time before these seemingly one-off events turn into regular events for all Pacific islands, including O'ahu and Maui.

Global models predict that by 2100, sea level will rise by between 0.5 meters and 2 meters, depending on the specific data and model used (Mara et al., 2012). While many researchers believe that these numbers are underestimates as the potential SLR due to glacier melting is not well accounted for, even a half a meter rise would be damaging in Hawai'i. Future predictive models, combined with evidence that the sea level was ≥ 5 meters higher during the last interglacial period (IPCC Working Group I, 2013), indicate that communities will be dealing with rising ocean levels and the negative impacts of a

changing coast. New mapping released by the National Ocean and Atmospheric Administration show a large amount of the coast line in Hawai'i would be inundated or affected by a rise of just 30 cm.

In addition to damage to buildings and infrastructure in the coastal zone, coastal flooding and SLR will have additional negative impacts that will be felt by the entire island population. Impacts to our physical systems include disruptions of sewer and drainage systems (Global Climate Change Impacts in the United States, 2009), water supplies (Rotzoll and Fletcher 2012), and enlargement of tsunami and hurricane inundation zones (Eversole et al., 2013).

The literature shows that there has been and currently are many different physical science studies quantifying and understanding rates of climate change and SLR and how they may physically impact and affect Hawai'i. In contrast, little is known about individual's perceptions of CC and SLR in Hawai'i and how these perceptions may influence behavior and adaptation measures or policies.

METHODS

Sample

A total of 675 residents (owners and renters) in four communities in Hawai'i completed survey questionnaires on perceptions of the coastal environment and community issues. This constitutes an overall response rate of 11.25% and includes 246 from North Shore and 153 from Ewa Beach within O'ahu and 134 from Kahului and 142 from Kihei on Maui. Questionnaires were distributed via the U.S. Postal Service. The questionnaires and survey methods followed approaches used in similar hazard research designed to understand public perceptions and knowledge of other natural hazard events including tsunamis and volcanic eruptions (Gregg et al., 2004a; Gregg and Houghton, 2006; Gregg et al., 2006; Gregg et al., 2007; Gregg et al., 2004b; Johnston et al., 2005; Johnston et al., 2001; Paton et al., 2003). Households were chosen at random using public property tax databases and received an introductory letter explaining the study, the survey instrument, and a self-addressed and pre-paid business reply envelope to return their instrument. Households that did not initially return the survey received a second blank questionnaire. Only completed questionnaires were included in the analyses. IBM's SSPS Statistics was used to compile and analyze the data. This study received an exempt status from the University of Hawai'i Committee on Human Studies (CHS).

Two of the four communities surveyed, Ewa Beach and the North Shore, are located in the City and County of Honolulu on the island of O'ahu and both communities are within heavily populated and suburbanized regions, with Ewa Beach being the more urbanized. Kihei, located in Maui County on the island of Maui, represents a more rural, island setting with greater dependence on tourism. Kahului, also in Maui County, is the economic hub of Maui and the center for businesses and county government.

Table 1 summarizes the demographic characteristics of the respondents. A small majority of respondents were male (56.2%) and over half of all respondents (60.3%) have a college degree. There is a slight majority of older respondents (between 50 and 70 years old) and most respondents have a yearly household income between \$50,000 and \$149,000 per year. While respondents were primarily white, demographic characteristics

of the four community samples did not vary significantly and were representative of census data for Hawai'i and the two islands.

Table 1: Summary of demographic characteristics of survey respondents from all four communities

Gender (n = 679)		%
	Male	56.2
	Female	43.8
Education Level Completed (n = 491)		%
	Less than 9th grade	1.0
	9th to 12th grade (no diploma)	1.8
	High school graduate or equivalent	13.4
	Some college, no degree	23.4
	Associates degree	11.4
	Bachelor's degree	28.7
	Graduate or professional degree	20.2
Yearly Household Income (n = 628)		%
	Less than \$10,000	2.4
	\$10,000 to \$14,999	2.2
	\$15,000 to \$24,000	4.0
	\$25,000 to \$34,000	7.3
	\$35,000 to \$49,000	12.3
	\$50,000 to \$74,999	23.9
	\$75,000 to \$99,000	17.7
	\$100,000 to \$149,000	19.4
	\$150,000 to \$199,000	5.4
	\$200,000 or more	5.4

Age (n = 659)		%
	Less than 20 years	.2
	21 - 30 years	2.6
	31 - 40 years	9.1
	41 - 50 years	18.7
	51 - 60 years	28.1
	61 - 70 years	22.5
	71 - 80 years	13.4
	81 - 90 years	4.7
	91+ years	.9

Race (n = 839)		% of Cases
	White	56.7
	Hawaiian	13.9
	Tongan	0.3
	Samoan	0.5
	Guam	0.5
	Other Islander	1.5
	Chinese	10.2
	Japanese	18.6
	Spanish	4.8
	American Indian	2.8
	Black	1.5
	Asian Indian	0.3
	Vietnamese	0.3
	Filipino	16.5
	Korean	0.9

Survey Instrument and Data

The survey instrument contains 19 groups of questions that assess residents' perceptions of, and attitudes toward, environmental hazards, non-environmental threats, trust in government and law enforcement, community satisfaction, SLR and CC issues, and mitigation options for reducing threats to the coastal environment. Additionally, several demographic questions were asked: age, gender, race, education, and household income. Respondents were asked to indicate on a 5-point Likert scale the degree to which they agree with item statements, with lower scores representing less agreement. The survey instrument is available in Appendix A.

Data used in this study consisted of ratings on questions related to SLR, CC, and community livelihood. Twelve composite variables were developed by grouping survey items that share a common theme or issue. These were created by computing the average rating for the questionnaire items comprising the composite variable. Table 2 describes the 12 composite variables and provides descriptive statistics including Cronbach's Alphas (internal consistency estimates) for each composite. Internal consistency estimates for the 12 composite variables fall within an acceptable range from 0.78 to 0.96.

Data for this study were derived from additional questions and analysis that included: (1) a question asking respondents if they live in an area that might be vulnerable to SLR in the future to which respondents answered "Yes," "No," or "Don't Know"; (2) questions asking respondents to indicate the time frame they felt SLR would become a problem for their home; and (3) a measure of physical vulnerability to SLR developed by calculating the physical distance in meters from respondent's residence to the shore using ArcGIS.

RESULTS

Residents' attitudes toward environmental and non-environmental issues, preparedness, and adaptation

Attitudes about the importance of environmental and non-environmental issues and respondents' general satisfaction and trust in their communities is illustrated from composites 1 – 3 in Table 2. The data indicate that non-environmental issues such as career and quality of life are slightly more important to residents than environmental issues and there is only a moderate degree of trust and satisfaction with their community as a whole. Composite 4 indicates residents' overall concern for the environment, CC, and SLR; composites 5 and 6 assess their willingness to prepare for SLR; and composites 7 and 8 examine residents' willingness to change individual behaviors related to reducing greenhouses gas emissions and intentions to increase preparedness. The data suggest that while residents are moderately concerned about SLR and CC, they currently perceive lesser need for preparedness activities and are only slightly willing to change their behavior in reducing greenhouse gas emission or increase their preparedness for and knowledge of SLR.

Composites 9 – 12 assess residents' perceptions of four different adaptation options for their community. The data indicate that building sea walls (composite 9) and relocating coastal development inland (composite 11) were the two least favored adaptation options of the four presented in the survey and that replenishing beaches with sand (composite 10) and raising infrastructure off the ground (composite 12) were favored.

Table 2: Description of composite variables and descriptive statistics

Composite Variable Descriptions	Total		Chronbach's alpha
	mean	sd	
1. Importance of non-environmental issues such as careers, health, quality of life, education, crime, and traffic	4.13	0.58	0.772
2. Importance of environmental and hazard issues (CC and SLR)	4.06	0.81	0.843
3. Trust in local government, leaders, media, and law enforcement and overall community satisfaction	3.37	0.61	0.877
4. Concern for the environment, CC, and SLR	3.61	0.89	0.801
5. SLR impacts and the need to prepare	3.27	1.03	0.803
6. Personal benefit to preparing for SLR	3.10	1.11	0.794
7. Willingness to reduce individuals own greenhouse gas emissions	3.24	1.05	0.830
8. Intentions to increase knowledge and preparedness information for SLR and CC	3.04	1.26	0.961
9. Willingness to build sea walls or harden shorelines	2.80	1.05	0.895
10. Willingness to replenish beaches with sand	3.36	1.12	0.927
11. Willingness to relocate coastal development and infrastructure	2.91	1.04	0.893
12. Willingness to raise infrastructure above ground	3.06	1.13	0.932

Residents' perception of vulnerability to SLR

When asked to indicate whether respondents lived in an area that might be vulnerable to SLR in the future, 60% ($n = 389$) responded “Yes” (referred to as the “vulnerable group”), 25% ($n = 180$) responded “No” (“not-vulnerable group”), and 15% ($n = 103$) indicated “Don’t know” (“unsure group”). As highlighted in the following section, our statistical analyses showed that residents’ perceptions and attitudes toward environmental and non-environmental issues, preparedness, and adaptation options, as measured by the 12 composite variables, varied as a function of this variable, i.e., whether or not respondents perceived their home to be vulnerable.

The survey also queried residents about the time frame that they felt SLR would be a problem for their house. Despite living in a coastal community, 33% ($n = 212$) indicated SLR would not be a problem at their house. Among the 66% of the respondents who felt SLR would become a problem for their house, 12% ($n = 56$) indicated it would be a problem within 10 years, 13% ($n = 59$) indicated 11-20 year, 16% ($n = 71$) indicated 21-30 years, and 60% ($n = 257$) felt SLR would be a problem for their house 31 years or more from now. We also found that the importance of the issues measured by the 12 composite variables varied as a function of the length of time respondents felt would elapse before their home would be threatened by SLR and results of these statistical analyses are presented below.

Differences in perceptions and attitudes as a function of perceived vulnerability

It was hypothesized that perceptions and attitudes would differ as a function of the geographic location of the four communities and residents’ demographic characteristics (age, gender, education, household income). To test this hypothesis, we conducted a series of one-way analyses of variance (ANOVA) to examine group differences in perceptions as measured by the 12 composite variables. Results of these ANOVAs on group means for the 12 composite variables showed no statistically significant differences in perceptions and attitudes between resident groups when they are defined based on community location, age, gender, education, and household income. In contrast, we found statistically significant differences in perceptions and attitudes when respondents were grouped based on their perceptions of personal vulnerability (i.e.,

whether they responded “Yes,” “No,” “Don’t Know” to the survey question asking whether the respondent lives in an area vulnerable to SLR in the future). Specifically, we conducted a one-way multivariate analysis of variance (MANOVA) to test the statistical significance of differences between the “vulnerable,” “not-vulnerable,” and “unsure” groups of respondents for the 12 composite means shown in Table 3. Results of the one-way MANOVA showed that the three groups differed significantly on the 12 composite variables taken together, Wilks’ $\lambda = .749$, $F(7, 26) = 6.90$, $p < .001$, power to detect the effect was 1.

We subsequently conducted one-way ANOVAs on each of the 12 composite variables separately to examine whether perceptions and attitudes of the three groups were significantly different as measured by group means for each composite. These ANOVAs were followed by pairwise comparisons of group means using Scheffe’s tests to identify which two group means were significantly different. Table 3 summarizes the results of individual ANOVAs and post-hoc Scheffe’s test for the 12 composites. As shown in this table, the three groups differed significantly in perceptions and attitudes on all but one composite variable (composite 11). Specifically, we found a consistent pattern of significant differences between the “vulnerable” and the “not-vulnerable” groups showing that the “vulnerable” group is more concerned about environmental hazard and CC issues, perceives more personal benefit in preparing for SLR, and is more willing to take action to mitigate and adapt to SLR and CC threats. Interestingly, results of the statistical analyses also showed that, in comparison to the “not-vulnerable” group, the “not-sure” group is more concerned about community issues and more willing to take action to mitigate and adapt to SLR and CC threats, but has less overall concern for the environment, CC, and SLR. As indicated above, the three groups differed significantly in their attitudes related to all but one composite variable, in which respondents in all three groups were uniformly less agreeable to relocate coastal development and infrastructure.

Table 3: ANOVA summary of SLR vulnerability groups for the 12 composite variables

	Yes		No		Don't Know		F-Test		
	Mean	sd,n	Mean	sd,n	Mean	sd,n	F	df,n	Scheffe
1. Importance of non-environmental issues such as careers, health, quality of life, education, crime, and traffic	4.14	0.56,389	4.05	0.62,179	4.22	0.54,103	3.05*	2,671	c*
2. Importance of environmental and hazard issues (CC and SLR)	4.15	0.76,389	3.90	0.82,179	4.09	0.81,103	6.26**	2,671	a*
3. Trust in local government, leaders, media, and law enforcement and overall community satisfaction	3.34	0.61,389	3.36	0.61,180	3.50	0.59,103	3.13*	2,672	b*
4. Concern for the environment, CC, and SLR	3.76	0.85,389	3.45	0.96,180	3.39	0.76,103	11.88***	2,672	a*** b**
5. SLR impacts and the need to prepare	3.41	0.97,384	3.00	1.09,173	3.13	1.02,96	10.83***	2,653	a***
6. Personal benefit to preparing for SLR	3.28	1.08,384	2.69	1.15,168	3.12	0.98,95	17.57***	2,647	a*** c*
7. Willingness to reduce individuals own greenhouse gas emissions	3.39	1.03,367	2.98	1.1,174	3.22	0.94,95	9.25***	2,636	a***
8. Intentions to increase knowledge and preparedness information for SLR and CC	3.20	1.25,384	2.72	1.17,178	3.02	1.36,102	9.29***	2,664	a***
9. Willingness to build sea walls or harden shorelines	2.80	1.06,388	2.63	0.98,173	3.09	1.08,99	5.85**	2,660	b* c*
10. Willingness to replenish beaches with sand	3.37	1.11,388	3.21	1.19,173	3.58	1.01,97	3.28*	2,658	c*
11. Willingness to relocate coastal development and infrastructure	2.89	1.01,388	2.86	1.05,171	3.05	1.08,97	1.2	2,656	
12. Willingness to raise infrastructure above ground	3.24	1.09,387	2.77	1.13,175	2.88	1.15,99	12.27***	2,661	a*** b*
* $p < .05$, ** $p < .001$ and *** $p < .001$ significant levels Between group significance: a = “yes” and “no”; b = “yes” and “don't know”; c = “don't know” and “no”									

Differences in perceptions and attitudes toward SLR and CC as a function of vulnerability timeframe

Statistically significant differences were found on two composite variables when we grouped respondents based on their perception of when SLR might be a problem for them at their house. Results of ANOVAs indicated that residents who believed SLR would be a problem for their house in the coming years (within 30 years) had significantly greater concern for the environment, SLR, and CC issues (composite 4, $F = 6.643$, $df = 438$, $p < .001$) and stronger intention to increase knowledge and preparedness for SLR and CC (composite 8, $F = 6.04$, $df = 436$, $p < .001$) in comparison to those who believed SLR would be a problem in the distant future (i.e., beyond 30 years).

Actual versus perceived vulnerability to SLR threats

As noted earlier, using ArcGIS, we calculated the minimum distance in meters from each respondent's address to the nearest coastline. This calculation provided a simplified but objective physical measure of vulnerability for each respondent. Our rationale for creating this physical indicator of vulnerability is that residents who live closer to the coast are more likely to be affected by the flooding and erosion problems associated from SLR and, thus, physical distance from the shoreline may correlate to residents' subjective perception of vulnerability. To explore whether respondents' subjective perceptions of vulnerability may be related to their home's physical vulnerability, we correlated respondents' ratings of perceived vulnerability with the physical distance of their home from the shoreline. Analysis showed that our objective indicator of physical vulnerability is not well correlated with subjective perceptions of vulnerability to SLR (Pearson correlation, $r = .11$). If perceived vulnerability and physical vulnerability were linked, we would expect to see a bimodal distribution, or a large percentage of the "not-vulnerable" group to cluster at the farthest distance from shore, with a large percentage of those who perceive themselves to be "vulnerable" to be at the a minimum distance from shore. Table 4, however, shows that across all three vulnerability groups, the largest percentage of respondents live within 1.5 km of the coast, and there is not a large grouping of those who are "not-vulnerable" located far from shore. We also found that, on average, the "not-vulnerable" group's homes are located twice as far ($m = 1$ km) from the shoreline than homes of the "vulnerable" group ($m = .5$ km).

Table 4: Distribution of physical distance from shore for all three perceived vulnerability groupings

		Perceived Vulnerability to SLR			Total
		“Vulnerable”	“Not Vulnerable”	“Unsure”	
Distance from shore (m)	<= .500	53.5%	19.0%	24.3%	39.8%
	500.01 - 1000.00	18.6%	24.0%	21.4%	20.5%
	1000.01 - 1500.00	10.9%	12.3%	19.4%	12.6%
	1500.01 - 2000.00	6.7%	16.2%	13.6%	10.3%
	2000.01 - 2500.00	5.9%	12.3%	12.6%	8.7%
	2500.01 - 3000.00	3.4%	8.9%	6.8%	5.4%
	3000.01 - 3500.00	1.0%	2.8%	1.9%	1.6%
	4500.01 - 5000.00	0%	1.7%	0%	.4%
	5000.01+	0%	2.8%	0%	.7%
Total		100.0%	100.0%	100.0%	100.0%

DISCUSSION

Differences in perceptions

When this study was conceptualized, it was hypothesized that residents' perceptions and attitudes would differ as a function of their demographic characteristics (age, gender, education, household income) and the geographic location of the four targeted communities. The results of this study, however, showed that socio-economic status and location of respondents had very little, if anything, to do with differences in perceptions and attitudes toward SLR and CC as measured by the composite variables. Instead, our findings indicated that differences in perceptions and attitudes are modulated by one's perception of personal vulnerability to SLR and CC. In particular, residents who felt they were vulnerable were significantly more willing to reduce greenhouse gas emissions and to increase SLR and CC knowledge and preparedness.

On a global scale there have been many different outreach or social marketing campaigns throughout the world designed to promote behavior change in a variety of contexts for non-environmental issues, such as being an organ donor or "getting out to vote" and environmental issues such as conserving water, being prepared for hazard events, or reducing greenhouse gasses in the atmosphere. These campaigns have had varying success rates and there is a significant amount of literature on different philosophies and approaches to induce behavior change (Pike et al, 2010; McKenzie-Mohr, 2011). The results of this study gives Hawai'i strong leads in terms of designing an outreach or behavior change campaign for issues such as reducing greenhouse gasses and preparing for sea level rise. Instead of educating residents on the negative effects of CC or SLR, or its scientific causes, or spending thousands of dollars on high-technology research to quantify SLR, we need to find a way to give residents an accurate impression of their vulnerability to SLR without causing alarm or other unwanted negative effects. Once residents understand the impending threats and their potential vulnerability to SLR, it will be easier to promote adoption of adaptation strategies and measures.

It is vital for communities who seek to mitigate the negative impacts of CC or SLR to identify and foster a realistic perception of vulnerability to SLR for their community

members. If community leaders and decision makers can tap into, and change, individual perception of personal vulnerability and risk, they may then be able to influence residents' perception of SLR issues and potential mitigation or adaptation solutions.

Will outreach, education, and policy campaigns that clearly demonstrate individual's vulnerability to SLR to their home and social spaces (e.g., at their work, school, church, etc.) modify their perceptions and behavioral intent related to SLR and CC? In the communities we studied, those who already felt more vulnerable had greater concerns about these chronic hazards and were more willing to prepare for and reduce negative impacts. This supports the idea that outreach and educational campaigns should focus on local or regional impacts, preparedness, and personal vulnerability, and not highlight global CC or SLR scenarios that are harder for individuals to assimilate. Strategies that focus on global changes and vulnerability in general may not elicit the same sense of personal vulnerability. Studies (e.g., Paton et al. 2010) show that individuals must have personal exposure to an acute hazard event for them to change their own perception of risk. It is unclear, however, if this observation also applies to slow-onset chronic hazard events such as SLR where only a small portion of the world's population has been directly exposed to the type of events Paton cites in his studies. Perhaps individual perceptions of vulnerability can serve as a proxy for personal exposure in studies designed to understand behavior change in relation to these slow-onset hazards.

Will developing outreach campaigns that focus on risk and vulnerability within the next 20-40 years be more beneficial than focusing on risks that may occur over the next 50, 100, to even 100+ years? We found that respondents who perceive that SLR would be a problem for their home in the near future (30 years) are significantly more concerned than their counterparts with CC and SLR and intend to increase their knowledge of and preparation. Understanding how individuals react to risks and information at different time scales should be explored further. On the other hand, Paton et al. (2005) have shown that intentions do not always translate directly to actions relating to natural hazards, especially if individuals are able to rationalize that they are not responsible for preparing or mitigating the issue.

Understanding factors that influence individual's perception of risk

This study showed there is no clear relationship between residents' perceived vulnerability to SLR and the physical distance of their homes from the coast. These findings clearly indicate we cannot assume, for educational, outreach, and policy purposes, that people who live very close to the beach always feel more vulnerable than those living further from the beach. Perception of vulnerability is influenced by many different factors which may include past experience, individuals' proximity to the ocean during school, work, religious and other recreational activities and not just their home, trust in government and in policy and regulations, and length of residency in the island community. Links between perceived and physical vulnerability are very complex and further specification of hypothesized models, data collection, and model testing are required to understand fully the primary factors or influences that modulate risk perception of climate change and sea level rise.

Brody et al., (2008) conducted a similar analysis that correlated physical distance to shore with their own measure of perceived vulnerability in a national U.S. data set. In that study, they found a very small but significant correlation of perceived vulnerability to physical distance. However, all of their variables, including physical vulnerability, accounted for only 4% of the variance in perceived vulnerability. The mean distance from shore, in the national study, was almost 3.5 times the width of the island of O'ahu. This variation suggests that findings pertaining to larger geographic land masses may not be generalizable to smaller regions and island communities and highlights the need to continue island or community specific studies that take into account specific features and culture unique to these communities.

Adaptation Measures

Understanding the benefits, unintended consequences, and public beliefs about different adaptation measures is an important first step for implementation. While there may be many technical and scientific evaluations of different engineering and planning measures, a comprehensive assessment of residents' perceptions of different adaptation solutions in Hawai'i has never been conducted. Sea walls or hardening shorelines to mitigate against SLR and high surf have unintended consequences including erosion, beach loss, and a

reduction in the natural beauty of the coast. This adaptation option was the least favored among four options rated in our survey and this finding may suggest to policy makers and land owners that perhaps these types of measures should be avoided and not considered as measures to strengthen resilience. It is assumed that the low approval rating for sea walls is due to the active culture of residents and tourists who spend a significant amount of time outside and at the beach.

Willingness to relocate existing coastal development was the second least favorable adaptation options rated by our respondents. Across the three different vulnerable groups, there was no statistically significant difference between groups in their willingness to relocate inland. The data are supportive of the suggestion that residents have a strong sense of community and enjoyment living in their community that outweigh the added security of moving to higher ground. Additionally, this finding may also provide insight that residents will not be easily ‘scared’ off or move if they feel vulnerable to SLR. While there has not been any broad discussion of these solutions in Hawai’i, our study’s baseline data are vital to inform policymakers about numerous hurdles and barriers that already exist in the communities. On the other hand, communities may be more inclined to start a dialog on improving construction codes and raising structures off the ground to reduce risks of flooding and SLR. Residents are more interested in modifying their current lifestyle to withstand SLR incrementally rather than change their lifestyles completely. Similarly, non-permanent and “soft” shoreline protection, such as replenishing beaches with sand, showed the largest amount of support in this study. Regardless of the adaptation or mitigation policies or implementation plans in place, survey responses to an independent question related to public involvement showed that a very high percentage feel that they should be consulted and involved in any decision-making process for adaptation.

CONCLUSIONS

Perceived vulnerability as a lens for sea level rise

Perceptions and attitudes relating to CC and SLR vary in Hawai'i, driven principally by the extent to which an individual or a family perceives themselves to be vulnerable, and the extent to which they perceive that threat or vulnerability to lie in the most immediate time frame (30 years). When a community is asked to develop, discuss, or implement regulation or policy relating to SLR and CC, community leaders may need to explore and emphasize vulnerability with community residents, and provide information regarding expected time-frame within which impacts may occur. Estimated time-frames for slow-onset hazards, such as SLR, is information that many scientists and policy makers do not want to provide due to uncertainties in the data and its interpretation. Due to the nature of physical science research, scientific data is often provided at a regional scale, with timelines in the hundreds of years, leaving a difficult translation for community members and individuals to understand the risk to them in their current home or situation.

However, being able to quantify and provide residents with a realistic view of their vulnerability may be the first critical step in developing political will and support for a long term climate adaptation plan for the state. The State of Hawai'i, and individual counties will be faced with difficult decisions on how to address individuals and communities that may likely need to rebuild, replace, or abandon their homes and businesses in the future due to changing conditions. While having a realistic perception of community risk will not solve problems due to SLR and CC, it may help advance understanding and a meaningful dialogue among stakeholders.

Adaptation solutions and managed retreat

Out of all of the adaptation options that were presented in the study, moving inland is the only complete solution to reduce all risks of SLR on a community. This study is clear that, at this moment in time, communities do not want to relocate or move inland. This is an important key finding for current planning efforts, as it identifies a key place of friction between science, policy, communities, and implementation when developing short- and long-term adaptation options. While the results of this study should not be

used to indicate that we should not have meaningful conversations or policies that reduce building in the coastal zone, but that those should occur in a manner that value and honor residents and communities sense of place and community. Since the response to this measure did not change with respect to individuals' perception of vulnerability, we cannot assume that simply providing specific vulnerability information as described above will change or alters communities' willingness to move inland. Additional work to understand why communities are not willing to move is needed, which could be helpful to a long-term planning discussion for the entire State. It is also important to note and reflect that this study provided four snap-shot adaptation measures, and did not elaborate on how communities would implement any of the options. This idea combined with the lack of support to relocate would suggest that we can't focus on only one adaptation option, but as climate adaptation as a suite of options that fit each community.

Climate change and sea level rise as a multi-disciplinary problem

An integrated approach to coastal management, including open and active discussions among scientific, academic, government, and community stakeholders of the imminent hazards posed by SLR and CC may provide a clear and better understanding of the risk that community's face, which we argue will influence changes in individuals' perceptions of vulnerability. This may, in turn, promote positive attitudes toward mitigation strategies and effective responses to this threat. Currently there are many different conversations and adaptation options on-going throughout the region, but many of these are focused on a set small area or event (such as the recent high-surf event that damaged homes in Sunset Beach region of O'ahu and has prompted the discussion of a community-scale beach management plan). A switch from one-off solutions and small scale beach management plans to a larger focus may provide communities a realistic understanding of the scale of the impacts that their communities may face.

Planning considerations and future work

The baseline information and set up for this study provides an interesting opportunity for future work specifically related to education, outreach, and urban and regional planning. This study is not intended to provide a permanent understanding of perceptions, as it is only expected that perceptions will and can change over time. Future work to resample

residents and expand this study into a longitudinal study will help planners and hazard extension agents understand if their educational and outreach campaigns are effective and meaningful. While this study found that perception of risk is key, it is unclear and would be premature to state specific options to help communities understand their risk. While this study has outlined that one next step may be to provide scientific information in a manner that is meaningful to individuals and families, additional studies should be conducted to evaluate if this approach does in fact produce results.

APPENDIX A: SURVEY INSTRUMENT



Coastal Environment Study Information for participants

Dear Kihei Resident:

This research is being conducted as part of my master's thesis at the University of Hawai'i. The aim of this study is to understand your thoughts and your neighbor's thoughts about your coastal environment and how it may change in the future. It asks specific questions to try to understand your knowledge and perception of sea level rise, climate change, and how you feel about possible actions that could reduce coastal hazards such as flooding and erosion.

The enclosed questionnaire should take about 20 minutes to complete. To understand the range of community views, we need responses from a diverse group of people — women and men, young and old. To increase diversity, the person who most recently had a birthday (age 18 or older) should complete this questionnaire. We need about 150 adults from the Kehei area, so the participation of your family or household is extremely important. Participation is voluntary and all replies will be confidential. Only university researchers will see your answers. We will only report on general trends and will not disclose your name. Your consent to voluntarily participate in this study is implied when you return the completed questionnaire to us.*

When you have completed all of the questions, return the questionnaire to us in the postage-paid envelope provided. If you do not wish to participate, please return the uncompleted questionnaire and we will not contact you again. Thank you for your time and participation. Your opinion is very important to the success of this study. If you have any questions please contact me, the principal researcher at 808-956-2561, or email at plarin@hawaii.edu.

Very Kind Regards,

A handwritten signature in cursive script, likely belonging to the principal researcher mentioned in the text.

Enclosures: Questionnaire, Return Envelope (no postage necessary if mailed within the US).

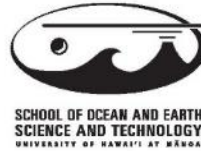
** You may choose not to answer some or all of the questions if they make you feel uncomfortable, although a complete questionnaire is most useful to us. If you have questions about your rights in this study, you may contact the University of Hawai'i Committee on Human Studies. Phone: 808-956-5007.*



COASTAL ENVIRONMENT STUDY

Survey - Kihei - Maui - Summer 2010

We greatly appreciate your participation in this survey. We will only report on general trends and will not disclose any personal information. To insure a wide range of responders, we ask that the person completing this questionnaire (18 years or older) be the household adult that most recently celebrated a birthday.



SECTION A. We would like your input on how you feel about living in your coastal community.

1. Please **rank** the following list of issues in your life right now from **not at all important** to **very important**.

	Not at all Important				Very Important
a. Career development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Employment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Coastal erosion and beach loss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Personal health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Quality of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. The Iraq/Afghanistan wars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Environmental problems (other than climate change)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Global food supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Climate change and sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Ocean health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Personal finances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Population and overcrowding in Hawai'i	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Neighborhood crime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Traffic congestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p. Coastal hazards (i.e., tsunami, hurricanes, and flooding)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. With regard to your **feelings** about leadership and the media in your community, please indicate the extent to which you **agree** or **disagree** with the following statements:

	Strongly Disagree				Strongly Agree
a. I trust my local government to meet the needs of residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I trust my community leaders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I trust the local media (newspapers, TV, radio) to report fairly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. I trust my local government to do what is right for the people they represent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I have confidence in the law to protect and maintain order in my community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. In general, and with regard to your feelings about living in your community, please indicate the extent to which you agree or disagree with each of the following statements.

	Strongly Disagree ←————→ Strongly Agree				
a. This community is a great place to live	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. This community has almost everything needed for a happy life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. This community is a safe place to live	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. This community is a good place to raise children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Residents of this community get along well with each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. There are few dependable ties between people anymore	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Residents of this community look for new solutions rather than being satisfied with the way things are	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. People want to work together to get things done in this community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. The future of this community looks bright	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. People who live around here are not friendly or helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION B. Your views on climate change and the environment

4. Please indicate the extent to which you agree or disagree with each of the following statements.

	Strongly Disagree ←————→ Strongly Agree				
a. The environment is a major concern for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The coastal area of Hawai'i is in good health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I am concerned about our climate changing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. The likelihood that the climate is changing in Hawai'i has been greatly exaggerated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Today's climate is being affected by human activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. The future climate will be affected by human activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Climate change is natural, therefore we should not worry about it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Please rank the amount that the following processes contribute to climate change.

	Not at All	Minor Contributor	Major Contributor
a. Natural CO ₂ emissions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Emissions from factories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Natural variations in the climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Burning of fossil fuels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Deforestation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Automobiles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Nuclear testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Natural sinking of the island	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Destruction of the ozone layer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Landfills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Solar cycles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please indicate how much you would favor changing your behavior to reduce your contributions to greenhouse gas emissions.

	Not Favor	←————→			Strongly Favor	Currently Doing
a. Reducing energy use in my home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Using more energy efficient appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Reducing my car usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Recycling more materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Accepting higher prices for oil, coal, gas and energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Giving up use of aerosol spray cans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Flying less frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION C. Your feelings about sea level changes and possible strategies for your community

7. Please mark the time frame in which you believe sea level rise may start to be a problem for your house and your community.

	0 - 10 years	11 - 20 years	21 - 30 years	31 - 40 years	50 + years	It won't be a problem
a. At my house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. In my community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. In Hawai'i	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. In 50 years, do you think the sea level in your area will be higher, lower, or the same as today?

- No change 1 foot lower 3 feet higher
 Don't know 1 foot higher 3 feet lower
 Other _____

9. What are the main causes of long term changes in sea level for Hawai'i? (check all that apply)

- Island movement (subsidence) Hurricanes and storms Glaciers melting
 Ocean temperature increase Other natural phenomena Don't know
 The sea level is not changing Other _____

10. Do you think the public should be actively involved in deciding what should be done to safeguard against the effects of possible sea level rise?

- The public should be consulted and actively involved The public should not be actively involved but should be consulted The public does not need to be consulted or involved

11. Do you live in an area that might be vulnerable to sea level rise in the future?

- Yes No Don't know

12. Please rank how you feel each of the following regions may be impacted by sea level rise, ranging from severely impacted to not impacted at all.

	Not at all Impacted ←————→ Severely Impacted					I don't know
a. U.S. East and Gulf Coasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. U.S. West Coast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Coastal Europe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Pacific atolls and small islands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Micronesia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Hawai'i	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Arctic and Antarctica	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Greenland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Rank how likely or unlikely is it that you will take the following actions in the next 6 months?

	Very Unlikely ←————→ Very Likely				
a. Improve your knowledge of sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Seek information on things to do to respond to sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Improve your knowledge of climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Seek information on things to do to respond to climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Please indicate the extent to which you agree or disagree with each of the following statements about preparing for sea level changes.

	Strongly Disagree ←————→ Strongly Agree				
a. Sea level rise is too slow to bother preparing for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Sea level rise is unlikely to affect me in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Preparing for sea level rise is too costly for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Preparing for sea level rise is inconvenient for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. It is too difficult to prepare for sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Preparing for sea level rise will reduce damage to my home should the sea level change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Preparing for sea level rise will improve my everyday living condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Preparing for sea level rise will improve my ability to deal with disruption to family/community life should the sea level change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Preparing for sea level rise will help save lives should the sea level change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. I do not know how I can prepare for a rise in sea level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. I feel responsible for preparing for sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. It is the responsibility of government agencies to prepare my community for sea level rise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. The likelihood that the sea level will rise here has been greatly exaggerated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. How strongly do you **support** the following efforts to **protect homes and infrastructure** from potential flooding due to changes in sea level in your community.

	Not Support	←————→			Strongly Support
a. Building sea walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Replenishing the beaches with sand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Relocating coastal development inland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Raising houses and buildings off of the ground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. How likely is it that the following groups would **favor** adopting hard coastline protective measures like **installation of sea walls** for your community?

	Very Unlikely	←————→			Very Likely
a. Your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Your general community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. People you interact with daily (i.e., work or school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Your city and county government officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Your state government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. How likely is it that the following groups would **favor** **relocating buildings and infrastructure** further inland from the coast as a protective measure against sea level rise for your community?

	Very Unlikely	←————→			Very Likely
a. Your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Your general community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. People you interact with daily (i.e., work or school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Your city and county government officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Your state government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. How likely is it that the following groups would **favor** **adding sand to beaches and coastal areas** to help reduce the effects of sea level rise for your community?

	Very Unlikely	←————→			Very Likely
a. Your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Your general community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. People you interact with daily (i.e., work or school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Your city and county government officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Your state government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. How likely is it that the following groups would favor raising the height of homes and buildings as a protective measure against sea level rise?

	Very Unlikely	←————→			Very Likely
a. Your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Your general community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. People you interact with daily (i.e., work or school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Your city and county government officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Your state government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION D. Personal Information

Please provide the following information about yourself. Remember, all information is confidential. We only collect this information to check that our sample is truly representative of your community.

In what year were you born? 19 _____ Male Female

Which of the following best describes your race? (Mark all that apply)

- White (Caucasian)
- Guamanian or Chamorro
- Spanish, Hispanic, or Latino
- Vietnamese
- Native Hawaiian
- Other Pacific Islander
- American Indian
- Filipino
- Tongan
- Chinese
- Black or African American
- Korean
- Samoan
- Japanese
- Asian Indian
- Other _____

Which of the following best describes your yearly household income before taxes? (Mark only one)

- Less than \$10,000
- \$25,000 to \$34,000
- \$75,000 to \$99,000
- \$150,000 to \$199,000
- \$10,000 to \$14,999
- \$35,000 to \$49,000
- \$100,000 to \$149,999
- \$200,000 or more
- \$15,000 to \$24,000
- \$50,000 to \$74,999

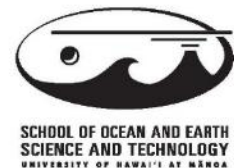
Which best reflects the highest level of education that you completed? (Mark only one)

- Less than 9th grade
- Associates degree
- 9th to 12th grade (no diploma)
- Bachelor's degree
- High school graduate (includes GED equivalency)
- Graduate or professional degree
- Some college, no degree

Reminder: Participation is voluntary and all replies will be confidential. Only university researchers will be able to see your answers. We will only report on general trends and will not disclose any personal information. When you have finished completing all of the questions, place the questionnaire in the postage-paid envelope provided and return it to us. If you do not wish to participate, please return the uncompleted questionnaire and we will not contact you again. **Mahalo for your time and input.**



University of Hawai'i at Mānoa Geology and Geophysics Department
 University of Hawai'i Sea Grant College Program
 National Disaster Preparedness Training Center at the University of Hawai'i



APPENDIX B: TABLES

1. Please rank the following list of issues in your life right now from not at all important to very important.

1 a. Career development

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	123	18.4	18.4
Not very Important	70	10.5	28.9
Neutral	124	18.6	47.5
Important	149	22.3	69.9
Very Important	201	30.1	100.0
Total	667	100.0	

1 b. Employment

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	92	13.8	13.8
Not very Important	37	5.6	19.4
Neutral	77	11.6	30.9
Important	102	15.3	46.2
Very Important	358	53.8	100.0
Total	666	100.0	

1 c. Coastal erosion and beach loss

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	15	2.2	2.2
Not very Important	43	6.4	8.7
Neutral	147	22.0	30.7
Important	173	25.9	56.6
Very Important	290	43.4	100.0
Total	668	100.0	

1 d. Personal health

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	0	0	0
Not very Important	6	.9	.9
Neutral	28	4.1	5.0
Important	128	19.0	24.0
Very Important	513	76.0	100.0
Total	675	100.0	

1 e. Quality of life

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	0	0	0
Not very Important	3	.5	.5
Neutral	23	3.5	3.9
Important	151	22.8	26.7
Very Important	486	73.3	100.0
Total	663	100.0	

1 f. The Iraq/Afghanistan wars

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	48	7.2	7.2
Not very Important	54	8.1	15.3
Neutral	176	26.4	41.7
Important	201	30.1	71.8
Very Important	188	28.2	100.0
Total	667	100.0	

1 g. Environmental problems (other than climate change)

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	10	1.5	1.5
Not very Important	25	3.7	5.2
Neutral	125	18.7	23.9
Important	230	34.3	58.2
Very Important	280	41.8	100.0
Total	670	100.0	

1 h. Global food supply

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	15	2.2	2.2
Not very Important	50	7.4	9.7
Neutral	164	24.4	34.1
Important	191	28.4	62.5
Very Important	252	37.5	100.0
Total	672	100.0	

1 i. Climate change and sea level rise

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	30	4.5	4.5
Not very Important	46	6.9	11.3
Neutral	149	22.2	33.5
Important	197	29.4	62.9
Very Important	249	37.1	100.0
Total	671	100.0	

1 j. Education

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	23	3.4	3.4
Not very Important	21	3.1	6.5
Neutral	82	12.1	18.7
Important	162	24.0	42.7
Very Important	387	57.3	100.0
Total	675	100.0	

1 k. Ocean health

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	7	1.0	1.0
Not very Important	16	2.4	3.4
Neutral	93	13.9	17.3
Important	212	31.6	48.9
Very Important	343	51.1	100.0
Total	671	100.0	

1 l. Personal finances

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	13	1.9	1.9
Not very Important	11	1.6	3.6
Neutral	59	8.8	12.4
Important	180	26.9	39.4
Very Important	405	60.6	100.0
Total	668	100.0	

1 m. Population and overcrowding in Hawai'i

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	22	3.3	3.3
Not very Important	32	4.7	8.0
Neutral	119	17.7	25.7
Important	187	27.7	53.4
Very Important	314	46.6	100.0
Total	674	100.0	

1 n. Neighborhood crime

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	7	1.0	1.0
Not very Important	26	3.9	4.9
Neutral	99	14.7	19.6
Important	182	27.1	46.7
Very Important	358	53.3	100.0
Total	672	100.0	

1 o. Traffic congestion

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	16	2.4	2.4
Not very Important	40	6.0	8.3
Neutral	109	16.2	24.6
Important	190	28.3	52.8
Very Important	317	47.2	100.0
Total	672	100.0	

1 p. Coastal hazards (i.e., tsunami, hurricanes, and flooding)

	Frequency	Valid Percent	Cumulative Percent
Not at all Important	19	2.8	2.8
Not very Important	38	5.6	8.5
Neutral	144	21.4	29.8
Important	163	24.2	54.0
Very Important	310	46.0	100.0
Total	674	100.0	

2. With regard to your feelings about leadership and the media in your community, please indicate the extent to which you agree or disagree with the following statements:

2 a. I trust my local government to meet the needs of residents

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	122	18.2	18.2
Disagree	175	26.1	44.3
Neutral	234	34.9	79.1
Agree	90	13.4	92.5
Strongly Agree	50	7.5	100.0
Total	671	100.0	

2 b. I trust my community leaders

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	102	15.2	15.2
Disagree	170	25.4	40.6
Neutral	266	39.7	80.3
Agree	95	14.2	94.5
Strongly Agree	37	5.5	100.0
Total	670	100.0	

c. I trust the local media (newspapers, TV, radio) to report fairly

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	86	12.8	12.8
Disagree	149	22.2	35.0
Neutral	242	36.1	71.1
Agree	134	20.0	91.1
Strongly Agree	60	8.9	100.0
Total	671	100.0	

2 d. I trust my local government to do what is right for the people they represent

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	122	18.2	18.2
Disagree	182	27.2	45.4
Neutral	209	31.2	76.6
Agree	94	14.0	90.6
Strongly Agree	63	9.4	100.0
Total	670	100.0	

2 e. I have confidence in the law to protect and maintain order in my community

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	50	7.5	7.5
Disagree	109	16.3	23.7
Neutral	208	31.0	54.8
Agree	223	33.3	88.1
Strongly Agree	80	11.9	100.0
Total	670	100.0	

3. In general, and with regard to your feelings about living in your community, please indicate the extent to which you agree or disagree with each of the following statements.

3 a. This community is a great place to live

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	3	.4	.4
Disagree	17	2.5	3.0
Neutral	87	12.9	15.9
Agree	264	39.3	55.2
Strongly Agree	301	44.8	100.0
Total	672	100.0	

3 b. This community has almost everything needed for a happy life

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	15	2.2	2.2
Disagree	32	4.8	7.0
Neutral	147	21.9	28.9
Agree	285	42.5	71.4
Strongly Agree	192	28.6	100.0
Total	671	100.0	

3 c. This community is a safe place to live

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	12	1.8	1.8
Disagree	29	4.3	6.1
Neutral	170	25.3	31.4
Agree	304	45.2	76.6
Strongly Agree	157	23.4	100.0
Total	672	100.0	

3 d. This community is a good place to raise children

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	14	2.1	2.1
Disagree	38	5.7	7.7
Neutral	154	23.0	30.7
Agree	273	40.7	71.4
Strongly Agree	192	28.6	100.0
Total	671	100.0	

3 e. Residents of this community get along well with each other

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	15	2.3	2.3
Disagree	30	4.5	6.8
Neutral	177	26.6	33.4
Agree	321	48.3	81.7
Strongly Agree	122	18.3	100.0
Total	665	100.0	

3 f. There are few dependable ties between people anymore

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	60	9.0	9.0
Disagree	130	19.6	28.6
Neutral	259	39.0	67.6
Agree	160	24.1	91.7
Strongly Agree	55	8.3	100.0
Total	664	100.0	

3 g. Residents of this community look for new solutions rather than being satisfied with the way things are

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	44	6.6	6.6
Disagree	116	17.4	24.0
Neutral	292	43.8	67.9
Agree	145	21.8	89.6
Strongly Agree	69	10.4	100.0
Total	666	100.0	

3 h. People want to work together to get things done in this community

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	24	3.6	3.6
Disagree	93	14.0	17.6
Neutral	291	43.9	61.5
Agree	189	28.5	90.0
Strongly Agree	66	10.0	100.0
Total	663	100.0	

3 i. The future of this community looks bright

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	19	2.9	2.9
Disagree	71	10.7	13.5
Neutral	274	41.1	54.7
Agree	230	34.5	89.2
Strongly Agree	72	10.8	100.0
Total	666	100.0	

3 j. People who live around here are not friendly or helpful

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	200	29.9	29.9
Disagree	245	36.6	66.4
Neutral	152	22.7	89.1
Agree	53	7.9	97.0
Strongly Agree	20	3.0	100.0
Total	670	100.0	

4. Please indicate the extent to which you agree or disagree with each of the following statements.

4 a. The environment is a major concern for me

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	11	1.7	1.7
Disagree	28	4.2	5.9
Neutral	124	18.6	24.5
Agree	207	31.1	55.6
Strongly Agree	296	44.4	100.0
Total	666	100.0	

4 b. The coastal area of Hawai'i is in good health

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	75	11.2	11.2
Disagree	160	24.0	35.2
Neutral	269	40.3	75.6
Agree	125	18.7	94.3
Strongly Agree	38	5.7	100.0
Total	667	100.0	

4 c. I am concerned about climate change

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	37	5.6	5.6
Disagree	55	8.3	13.8
Neutral	159	23.9	37.7
Agree	204	30.6	68.3
Strongly Agree	211	31.7	100.0
Total	666	100.0	

4 d. The likelihood that the climate is changing in Hawai`i has been greatly exaggerated

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	112	16.8	16.8
Disagree	157	23.6	40.4
Neutral	220	33.0	73.4
Agree	98	14.7	88.1
Strongly Agree	79	11.9	100.0
Total	666	100.0	

4 e. Today's climate is being affected by human activities

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	25	3.7	3.7
Disagree	58	8.7	12.4
Neutral	129	19.3	31.6
Agree	202	30.1	61.8
Strongly Agree	256	38.2	100.0
Total	670	100.0	

4 f. The future climate will be affected by human activities

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	27	4.0	4.0
Disagree	45	6.7	10.7
Neutral	112	16.7	27.4
Agree	192	28.6	56.0
Strongly Agree	295	44.0	100.0
Total	671	100.0	

4 g. Climate change is natural, therefore we should not worry about it

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	243	36.2	36.2
Disagree	163	24.3	60.5
Neutral	128	19.1	79.6
Agree	83	12.4	92.0
Strongly Agree	54	8.0	100.0
Total	671	100.0	

5. Please rank the amount that the following processes contribute to climate change.

5 a. Natural CO2 emissions

	Frequency	Valid Percent	Cumulative Percent
Not at All	69	10.7	10.7
Minor Contributor	325	50.5	61.3
Major Contributor	249	38.7	100.0
Total	643	100.0	

5 b. emissions from factories

	Frequency	Valid Percent	Cumulative Percent
Not at All	27	4.1	4.1
Minor Contributor	164	25.0	29.1
Major Contributor	465	70.9	100.0
Total	656	100.0	

5 c. Natural variations in the climate

	Frequency	Valid Percent	Cumulative Percent
Not at All	77	11.9	11.9
Minor Contributor	355	54.8	66.7
Major Contributor	216	33.3	100.0
Total	648	100.0	

5 d. Burning of fossil fuels

	Frequency	Valid Percent	Cumulative Percent
Not at All	22	3.4	3.4
Minor Contributor	168	25.7	29.1
Major Contributor	463	70.9	100.0
Total	653	100.0	

5 e. Deforestation

	Frequency	Valid Percent	Cumulative Percent
Not at All	15	2.3	2.3
Minor Contributor	123	18.9	21.2
Major Contributor	513	78.8	100.0
Total	651	100.0	

5 f. Automobiles

	Frequency	Valid Percent	Cumulative Percent
Not at All	18	2.7	2.7
Minor Contributor	161	24.5	27.2
Major Contributor	478	72.8	100.0
Total	657	100.0	

5 g. Nuclear testing

	Frequency	Valid Percent	Cumulative Percent
Not at All	123	19.0	19.0
Minor Contributor	216	33.3	52.2
Major Contributor	310	47.8	100.0
Total	649	100.0	

5 h. Natural sinking of the island

	Frequency	Valid Percent	Cumulative Percent
Not at All	227	35.7	35.7
Minor Contributor	282	44.3	80.0
Major Contributor	127	20.0	100.0
Total	636	100.0	

5 i. Destruction of the ozone layer

	Frequency	Valid Percent	Cumulative Percent
Not at All	36	5.5	5.5
Minor Contributor	166	25.3	30.8
Major Contributor	453	69.2	100.0
Total	655	100.0	

5 j. Landfills

	Frequency	Valid Percent	Cumulative Percent
Not at All	90	13.8	13.8
Minor Contributor	329	50.6	64.5
Major Contributor	231	35.5	100.0
Total	650	100.0	

5 k. Solar cycles

	Frequency	Valid Percent	Cumulative Percent
Not at All	78	12.2	12.2
Minor Contributor	336	52.4	64.6
Major Contributor	227	35.4	100.0
Total	641	100.0	

6. Please indicate how much you would favor changing your behavior to reduce your contributions to greenhouse gas emissions.

6 a. Reduce energy use in my home

	Frequency	Valid Percent	Cumulative Percent
Not Favor	10	1.7	1.7
Slightly not Favor	10	1.7	3.3
Neutral	25	4.1	7.4
Favor	49	8.1	15.5
Strongly Favor	108	17.8	33.3
Currently Doing	404	66.7	100.0
Total	606	100.0	

6 b. Using more energy efficient appliances

	Frequency	Valid Percent	Cumulative Percent
Not Favor	8	1.3	1.3
Slightly not Favor	9	1.5	2.8
Neutral	18	2.9	5.7
Favor	46	7.4	13.1
Strongly Favor	147	23.8	36.9
Currently Doing	390	63.1	100.0
Total	618	100.0	

6 c. Reducing your car usage

	Frequency	Valid Percent	Cumulative Percent
Not Favor	34	5.5	5.5
Slightly not Favor	21	3.4	8.8
Neutral	73	11.7	20.5
Favor	80	12.8	33.4
Strongly Favor	142	22.8	56.2
Currently Doing	273	43.8	100.0
Total	623	100.0	

6 d. Recycling more materials

	Frequency	Valid Percent	Cumulative Percent
Not Favor	6	1.0	1.0
Slightly not Favor	9	1.5	2.5
Neutral	24	4.0	6.5
Favor	40	6.7	13.2
Strongly Favor	110	18.3	31.5
Currently Doing	411	68.5	100.0
Total	600	100.0	

6 e. Accepting higher prices for oil, coal, gas and energy

	Frequency	Valid Percent	Cumulative Percent
Not Favor	269	42.0	42.0
Slightly not Favor	90	14.1	56.1
Neutral	67	10.5	66.6
Favor	59	9.2	75.8
Strongly Favor	48	7.5	83.3
Currently Doing	107	16.7	100.0
Total	640	100.0	

6 f. Giving up use of aerosol spray cans

	Frequency	Valid Percent	Cumulative Percent
Not Favor	39	6.1	6.1
Slightly not Favor	39	6.1	12.2
Neutral	97	15.2	27.5
Favor	89	14.0	41.4
Strongly Favor	164	25.7	67.2
Currently Doing	209	32.8	100.0
Total	637	100.0	

6 g. Flying less frequently

	Frequency	Valid Percent	Cumulative Percent
Not Favor	117	18.1	18.1
Slightly not Favor	62	9.6	27.6
Neutral	150	23.1	50.8
Favor	61	9.4	60.2
Strongly Favor	66	10.2	70.4
Currently Doing	192	29.6	100.0
Total	648	100.0	

7. Please mark the time frame in which you believe sea level rise may start to be a problem for your house and your community.

7 a. At my house

	Frequency	Valid Percent	Cumulative Percent
0 - 10 Years	56	8.5	8.5
11 - 20 Years	59	9.0	17.6
21 - 30 Years	71	10.8	28.4
31 - 40 Years	63	9.6	38.0
50 + Years	194	29.6	67.6
It won't be a problem	212	32.4	100.0
Total	655	100.0	

7 b. In my community

	Frequency	Valid Percent	Cumulative Percent
0 - 10 Years	98	15.2	15.2
11 - 20 Years	99	15.3	30.5
21 - 30 Years	100	15.5	46.0
31 - 40 Years	90	14.0	60.0
50 + Years	154	23.9	83.9
It won't be a problem	104	16.1	100.0
Total	645	100.0	

7 c. In Hawai'i

	Frequency	Valid Percent	Cumulative Percent
0 - 10 Years	135	20.9	20.9
11 - 20 Years	92	14.3	35.2
21 - 30 Years	104	16.1	51.3
31 - 40 Years	70	10.9	62.2
50 + Years	171	26.5	88.7
It won't be a problem	73	11.3	100.0
Total	645	100.0	

8. In 50 years time, how do you think the sea level in your community will be different than today?

	Frequency	Valid Percent	Cumulative Percent
No change	43	6.9	6.9
1 foot lower	10	1.6	8.5
3 feet higher	168	27.0	35.5
Don't Know	217	34.8	70.3
1 foot higher	175	28.1	98.4
3 feet lower	10	1.6	100.0
Total	623	100.0	

9. What are the main causes of long term changes in sea level for Hawai'i? (check all that apply)

9. Island movement (subsidence)

	Frequency	Valid Percent	Cumulative Percent
Yes	223	33.2	33.2
No	449	66.8	100.0
Total	672	100.0	

9. Hurricane and storms

	Frequency	Valid Percent	Cumulative Percent
Yes	158	23.4	23.4
No	516	76.6	100.0
Total	674	100.0	

9. glaciers melting

	Frequency	Valid Percent	Cumulative Percent
Yes	399	59.2	59.2
No	275	40.8	100.0
Total	674	100.0	

9. Ocean temperature increases

	Frequency	Valid Percent	Cumulative Percent
Yes	323	47.9	47.9
No	351	52.1	100.0
Total	674	100.0	

9. Other natural phenomena

	Frequency	Valid Percent	Cumulative Percent
Yes	239	35.5	35.5
No	435	64.5	100.0
Total	674	100.0	

9. don't know

	Frequency	Valid Percent	Cumulative Percent
Yes	128	19.0	19.0
No	546	81.0	100.0
Total	674	100.0	

9. The sea level is not changing

	Frequency	Valid Percent	Cumulative Percent
Yes	31	4.6	4.6
No	643	95.4	100.0
Total	674	100.0	

9. don't know

	Frequency	Valid Percent	Cumulative Percent
Yes	128	19.0	19.0
No	546	81.0	100.0
Total	674	100.0	

10. Do you think the public should be actively involved in deciding what should be done to safeguard against the effects of possible sea level rise?

	Frequency	Valid Percent	Cumulative Percent
The public should be consulted and actively involved	534	80.1	80.1
The public should not be actively involved but should be consulted	101	15.1	95.2
The public does not need to be consulted or involved	32	4.8	100.0
Total	667	100.0	

11. Do you live in an area that might be vulnerable to sea level rise in the future?

**11. Do you live in an area that might be vulnerable to sea level rise
in the future**

	Frequency	Valid Percent	Cumulative Percent
Yes	389	57.9	57.9
No	180	26.8	84.7
Don't Know	103	15.3	100.0
Total	672	100.0	

12. Please rank how you feel each of the following regions may be impacted by sea level rise, ranging from severely impacted to not impacted at all.

12 a. U.S. East and Gulf Coasts

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	24	3.7	3.7
Not as Impacted	17	2.6	6.4
Neutral	83	12.9	19.2
Impacted	156	24.2	43.4
Severely Impacted	200	31.0	74.4
I don't Know	165	25.6	100.0
Total	645	100.0	

12 b. U.S. West Coast

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	18	2.8	2.8
Not as Impacted	24	3.7	6.5
Neutral	102	15.8	22.3
Impacted	159	24.6	46.8
Severely Impacted	184	28.4	75.3
I don't Know	160	24.7	100.0
Total	647	100.0	

12 c. Coastal Europe

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	20	3.1	3.1
Not as Impacted	18	2.8	5.9
Neutral	92	14.2	20.1
Impacted	138	21.4	41.5
Severely Impacted	164	25.4	66.9
I don't Know	214	33.1	100.0
Total	646	100.0	

12 d. Pacific atolls and small islands

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	17	2.6	2.6
Not as Impacted	7	1.1	3.7
Neutral	40	6.2	9.8
Impacted	97	14.9	24.8
Severely Impacted	382	58.8	83.5
I don't Know	107	16.5	100.0
Total	650	100.0	

12 e. Micronesia

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	16	2.5	2.5
Not as Impacted	7	1.1	3.6
Neutral	45	7.0	10.5
Impacted	121	18.7	29.2
Severely Impacted	329	50.9	80.1
I don't Know	129	19.9	100.0
Total	647	100.0	

12 f. Hawai'i

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	15	2.3	2.3
Not as Impacted	16	2.4	4.7
Neutral	89	13.6	18.3
Impacted	177	27.1	45.4
Severely Impacted	267	40.8	86.2
I don't Know	90	13.8	100.0
Total	654	100.0	

12 g. Arctic and Antarctica

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	23	3.6	3.6
Not as Impacted	15	2.3	5.9
Neutral	63	9.7	15.6
Impacted	114	17.6	33.2
Severely Impacted	245	37.9	71.1
I don't Know	187	28.9	100.0
Total	647	100.0	

12 h. Greenland

	Frequency	Valid Percent	Cumulative Percent
Not at all Impacted	21	3.2	3.2
Not as Impacted	15	2.3	5.5
Neutral	77	11.9	17.4
Impacted	107	16.5	33.9
Severely Impacted	224	34.5	68.4
I don't Know	205	31.6	100.0
Total	649	100.0	

13. Rank how likely or unlikely is it that you will take the following actions in the next 6 months?

13 a. Improve your knowledge of sea level rise

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	126	19.0	19.0
Unlikely	109	16.5	35.5
Neutral	196	29.6	65.1
Likely	112	16.9	82.0
Very Likely	119	18.0	100.0
Total	662	100.0	

13 b. Seek information on things to do to respond to sea level rise

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	137	20.9	20.9
Unlikely	110	16.8	37.7
Neutral	204	31.1	68.9
Likely	98	15.0	83.8
Very Likely	106	16.2	100.0
Total	655	100.0	

13 c. Improve your knowledge of climate change

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	102	15.5	15.5
Unlikely	94	14.2	29.7
Neutral	191	28.9	58.6
Likely	151	22.9	81.5
Very Likely	122	18.5	100.0
Total	660	100.0	

13 d. Seek information on things to do to respond to climate change

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	111	16.9	16.9
Unlikely	94	14.3	31.2
Neutral	194	29.5	60.7
Likely	135	20.5	81.3
Very Likely	123	18.7	100.0
Total	657	100.0	

14. Please indicate the extent to which you agree or disagree with each of the following statements about preparing for sea level changes.

14 a. Sea level rise is too slow to bother preparing for

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	170	26.2	26.2
Disagree	144	22.2	48.5
Neutral	187	28.9	77.3
Agree	83	12.8	90.1
Strongly Agree	64	9.9	100.0
Total	648	100.0	

14 b. Sea level rise is unlikely to affect me in the future

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	147	22.5	22.5
Disagree	142	21.8	44.3
Neutral	164	25.2	69.5
Agree	102	15.6	85.1
Strongly Agree	97	14.9	100.0
Total	652	100.0	

14 c. Preparing for sea level rise is too costly for me

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	106	16.7	16.7
Disagree	128	20.2	36.9
Neutral	253	39.9	76.8
Agree	64	10.1	86.9
Strongly Agree	83	13.1	100.0
Total	634	100.0	

14 d. Preparing for sea level rise is inconvenient for me

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	138	21.7	21.7
Disagree	139	21.9	43.6
Neutral	213	33.5	77.0
Agree	70	11.0	88.1
Strongly Agree	76	11.9	100.0
Total	636	100.0	

14 e. It is too difficult to prepare for sea level rise

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	116	18.2	18.2
Disagree	133	20.9	39.1
Neutral	222	34.9	73.9
Agree	82	12.9	86.8
Strongly Agree	84	13.2	100.0
Total	637	100.0	

14 f. Preparing for sea level rise will reduce damage to my home should the sea level change

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	113	17.6	17.6
Disagree	88	13.7	31.3
Neutral	169	26.3	57.5
Agree	133	20.7	78.2
Strongly Agree	140	21.8	100.0
Total	643	100.0	

14 g. Preparing for sea level rise will improve my everyday living condition

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	121	18.9	18.9
Disagree	116	18.1	37.0
Neutral	231	36.1	73.1
Agree	84	13.1	86.3
Strongly Agree	88	13.8	100.0
Total	640	100.0	

14 h. Preparing for sea level rise will improve my ability to deal with disruption to family/community life should the sea level change

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	75	11.7	11.7
Disagree	85	13.3	25.0
Neutral	195	30.5	55.5
Agree	144	22.5	78.0
Strongly Agree	141	22.0	100.0
Total	640	100.0	

14 i. Preparing for sea level rise will help save lives should the sea level change

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	44	7.0	7.0
Disagree	39	6.2	13.2
Neutral	164	26.2	39.4
Agree	171	27.3	66.7
Strongly Agree	209	33.3	100.0
Total	627	100.0	

14 j. I do not know how I can prepare for a rise in sea level

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	56	8.7	8.7
Disagree	59	9.2	17.9
neutral	170	26.4	44.3
Agree	153	23.8	68.0
Strongly Agree	206	32.0	100.0
Total	644	100.0	

14 k. I feel responsible for preparing for sea level rise

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	108	16.9	16.9
Disagree	100	15.7	32.6
Neutral	236	37.0	69.6
Agree	99	15.5	85.1
Strongly Agree	95	14.9	100.0
Total	638	100.0	

14 l. It is the responsibility of government agencies to prepare my community for sea level rise

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	47	7.3	7.3
Disagree	45	7.0	14.3
Neutral	162	25.1	39.4
Agree	170	26.4	65.7
Strongly Agree	221	34.3	100.0
Total	645	100.0	

14 m. The likelihood that the sea level will rise here has been greatly exaggerated

	Frequency	Valid Percent	Cumulative Percent
Strongly Disagree	154	24.1	24.1
Disagree	135	21.1	45.2
Neutral	208	32.6	77.8
Agree	66	10.3	88.1
Strongly Agree	76	11.9	100.0
Total	639	100.0	

15. How strongly do you support the following efforts to protect homes and infrastructure from potential flooding due to changes in sea level in your community.

15 a. Building sea walls

	Frequency	Valid Percent	Cumulative Percent
Not Support	202	30.9	30.9
Kind of not support	73	11.2	42.0
Neutral	143	21.9	63.9
Support	104	15.9	79.8
Strongly Support	132	20.2	100.0
Total	654	100.0	

15 b. Replenishing the beaches with sand

	Frequency	Valid Percent	Cumulative Percent
Not Support	92	14.0	14.0
Kind of not support	55	8.4	22.4
Neutral	144	22.0	44.4
Support	144	22.0	66.3
Strongly Support	221	33.7	100.0
Total	656	100.0	

15 c. Relocating coastal development inland

	Frequency	Valid Percent	Cumulative Percent
Not Support	58	8.9	8.9
Kind of not support	48	7.4	16.3
Neutral	157	24.1	40.3
Support	148	22.7	63.0
Strongly Support	241	37.0	100.0
Total	652	100.0	

15 d. Raise houses and buildings off of the ground

	Frequency	Valid Percent	Cumulative Percent
Not Support	72	11.0	11.0
Kind of not support	58	8.9	19.9
Neutral	163	25.0	44.9
Support	165	25.3	70.2
Strongly Support	194	29.8	100.0
Total	652	100.0	

16. How likely is it that the following groups would favor adopting hard coastline protective measures like installation of sea walls for your community?

16 a. Your family

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	198	30.8	30.8
Unlikely	105	16.4	47.2
Neutral	148	23.1	70.2
Likely	87	13.6	83.8
Very Likely	104	16.2	100.0
Total	642	100.0	

16 b. Your general community

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	140	21.9	21.9
Unlikely	130	20.3	42.2
Neutral	211	33.0	75.2
Likely	99	15.5	90.6
Very Likely	60	9.4	100.0
Total	640	100.0	

16 c. Your friends

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	146	22.8	22.8
Unlikely	126	19.7	42.6
Neutral	215	33.6	76.2
Likely	82	12.8	89.0
Very Likely	70	11.0	100.0
Total	639	100.0	

16 d. People you interact with daily (i.e., work or school)

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	131	20.5	20.5
Unlikely	130	20.4	40.9
Neutral	228	35.7	76.6
Likely	86	13.5	90.1
Very Likely	63	9.9	100.0
Total	638	100.0	

16 e. Your city and county government officials

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	106	16.5	16.5
Unlikely	114	17.8	34.3
Neutral	238	37.1	71.3
Likely	104	16.2	87.5
Very Likely	80	12.5	100.0
Total	642	100.0	

16 f. Your state government

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	116	18.1	18.1
Unlikely	99	15.4	33.5
Neutral	237	37.0	70.5
Likely	97	15.1	85.6
Very Likely	92	14.4	100.0
Total	641	100.0	

17. How likely is it that the following groups would favor relocating buildings and infrastructure further inland from the coast as a protective measure against sea level rise for your community?

17 a. Your family

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	170	26.6	26.6
Unlikely	96	15.0	41.6
Neutral	144	22.5	64.2
Likely	112	17.5	81.7
Very Likely	117	18.3	100.0
Total	639	100.0	

17 b. Your general community

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	158	24.8	24.8
Unlikely	135	21.2	46.0
Neutral	196	30.8	76.8
Likely	86	13.5	90.3
Very Likely	62	9.7	100.0
Total	637	100.0	

17 c. Your friends

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	143	22.4	22.4
Unlikely	133	20.9	43.3
Neutral	202	31.7	75.0
Likely	84	13.2	88.2
Very Likely	75	11.8	100.0
Total	637	100.0	

17 d. People you interact with daily (i.e., work or school)

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	127	20.0	20.0
Unlikely	135	21.2	41.2
Neutral	220	34.6	75.8
Likely	91	14.3	90.1
Very Likely	63	9.9	100.0
Total	636	100.0	

17 e. Your city and county government officials

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	138	21.7	21.7
Unlikely	119	18.7	40.5
Neutral	206	32.4	72.9
Likely	104	16.4	89.3
Very Likely	68	10.7	100.0
Total	635	100.0	

17 f. Your state government

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	143	22.5	22.5
Unlikely	112	17.6	40.2
Neutral	202	31.8	72.0
Likely	104	16.4	88.3
Very Likely	74	11.7	100.0
Total	635	100.0	

18. How likely is it that the following groups would favor adding sand to beaches and coastal areas to help reduce the effects of sea level rise for your community?

18 a. Your family

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	118	18.4	18.4
Unlikely	63	9.8	28.3
Neutral	124	19.4	47.7
Likely	139	21.7	69.4
Very Likely	196	30.6	100.0
Total	640	100.0	

18 b. Your general community

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	82	12.9	12.9
Unlikely	59	9.3	22.2
Neutral	174	27.4	49.6
Likely	171	26.9	76.5
Very Likely	149	23.5	100.0
Total	635	100.0	

18 c. Your friends

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	91	14.3	14.3
Unlikely	65	10.2	24.5
Neutral	165	25.9	50.4
Likely	161	25.3	75.7
Very Likely	155	24.3	100.0
Total	637	100.0	

18 d. People you interact with daily (i.e., work or school)

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	80	12.6	12.6
Unlikely	70	11.0	23.6
Neutral	184	29.0	52.6
Likely	162	25.5	78.1
Very Likely	139	21.9	100.0
Total	635	100.0	

18 e. Your city and county government officials

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	79	12.4	12.4
Unlikely	77	12.1	24.5
Neutral	201	31.6	56.0
Likely	152	23.9	79.9
Very Likely	128	20.1	100.0
Total	637	100.0	

18 f. Your state government

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	78	12.3	12.3
Unlikely	83	13.1	25.3
Neutral	195	30.7	56.0
Likely	146	23.0	78.9
Very Likely	134	21.1	100.0
Total	636	100.0	

19. How likely is it that the following groups would favor raising the height of homes and buildings as a protective measure against sea level rise?

19 a. Your family

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	148	23.2	23.2
Unlikely	81	12.7	35.9
Neutral	167	26.2	62.1
Likely	116	18.2	80.3
Very Likely	126	19.7	100.0
Total	638	100.0	

19 b. Your general community

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	123	19.3	19.3
Unlikely	98	15.4	34.7
Neutral	207	32.5	67.2
Likely	119	18.7	85.9
Very Likely	90	14.1	100.0
Total	637	100.0	

19 c. Your friends

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	122	19.2	19.2
Unlikely	96	15.1	34.3
Neutral	201	31.6	65.9
Likely	122	19.2	85.1
Very Likely	95	14.9	100.0
Total	636	100.0	

19 d. People you interact with daily (i.e., work or school)

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	117	18.5	18.5
Unlikely	95	15.0	33.5
Neutral	231	36.5	70.0
Likely	106	16.7	86.7
Very Likely	84	13.3	100.0
Total	633	100.0	

19 e. Your city and county government officials

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	112	17.7	17.7
Unlikely	91	14.4	32.0
Neutral	219	34.5	66.6
Likely	110	17.4	83.9
Very Likely	102	16.1	100.0
Total	634	100.0	

19 f. Your state government

	Frequency	Valid Percent	Cumulative Percent
Very Unlikely	114	18.0	18.0
Unlikely	92	14.5	32.5
Neutral	214	33.8	66.2
Likely	107	16.9	83.1
Very Likely	107	16.9	100.0
Total	634	100.0	

Demographic Questions

In what year were you born?

	Frequency	Valid Percent	Cumulative Percent
1919	3	.5	.5
1920	3	.5	.9
1922	2	.3	1.2
1925	7	1.1	2.3
1927	4	.6	2.9
1928	6	.9	3.8
1929	5	.8	4.6
1930	2	.3	4.9
1931	5	.8	5.6
1932	3	.5	6.1
1933	6	.9	7.0
1934	5	.8	7.7
1935	8	1.2	9.0
1936	8	1.2	10.2
1937	9	1.4	11.5
1938	9	1.4	12.9
1939	17	2.6	15.5
1940	10	1.5	17.0
1941	13	2.0	19.0
1942	10	1.5	20.5
1943	21	3.2	23.7
1944	10	1.5	25.2
1945	13	2.0	27.2
1946	10	1.5	28.7
1947	19	2.9	31.6
1948	15	2.3	33.8
1949	18	2.7	36.6
1950	15	2.3	38.8
1951	17	2.6	41.4

1952	8	1.2	42.6
1953	19	2.9	45.5
1954	19	2.9	48.4
1955	19	2.9	51.3
1956	17	2.6	53.9
1957	16	2.4	56.3
1958	22	3.3	59.6
1959	26	3.9	63.6
1960	24	3.6	67.2
1961	15	2.3	69.5
1962	16	2.4	71.9
1963	8	1.2	73.1
1964	10	1.5	74.7
1965	14	2.1	76.8
1966	13	2.0	78.8
1967	15	2.3	81.0
1968	9	1.4	82.4
1969	12	1.8	84.2
1970	14	2.1	86.3
1971	12	1.8	88.2
1972	9	1.4	89.5
1973	6	.9	90.4
1974	7	1.1	91.5
1975	8	1.2	92.7
1976	6	.9	93.6
1977	6	.9	94.5
1978	5	.8	95.3
1979	2	.3	95.6
1980	6	.9	96.5
1981	5	.8	97.3
1982	5	.8	98.0
1983	8	1.2	99.2
1984	2	.3	99.5
1986	1	.2	99.7
1991	1	.2	99.8
1992	1	.2	100.0

Total	659	100.0
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Are you male or female?

	Frequency	Valid Percent	Cumulative Percent
Male	374	56.2	56.2
Female	292	43.8	100.0
Total	666	100.0	

Which of the following best describes your race? (Mark all that apply)

	Responses		Percent of Cases
	N	Percent	
White (Caucasian)	368	43.9%	56.7%
Native Hawaiian	90	10.7%	13.9%
Tongan	2	0.2%	0.3%
Samoan	3	0.4%	0.5%
Guamanian or Chamorro	3	0.4%	0.5%
Other Pacific Islander	10	1.2%	1.5%
Chinese	66	7.9%	10.2%
Japanese	121	14.4%	18.6%
Spanish, Hispanic, or Latino	31	3.7%	4.8%
American Indian	18	2.1%	2.8%
Black or African American	10	1.2%	1.5%
Asian Indian	2	0.2%	0.3%
Vietnamese	2	0.2%	0.3%
Filipino	107	12.8%	16.5%
Korean	6	0.7%	0.9%
Total	839	100.0%	129.3%

Dichotomy group tabulated at value 1.

Which of the following best describes your yearly household income before taxes? (Mark only one)

	Frequency	Valid Percent	Cumulative Percent
Less than \$10,000	15	2.4	2.4
\$10,000 to \$14,999	14	2.2	4.6
\$15,000 to \$24,000	25	4.0	8.6
\$25,000 to \$34,000	46	7.3	15.9
\$35,000 to \$49,000	77	12.3	28.2
\$50,000 to \$74,999	150	23.9	52.1
\$75,000 to \$99,000	111	17.7	69.7
\$100,000 to \$149,000	122	19.4	89.2
\$150,000 to \$199,000	34	5.4	94.6
\$200,000 or more	34	5.4	100.0
Total	628	100.0	

Which best reflects the highest level of education that you completed? (Mark only one)

Which of the following best describes your education level?

	Frequency	Valid Percent	Cumulative Percent
Less than 9th grade	5	1.0	1.0
9th to 12th grade (no diploma)	9	1.8	2.9
High school graduate (includes GED equivalency)	66	13.4	16.3
Some college, no degree	115	23.4	39.7
Associates degree	56	11.4	51.1
Bachelor's degree	141	28.7	79.8
Graduate or professional degree	99	20.2	100.0
Total	491	100.0	

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