

NOAA Technical Memorandum CRCP 45

**National Coral Reef Monitoring Program
Socioeconomic Monitoring Component**

Summary Findings for American Samoa, 2021



NOAA Coral Reef Conservation Program
Silver Spring, MD



June 2023

United States
Department of Commerce

National Oceanic and
Atmospheric Administration

National Ocean Service

Gina Raimondo
Secretary

Richard Spinrad
Under Secretary

Nicole LeBoeuf
Assistant Administrator

National Coral Reef Monitoring Program Socioeconomic Monitoring Component Summary Findings for American Samoa, 2021

M.E. Allen, C.S. Fleming, A.T. Alva, S.B. Gonyo, S.D. Regan, and E.K. Towle
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Special Dedication

We dedicate this report in memory of Chris King, our research field coordinator and the American Samoa Port Administration Director. Gone but not forgotten, Chris was an instrumental member of our research team and loved by many.

Executive Summary

The Socioeconomic Component of the National Coral Reef Monitoring Program (NCRMP) collects socioeconomic data across all United States (U.S.) coral reef territories and jurisdictions to inform human connections indicators. These indicators fall under the broad categories of demographics of these populations, human use of coral reef resources, and knowledge, attitudes, and perceptions of coral reefs and coral reef management. The overall goal of this endeavor is to track relevant information regarding each jurisdiction's population, social and economic structure, human interactions with coral reef resources, and the responses of local communities to coral management. These data are used to develop and update indicators that describe the state of each jurisdiction relative to other U.S. jurisdictions. The National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Conservation Program (CRCP) uses this information to protect coral reefs at local, regional, and national levels, as well as to inform continuing research and communication products. NOAA CRCP staff, along with educators and managers in the jurisdictions, use this information to monitor changes in coral reef dependent communities and jurisdictions, and ensure education programs are designed to achieve their goals.

This report presents primary data collected from the second socioeconomic monitoring cycle in American Samoa (the first monitoring cycle was completed in 2014). The survey was conducted in person with household residents from May to September 2021. Results are representative of the resident population of American Samoa as a whole, as well as five strata: rural villages, semi-rural villages, urban villages, Aua village, and the Manu'a Islands. The following are key highlights from the results:

- **Activity Participation:** Swimming/wading, beach recreation, and waterside/beach camping were primary activities for American Samoa residents in both 2014 and 2021, but frequency of participation in all activities declined in 2021.
- **Importance of Coral Reefs:** Residents recognized that American Samoa's coral reefs provide a variety of ecosystem services. There was a general consensus that coral reefs are important to coastal protection, the local economy, culture, and food for coastal communities in American Samoa.
- **Seafood:** Most resident households consumed seafood on a weekly basis, and nearly all residents ate local seafood from coral reefs at least once a month.
- **Perceived Resource Conditions:** Residents believed that the overall marine ecosystem in American Samoa had become worse or not changed over the past ten years, but most believed that resource conditions may improve in the future. In 2021, the conditions of ocean water quality and amount of live coral were particular concerns.
- **Threats to Coral Reefs:** Residents were familiar with all included threats to coral reefs, but were most familiar with hurricanes, pollution, climate change, and overfishing and over-gleaning. They were less familiar with ocean acidification and its impacts to coral reefs.

- **Conservation Behaviors:** At least 50% of residents reported volunteering with environmental groups or speaking with others about environmentally responsible practices in an average year.
- **Management Strategies:**
 - **Marine Protected Areas:** The majority of residents were familiar with marine protected areas (MPAs) in American Samoa and supported their establishment. Residents generally believed that the establishment of MPAs has led to a range of improved benefits for coral reefs and coastal communities.
 - **Support for Management Strategies:** There was strong support (positive attitudes) for improving law enforcement, incorporating traditional Samoan practices into coral reef management, and stricter control of pollution sources to preserve water quality. There was lower support for fishing bans, catch limits, and fishing gear restrictions.

In general, the results indicate that American Samoa residents have important human connections to coral reefs and rely on these ecosystems for a variety of cultural and socioeconomic benefits. Results also suggest that residents want to see efforts to mitigate threats (e.g., pollution) to coral reefs and prevent resource conditions (e.g., ocean water quality, amount of live coral) from becoming worse. Targeted outreach, particularly about ocean acidification, could help increase awareness of threats to coral reefs and how those threats are linked to ecosystem services and sustained benefits.

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List of Acronyms

C-CAP	Coastal Change Analysis Program
COVID-19	Disease caused by SARS-CoV-2 coronavirus
CNMI	Commonwealth of the Northern Mariana Islands
CRAG	American Samoa Coral Reef Advisory Group
CRCP	Coral Reef Conservation Program
MPA	Marine Protected Area
NCCOS	National Centers for Coastal Ocean Science
NCEI	National Center for Environmental Information
NCRMP	National Coral Reef Monitoring Program
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
OCM	Office for Coastal Management
OMB	Office of Management and Budget
OSA	Office of Samoan Affairs
RR	Response Rate
SCUBA	Self Contained Underwater Breathing Apparatus
U.S.	United States

1. Introduction

Coral reefs are among the most valuable ecosystems on Earth, providing food, protection from storms, and recreational opportunities to adjacent coastal communities (e.g., Spurgeon et al. 2004; Storlazzi et al. 2019). These assets are also tied to economic benefits including tourism, fishing, the aquarium trade and other ornamental resources, and biomedical products. When coral reefs are threatened by climate change, fishing impacts, and land-based sources of pollution, nearby human communities are also threatened. In 2013, the National Oceanic and Atmospheric Administration’s (NOAA) Coral Reef Conservation Program (CRCP) created the National Coral Reef Monitoring Program (NCRMP) to establish an integrated and focused long-term monitoring program for all United States (U.S.) coral reef ecosystems. Since 2014, the program has been conducting sustained observations of biological, climatic, and socioeconomic indicators in U.S. states and territories where coral reefs are present. More information about all components of the NCRMP can be explored in the “NOAA Coral Reef Conservation Program: National Coral Reef Monitoring Plan” (NOAA CRCP 2021).¹

The novel inclusion of a socioeconomic monitoring component to the NCRMP represents a progressive, interdisciplinary approach for the CRCP, which has recognized the need to integrate socioeconomic information with biophysical indicators relevant to the conservation of coral reef resources.

1.1 Socioeconomic Component of NCRMP

The Socioeconomic Component of the NCRMP collects and monitors socioeconomic information, including human use of coral reef resources, knowledge, attitudes, and perceptions of coral reefs and coral reef management, and demographics of the populations living in coral reef areas. The overall goal of the socioeconomic monitoring component is to track relevant information regarding each jurisdiction's population, social and economic structure, the benefits of coral reefs and related habitats, the perceived impacts of society on coral reefs, and the impacts of coral management on communities. NOAA's CRCP uses the information to improve programs designed to protect coral reefs at local, regional, and national levels, as well as to inform continuing research and communication products.

In 2012, a suite of 13 survey indicators were developed in consultation with local stakeholders, partners, and other scientists. These composite indicators allow researchers to measure the relationship between coral reefs and coral reef adjacent communities (Table 1) (Lovelace and Dillard 2012).² Researchers are then able to track the various facets of this relationship over time by breaking down an intellectually complex and immeasurable concept into its various smaller and more measurable parts to improve communication and policy (Schirnding 2002).

¹https://www.coris.noaa.gov/activities/NCRMP_Plan_2021/welcome.html

²https://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/626_Loper/Social_and_Economic_Indicators_for_Monitoring_the_U.S._Coral_Reef_Jurisdictions_Workshop_Report_2012.pdf

Table 1: Thirteen socioeconomic indicators for the NCRMP socioeconomic surveys.

	Indicators	Rationale
1	Participation in coral reef activities (including snorkeling, diving, fishing, harvesting)	Measuring participation in coral reef activities enhances understanding of the economic and recreational importance of coral reefs to local residents as well as the level of extractive and non-extractive pressures on reefs
2	Perceived resource condition	Assessment of perceived conditions is a complement to biophysical information and is key to evaluating differences in levels of support for various management strategies
3	Attitudes towards coral reef management strategies	Monitoring this information over time will be valuable to decision makers, as it will provide insight into possible changes in public perception concerning coral reef management strategies
4	Awareness and knowledge of coral reefs	Monitoring this information over time is key to tracking whether CRCP constituents understand threats to coral reefs and will help inform management strategies (and education/outreach efforts)
5	Human population trends (change) near coral reefs	Monitoring human population trends is important for understanding increasing pressure on coral reefs, as well as reef-adjacent populations
6	Economic impact of coral reef fishing to jurisdiction	Tracking the economic contributions of coral reefs can help justify funds allocated for coral reef protection
7	Economic impact of dive/snorkel tourism to jurisdiction	Tracking the economic contributions of coral reefs can help justify funds allocated for coral reef protection
8	Community well-being	Tracking changes in health, basic needs, and economic security enhances understanding of links between social conditions and coral reefs
9	Cultural importance of coral reefs	Measuring cultural importance improves understanding of traditional and cultural significance of coral reefs to jurisdictional residents, and whether this is changing over time
10	Participation in behaviors that may help improve coral reef health (e.g., beach cleanups, sustainable seafood choices)	Measuring participation improves understanding of positive impacts to coral reefs as well as negative impacts
11	Physical Infrastructure	Assessment of coastal development footprint, physical access to coastal resources, and waste and water management infrastructure provides an understanding of human impacts on the coast
12	Knowledge of coral reef rules and regulations	Tracking this information over time at the jurisdictional/national level will inform investment in education and outreach
13	Governance	Measurement of governance provides information on the current status of local institutions involved in coral reef conservation, number of functioning management strategies, and percent area of coral reefs under protection

Primary and secondary data streams inform the indicators for each of the seven inhabited U.S. coral reef jurisdictions: South Florida, the U.S. Virgin Islands, Puerto Rico, Hawai'i, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (CNMI) (Table 2).

From 2014-2018, the NCRMP Socioeconomic team completed its first round of monitoring via a random sample of resident households in each jurisdiction (Gorstein et al. 2019a; Gorstein et al. 2019b; Gorstein et al. 2018a; Gorstein et al. 2018b; Gorstein et al. 2017; Gorstein et al. 2016;

Levine et al. 2016). The survey instrument was composed of one standard set of questions for all U.S. coral reef jurisdictions, as well as a subset of jurisdiction-specific questions relevant to local management needs. NCRMP socioeconomic data are collected using a variety of modes as appropriate to the context in each jurisdiction with methodology that generally follows Dillman’s Tailored Design Method (Dillman et al. 2014). For all jurisdictions, the aim is a representative sample of the population that meets a 95% confidence level with a minimum of a +/-5% margin of error. All survey questions are periodically approved for use by the Office of Management and Budget (OMB) under OMB#0648-0646. Surveys are planned to be repeated in each U.S. coral reef jurisdiction approximately once every five to seven years, and the second round of monitoring began in 2019.

Table 2: Geographic scope of current NCRMP Socioeconomic Monitoring.

Location	Inhabited Islands/Counties
American Samoa	Islands of Tutuila, Ta'u, Olosega, Ofu, Aunu'u
Florida	Martin, Palm Beach, Broward, Miami-Dade, and Monroe Counties
Hawai'i	Islands of Kaua'i, Maui, Moloka'i, O'ahu, Hawai'i, Lāna'i
Puerto Rico	Islands of Puerto Rico, Vieques, and Culebra
Commonwealth of the Northern Mariana Islands	Islands of Saipan, Tinian, and Rota
Guam	Entire island of Guam
U.S. Virgin Islands	Islands of St. Croix, St. Thomas, and St. John

Following the first round of monitoring (2014-2018), the NCRMP Socioeconomic team coordinated a series of expert panels and workshops to determine how each of the 13 socioeconomic indicators would be measured using primary data collected through the NCRMP resident surveys and existing secondary data. In 2019, the team published an indicator development report (Abt Associates, Inc. 2019) that presented guiding methodology for each monitoring cycle’s indicator score development, as well as the calculated indicator scores for the first round of monitoring. Following the completion of each monitoring cycle, the 13 socioeconomic indicator scores will be recalculated using the 2019 foundational methodology. Tracking indicator scores over time will allow CRCP to monitor trends in human connections to U.S. coral reef ecosystems.

More information on indicator development, secondary data, as well as summary findings and methods can be found at the project website:

www.coris.noaa.gov/monitoring/socioeconomic.html.

1.2 Purpose of this Report

This technical memorandum presents the findings from the second American Samoa NCRMP socioeconomic primary data collection, which inform the following indicators:

- Participation in coral reef activities (including snorkeling, diving, fishing, harvesting)
- Cultural importance of coral reefs
- Perceived resource conditions
- Awareness and knowledge of coral reefs
- Attitudes towards coral reef management strategies
- Awareness of coral reef rules and regulations
- Participation in behaviors that may help improve coral health

While additional secondary data collection efforts will support the remaining six indicators (Human population change near coral reefs, Community well-being, Physical infrastructure, Economic impact of coral reef fishing to jurisdiction, Economic impact of dive/snorkel tourism to jurisdiction, and Governance), the present report focuses solely on data collected through the American Samoa NCRMP survey. As demonstrated in Abt Associates, Inc. (2019), the data presented in this report as well as additional secondary data will be synthesized and published at the completion of the current monitoring cycle.

This report is organized into five remaining sections. Section 2 briefly describes the current jurisdiction (American Samoa), Section 3 details the methodology used in data collection and analysis, Section 4 provides descriptive statistics for the current (2021) round of monitoring, and Section 5 provides trend analysis between the first (2014) and second (2021) rounds of monitoring. Section 6 provides discussion and ideas for future monitoring.

2. Jurisdiction Description

American Samoa is an unincorporated territory of the United States and is the country's southernmost jurisdiction. It is located 14 degrees south of the equator in the Pacific Ocean, about 2,300 miles south-southwest of Hawai'i. American Samoa lies just east of the international dateline and is part of the Samoa Archipelago. Its 224 km² consists of seven islands including the main island of Tutuila, and the smaller islands of Aunu'u, the Manu'a group (about 100 km east of Tutuila, consisting of Ta'u, Olosega, and Ofu), Rose Atoll, and Swains Island (Figure 1). American Samoa's climate is classified as tropical marine. The territory experiences a rainy season from November to April and it has little seasonal variation in average temperature. American Samoa has 116 km of coastline encompassing five volcanic and rugged peaks and two coral atolls (CIA 2022).

As part of the Samoa Archipelago, American Samoa is linked to the nation of Samoa. The archipelago was initially inhabited around 1500 B.C. with early ties to Fiji and Tonga. Following contact with European explorers in the 18th century, the Samoan islands were split between Germany (now independent Samoa) and America. As a result, American Samoa's culture has

blended with American customs and culture. However, traditional life was and still is largely communal, with life centered on the village and led by village chiefs (Pacific RISA 2022). The Samoan hierarchical social structure remains intact in most villages, with *matai* (family leaders) comprising the village administrative group (*fono*). According to the revised 1967 American Samoa Constitution (2011), the *fono* structure is reproduced at the jurisdictional scale, and individuals are required to have the *matai* title in order to serve in the American Samoan Senate. Samoan culture, or *Fa'a Samoa*, was the foundation of life in these islands, and remains extremely important in modern times (Pacific RISA 2022).

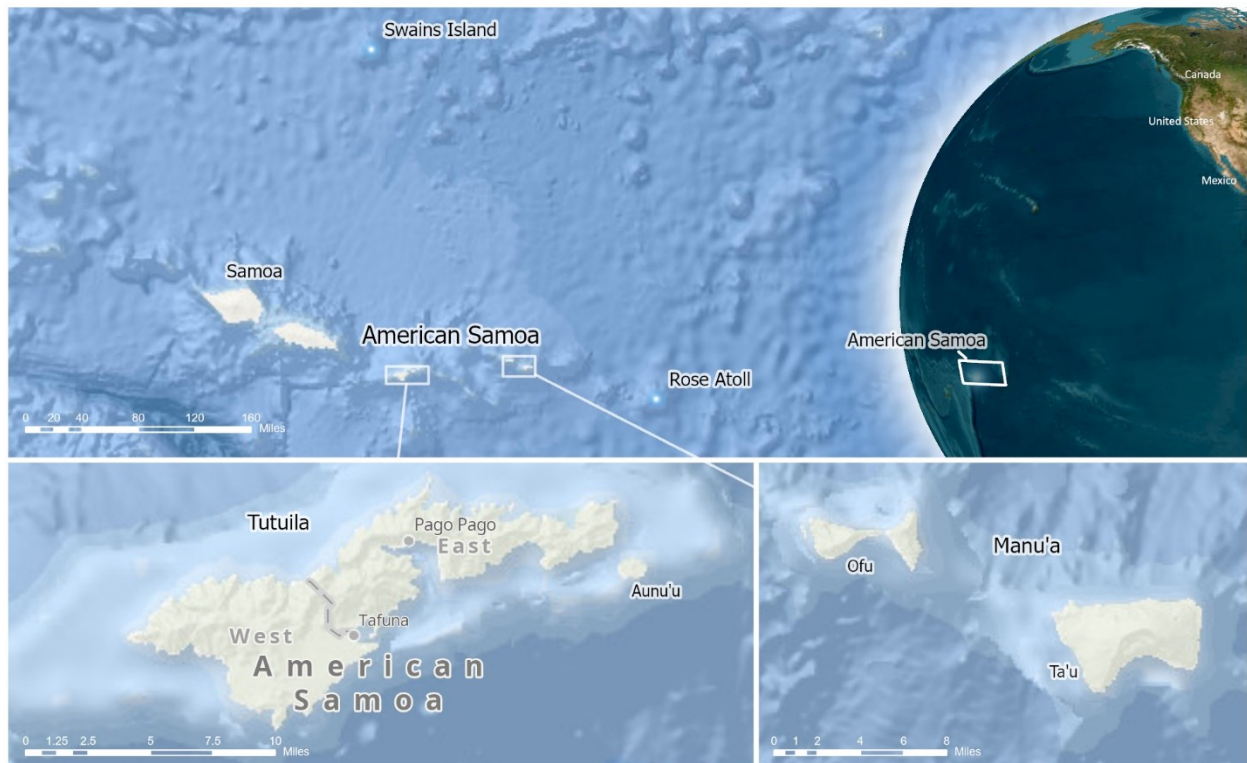


Figure 1: Map of American Samoa region.

From 2010 to 2020, American Samoa's population decreased, and in 2020, the territory was home to 49,710 people (U.S. Census Bureau 2020), the majority (98%) of whom live on the largest island of Tutuila. Tutuila island covers an area of 143 km², accounting for 72% of the total land area (CIA 2022), and hosts the territory's capital, Pago Pago (Pacific RISA 2022). Tutuila is the only island with villages classified as 'urban' and has the highest amount of impervious surface (around 5% of the total land area according to high resolution 2010 data classified by the NOAA Coastal Change Analysis Program (C-CAP 2010)). The remaining islands are less developed, largely due to having fewer inhabitants. The majority of the jurisdiction speaks Samoan, though both English and Samoan are the official languages (Pacific RISA 2022), and most people are bilingual (CIA 2022). The majority of American Samoa inhabitants identify as Pacific Islander (CIA 2022).

American Samoa is closely linked to the ocean, both economically and culturally. Tuna fishing and canning are two significant economic industries within the territory, with canned tuna as the primary export. There is a small tourism industry and other private sector ventures, but much of the economy is further supported by the U.S. government (Pacific RISA 2022). American Samoa's ocean economy employs about 40% of the territory's people. In addition to two coral atolls, the shallow water coral reef habitats surrounding all of the islands (Figure 2, Section 3) consist primarily of fringing coral reefs and a few offshore banks. The American Samoa coral reef ecosystem has high biodiversity with over 2,700 species to include corals, invertebrates, fishes, and mammals (OCM 2022). This ecosystem is critical to the American Samoa economy, and coastal stewardship is important to American Samoa culture (OCM 2022).



**Residents collecting turban snails in Ofu, Manu'a Islands, American Samoa.
Photo credit: Keith AhSoon.**

However, this ecosystem and its dependent population are at risk to a number of natural and human-induced threats, including the invasion of crown-of-thorns starfish, recurrent mass bleaching events, and damaging cyclones (NOAA CRCP 2018a). Harmful fishing practices, coastal construction, pollution, and invasive algal outbreaks have also impacted American Samoa's reef system (NOAA CRCP n.d.). American Samoa's Coral Reef Advisory Group (CRAG) coordinates American Samoa's coral reef management efforts through a collaboration

of local agencies (CRAG 2022). The jurisdiction has implemented a range of conservation and management actions such as regulating SCUBA spearfishing, protecting large reef species, and reducing onshore pollution sources to help mitigate adverse impacts to its reefs. American Samoa has also implemented many marine managed or protected areas. Some of these include the National Marine Sanctuary of American Samoa, the National Park of American Samoa, the Rose Atoll National Marine Monument, village marine protected areas, special management areas, and marine parks (NOAA CRCP n.d.). Despite these efforts, corals are still at risk with coral bleaching and other threats on the rise (Eakin et al. 2019; U.S. Climate Resilience Toolkit 2019).

3. Methodology

It is local custom to seek permission from American Samoa leadership prior to conducting scientific research in American Samoa. Accordingly, in January 2021, the project team sent a formal advisory letter to the Office of Samoan Affairs (OSA) in American Samoa to communicate intent to survey residents later that year. The team delivered a project one-pager translated into both English and Samoan to the OSA and the Governor's Chief of Staff in March 2021, and then presented to the village mayors (*pulenu'u*) in early April 2021. The Manu'a Islands were added to the survey effort following further consultation with local partners and the project team met with Manu'a leaders in mid-May 2021.

An in-person survey of household residents (ages eighteen and older) within Tutuila and the Manu'a Islands was conducted from May to September 2021. The survey instrument is included in Appendix A. The project team implemented a stratified random sampling design with eight strata: east rural villages, west rural villages, east semi-rural villages, northwest semi-rural villages, southwest semi-rural villages, urban villages, the village of Aua (within Tutuila), and the Manu'a Islands (Figure 2). At partner request, Aua was included as a stand-alone stratum due to its importance as a key watershed.³ The eight strata were further divided into 84 clusters of villages and village segments (based on population size), and 20 of these clusters were randomly selected for data collection. Following a Census-style surveying approach, all households within each randomly selected cluster were invited to participate in the survey. With this approach, the results are representative of (i.e., generalizable to) to each stratum and the general population. Figure 2 shows the surveyed areas and locations of coral reef and hardbottom habitat.

³https://www.coris.noaa.gov/activities/strategic_plan2018/crcp_key_elements_fy21-23_508ocm.pdf

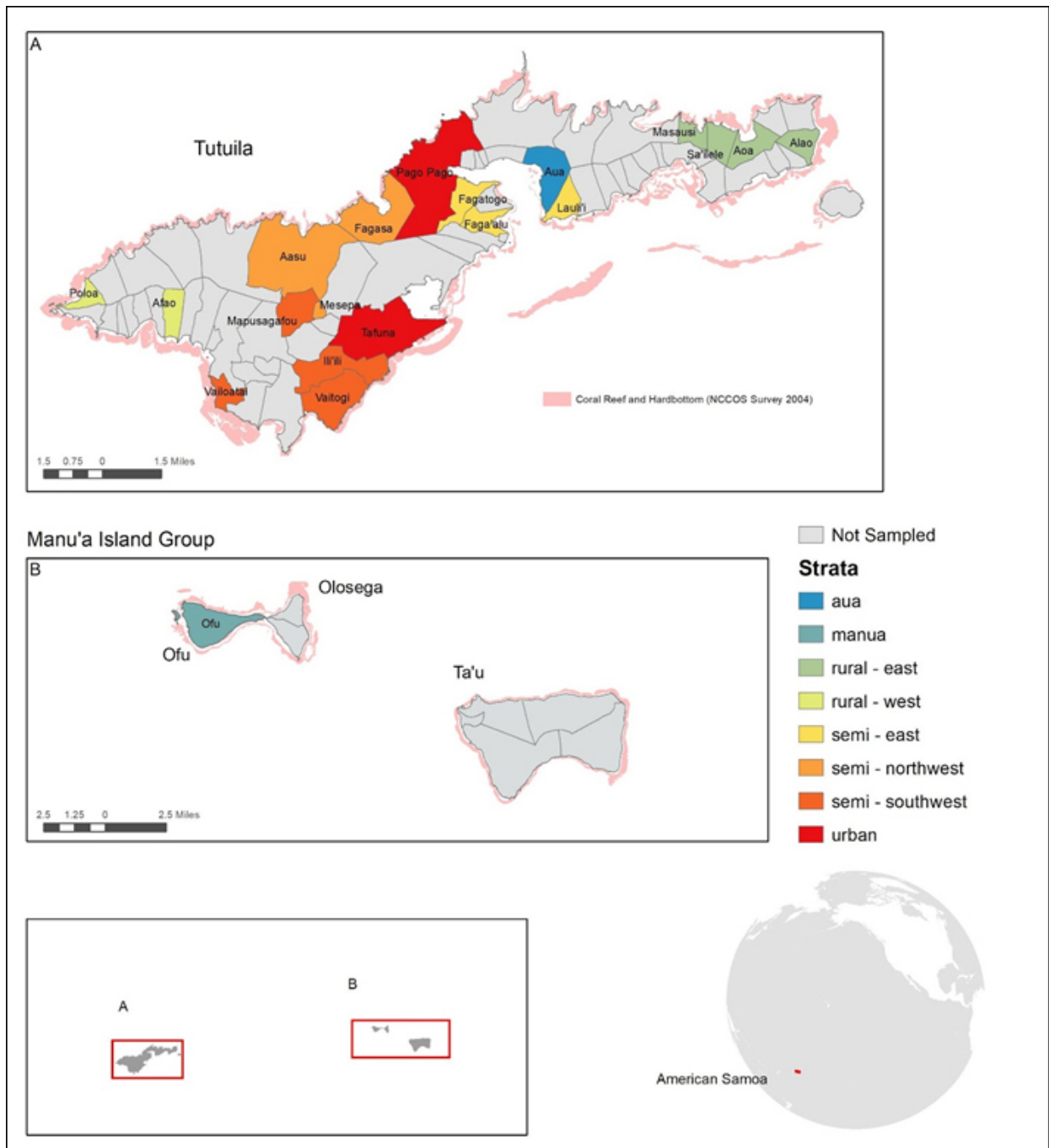


Figure 2: Map of sampling areas and locations of coral reef and hardbottom habitat in American Samoa.

Local field interviewers visited resident households in selected villages up to three times to invite them to participate in the survey. A total of 1,318 surveys were completed (66% in Samoan and 34% in English), yielding an overall response rate of 19%. For more information on data collection procedures, please see Appendix B.1. Data were weighted to adjust for the sample design and to address potential non-response bias. For more details on data weighting and trimming protocols, please see Appendix B.2.

Table 3 provides weighted estimates of key demographic variables for American Samoa household residents. Most people lived in semi-rural villages, identified as native born, had been living in American Samoa (residential tenure) for over 10 years. More than 90% of residents had less than a college degree, and over half had an annual household income under \$30,000. A slight majority of residents were employed full-time or part-time, and over one-third were unemployed. Most residents did not have a marine-related occupation, but some common marine industry occupations included working at the tuna cannery, charter fishing, and marine law enforcement.

Table 3: Weighted estimates of key demographics for American Samoa residents (N=1,318).

Demographic Variables		Study area residents (percent)
Strata of Residence	Manu'a Islands	0.4
	Aua	3.1
	Rural	14.6
	Semi-rural	51.4
	Urban	30.5
Sex	Female	53.7
Race	Samoan	94.0
	Asian	3.8
	Tongan	3.6
	Other	4.4
Age	18-34	39.9
	35-44	22.6
	45-54	19.0
	55-64	11.3
	65+	7.2
Education	Some college or less	91.3
	College degree or higher	8.7
Household Income	Under \$30,000	59.2
	\$30,000-\$49,999	20.3
	\$50,000-\$99,999	18.1
	\$100,000 or higher	2.4
Residential Tenure	1 year or less	0.0
	2-5 years	5.6
	6-10 years	3.3
	More than 10 years	91.1
Native Born	Yes	51.8
Employment Status	Employed full time	43.7
	Employed part time	6.0
	Unemployed	37.7
	Retired	8.5
	Student	4.1
Employment in marine occupation	Yes	34.2

Data analysis of all monitoring cycles includes descriptive statistics, as well as examinations of statistical relationships between variables (e.g., cross tabulations, mean comparisons). All data were publicly archived with the National Center for Environmental Information (NCEI Accession 0276137) available at <https://www.ncei.noaa.gov/archive/accession/0276137>.



**A surveyor in the field in Ofu, Manu'a Islands, American Samoa.
Photo credit: Keith AhSoon.**

4. Results: Summary Findings

Survey results are organized into the following subsections: 4.1 Participation in coral reef activities, 4.2 Cultural importance of reefs and reef reliance, 4.3 Perceived resource conditions, 4.4 Awareness and knowledge of coral reefs, 4.5 Attitudes towards coral reef management strategies, 4.6 Participation in behaviors that may improve coral reef health, and 4.7 Sources of coral reef information. The majority of these data support measurement of the seven NCRMP indicators reliant upon primary data; however, other data of jurisdictional importance from the 2021 survey are incorporated here as well. Key findings by stratum are also summarized and presented. All stratum-level tables are provided in Appendix C, and these tables are referenced throughout this section.



Ofu Island's backreef as a wave crests over the corals in American Samoa.

Photo credit: NOAA Fisheries/Evan Barba.

4.1 Participation in coral reef activities

Participation in coral reef activities was generally low in 2021, but residents most often participated in swimming and wading, beach/waterside camping, and beach recreation (Figure 3). The least frequented activities were surfing and SCUBA diving. Residents in the Manu‘a Islands had higher participation rates than other residents in most activities (Table C1).

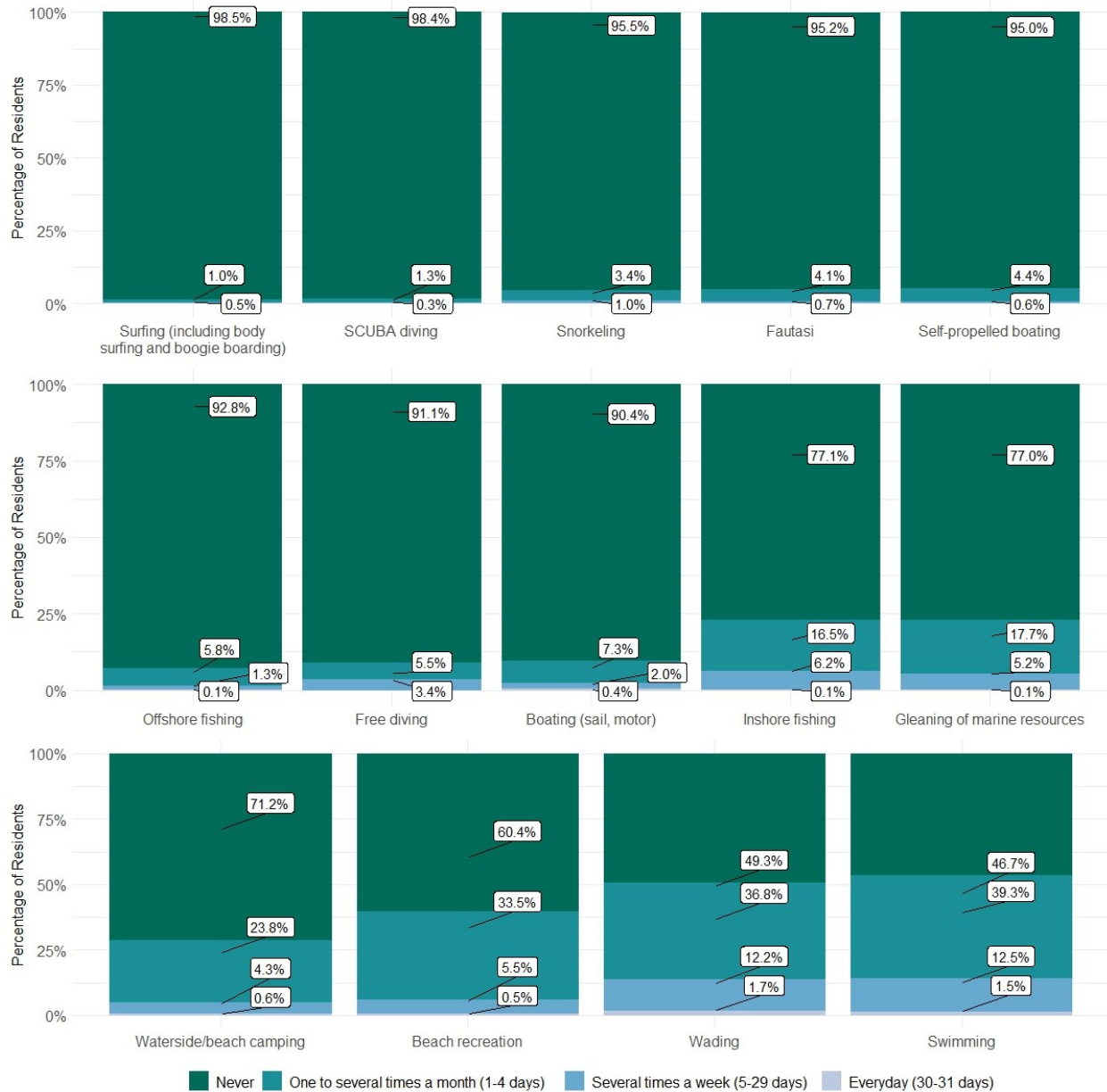


Figure 3: Frequency of participation in coral reef activities.

Residents most commonly fished for or gleaned marine resources to feed themselves, their households, or to give away to extended family and friends (Figure 4). While most residents never fished to sell their catch or for recreation, residents in the Manu‘a Islands were more likely than other residents to fish to sell their catch. Rural and urban residents were most likely to fish to give their catch to pastors or village leaders (Table C2).

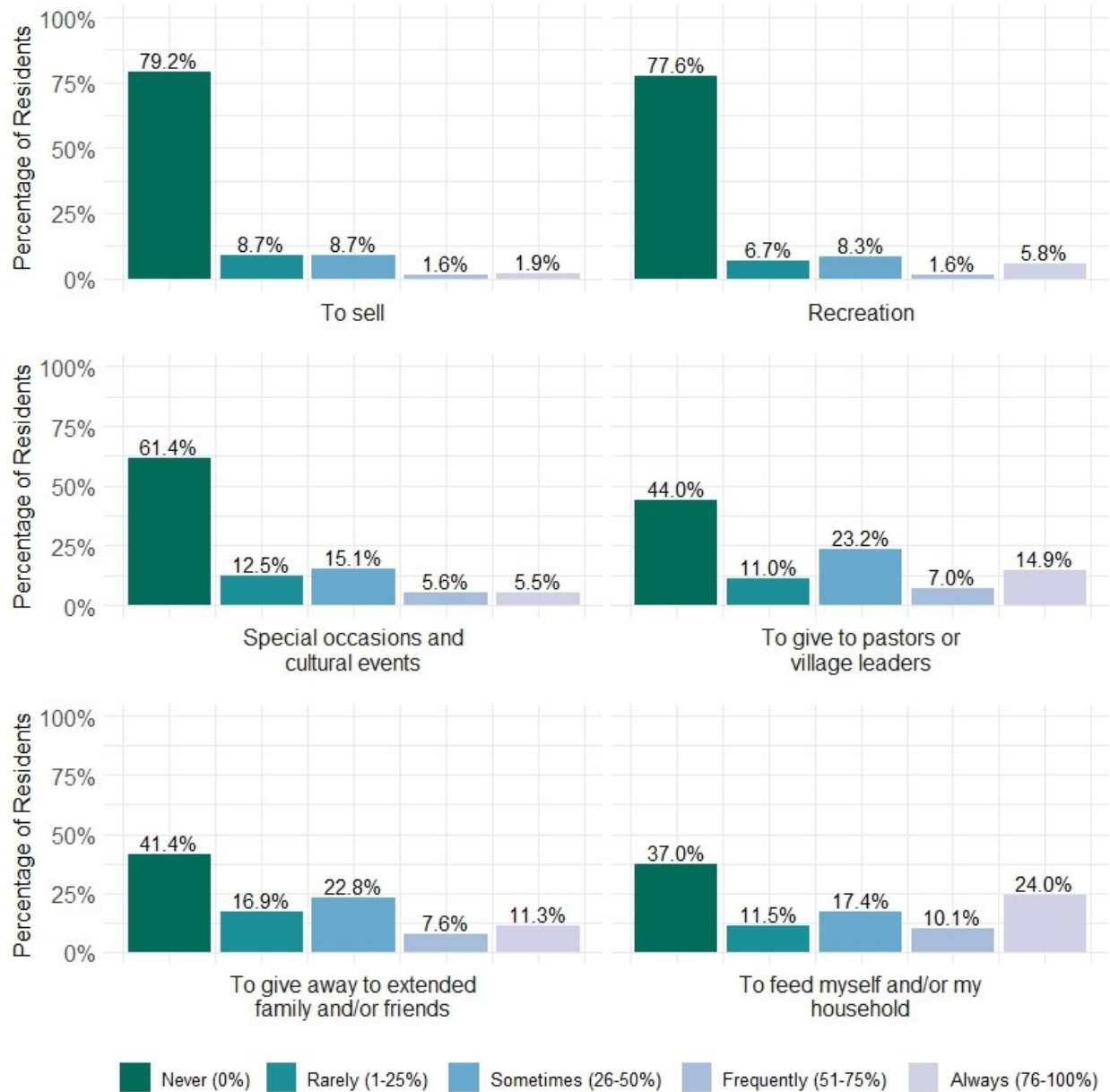


Figure 4: Reasons for time spent fishing or gleaning marine resources.

Species groups were targeted at similar rates (Figure 5). Manu'a residents were more likely to target trevallies, surgeonfish, and invertebrates (Table C3).

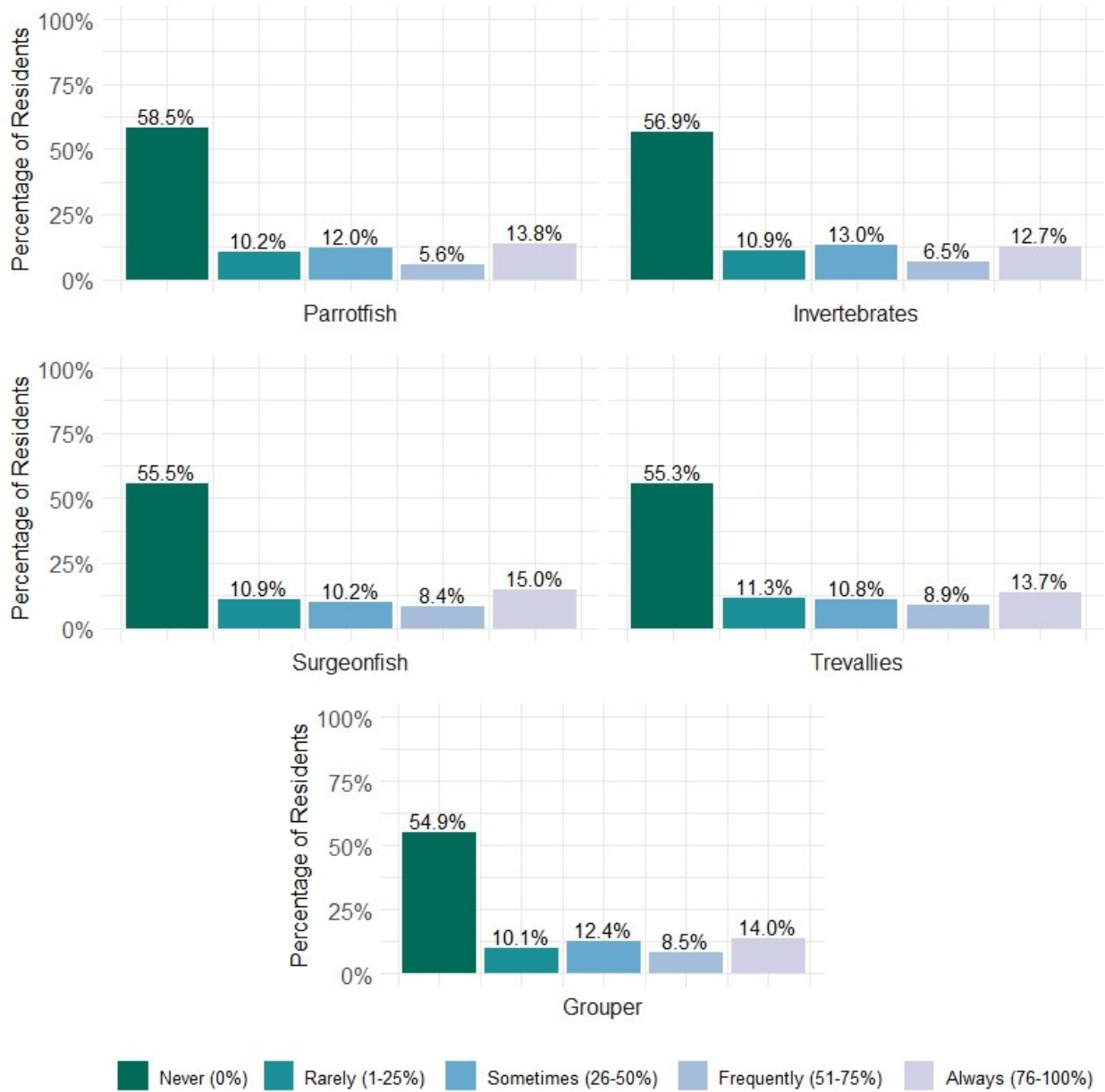


Figure 5: Time spent fishing or gleaning marine resources by targeted fishery groups.

4.2 Cultural importance of reefs and reef reliance

4.2.1 Seafood consumption

Most resident households (96.6%) consumed seafood at least once a month to several times a week; very few never consumed seafood (Figure 6). Of residents who consumed seafood, 86.9% did so from local coral reefs at least once a month. A small percentage of residents (4.7%) were not sure where their seafood was harvested.

Aua residents were least likely to consume seafood in general (Table C4) or from local coral reefs (Table C6). Manu'a residents most commonly ate seafood from local coral reefs (Table C5).

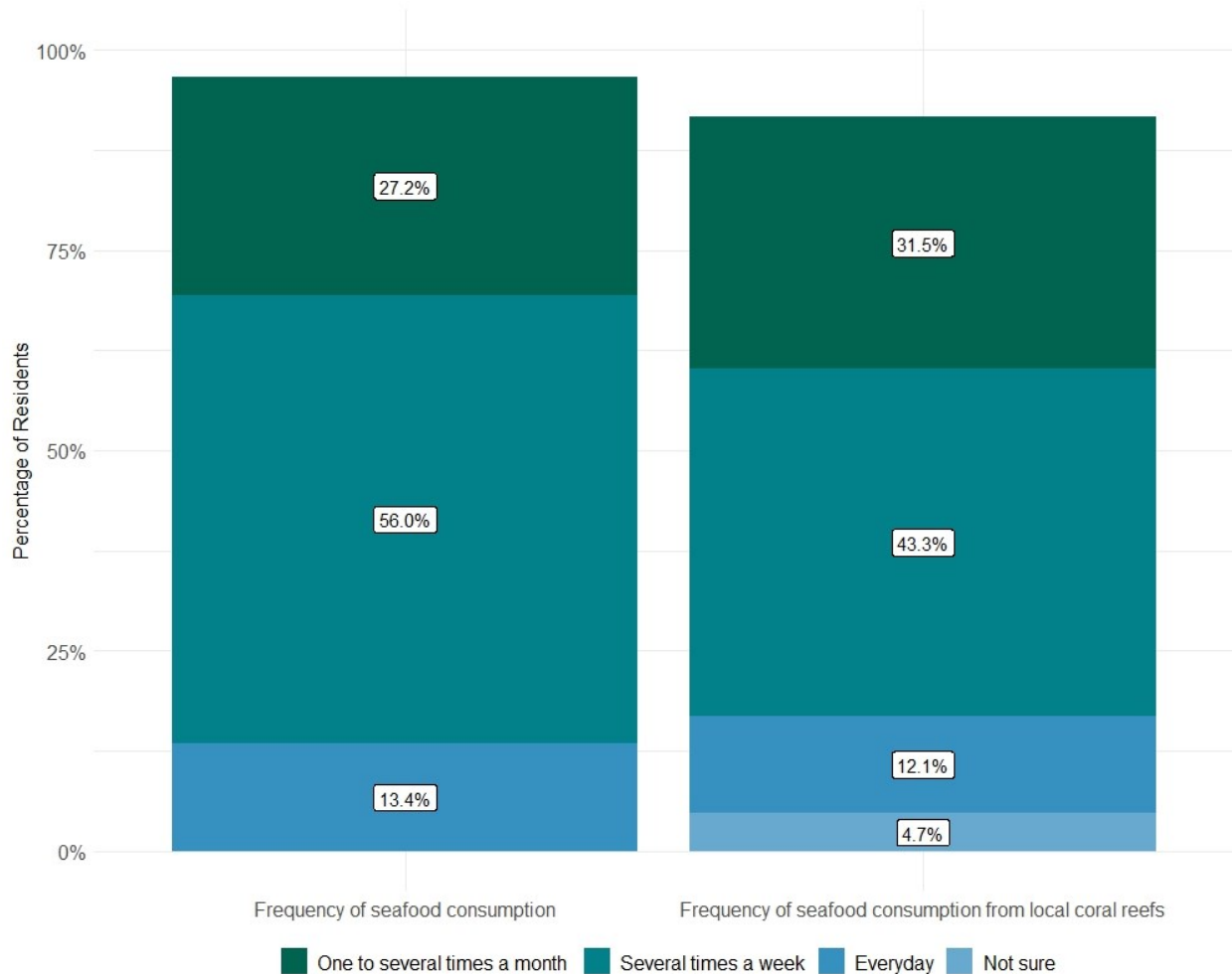


Figure 6: Frequency of seafood consumption (for all residents) and seafood consumption from local coral reefs (for those who ate seafood).

Among residents who consumed seafood, most sourced their seafood from a store or restaurant. Residents were least likely to catch their seafood themselves or by family members (Figure 7). Manu'a residents were least likely to purchase seafood at a store or restaurant (Table C7).

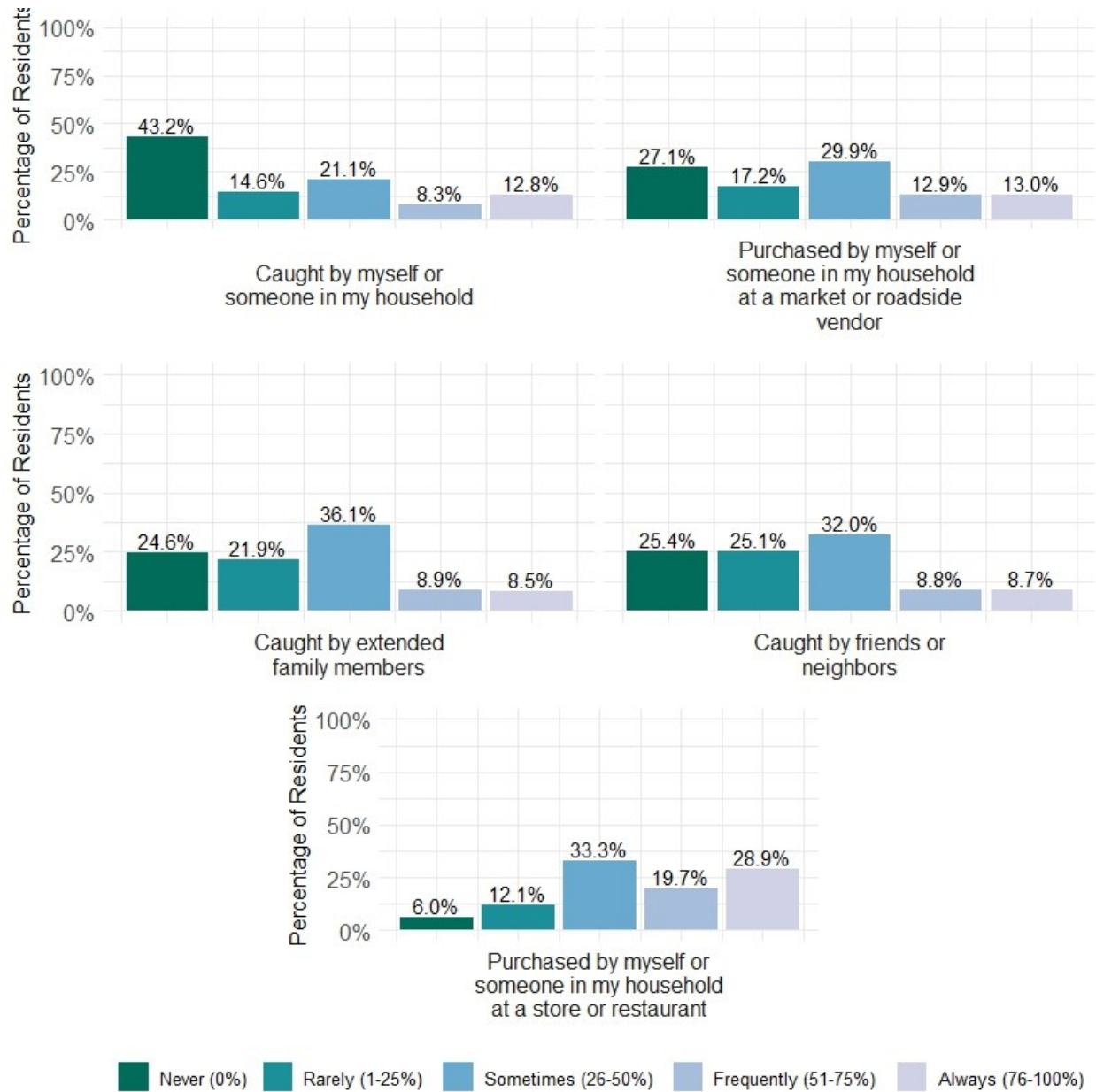


Figure 7: Primary sources of seafood for consumption.

4.2.2 Reef ecosystem services and cultural value

Residents generally believed that coral reefs are important and valuable. Residents were most unsure if coral reefs are important for local recreation and tourism (Figure 8). Manu‘a residents were most likely to believe that coral reefs are extremely important to the culture of American Samoa and to their and their families’ cultural beliefs (Table C8).

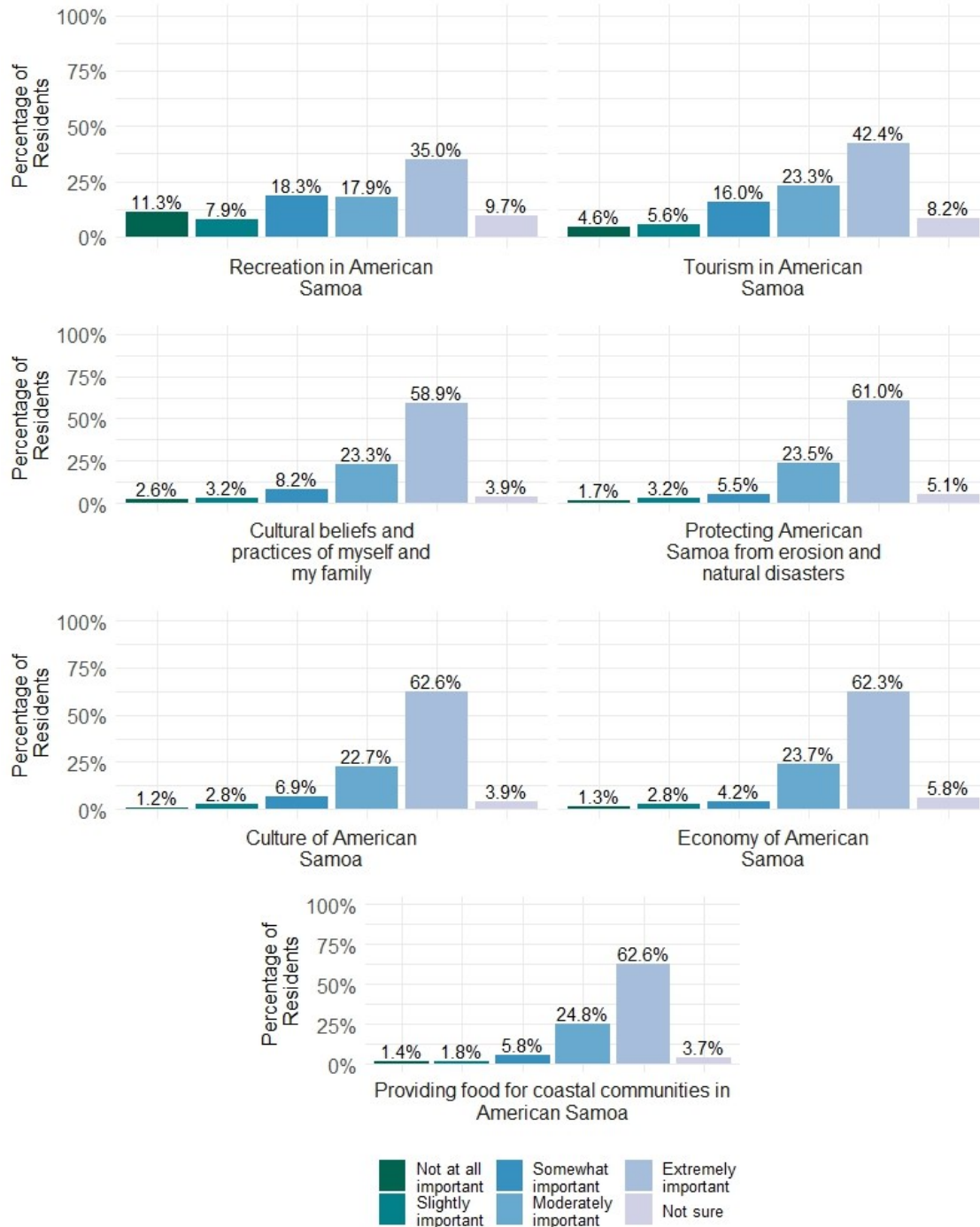


Figure 8: Perceived importance of coral reefs in American Samoa.

4.3 Perceived resource conditions

American Samoa residents were generally split on their perception of resources being in bad or good condition. Further, many residents were either unsure of conditions or held neutral opinions (Figure 9). Residents of Aua were the most likely to perceive bad conditions for all five resources (Table C9).

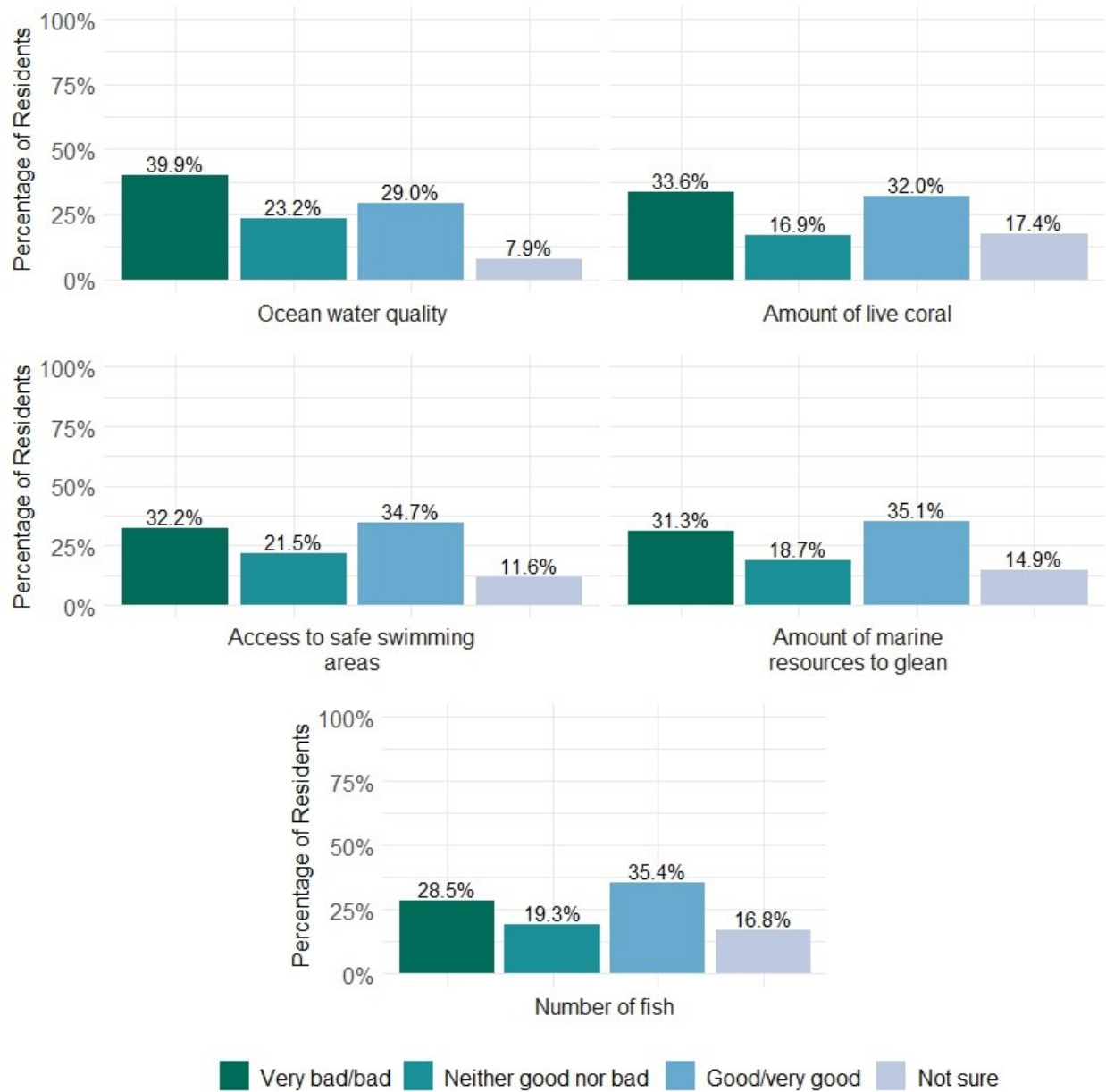


Figure 9: Perceived current resource conditions.

Most residents believed that the overall marine ecosystem had worsened or not changed over the past ten years (Figure 10). Aua residents more commonly believed that the marine ecosystem had worsened, while Manu'a residents were more likely to think that the marine ecosystem had improved (Table C10).

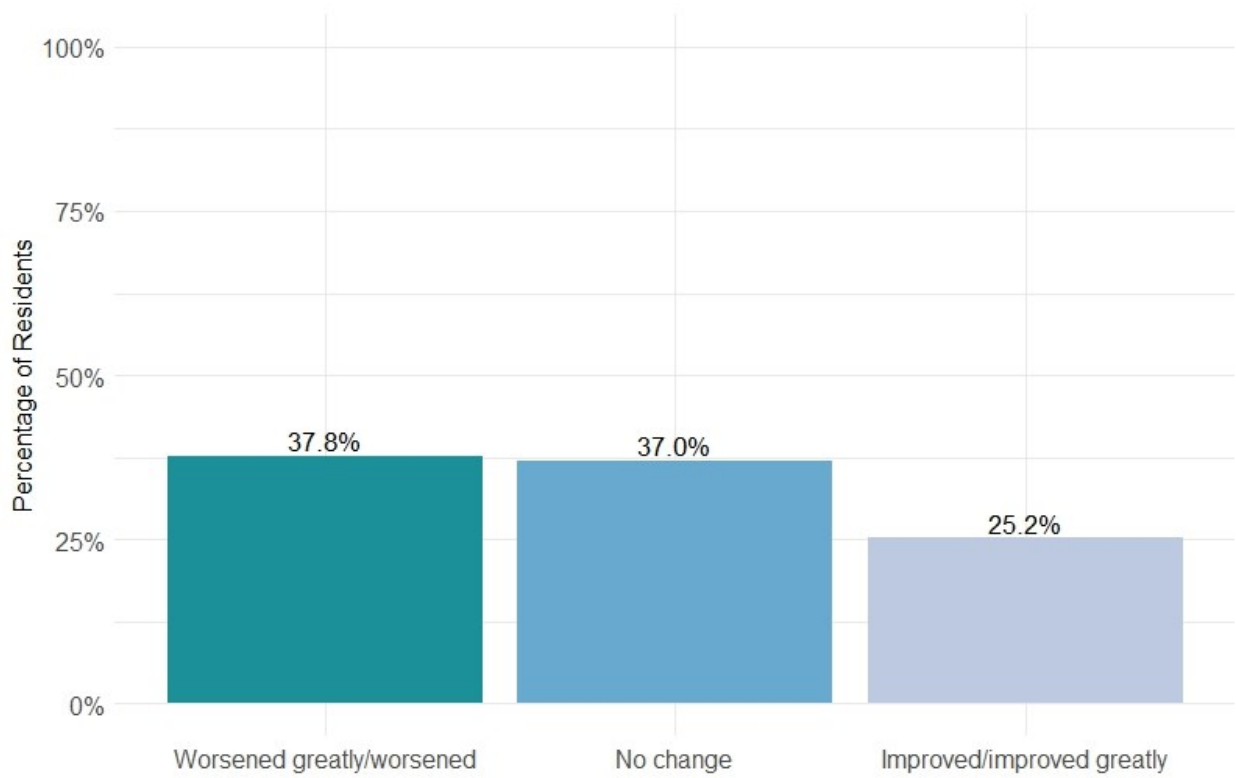


Figure 10: Perceived overall change in resource conditions (past ten years).



Vatia village, Tutuila, American Samoa. Photo credit: NOAA.

The majority of residents believed resource conditions will improve over the next ten years, but there were also high levels of uncertainty (Figure 11). Residents in the Manu‘a Islands were most likely to believe most resource conditions will worsen, while Tutuila residents, with the exception of Aua, had a more positive outlook (Table C11).

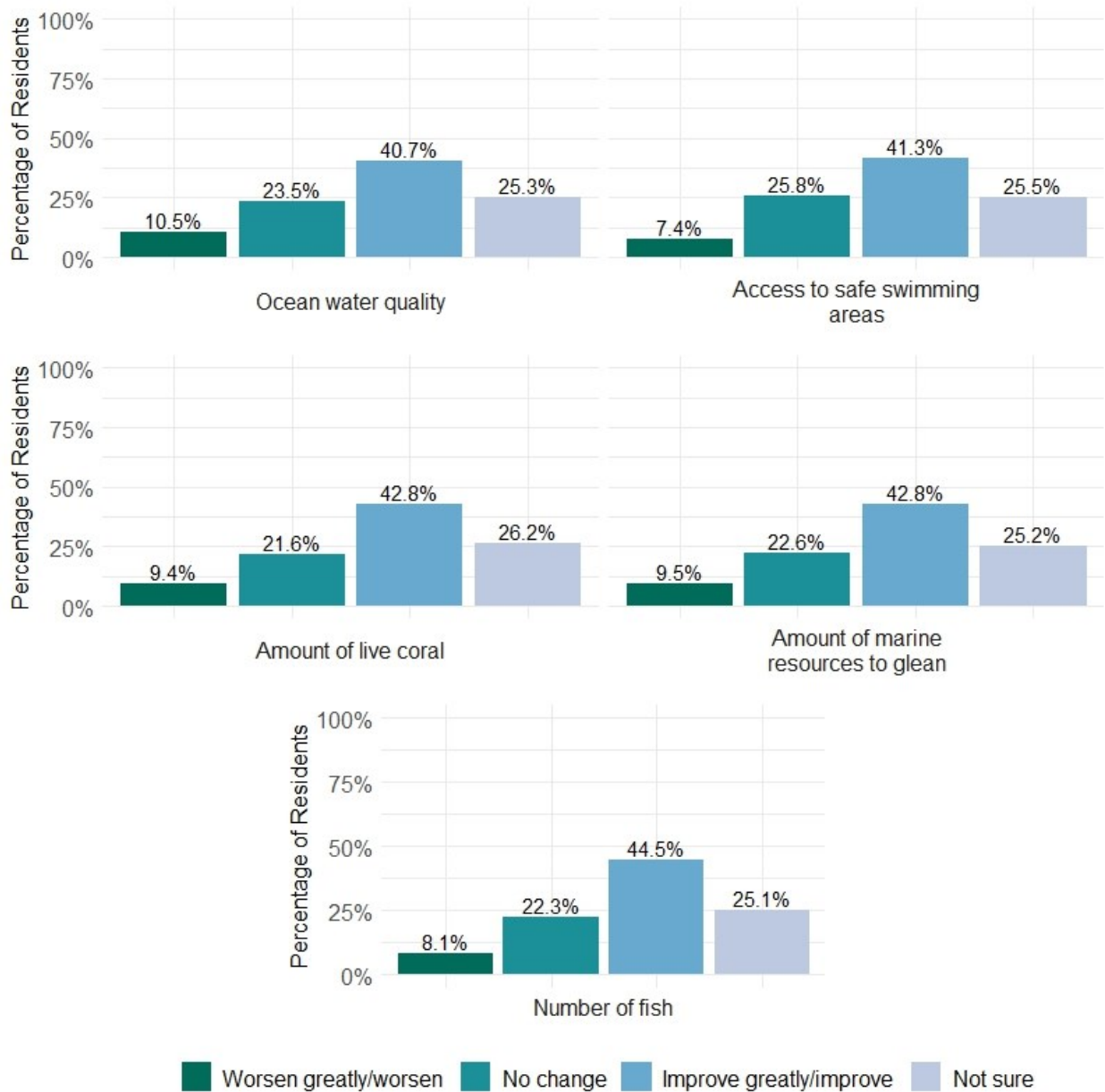


Figure 11: Perceived projected resource conditions (next ten years).

4.4 Awareness and knowledge of coral reefs

Residents had high levels of familiarity with all threats. Familiarity was highest for hurricanes and pollution; familiarity was lowest for ocean acidification, coral bleaching, and invasive species (Figure 12). Rural and semi-rural residents were less familiar with these threats than residents in other strata (Table C12).

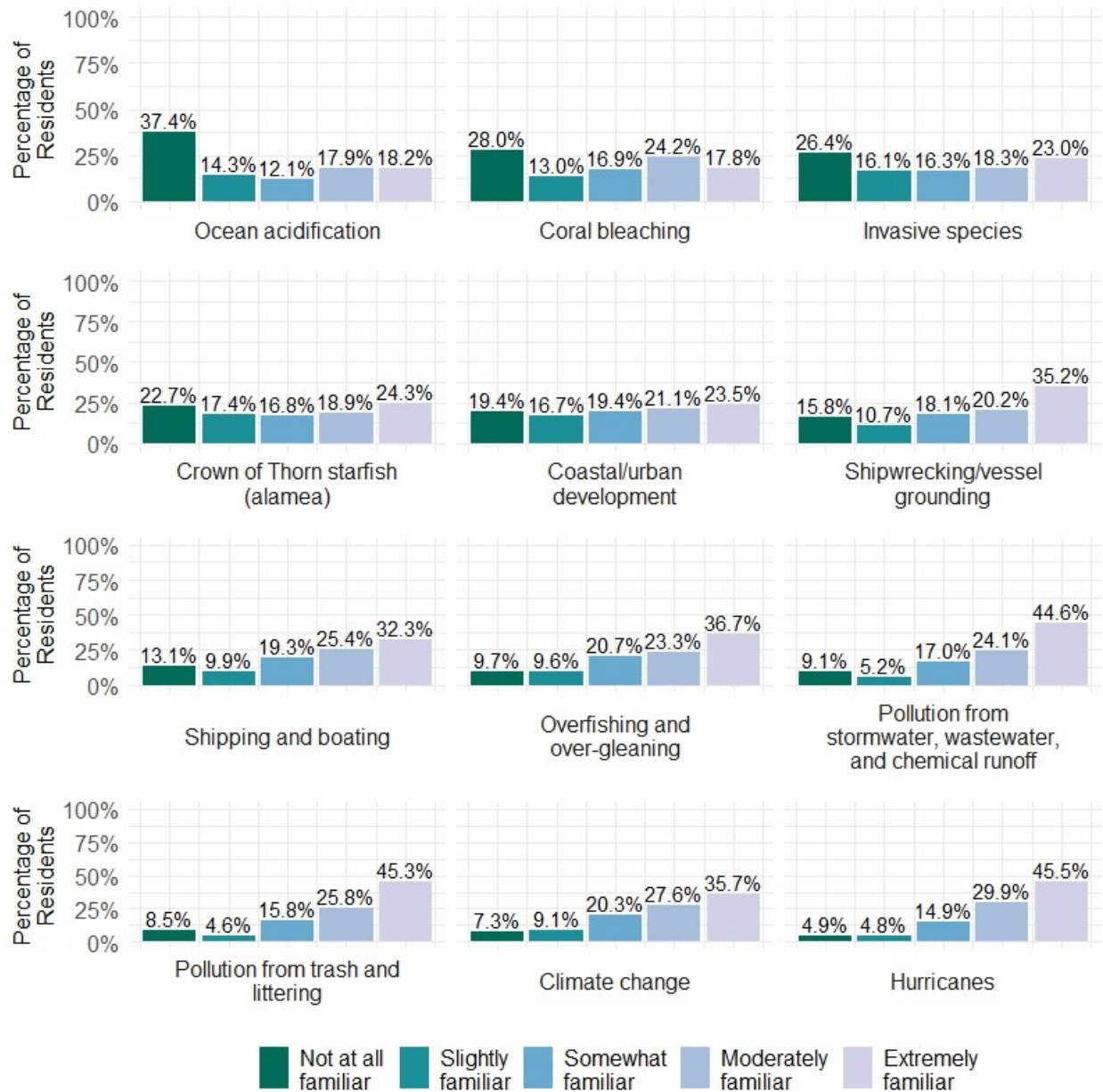


Figure 12: Familiarity with coral reef threats.

Residents were more likely to believe threats had negative impacts to coral reefs; however, over a quarter of residents were unsure about the impact from ocean acidification, coral bleaching, Crown of Thorns starfish, and invasive species (Figure 13). Aua and Manu‘a residents were most likely to perceive the impacts from some of these threats as being more negative, compared to the perceptions of residents from urban villages (Table C13).

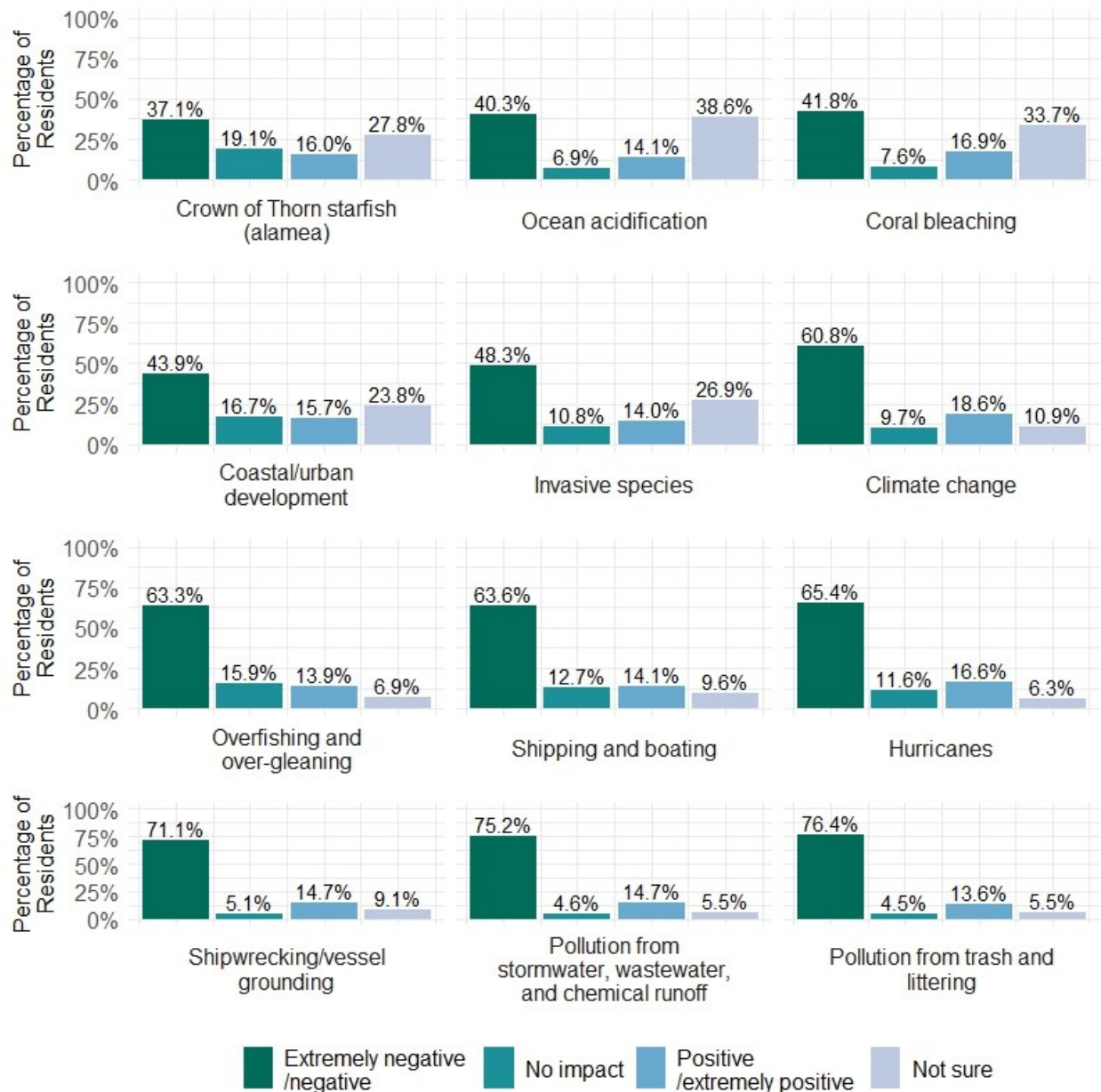


Figure 13: Perceived impacts from coral reef threats.

4.5 Attitudes towards coral reef management strategies

The survey defined a marine protected area (MPA) as “an area of the ocean where human activity is typically restricted to protect living, non-living, cultural, and/or historic resources, such as marine sanctuaries or parks, village MPAs, and private reserves in American Samoa” (Appendix A). The majority (70%) of residents were slightly to extremely familiar with MPAs in American Samoa (Figure 14).

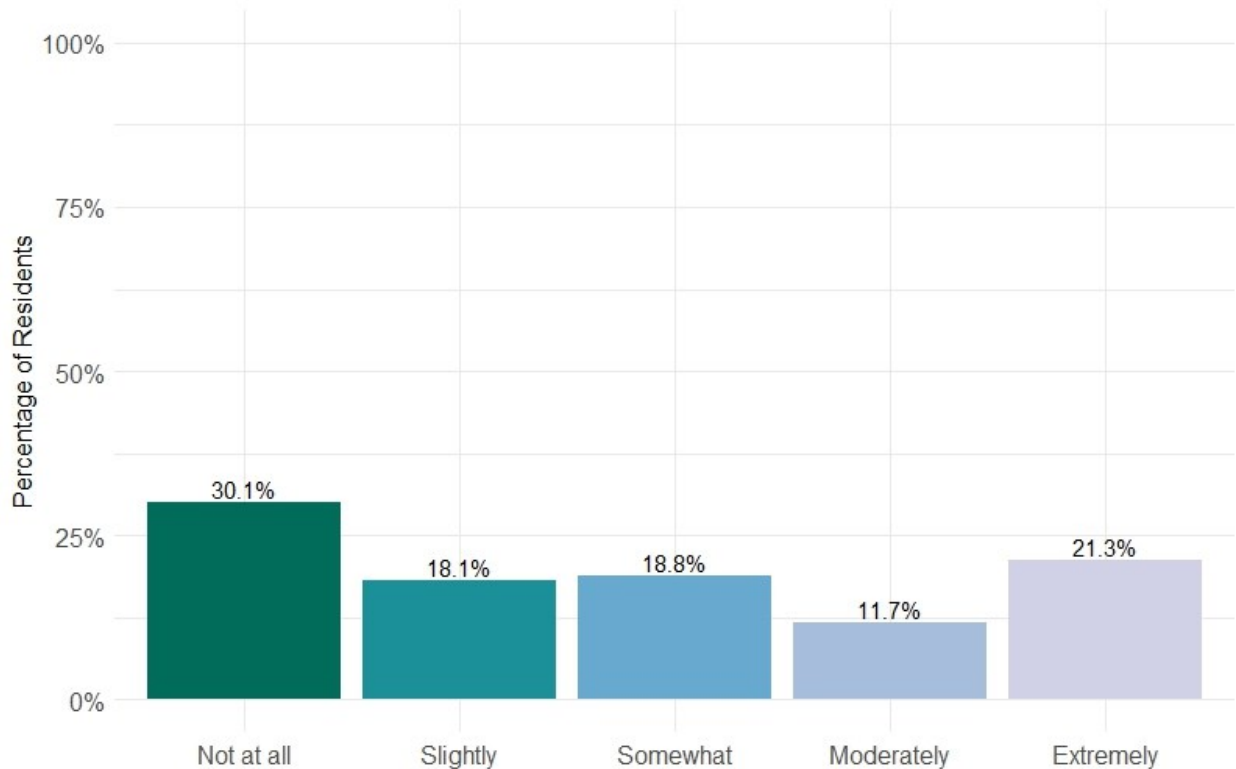


Figure 14: Familiarity with Marine Protected Areas.

4.5.1 Impacts of Marine Protected Areas

Among the residents who were slightly to extremely familiar with MPAs, most generally believed that MPAs have led to multiple improvements in the territory (Figure 15). However, up to a quarter of residents felt that no changes had resulted from MPA establishment, and a slightly smaller percentage were unsure of their impacts. About 57% of residents believed MPAs improved fishermen’s livelihoods, whereas 9% felt that fishermen’s livelihoods had worsened. Aua residents were more likely to perceive negative impacts from MPAs, while urban residents were most likely to perceive improvements (Table C15).

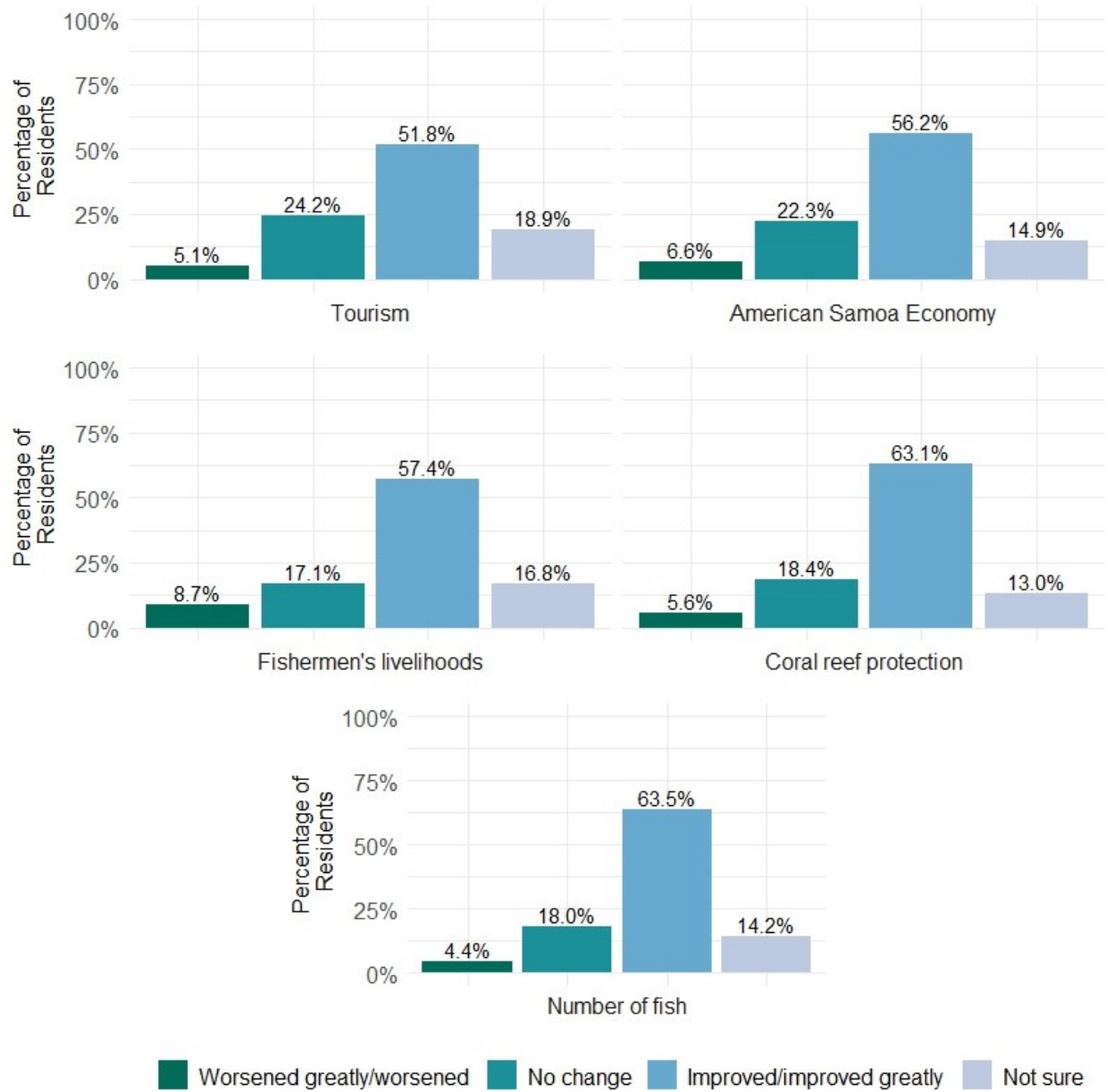


Figure 15: Perceived impacts from Marine Protected Areas.

4.5.2 Support for the establishment of Marine Protected Areas

Overall, the majority of residents supported the establishment of MPAs (Figure 16); however, 50% of Manu‘a residents and 35% of Aua residents were most likely to neither oppose nor support their establishment. By contrast, over 90% of residents from semi-rural villages and over 86% of residents from urban villages supported them (Table C16).

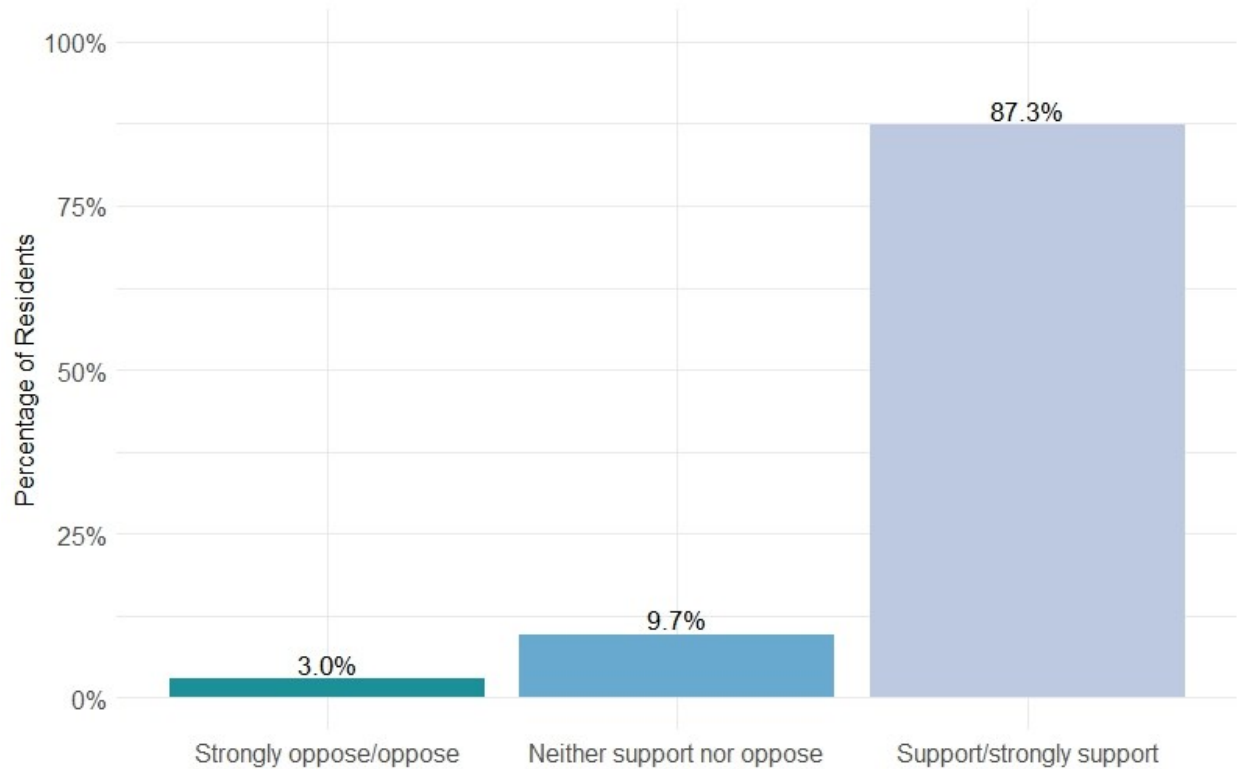


Figure 16: Support for the establishment of Marine Protected Areas.

4.5.3 Support for Management Strategies

Residents were generally supportive of all nine coral reef management strategies (Figure 17). Residents were most supportive of improving law enforcement, incorporating traditional Samoan practices into coral reef management, and stricter control of sources of pollution. Over 34% of residents were either neutral or opposed to fishing bans on “big fish” species, and over 20% were opposed to a tax on luxury items to support coral reef conservation efforts. Manu‘a residents were more likely than other residents to oppose various fishing restrictions, especially size and seasonal catch limits (Table C17). Residents of Aua and urban villages were most likely to support all management strategies.

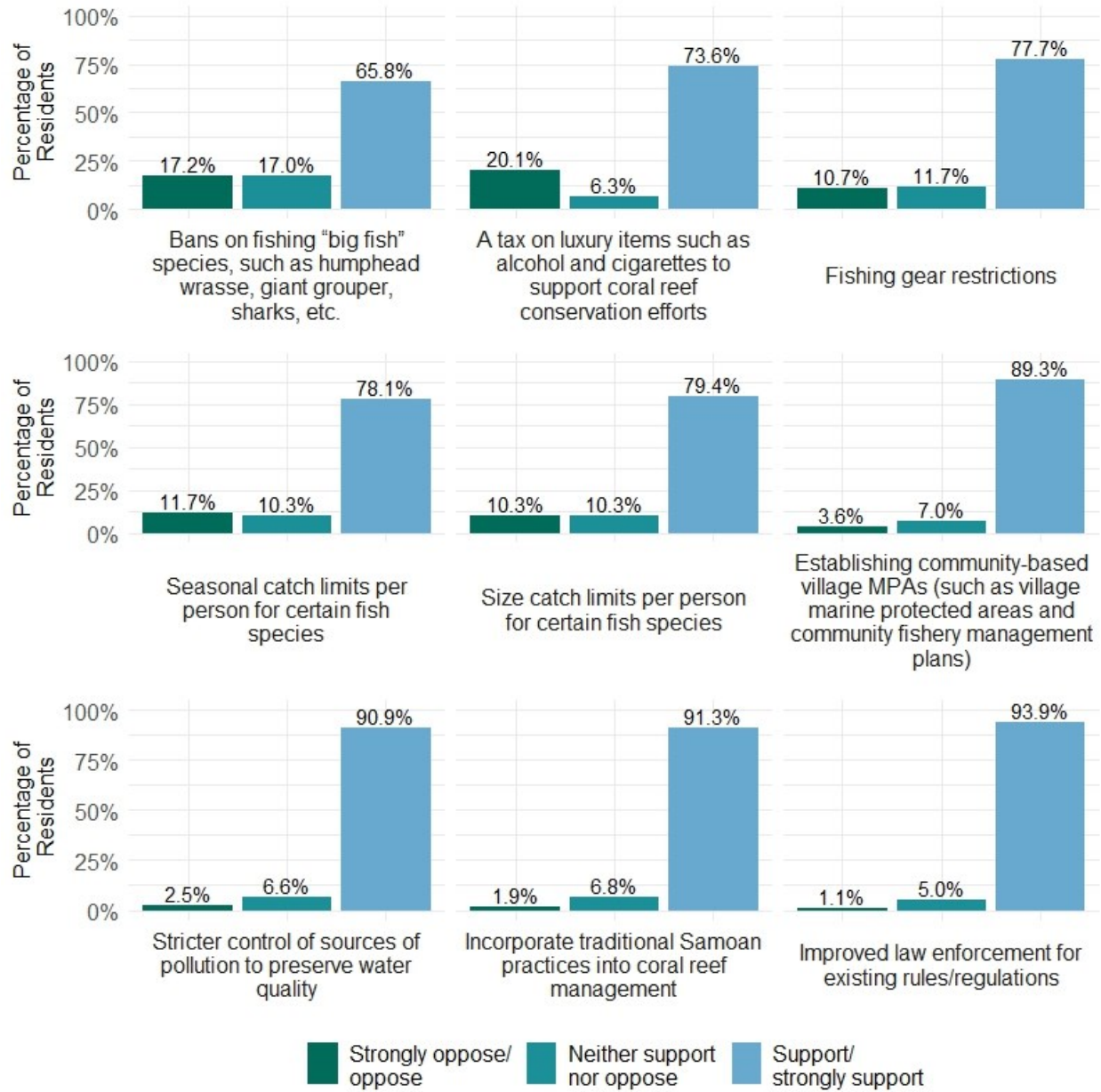


Figure 17: Support for coral reef management strategies.

4.6 Participation in behaviors that may improve coral reef health

In the past 12 months, residents most frequently volunteered with environmental groups or spoke with family, friends, and village leaders about environmentally responsible practices, but rarely donated to environmental causes (Figure 18). Using reusable items instead of single use plastics had the most routine participation from residents (over 3% did this every day, and over 6% did this at least several times a week); however, overall participation was still low (over 66% never did this). More than 70% of Aua residents never participated in the listed environmental behaviors. In addition, Manu‘a residents were very likely to use reusable items instead of single use plastics at some frequency (Table C18).

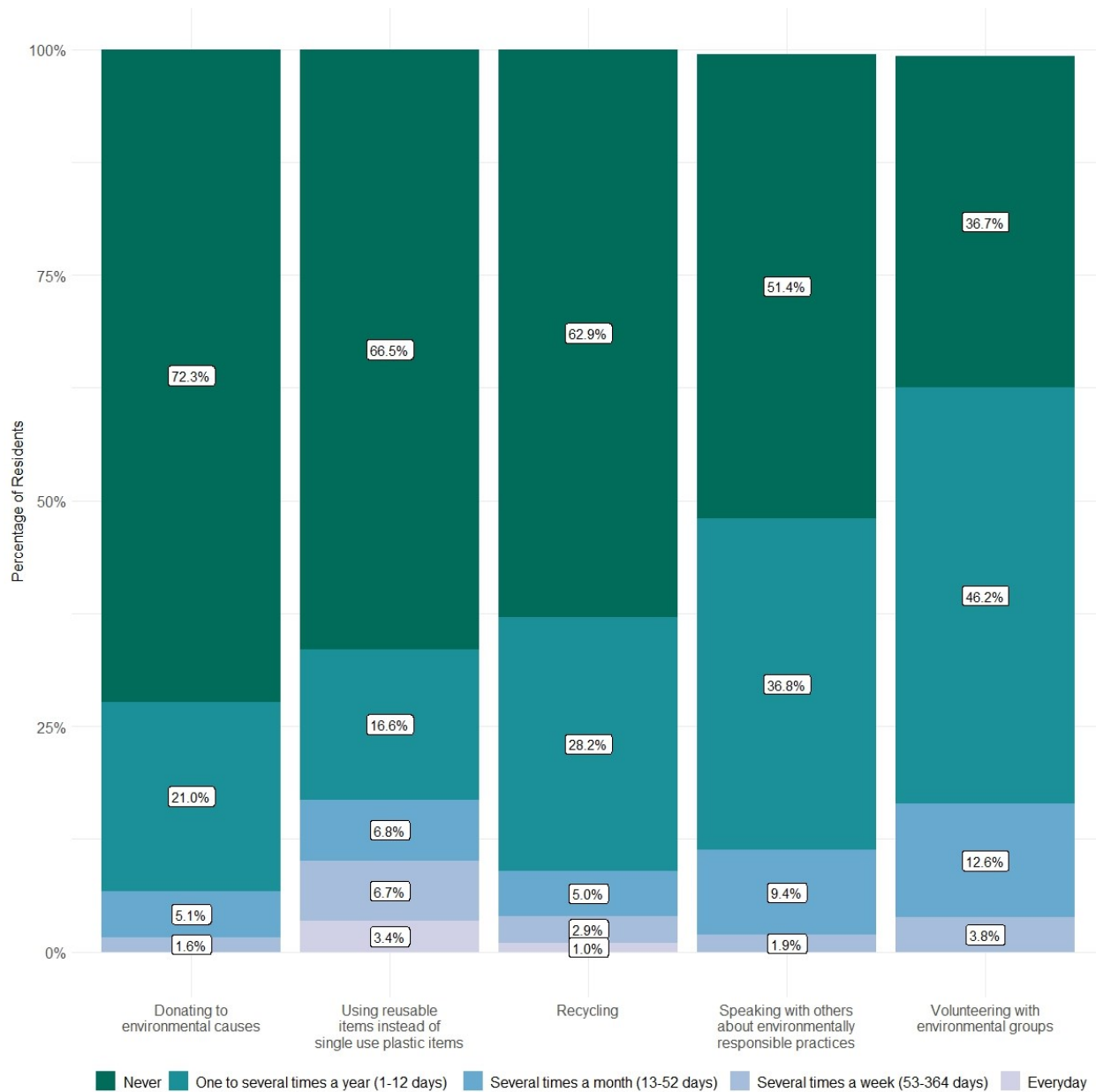


Figure 18: Participation in pro-environmental behaviors.

4.7 Sources of coral reef information

Radio and television were the most preferred sources of coral reef information, and word of mouth was least preferred (Figure 19). Residents in Aua, rural villages, and semi-rural villages were most likely to prefer radio, while residents from urban villages were most likely to prefer television (Table C19).

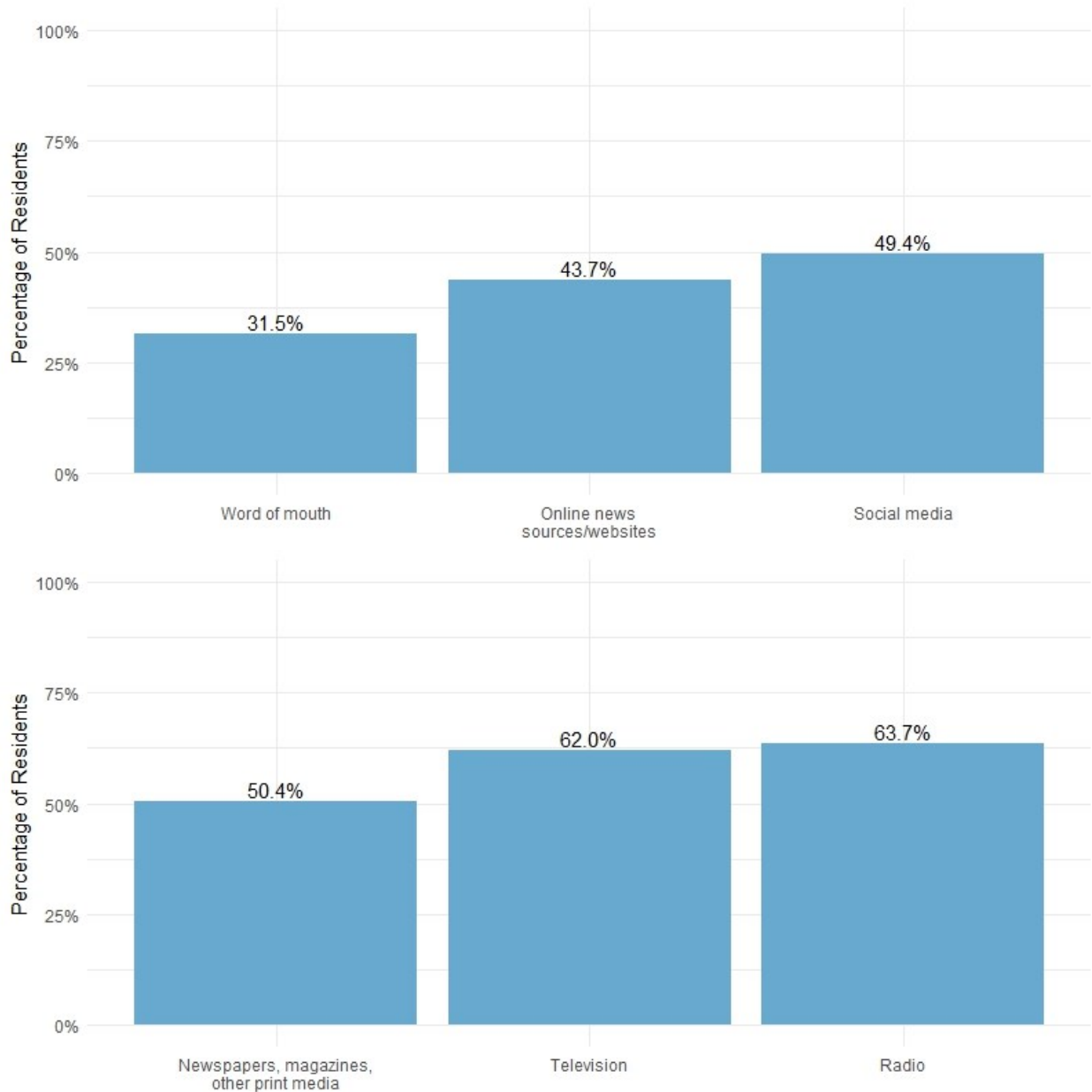


Figure 19: Preferred ways to receive coral reef information.

Most residents believed all presented sources to be somewhat credible for coral reef information. While credibility was roughly similar across the majority of sources, the most credible were church groups and friends and family, and the least credible were non-profit organizations (Figure 20).

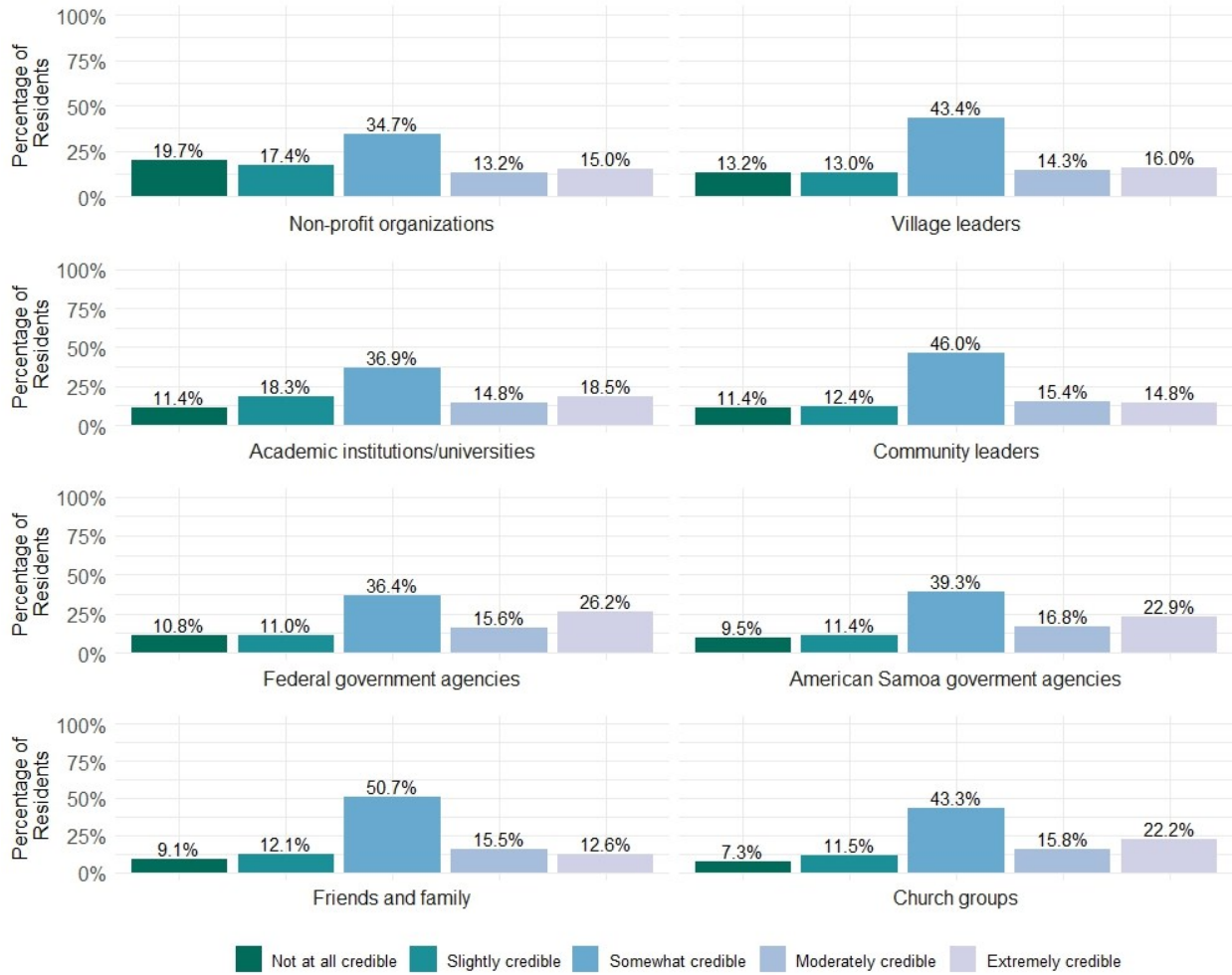


Figure 20: Credibility of sources for coral reef information.

5. Results: Trend Analysis for 2014 to 2021

With two cycles of survey data from 2014 and 2021, NCRMP is able to track changes in socioeconomic conditions in American Samoa over time, where data are available.⁴ Key trend analyses are presented below. Where appropriate, *t*-tests were performed to test for statistically significant differences in mean percentages of responses between residents in 2014 and residents in 2021 (*p*-values are indicated in the figures below).⁵

5.1 Participation in coral reef activities

Between 2014 and 2021, there was a statistically significant decrease in resident participation in all activities, except for diving (SCUBA and free) which remained relatively stable (Figure 21). The largest decreases in resident participation between survey years were in fishing (all types) (26.7%), swimming and wading (25.9%), and beach recreation (20.4%).⁶

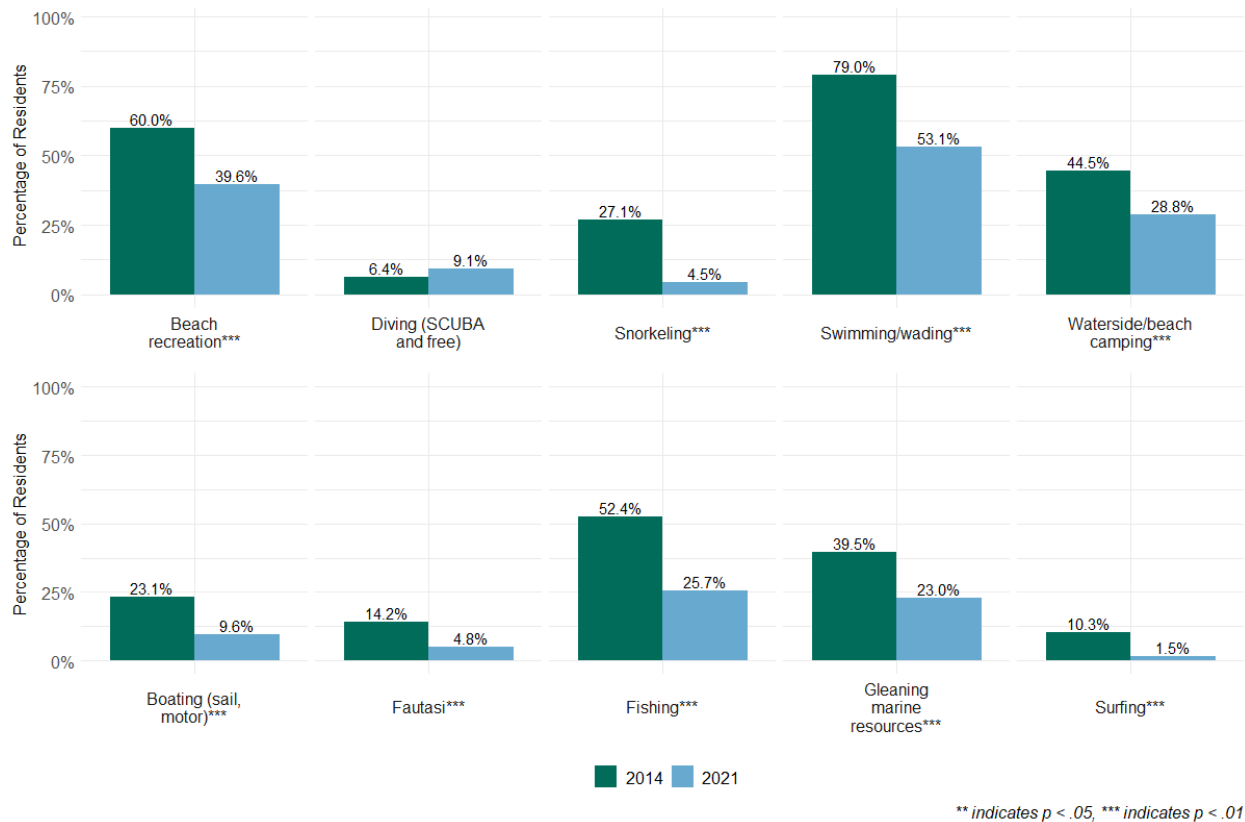


Figure 21: Resident participation in coral reef activities during 2014 and 2021.

⁴ The 2021 American Samoa survey (Appendix A) underwent some improvements since its first implementation in 2014, and trends are only shown when appropriate.

⁵ Due to slight differences in survey measurement scales, statistical comparisons were not done for the results presented on sources of seafood and importance of coral reefs.

⁶ “Inshore fishing” and “offshore fishing” were combined in the 2021 data to be comparable to “fishing” measured in the 2014 data.

Between 2014 and 2021, there were statistically significant differences in participation frequency for all six reasons for fishing (Figure 22).⁷ While fishing participation generally declined in 2021, there were small increases in the percentage of residents who frequently or always fished to feed themselves and their family or household (16.0%), give catch to extended family and/or friends (10.7%), or give to pastors or village leaders (10.7%). In both survey years, residents typically never fished recreationally or to sell their catch.

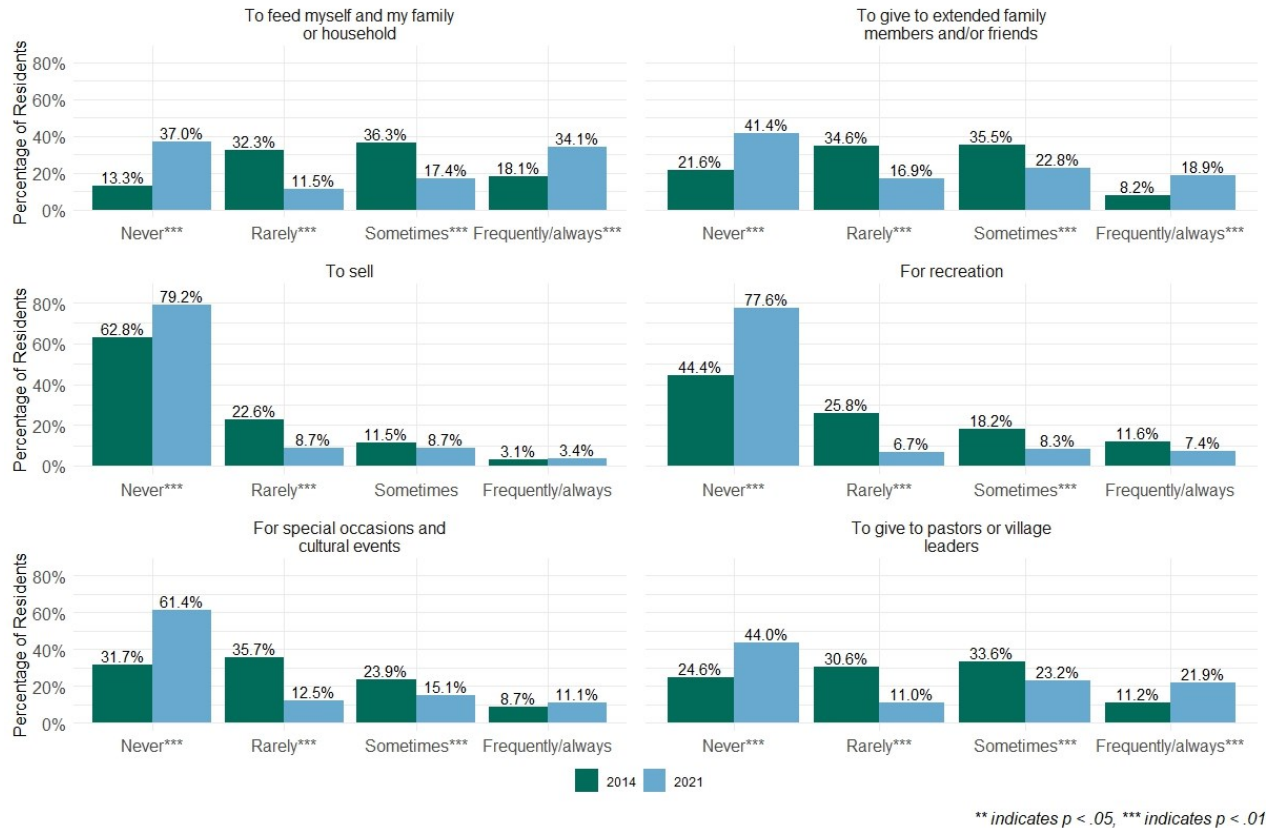


Figure 22: Reasons for resident participation in fishing in 2014 and 2021.

⁷ For purposes of analysis, the five-point frequency scale used in the 2021 survey was recoded into a four-point scale consistent with the 2014 measure (“often” and “always” were combined into “frequently”). Recoding is a common practice as long as the meaning of the scales is maintained.

5.2 Seafood consumption

Overall, there was an increasing trend in the frequency of seafood consumption among resident households between 2014 and 2021 (Figure 23). There was a statistically significant increase of 10.9% in the percentage of residents who consumed seafood a few times a week, and a 3.9% decrease in the percentage of residents who reported never eating seafood.

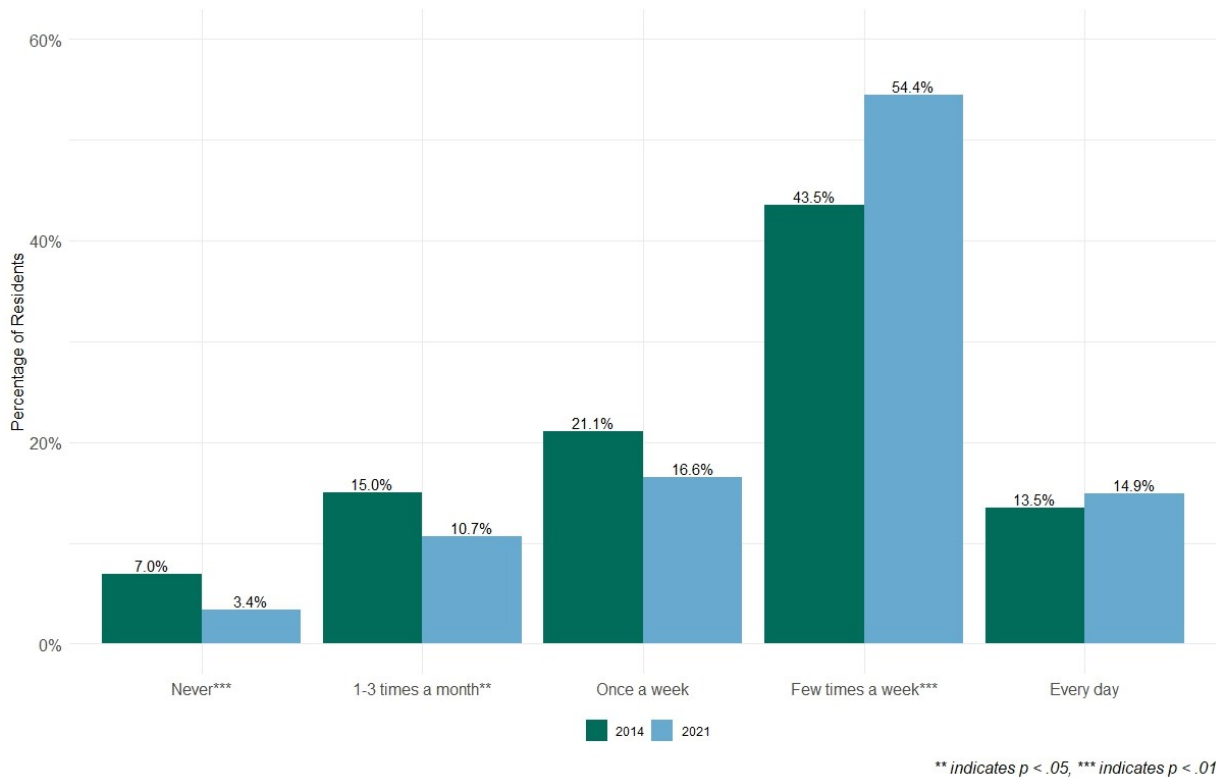


Figure 23: Frequency of resident seafood consumption in 2014 and 2021.



Humbug damselfish (*Dascyllus aruanus*) and multibar goatfish (*Parupeneus multifasciatus*) in a shallow coral reef of American Samoa. Photo credit: NOAA, S. Annadale.

Residents’ sources of seafood in 2014 and 2021 were examined, but statistical differences were not tested due to differences in the way this question was asked between surveys (Figure 24). The 2014 results show residents’ “top two” sources of seafood, while the 2021 results show frequently used sources (frequently or always). In both years, purchasing at a store or restaurant was the most frequent seafood source.

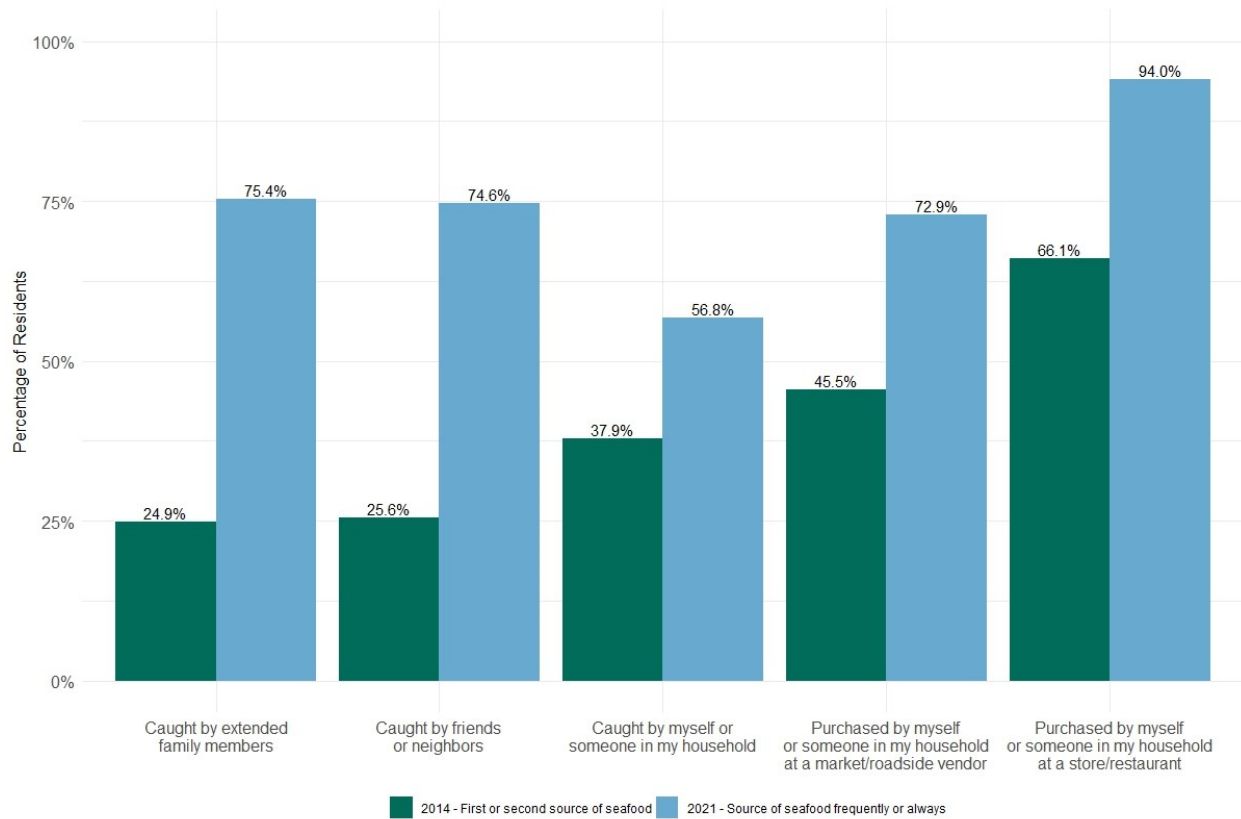


Figure 24: Sources of seafood for residents’ consumption in 2014 and 2021.

5.3 Importance of coral reefs

Two statements rated by residents in 2014 and 2021 on the importance of corals reefs were examined, but no statistical comparisons were made due to differences in scales (Figure 25). In 2014, the majority of residents agreed or strongly agreed that coral reefs protect American Samoa from erosion and natural disasters and are important to the culture of American Samoa. In 2021, the majority of residents rated these statements as being slightly to extremely important.

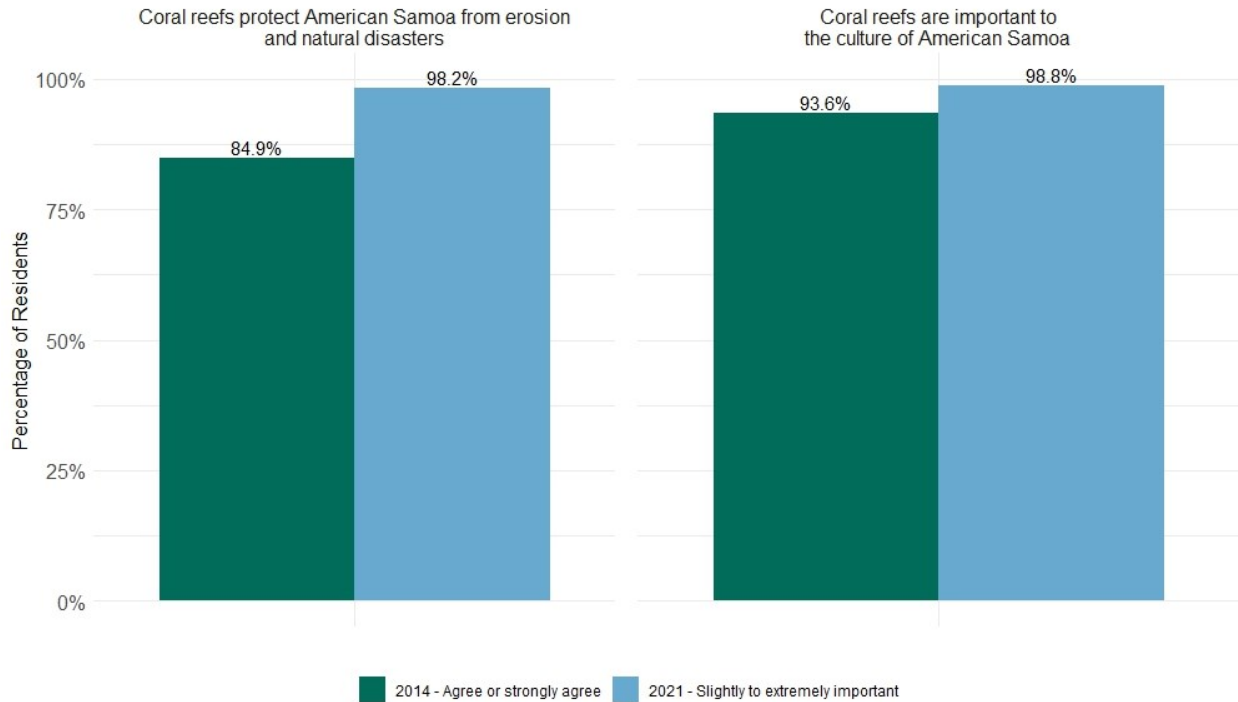


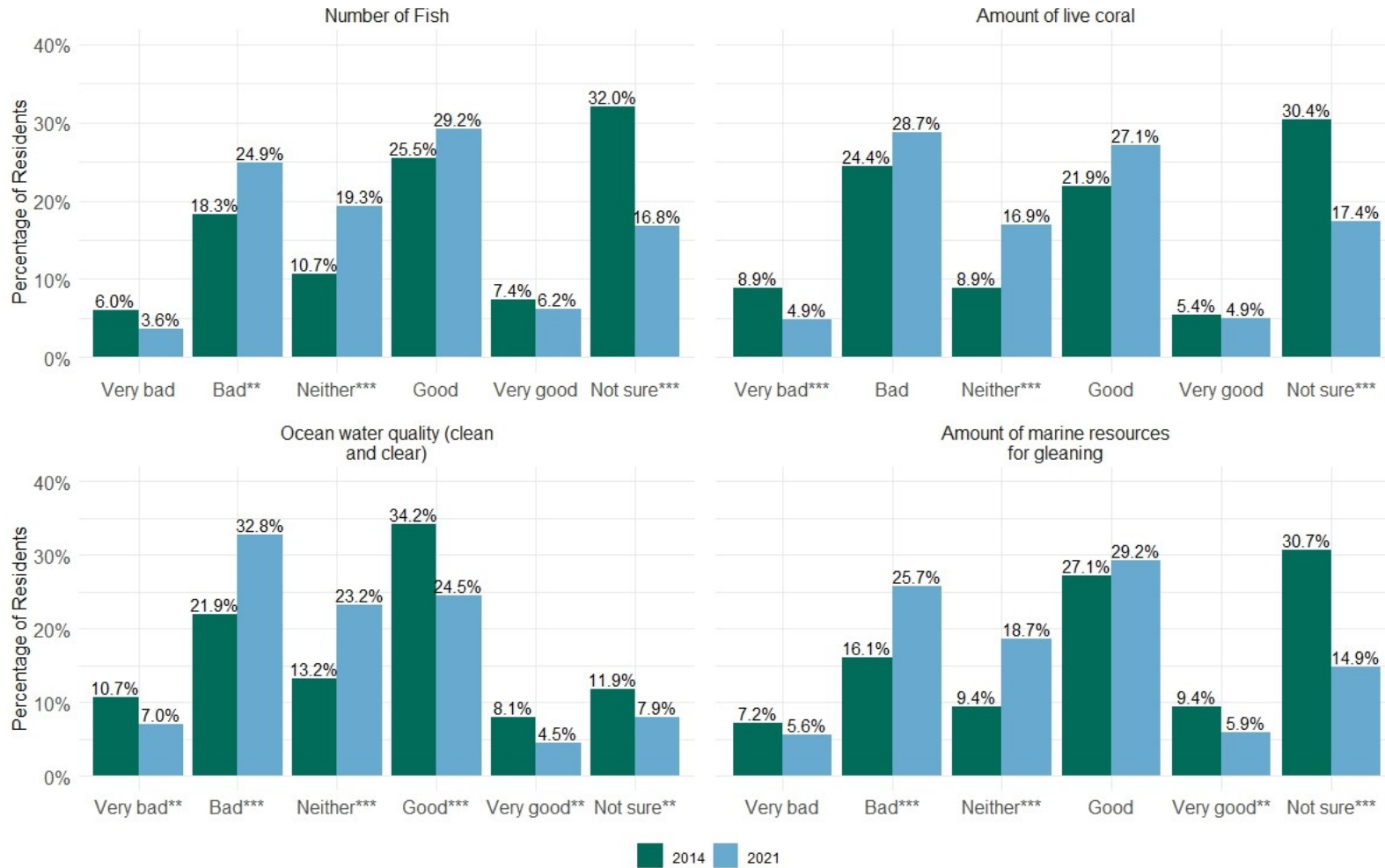
Figure 25: Residents’ perceived importance of coral reefs in 2014 and 2021.

5.4 Perceived resource conditions and threats

Both the 2014 and 2021 surveys asked about the current condition of four marine resources: number of fish, amount of live coral, ocean water quality, and amount of marine resources for gleaning. In general, residents’ perceptions of all four resource conditions were more neutral in 2021, and there was a significant decrease in the percentage of residents who were not sure about these conditions (Figure 26). In both years, ocean water quality was perceived as being in the worst condition (relative to other resources) and the percentage of residents who rated water quality as bad increased by 10.9% in 2021.

Residents’ familiarity of potential threats to coral reefs in 2014 and 2021 were also examined (Figure 27).⁸ Overall, residents were less familiar with coastal/urban development, Crown of Thorns starfish, and shipping and boating as threats to coral reefs in 2021 than they were in 2014. However, residents’ familiarity with climate change as a threat increased by 7.6%.

⁸ Due to slight differences between the scales used in the 2014 and 2021 surveys, responses were consolidated into “unfamiliar” and “familiar” categories for purposes of analysis and visualization.



** indicates $p < .05$, *** indicates $p < .01$

Figure 26: Resident perceptions of current resource conditions in 2014 and 2021.



** indicates $p < .05$, *** indicates $p < .01$

Figure 27: Residents' familiarity of coral reef threats in 2014 and 2021.

5.5 Attitudes toward coral reef management strategies

Between 2014 and 2021, the percentage of residents who were familiar with marine protected areas decreased by 22.0% (Figure 28). In both surveys, a marine protected area was defined as “an area of the ocean where some human activities are limited to protect living, non-living, cultural, and/or historic resources” and the 2021 survey included examples of MPAs (such as marine sanctuaries or parks, village MPAs, or private reserves).

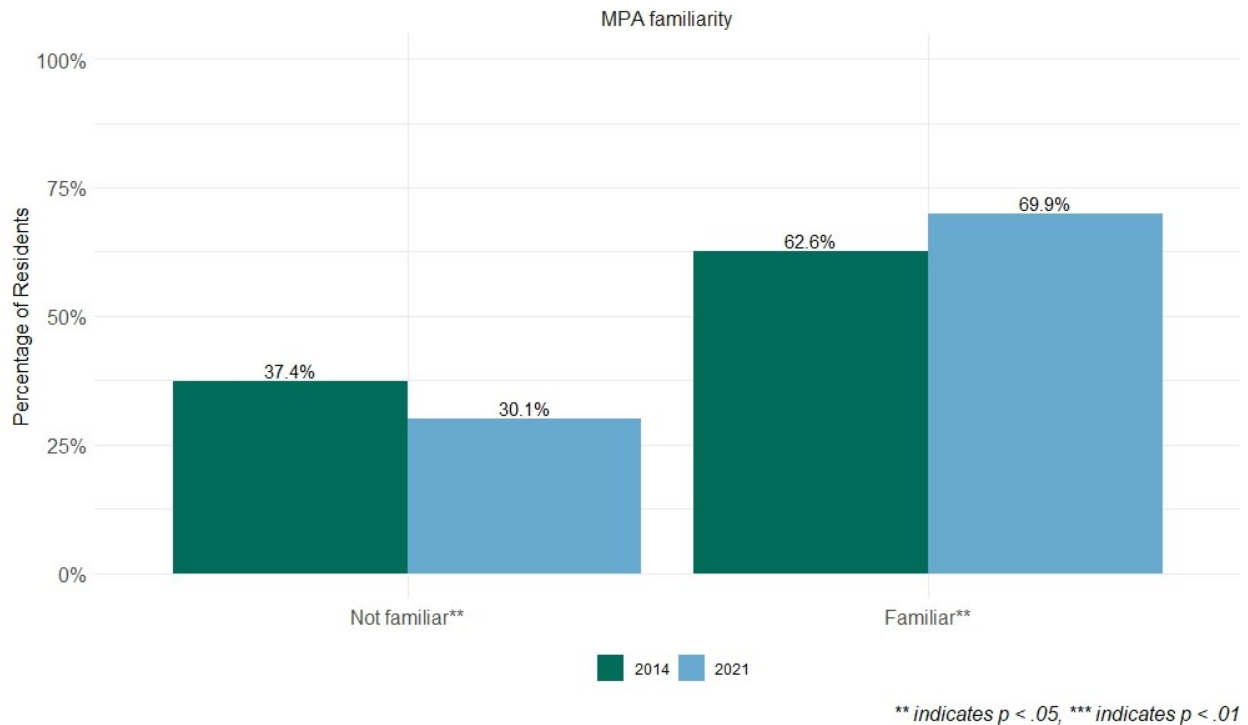
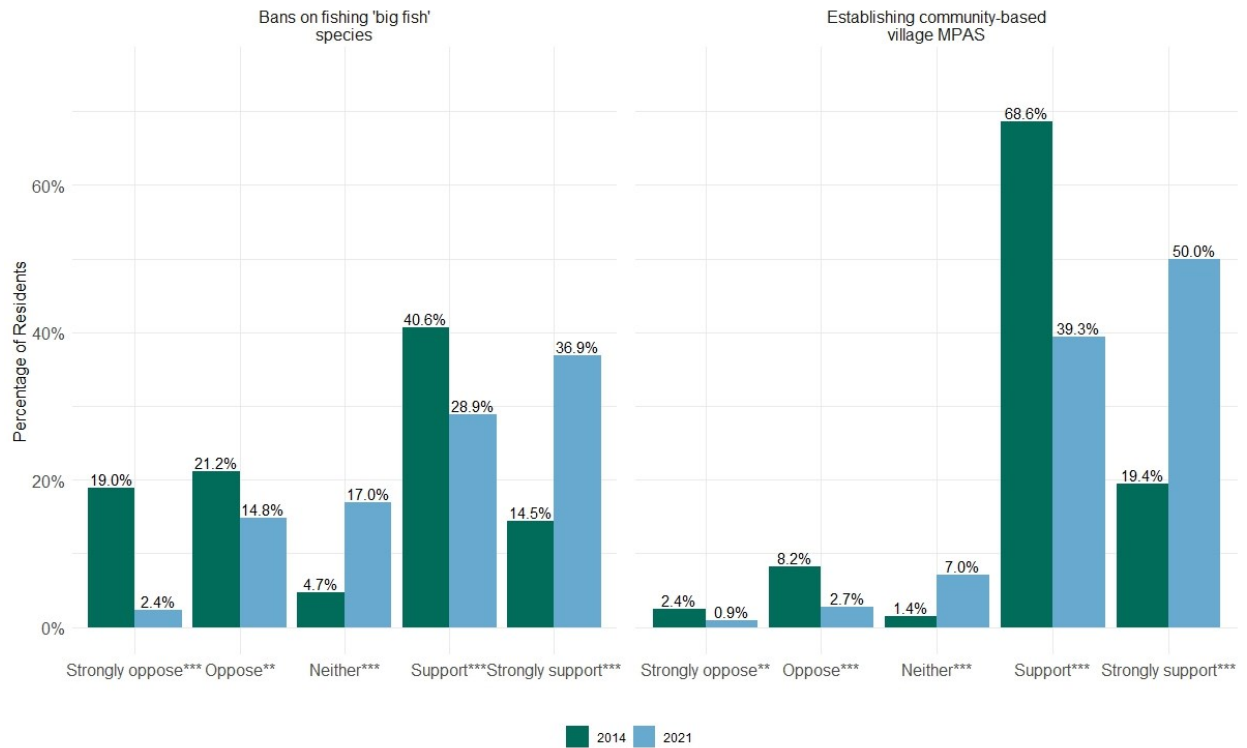


Figure 28: Residents’ familiarity of Marine Protected Areas in 2014 and 2021.

Residents’ attitudes toward bans on fishing ‘big fish’ species and establishing community-based village MPAs were included in both the 2014 and 2021 surveys, and there were statistically significant differences in the results (Figure 29). In both years, the majority of residents supported bans on fishing ‘big fish’ species and establishing community-based village MPAs. However, the percentage of residents who strongly supported these two management strategies significantly increased in 2021.



** indicates $p < .05$, *** indicates $p < .01$

Figure 29: Residents' support for management strategies in 2014 and 2021.



A large school of Pacific Slopehead Parrotfish (*Chlorurus frontalis*) graze on crustose coralline algae in a marine protected area in American Samoa. Photo credit: NOAA, Kevin Lino.

6. Discussion

The results from the 2021 NCRMP socioeconomic survey can inform important management decisions related to residents' coral reef behaviors, and results highlights how resident actions may be linked to their perceptions, beliefs, and attitudes toward coral reef management strategies in American Samoa. Based on the survey findings, some general conclusions about the population of American Samoa in 2021 and their interactions with coral reefs are evident. Notable changes or similarities between 2014 and 2021 are also reported. We conclude this section by discussing directions for future research and integration.

6.1 Participation in coral reef activities

Swimming/wading, beach recreation, and waterside/beach camping were primary activities for American Samoa residents in both 2014 and 2021, but frequency of participation declined in 2021. As such, it is important for residents to have sufficient access to beaches and coastal areas that are managed by communities, villages, and families adjacent to these public waters (ONMS 2022). Declining participation rates in 2021 may have been influenced by COVID-19 restrictions or precautions such as social distancing and stay-at-home measures.

Some differences in activity participation may be influenced by differences in the sampling design and geography. In general, participation in marine-based activities, such as diving, snorkeling, and surfing, was less common among residents. However, residents in the Manu'a Islands were much more likely than other residents to participate in coral reef activities. While the sample size of Manu'a residents was limited, the results suggest that Manu'a residents may have an increased attachment or connection to the marine environment.

Activity participation among residents has social, environmental, and management implications. High participation in beach activities, which are considered coral reef activities for purposes of monitoring, indicate there are important ecosystem services or benefits being provided to communities. At the same time, increases in activity participation can also result in higher densities of people in one area, which can further impact the quality of resource conditions, recreational experiences or other social conditions, such as overcrowding or conflict between different activity groups (Manning 1999). Sustained access to activities and the quality of those experiences are linked to ecosystem conditions. Beach recreation, for instance, is most directly linked to coral reefs through the protection of beaches from erosion due to storm events (Shivlani et al. 2003). Additionally, reefs provide material for natural beach replenishment (NOAA CRCP 2015). Swimming and wading depend on ocean water quality for public health and safety, aesthetics, and other benefits, but may also impact the health of corals by introducing toxic sunscreen residues or other transferable chemicals.

6.2 Cultural importance of coral reefs

Ecosystem services and culture. *The majority of residents recognized that coral reefs provide a variety of ecosystem services to American Samoa.* There was a general consensus that coral reefs are important to coastal protection, the economy, culture, and food for coastal communities in American Samoa. This demonstrates that residents recognize the value of coral reefs in providing a range of benefits.

The majority of residents indicated that they are Samoan, and half were native born in American Samoa. Samoan culture, *Fa'a Samoa*, continues to be an important foundation of life, Samoan heritage, and connection to ongoing cultural traditions across generations (Pacific RISA 2022). *Fa'a Samoa* emphasizes loyalty to family, respect of elders, and a commitment to serving the community. These principles and sociocultural values are apparent throughout the survey results as evidenced by stated reasons for time spent fishing and gleaning, support for incorporating traditional Samoan practices into coral reef management, and the importance of coral reefs for cultural practices.

Residents overwhelmingly believed that *coral reefs are important to their family's cultural beliefs and practices*. While the 2021 survey did not ask about specific types of cultural beliefs and practices, the results indicate that fishing and providing local seafood towards household food self-sufficiency and communal sharing is of high cultural value in American Samoa. For example, residents primarily fished or gathered marine resources to feed themselves and their families, or to give away to extended family, friends, pastors or village leaders. This suggests that communities tend to rely on fishing for subsistence or cultural purposes more often than for recreation or income. Similar to the 2021 and 2014 results, other studies have emphasized the important cultural context of fishing in maintaining communal resource values, reciprocity, and social structures in American Samoa (Levine et al. 2016; Levine and Sauafea-Le'au 2013; Severance et al. 2013). These findings underscore the need for sustainable management of traditional fishing practices and seafood.

Seafood sourced from local coral reefs. *Most resident households consumed seafood on a weekly basis, and nearly all residents ate local seafood from coral reefs at least once a month.* While most of this seafood was purchased from a store or restaurant, the majority of residents knew what was locally caught from the reefs and where seafood was harvested. High levels of awareness may be explained by the direct relationship residents have with coral reef resources. Many residents also relied on themselves, family, friends, or neighbors as sources of seafood. This finding was particularly prevalent among Manu'a residents and is consistent with the high frequency of participation in inshore fishing and gathering of marine resources, further highlighting the important role of fishing in communal sharing.

6.3 Perceived resource conditions

Current resource condition. In 2021, *residents were most likely to perceive the condition of ocean water quality and the amount of live coral as bad or very bad.* Negative perceptions of ocean water quality have important implications to public health and safety messaging considering swimming/wading, beach recreation, and waterside/beach camping were primary activities for residents. Poor water quality also has an adverse effect on coral conditions as well as the availability of fishery and marine resources that residents rely on for subsistence or cultural purposes. These results suggest that ocean water quality and live coral cover are critical issues to manage. Between geographies, Aua residents had the most negative perceptions of all resource conditions. This suggests that residents recognize Aua as an area vulnerable to resource decline and further supports the American Samoa CRAG and NOAA CRCP priority to reduce negative impacts of land-based sources of pollution to the Aua watershed (NOAA CRCP 2018b). Residents of the Manu‘a Islands had relatively more positive perceptions of conditions, which may be influenced by the remoteness of these islands where coral reef resources are in better condition compared to Tutuila (NOAA CRCP 2018a).

Resource condition over time. Residents believed that the *overall marine ecosystem in American Samoa had become worse or not changed over the past ten years*, and most believed that *resource conditions would improve in the future*. These findings indicate residents’ perspectives of how resource conditions are changing, and may also illustrate a sense of confidence among residents that coral reef conditions will be effectively addressed. However, if conditions instead worsen over time due to global or local factors, this would conflict with residents’ beliefs about how future conditions will be. Communication and outreach about the status of reef conditions will be needed.

Residents were more certain about their perceptions of resource conditions in 2021 than they were in 2014. They were most sure about ocean water quality, but about 17% of residents were still unsure about the amount of live coral. High certainty of ocean water quality conditions may be related to residents’ frequent participation in swimming and beach activities, whereas relatively less certainty about coral be related to low participation rates in activities more directly related to coral reefs such as diving or snorkeling. This highlights the importance of local knowledge, as individuals who regularly observe, pursue, and use living marine resources tend to possess a wealth of understanding about the marine environment.

6.4 Awareness of threats to coral reefs

Residents were *most familiar with hurricanes, climate change, pollution, and overfishing as having a negative impact to coral reefs*. These threats and their impacts influence residents’ ability to continue benefiting from reef activities. Sustaining marine resource conditions and coral reef ecosystem services require addressing these potential threats. Education and outreach campaigns can help to raise public awareness of coral reef issues as well as societal and individual actions that residents can take. Further focus on informing citizens of coral reef issues

and the potential costs to people's livelihoods can promote stronger environmental attitudes, stewardship, and active engagement in conservation activities (Danielson et al. 1995). Findings also suggest that communication could be targeted through radio and television and community social networks.

Residents' perceptions of how resource conditions have changed (and will change in the future) can be connected to their familiarity with coral reef threats. The survey found that residents were familiar with a variety of threats facing coral reefs, including climate change, but were *least familiar with ocean acidification and its impact to coral reefs*. National awareness of ocean acidification has been shown to vary (The Ocean Project 2012; Mossler et al. 2017; Cooke and Kim 2019), so more communication and outreach may be needed to enhance public awareness of climate change impacts, such as ocean acidification, and how these issues threaten not only coral reefs but also daily lives in American Samoa. Similar outreach strategies may also be needed to boost awareness of coral bleaching and Crown of Thorns starfish, how they impact coral reefs, and relate to other types of threats that residents may be more familiar with.

Together with findings on perceptions of resource conditions, findings on threats to coral reefs can be useful for a) assessing public perceptions regarding the relative degree of success of current management efforts and as a means for indicating how such efforts might be adjusted to accommodate changing conditions; b) designing new management approaches that are readily understood and therefore more likely to be accepted and followed by resource users; and c) adjusting outreach and educational efforts per changing local observations about threats to the local marine environment.

6.5 Attitudes toward coral reef management strategies

Marine Protected Areas. The majority of residents were familiar with marine protected areas (MPAs) in American Samoa and supported their establishment. Residents generally *believed that the establishment of MPAs had led to improved benefits for coral reefs and coastal communities* such as the improvement of tourism, fishermen's livelihoods, and the economy to improved number of fish and coral reef protection. These findings are consistent with residents' ratings on the importance coral reefs have in providing these ecosystem services.

However, about 25% of residents either believed that no change had occurred since the establishment of MPAs or were unsure of the impacts. A similar proportion of residents believed that fishermen's livelihoods had either not changed or had become worse. It is important to consider that the level of support or perceived benefits may vary based on how people are differentially impacted by restrictions imposed by an MPA (Bennett et al. 2019). Additional analyses could examine differences in opinions between fishing subgroups, as well as the procedural and distributive justice of MPA rules and regulations (Loomis et al. 2019).

Support for strategies to improve coral reef protection. Information on residents' attitudes can provide managers and decision-makers with a better understanding of which kinds of

resource management strategies are most likely to be supported by residents. This survey found *strong support (positive attitudes) for improving law enforcement for existing rules and regulations, incorporating traditional Samoan practices into coral reef management, and stricter control of pollution sources to preserve water quality*. Support for these management strategies is consistent with residents' perceptions of resource conditions and threats to reefs. The findings suggest that American Samoa residents want to see efforts to mitigate threats (e.g., pollution) to coral reefs and prevent resource conditions (i.e., ocean water quality and amount of live coral) from becoming worse. Additional management strategies that are supported by residents could be taken to help maintain or improve resource conditions.

However, survey results suggest that some management strategies for fishing activities need careful consideration. The least amount of support was for fishing bans on 'big fish' species (such as hump-head wrasse, giant grouper, and sharks) and a tax on luxury items (such as alcohol and cigarettes) to support coral reef conservation efforts. Lack of support for fishing bans may be linked to residents who participate in fishing for community livelihoods. Support is also influenced by the perceived fairness of the decision-making process (procedural justice) and has further implications to equity and compliance. Understanding resident support for potential management strategies is important for managers and decision-makers proposing actual rules and regulations.

6.6 Participation in behaviors that may improve coral reef health

Residents varied in their participation in pro-environmental behaviors that may help to improve coral reef health. *About 50% of residents volunteer with environmental groups or speak with others about environmentally responsible practices at least once to several times a year*. While the survey did not ask respondents for reasons why they participated (or did not participate), higher reports of pro-environmental behaviors may reflect the values residents have for coral reefs and the sharing of local knowledge (Wynveen et al. 2015). Relatively lower participation in behaviors such as using reusable items or donating to environmental causes may be influenced by a range of factors such as convenience, habit, preferences, social norms, income, or availability of services or resources to be able to participate (Kollmus and Agyeman 2002).

6.7 Future research and integration

There were a few lessons learned from the second NCRMP socioeconomic data collection in American Samoa related to the survey instrument and questions used to measure the primary indicators. Minor changes were made to the way questions were asked to improve the 2021 survey from the 2014 survey. Moving forward, the NCRMP team will be making additional adjustments to the survey and data collection effort to further improve the accuracy and validity of the type of information generated, while maintaining comparability between monitoring rounds. Some of the improvements include clarity of wording, refinement and consistency of scales, and additional questions to better capture the cultural importance and pro-environmental behavior indicators. For example, future surveys will include follow-up questions on motivations

or constraints to participation in pro-environmental activities. This would help management target communication and outreach efforts to engage citizen participation in stewardship and conservation activities (Kollmuss and Agyeman 2002). Future surveys will also seek to incorporate more spatial information, such as collecting information on where residents engage in outdoor activities, when feasible, which could be correlated to habitat and resource conditions. Making these improvements is necessary to achieve more precise and accurate measurement of indicators, but the NCRMP socioeconomic team will continue to assess potential comparability concerns between monitoring cycles for data transparency and trend accuracy.

As NCRMP is a national monitoring program with the goal of measuring 13 socioeconomic indicators over time, there is minimal space available for additional survey questions on future surveys. However, future complementary research could ask about the impacts of coral reef threats on particular resource conditions, and further analysis could examine the links between residents' awareness of threats and their perceptions of resource change. Related, additional studies could examine climate literacy, social vulnerability, adaptation, and community resiliency to climate change issues. Additional analyses or studies could also examine how level of support and perceived benefits of MPAs vary by stakeholder group (such as those who fish), as well as the preferences those groups have for different management strategies and regulations. This informs the tradeoffs between resource protection and use, and has implications for social justice (equity, perceived fairness), effective governance, and the success of marine conservation management actions (Loomis et al. 2019).

The second cycle of monitoring data collection in American Samoa also made improvements to the sampling design. In 2014, residents were sampled opportunistically. In 2021, a stratified random sampling design was implemented and a larger sample size was obtained, including the addition of the Manu'a Islands. This sampling design was made together with local partners and resulted in a stronger and more representative sample. However, we recognize that the sample from the Manu'a Islands was limited to the village of Ofu. Partners have emphasized that future surveys include additional villages for better representation of Manu'a residents and, at a minimum, include at least one village from Ta'u and at least one village from the Ofu/Olosega complex. Increasing the sampling resolution will improve our ability to understand diverse sub-populations and spatial patterns in American Samoa and expand how NCRMP socioeconomic data can be used to inform management decisions. It is also important that nonresponse data are collected to determine more accurate response rates and representation of the data. This was a limitation of the second cycle of data collection; therefore, some caution should be taken when making strata-level conclusions.

NCRMP continues to collaborate with the biological and climate NCRMP themes and jurisdictional agencies to integrate socioeconomic and biophysical data, and to inform coral reef management and monitoring across all jurisdictions. Comparing perceived coral reef resource conditions to biophysical data can reveal gaps between residents' perceptions of resources and patterns observed in fisheries, benthic, and climate data. Integration of socioeconomic,

biological, and climate NCRMP data provides for a holistic understanding of the socio-ecological connections and implications of the indicators that NCRMP is monitoring. This supports communication of complex data in a way that facilitates better science-based resource management decision making.

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Appendix A: 2021 Survey Instrument

OMB SUBMISSION

NOAA Coral Reef Conservation Program
National Coral Reef Monitoring Program (NCRMP)
Resident Coral Reef Survey
OMB Control Number 0648-0646

Survey administered in: English or Samoan
Fesili Fuafua e fesiligia i le (Fa'aaoga se tali e tasi) Egilisi po'o le Fa'aSamoa

[SCRIPT] Talofa, my name is _____ working on behalf of the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program. We are interested in obtaining your opinions on some important issues related to coral reefs and the environment in American Samoa. Your household has been selected to participate. May I please speak to the adult over 18 in your household who had the most recent birthday?

[FA'AMATALAGA] Talofa, o lo'u igoa o _____ oute galue o se sui Ofisa ole Feturale mo le Sami ma le Atimosifia. Matou te fiailoa la outou taofi i mataupu taua i le feso'ota'iga o a'au amu ma le si'osi'omaga i Amerika Samoa. Ua tofia ai la outou aiga e fesoasoani mai ai. Fa'amolemole pe mafai na ou talanoa atu i sei-isi i luga atu o le 18 tausaga e lata mai lona aso fanau?

- a. Selected Person is available CONTINUE
A e iai seisi FA'AALU PEA FESILI
- b. Selected Person is not available PROCEED WITH "NOT AVAILABLE" PROTOCOL, THANK CURRENT RESPONDENT, END INTERVIEW
A leai seisi fa'ataunu'u loa le "le leai seisi" FESILI MASANI, FA'AFETAI ATU I LE TALIFESILI, FA'AGATA LOA LE FUAFUA
- c. New individual comes to the door – RE-READ INTRODUCTION AND CONTINUE TO S1
A maliu mai se tagata fou matua atu i le 18 tausaga i le faitoto'a – Toe faitau Fesili fa'afeiloa'i amata mai i le Fesili S1.

S1. Are you at least 18 years of age? Ua atoa lou 18 tausaga?

- a. Yes - loe
- b. No - Leai

IF "NO", – Please ask the person over 18 in your household who had the most recent birthday to complete this survey. Thank you.

A "LEAI", Fa'amolemole Fesili atu mo seisi ua 18 ona tausaga l lona aufale pe mafai ona malaga mai i le faitoto'a.

RE-READ INTRODUCTION WITH NEW INDIVIDUAL OR PROCEED WITH "NOT AVAILABLE" PROTOCOL

Toe faitau atu le fa'afeiloaiga i tagata fou PE FA'AALU PEA LE "LEAI SEISI" FA'AVAE FA'ATA'ATIA"

**IF NO INDIVIDUAL OVER 18 IN THE HOUSEHOLD EXISTS, TERMINATE THE INTERVIEW
A LEAI SEISI E ILUGA ATU O LE 18 TAUSAGA FA'AGATA LOA LE FUAFUA O TALANOAGA**

[SCRIPT] Your participation is voluntary and will be kept strictly confidential. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subjected to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

[FA'AMATALAGA] O lou au ai e ofogia fua ae puipua malosi i la le tulafono lona fa'alilolilo. Ae ui i lea e iai isi fa'atulagaina o le tulafono e le tau taliaina ai ni fesili pe iai fo'i seisi e fa'asalaina pe a fai e le talia e ia ni vaega fesili putiputi o lo'o taumafai le Fuafua e tali uma ai latou fesili vagana ai ua fa'aalia i le OMB Control Number.

[SCRIPT] Public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other suggestions for reducing this burden to Mary Allen, National Oceanic and Atmospheric Agency, National Ocean Service, Coral Reef Conservation Program, (1305 East West Highway, Silver Spring, MD, 20910, USA.

[FA'AMATALAGA] Repoti avega faitele mo le aotelega o fa'amatalaga ua taufa'atatau e averesi (e pei o tulaga e masani lelei) e 20-minute i le tali e fa'aopopo ai ma le taimi e faitau fa'atonuga, sa'iliga o fa'amaumauga mafuaaga fa'aneionapo, fa'aopopoga ma fa'amautuina o fa'amaumauga, ma fa'auma ma toe iloilo le aoga fa'amatalaga ua aofia. Lafo mai au fautuaga e fa'asaga i le avega ia Malia Aleni, o le National Oceanic and Atmospheric Agency, National Ocean Service, Coral Reef Conservation Program, 1305 East West Highway, Silver Spring, MD, 20910, USA.

PARTICIPATION IN REEF ACTIVITIES
AUAI I GAIOIGA A'AU

[SCRIPT] This first section will focus on your ocean and marine-based activities in American Samoa.

[FA'AMATALAGA] O le vaega muamua lea e tatou tepe taula'i ai i le sami ma gaoiga sami-fa'avae i Amerika Samoa.

- 1. On average, how many days per month do you participate in each of the following activities in American Samoa? Please answer "0" if you don't participate in the activity.**
I tulaga masani, e fia aso i le masina e te auai i gaoiga nei i Amerika Samoa? Fa'amolemole tali mai e "selo" pe'a e le auai i ni gaoiga.

	Days per month / e fia aso i le masina
Swimming/Auau	
Wading/Savalivali pe fa'asusu na'o vae	
Snorkeling	
SCUBA diving/Tofu tane	

Free diving/Tofu e aunoa ma se tane ea	
Waterside/beach camping/Tafaoga	
Beach recreation (beach sports, picnics, etc.)/Tafaoga matafaga	
Boating (sail, motor)/Folauga va'a	
Inshore fishing/Fagotaga papa'u	
Offshore fishing/Fagota i fafo	
Fautasi/Long Canoe (fifty paddlers) *	
Other self-propelled boating activities (outrigger canoe, kayak, stand up paddle boarding, etc.)/O isi gaoioga fa'amalosia e tagata e pei o (aloga paopao, aloga kayak, alo laupapa tu, ma isi)*	
Surfing (including body surfing and boogie boarding)/Fa'ase'e (aofia ai le fa'ase'e galu, ma le fa'ase'ega laupapa puki)*	
Gleaning of marine resources (limu, octopus, urchins, sea cucumbers, clams, etc.)/Fagotaina o alaga oa o le sami (limu, fe'e, tuitui, loli, tugane, ma isi).	

SKIP PATTERN: IF RESPONDENT ANSWERS '0' TO ALL ACTIVITIES RELATING TO FISHING AND GATHERING OF OCEAN RESOURCES, THEN SKIP TO #4.

MAMANU FA'ASOLO: PE'A TALI MAI SEISI 'LEAI SE ASO I GAIIOIGA E FESO'OTA'I FASAGA I FAIVA MA LE FA'APOTOPOTOINA O PUNAOA SAMI, MA OSO LOA I LE #4.

CORAL REEF RELIANCE / CULTURAL IMPORTANCE OF REEFS
FA'AMOEMOEGA O A'AU AMU /TAUA LE AGANU'U O AMU A'AU

- 2. On average, what percent of your time spent fishing or gleaning marine resources in American Samoa is for the following purposes? [INTERVIEWER REPEATS SCALE AS NEEDED]**
I tulaga masani, e fia pasene o lau taimi ete fa'aaoga ai e fagota i luga ole aloalo aua le aoina o ni figota ma i'a mai le sami i Amerika Samoa? [TAGATA FAI FA'ATALANOAGA E TOE FA'AMATALA FESILI PE'A MOOMIA]

	Never Leai lava	Rarely Seasea	Sometimes isi taimi	Frequently Fai so'o	Always Taimi uma
To feed myself and my family/household / Fafaga ai a'u ma lo'u aiga					
To sell or exchange for goods and services / Fa'atau atu pe fesuia'i mo oloa ma isi auaunaga					
To give to extended family members and/or friends / Foa'i atu i aiga ma le nu'u					
For recreation					
For special occasions and cultural events / Mo aso fiafia ma fa'alavelave fa'aaganu'u					
To give to pastors or village leaders / Foa'i i le faifeau ma tagata nu'u					

3. On average, what percent of your time spent fishing or gleaning marine resources in American Samoa is for the following species groups? **[INTERVIEWER REPEATS SCALE AS NEEDED]**
 I tulaga masani, o lea le pasene o lou taimi e fa'aaoga e saili ai tamaoaiga o le sami i Amerika Samoa i ituaiga l'a ia? **[TAGATA FAI FA'ATALANOAGA E TOE FA'AMATALA FESILI PE'A MO'OMIA]**

	Never Leai lava	Rarely Seasea	Sometimes isi taimi	Frequently Fai so'o	Always Taimi uma
Groupers / Gatala					
Trevallies / Malauli, Sapoanae, Tafauli					
Parrotfish / Laea, Fuga					
Surgeonfish / Alogo, Pone, Ume					
Invertebrates (octopus, urchins, sea cucumbers, etc.) / i'a le auivia (Fe'e, tuitui, loli, ma isi)					

*[SCRIPT] The next few questions will ask about your seafood consumption.
 [FA'AMATALAGA] O isi fesili to'aititi e fesili atu ai i l'a e te taumafa ai.*

4. On average, how many days per month do you or your family/household eat seafood?
 I tulaga masani, e fia aso ole masina e taumafa ai oe po'o lou aiga i mea'ai mai le sami?

_____ Days per month/Aso i le masina

*SKIP PATTERN: IF RESPONDENT ANSWERS '0', THEN SKIP TO #8
 Mamanu Fa'asolo: A tali mai le alii talifesili e leai, alu loa i le fesili #8*

5. Do you or your family/household eat seafood that is harvested from local coral reefs in American Samoa? (for example, things like *parrotfish, surgeonfish, octopus, limu, and big eye scad*)
 E tausami e oe po'o lou aiga i'a e fagota mai a'au amu i Amerika Samoa? (fa'ata'ita'iga Laea)

- a. Yes / loe
- b. No / Leai
- c. I'm not sure what is locally caught from the reefs / Ou te le mautinoa ituaiga i'a o maua mai I le a'au
- d. I'm not sure where the seafood my family/household eats was harvested / Ou te le'o mautinoa po'o fea o lo'o maua ai mea taumafa sami o seleseleina mai ai

*SKIP PATTERN: IF RESPONDENT ANSWERS 'NO' OR 'NOT SURE', THEN SKIP TO #7
 MAMANU FA'ASOLO: A TALI MAI LE UA FESILIGIA E LEAI PE E LE'O MAUTINOA FA'ASOLO LOA I LE FESILI #7.*

6. On average, how many days per month do you or your family/household eat seafood that is harvested from local coral reefs?
 I tulaga masani, e fia aso I le masina e tausami ai oe ma lou aiga i i'a sami o lo'o Fagotaina ma seleseleina mai a'au amu lotoifale?

_____ Days per month/Aso i le masina

7. On average, what percent of the time do you get the seafood that your family/household eats from the following sources? **[INTERVIEWER REPEATS SCALE AS NEEDED]**
 I tulaga masani, o lea pasene o le taimi e te fa'atauina ai i'a Sami e taumafai mai punavai nei.
[TAGATA FAI FA'ATALANOAGA E TOE FA'AMATALA FESILI PE'A MO'OMIA]

	Never Leai lava	Rarely Seasea	Sometimes isi taimi	Frequently Fai so'o	Always Taimi uma
Purchased by myself or someone in my household at a store or restaurant / Fa'atau e a'u po'o seisi mai i lo'u aiga i se faleoloa pe mai se faleaiga					
Purchased by myself or someone in my household at a market or roadside vendor / Fa'atau e a'u pe o seisi mai i lo'u aiga mai le maketi po'o se fatau i'a i autafa o le auala					
Caught by myself or someone in my household / Pu'e e a'u pe 'o seisi mai i lo'u aiga					
Caught by extended family members / I'a na Fagotaina e tagata o lo'u aiga fa'alautele					
Caught by friends or neighbors / I'a Fagotaina e a'u uo ma tuao'i					

AWARENESS AND IMPORTANCE OF CORAL REEFS
FA'ALAUUILOA MA LE TAUU O A'AU AMU

[SCRIPT] Next, we'll ask about the importance of coral reefs in American Samoa.
[FA'AMATALAGA] E soso'o atu, Matou fesiligia le tauu o amu a'au i Amerika Samoa

8. In your opinion, how important are coral reefs in American Samoa to each of the following? **[INTERVIEWER REPEATS SCALE AS NEEDED]**
 I lou manatu, o lea le tauu o a'au amu i Amerika Samoa i aitema mulimuli mai? **[TOE FAI FESILI PE'A MANA'OMIA]**

	Not at all Le tauu	Slightly Tauu ititi	Somewhat Tauu feololo	Moderately Tauu tele	Extremely Tauu atotonu	Not Sure Lei iloa
Protection from erosion and natural disasters in American Samoa / Pui puiga mai eleele tafia ma mala natura i Amerika Samoa						
Recreation in American Samoa / Fa'afiafiaga i Amerika Samoa						
Tourism in American Samoa / Turisi i Amerika Samoa						

Food for coastal communities in American Samoa / Mea tausami mo nu'u tu matafaga i Amerika Samoa						
The economy of American Samoa / Le tamaoaiga i Amerika Samoa						
The culture of American Samoa / Le aganu'u o Amerika Samoa						
You and your family's cultural beliefs and practices / O aganu'u, talitonuga, ma faiga a lou aiga						

[SCRIPT] The next two questions will ask about a list of items that may potentially impact coral reefs in American Samoa.

[Fa'amatalaga] O isi fesili e lua e fesili atu mo se lisi o aitema e mafai ai na a'afia amu i Amerika Samoa.

9. First, how familiar are you with each of the following items? [INTERVIEWER REPEATS SCALE AS NEEDED]

Muamua, e iai sou malamalama i aitema nei e mulimuli mai [TAGATA FA'ATALANO, TOE FA'AALI FESILI PE'A MANA'OMIA]

	Not at all Le taua	Slightly Taua ititi	Somewhat Taua feololo	Moderately Taua tele	Extremely Taua atoatoa
Climate change / Suiga o le tau					
Coral bleaching / Amu papa'epa'e					
Hurricanes / Afa malosi					
Pollution from stormwater, wastewater, and chemical runoff / Vai filogia mai afa, Suavai leaga, Lologa vaila'au					
Pollution from trash and littering / fa'aleagaina filogia mai lapisi togi solo					
Coastal/urban development / Atina'e le talafatai					
Invasive species / feosofaiga filogia					
Overfishing and over-gathering / Soona fagota, ma ua tele le la'uga mea taumafai mai le sami					
Shipping and boating / Va'a la'u uta tetele, ma va'afeoa'i eseese					
Crown of Thorns Starfish (<i>alamea</i>) / I'a fetu alamea					
Ocean Acidification / Sami Fa'aasiti					
Shipwrecking and vessel grounding / Va'a malepe/Fa'agoto va'a					

10. Next, what impact do you believe each of these items have on coral reefs in American Samoa? Fa'aailoa mai po'o le a le tulaga o le a'afiaga o mea nei ua ta'ua e a'afia ai a'au 'amu i Amerika Samoa? [TAGATA SU'ESU'E, TOE FA'AMATALA FESILI PE'A MANA'O MIA]

	Extremely negative Matua leaga le aafiaga	Negative A'afiaga leaga	No impact Leai se a'afiaga	Positive A'afiaga lelei	Extremely Matua lelei le a'afiaga positive	Not sure Le mautilino
Climate change / Suiga o le tau						
Coral bleaching / Amu papa'epa'e						
Hurricanes / Afa malosi						
Pollution from stormwater, wastewater, and chemical runoff / Vai filogia mai afa, Suavai leaga, Lologa vaila'au						
Pollution from trash and littering / fa'aleagaina filogia mai lapisi togi solo						
Coastal/urban development / Atina'e le talafatai						
Invasive species / feosofaiga filogia						
Overfishing and over-gathering / Soona fagota, ma ua tele le la'uga mea taumafai mai le sami						
Shipping and boating / Va'a la'u uta tetele, ma va'afeoa'i eseese						
Crown of Thorns Starfish (<i>alamea</i>) / l'a fetu alamea						
Ocean Acidification / Sami Fa'aasiti						
Shipwrecking and vessel grounding / Va'a malepe/Fa'agoto va'a						

PERCEIVED RESOURCE CONDITION
ILOA TULAGA O PUNA'OA

[SCRIPT] In the next few questions, you will be presented with a series of marine resources, and will be asked to rate their condition.

[FA'AMATALAGA] I isi fesili iti e mulimuli mai

- 11. In your opinion, how would you rate the current condition of each of the following marine resources in American Samoa? *[INTERVIEWER REPEATS SCALE AS NEEDED]***
I lou manatu e fa'apefea na'e fuafuaina aiaiga fa'atasi o aitema punaoa i Amerika Samoa?
[TAGA SU'ESU'E TOE FA'AALI FESILI PE'A MANA'OMIA]

	Very bad Lelei atoatoa	Bad Leaga	Neither bad nor good E le lei pe	Good Lelei	Very good Matua lelei lava	Not sure Le mauninoa
Ocean Water Quality (clean and clear) / Vai sami mama lelei						
Amount of Live Coral / Aofa'i of amu ola						
Number of Fish / Numera o l'a						
Amount of marine resources for gleaning (limu, octopus, sea cucumbers, clams, etc.) / Aofa'i o tamaoaiga mo le aoina (limu, fe'e, tuitui, loli, tugane, ma isi)*						
Access to safe swimming areas (for example, sandy bottom, no strong current) / Ulufalega i eria e saogalemu mo Auauga e oneonea lalo, e le a'ave le tai*						

- 12. Over the next 10 years, do you think the condition of each of those same marine resources will change in American Samoa? [INTERVIEWER REPEATS SCALE AS NEEDED]**
I le isi 10 tausaga, o le a sou manatu ile tulaga o le a iai nisi nei o tamaoaiga ole sami i Amerika Samoa? [TAGATA SU'ESU'E FA'AMATALA FESILI PE'A MANA'OMIA]

	Worsen greatly Ua leaga atili	Worsen Sili atu le leaga	No Change Leai se suiga	Improve Ua lelei atu	Improve greatly Ua sili atu le lelei	Not sure Leiloa
Ocean Water Quality (clean and clear) / Vai sami mama lelei						
Amount of Live Coral / Aofa'i of amu ola						
Number of Fish / Numera o l'a						
Amount of marine resources for gleaning (limu, octopus, sea cucumbers, clams, etc.) / Aofa'i o tamaoaiga mo le aoina (limu, fe'e, tuitui, loli, tugane, ma isi)						
Access to safe swimming areas (for example, sandy bottom, no strong current) / Ulufalega i eria e saogalemu mo Auauga e oneonea lalo, e le a'ave le tai*						

13. How would you say the overall condition of the marine ecosystem in American Samoa has changed over the past 10 years?

O lea sou manatu i le tulaga o le ekosisitema i Amerika Samoa ma ona Suiga i le sefulu tausaga taluai?

- a. Worsened greatly / Ua matua leaga lava
- b. Worsened / Ua leaga
- c. No change / Leai se suiga
- d. Improved / Ua lelei
- e. Improved greatly / Ua matua lelei lava

ATTITUDES TOWARDS CORAL REEF MANAGEMENT STRATEGIES AND ENFORCEMENT
UIAGA FA'ALIA FA'ASAGA I LE PULEGA A'AU AMU FUAFUAGA MA LE FA'AMALOSIAGA

[SCRIPT] There are many management strategies for protecting coral reefs in American Samoa. The next few questions will ask about your opinions on these strategies.

[FA'AMATALAGA]E tele fuafuaga a le Pulega e puipuia ai a'au amu i Amerika Samoa. O isi fesili iti e soso'o ai e fesiligia ai lou manatu i fuafuaga ia.

14. First, a marine protected area (MPA) is an area of the ocean where some human activities are limited to protect living, non-living, cultural, and/or historic resources, such as marine sanctuaries or parks, village MPAs, and private reserves in American Samoa. How familiar are you with MPAs?

Muamua, o se Eria o le Ogasami Puipuia, o se vaega o le ogasami e limiti ai gaioiga a tagata nuu aua le malupuipua o meaola, mea le ola, o le aganuu, ma/poo punaoa mai anamua pei o nofoaga i gataifale poo paka, Eria o le Ogasami Puipuia o nuu ma alalafaga, ma nofoaga tuma'oti i Amerika Samoa. O le a se atoatoa o lou silafia o le Eria o le Ogasami Puipuia?

- a. Not at all familiar / E le masani
- b. Slightly familiar / E masani ititi
- c. Somewhat familiar / Ua tau masani
- d. Moderately familiar / Ua masani
- e. Extremely familiar / Matua masani lava

SKIP PATTERN—IF RESPONDENT ANSWERS 'NOT AT ALL', THEN SKIP TO #17.
MAMANU FA'ASOLO: A TALI LE ALII 'E LEAI' FA'ASOLO LOA I LE NUMERA #17.

15. In your opinion, how has the establishment of MPAs affected the following in American Samoa? [INTERVIEWER REPEATS SCALE AS NEEDED]

I lou taofi, e faapefea ona afaina mea nei i le faavaeina o ogasami puipuia i Amerika Samoa

	Worsened greatly Ua leaga atili	Worsened Sili atu le leaga	No change Leai se suiga	Improved Ua lelei atu	Improved greatly Ua sili atu le lelei	Not sure Leiloa
Protection of coral reefs in American Samoa / Puipuiga o a'au amu i Amerika Samoa						
Number of fish in American Samoa / Numera o l'a i i Amerika Samoa						

The economy of American Samoa / Le tamaoaiga O Amerika Samoa						
Fishermen's livelihoods in American Samoa / Olataga o le au fai faiva i Amerika Samoa						
Tourism in American Samoa / Turisi i Amerika Samoa						

16. Overall, how much do you support or oppose the establishment of MPAs in American Samoa? Aotelega, e te lagolagoina pe e te tete'eina le fa'atuina o MPAs i Amerika Samoa?

- Strongly oppose / Malosi lo'u tete'eina
- Oppose / Tete'e
- Neither support nor oppose / E le lagolago pe tete'e
- Support / Lagolagosua
- Strongly support / Malosi le Lagolagosua

**17. Next, how much do you support or oppose each of the following management strategies in American Samoa? [INTERVIEWER REPEATS SCALE AS NEEDED]
O lea le malosi e te lagolago ai pe tete'eina ta'itasi fuafuaga fa'atautaia ale au Pulega i Amerika Samoa? [TAGATA SU'ESU'E TOE FA'AMALAMALAMA FESILI PE'A MANA'OMIA]**

	Strongly Oppose Tete'e malosi lava	Oppose Tete'e	Neither Support nor Oppose Le tete'e le lagolago	Support Lagolago	Strongly Support Lagolago Malosi lava
Size catch limits per person for certain fish species / Limiti le tele ole faiva e maua e le tagata ile ituaiga i'a					
Seasonal catch limits per person for certain fish species / Limiti fa'avaitaimi faiva o tagata fagota i l'a eseese					
Stricter control of sources of pollution to preserve water quality / Maumaua'i e le Pulega le vaiga e puipuia ai manino ma le mama o le sami					
Incorporate traditional Samoan practices into coral reef management / Tu'ufa'atasia aganu'u ma faiga Pulega e tausi ai a'au amu					
Improved law enforcement for existing rules/regulations / Faamalosi atili le tausiga o tulafono ua pasia					
Establishing community-based village MPAs (such as village marine protected areas and community fishery management plans) / Fausiaina ni nofoaga mo ogasami fa'asao a nu'u (e pei o le polokalama o ogasami fa'asao a nu'u ma o latou ta'iala)					

Bans on fishing “big fish” species, such as hump head wrasse, giant grouper, sharks, etc. / Fa’asa le Fagotaina o l’a tele e pei o atugaloloa, Malau ugatele, malie, ma isi					
Fishing gear restrictions / Fa’atapula’a mea fagota					
A tax on luxury items such as alcohol and cigarettes to support coral reef conservation efforts / Fai se lafoga mo ava malosi, sikaleti, e lagolago ai le fa’asaoga a’au amu					

PARTICIPATION IN BEHAVIORS THAT MAY IMPROVE CORAL HEALTH
AU AI I AMIOGA E MAFAI NA FAALELEI ATILI AI LE OLA MALOLOINA O AMU

[SCRIPT] There are also activities that you can do to help protect coral reefs in American Samoa.
[FAMATALAGA] E iai fo’i gaioiga e mafai na e faia e fesoasoai i le puipuiga o a’au amu i Amerika Samoa

18. On average, how many times per year do you engage in the following activities?

[INTERVIEWER REPEATS SCALE AS NEEDED]

I tulaga masani, e fia taimi I le tausaga e te au ai I gaioiga ia? [TAGATA SU’ESU’E TOE FA’AMATALA PE’A MANA’O MIA]

	Number of times per year Taimi i le tausaga
Recycling / fa’aliliu otaota i mea toe fa’aaoga	
Volunteering with environmental groups (e.g. beach clean-ups) / Volenitia ma vaega o le si’osi’omaga (fa’ata’ita’iga, le fa’amamaina o matafaga)	
Donating to environmental causes / Foa’i i mafua’aga tau siosiomaga	
Use reusable items such as cloth bags, personal straws, or personal take out containers instead of Styrofoam or single-use plastic items / Fa’aaoga aitema e mafai ona toe fa’aaogaina e pei o taga ie, mitivai, po’o le koneteina faaletagata lava ia nai lo le Styrofoam po o aitema palasitika e tasi le faaaogaina	
Speak with family, church, or village leadership about environmentally responsible practices / Talanoa i le aiga, ekalesia, po o le taitaiga o le nuu e uiga i le faatautaia o le siosiomaga	

[SCRIPT] Finally, we’ll ask about sources of information on coral reefs and reef related topics in American Samoa.

[FAMATALAGA] Ma le mea mulimuli, o le a matou fesili atu e uiga i punavai o faamatalaga e faatatau o a’au amu faatatau i autu i Amerika Samoa.

19. In your opinion, how credible are each of the following sources for information on coral reefs and reef related topics in American Samoa?

I lou lava manatu, e faapefea ona faatuatuaia ia punavai taitasi nei mo faamatalaga i luga o a’au amu ma aau autu e faatatau i Amerika Samoa?

	Not at all E le faatuatuaia	Slightly Faatuatuaia teisi	Somewhat Fa'atuatuaia	Moderately Atili ona faatuatuaia	Extremely matua talitonuina
Friends and family / Uo ma aiga					
Community leaders / taitai o alalafaga					
Village leaders / taitai o nuu					
American Samoa government (ASG) agencies / Ofisa o le malo o Amerika Samoa					
Federal government agencies / Ofisa o le malo tele					
Academic institutions/universities / Faapotopotoga faaleaoaoga/lunivesite					
Non-profit organizations / Faalapotopotoga e le saili tupe					
Church groups / Vaega faaleEkalesia					

20. Of the following choices, which are your three most preferred ways of receiving information on coral reefs and coral reef related topics? [INTERVIEWER LIST AND CHECK THE TOP 3]

Mai filifiliga nei, o a ni auale e tolu e sili ona fiafia i ai o le mauaina o faamatalaga e uiga i a’au amu e faatatau i autu?

	Top three preferred ways auale e tolu e sili ona fiafia i ai
Word of mouth / fesootaiga tautalagia	
Newspapers, magazines, other print publications / Nusipepa, mekasini, ma isi lomiga	
Radio / leitio	
Television / televise	
Online news sources/websites / Punavai o talafou i luga o le Initoneti/uepisaite	
Social media / ala o faasalalauga faaleagafesootai	

DEMOGRAPHICS

FUATASI

[SCRIPT] I just have a few more questions that will help us to interpret our results. As a reminder, the information you provide is completely confidential.

[FAMATALAGA] E iai lava nai a'u fesili o le a fesoasoani ia matou e fa'amatalaina a matou i'uiga. O se fa'amanatu, o le fa'amatalaga e te tu'uina mai e matua agatapuaia.

21. Do you identify as male or female?

Pe e te faailoaina o se alii po o se tamaitai?

- a. Male / alii
- b. Female / tamaitai

22. What is your year of birth?/O le a lou tausaga fanau? _____

23. Were you born in American Samoa?

Na e fanau i Amerika Samoa?

- a. Yes / Ioe
- b. No / leai

24. How many years have you lived in American Samoa?

E fia tausaga na e nofo ai i Amerika Samoa? _____

25. What race/ethnicity do you consider yourself? Check all that apply.

O le a le ituaiga tagata/ituaiga e te manatu ia te oe lava? Faailoga mea uma e faatatau i ai.

- | | |
|---|---|
| a. Samoan / Tagata Samoa | j. Korean / Tagata Korea |
| b. Niuean / Tagata Niue | k. Asian Indian / Initia Asia |
| c. Tokelauan / Tokelau | l. Other Asian / Isi Tagata Asia |
| d. Tongan / Tagata Toga | m. White / Paepae |
| e. Fijian / Tagata Fiti | n. Black or African American / Tagata Amerika uliuli pe Aferika |
| f. Other Pacific Islander / Isi Tagata Pasifika | o. Hispanic or Latino / Tagata Latino |
| g. Chinese / Saina | p. Other / Isi |
| h. Filipino / Filipino | q. No response / Leai se tali |
| i. Japanese / Tagata Iapani | |

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

O le a le tulaga aupito maualuga o aoaoga ua e faamaeaina?

- a. 8th Grade or Less / Vasega 8 po o le Itiiti Ifo
- b. Some high school / O nisi o aoga maualuga
- c. High School Graduate, GED / Faauu i le Aoga Maualuga
- d. Some college, community college or AA / O nisi kolisi, kolisi faalenuu po o AA
- e. College Graduate / Faauu i le kolisi
- f. Graduate School, Law School, Medical School / Aoga Faauu, Aoga Faaloia, Aoga Faafomai

27. What is your current employment status? Check all that apply.

O le a lou tulaga faalegaluega o i ai nei? Faailoa mai mea uma e faatatau i ai.

- a. Unemployed / Le faigaluega
- b. Student / tagata aoga
- c. Employed full time / faigaluega tumau
- d. Employed part time / Fa' faigaluega faavaitaimi
- e. Retired / Litaea

28. Do any of the following industries fit your current or most recent occupation? Check all that apply.

E i ai se tasi o nei alamanuia e sili ona fetai ma lau galuega taimi nei po o galuaga aupito lata mai?

- a. Boat building/repair / Fale o le vaa/lipea
- b. Charter fishing / Fagotaga e totogi le va'a e fa'aaogaina
- c. Other recreational outfitter, including dive/snorkel/eco-tour operations / O isi outfitter faafiafia, e aofia ai ifo puna/snorkel/eco e malaga taamilo ai
- d. Commercial fishing / Fagota Faalepisinisi
- e. Marine law enforcement / Faamalosi le tulafono o le Sami
- f. Ocean/coastal management, science, and/or research / Pulega o le vasa/tumatafaga, saienisi, ma/poo suesuega
- g. Ocean/coastal artisan (photographer, painter, craftsman, etc.) / Vasa/tumatafaga artisan (tagata pueata, vali, faiseevae, ma isi)
- h. Ocean/coastal construction or engineering / Vasa/talafatai fausiaina po'o inisia
- i. Ocean/coastal education / Vasa/tumatafaga o le fausiaina po o le enisia
- j. Tuna cannery / Tuna tuuapa
- k. Waterfront hospitality (restaurant/hotel) / Apitagalu le talimalo (faleaiga/fale talimalo)
- l. Ocean/coastal dependent military (including Navy, Coast Guard, Marines) / O le vasa/tumatafaga e faalagolago i le militeli (e aofia ai le neivi, leoleo o le talafatai, marini)
- m. None of the above / E le o se tasi o nei vaega o loo taua i luga

29. How many adults aged 18 years or older live in your household, including yourself?/E toafia tagata matutua e 18 tausaga pe sili atu e nonofo i lou aiga, e aofia ai ma oe? _____

30. What is your annual household income?

O le a le tupe maua faaletausaga a lou aiga

- a. Less than \$2,500 / Lalo ifo i le \$2,500
- b. \$2,500-4,999
- c. \$5,000-9,999
- d. \$10,000-14,999
- e. \$15,000-24,999
- f. \$25,000-29,999
- g. \$30,000-39,999
- h. \$40,000-49,999
- i. \$50,000-74,999
- j. \$75,000-99,999
- k. \$100,000 or more / Sili atu \$100,000
- l. No Response / Leai se tali

Thank you for taking the time to provide your responses for the NOAA National Coral Reef Monitoring Program 2021 American Samoa survey.

Faafetai mo le fa'aavanoaina o le taimi e tuuina mai ai au tali mo le NOAA National a'au amu mataituina polokalama 2020 saililiga a Amerika Samoa.

Appendix B: Data Collection Protocols and Weighting Efforts

B.1 Data Collection

The initial unit of analysis for this survey was American Samoa households on Tutuila. Prior to survey implementation, project partners requested that all households in the Manu‘a Islands (Ofu, Olosega, and Ta‘u islands) be included for consideration. A multi-level stratification scheme was used and the study region was stratified based on village remoteness (amount of roads and buildings within each village), geographic region, and partner input. The five strata were further stratified by eight sub-strata and 84 sub-areas (Table B.1a). Sub-areas were defined as “villages, combination of villages, or village segments” of roughly equal size (occupied households) and were assigned a unique number from 1-84. Village segments were created using a multi-wedge approach overlaid on the larger villages and the Google Random Number generator was used to randomly select a wedge (Table B.1a). To determine the sample, sub-areas were randomly selected within each stratum. All households within each randomly selected sub-area were selected for surveying (i.e., using a census approach), and an adult 18 years old or older from each household was randomly selected to participate in the survey using the Last Birthday method.

Table B.1a. Strata, substrata, and village sub-areas.

5 Strata	8 Sub-strata	84 Sub-areas	20 Villages Selected in the Substrata
Rural	Rural West	9	Poloa, Afao
	Rural East	14	Masausi, Sa'ilele, Aoa A, Alao
Semi- Rural	Semi-rural North-west	14	Aasu B, Mesepa B, Fagasa C
	Semi-rural East	14	Faga`alu B, Fagatogo A, Lauili`i A
	Semi-rural South-west	18	Vailoatai B, Mapusagafou, Ili`ili A, Vaitogi A
Urban	Urban	10	Tafuna C, Pago Pago B
Aua	Aua	1	Aua
Manu'a	Manu'a	7	Ofu

All “safely accessible homes” (defined as those that were not dangerous to access at the time of approach, or generally) within the selected sub-areas were targeted for data collection. All such households were contacted up to three times. The field coordinator collected, scanned, and emailed logs and data sheets to the project manager on a weekly basis and had formal weekly check-ins with the surveyor team.

The majority of sampling was conducted after 4 pm and during the weekends; however, surveyors also conducted sampling during mornings, afternoons, and evenings during both weekdays and weekends as possible. Surveyors respected *Sa*, the time (usually at 6 pm) in the villages when residents and visitors are generally required to stop and quietly reflect for 15 to 20 minutes. In most outdoor situations, (i.e., walking around the village and interviews that were

being conducted outside the home) our surveyors did stop and reflect. Some families did allow surveyors to continue with interviews when it was being conducted in their homes.

Unoccupied homes (i.e., a home in which someone lived, but at which no one was home at the time of contact) and abandoned homes (i.e., a home at which no one lived) were logged; however, this information was not logged consistently nor uniformly.

Response rates by major strata are shown in Table B.1b and response rates by sub-area are shown in Table B.1c. These response rates are based on the total number of completed surveys divided by the total number of actual occupied households. However, the accuracy of these response rates is unknown due to inconsistent or lack of documentation on the number of households contacted and nonresponse data collected. Therefore, some caution should be taken when making strata-level comparisons and conclusions.

Table B.1b. Response and response rate by major strata.

Strata	Expected Occupied Households	Abandoned Households	Actual Occupied Households	Refusals	Completed Surveys	Response Rate
Aua	342	73	269	0	251	93%
Rural	404	8	396	0	161	41%
Semi-rural	3,969	100	3,869	6	596	15%
Urban	2,053	79	1,974	2	283	14%
Manu'a	55	28	27	0	27	100%

Table B.1c. Response and response rate by sub-area.

Village	Expected Occupied Households	Abandoned Households	Actual Occupied Households	Refusals	Completed Surveys	Response Rate
Poloa	35	3	32	0	14	44%
Afao	30	5	38	0	38	100%
Masausi	28	0	28	0	14	50%
Sa'ilele	13	0	13	0	13	100%
Aoa	148	0	148	0	29	20%
Alao	85	0	85	0	52	61%
Aasu	76	9	67	0	32	48%
Mesepa	81	0	81	5	45	56%
Fagasa	137	0	137	0	18	13%
Faga'alu	169	0	169	0	39	23%
Fagatogo	332	0	332	0	41	12%

Lauli'i	142	0	142	0	52	37%
Vailoatai	244	32	212	0	105	50%
Mapusaga Fou	193	15	178	0	84	47%
Ili'ili	590	20	590	0	68	12%
Vaitogi	342	24	318	1	113	35%
Tafuna	1,428	79	1,349	2	175	13%
Pago Pago	625	0	625	0	108	17%
Aua	342	73	269	0	251	93%
Ofu	55	28	27	0	27	100%

B.2 Weighting

Data were weighted to account for sample design and non-response, and then calibrated based on key variables (age category, gender, education, race, and household income) within each stratum to ensure data were representative of the adult population of American Samoa. This was accomplished through iterative proportional fitting, a method commonly referred to as “raking.” Iterative proportional fitting creates a weight for each survey respondent to help the sample become more representative of true population characteristics. In this analysis, base weights were computed as the product of three stages of random selection that included (1) random selection of villages within each of 8 substrata (2) random selection of households within selected villages and (3) random selection of adults within selected households. Because the sampling design utilized 8 substrata, sampling was conducted for each of these stages independently within the identified substrata and the sample inclusion probabilities were computed separately per stage within each of the substrata and combined multiplicatively to produce the final base weights. These weights were then calibrated to match five of the survey sample’s demographic data to the true demographic characteristics of the American Samoa population: sex (male, female, unknown), age group (18-24, 25-34, 35-44, 45-54, 55-64, and 65 or older, unknown), education level (less than high school, high school or GED, some college or Associates degree, college degree or higher, unknown), race (Samoan, Other Native American or Pacific Islander, Other Races, unknown), and median household income (less than \$10,000, \$10,000-14,999, \$15,000-24,999, \$25,000-29,000, \$30,000-39,999, \$40,000-49,000, \$50,000 or higher, unknown). These population controls were from the U.S. 2010 Census. Finally, weights were trimmed to ensure no single final weight dominated the distribution. A comparison between the demographics in the weighted sample is presented in Table B1.

Table B1: Demographics of true population and weighted respondents.

Demographic Variables	Population	Weighted Respondents	
Location of Residence	Rural West	3.6	3.7
	Rural East	10.8	10.9
	Semi-rural North	6.7	6.8
	Semi-rural East	13.6	13.4
	Semi-rural Southwest	31.2	31.1
	Urban	29.8	29.7
	Aua	3.9	4.0
	Manu'a	0.4	0.4
Gender	Female	53.3	53.3
	Male	46.0	46.0
	Unknown	0.7	0.7
Race	Samoan	88.3	88.1
	Other Native American or Pacific Islander	3.8	3.9
	Other Race(s)	7.4	7.5
	Unknown	0.7	0.7
	Unknown	0.7	0.7
Age	18-24	19.2	18.8
	25-34	21.3	21.0
	35-44	22.4	22.6
	45-54	18.9	19.0
	55-64	11.0	11.2
	65 or older	7.0	7.1
	Unknown	0.2	0.2
	Unknown	0.2	0.2
Education	Less than high school	17.8	17.6
	High school or GED	47.4	48.1
	Some college / Associates degree	25.7	25.1
	College degree or more	8.4	8.6
	Unknown	0.7	0.7
Household Income	Under \$10,000	13.2	13.2
	\$10,000-\$14,999	9.0	9.2
	\$15,000-\$24,999	15.3	15.2
	\$25,000-\$29,999	5.6	5.7
	\$30,000-\$39,999	8.9	9.1
	\$40,000-\$49,999	5.7	5.8
	\$50,000 or higher	15.5	15.0
	Unknown	26.8	26.8
	Unknown	26.8	26.8

Appendix C: American Samoa and Strata Results for 2021

Table C1: Proportion of participation in activities by stratum.

Activity	Rural	Semi-rural	Urban	Aua	Manu'a Islands ⁹	Total
Extractive						
Inshore fishing	35.1%	24.0%	14.6%	18.7%	89.8%***	22.9%
Offshore fishing	13.9%	6.3%	5.0%	7.4%	36.6%	23.0%
Gleaning of marine resources (limu, octopus, urchins, sea cucumbers, clams, etc.)	36.0%	22.8%	17.1%	14.6%	91.2%***	23.0%
Non-extractive						
Beach recreation (beach sports, picnics)	46.7%	41.1%	35.1%	17.6%	98.7%***	39.6%
Boating (sail, motor)	7.1%	10.7%	8.5%	2.5%	99.1%***	9.6%
Self-propelled boating (canoeing, kayaking)	8.0%	6.3%	1.7%	2.4%	16.6%	5.0%
Fautasi	6.2%	4.8%	4.5%	2.2%	0.0%	4.8%
SCUBA diving	4.1%	1.1%	1.4%	0.7%	0.0%	1.6%
Free diving	18.4%	8.6%	4.7%	4.6%	64.8%***	8.9%
Snorkeling	7.4%	3.8%	2.6%	9.9%	85.1%***	4.5%
Swimming	65.2%	53.5%	49.0%	30.5%	98.7%***	53.3%
Wading	64.4%	50.5%	46.3%	25.5%	94.5%***	50.7%
Waterside/beach camping	38.2%	28.8%	25.0%	14.7%	72.5%***	28.8%
Surfing	2.2%	1.8%	1.5%	1.9%	8.0%	23.0%

Table C2: Frequency percent of reasons for fishing and gathering reasons by stratum.

Reason	Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
To feed myself and my family /household	Never	36.3%	35.4%	42.3%	14.7%	5.4%	37.0%
	Rarely	21.3%	11.5%	4.4%	22.0%	13.2%	11.5%
	Sometimes	16.3%	19.3%	13.2%	36.9%	39.6%	17.4%
	Frequently	6.7%	14.0%	5.6%	3.6%	25.3%	10.1%
	Always	19.4%	19.9%	34.6%	22.8%	16.6%	24.0%
Recreation	Never	88.3%	73.1%	80.5%	80.0%	1.8%***	77.6%
	Rarely	8.6%	6.2%	5.5%	16.1%	24.5%	6.7%
	Sometimes	1.9%	10.9%	6.7%	3.5%	67.7%***	8.3%
	Frequently	0.2%	2.0%	1.8%	0.4%	6.1%	1.6%
	Always	1.2%	7.8%	5.6%	0.0%	0.0%	5.8%
	Never	36.3%	42.9%	43.1%	39.0%	0.9%***	41.4%

⁹ Because of the small number of responses from the Manu'a Islands ($n = 27$), statistically significant findings compared to all other strata are shown with asterisks ($p \leq 0.05 = **$, $p \leq 0.01 = ***$).

To give to extended family members and/or friends	Rarely	26.0%	15.5%	13.3%	18.0%	16.8%	11.5%
	Sometimes	16.8%	26.4%	19.7%	32.9%	31.1%	17.4%
	Frequently	6.8%	7.4%	8.2%	0.8%	40.3%**	10.1%
	Always	13.8%	7.8%	15.7%	9.3%	10.9%	24.0%
To sell	Never	75.9%	79.6%	82.1%	77.7%	26.3%***	79.2%
	Rarely	13.5%	9.0%	3.7%	20.9%	33.6%	8.7%
	Sometimes	8.9%	8.6%	8.7%	0.57%	23.3%	8.7%
	Frequently	0.0%	1.7%	2.2%	0.8%	8.5%	1.6%
	Always	1.7%	1.1%	3.3%	0.0%	8.3%	1.9%
For special occasions and cultural events	Never	60.6%	60.6%	65.0%	54.7%	0.9%***	61.4%
	Rarely	13.6%	13.6%	9.2%	15.4%	24.8%	12.5%
	Sometimes	17.5%	13.9%	15.1%	24.6%	19.2%	15.1%
	Frequently	3.7%	5.5%	6.2%	2.4%	46.8%***	5.6%
	Always	2.9%	4.7%	6.3%	4.5%	8.3%	5.5%
To give away to village leaders or pastors	Never	44.0%	43.5%	46.0%	37.6%	0.9%***	44.0%
	Rarely	10.7%	11.3%	10.7%	14.1%	6.0%	11.0%
	Sometimes	21.9%	25.3%	20.3%	25.5%	18.5%	23.2%
	Frequently	3.7%	7.4%	6.9%	13.0%	62.9%***	7.0%
	Always	19.6%	12.6%	16.2%	9.8%	11.7%	14.9%

Table C3: Proportion of frequency of fishing for certain species by stratum.

Species	Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Groupers	Never	47.2%	61.8%	49.8%	33.7%	23.4%	54.9%
	Rarely	17.2%	8.4%	7.3%	28.6%	11.7%	10.1%
	Sometimes	20.4%	10.7%	9.2%	18.9%	37.5%	12.4%
	Frequently	6.2%	8.7%	9.1%	18.8%	19.1%	8.5%
	Always	9.0%	10.4%	24.6%	0.0%	8.3%	14.0%
Trevallies	Never	46.9%	61.2%	51.8%	52.2%	6.8%***	58.4%
	Rarely	23.8%	8.9%	5.9%	24.6%	41.3%	28.0%
	Sometimes	14.8%	10.5%	8.9%	10.9%	6.5%	10.0%
	Frequently	8.0%	9.7%	7.9%	1.8%	28.8%	2.7%
	Always	6.5%	9.7%	25.5%	10.5%	16.7%	0.8%
Invertebrates	Never	49.0%	57.3%	63.9%	31.5%	8.1%***	56.9%
	Rarely	17.0%	10.0%	7.5%	26.4%	22.1%	10.9%
	Sometimes	17.9%	12.6%	9.0%	29.3%	34.2%	13.0%
	Frequently	6.7%	8.3%	2.7%	6.4%	21.7%	6.5%
	Always	9.3%	11.8%	16.9%	6.4%	14.0%	12.7%
Parrotfish	Never	52.9%	63.8%	54.5%	39.9%	27.4%	58.5%
	Rarely	18.6%	9.0%	6.1%	15.9%	28.0%	10.2%
	Sometimes	16.3%	11.4%	9.6%	28.0%	1.5%**	12.0%
	Frequently	5.4%	5.7%	4.8%	5.2%	30.6%**	5.6%

	Always	6.8%	10.2%	25.0%	11.0%	12.5%	13.8%
Surgeonfish	Never	48.4%	60.4%	53.5%	43.1%	7.4%***	55.5%
	Rarely	20.9%	10.0%	5.1%	7.3%	41.8%	10.9%
	Sometimes	13.0%	9.0%	10.0%	18.1%	9.4%	10.2%
	Frequently	9.4%	9.0%	6.8%	18.6%	22.3%	8.4%
	Always	9.3%	11.7%	24.7%	12.9%	19.0%	15.0%

Table C4: Frequency of seafood consumption by stratum.

Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Never	1.0%	4.2%	1.3%	22.2%	0.0%	3.4%
One to several times a month	27.8%	24.9%	30.5%	33.2%	1.4%	27.2%
Several times a week	55.9%	59.6%	51.0%	41.1%	90.2%	56.0%
Every day	15.3%	11.3%	17.2%	3.5%	8.4%	13.4%

Table C5: Seafood consumption from local coral reefs by stratum.

	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
No	3.4%	1.6%	7.8%	32.9%	0%***	4.6%
Yes	90.8%	91.8%	90.9%	57.9%	100%***	96.8%
I'm not sure what is locally caught from the reefs	2.0%	2.1%	0.1%	4.6%	0.0%	1.3%
I'm not sure where the seafood my family/household eats is from	3.7%	3.7%	4.6%	4.6%	0.0%	3.4%

Table C6: Frequency of seafood consumption from local coral reefs by those who eat seafood at least once a month by stratum.

Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Never	0.6%	0.4%	1.3%	4.9%	0.0%	0.8%
One to several times a month	39.8%	14.9%	35.3%	37.2%	3.0%	36.1%
Several times a week	42.7%	53.3%	49.4%	52.0%	92.7%	49.4%
Every day	16.9%	10.4%	18.1%	5.9%	4.2%	13.7%

Table C7: Top sources of seafood by stratum.

Source	Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Purchased by myself or someone in my household at a store or restaurant	Never	9.1%	4.9%	5.6%	7.9%	42.3%**	6.0%
	Rarely	20.2%	11.4%	8.4%	18.2%	44.8%	12.1%
	Sometimes	29.9%	34.7%	33.2%	27.6%	12.9%	33.3%
	Frequently	19.7%	21.9%	16.4%	20.8%	0.0%***	19.7%
	Always	21.1%	27.0%	36.4%	25.5%	0.0%***	28.9%
	Never	31.4%	20.5%	34.2%	42.0%	48.2%	27.1%

Purchased by myself or someone in my household at a market or roadside vendor	Rarely	24.6%	17.5%	12.3%	26.0%	35.1%	17.2%
	Sometimes	24.3%	32.6%	29.0%	22.0%	15.9%	29.9%
	Frequently	7.1%	14.4%	13.8%	6.7%	0.8%	12.9%
	Always	12.6%	15.1%	10.8%	3.2%	0.0%	13.0%
Caught by myself or someone in my household	Never	42.4%	43.1%	43.6%	54.5%	0.9%***	43.2%
	Rarely	20.8%	15.0%	11.1%	16.8%	0.8%***	14.6%
	Sometimes	18.6%	21.5%	22.2%	12.0%	28.7%	21.1%
	Frequently	2.5%	8.8%	9.7%	7.6%	43.2%**	8.3%
	Always	15.8%	11.6%	13.4%	9.0%	26.3%	12.8%
Caught by extended family members	Never	24.6%	22.2%	27.0%	48.6%	1.3%***	24.6%
	Rarely	32.0%	21.1%	18.5%	16.7%	28.3%	21.9%
	Sometimes	28.9%	37.4%	39.1%	19.3%	25.8%	36.1%
	Frequently	3.4%	8.9%	11.7%	7.7%	18.6%	8.9%
	Always	11.1%	10.5%	3.8%	7.7%	26.0%	8.5%
Caught by friends or neighbors	Never	23.5%	24.2%	26.5%	51.7%	0.0%***	25.4%
	Rarely	30.2%	25.0%	23.6%	16.4%	31.7%	25.1%
	Sometimes	27.8%	31.8%	35.7%	16.8%	33.5%	32.0%
	Frequently	6.4%	8.4%	10.4%	9.4%	14.4%	8.8%
	Always	12.1%	10.7%	3.8%	5.7%	20.4%	8.7%

Table C8: Importance of coral reefs to various ecosystem services by stratum.

Value	Importance	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Protection from erosion and natural disasters	Not at all	3.2%	1.0%	2.1%	1.5%	1.3%	1.7%
	Slightly	4.6%	3.7%	1.5%	5.2%	0.0%	3.2%
	Somewhat	8.1%	5.9%	3.6%	5.7%	6.0%	5.5%
	Moderately	24.6%	25.5%	17.6%	48.5%	0.0%***	23.5%
	Extremely	52.6%	57.9%	72.1%	37.1%	92.7%***	61.0%
	Not sure	7.0%	6.1%	3.0%	2.1%	0.0%	5.1%
Recreation	Not at all	16.5%	9.6%	12.5%	5.9%	0.0%***	11.3%
	Slightly	13.4%	5.9%	7.6%	18.4%	0.0%***	7.9%
	Somewhat	15.8%	19.2%	15.9%	37.6%	29.9%	18.3%
	Moderately	17.1%	18.9%	15.9%	27.0%	11.5%	17.9%
	Extremely	23.4%	27.6%	38.4%	8.7%	58.7%	35.0%
	Not sure	13.8%	9.0%	9.7%	2.4%	0.0%***	9.7%
Tourism	Not at all	7.1%	3.9%	4.7%	1.9%	8.4%	4.6%
	Slightly	9.4%	4.0%	5.7%	14.5%	2.7%	5.6%
	Somewhat	19.6%	13.2%	16.7%	37.4%	20.9%	16.0%
	Moderately	16.7%	24.8%	23.1%	32.5%	8.3%	23.3%
	Extremely	39.1%	44.4%	43.6%	11.9%	59.6%	42.4%
	Not sure	8.2%	9.7%	6.4%	1.9%	0.0%	8.2%

Providing food for coastal communities	Not at all	0.2%	0.0%	1.6%	0.9%	2.1%	1.4%
	Slightly	8.3%	0.0%	6.9%	0.8%	0.4%	1.8%
	Somewhat	6.3%	7.4%	11.0%	5.7%	3.3%	5.8%
	Moderately	54.3%	10.9%	30.0%	24.6%	20.2%	24.8%
	Extremely	28.8%	81.7%	49.0%	63.2%	71.1%	62.6%
	Not sure	2.2%	0.0%	1.5%	4.8%	3.0%	3.7%
Economy	Not at all	2.8%	0.5%	1.9%	1.0%	0.0%	1.3%
	Slightly	4.3%	2.6%	2.3%	4.2%	0.0%	2.8%
	Somewhat	7.2%	4.2%	2.5%	6.1%	0.9%	4.2%
	Moderately	28.8%	23.2%	19.3%	54.2%	10.0%	23.7%
	Extremely	49.6%	62.0%	71.4%	32.2%	89.1%***	62.3%
	Not sure	7.4%	7.5%	2.7%	3.4%	0.0%	5.8%
Culture of American Samoa	Not at all	2.5%	0.5%	1.8%	0.6%	0.0%	1.2%
	Slightly	5.0%	3.5%	0.7%	2.3%	0.0%	2.8%
	Somewhat	9.9%	7.4%	4.6%	6.4%	2.2%	6.9%
	Moderately	30.4%	21.7%	18.3%	48.8%	4.3%***	22.7%
	Extremely	51.0%	61.8%	71.3%	40.3%	93.5%***	62.6%
	Not sure	1.2%	5.1%	3.3%	1.6%	0.0%	3.9%
The culture of myself and my household	Not at all	5.0%	2.0%	2.8%	0.4%	0.0%	2.6%
	Slightly	7.4%	3.34%	1.1%	2.9%	0.0%***	3.2%
	Somewhat	12.8%	8.2%	6.2%	7.6%	0.0%***	8.2%
	Moderately	30.0%	22.9%	18.9%	46.3%	1.3%***	23.3%
	Extremely	44.6%	59.3%	65.8%	42.6%	97.8%***	58.9%
	Not sure	0.3%	0.9%	0.2%	4.3%	0.9%	3.9%

Table C9: Perceptions of marine resource current condition by stratum.

Resource	Current condition	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Amount of live coral	Very bad	4.4%	4.9%	3.8%	16.8%	0.0%**	4.9%
	Bad	31.5%	26.7%	30.4%	34.7%	21.9%	28.7%
	Neither bad nor good	14.4%	20.4%	12.3%	13.9%	34.6%	16.9%
	Good	22.4%	25.1%	34.6%	9.0%	16.4%	27.1%
	Very good	13.8%	3.3%	3.5%	3.1%	25.6%	5.0%
	Not sure	4.4%	4.9%	3.8%	16.8%	1.5%***	17.4%
Amount of marine resources to glean	Very bad	4.0%	5.1%	6.9%	9.1%	14.3%	5.6%
	Bad	29.5%	22.1%	28.9%	39.1%	13.5%	25.7%
	Neither bad nor good	14.9%	22.4%	14.0%	19.9%	28.8%	18.7%
	Good	26.7%	30.2%	29.9%	17.3%	57.0%	29.2%
	Very good	16.3%	3.7%	4.8%	2.5%	27.3%	5.9%
	Not sure	8.6%	16.5%	15.5%	12.1%	0.0%***	14.9%
Number of fish	Very bad	3.9%	3.2%	3.6%	9.6%	1.8%	3.6%

	Bad	27.7%	22.3%	27.8%	25.6%	14.6%	24.9%
	Neither bad nor good	14.3%	23.3%	15.0%	21.4%	15.1%	19.3%
	Good	28.0%	27.5%	33.8%	15.7%	33.8%	29.2%
	Very good	14.0%	5.7%	3.2%	3.3%	34.6%	6.2%
	Not sure	12.2%	17.9%	16.6%	24.3%	0.0%***	16.8%
Ocean water quality (clean and clear)	Very bad	5.1%	7.9%	4.5%	26.8%	2.6%	7.0%
	Bad	36.5%	31.8%	32.5%	39.4%	17.0%	32.9%
	Neither bad nor good	15.6%	25.7%	23.8%	13.8%	8.0%	23.2%
	Good	24.9%	23.2%	27.6%	14.5%	23.8%	24.5%
	Very good	9.7%	3.4%	3.2%	3.8%	48.7%***	4.5%
	Not sure	8.2%	7.9%	8.5%	1.6%	0.0%	7.9%
Access to safe swimming areas	Very bad	2.8%	5.0%	3.4%	9.2%	1.8%	4.3%
	Bad	24.5%	26.0%	31.5%	43.9%	2.7%***	27.9%
	Neither bad nor good	21.9%	23.7%	17.3%	23.4%	42.5%	21.5%
	Good	32.4%	29.5%	29.4%	12.2%	29.4%	29.4%
	Very good	10.2%	5.3%	3.1%	4.0%	23.7%	5.3%
	Not sure	8.3%	10.6%	15.4%	7.3%	0.0%***	11.6%

Table C10: Perceived overall marine resource change over the past 10 years by stratum.

Predicted change	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Worsened greatly	19.4%	9.9%	9.3%	32.1%	23.5%	11.9%
Worsened	28.2%	27.4%	20.9%	42.6%	14.3%	25.9%
No change	24.9%	39.1%	41.4%	19.3%	19.2%	37.0%
Improved	25.9%	22.1%	25.3%	5.3%	1.2%**	23.0%
Improved greatly	1.6%	1.5%	3.2%	0.6%	41.9%***	2.2%

Table C11: Perceived change in resource conditions over the next ten years by stratum.

Resource	Change in condition	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Amount of live coral	Worsen greatly	4.4%	7.5%	6.0%	14.7%	48.9%**	7.0%
	Worsen	11.4%	28.2%	27.8%	39.3%	13.5%	25.9%
	No change	17.9%	16.1%	15.6%	9.3%	14.4%	16.0%
	Improve	34.0%	19.7%	22.9%	7.7%	4.7%	22.3%
	Improve greatly	6.7%	9.4%	11.2%	4.9%	4.3%	9.4%
	Not sure	25.6%	19.2%	16.4%	24.2%	14.1%	19.4%
Amount of marine resources to glean	Worsen greatly	5.1%	8.3%	5.8%	8.7%	41.0%**	7.2%
	Worsen	16.7%	23.2%	27.3%	45.0%	5.0%***	24.1%
	No change	14.5%	19.8%	13.9%	15.8%	26.7%	17.1%
	Improve	30.1%	18.8%	24.4%	6.1%	10.0%	21.8%
	Improve greatly	9.4%	10.7%	11.8%	7.1%	7.0%	10.7%

Number of fish	Not sure	24.3%	19.1%	16.9%	17.2%	10.3%	19.1%
	Worsen greatly	4.7%	6.6%	5.2%	7.7%	41.8%**	6.1%
	Worsen	16.0%	26.5%	26.2%	31.9%	14.8%	25.0%
	No change	14.6%	18.0%	15.4%	19.0%	14.1%	16.7%
	Improve	31.9%	21.3%	22.7%	8.4%	17.3%	22.8%
	Improve greatly	10.8%	9.9%	11.8%	7.1%	4.3%	10.5%
Ocean water quality (clean and clear)	Not sure	22.1%	17.6%	18.8%	25.9%	7.6%	18.8%
	Worsen greatly	8.7%	7.3%	6.0%	22.5%	27.7%	7.7%
	Worsen	17.7%	26.9%	28.3%	51.0%	27.8%	26.8%
	No change	11.5%	20.0%	16.2%	7.9%	22.3%	17.2%
	Improve	26.9%	19.7%	22.2%	9.2%	1.3%***	21.1%
	Improve greatly	9.8%	7.1%	11.3%	5.2%	9.2%	8.7%
Access to safe swimming areas	Not sure	25.4%	19.0%	16.0%	4.1%	11.8%	18.5%
	Worsen greatly	6.2%	6.3%	3.9%	8.8%	44.7%**	5.8%
	Worsen	12.3%	22.5%	24.9%	46.4%	1.3%***	22.4%
	No change	19.4%	21.7%	17.2%	21.1%	29.8%	20.0%
	Improve	27.8%	22.3%	23.7%	9.1%	13.2%	23.1%
	Improve greatly	9.3%	9.4%	8.7%	3.9%	0.0%	9.0%
Not sure	25.1%	17.8%	21.5%	10.5%	11.0%	19.8%	

Table C12: Threat familiarity by stratum.

Threat	Familiarity	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Climate change	Not at all	7.6%	7.9%	6.3%	6.0%	0.0%***	7.3%
	Slightly	16.4%	9.5%	4.8%	10.6%	2.1%	9.1%
	Somewhat	19.0%	24.3%	14.2%	17.7%	39.2%	20.3%
	Moderately	36.5%	26.4%	28.0%	49.4%	31.2%	27.6%
	Extremely	30.6%	31.9%	46.7%	16.3%	27.5%	35.7%
Coastal/urban development	Not at all	27.3%	20.4%	15.4%	6.6%	1.6%	19.4%
	Slightly	17.3%	14.4%	21.1%	9.3%	1.5%	16.7%
	Somewhat	16.1%	24.9%	12.0%	14.5%	38.4%	19.4%
	Moderately	15.0%	20.2%	23.6%	38.8%	19.0%	21.1%
	Extremely	23.9%	20.1%	28.0%	30.9%	39.6%	23.5%
Coral bleaching	Not at all	30.8%	30.2%	24.4%	17.5%	3.0%***	28.0%
	Slightly	12.1%	12.4%	14.4%	14.1%	8.5%	13.0%
	Somewhat	15.7%	17.4%	17.2%	8.0%	37.0%	16.9%
	Moderately	23.4%	22.6%	24.6%	49.7%	32.5%	24.2%
	Extremely	18.0%	17.4%	19.4%	10.8%	19.1%	17.8%
Shipping and boating	Not at all	21.5%	13.0%	10.5%	4.5%	6.0%	13.1%
	Slightly	16.6%	9.0%	8.4%	9.1%	5.2%	9.9%
	Somewhat	19.7%	22.4%	14.3%	10.9%	55.1%**	19.3%
	Moderately	20.6%	25.6%	24.9%	48.7%	16.6%	25.4%

	Extremely	21.6%	30.0%	42.0%	26.7%	17.1%	32.3%
Shipwrecking	Not at all	3.0%	17.5%	6.6%	12.2%	5.5%	15.8%
	Slightly	14.8%	10.5%	10.1%	3.1%	4.3%	10.7%
	Somewhat	12.6%	21.7%	15.3%	9.2%	32.7%	18.1%
	Moderately	14.7%	21.3%	18.0%	48.9%	21.5%	20.2%
	Extremely	28.0%	29.0%	50.0%	26.5%	36.1%	35.2%
Hurricanes	Not at all	6.4%	5.3%	3.4%	5.8%	1.4%	4.9%
	Slightly	7.4%	3.9%	4.6%	11.0%	12.0%	4.8%
	Somewhat	18.4%	14.5%	13.8%	15.2%	24.1%	14.9%
	Moderately	27.7%	30.1%	27.9%	55.0%	28.4%	29.9%
	Extremely	40.1%	46.2%	40.5%	13.1%	34.1%	45.5%
Invasive species	Not at all	33.0%	33.3%	13.3%	10.9%	1.4%***	26.4%
	Slightly	20.1%	15.3%	16.4%	7.9%	7.1%	16.1%
	Somewhat	10.0%	16.2%	19.4%	12.8%	58.5%***	16.3%
	Moderately	11.7%	19.7%	18.0%	36.9%	16.5%	18.3%
	Extremely	25.3%	16.2%	33.0%	31.4%	16.6%	23.0%
Ocean acidification	Not at all	39.9%	43.0%	29.4%	12.4%	27.3%	37.4%
	Slightly	17.9%	12.3%	17.1%	6.6%	2.4%	14.3%
	Somewhat	9.4%	12.4%	12.5%	12.7%	48.7%**	12.1%
	Moderately	13.6%	17.6%	17.8%	45.0%	19.7%	17.9%
	Extremely	19.3%	14.7%	23.3%	23.3%	1.2%***	18.2%
Pollution (stormwater, wastewater, chemical runoff)	Not at all	17.6%	8.6%	6.6%	3.8%	0.0%**	9.1%
	Slightly	9.8%	4.7%	3.8%	5.2%	4.3%	5.2%
	Somewhat	21.6%	18.2%	13.1%	11.7%	18.1%	17.0%
	Moderately	16.4%	25.0%	24.8%	42.3%	38.0%	24.1%
	Extremely	34.7%	43.5%	52.2%	36.0%	39.6%	44.6%
Pollution (trash and littering)	Not at all	16.2%	8.4%	5.8%	2.7%	0.0%	8.5%
	Slightly	8.2%	4.2%	3.8%	3.0%	4.3%	4.6%
	Somewhat	19.7%	16.9%	13.1%	7.6%	11.7%	15.8%
	Moderately	19.2%	26.6%	25.4%	46.2%	30.4%	25.8%
	Extremely	36.7%	44.0%	52.0%	40.7%	53.6%	45.3%
Crown of Thorns starfish (<i>alamea</i>)	Not at all	27.9%	25.0%	17.9%	15.3%	6.8%	22.7%
	Slightly	15.8%	15.9%	21.7%	8.3%	0.0%***	17.4%
	Somewhat	11.1%	17.6%	18.6%	11.0%	20.8%	16.8%
	Moderately	15.4%	19.3%	17.1%	44.1%	36.4%	18.9%
	Extremely	29.8%	22.6%	24.8%	21.4%	36.1%	24.3%
Overfishing and over-gleaning	Not at all	17.5%	10.3%	5.6%	6.6%	0.0%***	9.7%
	Slightly	14.7%	9.2%	8.1%	6.9%	2.7%	9.6%
	Somewhat	21.9%	23.0%	16.6%	11.0%	52.7%**	20.7%
	Moderately	19.5%	23.2%	23.2%	44.6%	23.4%	23.3%
	Extremely	26.4%	34.5%	46.4%	30.1%	21.3%	36.7%

Table C13: Threat impact by stratum.

Threat	Impact	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Climate change	Extremely negative	33.3%	23.0%	23.1%	30.3%	70.1%***	25.0%
	Negative	29.9%	35.4%	37.6%	59.1%	10.3%**	35.9
	No impact	12.5%	10.1%	8.2%	1.9%	18.1%	9.7%
	Positive	7.8%	13.1%	12.1%	3.8%	0.0%**	11.7%
	Extremely positive	6.4%	6.1%	9.2%	0.7%	0.0%**	6.9%
	Not sure	10.1%	12.3%	9.8%	4.2%	1.5%	10.9%
Coastal/urban development	Extremely negative	20.0%	19.4%	14.9%	38.7%	32.7%	18.7%
	Negative	15.8%	25.8%	26.0%	49.4%	38.3%	25.2%
	No impact	25.5%	15.3%	15.9%	3.4%	20.6%	16.7%
	Positive	7.2%	10.0%	6.5%	3.9%	7.5%	8.3%
	Extremely positive	7.7%	5.9%	10.5%	1.1%	0.0%	7.4%
	Not sure	23.8%	23.7%	26.3%	3.5%	0.9%	23.8%
Coral bleaching	Extremely negative	23.3%	18.0%	12.0%	20.5%	81.8%***	17.2%
	Negative	20.3%	23.6%	24.8%	60.0%	13.1%	24.6%
	No impact	11.4%	7.5%	6.3%	4.3%	5.1%	7.6%
	Positive	11.8%	9.7%	11.5%	3.8%	0.0%**	10.3%
	Extremely positive	5.7%	5.9%	9.0%	0.8%	0.0%**	6.6%
	Not sure	27.5%	35.4%	36.5%	10.6%	0.0%***	33.7%
Shipping and boating	Extremely negative	25.8%	28.5%	35.0%	35.9%	34.4%	30.4%
	Negative	33.6%	34.3%	29.5%	51.0%	43.9%	33.3%
	No impact	15.4%	13.5%	10.6%	5.8%	14.9%	12.7%
	Positive	7.7%	7.3%	4.6%	4.3%	0.0%**	6.4%
	Extremely positive	6.0%	6.6%	11.1%	0.6%	4.3%	7.7%
	Not sure	11.5%	9.8%	9.2%	2.3%	2.4%	9.6%
Shipwrecking	Extremely negative	35.6%	38.9%	47.1%	42.3%	87.7%***	41.2%
	Negative	33.7%	30.3%	26.0%	45.7%	3.6%***	29.8%
	No impact	6.8%	4.8%	5.0%	1.4%	4.2%	5.1%
	Positive	8.1%	7.1%	5.6%	5.0%	4.5%	6.7%
	Extremely positive	6.0%	7.1%	11.4%	0.9%	0.0%**	8.0%
	Not sure	9.8%	11.8%	4.9%	4.6%	0.0%**	9.1%
Hurricanes	Extremely negative	38.0%	26.8%	29.8%	26.7%	94.5%***	29.6%
	Negative	28.1%	37.5%	34.6%	61.7%	5.5%***	35.9%
	No impact	13.0%	12.2%	11.0%	2.5%	0.0%	11.6%
	Positive	6.2%	10.9%	10.2%	3.7%	0.0%**	9.7%
	Extremely positive	6.6%	5.9%	9.3%	1.5%	0.0%	6.9%
	Not sure	8.1%	6.7%	5.1%	3.9%	0.0%**	6.3%
Invasive species	Extremely negative	21.0%	20.4%	17.6%	46.0%	58.3%	20.6%
	Negative	18.3%	27.5%	31.4%	37.6%	29.4%	27.7%
	No impact	18.1%	9.3%	10.8%	2.1%	12.3%	10.8%

	Positive	9.3%	7.5%	6.4%	6.0%	0.0%***	7.4%
	Extremely positive	6.4%	5.4%	9.7%	1.3%	0.0%	6.7%
	Not sure	26.9%	29.9%	24.2%	7.0%	0.0%***	26.9%
Ocean acidification	Extremely negative	29.3%	17.4%	21.0%	34.6%	40.0%	20.9%
	Negative	18.4%	20.6%	15.0%	48.4%	36.6%	19.5%
	No impact	6.8%	6.9%	7.5%	1.7%	12.7%	6.9%
	Positive	12.2%	6.9%	6.2%	4.5%	0.0%**	7.4%
	Extremely positive	3.3%	6.5%	9.5%	0.4%	0.0%	6.7%
	Not sure	30.0%	41.7%	40.9%	10.4%	10.7%	38.6%
Pollution (stormwater, wastewater, chemical runoff)	Extremely negative	46.4%	50.3%	50.5%	52.1%	90.3%***	50.0%
	Negative	28.7%	25.6%	21.3%	41.0%	9.7%	25.2
	No impact	8.4%	3.8%	4.7%	0.3%	0.0%	4.6%
	Positive	4.1%	8.4%	8.8%	4.0%	0.0%**	7.8%
	Extremely positive	7.8%	5.7%	9.0%	1.4%	0.0%**	6.9%
	Not sure	4.5%	6.0%	5.6%	1.2%	0.0%	5.5%
Pollution (trash and littering)	Extremely negative	49.1%	51.1%	50.7%	55.9%	94.6%	51.0%
	Negative	27.1%	25.9%	22.9%	37.4%	5.4%***	25.4%
	No impact	5.1%	4.6%	4.4%	1.5%	0.0%	4.5%
	Positive	3.7%	7.6%	7.9%	3.8%	0.0%**	7.0%
	Extremely positive	8.1%	4.9%	9.6%	1.1%	0.0%	6.7
	Not sure	7.0%	6.1%	4.5%	0.2%	0.0%	5.5%
Crown of Thorns starfish (<i>alamea</i>)	Extremely negative	19.0%	15.7%	14.6%	36.2%	61.5%	16.7%
	Negative	14.6%	20.5%	21.2%	42.2%	14.3%	20.5%
	No impact	17.6%	20.6%	18.7%	3.5%	18.9%	19.1%
	Positive	13.1%	7.5%	6.3%	4.7%	0.0%**	7.8%
	Extremely positive	4.8%	7.6%	11.5%	1.2%	0.0%	8.1%
	Not sure	30.9%	28.2%	27.7%	12.2%	5.2%	27.8%
Overfishing and over-gleaning	Extremely negative	28.7%	26.1%	28.9%	43.1%	60.5%	28.0%
	Negative	30.9%	35.6%	36.6%	41.3%	19.3%	35.3%
	No impact	18.8%	16.5%	14.2%	7.6%	17.5%	15.9%
	Positive	9.2%	7.6%	4.8%	3.5%	2.7%	6.8%
	Extremely positive	6.2%	5.3%	11.4%	0.9%	0.0%**	7.1%
	Not sure	6.3%	8.9%	4.2%	3.5%	0.0%	6.9%

Table C14: Familiarity with marine protected areas by stratum.

Familiarity	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Not at all familiar	23.4%	32.5%	26.9%	58.4%	0.0%***	30.2%
Slightly familiar	20.9%	20.0%	14.0%	16.1%	9.8%	18.1%
Somewhat familiar	16.6%	20.0%	18.5%	11.7%	19.8%	18.8%
Moderately familiar	17.9%	9.7%	12.1%	7.6%	30.9%	11.7%
Extremely familiar	21.3%	17.8%	28.5%	6.2%	39.5%	21.3%

Table C15: Perceived impacts of marine protected areas by stratum.

Statement	Change in condition	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Protection of coral reefs	Worsened greatly	1.5%	0.7%	0.4%	11.5%	12.5%	1.0%
	Worsened	4.4%	4.7%	3.4%	25.4%	0.8%	4.6%
	No change	30.1%	19.1%	11.6%	15.2%	29.2%	18.4%
	Improved	34.1%	44.9%	61.8%	27.0%	6.9%	48.1%
	Improved greatly	26.3%	15.4%	8.4%	9.4%	46.2%	14.9%
	Not sure	3.6%	15.2%	14.4%	11.6%	4.4%	13.0%
Number of fish	Worsened greatly	1.6%	0.2%	0.0%	4.4%	12.5%	0.5%
	Worsened	6.4%	2.3%	4.1%	25.2%	0.9%	3.9%
	No change	23.0%	20.8%	10.8%	22.0%	28.7%	18.0%
	Improved	33.4%	43.5%	56.8%	21.0%	19.6%	45.7%
	Improved greatly	29.1%	17.4%	12.9%	10.4%	38.3%	17.8%
	Not sure	6.5%	15.8%	15.4%	17.0%	0.0%***	14.2%
Economy	Worsened greatly	2.1%	0.3%	0.0%	4.9%	0.0%	0.5%
	Worsened	6.2%	4.5%	7.4%	28.7%	0.0%**	6.1%
	No change	22.6%	25.2%	17.4%	21.1%	33.9%	22.3%
	Improved	32.7%	36.7%	51.4%	24.8%	35.1%	40.6%
	Improved greatly	27.4%	14.4%	12.0%	9.3%	30.1%	15.7%
	Not sure	9.0%	18.9%	11.8%	11.2%	0.9%	14.9%
Fishermen's livelihoods	Worsened greatly	2.1%	1.5%	NA	4.4%	12.5%	1.2%
	Worsened	9.9%	8.8%	2.6%	34.4%	0.9%	7.4%
	No change	24.6%	16.7%	14.1%	15.8%	24.8%	17.1%
	Improved	31.0%	38.1%	54.8%	27.7%	43.9%	42.2%
	Improved greatly	23.0%	15.9%	10.7%	6.2%	17.9%	15.2%
	Not sure	9.5%	18.9%	17.8%	11.5%	0.9%**	16.8%
Tourism	Worsened greatly	1.6%	0.3%	0.0%	2.0%	1.3%	0.4%
	Worsened	9.6%	2.7%	3.9%	29.4%	0.0%	4.6%
	No change	25.7%	26.0%	20.4%	31.6%	16.0%	24.2%
	Improved	27.7%	33.9%	48.0%	14.9%	18.0%	37.0%
	Improved greatly	22.3%	15.6%	9.6%	6.2%	62.2%***	14.8%
	Not sure	13.0%	21.6%	18.1%	15.9%	2.6%	18.9%

Table C16: Support for establishing marine protected areas by stratum.

Support	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Strongly oppose/oppose	11.5%	1.6%	0.9%	6.3%	2.7%	3.0%
Neither oppose nor support	5.6%	8.1%	12.2%	35.0%	50.2%***	9.7%
Support/strongly support	82.8%	90.3%	86.9%	58.7%	47.1%	87.3%

Table C17: Support for coral reef management strategies by stratum.

Strategy	Support	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Size catch limits per person for certain fish species	Strongly oppose	2.2%	0.2%	0.0%	3.1%	49.5%***	0.8%
	Oppose	9.9%	8.1%	12.0%	7.3%	2.7%	9.5%
	Neither oppose nor support	10.7%	12.1%	6.9%	13.3%	7.5%	10.3%
	Support	46.3%	44.1%	42.0%	59.2%	4.5%***	44.1%
	Strongly support	30.8%	35.4%	39.1%	17.1%	35.8%	35.3%
Seasonal catch limits per person for certain fish species	Strongly oppose	2.3%	0.5%	0.4%	0.9%	57.2%***	1.0%
	Oppose	17.9%	8.0%	12.2%	5.7%	2.7%	10.7%
	Neither oppose nor support	13.5%	10.4%	8.3%	12.9%	2.3%**	10.3%
	Support	40.6%	41.9%	40.3%	62.0%	6.4%***	41.7%
	Strongly support	25.6%	39.1%	38.8%	18.5%	31.3%	36.4%
Bans on fishing "big fish" species (humphead wrasse, giant grouper, sharks, etc.)	Strongly oppose	0.6%	3.0%	1.4%	3.5%	48.3%***	2.4%
	Oppose	14.8%	14.0%	17.4%	4.5%	0.0%***	14.8%
	Neither oppose nor support	21.5%	19.8%	10.3%	12.1%	37.9%	17.0%
	Support	35.3%	26.4%	28.6%	47.2%	5.4%***	28.9%
	Strongly support	27.8%	36.8%	42.3%	32.8%	8.4%***	36.9%
Stricter control of sources of pollution to preserve water quality	Strongly oppose	2.0%	0.7%	0.0%	1.6%	6.8%	0.8%
	Oppose	4.4%	0.7%	2.3%	0.0%	0.0%	1.7%
	Neither oppose nor support	11.0%	7.9%	2.8%	4.2%	2.9%	6.7%
	Support	42.5%	41.9%	41.7%	61.3%	0.0%***	42.4%
	Strongly support	40.0%	48.8%	53.2%	32.9%	90.3%***	48.5%
Establishing community-based village MPAs	Strongly oppose	2.5%	0.8%	0.0%	2.8%	7.5%	0.9%
	Oppose	3.6%	2.0%	3.9%	0.0%	0.0%	2.7%
	Neither oppose nor support	9.9%	8.6%	2.8%	10.1%	1.5%	7.0%
	Support	46.1%	37.0%	39.5%	49.6%	2.4***	39.3%
	Strongly support	37.9%	51.6%	53.8%	37.5%	88.5%***	50.0%
Incorporate traditional Samoan practices into coral reef management	Strongly oppose	0.0%	0.6%	0.0%	1.6%	0.0%	0.4%
	Oppose	6.5%	0.6%	0.6%	2.0%	0.0%	1.5%
	Neither oppose nor support	11.2%	6.6%	5.5%	3.1%	2.3%	6.8%
	Support	43.7%	44.5%	41.3%	51.3%	4.3%***	43.4%
	Strongly support	38.5%	47.7%	52.6%	41.9%	93.4%***	47.8%
Improved law enforcement for existing rules/regulations	Strongly oppose	1.8%	0.7%	0.0%	1.6%	0.0%	0.7%
	Oppose	0.9%	0.1%	0.8%	0.1%	0.0%	0.4%
	Neither oppose nor support	8.2%	6.1%	1.6%	4.1%	6.4%	5.0%
	Support	48.3%	44.1%	43.1%	51.8%	4.3%	44.5%
	Strongly support	40.7%	49.0%	54.5%	42.4%	89.3%***	49.5%

Fishing gear restrictions	Strongly oppose	4.0%	1.0%	0.6%	1.6%	25.4%	1.5%
	Oppose	11.6%	9.2%	8.9%	2.9%	0.8%	9.2%
	Neither oppose nor support	17.8%	14.3%	4.6%	7.3%	27.1%	11.7%
	Support	40.3%	38.5%	42.3%	44.7%	8.1%***	40.0%
	Strongly support	26.4%	37.0%	43.6%	43.5%	38.5%	37.7%
A tax on luxury items to support coral reef conservation efforts	Strongly oppose	4.4%	6.9%	3.6%	2.0%	25.8%	5.5%
	Oppose	12.9%	15.7%	14.7%	5.2%	0.0%**	14.6%
	Neither oppose nor support	12.0%	6.4%	3.5%	4.2%	10.6%	6.3%
	Support	34.9%	33.0%	32.3%	35.7%	4.5%	33.0%
	Strongly support	35.8%	37.9%	45.9%	52.9%	59.1%	40.6%

Table C18: Participation in pro-environmental behaviors by stratum.

Behavior	Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Recycling	Never	60.6%	62.4%	62.4%	87.4%	50.1%	62.9%
	One to several times a year	34.4%	26.5%	29.7	8.9%	40.5%	28.2%
	Several times a month	4.0%	5.3%	5.1	2.4%	7.9%	5.0%
	Several times a week	0.8%	4.1%	2.2	1.1%	1.5%	2.9%
	Everyday	0.2%	1.7%	0.5%	0.2%	0.0%	1.0%
Using reusable items instead of single-use plastic items	Never	66.7%	62.7%	71.6%	86.4%	4.3%***	66.5%
	One to several times a year	17.9%	17.1%	16.4%	7.5%	5.3%***	16.6%
	Several times a month	9.9%	6.4%	6.4%	1.8%	5.2%***	6.8%
	Several times a week	5.1%	7.9%	4.7%	3.9%	85.2%***	6.7%
	Everyday	0.5%	5.9%	0.9%	0.4%	0.0%***	3.4%
Volunteering with environmental groups (e.g. beach clean-ups)	Never	24.2%	38.9%	35.8%	72.3%	0.9%	36.7%
	One to several times a year	60.6%	41.5%	49.2%	23.5%	62.7%	46.2%
	Several times a month	12.6%	14.3%	10.4%	3.5%	27.4%	12.6%
	Several times a week	2.6%	4.1%	4.2%	0.8%	3.3%	3.8%
	Everyday	0.1%	1.2%	0.4%	0.0%	5.7%	<0.01%
Donating to environmental causes	Never	75.8%	75.8%	67.7%	89.2%	28.0%	72.3%
	One to several times a year	19.9%	19.9%	24.8%	7.3%	42.7%	21.0%
	Several times a month	3.3%	3.3%	5.8%	2.7%	23.7%	5.1%
	Several times a week	1.0%	1.0%	1.7%	0.8%	1.5%	1.6%

	Everyday	0.0%	0.0%	0.0%	0.0%	4.1%	<0.01%
Speaking with others about environmentally responsible practices	Never	42.4%	53.0%	50.8%	18.1%	0.9%	51.4%
	One to several times a year	44.0%	35.6%	37.3%	8.0%	35.4%	36.8%
	Several times a month	12.8%	8.5%	9.7%	11.0%	27.5%	9.4%
	Several times a week	0.0%	2.4%	1.5%	8.9%	35.4%	1.9%
	Everyday	0.8%	0.5%	0.6%	53.9%	0.8%	<0.01%

Table C19: Preference for sources of coral reef information by stratum.

Source	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Word of mouth	23.0%	32.0%	30.9%	66.9%	51.1%	31.5%
Newspapers, magazines, and other print publications	57.0%	49.1%	47.5%	76.9%	15.1%***	50.4%
Radio	71.4%	65.7%	54.6%	82.8%	49.9%	63.7%
Television	65.9%	61.4%	63.5%	36.6%	80.9%	62.0%
Online news	43.8%	42.8%	48.8%	10.7%	30.0%	43.7%
Social media	50.0%	49.3%	51.2%	26.8%	72.9%	49.4%

Table C20: Credibility of sources for coral reef related information by stratum

Source	Frequency	Rural	Semi-rural	Urban	Aua	Manu'a Islands	Total
Friends and family	Not at all	10.5%	9.4%	8.8%	3.5%	2.3%	9.1%
	Slightly	14.1%	13.1%	9.7%	10.8%	10.7%	12.1%
	Somewhat	53.3%	49.3%	54.6%	23.5%	40.2%	50.7%
	Moderately	10.3%	13.7%	17.4%	50.7%	18.5%	15.5%
	Extremely	11.8%	14.5%	9.5%	11.5%	28.3%	12.6%
Church groups	Not at all	7.3%	8.6%	5.3%	2.3%	17.0%	7.3%
	Slightly	14.5%	11.9%	9.3%	11.8%	9.4%	11.5%
	Somewhat	52.5%	41.6%	41.7%	44.9%	30.4%	43.4%
	Moderately	9.0%	17.6%	14.6%	29.6%	11.0%	15.8%
	Extremely	16.6%	20.3%	29.1%	11.4%	32.3%	22.2%
Community leaders	Not at all	9.7%	12.0%	11.9%	2.6%	18.2%	11.4%
	Slightly	9.1%	13.2%	13.1%	7.9%	14.5%	12.4%
	Somewhat	59.3%	44.9%	44.9%	16.5%	23.9%	46.0%
	Moderately	4.9%	16.2%	15.9%	47.1%	11.0%	15.4%
	Extremely	16.9%	13.7%	14.2%	25.9%	32.4%	14.8%
Village leaders	Not at all	11.0%	14.5%	12.9%	2.3%	25.7%	13.2%
	Slightly	10.5%	13.4%	14.3%	7.4%	7.5%	13.0%
	Somewhat	55.9%	41.3%	44.2%	14.1%	25.7%	43.4%
	Moderately	5.4%	15.7%	14.3%	35.3%	12.8%	14.3%
	Extremely	17.2%	15.1%	14.4%	40.9%	28.3%	16.0%

Academic institutions /universities	Not at all	14.6%	9.2%	14.7%	3.0%	0.0%***	11.4%
	Slightly	19.8%	16.7%	20.5%	15.9%	27.0%	18.3%
	Somewhat	40.5%	37.2%	34.2%	43.5%	20.0%	36.9%
	Moderately	9.1%	17.3%	12.0%	27.5%	22.8%	14.8%
	Extremely	16.1%	19.6%	18.5%	10.2%	30.2%	18.5%
American Samoa government agencies	Not at all	5.0%	10.6%	10.8%	0.4%	7.5%	9.5%
	Slightly	11.7%	11.3%	12.3%	4.7%	8.5%	11.4%
	Somewhat	48.0%	37.1%	41.5%	13.0%	28.5%	39.3%
	Moderately	10.9%	18.8%	14.3%	37.4%	24.3%	16.8%
	Extremely	24.4%	22.2%	21.0%	44.6%	31.2%	22.9%
Federal government agencies (NOAA, EPA)	Not at all	9.8%	10.7%	12.6%	0.8%	0.0%	10.8%
	Slightly	8.6%	10.9%	13.2%	3.0%	6.8%	11.0%
	Somewhat	48.3%	33.1%	38.9%	13.7%	27.5%	36.4%
	Moderately	8.8%	17.5%	13.4%	35.6%	33.0%	15.6%
	Extremely	24.4%	27.9%	22.1%	46.9%	32.7%	26.2%
Non-profit organizations	Not at all	21.8%	15.8%	27.1%	2.7%	19.4%	19.7%
	Slightly	22.4%	18.4%	13.6%	16.5%	8.6%	17.4%
	Somewhat	32.1%	37.1%	30.7%	47.3%	21.4%	34.7%
	Moderately	11.3%	13.9%	11.4%	25.8%	23.7%	13.2%
	Extremely	12.4%	14.8%	17.3%	7.6%	26.9%	15.0%

Gina Raimondo, Secretary
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Richard W. Spinrad, Under Secretary
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