



NOAA
CORAL REEF
CONSERVATION PROGRAM



NCRMP Socioeconomic Monitoring For Hawaii



Presented By: NCRMP Socioeconomic Team

**NOAA Coral Reef Conservation Program
& National Centers for Coastal Ocean Science**

for more information, visit the web-portal at:

<http://www.coris.noaa.gov/monitoring/socioeconomic.html>

June 16, 2016

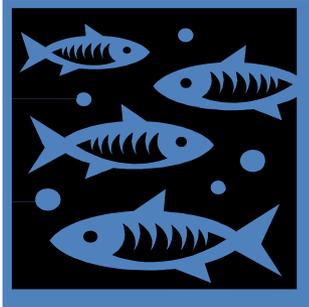


Outline

- Background on the National Coral Reef Monitoring Program's Socioeconomic Component
- Social survey for Hawaii
 - Methods
 - Results
 - Applications of the data
- Questions and opportunities for input



National Coral Reef Monitoring Plan

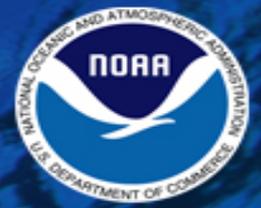


Biological
Indicators

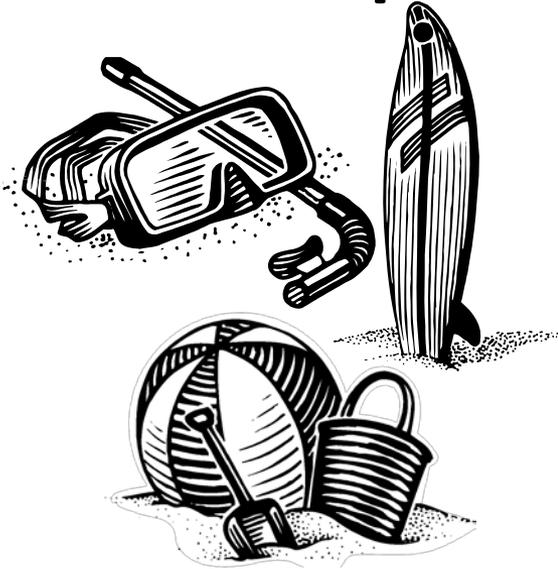
Climate
Indicators



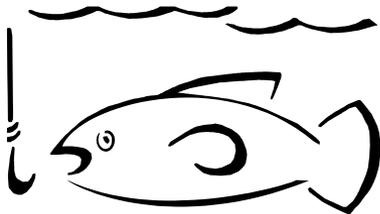
Socioeconomic
Indicators



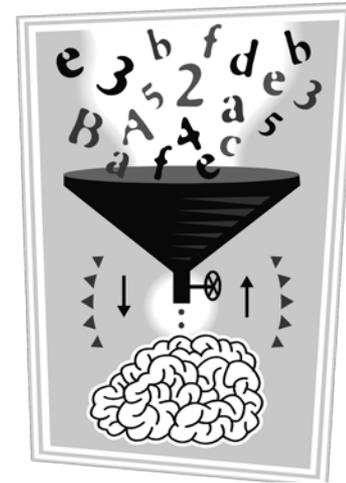
Socioeconomic Component: Examples of the types of data we collect



Use of coral reef resources



Population change



Knowledge, attitudes, & perceptions of coral reefs and coral reef management



Socioeconomic Monitoring Approach

- ❖ Data collection occurs through
 - ❖ Surveys of residents in coral reef jurisdictions
 - ❖ Synthesis of existing socioeconomic data
- ❖ Resulting data will feed into several products
 - ❖ Social science database
 - ❖ Data products such as infographics, posters, presentations, and publications
 - ❖ NCRMP report cards



Project Team

- ❖ Peter Edwards
- ❖ Arielle Levine
- ❖ Maria Dillard
- ❖ Jarrod Loerzel
- ❖ NCCOS social science team
- ❖ Jurisdictional management agencies
- ❖ Key jurisdictional stakeholders
- ❖ CRCP and NMFS management liaisons





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MONITORING METHODS: Survey





Indicators for NCRMP Social Monitoring

- * Participation in reef activities
- * Perceived resource condition
- * Attitudes towards coral reef management strategies and enforcement
- * Awareness and knowledge of coral reefs
- Human population changes near coral reefs
- Economic impact of coral reef fishing to jurisdiction
- Economic impact of dive/snorkel tourism to jurisdiction
- Community well-being
- * Cultural importance of reefs
- * Participation in behaviors that may improve coral reef health
- Physical infrastructure
- * Awareness of coral reef rules and regulations
- Governance



Survey Methodology

- ❖ Core module vs. jurisdiction specific module:
 - ❖ Asking some of the same questions in all areas allows comparisons across jurisdictions
 - ❖ Asking some specific questions for each area allows jurisdictional management and resource issues to be addressed
- ❖ Survey sample:
 - ❖ Random sample of adult residents in the jurisdiction
 - ❖ Representative of population demographics (age, race, sex, income)
- ❖ Survey implementation:
 - ❖ By a contracted entity with experience conducting surveys in the jurisdiction
 - ❖ Survey mode for HI was phone (included cell and landline) in English



Social Monitoring by Geography and Year

Jurisdiction	Geographic scope	Year
American Samoa	Island of Tutuila	2013-14
Florida	Martin, Palm Beach, Broward, Miami-Dade, Monroe Co.	2013-14
Hawai'i	Islands of Kauai, Maui, Moloka'i, O'ahu, Hawai'i, Lana'i	2014-15
Puerto Rico	Islands of Puerto Rico, Vieques, Culebra	2014-15
CNMI	Islands of Saipan, Tinian, Rota	2015-16
Guam	Entire island of Guam	2015-16
USVI	Islands of St. Croix, St. Thomas, St. John	2016-17

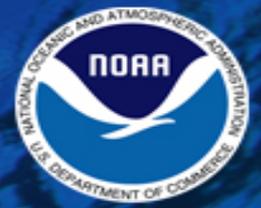


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MONITORING RESULTS: Survey



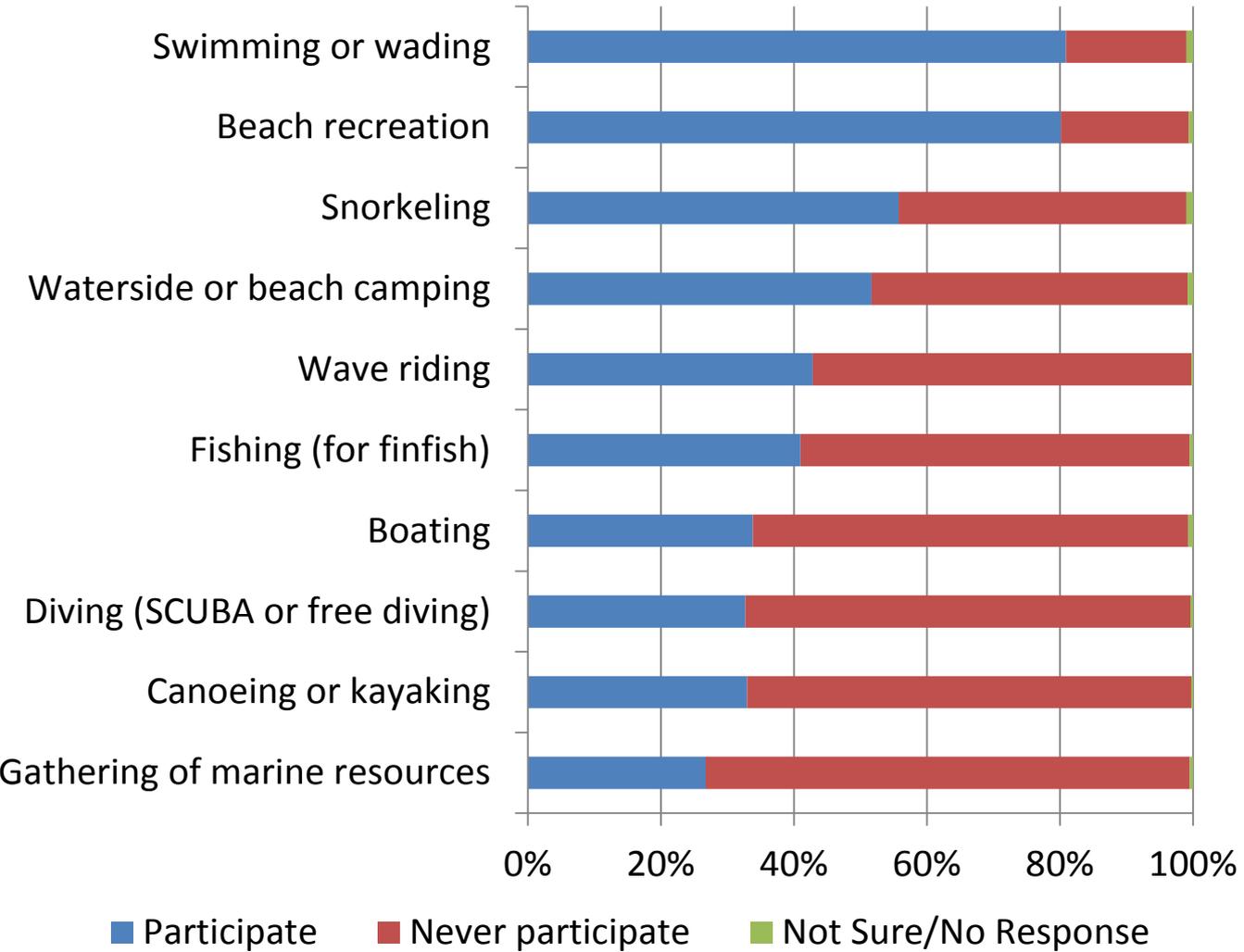


The Sample

Island	# of Completed Interviews	% of Completed Interviews	Margin of Error	Response Rate**
Oahu	653	29.2%	3.83	27.2%
Hawaii	620	27.7%	3.90	33.6%
Maui	476	21.3%	4.49	25.7%
Kauai	425	19.0%	4.75	29.5%
Molokai	51	2.3%	13.72	N/A
Lanai	15	0.7%	25.3	N/A
Total	2,240	100%	2.06	28.6%

- Total of 2,240 with a margin of error of +/-2% and a 95% confidence interval.
- An overall response rate of 29%.
- Both cell and landline telephone sample frames were used; the completed surveys represent a near even split across the two.

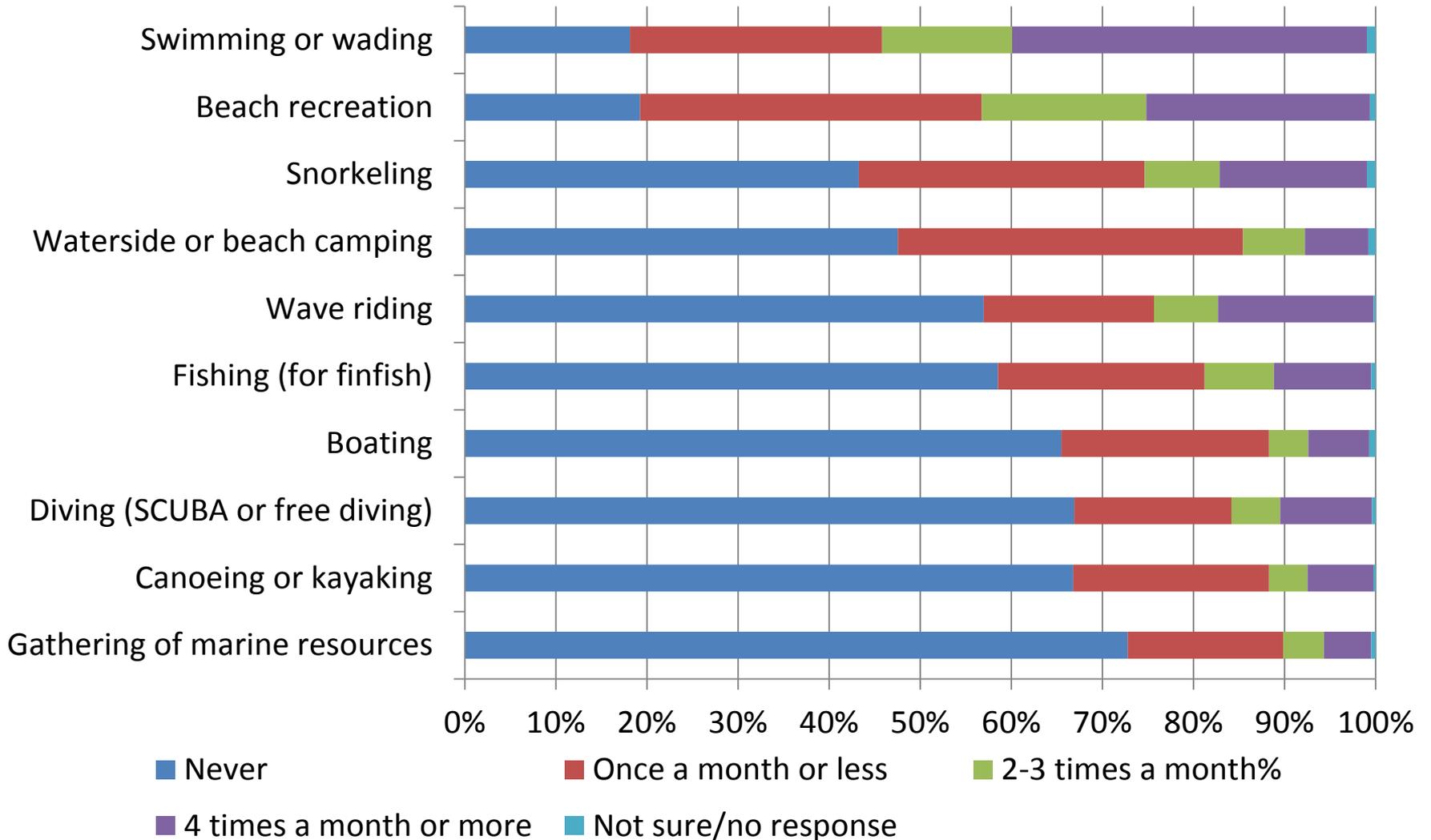
Participation in Coral Reef Activities



➤ The recreation activities with the highest level of participation were swimming/wading (80.9%) and beach recreation (80.2%).

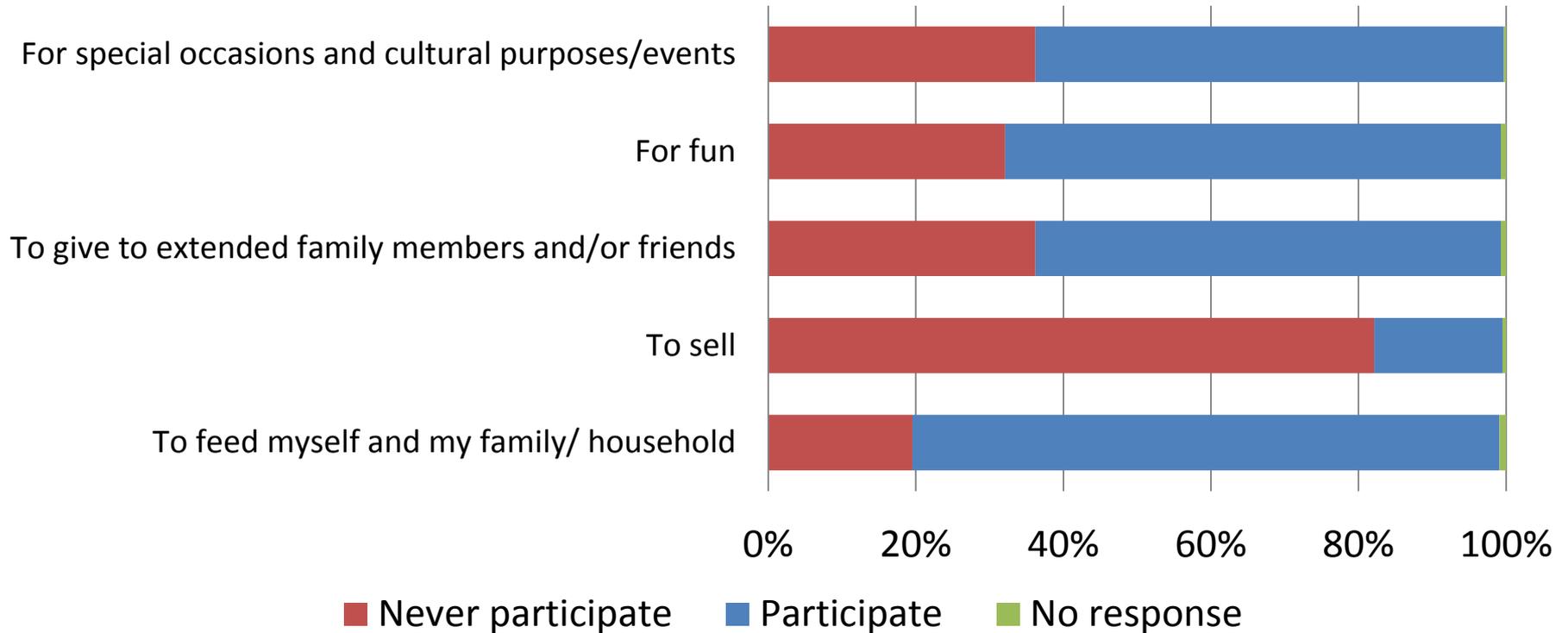
➤ The recreation activities with the greatest proportion of respondents who never participate were gathering of marine resources (72.8%), diving (66.9%), canoeing or kayaking (66.8%), and diving (65.5%).

Participation in Coral Reef Activities





Reasons for participation in fishing or harvesting marine resources

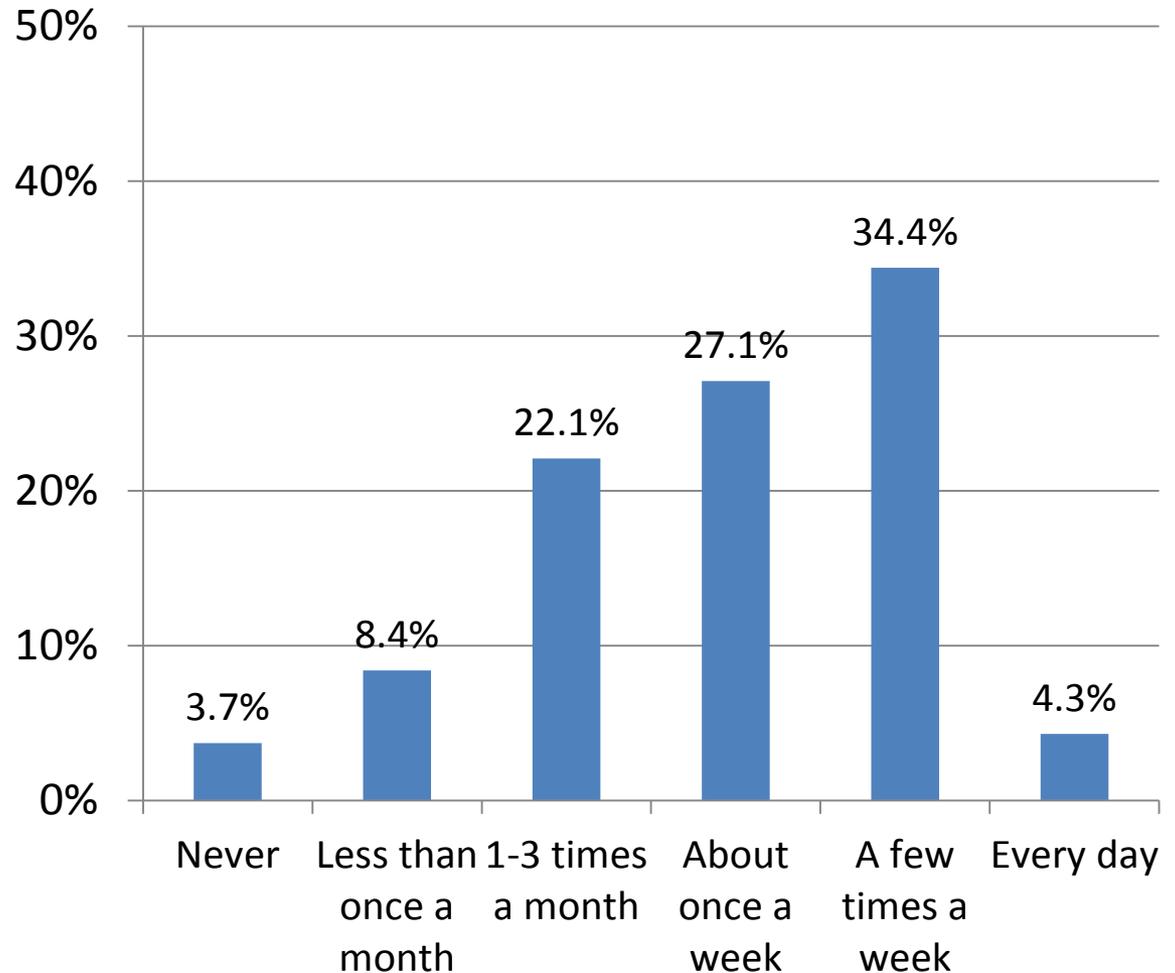


- The reason for fishing or harvesting marine resources with the highest level of participation was “To feed myself and my family/household” (80.2%).
- The reason for fishing or harvesting marine resources with the lowest level of participation was “To sell” (82.5% Never participate).

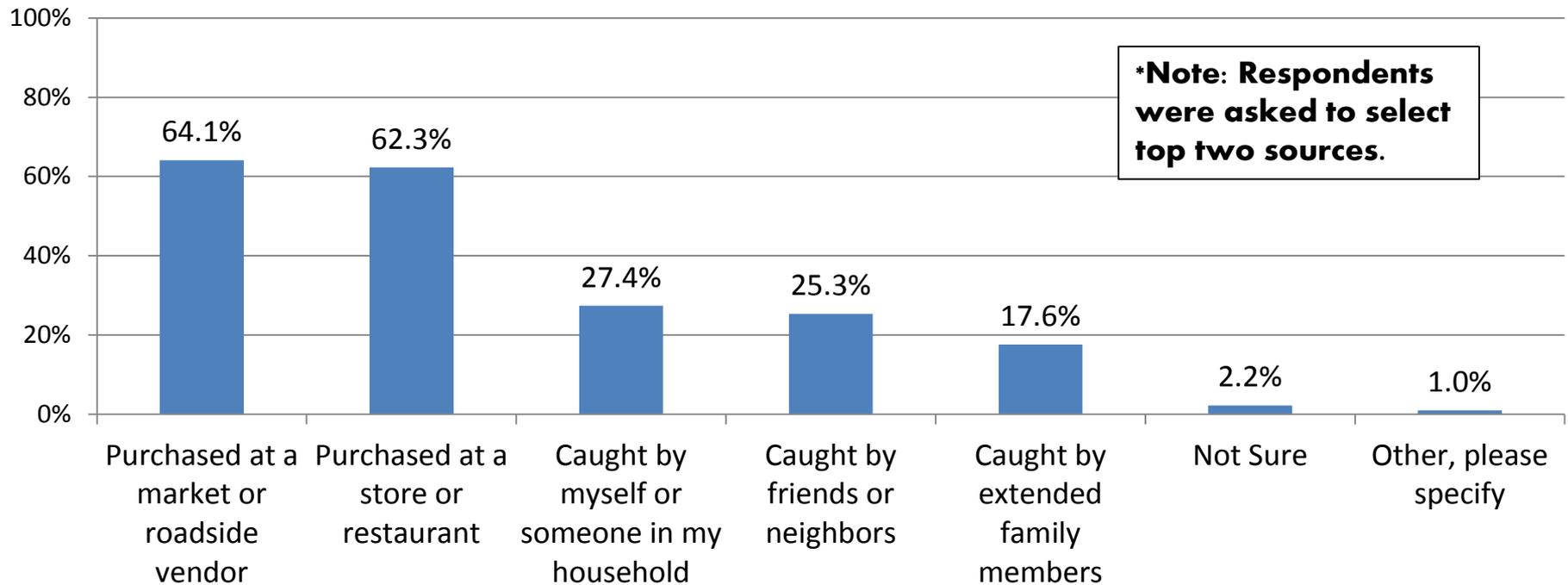


Frequency of Fish/Seafood Consumption for Respondents and their Household

- The majority of respondents (65.8%) ate seafood at least once a week.
- A very large proportion of respondents (87.9%) ate seafood at least once a month.



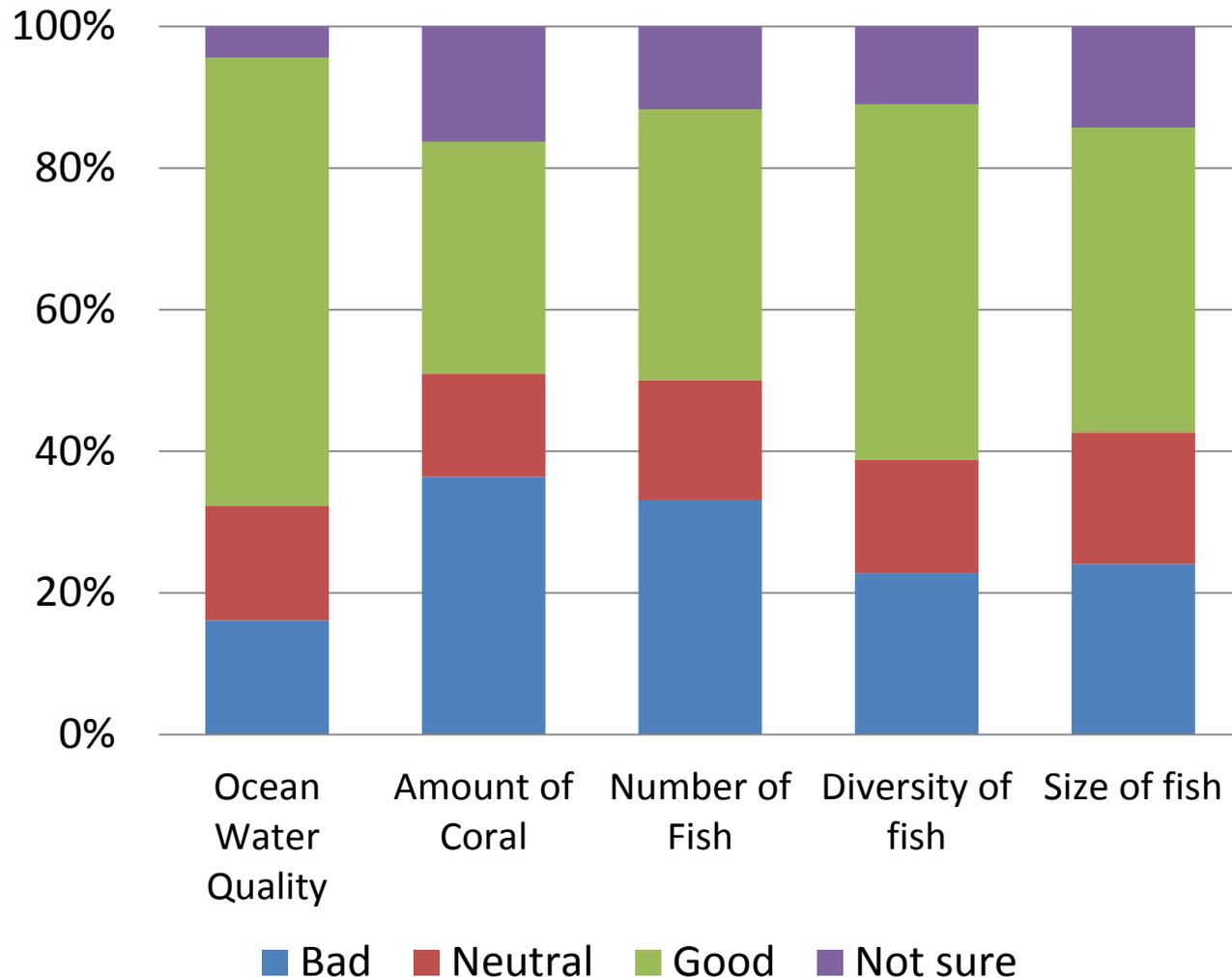
Main Source of Fish and Seafood for Personal and Household Consumption



- The source chosen most as a main source of fish and seafood was “Purchased by myself or someone in my household at a market or roadside vendor” (64.1%) followed closely by “Purchased...at a store or restaurant” (62.3%).
- The source chosen least as a main source of fish and seafood was “Caught by extended family members” (17.6%).



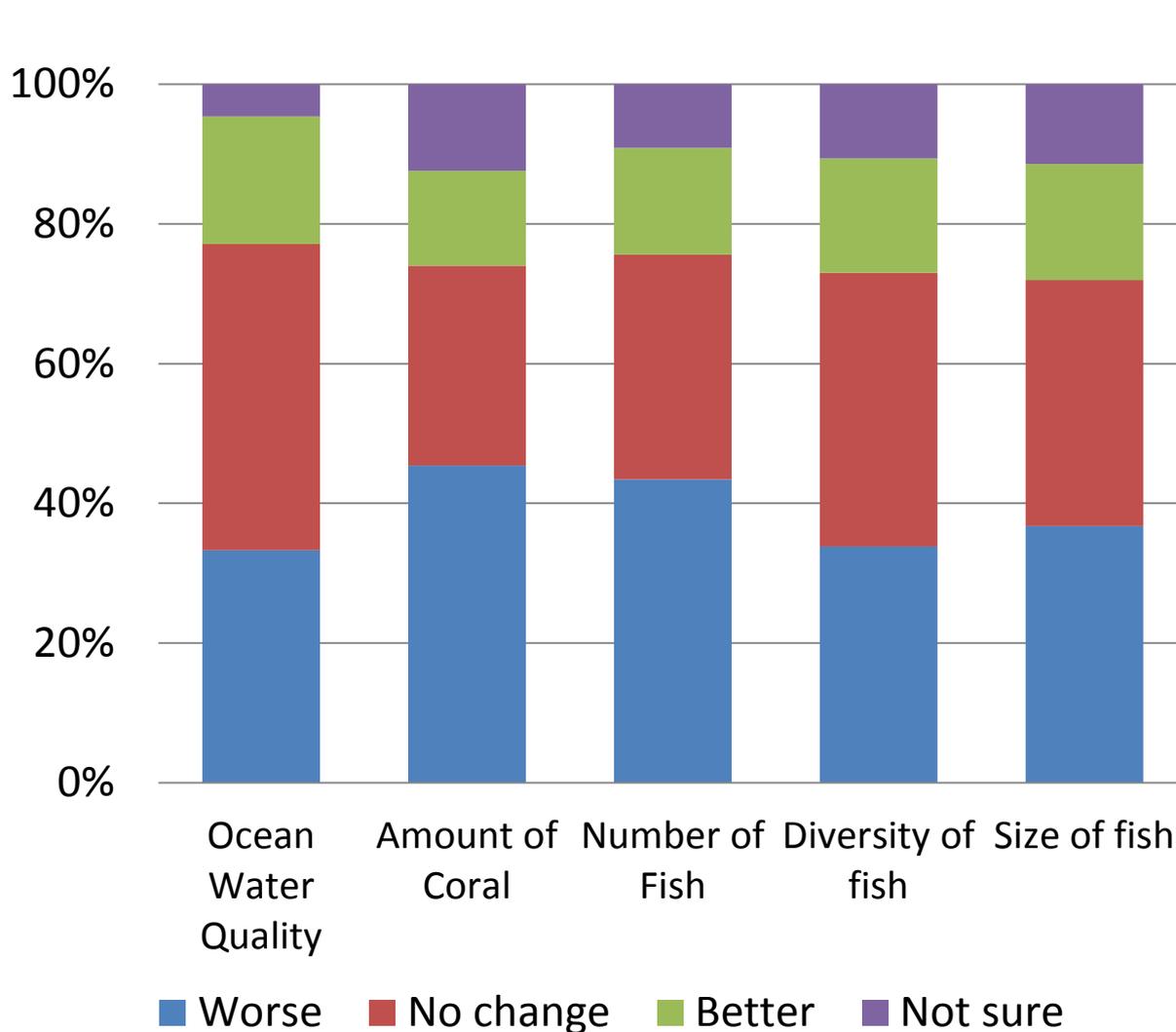
Perceptions of Current Resource Conditions



➤ The resources considered to be in the best condition were Ocean Water Quality (63.3%) and Diversity of Fish (50.2%).

➤ The resources considered to be in the worst condition were Amount of Coral (36.4%) and Number of Fish (33.1%).

Perceptions of Change in Resource Conditions Over the Last 10 Years

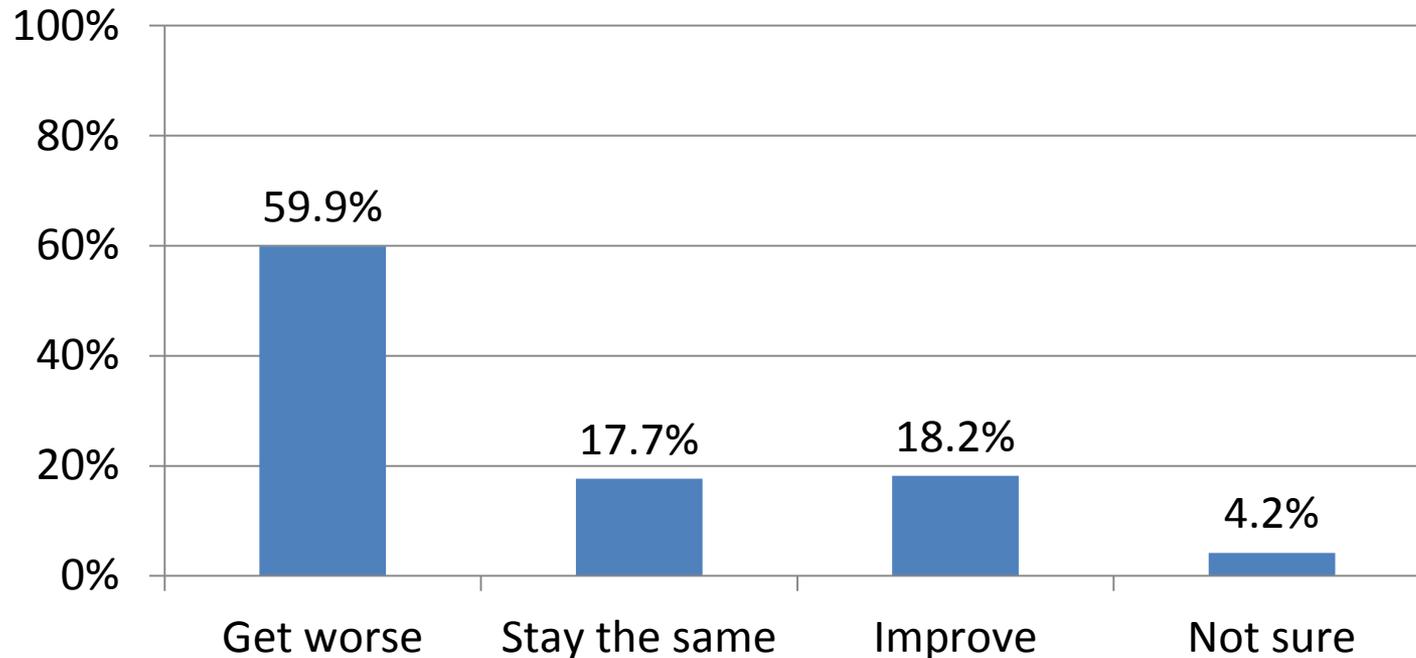


➤ When compared to other resources, Ocean Water Quality is perceived to be stable or improving by more people with 43.8% stating “no change” and 18.3% stating it had gotten better.

➤ When compared to other resources, more people perceived declines in Amount of Coral (45.4%) and Number of Fish (43.3%).

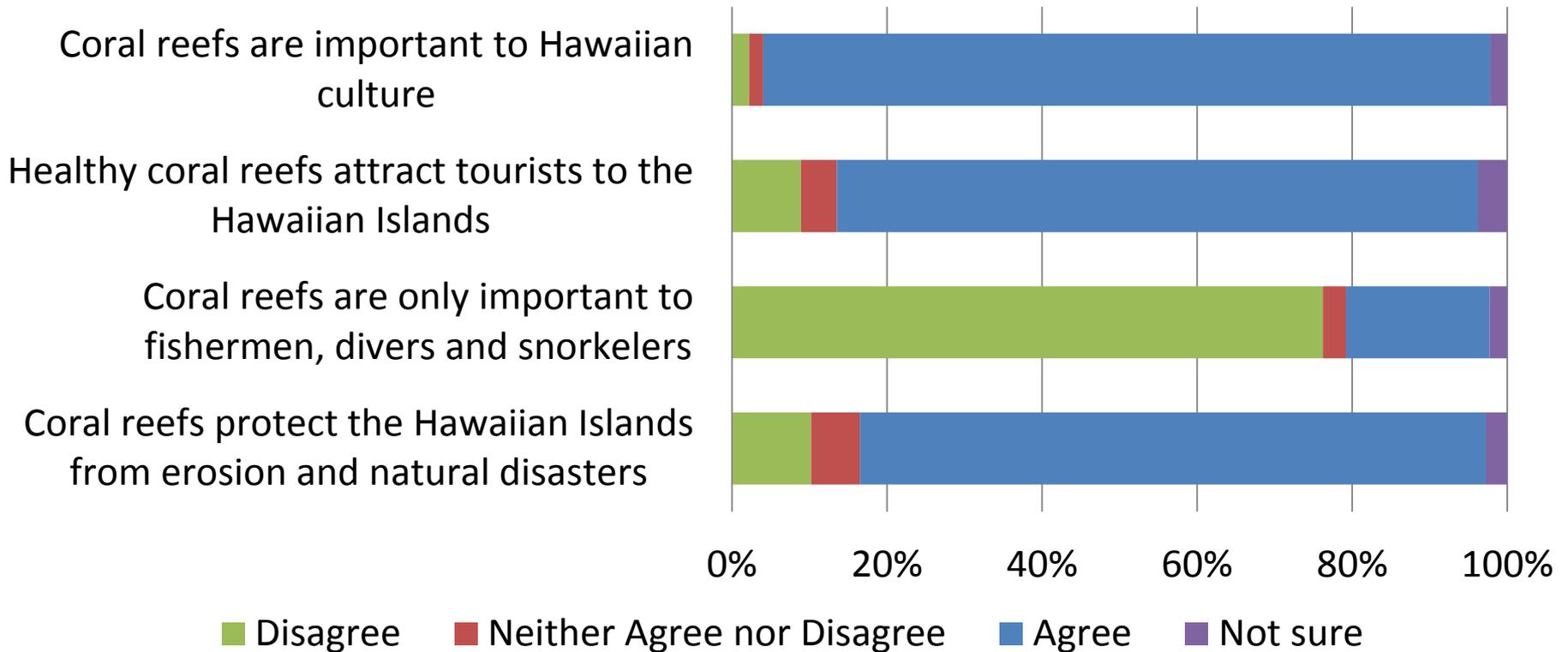
➤ Over 1/4 of respondents felt there was “No change” in resource conditions over the last 10 years for each of the resources.

Perceptions of Anticipated Change in Resource Conditions Over the Next 10 Years



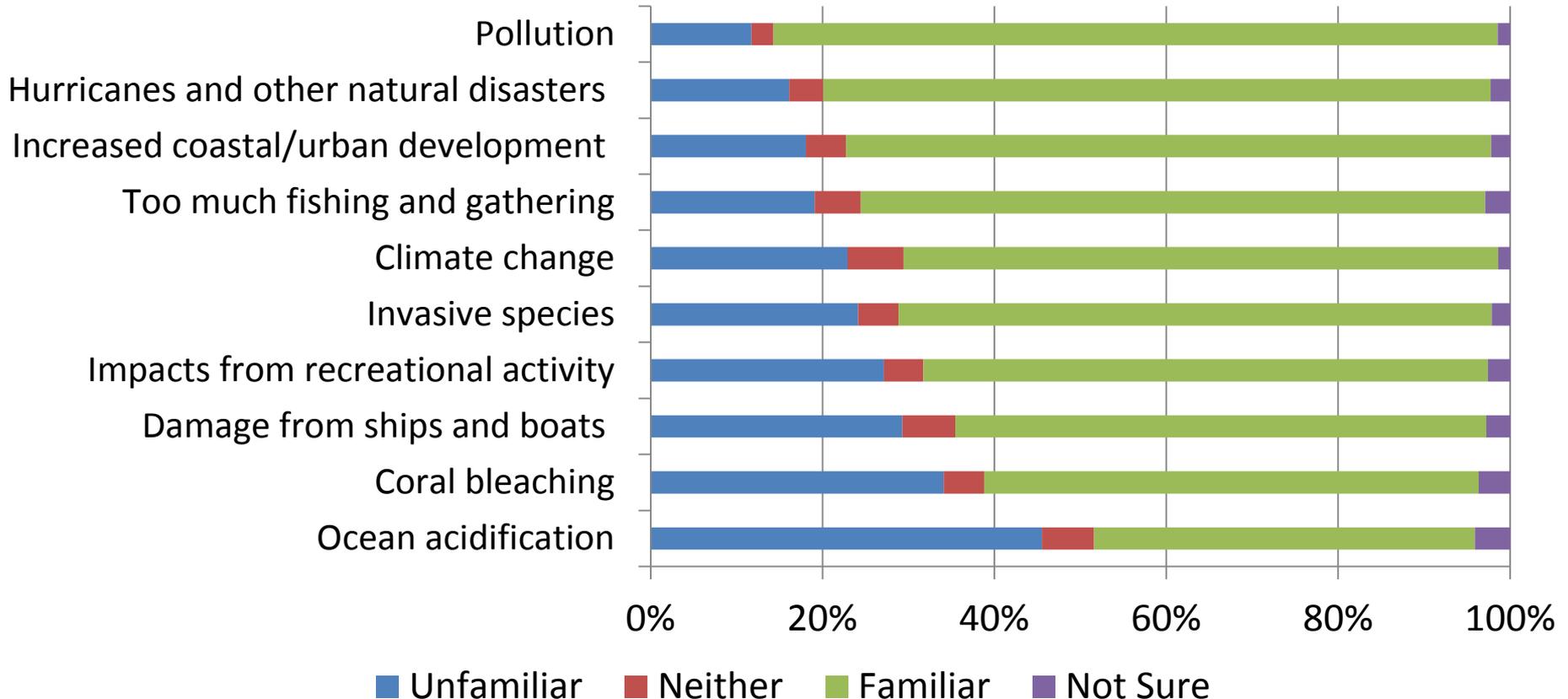
- The majority of respondents (59.9%) anticipated the overall resource condition will get worse over the next 10 years.
- 18.2% of respondents anticipated the resource condition will improve.
- 17.7% of respondents anticipated the resource condition will stay the same , while 4.2% were not sure.

Agreement with Statements of Coral Reef Value



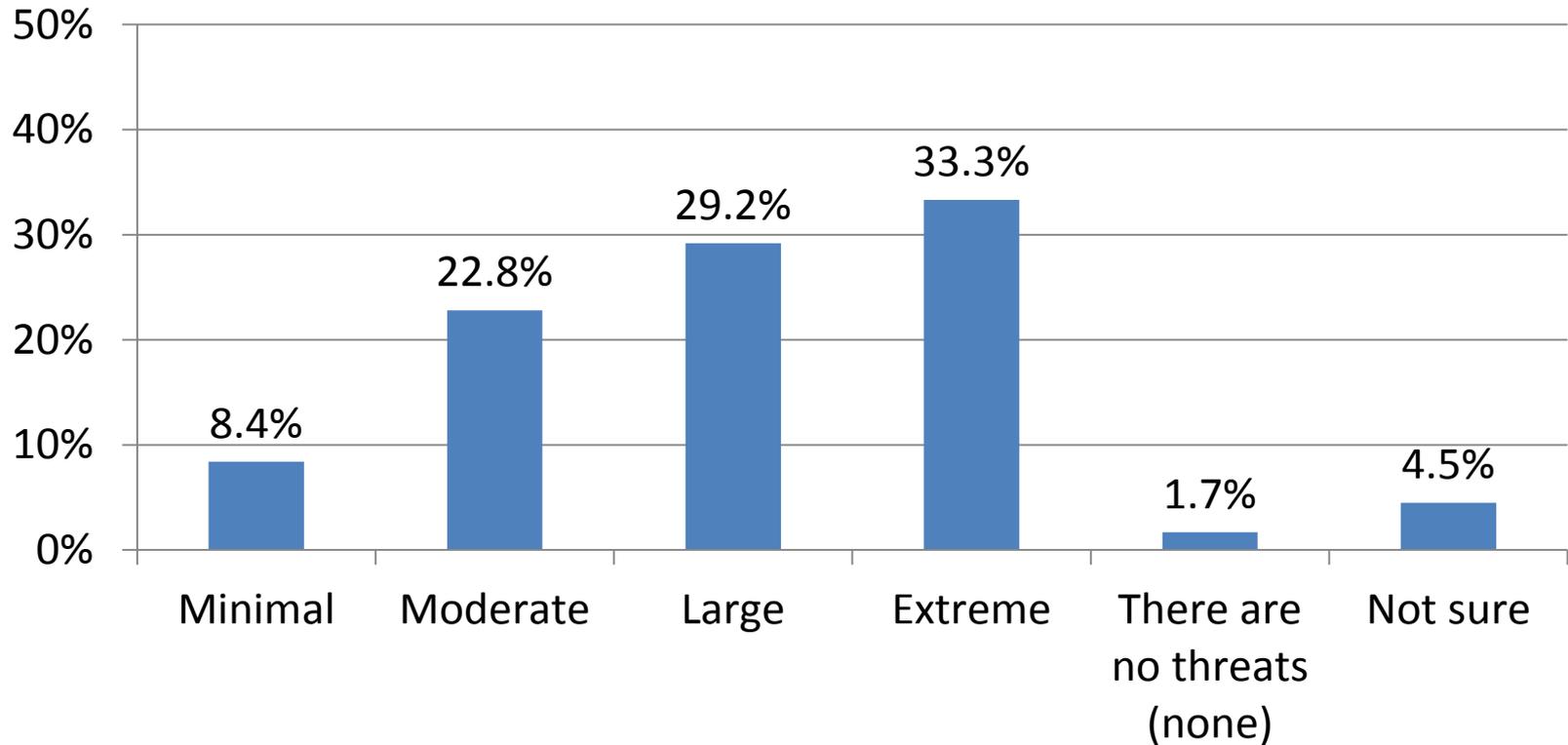
- The statement that respondents agreed the most with was “Coral Reefs are important to Hawaiian culture” (93.8%).
- The statement that respondents disagreed the most with was “Coral reefs are only important to fisherman, divers, and snorkelers” (76.2%).

Familiarity with Threats Facing Coral Reefs



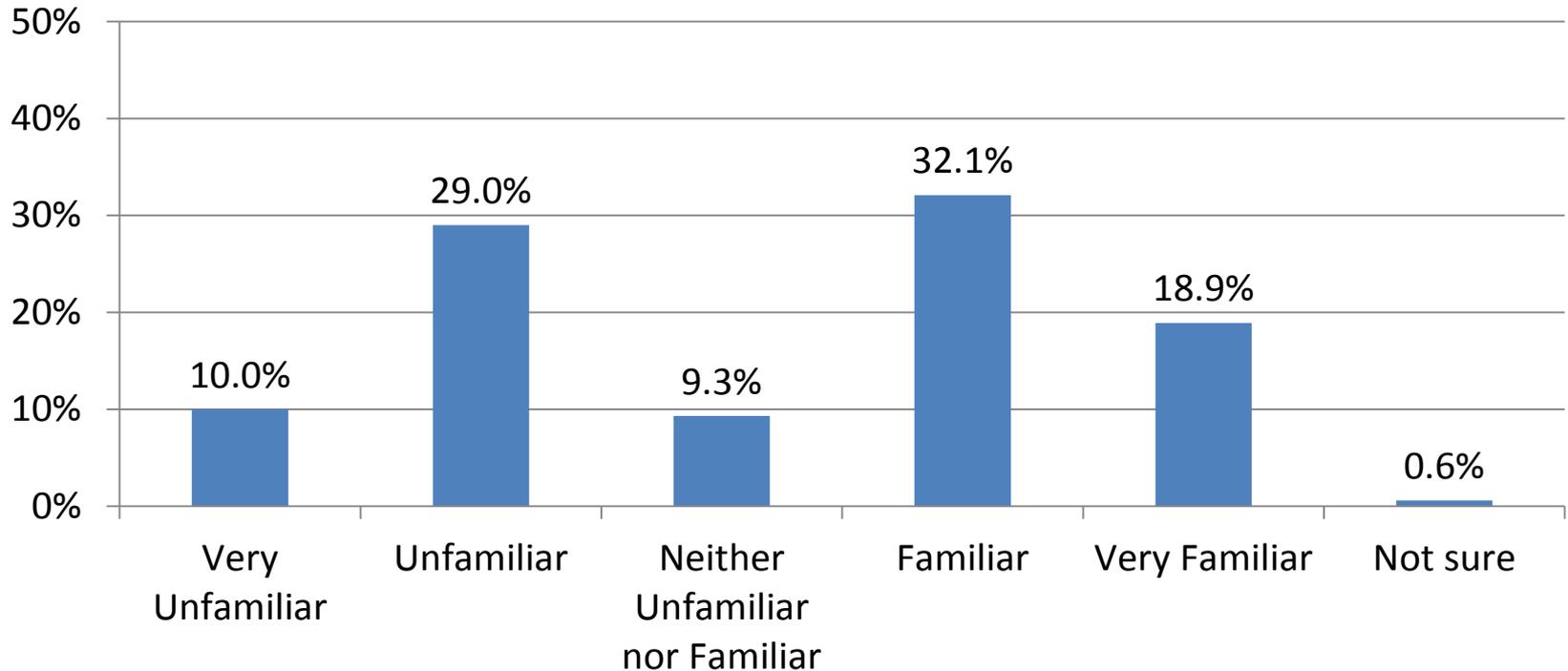
- The majority of respondents (>50%) were familiar with each of the threats facing coral reefs except Ocean Acidification (44.3%). Ocean Acidification had the highest proportion of respondents who were unfamiliar with the threat (45.6%).
- Respondents were most familiar with Pollution (84.3%) and Hurricanes and other natural disasters (77.6%)

Perceptions of the Level of Threat to Coral Reefs



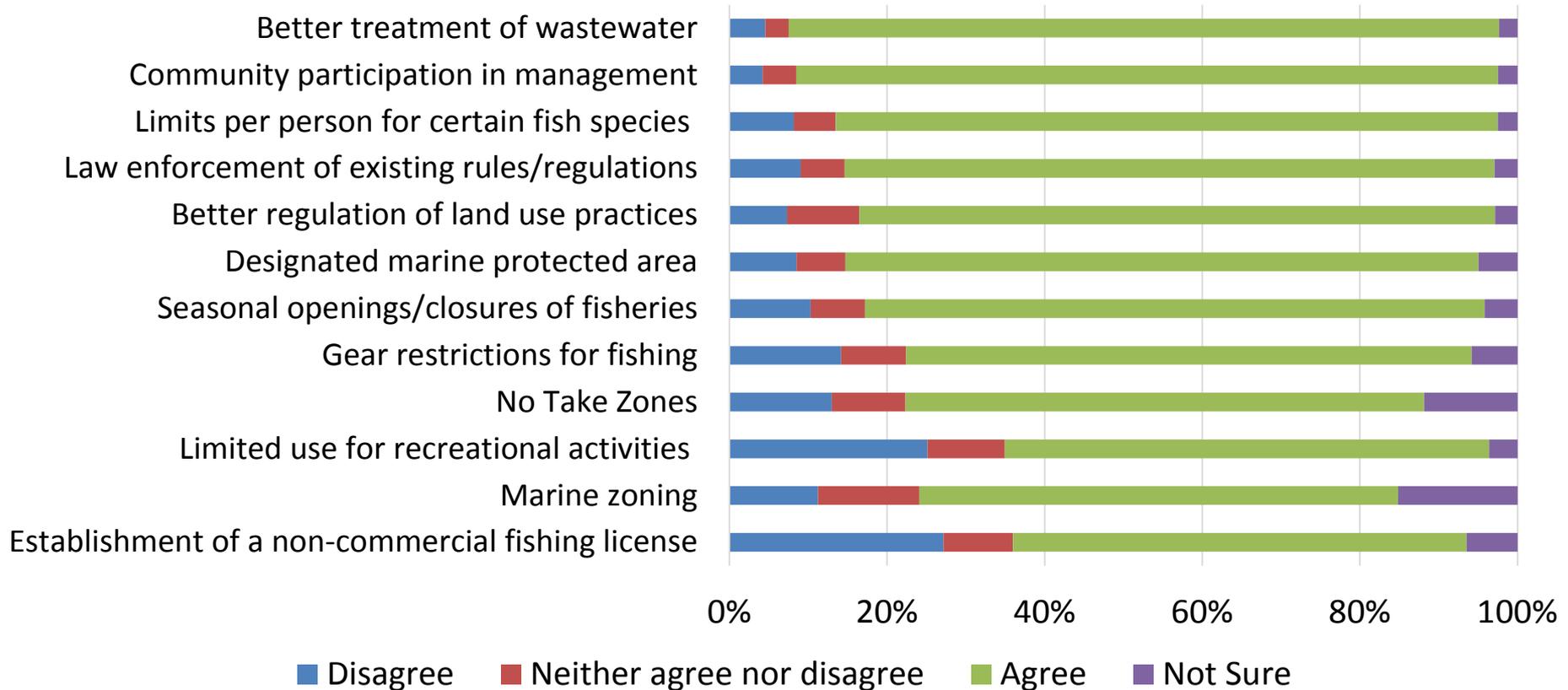
- Over half of respondents (62.5%) perceived the level of threat to coral reefs as Large or Extreme.
- Slightly over one quarter of respondents (31.2%) perceived the level of threat to coral reefs as Minimal or Moderate
- Only 1.7% believed there are no threats and 4.5% were not sure.

Familiarity with MPAs



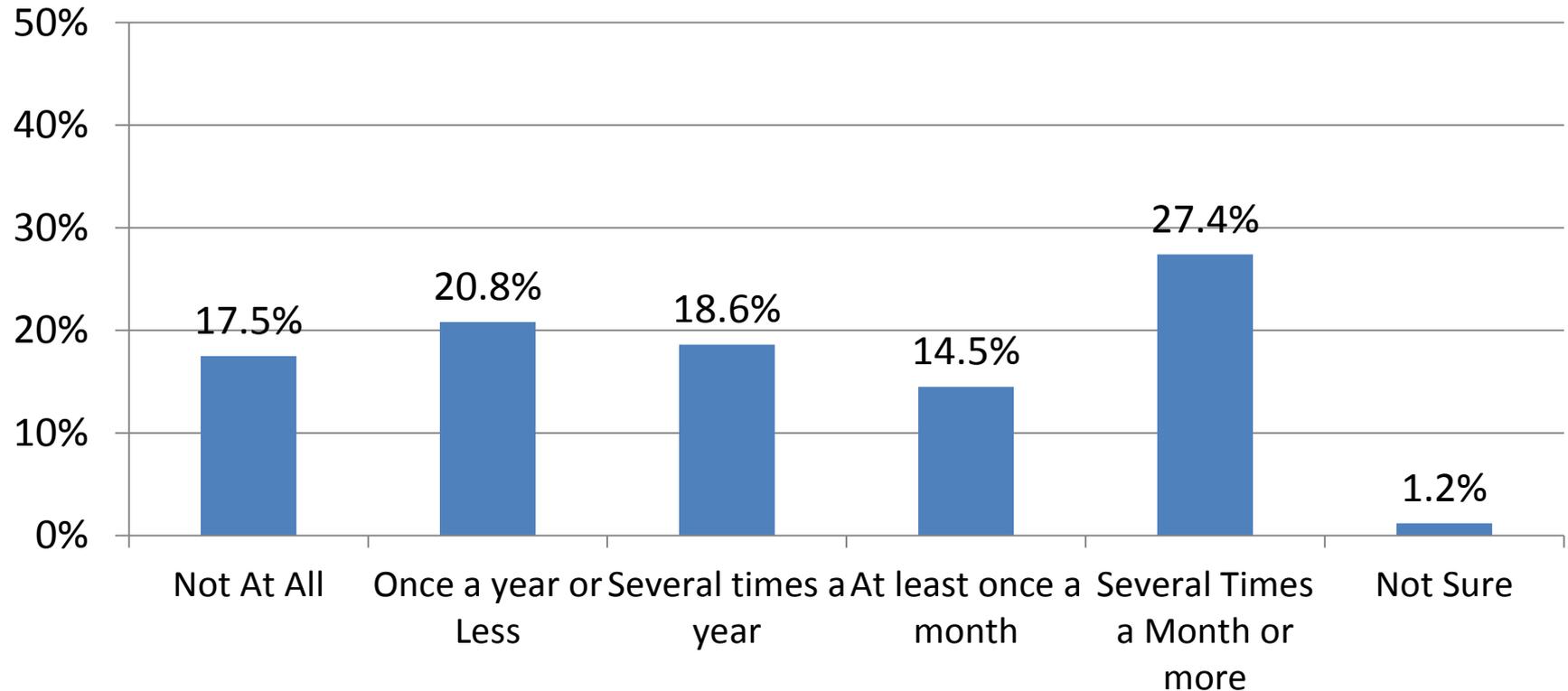
- Just over half (51.0%) of respondents were familiar or very familiar with MPAs
- 39.0% were unfamiliar or very unfamiliar with MPAs

Support for Management Strategies



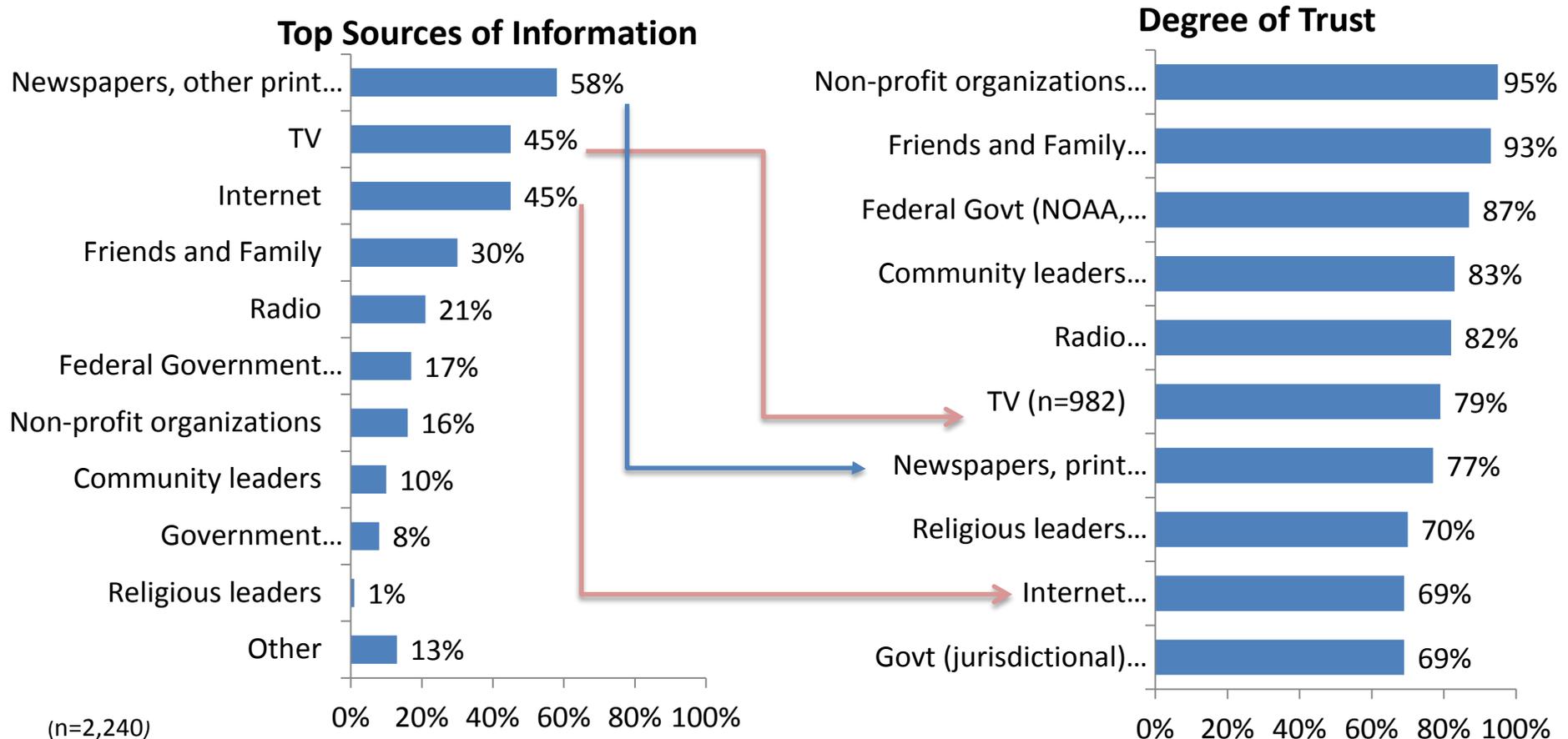
- At least half of respondents agreed with all the presented management strategies.
- Respondents agreed the most with “Better treatment of wastewater” (90.1%) and “Community participation in marine management” (89.0%).
- Respondents disagreed most with “Establishment of a non-commercial fishing license” (27.2%) and “Limited use for recreational activities” (25.2%).

Frequency of Participation in Any Activity to Protect the Environment



- Over half of respondents (60.5%) state that they participate in pro-environmental activities at least several times a year (which includes “Several times a year” + “At least once a month” + “Several times a month or more”).
- 20.8% participate once a year or less.
- 17.5% never participate.

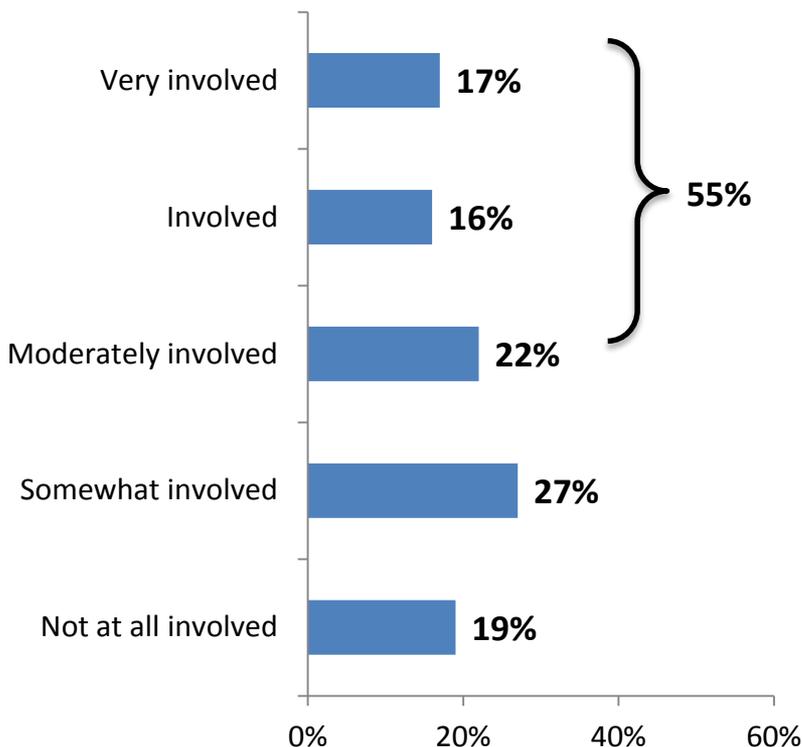
Respondents' Top Sources for Information about Coral Reefs and the Environment and Source Trust



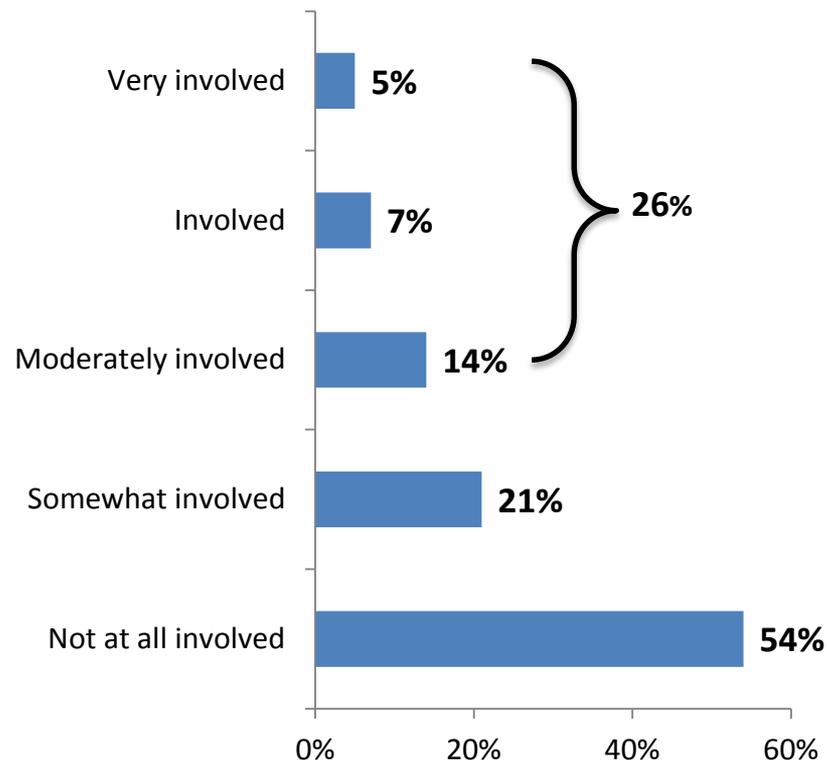
- Print publications (58%), TV (45%), and the internet (45%) are the top sources of information about coral reefs and the environment.
- However, these top sources are perceived to be less trustworthy than other sources chosen by respondents.

Perceptions of Individual and Community Involvement in Coral Reef Management & Decision Making

How involved is your local community in protecting and managing coral reefs?



How involved are YOU in making decisions related to the management of coral reefs in Hawaii?



- Just over half of the respondents (55%) perceive their local communities as at least moderately involved in protecting and managing coral reefs.
- However, only about a quarter (26%) of respondents indicated moderate or higher involvement themselves

Respondent Demographic Characteristics

Gender	Percent
Male	53%
Female	47%

Age	Percent
70 + year olds	16%
50 – 69 year olds	45%
30 – 49 year olds	27%
18 – 29 year olds	12%

Year(s) of Residence	Percent
1 year or less	4%
2-5 years	9%
6-10 years	8%
More than 10 years (less than all my life)	43%
All my life	36%

Education Level	Percent
Less than high school	3%
High School Graduate, GED	21%
Some college, community college or AA	29%
College Graduate	31%
Graduate School, Law School, Medical School	16%

Respondent Demographic Characteristics

Annual Household Income	Percent
Under \$10,000	10%
\$10,000 to \$19,999	9%
\$20,000 to \$29,999	12%
\$30,000 to \$39,999	9%
\$40,000 to \$49,999	9%
\$50,000 to \$59,999	9%
\$60,000 to \$74,999	9%
\$75,000 to \$99,999	12%
\$100,000 to \$149,999	11%
\$150,000 or More	8%

Employment Status	Percent
Unemployed	6%
Student	3%
Employed full-time	47%
Homemaker	4%
Employed part-time	8%
Retired	27%
NA	5%

Respondent Demographic Characteristics

Languages Spoken	Percent
English	96%
Spanish	11%
Hawaiian	9%
Tagolog	7%
Japanese	5%
French	4%
Illocano	4%
Chinese	2%
Hawaii Pidgin English	2%
Korean	1%
Sāmoan	1%
Tongan	0.4%
Vietnamese	0.2%
Chamorro	0.1%
Carolinian	0%
Other	6%

Race/Ethnicity	Percent
White	52%
Native Hawaiian	17%
Filipino	13%
Japanese	12%
Hispanic or Latino	5%
Chinese	5%
American Indian or Alaskan Native	2%
Other Asian	2%
Black or African American	2%
Micronesian	1%
Korean	1%
Other Pacific Islander	1%
Samoan	1%
Vietnamese	0.3%
Tongan	0.2%
Other	4%



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MONITORING APPLICATIONS: Survey



Perception of Resource Condition & Tenure

Hawaiian Resource	Lived In Hawaii for 10 Years or Less		Lived In Hawaii for More Than 10 Years		Statistical test for difference	
	n	Mean	n	Mean	t	p
<i>Current Conditions</i>						
Ocean water quality	438	3.82	1704	3.61	3.94***	<0.01
Amount of coral	384	3.14	1492	2.85	4.25***	<0.01
Number of fish	399	3.37	1578	2.98	6.22***	<0.01
Diversity of Fish	406	3.65	1588	3.31	5.93***	<0.01
Size of Fish	381	3.58	1539	3.18	6.86***	<0.01
<i>Change in conditions over last 10 years</i>						
Ocean water quality	412	2.95	1726	2.77	3.09***	<0.01
Amount of coral	394	2.59	1569	2.47	1.99**	0.05
Number of fish	395	2.79	1641	2.55	4.13***	<0.01
Diversity of Fish	392	2.94	1611	2.71	3.99***	<0.01
Size of Fish	379	2.89	1605	2.66	3.80***	<0.01

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level

- Higher mean values indicate a more positive perception.
- Respondents who have lived in Hawaii longer had an overall more pessimistic perception as it pertains to the current condition of marine resources as well the change in condition over the last ten years when compared to respondents who have lived in Hawaii for less time.

Who is your audience?

Information Source & Demographics

	Demographics														
	Male	Female	Older Age	Younger Age	Lived in Hawaii for 10 years or less	Lived in Hawaii for more than 10 years	Completed College	Did Not Complete College	More Annual Income	Less Annual Income	White	Native Hawaiian/ other Pacific Islander	Filipino	Japanese	Hispanic
Coral Reef Information Source															
Newspaper/Print		✓	✓			✓								✓	
Radio								✓		✓			✓		
TV			✓			✓		✓		✓		✓	✓	✓	
Internet	✓			✓	✓		✓		✓		✓				
Friends and family		✓		✓							✓	✓			
Community Leaders				✓											✓
Religious Leaders		✓						✓		✓					
Jurisdiction government	✓											✓			
Federal government agencies (NOAA, EPA)	✓						✓		✓		✓				
Non-Profit Organizations		✓		✓	✓		✓				✓				



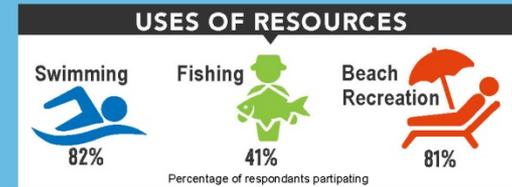
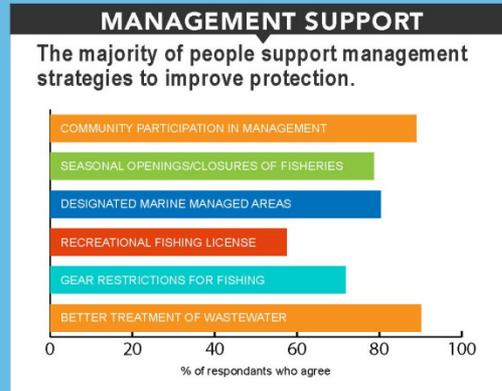
Products

- Presentations, infographics, technical reports for American Samoa and Florida
- Coming soon:
 - Poster highlighting findings for Hawaii
 - Technical report for Hawaii

CONNECTIONS BETWEEN **CORAL REEFS & COASTAL COMMUNITIES**

NOAA's Coral Reef Conservation Program monitors the biological, socioeconomic, and climate conditions of US coral reef areas and communities. This includes collection of socioeconomic variables including demographics, human use of coral reef resources, as well as knowledge, attitudes, and perceptions of coral reefs and coral reef management through the use of surveys and existing data. The takeaways below are based on the survey results for Hawaii.

TAKEAWAYS FROM HAWAII

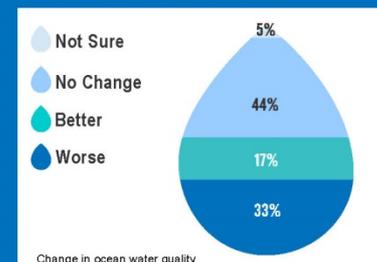
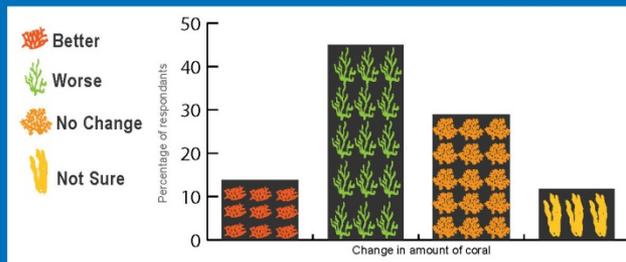


TENURE & CONDITION

Years of residence impacts perceptions of marine resource conditions. Residents who have lived in Hawaii for over 10 years are more likely to have a more negative opinion concerning the condition of marine resources.

PERCEPTIONS

PARTICIPANTS WERE ASKED HOW THE AMOUNT OF CORAL AND CONDITION OF OCEAN WATER QUALITY HAS CHANGED IN THE PAST 10 YEARS...





❖ **Analyses are ongoing**

- ❖ Linkages between biological, climate, and social data will be explored

❖ **Input needed**

- ❖ Are there results you would like to see further examined?
- ❖ Are there information products that would be especially useful?

❖ **Need more information?**

- ❖ CRCP: Peter Edwards peter.edwards@noaa.gov or Arielle Levine arielle.levine@noaa.gov
- ❖ NCCOS: Maria Dillard maria.dillard@noaa.gov or Jarrod Loerzel jarrod.loerzel@noaa.gov
- ❖ Visit <http://www.coris.noaa.gov/monitoring/socioeconomic.html>



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Additional Slides



Perceptions of Resource Condition & Education

Hawaii Resource	Did not complete college		Completed college		Statistical test for difference	
	n	Mean	n	Mean	t	p
Current Conditions						
Ocean water quality	1094	3.68	974	3.63	1.10	0.27
Amount of coral	944	3.04	866	2.77	4.84***	<0.01
Number of fish	1010	3.21	902	2.90	5.76***	<0.01
Diversity of Fish	1019	3.47	910	3.28	3.84***	<0.01
Size of Fish	1008	3.40	849	3.11	5.63***	<0.01
Change in conditions over last 10 years						
Ocean water quality	1097	2.93	970	2.67	5.43***	<0.01
Amount of coral	1001	2.66	894	2.29	7.37***	<0.01
Number of fish	1033	2.76	936	2.41	7.02***	<0.01
Diversity of Fish	1025	2.88	913	2.62	5.34***	<0.01
Size of Fish	1033	2.87	886	2.51	7.34***	<0.01

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level

- Higher mean values indicate a more positive perception.
- More education is associated with more pessimistic perceptions of conditions of marine resources, as well as the change over the last 10 years.
- This relationship was also found in American Samoa and Florida.

Management Support & Tenure

Management Approach	Lived In Hawaii for 10 Years or Less		Lived In Hawaii for More Than 10 Years		Statistical test for difference	
	n	Mean	n	Mean	t	p value
Better regulation of land use practices	451	4.08	1725	4.15	-1.56	0.12
Limits per person for certain fish species	452	4.17	1732	4.15	0.35	0.73
Seasonal openings/closures of fisheries	442	4.04	1705	4.03	0.03	0.97
Gear restrictions for fishing	440	3.90	1670	3.86	0.72	0.47
Better treatment of wastewater	455	4.47	1733	4.39	2.26**	0.02
Law enforcement of existing rules/regs	455	4.16	1720	4.09	1.51	0.13
Community participation in management	456	4.30	1729	4.26	1.13	0.26
Marine zoning	386	3.77	1515	3.79	-0.21	0.84
Designated marine protected area	444	4.13	1685	4.00	2.65***	<0.01
Limited use for recreational activities	452	3.51	1707	3.50	0.11	0.91
No Take Zones	417	3.87	1558	3.80	1.32	0.19
Est a non-commercial fishing license	435	3.58	1660	3.39	3.08***	<0.01

* = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level

Perceptions of Management & Fishing Activity

Management Approach	Respondent DOES NOT participate in fishing		Respondent participates in fishing		Statistical test for difference	
	n	Mean	n	Mean	t	p value
Limits per person for certain fish species	1266	4.20	907	4.10	2.38**	0.02
Seasonal openings/closures of fisheries	1231	4.07	905	3.99	1.74*	0.08
Gear restrictions for fishing	1209	3.95	890	3.77	3.83***	<0.01
Community participation in management	1265	4.23	909	4.31	-2.33**	0.02
Marine zoning	1062	3.84	828	3.71	2.59***	0.01
Designated marine protected area	1220	4.09	898	3.95	3.38***	<0.01
Limited use for recreational activities	1248	3.60	900	3.38	4.22***	<0.01
No Take Zones	1111	3.92	854	3.68	5.13***	<0.01
Establishment of a non-commercial fishing license	1193	3.53	892	3.29	4.45***	<0.01

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