



# Total Economic Value for Protecting and Restoring Hawaiian Coral Reef Ecosystems

## Final Report

---

NOAA Technical Memorandum CRCP 16

October 2011



# ABOUT THIS DOCUMENT

## **CITATION:**

Richard C. Bishop, David J. Chapman, Barbara J. Kanninen, Jon A. Krosnick, Bob Leeworthy, and Norman F. Meade. 2011. Total Economic Value for Protecting and Restoring Hawaiian Coral Reef Ecosystems: Final Report. Silver Spring, MD: NOAA Office of National Marine Sanctuaries, Office of Response and Restoration, and Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 16. 406 pp.

## **FUNDED BY:**

U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Ocean Service  
Office of National Marine Sanctuaries, the Coral Reef Conservation Program, and the Office of Response and Restoration, Assessment and Restoration Division  
1305 East West Highway, SSMC4, 10th Floor  
Silver Spring, MD 20910

## **PREPARED BY:**

Stratus Consulting Inc.  
PO Box 4059  
Boulder, CO 80306

## **FOR MORE INFORMATION:**

For more information about this report or to request a copy, please contact NOAA's Coral Reef Conservation Program at 301-713-3155 or write to: NOAA Coral Reef Conservation Program; NOAA/NOS/OCRM; 1305 East West Highway; Silver Spring, MD 20910 or visit [www.coralreef.noaa.gov](http://www.coralreef.noaa.gov).

## **DISCLAIMER:**

Mention of trade names or commercial products does not constitute endorsement or recommendation for their use by the United States government.

Special thanks to Trudy Cameron, Arielle Levine, Christy Loper, Ted McConnell, Tony Penn, and Steven Thur for technical review, Zhe Liu for graphic design, and Lauren Chhay for photo support.

# Total Economic Value for Protecting and Restoring Hawaiian Coral Reef Ecosystems

## Final Report

Richard C. Bishop, David J. Chapman, Barbara J. Kanninen,  
Jon A. Krosnick, Bob Leeworthy, and Norman F. Meade

October 2011



NOAA Technical Memorandum CRCP 16



---

United States Department of Commerce  
**Rebecca M. Blank**  
Acting Secretary

National Oceanic and Atmospheric Administration  
**Dr. Jane Lubchenco**  
Administrator

National Ocean Service  
**David Kennedy**  
Assistant Administrator

---

# Contents

<b>List of Figures</b> .....	ix
<b>List of Tables</b> .....	xi
<b>List of Acronyms and Abbreviations</b> .....	xiii
<b>Executive Summary</b> .....	S-1
<b>Chapter 1 Introduction</b> .....	1-1
1.1 Background on Coral Reefs .....	1-1
1.1.1 Goods .....	1-1
1.1.2 Services .....	1-3
1.1.3 Hawaiian coral reefs.....	1-4
1.1.4 Risks and threats to coral reefs .....	1-5
1.1.5 U.S. coral reef policy .....	1-6
1.2 Motivation for this Study .....	1-7
1.2.1 Review of coral reef valuation literature.....	1-8
1.2.2 Review of internet survey literature.....	1-12
1.3 Report Structure .....	1-17
References.....	1-17
<b>Chapter 2 Economic Valuation</b> .....	2-1
2.1 Introduction.....	2-1
2.2 Environmental Goods Defined .....	2-2
2.3 Total Valuation Framework .....	2-3
2.4 Methodological Issues and Opportunities.....	2-5
2.5 A Hybrid Stated Preference Approach for Total Value Estimation.....	2-8
References.....	2-10
<b>Chapter 3 Development of the Survey Instrument</b> .....	3-1
3.1 Focus Groups .....	3-1
3.2 June 2004 One-on-One Interviews .....	3-2
3.3 Initial Design of Survey Information .....	3-3
3.3.1 Physical/natural science panel.....	3-3
3.4 External Peer Reviews .....	3-3
3.5 2005 OMB Clearance.....	3-4
3.6 2005 Pretest.....	3-4

3.7	2008 OMB Clearance.....	3-5
3.8	April 2009 One-on-One Interviews .....	3-5
3.9	2009 Pretest.....	3-5
3.10	Finalization of the Survey Instrument.....	3-5
<b>Chapter 4</b>	<b>Structure and Content of the Final Survey Instrument .....</b>	<b>4-1</b>
4.1	Section 1. Instructions and Warm-up.....	4-1
4.2	Section 2. Introduction.....	4-3
4.3	Section 3. Description of Baseline Conditions .....	4-5
4.4	Section 4. Overfishing .....	4-10
4.5	Section 5. Ship Accidents .....	4-17
4.6	Section 6. Stated Preference Questions and Follow-up Evaluation.....	4-21
4.7	Section 7. Debriefing Questions .....	4-31
	References.....	4-36
<b>Chapter 5</b>	<b>Implementation of the Final Survey.....</b>	<b>5-1</b>
5.1	Selection and Sample Design.....	5-1
	5.1.1 ANES sampling design.....	5-1
	5.1.2 FFRISP sampling design.....	5-3
5.2	Data Collection Process .....	5-4
	5.2.1 ANES and FFRISP data collection procedures.....	5-4
5.3	Administration Period.....	5-5
5.4	Completed Cases by Panel.....	5-5
5.5	Response Rates .....	5-5
	5.5.1 ANES response rate statistics .....	5-5
	5.5.2 FFRISP response rate statistics .....	5-7
<b>Chapter 6</b>	<b>Comparability of the Internet Panels.....</b>	<b>6-1</b>
6.1	Attitudinal Questions .....	6-1
6.2	Demographic Questions.....	6-4
6.3	Summary.....	6-6

<b>Chapter 7</b>	<b>Distribution of Choices and Tests of Validity</b> .....	7-1
7.1	Distribution of Choices .....	7-1
7.2	Tests of Validity.....	7-4
	7.2.1 Scenario acceptance .....	7-4
	7.2.2 Construct validity.....	7-11
7.3	Certainty.....	7-28
7.4	Conclusion .....	7-31
<b>Chapter 8</b>	<b>Model Estimation and Willingness to Pay</b> .....	8-1
8.1	Final Model and Variables.....	8-1
8.2	Per Household Values.....	8-8
8.3	Elasticities and Marginal Effects of Variables on WTP .....	8-9
8.4	Aggregating Annual Household WTP to the U.S. Population.....	8-10
8.5	Validity Assessment.....	8-11
	References.....	8-17

## Appendices

A	Coral Reef Survey Instrument
B	Experimental Design
C	Sample Weights
D	Additional Analyses of Rank-Ordered Choice Data
E	The Rank-Ordered Probit Model
F	Demographic Variables
G	Nonresponse Analysis
H	Tabulation of Close-Ended Responses
I	Listing of Open-Ended Responses

---

## Figures

2.1	First choice question from the survey instrument.....	2-9
-----	---	-----

---

## Tables

1.1	Goods and services provided by coral reef ecosystems .....	1-2
5.1	Completed cases by panel .....	5-5
5.2	Final case-level disposition of ANES panel study recruitment sample .....	5-6
6.1	Comparison of responses to attitudinal questions across the two panels, the pooled sample, and the GSS – standard wording (%).....	6-2
6.2	Comparison of responses to attitudinal questions across the two panels, the pooled sample, and the GSS – variant wording (%).....	6-3
6.3	Comparison of demographic characteristics across the two panels, the pooled sample, and the ACS (%) .....	6-4
7.1	Responses across programs for each choice question.....	7-2
7.2	Responses to Q10 based on survey version .....	7-2
7.3	When you chose your most preferred programs, how effective did you think that no-fishing zones would be in restoring fish and other marine life in the coral reef ecosystem around the Main Hawaiian Islands (Q19)?.....	7-5
7.4	When you chose your preferred programs, how effective did you think that repairing injuries from ship accidents would be in speeding up recovery of the coral reef ecosystem around the Main Hawaiian Islands (Q21)?.....	7-6
7.5	When you chose your most preferred programs, did you think that repairs of injuries to coral reefs after ship accidents would help reefs recover in about 10 years, more than 10 years, or less than 10 years (Q22)? .....	7-7
7.6	When you chose your most preferred programs, did you think that your household would pay the tax amount stated, or did you think you would pay more than that amount, or less than that amount (Q23)? .....	7-8
7.7	When you chose your most preferred programs, did you think overfishing contributed to coral reef change ecosystems we told you about or did you think it did not contribute to those changes (Q17)? .....	7-9
7.8	If no-fishing zones are NOT put in place, how serious did you think the effects of overfishing would be on the coral reef ecosystem around the Main Hawaiian Islands (Q18)? .....	7-10
7.9	When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands (Q20)? .....	7-10
7.10	Respondent education levels .....	7-12
7.11	Respondent home ownership .....	7-13
7.12	Respondent employment status.....	7-14
7.13	Respondent income .....	7-14

7.14	Respondent marital status .....	7-16
7.15	Did anyone in your household pay any federal taxes last year, 2008 (Q29)? .....	7-17
7.16	How often have you read or heard about coral reefs, either in U.S. waters or elsewhere (Q1)? .....	7-18
7.17	About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason (Q2)? .....	7-19
7.18	Have you ever lived in Hawaii, or have you never lived in Hawaii (Q4)? .....	7-19
7.19	In the next 10 years, how likely is it that you will go to Hawaii (Q5)? .....	7-20
7.20	Cost should not be a factor when protecting the environment (Q28a)? .....	7-21
7.21	Current spending on the environment (Q2D1b)? .....	7-22
7.22	Current spending on improving and protecting the environment (Q2D2b)? .....	7-22
7.23	Would you say you think of yourself as not an environmentalist at all, slightly an environmentalist, a moderate environmentalist, a strong environmentalist, or a very strong environmentalist (Q27)? .....	7-23
7.24	How much confidence do you have in the people who run the U.S. government (Q24a)? .....	7-24
7.25	How much confidence do you have in university scientists (Q24b)? .....	7-25
7.26	I should not have to pay more federal taxes to protect coral reefs in Hawaii (Q28e)? .....	7-26
7.27	How do you feel about increasing federal taxes to protect coral reefs around the Main Hawaiian Islands (Q25)? .....	7-27
7.28	If you had to choose, would you prefer to pay for new environmental programs through higher income taxes or through higher prices (Q26)? .....	7-28
7.29	Certainty of choice in Q10 [ <i>Q11</i> ] .....	7-29
7.30	Certainty of choice in Q13 [ <i>Q14</i> ] .....	7-30
7.31	Certainty of choice in Q15 [ <i>Q16</i> ] .....	7-30
7.32	Certainty by choice question .....	7-31
8.1	Variables used in the rank-ordered probit model .....	8-3
8.2	Summary of variables included in the final model (N = 3,277) .....	8-4
8.3	Rank-ordered probit estimation results .....	8-5
8.4	Mean WTP estimates (N = 3,183) .....	8-8
8.5	Income elasticity of WTP .....	8-9
8.6	Marginal effects of variables on WTP .....	8-10
8.7	Estimated annual U.S. WTP .....	8-11

---

## List of Acronyms and Abbreviations

AAPOR	American Association for Public Opinion Research
ABM	attribute-based method
ACS	American Community Survey
AIDS	acquired immune deficiency syndrome
ANES	American National Election Study
CDF	cumulative density function
Census	U.S. Census Bureau
CPS	Current Population Survey
CRTF	Coral Reef Task Force
CV	contingent valuation
DSF	Delivery Sequence File
DSL	Digital Subscriber Line
EO	Executive Order
EVRI	Environmental Valuation Reference Inventory
FFRISP	Stanford University's Face-to-Face Recruited Internet Survey Panel
FKNMS	Florida Keys National Marine Sanctuary
GED	General Equivalency Diploma
GSS	General Social Survey
IIA	independence of irrelevant alternatives
KN	Knowledge Networks
LRT	likelihood ratio test
MHI	Main Hawaiian Islands
MPA	Marine Protected Area
NMS	National Marine Sanctuaries
NMSA	National Marine Sanctuaries Act
NMSP	National Marine Sanctuary Program

NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
NWHI	Northwestern Hawaiian Islands
OMB	Office of Management and Budget
PC	personal computer
PSU	principal sampling unit
RDD	random digit dialing
SP	stated preference
USPS	U.S. Postal Service
WTP	willingness to pay

## Executive Summary

This report documents results of a study commissioned by the National Oceanic and Atmospheric Administration (NOAA) to improve methods for measuring the economic values that the U.S. public places on the protection and restoration of coral reef ecosystems. The work focused on the coral reefs of Hawaii. These reefs are obviously of economic importance to both the state and the nation, yet there has been less economic research focused on the reefs of Hawaii compared to other parts of the United States, particularly Florida, in the past.

Several human activities impinge on Hawaii's coral reefs. In order to gain insights into the public's values for coral reef protection and restoration, the study focused on impacts from fishing and damage to reefs from ship accidents.

Minimizing impacts from fishing served as a case study to evaluate how the public would value steps to protect and restore reefs at the ecosystem level. More specifically, for our impacts of fishing case study, we focused on the potential value of increasing the size of no-fishing zones, a specific type of Marine Protected Area (MPA) around the main Hawaiian Islands, from the current 1% of reefs to 25%. This would be done in order to achieve broader ecosystem benefits from ecosystem protection and restoration. The figure of 25% was based on the judgment of NOAA scientists regarding a threshold where substantial benefits to fish and the larger ecosystems would start being achieved. Thus, although there is currently no proposal to increase MPAs around the Hawaiian Islands by such a magnitude, expanding no-fishing zones to 25% was a convenient, science-based case study to evaluate how much the public values large-scale coral reef ecosystem protection and restoration.

We also studied the potential value of repairing 5 acres of reefs per year damaged by ship accidents. This served as a case study of the public's values for restoring coral reefs after localized, traumatic injuries, which can result not only from ship strikes but also from relatively small, localized spills of oil and toxics and other localized pollution events. There is currently no specific proposal to repair such damage in Hawaii; NOAA scientists estimate that 5 acres is a rough, current estimate of average annual damages from ship accidents. Restoration of ship-damaged reefs would reduce recovery time by 40 years compared to natural recovery.

Recent advances in environmental economics have called attention to the possibility that people hold both direct use and passive use values for environmental resources. Direct use values stem from personal use of environmental resources and personal consumption of products derived from them. For example, people may derive value from snorkeling over a coral reef or from consuming fish produced by coral reef ecosystems. But people may also receive positive values for reasons that are not related to direct use. For example, people may value restored ecosystems

as part of their legacy to future generations. Early research involving focus groups indicated that many people from across the United States do hold passive use values for Hawaii's coral reef ecosystems. Hence, *the goal of the study was to estimate the total value – including both direct use and passive use values – for the U.S. population.*

Many services provided by ecosystems occur outside of organized markets. This is certainly true of the passive use services associated with restoration of coral reef ecosystems. Market prices are not available as a basis for estimating total values in such cases. For this reason, where passive use values are expected to be a significant component of total values, environmental economists apply so-called stated-preference (SP) methods to estimate total values. SP methods use carefully crafted surveys to quantify economic values.

The earliest and most widely applied SP method is contingent valuation (CV). A typical CV survey asks respondents about their values for one proposed action compared to the status quo. For example, a conventional CV exercise in the current context might have asked respondents about their values for expanding MPAs in Hawaii to 25% of coral reefs compared to the current 1%.

Since 1963, more than 6,000 studies involving CV have been published in the United States and other countries, including many in the peer-reviewed literature. CV – and other SP methods – are still evolving and hence continue to generate scientific discussion and research. Nevertheless, enough has been learned to gain wide acceptance of CV. It is commonly applied by a number of federal agencies. In fact, the Office of Management and Budget and the U.S. Environmental Protection Agency have published guidelines for its application in policy analyses. NOAA and the U.S. Department of the Interior have approved CV for natural resource damage assessments involving releases of oil and toxics into the environment.

In considering CV for the current study, some limitations of CV as it is usually applied became apparent. Our goal was to evaluate three alternatives: increase MPAs to 25% or repair 5 acres of ship-damaged reefs or both. Valuing more than one proposal in the same CV survey has significant potential pitfalls. Conducting three separate CV studies, each focused on one of the alternatives, also has some undesirable features.

To address these issues, we looked to the other main branch of SP methods, the so-called attribute-based methods (ABMs). In ABM surveys, respondents are presented with two or more alternatives. Each alternative is described in terms of its features or “attributes.” Dollar values are included by making one of the attributes the cost of each alternative to the respondent. Several alternatives can be introduced by varying the attributes. Respondents are asked to either choose their most preferred alternative or to rank the alternatives.

As the project evolved, we were able to develop a new, hybrid SP approach that combines the simplicity of CV with the ability of ABMs to value more than one proposal in the same survey.

A second innovation was to employ internet survey technology in a way that led respondents to rank four alternatives: the status quo, expanding MPAs to 25%, repairing 5 acres of ship-damaged reefs, or doing both. A third innovation of the study was to administer the survey over the internet to two internet panels in order to evaluate the potential impact of different panel recruitment methods on the willingness-to-pay estimates.

We estimated that protection and restoration of degraded ecosystems, as exemplified by increasing MPAs in the main Hawaiian Islands to 25%, is worth about \$224.81 per year to the average U.S. household. Restoration of coral reefs after localized injuries, as exemplified by repairing 5 acres of reef per year after ship strikes, is worth about \$62.82 per year. This makes the estimated value of doing both about \$34 billion per year when aggregated over the entire number of households in the United States.

# 1. Introduction

This chapter provides background information on coral reefs, including the goods and services they provide, specifics about Hawaiian coral reef ecosystems, the current risks and threats to coral reefs worldwide, and U.S. policies to protect and understand coral reefs. It also provides the primary motivation for this study: to estimate total economic values for protecting and restoring coral reefs in Hawaii. The secondary, methodological motivations for this study are also addressed and supported by two literature reviews on coral reef valuation studies and the use of internet surveys in valuation studies.

## 1.1 Background on Coral Reefs

Coral reef ecosystems are one of the most diverse and densely populated environments on Earth (Spalding et al., 2001). Approximately 100,000 species of plants and animals living near coral reefs have been named and described, but the total number of plant and animal species supported by the world's reefs could be close to 1 million (Reaka-Kudla, 1997). Even so, coral reefs cover only an estimated 600,000 square kilometers and only 0.1% of the Earth's surface (Reaka-Kudla, 1997). Coral reefs can be found in shallow lagoons (platform reefs), along shorelines (fringing reefs), offshore (barrier reefs), and as isolated shallow areas in the open ocean (atolls). They are generally found in warm, clear, shallow waters with few nutrients.

The ecological functioning of healthy coral reef ecosystems provides an extensive array of both economic and ecological goods and services (Table 1.1). The types and levels of these goods and services vary by their location and type. For example, an atoll hundreds of miles from shore will not provide shoreline protection services, but nitrogen fixation by such a reef may be more critical (Moberg and Folke, 1999).

### 1.1.1 Goods

Some goods provided by coral reefs may be renewable if utilized carefully; however, the extraction of other goods is incompatible with sustainable uses of the ecosystem. Potentially renewable resources include commercial and recreational fisheries, as well as other food sources such as seaweed (Moberg and Folke, 1999). It is estimated that 50% of all federally managed fisheries in the United States depend on coral reefs and related habitats for at least part of their lifecycle (NOAA, 2001). The catch directly from reef areas constitutes around 10% of the fish consumed by humans (Moberg and Folke, 1999).

**Table 1.1. Goods and services provided by coral reef ecosystems**

Goods		Services				
Renewable resources	Nonrenewable resources	Physical structure	Biotic	Biogeochemical	Information	Social and cultural
Commercial and recreational fisheries	Coral blocks and sand for building materials	Construction of complex structural base for habitat by hermatypic corals	Maintenance of coral reef habitat processes and functions	Nitrogen fixation	Historical record of contaminants	Recreation such as ecotourism, diving, and snorkeling
Pharmaceuticals and medical raw materials	Raw materials for production of lime and cement	Protection of shallow aquatic nursery and feeding habitat from severe wave action	Provision of spawning, nursery, breeding, and feeding areas for many species	Carbon cycling	Historical record of salinity	Cultural and religious values
Raw materials (primarily seaweed) for production of agar, carrageenan, and fertilizer	Mineral oil and gas	Protection of shoreline property from severe wave action and erosion	Maintenance of species and genetic diversity	Calcium sink	Historical record of sea temperature	Maintenance of traditional lifestyles
	Shells and corals for jewelry and souvenirs	Construction of new land	–	Export of dissolved organic matter, nutrients, and plankton to nearby habitats	Monitoring of environmental pollution impacts	Aesthetic values and artistic inspiration
Live fish and corals for aquariums	–	Provision of sand to tropical beaches	–	Assimilation of waste (particularly petroleum)	–	–

Source: Adapted from Moberg and Folke, 1999, Table 2.

The natural resources of coral reefs also have great potential for use by the pharmaceutical industry. Seaweeds, sponges, mollusks, soft corals, and sea anemones found on coral reefs contain substances that may be useful in development of new anti-cancer, acquired immune deficiency syndrome (AIDS)-inhibiting, antimicrobial, anti-inflammatory, and anticoagulating drugs (Moberg and Folke, 1999). Coral skeletons may also be used for bone graft operations (Moberg and Folke, 1999).

Reefs also supply other potentially renewable goods to humans such as seaweed used to produce agar, carrageenan, and fertilizer, as well as live fish and corals for aquariums (Moberg and Folke, 1999).

Nonrenewable uses of coral reefs include the extraction of carbonate structures of corals for building materials and for the production of lime, mortar, and cement (Moberg and Folke, 1999).

### **1.1.2 Services**

The structure and functioning of coral reefs also provide many services of both ecological and human importance. These services can be categorized into physical structure, biotic, biogeochemical, information, and social and cultural services (Cesar, 2000b, Table 1).

The physical structures of coral reefs protect shallow aquatic habitats such as lagoons, mangroves, and sea grass beds from severe wave action. These habitats, in turn, provide key nursery, breeding, and feeding habitats for aquatic biota (Reaka-Kudla, 1997; Moberg and Folke, 1999). Additionally, coral reefs buffer wave action, providing important protection for shoreline property. They help to prevent loss of life, property damage, and erosion during severe storms (Reaka-Kudla, 1997; NOAA, 2001). It has been estimated that destruction of reefs in Indonesia has resulted in 0.2 meters of coastal erosion per year (Moberg and Folke, 1999).

The coral reef ecosystem provides important spawning, nursery, breeding, and feeding areas for many organisms. Its complex structure and heterogeneity of habitat facilitate niche diversification and thus the potential for evolutionary development of new species (Moberg and Folke, 1999). Coral reefs also help to maintain current biological and genetic diversity.

Coral reefs provide biogeochemical services, acting as sinks for carbon dioxide on a geologic timescale and as minor sources on human timescales (Moberg and Folke, 1999). Coral reefs also appear to support nearby habitats by exporting excess dissolved organic matter and nitrogen, as well as bacterio-, phyto-, and zooplankton (Moberg and Folke, 1999).

Microbes found in coral reefs play an important role in the assimilation of waste that enters the ocean (Moberg and Folke, 1999). Reefs can help detoxify petroleum products by converting hydrocarbons into carbon dioxide and water. They also immobilize or sequester persistent pollutants.

Reefs provide valuable information to scientists about long-term changes in the environment (Moberg and Folke, 1999). For example, reef deposits have been used to review the history of contaminant levels in seawater and to track historical variations in temperature, salinity, and flooding. Because they are highly sensitive to environmental change, coral reefs can also be used to monitor current changes in the environment and effects of human disturbance and environmental pollution.

Services provided by coral reefs extend to the cultural and spiritual realm as well. They are important for recreational activities such as ecotourism, diving, and snorkeling. Religious rituals in southern Kenya focus on the importance of reefs to the society (Moberg and Folke, 1999). Reefs are also important as a traditional source of livelihood for local communities and can maintain cultural traditions. They also offer aesthetic value and serve as artistic inspiration (Cesar, 2000b).

### **1.1.3 Hawaiian coral reefs**

The coral reefs of the Hawaiian Islands comprise almost 10% of reefs within U.S. territorial seas and the exclusive economic zone (Rohmann et al., 2005).<sup>1, 2</sup>

Hawaiian coral reefs contain about 55 species of stony corals, with the majority of these species found in the Main Hawaiian Islands (MHI; Gulko et al., 2000b). About 25% to 50% of Hawaii's coral species are endemic (DeMartini and Friedlander, 2004), which is due to the islands' geographic isolation from other reef habitats (Gulko et al., 2000a). Marine invertebrate diversity is high, with more than 100 species of sponges, 1,071 species of marine mollusks, 884 species of crustaceans, and 278 species of echinoderms. The number of species of reef and shore fishes, 557, is low compared to other Indo-West Pacific reefs. However, Hawaii has the highest percentage of endemic fish species (24.3%) in the world.

The Hawaiian Island archipelago consists of 8 large islands and 124 small islands, atolls, reefs, and shoals. The Hawaiian reefs consist of two regions with distinct differences: the MHI are made up of large, populated islands with platform, fringing, and barrier reefs and the Northwestern Hawaiian Islands (NWHI) are comprised primarily of uninhabited atolls and banks.

1. All estimates reported in Rohmann et al. (2005) are calculated using the 10-fathom depth curve.
2. The exclusive economic zone is the area over which a state or country has the right to exploit or use marine resources. It generally extends about 200 nautical miles seaward from the edge of the state or country's seaward edge.

The MHI reefs exist in close proximity to high levels of human activities. They provide important shoreline protection functions, generate sandy beaches, and provide food products and recreational opportunities (Gulko et al., 2000b). These reefs cover approximately 1,231 square kilometers (Rohmann et al., 2005).

The NWHI are older and more isolated than the MHI. They begin approximately 200 kilometers west of the MHI and stretch northwest for more than 2,000 kilometers (NOAA, 2009). Habitats extend from the shorelines of small islands and atolls to submerged banks and reefs at depths of up to 183 meters (NOAA, 2009). The NWHI coral reefs account for 4.3% of all coral reefs in the United States and cover approximately 1,595 square kilometers (Rohmann et al., 2005). The NWHI reefs contain 51 species of stony coral and 8 species of soft coral and coral-like anemones (NOAA, 2002). The diversity of coral species in the NWHI is low compared to other coral reefs around the world, most likely because of their geographic isolation.

Up to half of the 7,000 marine species documented in the Hawaiian Islands are found only in the NWHI (NOAA, 2002). The reefs there support a complex association of species, including vertebrates (e.g., monk seals, reef and bottom fish, turtles, birds, sharks), invertebrates (e.g., corals, anemones, jellyfish, mollusks, shrimp, crabs, lobsters, sea urchins, sea stars, sea cucumbers), sea grasses, and algae (NOAA, 2002). Average fish biomass in the NWHI is nearly three times greater than that in the MHI, largely due to high proportions of large predators and larger average body sizes of fish (Maragos and Gulko, 2002).

Species of particular importance found in both the MHI and the NWHI include the endangered Hawaiian monk seal (*Monachus schauinslandi*) and the threatened green sea turtle (*Chelonia mydas*). Nearly the entire population of the Hawaiian monk seal is found in the NWHI, and many areas of the islands have been designated as critical habitat for this endangered species (NOAA, 2002). Additionally, the reefs provide important nesting habitat for the threatened green sea turtle. Ninety percent of green sea turtle nesting in the NWHI occurs at one site, the French Frigate Shoals.

#### **1.1.4 Risks and threats to coral reefs**

Coral reefs appear to be resilient in response to periodic natural disturbances, such as destructive storms, outbreaks of predators, and shifts in oceanographic conditions. However, they are less able to adapt to chronic, persistent disturbance (Moberg and Folke, 1999). Additionally, chronic anthropogenic impacts can reduce a coral reef's ability to respond to natural disturbances.

Anthropogenic threats to coral reefs occur at the global and local levels. The primary global threat to reefs is increased sea temperature, which results in coral "bleaching" (Cesar, 2000b). Increases in ocean temperature have been linked to the loss of zooxanthellae, the corals' symbiotic microalgae that assist in the production of calcium carbonate and provide the corals

with their color (Moberg and Folke, 1999). Corals are much more susceptible to pollution and eventually die without the assistance of zooxanthellae (NOAA, 2008).

Local threats can be summarized under the following four main categories: destructive fishery practices; mining and dredging; sedimentation, pollution, and waste; and nonsustainable tourism (Cesar, 2000b). Jennings and Kaiser (1998) and Jackson et al. (2001) found that although pollution, coastal development, invasive species, and global climate change all impact coral reefs, overfishing<sup>3</sup> is the most pervasive and direct threat to coral reefs and other coastal ecosystems.

Other activities with similar impacts include dredging for the maintenance of navigational channels (Cesar, 2000b; NOAA, 2001), ship groundings (Gulko et al., 2000b), and the extraction of oil and gas from below coral reefs (Moberg and Folke, 1999).

Although tourism can be a sustainable use of reef ecosystems, nonsustainable tourism can cause adverse impacts (Cesar, 2000b). Particular problems include the collection of reef organisms for souvenirs (Miller and Crosby, 1998; Moberg and Folke, 1999), boat groundings, and damage by anchors (Miller and Crosby, 1998; Gulko et al., 2000b).

The highest priority threats to reefs in the MHI include coastal development and runoff, coastal pollution, tourism and recreation, fishing, trade in coral and live reef species, ship and boat groundings, and nonnative species. The highest priority threats for the NWHI include ship and boat groundings, marine debris, and alien species (NOAA, 2002). In 2006, nearly all of the NWHI, including coral reefs, came under full protection when the area was designated as the Papahānaumokuākea Marine National Monument.

### **1.1.5 U.S. coral reef policy**

In June 1998, President Clinton established the U.S. Coral Reef Task Force (CRTF) [Executive Order (EO) 13089], which is a partnership of federal, state, territorial, and commonwealth governments; the scientific community; the private sector; and other organizations. The goal of the CRTF is to strengthen and fill the gaps in existing efforts to conserve and sustainably manage coral reefs and related ecosystems (e.g., sea grass beds and mangrove forests) in U.S. waters and “to inventory, monitor, and identify the major causes and consequences of degradation of coral reef ecosystems” (EO 13089). Duties of the task force include mapping and monitoring of U.S. coral reefs, researching causes of reef degradation, developing measures to restore reefs and

3. Throughout this report, we use the term “overfishing” in the way it is used in fishery economics, and not in the strict legal sense of the term used in implementation of the Magnuson-Stevens Fishery Conservation and Management Act as amended.

prevent further degradation, and promoting conservation and sustainable use of coral reefs internationally (U.S. Coral Reef Task Force, 2009; U.S. EPA, 2009).

The CRTF developed the National Action Plan to Conserve Coral Reefs, which lays out 13 strategies to address challenges to coral reefs (U.S. Coral Reef Task Force, 2000). These initiatives focus on increasing the understanding of and reducing adverse impacts to coral reefs.

The National Oceanic and Atmospheric Administration (NOAA) is co-chair of the CRTF and has significant responsibilities for managing U.S. coral reef habitats and for undertaking scientific research studies to better understand the nation's coral reef resources.

NOAA also manages three National Marine Sanctuaries (NMS) with coral reef resources under the National Marine Sanctuaries Act (NMSA, 16 U.S.C. 1431, et seq.): the Florida Keys National Marine Sanctuary (FKNMS), the Flower Gardens Bank National Marine Sanctuary, and the Fagatele Bay National Marine Sanctuary. Additionally, NOAA has the authority to conduct research to understand the use of Marine Protected Areas (MPAs) under EO 13158.

## 1.2 Motivation for this Study

Given the economic and environmental importance of coral reef ecosystems to the United States and around the world, NOAA convened a research team to develop better methods to evaluate public preference for and economic values of coral reef ecosystems. The Research Team (hereinafter referred to as “the Team”) has expertise in economics, coral reef ecology, survey methodology, and statistical analysis.

The Team chose Hawaii as a case study. The study was conducted within a total valuation framework to account for a wide range of possible values, including passive use values (see Chapter 2 for more details). As shown in the literature review that follows (Section 1.2.2), this is the first major total value study of coral reef ecosystems conducted using a state-of-the-art survey of the population of a developed nation.

The Team also addressed several methodological issues, including:

- ▶ **Using internet surveys in nonmarket valuation studies.** The rapid growth of the internet over the past two decades has made internet administration of surveys increasingly feasible. However, the application of internet surveys in nonmarket valuation studies is still in its infancy, as shown in the literature review below. This issue was addressed by administering the survey to two independent internet panels.

- ▶ **Designing a stated-preference (SP) and stated-choice hybrid survey.** Internet administration allowed the Team to develop a new approach to SP surveys. In recent years, researchers who have chosen to go beyond traditional contingent valuation (CV) have gravitated toward the stated-choice approach. That is, survey respondents are asked to choose their most preferred alternative from a choice set composed of two or at most three alternatives, each of which is described in terms of its attributes. This mimics the types of choices consumers face in the marketplace; people compare alternative products and choose one. This is in contrast to the SP approach, which involves ranking. In ranking questions, respondents are presented with several alternatives and asked to rank them from most preferred to least preferred. In the marketplace, consumers are not required to determine a full ranking. On the other hand, ranking provides more information about preferences. Using an internet survey (see Appendix A), we were able to use a hybrid approach that combines CV with the stated choice format, yet obtain a full ranking of four alternatives (see Chapter 2).
- ▶ **Dealing with multiple SP questions.** Data from surveys involving more than one SP question create what has turned out to be a persistent econometric problem. When any given respondent answers more than one such question, successive choices are not an independent observation. Rather, successive choices are correlated. We offer here a rank-ordered probit model, which has some desirable properties to deal with this issue, instead of other econometric approaches that have been applied in the past (see Chapter 8).
- ▶ **Testing representativeness of internet panels.** Furthermore, as discussed in the literature review, questions remain regarding whether internet surveys can produce results that are representative of a general population like that of the United States. We attempt to help inform this issue by procuring and comparing survey results from two internet samples that were recruited in different ways (see Chapter 5).

### 1.2.1 Review of coral reef valuation literature

As part of the research process, the Team assessed whether the existing literature on coral reef valuation provides useful insights. For Hawaii, the most notable study is by Cesar et al. (2002). They estimate the total economic values<sup>4</sup> of the coral reefs of the MHI to be \$364 million per year.

4. “Total economic values include all the several kinds of economic values that have been identified by economists. Total economic value is the [willingness to pay] (WTP) for a change in the state of the world” (NRC, 1999, p. 90).

Although their goal may have been comparable to ours, the approach of Cesar et al. (2002) is very different from the present effort. Both studies begin with the concept of total value, but they involve very different empirical approaches. Our study conducted a survey of probability samples of U.S. residents, and the survey sought to capture the fullest possible array of values through SP questions. Cesar et al. (2002) attempted a “bottom-up” approach where they tried at the outset, on an a priori basis, to select “the most important goods and services for coral reef valuation” (Cesar et al., 2002, p. 11). They divided potential values into recreational value, amenity value, fisheries value, and biodiversity value and attempted to estimate these values separately and then total them. Cesar et al. (2002) did not account for values of U.S. residents outside Hawaii, and many assumptions were made to complete their study.

In Cesar et al. (2002), recreational value includes an allowance for consumer surplus based on (1) a small CV survey conducted with a convenience sample, (2) estimated recreational expenditures associated directly with diving and snorkeling (assuming value added was 25%), (3) estimated indirect expenditures on hotels and travel (assuming value added was 25%), and (4) a multiplier effect of 1.25.

Amenity value was based on property prices. Project resources were inadequate for a hedonic property value study, so amenity value is based on a simplified approach that involves expert opinions of real estate agents and information obtained from real estate listings, tax records, and other sources of data plus many assumptions.

Fishery value is based on the potential productivity of coral reef ecosystems from the literature multiplied by an assumed price of \$5 per kilogram, an allowance for value added, and an assumed multiplier effect.

The estimate of biodiversity value from Cesar et al. (2002) includes an explicit estimate of passive use values of \$7,390,000. This value is not based on an original survey, but on benefits transfer from the study by Leeworthy and Wiley (2000), who conducted a socioeconomic impact analysis of the proposed Tortugas 2000 Ecological Reserve. Five alternative plans for the reserve were under consideration by NOAA and the State of Florida. Although they judged that some sort of recognition of passive use values was desirable in the context of their impact assessment, they point out that, “To date there are no known studies that have estimated nonuse or passive use economic values for coral reefs or marine ecological reserves” (Leeworthy and Wiley, 2000, p. 57). Hence, they decided to gain a very rough idea of the potential magnitude of passive use values for the reserve by referring to 19 passive use value studies that did not actually involve coral reefs, 18 from Desvousges et al. (1992) and 1 from Carson et al. (1992). From this review, Leeworthy and Wiley (2000) judged that values from \$3 per household per year to \$10 per household per year were plausible for their case. To be very conservative, they used the low figure and assumed that it would apply to only 1% of U.S. households.

Cesar et al. (2002) assume that Hawaii's households have a passive use value for reef biological diversity of \$10 per household per year (the upper end of the range from Leeworthy and Wiley, 2000) and that 1% of mainland households hold values of \$3 per year (Leeworthy and Wiley's lower bound value). Whatever this approach's merits are, Cesar et al. (2002) provide few insights for our Coral Reef Valuation Study.

We were able to identify only one other published economic study of the Hawaiian reefs. Mak and Moncur (1998) present results from a political economic analysis of efforts to protect Hanauma Bay, a popular recreational destination that includes a large reef complex managed by the City of Honolulu. Unfortunately for our efforts to estimate total values, the only dollar values in Mak and Moncur (1998) are revenues from user fees.

Looking beyond Hawaii, it became clear that the international literature is dominated by recreational studies. Brander et al. (2007) find 166 coral reef recreation studies worldwide. A search of the Environmental Valuation Reference Inventory (EVRI)<sup>5</sup> added more recreation studies. Although some of the studies involved surveys that could have included some passive use values, nearly all the studies involved samples of locals and tourists and focused heavily on recreational direct use values rather than total values. Most of these studies are found only in the grey literature. Exceptions published in professional journals include White et al. (1997) on various benefits and costs of reef restoration at a tourist destination in Sri Lanka; Berg et al. (1998) on the environmental economics of reef destruction in Sri Lanka; Bowker and Leeworthy (1998), Park et al. (2002), and Bhat (2003) on recreational direct use values of reef visits in the Florida Keys; Arin and Kramer (2002) on the value to divers of preserving marine biodiversity associated with coral reefs in the Philippines; Carr and Mendelsohn (2003) on recreational direct use values of the Great Barrier Reef in Australia; Wielgus et al. (2003) on the value to divers of damage to the Eilat Coral Beach Nature Reserve in Israel; and Parsons and Thur (2007) on the value to scuba divers of changes in the quality of a coral reef ecosystem in Bonaire.

Studies by Seenprachawong (2001, 2002) devoted more attention to passive use values. Seenprachawong (2001) included passive use values in a study of domestic visitors to Thailand's Phi Phi Island reefs. Resulting value estimates per visitor are expanded to estimate the passive use values of the Thai working population. The value per hectare was used in a benefits transfer to estimate the value of Thailand's other marine national parks.

Seenprachawong (2002) is worthy of special note because it involved stated choice questions to obtain total values. The topic is improvements in coral reefs and associated mangrove forests of Phang Nga Bay, Thailand. The stated choice experiment was conducted using four choice sets.

5. EVRI is a database of environmental valuation studies for use in benefits transfer maintained by Environment Canada.

Each choice set included the status quo and two alternatives or “plans” involving reef ecosystem improvements. Quoting from the study’s report (pp. 16–17):

Each plan is defined using four ecosystem attributes: living coral cover (a proxy for recreational use), income from fishery (a proxy for consumptive use), flood occurrence (a proxy for indirect use), and area protected (a proxy for nonuse [passive use] value). The increase in income tax in 2002 is included as a [willingness to pay] WTP measure attribute, which will provide the link between the parameter weights of the ecosystem attributes (recreational use, consumptive use, indirect use, and existence value) and money.

Seenprachawong (2002) differed from our study in several respects. Most importantly, data were gathered by intercepting visitors to Phang Nga Bay and interviewing them personally.

Cesar (2000a) provides a collection of essays on the economics of coral reefs, with frequent references to economic values. Several economically important issues are addressed including the external effects of forestry, damaging fishing practices, coral mining, and bleaching. One of the essays, Rodwell and Roberts (2000), surveys the positive impacts of MPAs on fisheries, arguing that the impacts are probably substantial and so far underappreciated. The potential importance of total values is emphasized throughout this volume. However, the only empirical research on reef values is reported by Spash (2000) who conducted a CV study of maintaining and improving coral reefs in Jamaica and Curaçao. Like so many other studies in this literature, the samples were drawn from locals and tourists and only estimated recreation direct use values.

This review shows that the research presented in this report is unique in several respects. Specifically, we:

- ▶ Set out to estimate total values, not merely direct use values
- ▶ Surveyed the national population of a major developed country, not smaller subpopulations of users
- ▶ Employed SP methods using an uncommonly large sample of respondents
- ▶ Developed econometric methods that have rarely been applied in nonmarket valuation and have never been applied, to our knowledge, in a coral reef valuation study
- ▶ Gathered data using state-of-the-art internet administration, which led us to consider the literature on survey research, in addition to the economics literature.

### 1.2.2 Review of internet survey literature

The rapid expansion of the internet through the 1990s provided opportunities to develop a new survey mode, internet administration. The popularity of internet surveys for both marketing and social science research has grown rapidly. According to sources cited by Deutskens et al. (2006), by 2004 online surveys accounted for 35% of the U.S. survey research market. As use of internet surveys expanded, several potential advantages and disadvantages of internet administration were soon identified (Evans and Mathur, 2005).

Best et al. (2001, p. 131) summarize why many researchers have embraced internet surveys:

The internet offers unprecedented opportunities for data collection. It provides access to millions of potential research participants .... It permits complex instruments capable of experimentally manipulating stimuli, accommodates audio and video transmissions, and facilitates live interaction between participants .... And it can be employed quickly, conveniently, and inexpensively by eliminating the need for interviewers or synchronous interaction ....

Not surprisingly, researchers performing nonmarket valuation surveys are trying to capitalize on the opportunities provided by this relatively new medium. Examples of SP studies in the peer-reviewed literature that rely on internet-based data collection include studies on the value of a statistical life by Alberini et al. (2004); climate change by Berrens et al. (2003, 2004) and Li et al. (2005); dead zones in the Gulf of Mexico by Hudson et al. (2004); recreational fishing in Germany by Arlinghous and Mehner (2004); water pollution at a site in Japan by Tsuge and Washida (2003); preservation of agricultural landscape as bird habitat in Portugal by Marta-Pedroso et al. (2007); and landscape effects of new highway construction in Denmark by Ladenburg and Olsen (2008) and Olsen (2009). A recent study focuses on the value of morbidity reductions (Cameron and DeShazo, 2009). Additional SP studies, including Vossler and Kerkvliet (2003) and Rollins et al. (2008), have allowed respondents the option of responding via the internet if they wished. In addition to SP surveys, at least one travel cost survey used the internet, that is, Fleming and Bowden's (2009) study of recreation at Frazier Island in Australia.

Internet surveys also have some disadvantages that could affect the validity of this study's results. The most serious issues from the perspective of the present study have to do with whether parameter estimates (most notably WTP) based on state-of-the-art internet surveys are representative of the parameter values for the underlying population. In this review, we limit ourselves to surveys of the general public. In our case, the issue is whether values of Hawaiian coral reef ecosystems derived by internet-based surveys are sufficiently representative of the values of the U.S. population to be reliable.

Two closely related issues require consideration: the coverage error and potentially low overall response rates. Schonlau et al. (2002, p. 29) describe the first issue this way:

Coverage error is the most widely recognized shortcoming of internet surveys. Although the fraction of the population with internet access and the skills and hardware necessary to use the web is continually increasing, the general population coverage for internet-based surveys still lags considerably behind the coverage achievable using conventional survey modes.

The second issue is one of response rates and the extent to which sample results can be generalized to the population of interest. With relatively high response rates, say 80% or higher, a good *prima facie* argument can be made that for most variables, distortions due to nonresponse bias, if any, are not likely very large. But when response rates are low, those who did respond may not be representative of the sample, or population, as a whole. If generalizing survey results to the population is the goal, the question of potential nonresponse bias needs to be evaluated.

So far, most internet surveys of general populations have had low overall response rates. Even for the best internet surveys, potential response rate problems have arisen because of attrition of respondents through various stages of recruiting. To understand how this happens, consider a simplified example.<sup>6</sup> Suppose that the goal is to conduct an internet survey and generalize the results to all U.S. households. Suppose that the first contact with potential respondents is through a random digit dialing (RDD) survey. Suppose 10,000 numbers are drawn and 6,000 calls are completed. We will assume that the original sample of telephone numbers is representative of U.S. households. Suppose further that 3,000 individuals agree to participate and that 70% or 2,100 actually complete the survey. That would yield an overall response rate of 21% (2,100 out of the original 10,000). Since the 21% who decided to complete the survey may not be representative of the full sample, results may contain nonresponse bias.<sup>7</sup>

It is important to recognize that a low response rate does *not* necessarily mean that nonresponse bias is a significant problem in a dataset. It only signals that one should investigate the potential for nonresponse bias. Nevertheless, there is evidence that, even for state-of-the-art internet sampling, issues of coverage and low response rates persist.

Lee (2006) provided a particularly thorough empirical investigation of the issues. She examined coverage and nonresponse error in an internet survey of a sample drawn from a pool of

6. For a full discussion of response rate calculation for internet surveys, see DiSogra and Callegaro (2008).

7. Such an outcome is consistent with even the better general population internet surveys found in the literature. For example, Berrens et al. (2004) used a sample from the general population of the United States that was drawn from a larger, RDD pre-recruited pool of respondents; the “multistage response rate” was 24.1%. Care should be exercised in interpreting reported response rates. For example, Olsen (2009) reported a response rate of 63.6%. On its face, such a figure would dampen concerns about nonresponse bias. However, this is a response rate for only the last stage of the research process, where the numerator is the total number of returned surveys and the denominator is the size of the sample drawn from a pre-recruited pool. Attrition at stages before selection of the final sample is not accounted for in the 63.6% figure.

respondents recruited in advance by Knowledge Networks (KN). KN recruited its pool of potential respondents using state-of-the-art RDD procedures. Potential coverage problems were addressed by making WebTV available to respondents. Respondents could then use their television sets to complete their internet surveys. New recruits were surveyed to establish sociodemographic and other characteristics. At the time, KN had about 100,000 U.S. residents in its pool of potential survey respondents. KN drew samples from this pool to match the U.S. population in terms of sociodemographic and other characteristics. After the survey was completed, KN provided weights to make statistical analyses more representative.

Lee (2006) reports an overall response rate of 5.5%. She focused on four variables: computer ownership, prior web experience, employment, and household size. Each variable was evaluated for the overall sample and subsamples broken down by age, education, ethnicity, region of the country, and gender. Lee (2006) based her conclusions on comparisons with U.S. Census Bureau (Census) statistics. Errors relating to nonresponse on part of the final sample disappeared when controls for demographic differences between the respondents and the full sample were introduced. “However, coverage properties of the full survey sample show some problems, and traditional post-survey adjustments were limited in alleviating the unequal coverage of the survey sample. The coverage problem was more evident for the subpopulation-level estimates” (Lee, 2006, p. 460).

Of course, there are no perfect surveys. From our perspective, what matters is whether the sorts of issues identified by Lee (2006) are sufficient to seriously bias SP estimates of WTP. Hence, nonmarket studies that have addressed the issue are of particular interest. Berrens et al. (2003) compared telephone and internet survey results.<sup>8</sup> Two internet sampling approaches used by two leading internet survey firms were considered. Harris Interactive recruits pools of potential respondents using invitations extended through advertisements, telephone surveys conducted for other purposes, product registrations, and other means. At the time of the Berrens et al. (2003) study, Harris Interactive had a pool of about 7 million American adults who had volunteered. Volunteers in the pool had to have an internet connection; at the time, only about half the U.S. population fulfilled this criterion. Berrens et al. (2003) estimated their overall response rate from their sample at roughly 5%. Hence, both coverage and potential nonresponse bias are possibilities. Harris International addressed these potential issues by providing “propensity weights” for use in statistical analyses. Berrens et al. (2003) pointed out that Harris International has had excellent success in predicting election results using this approach.

8. Berrens et al. (2004) use data from the same surveys, but focus more on the role of information in SP studies. They do not explicitly consider whether coverage and non-representativeness are problems in that paper.

The other internet sample is from KN. The overall response rate for Berrens et al. (2003) is 24.1%. The standard for comparison is a survey administered entirely by telephone to an RDD sample with an overall response rate of 45.6%.

Berrens et al. (2003) did not find reasons to be concerned about the representativeness of either the Harris International or KN samples. They conclude (p. 2), “with appropriate weighting, samples from these [internet] panels are sufficiently representative of the U.S. population to be reasonable alternatives in many applications to samples gathered through RDD telephone surveys.”

Marta-Pedroso et al. (2007) compared performance of in-person and internet surveys in Portugal. Their in-person interviews were conducted on beaches at a time when many Portuguese vacation there. They achieved a response rate of 84%. For their internet sample, they sent out email invitations to a nonrandom sample of subscribers to Portugal’s leading internet service provider. The overall response rate was 5.1%. The internet sample tended to be younger and better educated than the in-person sample and to have higher incomes. Nevertheless, WTP to protect an agricultural landscape to benefit birds was lower for the internet respondents. Matra-Pedroso et al. (2007) take this to be a virtue, since it is more conservative. They conclude that the internet approach is promising for CV studies and deserves further research.

Fleming and Bowden (2009) compared the performance of travel cost surveys administered by mail and the internet. Mail surveys with mail-back envelopes were distributed to visitors to the recreation site. The mail response rate was 31.6%. Internet respondents were recruited through invitations posted on several websites. Their internet response rate was estimated to be 33%, which is based on the number of completed surveys divided by the number of times the invitations were opened.<sup>9</sup> Fleming and Bowden (2009) conclude (p. 88), “We find that the web-based survey yields a sample not significantly different than the mail survey in terms of gender, age, income, education and country of residence of respondents, and at a substantially lower cost.” Estimates of consumer surplus per visit based on the two datasets were quite close.

Olsen (2009) used stated-choice questions to evaluate landscape effects of highway location. Mail and internet administration are compared. In Denmark, where this study was done, internet coverage is not so large an issue as in other countries. Fully 90% of the Danish population has access to the internet, either at home or at work, and 74% report using the internet at least once a week. Olsen’s internet sample came from a pre-recruited pool assembled by a Danish survey firm. Olsen reported an internet response rate of 63.6%. This is the number of completed surveys

9. Fleming and Bowden (2009) argue that this underestimates the response rate since some people may have opened the website more than once before completing the survey. On the other hand, they also admit that it is impossible to estimate how many people viewed the invitation and had visited the recreation site, but decided not to open the invitation.

divided by the sample size, so the response rate would have been lower had attrition through the entire recruitment process been accounted for.

In the Olsen study, the mailed survey was targeted to a sample drawn at random from names and addresses in the Danish Civil Registration System. The mail response rate was 60.3%. The results from the two samples were compared based on response rates, protest responses, demographics, WTP, estimation precision, and certainty of choice. Some differences were observed, but they did not translate into a difference in estimated WTP. Olsen (2009, p. 607) concluded that while some mode effects<sup>10</sup> may persist, “Considering the advantages as well as the continuing increase in internet access in the general population, internet sampling appears to be a valid replacement of the traditional mail sampling approach in SP surveys considering valuation of nonmarket goods.”

In a groundbreaking study, Cameron and DeShazo (2009) addressed this issue for a stated choice study that focused on the value of health outcomes. Their survey was administered to a U.S. sample by KN. As noted above, KN addresses the coverage issue by offering free internet access and WebTV to potential respondents who do not have internet access. As was also noted, KN samples are drawn to match the U.S. population in terms of demographics from the Census and other characteristics. Also, weights are provided to facilitate statistical analyses, which hopefully lead to final results that are representative of the U.S. population. In an appendix to their paper, Cameron and DeShazo (2009) ask whether these procedures succeeded in overcoming the coverage and response rate problems.

Studying nonrespondents is difficult because, by definition, there are no survey responses from them. To overcome this hurdle, Cameron and DeShazo (2009) assembled a dataset from the Census tracts where nonrespondents lived. They compared Census tract characteristics of the more than half a million people in the original RDD sample with characteristics of the 1,801 people who completed their survey and met certain criteria for inclusion in the final dataset. Though it was not a perfect match, the authors concluded that it was strong enough to generalize their results to the population.

We find results from the nonmarket valuation literature encouraging. Possible issues stemming from coverage and nonresponse errors do not appear to be as serious as some have feared, at least for high-quality internet surveys. Still, this literature is in its infancy and more research is obviously warranted. The present study is in this tradition. We compare results from two internet panels (described in Chapter 6 and Appendix H), recruited in different ways, to see whether coverage and response rate effects were present.

10. Olsen (2009) is not referring to coverage or nonresponse effects here, but to other ways in which mail and internet responses may differ.

### 1.3 Report Structure

This report presents the Team’s efforts to use an SP survey to estimate the public’s value for protecting or repairing Hawaiian coral reefs and to address some methodological issues discussed in Section 1.2. Chapter 2 defines the environmental “goods” to be valued in this study and explains the theoretical and methodological foundations of the Team’s approach. Chapter 3 outlines the steps involved in the survey development process, which included focus groups, one-on-one interviews, design of the survey information, external review, Office of Management and Budget (OMB) clearance, pretesting, and finalizing the survey instrument. Chapter 4 presents the section-by-section wording of the coral reef valuation survey instrument, providing insights as to why the Team chose to present illustrations, questions, and other materials to respondents. Chapter 5 describes the survey implementation process, including sample design and selection and the data collection process. Chapter 6 compares the two internet panel samples to the 2008 General Social Survey (GSS) and the 2006–2008 American Community Survey (ACS) in order to identify any systematic differences in the two datasets. Chapter 7 presents the responses to the choice questions and describes the responses to other key questions in the survey, including scenario acceptance and validity questions. Chapter 8 identifies the WTP estimate for the value of protecting or repairing coral reefs in the MHI.

## References

- Alberini, A., M. Cropper, A. Krupnick, and N.B. Simon. 2004. Does the value of a statistical life vary with age and health status? Evidence from the U.S. and Canada. *Journal of Environmental Economics and Management* 48(1):769–792.
- Arin, T. and R.A. Kramer. 2002. Divers’ willingness to pay to visit marine sanctuaries: An exploratory study. *Ocean & Coastal Management* 45:171–183.
- Arlinghous, R. and T. Mehner. 2004. Testing the reliability and construct validity of a simple and inexpensive procedure to measure the use value of recreational fishing. *Fisheries Management and Ecology* 11:61–64.
- Berg, H., M.C. Ohman, S. Troeng, and O. Linden. 1998. Environmental economics of coral reef destruction in Sri Lanka. *Ambio* 27(8):627–634.
- Berrens, R.P., A.K. Bohara, H. Jenkins-Smith, C. Silva, and D.L. Weimer. 2003. The advent of internet surveys for political research: A comparison of telephone and internet samples. *Political Analysis* 11(1):1–22.

- Berrens, R.P., A.K. Bohara, H. Jenkins-Smith, C.L. Silva, and D.L. Weimer. 2004. Information and effort in contingent valuation surveys: Application to global climate change using national internet samples. *Journal of Environmental Economics and Management* 47:331–363.
- Best, S.J., B. Krueger, C. Hubbard, and A. Smith. 2001. An assessment of the generalizability of internet surveys. *Social Science Computer Review* 19(2):131–145.
- Bhat, M.G. 2003. Application of non-market valuation to the Florida Keys marine reserve management. *Journal of Environmental Management* 67:315–325.
- Bowker, J.M. and V.R. Leeworthy. 1998. Accounting for ethnicity in recreation demand: A flexible count data approach. *Journal of Leisure Research* 30(1):64–78.
- Brander, L.M., P. van Beukering, and H.S.J. Cesar. 2007. The recreational value of coral reefs: A meta-analysis. *Ecological Economics* 63:209–218.
- Cameron, T.A. and J.R. DeShazo. 2009. Demand for Health Risk Reductions. Unpublished paper, University of Oregon, Department of Economics.
- Carr, L. and R. Mendelsohn. 2003. Valuing coral reefs: A travel cost analysis of the Great Barrier Reef. *Ambio* 32(5):353–357.
- Carson, R.T., R.C. Mitchell, W.M. Hanemann, R.J. Kopp, S. Presser, and P.A. Ruud. 1992. A Contingent Valuation Study of Lost Passive Use Values Resulting from the Exxon Valdez Oil Spill. Prepared for the Attorney General of the State of Alaska.
- Cesar, H.S.J. (ed.). 2000a. *Collected Essays on the Economics of Coral Reefs*. CORDIO, Department for Biology and Environmental Sciences, Kalmar University, Sweden.
- Cesar, H.S.J. (ed.). 2000b. Coral reefs: Their functions, threats and economic value. In *Collected Essays on the Economics of Coral Reefs*. CORDIO, Department for Biology and Environmental Sciences, Kalmar University, Sweden. pp. 14–39.
- Cesar, H., P. van Beukering, S. Pintz, and J. Dierking. 2002. Economic Valuation of the Coral Reefs of Hawaii. Final Report. Cesar Environmental Economics Consulting, The Netherlands.
- DeMartini, E.E. and A.M. Friedlander. 2004. Spatial patterns of endemism in shallow-water reef fish populations of the northwestern Hawaiian Islands. *Marine Ecology Progress Series* 271:281–296.

- Desvousges, W.H., F.R. Johnson, R.W. Dunford, K.J. Boyle, S.P. Hudson, and N.K. Wilson. 1992. *Measuring Nonuse Damages Using Contingent Valuation: An Experimental Evaluation of Accuracy*. Research Triangle Institute Monograph 92-1. Exxon Corporation.
- Deutskens, E., A. de Jong, K. de Ruyter, and M. Wetzels. 2006. Comparing the generalizability of online and mail surveys in cross-national service quality research. *Marketing Letters* 17:119–136.
- DiSogra, C. and M. Callegaro. 2008. Computing response metrics for online panels. *Public Opinion Quarterly* 72(5):1008–1032.
- Evans, J.R. and A. Mathur. 2005. The value of online surveys. *Internet Research* 15(2):195–219.
- Fleming, C.M. and M. Bowden. 2009. Web-based surveys as an alternative to traditional mail methods. *Journal of Environmental Management* 90:284–292.
- Gulko, D., J. Maragos, A. Friedlander, C. Hunter, and R. Brainard. 2000a. Status of coral reefs in the Hawaiian archipelago. In *Status of Coral Reefs of the World: 2000*, C. Wilkinson (ed.). Australian Institute of Marine Science, Cape Ferguson, Queensland. pp. 219–238.
- Gulko, D.A., J.E. Maragos, A.M. Friedlander, C.L. Hunter, and R.E. Brainard. 2000b. The Status of Coral Reefs in the Hawaiian Archipelago.
- Hudson, D., L.-H. Seah, D. Hite, and T. Haab. 2004. Telephone presurveys, self-selection, and non-response bias to mail and internet surveys in economic research. *Applied Economics Letters* 11:237–240.
- Jackson, J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Botsford, B.J. Bourque, R.H. Bradbury, R. Cooke, J. Erlandson, J.A. Estes, T.P. Hughes, S. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner, and R.R. Warner. 2001. Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293:629–638.
- Jennings, S. and M.J. Kaiser. 1998. The effects of fishing on marine ecosystems. *Advances in Marine Biology* 34:201–352.
- Ladenburg, J. and S.B. Olsen. 2008. Gender-specific starting point bias in choice experiments: Evidence from an empirical study. *Journal of Environmental Economics and Management* 56:275–285.
- Lee, S. 2006. An evaluation of nonresponse and coverage errors in a prerecruited probability web panel survey. *Social Science Computer Review* 24(4):460–475.

- Leeworthy, V.R. and P.C. Wiley. 2000. *Proposed Tortugas 2000 Ecological Reserve: Final Socioeconomic Impact Analysis of Alternatives*. National Ocean Service, National Oceanic and Atmospheric Administration, Silver Spring, MD. October.
- Li, H., R.P. Berrens, A.K. Bohara, H. Jenkins-Smith, C.L. Silva, and D.L. Weimer. 2005. Testing for budget constraint effects in a National Advisory Referendum Survey on the Kyoto Protocol. *Journal of Agricultural and Resource Economics* 30(2):350–366.
- Mak, J. and J.E.T. Moncur. 1998. Political economy of protecting unique recreational resources: Hanauma Bay, Hawaii. *Ambio* 27(3):217–223.
- Maragos, J. and D. Gulko (eds.). 2002. *Coral Reef Ecosystems of the Northwestern Hawaiian Islands: Interim Results Emphasizing the 2000 Surveys*. U.S. Fish and Wildlife Service and the Hawai'i Department of Land and Natural Resources, Honolulu.
- Marta-Pedroso, C., H. Freitas, and T. Domingos. 2007. Testing for the survey mode effect on contingent valuation data quality: A case study of web based *versus* in-person interviews. *Ecological Economics* 62:388–398.
- Miller, S.L. and M.P. Crosby. 1998. *The Extent & Condition of U.S. Coral Reefs*. National Oceanic and Atmospheric Administration's State of the Coast Report, Silver Spring, MD.
- Moberg, F. and C. Folke. 1999. Ecological goods and services of coral reef ecosystems. *Ecological Economics* 29:215–233.
- NOAA. 2001. What are coral reefs? And why are they in peril? *NOAA Magazine* (December 3). Available: <http://www.magazine.noaa.gov/dec0301.html>. Accessed March 11, 2010.
- NOAA. 2002. Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve Draft Reserve Operations Plan. National Ocean Service, National Oceanic and Atmospheric Administration. February.
- NOAA. 2008. National Ocean Service Education: Zooxanthellae...What's That? Available: [http://oceanservice.noaa.gov/education/kits/corals/coral02\\_zooxanthellae.html](http://oceanservice.noaa.gov/education/kits/corals/coral02_zooxanthellae.html). Accessed March 29, 2010.
- NOAA. 2009. Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. National Oceanic and Atmospheric Administration. Available: <http://papahanaumokuakea.gov/welcome.html>. Accessed March 11, 2010.
- NRC. 1999. *Perspectives on Biodiversity: Valuing Its Role in an Everchanging World*. National Research Council. National Academy Press, Washington, DC.

- Olsen, S.B. 2009. Choosing between internet and mail survey modes for choice experiment surveys considering non-market goods. *Environmental and Resource Economics* 44:591–610.
- Park, T., J.M. Bowker, and V.R. Leeworthy. 2002. Valuing snorkeling visits to the Florida Keys with stated and revealed preference models. *Journal of Environmental Management* 65:301–312.
- Parsons, G.R. and S.M. Thur. 2007. Valuing changes in quality of coral reef ecosystems: A stated preference study of SCUBA diving in the Bonaire National Marine Park. *Environmental and Resource Economics* 40:593–608.
- Reaka-Kudla, M.L. 1997. The global biodiversity of coral reefs: A comparison with rain forests. In *Biodiversity II: Understanding and Protecting Our Biological Resources*, M.L. Reaka-Kudla, D.E. Wilson, and E.O. Wilson (eds.). Joseph Henry Press, Washington, DC. pp. 83–108.
- Rodwell, L.D. and C.M. Roberts. 2000. Economic implications of fully-protected marine reserves for coral reef fisheries. In *Collected Essays on the Economics of Coral Reefs*, H.S.J. Cesar (ed.). CORDIO, Department for Biology and Environmental Sciences, Kalmar University, Sweden. pp. 107–124.
- Rohmann, S.O., J.J. Hayes, R.C. Newhall, M.E. Monaco, and R.W. Grigg. 2005. The area of potential shallow-water tropical and subtropical coral ecosystems in the United States. *Coral Reefs* 24:370–383.
- Rollins, K., D. Dumitras, and A. Castledine. 2008. An analysis of congestion effects across and within multiple recreation activities. *Canadian Journal of Agricultural Economics* 56:95–116.
- Schonlau, M., R.D. Fricker Jr., and M.N. Elliott. 2002. *Conducting Research Surveys Via E-Mail and the Web*. RAND, Pittsburgh, PA.
- Seenprachawong, U. 2001. An Economic Analysis of Coral Reefs in the Andaman Sea of Thailand. EEPSEA, Singapore. June.
- Seenprachawong, U. 2002. An Economic Valuation of Coastal Ecosystems in Phang Nga Bay, Thailand. EEPSEA, Singapore. October.
- Spalding, M.D., C. Ravilious, and E.P. Green. 2001. *World Atlas of Coral Reefs*. University of California Press, Berkeley.
- Spash, C.L. 2000. Assessing the benefits of improving coral reef biodiversity: The contingent valuation method. In *Collected Essays on the Economics of Coral Reefs*, H.S.J. Cesar (ed.). CORDIO, Department for Biology and Environmental Sciences, Kalmar University, Sweden. pp. 40–54.

Tsuge, T. and T. Washida. 2003. Economic valuation of the Seto Inland Sea by using an internet CV survey. *Marine Pollution Bulletin* 47:230–236.

U.S. Coral Reef Task Force. 2000. The National Action Plan to Conserve Coral Reefs. March 2. Washington, DC.

U.S. Coral Reef Task Force. 2009. U.S. Coral Reef Task Force. Available: <http://coralreef.gov/>. Accessed March 11, 2010.

U.S. EPA. 2009. Habitat Protection: U.S. Coral Reef Task Force. Available: <http://www.epa.gov/owow/oceans/coral/taskforce.html>. Accessed March 11, 2010.

Vossler, C.A. and J. Kerkvliet. 2003. A criterion validity test of the contingent valuation method: comparing hypothetical and actual voting behavior for a public referendum. *Journal of Environmental Economics and Management* 45:631–649.

White, A.T., V. Barker, and G. Tantrigama. 1997. Using integrated coastal management and economics to conserve coastal tourism resources in Sri Lanka. *Ambio* 26(6):335–344.

Wielgus, J., N.E. Chadwick-Furman, N. Zeitouni, and M. Shechter. 2003. Effects of coral reef attributive damage on recreational welfare. *Marine Resource Economics* 18:225–237.

---

## 2. Economic Valuation

In this chapter we define the environmental “goods” to be valued (Section 2.2), discuss the total valuation framework (Section 2.3), lay out the methodological foundations of the Team’s approach (Section 2.4), and outline the approach for total value estimation (Section 2.5).

### 2.1 Introduction

As noted in Chapter 1, some threats to coral reef ecosystems occur over broad areas while others are more localized. This study estimates values of expanding MPAs around the MHI (broad) and repairing coral reefs damaged by ship strikes (localized).

Because many environmental services provided by coral reefs are not valued in markets, measuring the total value of MPAs and ship strike repairs requires a nonmarket valuation approach. In this study, we used an SP approach. SP methods elicit individuals’ WTP by directly presenting tradeoffs between obtaining the good or service in question and paying some additional costs and, in turn, foregoing the proposed change and not incurring any additional costs. Among SP methods, traditional CV methods (Boyle, 2003) and so-called attribute-based methods (ABMs; Holmes and Adamowicz, 2003) are alternative approaches. Most often, CV applications focus on a single program to improve the environment. ABMs allow for the valuation of multiple programs within the same survey instrument. Each alternative program (including baseline conditions) is described in terms of a series of attributes that combine to represent a state of the environment. Different alternatives for improving the environment are defined by changing the attribute levels.

Several variants of ABMs have appeared in the literature, with two being prominent. One is what we will call the “stated-choice approach.” As described in Section 2.4, stated-choice questions present survey respondents with two or perhaps three alternatives in a table format that makes the attributes easy to compare. Respondents are asked to choose their most preferred alternative. The other SP approach is ranking or rating<sup>1</sup> (also considered in Section 2.4). In this approach, attributes are described for several alternatives, and respondents are asked to either rank the alternatives from most preferred to least preferred or to rate them on a qualitative scale.

In this study, we adopted a *hybrid approach*, which is explained in Section 2.5. Our approach has much in common with CV, yet uses an attribute-based format that allowed us to estimate values for expansion of MPAs, or the implementation of a ship damage repair program, or *both*

---

1. For simplicity of exposition, we treat ranking and rating together.

programs within a single survey. And, through internet administration, we were able to gain a full ranking of the three alternatives and baseline.

## 2.2 Environmental Goods Defined

Overfishing is the most widespread threat to the coral reef ecosystems of the MHI. In his popular book on coral reef ecology, Gulko (1998, p. 189) put it this way:

When I was a kid, there were so many more reef fish than there are today... Although there are many causes to the decline of nearshore fisheries in Hawai'i, a prominent one is simply overfishing. Our population has steadily grown and more and more people want to fish. This, along with an increased ability to catch fish and a decrease in habitat space for recruitment, has led to a dramatic decrease in fish populations. When was the last time you saw a really large school of anything?

Fishery statistics show that commercial catches in recent years have been around 10% of historic highs (Dye and Graham, 2004). Even allowing for unsustainable high catches as exploitation of stocks expands rapidly, there is clear evidence that fishing levels far exceed the amounts that would produce maximum sustainable yields. The result is that few large fish are present on the reefs, especially primary consumers that keep undesirable algae levels under control and allow corals to thrive.

In recent years there has been increasing interest in no-fishing zones (a type of MPA) as a strategy to combat overfishing (Bohnsack and Ault, 1996; Davis, 1998; Sanchirico, 2000, 2004, 2005; Roberts et al., 2001; Gell and Roberts, 2002; Meester et al., 2004). The idea is that no-fishing zones provide a refuge for young fish to mature and become more fecund. For coral reefs, the hope is that this will lead to more coral growth and associated coralline algae, enhance nonconsumptive recreation like snorkeling and scuba diving, and increase quantities of catchable and viewable fish outside the MPA. This strategy has succeeded in restoring coral reef ecosystems and catches in several locations around the world.

For this case study, we valued an increase in MPAs around the MHI from the current level of 1% to 25%. The increase to 25% protection was arrived at through consultation with NOAA scientists and available literature (Sladek Nowlis and Roberts, 1999; Gell and Roberts, 2002; Sladek Nowlis and Bollermann, 2002). Expanding the MPA to 25% would provide the minimum amount of protection needed (a threshold) to restore reef ecosystems and catches of reef fish outside of the MPA. With 25% of the MHI reef ecosystems protected from fishing, catches would increase to roughly 50% of historical levels, although rebuilding the stocks could take 10 years to be fully realized. In the judgment of the scientists, the ecosystem, both inside and

outside the MPAs, would be enhanced by the presence of more birds, seals, corals, and other sea life. Thus, expansion of no-fishing areas served as a good case study for considering the values to the public for protection and restoration of coral reef ecosystems more generally. We are not aware of any proposals to expand MPAs around the Hawaiian Islands by this magnitude.

The second environmental good evaluated in this study was repair of coral reefs damaged by ship strikes. Ship strike injuries and their repair are fairly well defined, easy to describe, and have specific policy relevance to NOAA. It also served as a good case study of the values the public would place on restoration after other localized injuries to coral reefs, such as oil spills and urban pollution.

Coast Guard records indicated that damage to MHI reefs varies significantly from year to year. NOAA scientists estimated that, on average, about 5 acres of reef per year are damaged. Studies in Florida and elsewhere show that reefs that have been seriously damaged can easily take 50 years to grow back but that active restoration can restore reefs in about 10 years. This involves planting coral raised elsewhere and restoring living coral that has been broken up. Under the scenario developed in the survey, about 5 acres of reef per year would be restored. We are unaware of any such proposal to repair damaged reefs in Hawaii.

### 2.3 Total Valuation Framework

Below we present the total valuation framework employed in our study using the specific changes in the two environmental goods: expanding MPAs and repairing ship strike injuries.

As a starting point, take the indirect utility function of a typical person:

$$U = n(P, M, MPA, S) \tag{2.1}$$

where:

- $P$  = a vector of market prices
- $M$  = money income
- $MPA$  = 1,25 = percent of coral reef ecosystems in MPAs around the MHI
- $S$  = 0 for “no repair of ship damage”; 1 for the “ship damage repair program.”

For simplicity, we will suppress the price vector, assuming that enlarging MPAs and/or establishing a ship damage repair program will not affect market prices. Baseline utility is given by:

$$U_0 = n(M, 1,0) \tag{2.2}$$

Enlarging the MPAs alone would yield utility of:

$$U_{M,25,0} = n(M, 25,0) \text{ }^3 U_0 \quad (2.3)$$

Equality would hold if this person would receive no benefit from expanding MPAs. WTP for the expansion of the MPAs to 25%, assuming no ship repair program, is  $WTP_F$  defined by:

$$n(M - WTP_F, 25,0) = n(M, 1,0) \quad (2.4)$$

Likewise,  $WTP_S$ , WTP for the ship repair program and given no expansion in the MPAs, is defined by:

$$n(M - WTP_S, 1,1) = n(M, 1,0) \quad (2.5)$$

And WTP for both MPA expansion and ship damage repair is symbolized by  $WTP_B$  and defined by:

$$n(M - WTP_B, 25,1) = n(M, 1,0) \quad (2.6)$$

Even such a simple model can hide significant complexities. Both direct use and passive use values could be embedded in the WTP definitions. Increasing the areas protected by MPAs is particularly interesting.<sup>2</sup> Many U.S. residents may support expanding the MPAs for reasons that have nothing to do with their personal use in the future. Indeed, focus groups conducted in preparation for our survey, as described in Chapter 3, indicated that many people who never plan to visit Hawaii, or otherwise benefit from the MPAs through direct use, still support their expansion. For example, many support expanding MPAs in order to pass along improved ecosystems to future generations. In such cases, the three WTP definitions would represent pure passive use values. For someone who uses Hawaiian reefs, the motives underlying the WTP values may be more complex. Such a person may still hold passive use values, but if MPAs enhance their visits to Hawaii for snorkeling, diving, fishing outside MPA boundaries, or other activities, then direct use values would be added in. The effect of the MPAs on trips taken and utility obtained is implicit in the individuals' optimization process leading to their maximization of their indirect utility function.<sup>3</sup>

---

2. Since the size of ship damages is so small relative to the acres of coral reefs that are available for direct use, we speculate that the total value of ship damage repairs is predominantly a passive use value. For most users, there are hundreds of thousands of undamaged acres available as substitutes.

3. The assumption that the price vector,  $P$ , is not affected by expanding the MPAs is important here. If prices are affected, then this would need to be explicitly accounted for by introducing the price change into the analysis.

No attempt will be made here to unravel direct use and passive use values, either theoretically or empirically. The theoretical challenges are formidable, and it is not clear that they have been fully resolved.<sup>4</sup>

Furthermore, and most important, what matters most is the total economic value, not the direct use or passive use value considered separately. Economics has a long tradition of avoiding the motives for value. One small exception in environmental economics, which goes back to Milgrom (1993), relates to passive use values motivated by altruism (see also Freeman, 2003). Supposedly, if such altruism is “nonpaternalistic,” then resulting passive use values should not be counted in measuring welfare. However, regardless of what the theoretical merits of this argument are, so far it has been entirely void of empirical content. A valid way of asking people in the real world to distinguish between their passive use values that are paternalistic and nonpaternalistic has not panned out.

In principle, as the term implies, total value is very comprehensive in its coverage of possible economic values, but there are practical limitation. Consider the possible benefits and costs to commercial fishers from expanded MPAs. In principle, commercial fishers have as much chance as anyone else of being included in a national sample for our survey and would incorporate expected gains and losses from fishery restoration in their values for  $WTP_F$ . In practice, however, commercial fishers might not have much confidence in this answer. If it were desirable to know the benefits and costs to commercial fishers from expansion of MPAs, for example, to better understand the income distributional implication of the proposal, then a separate study of commercial fishing impacts might be warranted. Such a study is beyond the scope of our work. It should be added that it would not be correct, from a theoretical point of view, to add these commercial fishing benefits and costs to the results of the work reported here.

## 2.4 Methodological Issues and Opportunities

The Team considered two methods for measuring total value: CV and stated choice. A CV method has the virtue of directness and simplicity. In a typical CV study, respondents are asked about their values for a single program. Here, for example, we might have asked about their values for expanding MPAs from 1% of MHI reefs to 25%. Our goal, however, was to value three alternatives to the status quo: expansion of MPAs alone, repairing ship strikes alone, and both programs together. Valuing all three options in a single survey using traditional CV methods would have been challenging. Three standalone CV questions would have been

---

4. For an attempt, see Freeman (2003). Freeman bases his analysis on weak complementarity; passive use value becomes the residual when the price of direct use becomes prohibitive. But, in most cases, the actual price of direct use will not be prohibitive for everyone, and the boundary between direct use and passive use values becomes murky.

required. Splitting the sample and conducting three separate CV surveys would have increased overall sampling costs. If implementing one of the programs alone and implementing both are really options, one could argue that respondents need to know this in order to make informed choices. Performing three separate surveys would have ruled out the ability to inform respondents about all three alternatives to the status quo. ABMs are capable of valuing more than one program in the same survey, and we turned in that direction to incorporate these issues.

Stated-choice questions, as the term is used here, involve presenting respondents in a survey with two or more alternatives. Each alternative is described in terms of its characteristics or attributes. In a recreational fishing study, for example, fishing sites might be described in terms of their catch rates, distance from home, and other characteristics. Where monetary values are sought, the cost or price of the alternatives is also included as one of the characteristics. A group of alternatives defined in this way is known as a choice set. Alternatives are distinguished by having different characteristics or attribute levels. Traditionally, in stated-choice studies, respondents have been asked to reveal which of the alternatives from the choice set they most prefer.

The stated-choice approach is well established in the literature on environmental economics (Kanninen, 2007). It evolved from conjoint analysis, a method used extensively in marketing and transportation research (Louviere et al., 2000). Conjoint studies have most often asked respondents to rank or rate alternatives (Holmes and Adamowicz, 2003). Choice questions used in environmental economics have typically been less demanding than the conjoint questions used in marketing and transportation. Rather than asking respondents to fully rank a number of alternatives or rate them depending on their relative preferredness, they require only that respondents choose the most preferred alternative (a partial ranking) from multiple alternative goods (i.e., a choice set). This procedure seeks to capitalize on the fact that choosing the most preferred alternative from some set of alternatives is a common experience in everyday life.

Morikawa et al. (1990) note that responses to choice questions often contain useful information on tradeoffs among characteristics. Quoting from Mathews et al. (1997), who studied recreational fishing, stated-choice “models provide valuable information for restoration decisions by identifying the characteristics that matter to anglers and the relative importance of different characteristics that might be included in a fishing restoration program.” Johnson et al. (1995, p. 22) note, “The process of evaluating a series of pair wise comparisons of attribute profiles encourages respondents to explore their preferences for various attribute combinations.” Furthermore, Adamowicz et al. (1998a) note that the repeated nature of choice questions makes it difficult to behave strategically. As mentioned previously, choice questions allow for the construction of alternatives with characteristic levels that currently do not exist. This feature is particularly useful in marketing studies whose purpose is to estimate preferences for proposed goods, where various characteristics can be manipulated in arriving at final product designs. For example, 30 years ago, Beggs et al. (1981) assessed the potential demand for electric cars.

Similarly, researchers estimating the value of environmental goods are often valuing a good or condition that does not currently exist, e.g., MPAs around coral reefs that are currently open to exploitation.

Examples of environmental economic applications are numerous. Magat et al. (1988) and Viscusi et al. (1991) estimate the value of reducing environmental health risks; Adamowicz et al. (1994, 1998b, 2004), Breffle et al. (2005), and Morey et al. (1999a) estimate recreational site choice models for moose hunting, fishing, and mountain biking, respectively; Breffle and Rowe (2002) estimate the value of broad ecosystem attributes (e.g., water quality, wetlands habitat); Adamowicz et al. (1998a) estimate the value of enhancing the population of a threatened species; Layton and Brown (1998) estimate the value of mitigating forest loss resulting from global climate change; and Morey et al. (1999b) estimate WTP for monument preservation in Washington, DC. In each of these studies, a price (e.g., tax or a measure of travel costs) is included as one of the characteristics of each alternative, so that preferences for the other characteristics can be measured in terms of dollars. Other examples include Swait et al. (1998), who compare prevention versus compensation programs for oil spills, and Mathews et al. (1997) and Ruby et al. (1998), who ask anglers to choose between two saltwater fishing sites as a function of site characteristics.

Alternatively, a number of environmental studies have followed a more conventional conjoint approach by using ranking or rating questions. Ranking studies present respondents with three or more alternatives and ask them to rank them from most preferred to least preferred. Rating studies ask respondents to rate the degree to which they prefer one alternative over another, often on an integer scale such as 1 to 10. For example, Opaluch et al. (1993) and Kline and Wichelns (1996) develop a utility index for the characteristics associated with potential noxious facility sites and farmland preservation, respectively. Johnson and Desvousges (1997) estimate WTP for various electricity generation scenarios using a rating scale in which respondents indicate their strength of preference for one of two alternatives within each choice set. Other environmental examples include Rae (1983), Lareau and Rae (1989), Krupnick and Cropper (1992), Gan and Luzar (1993), and Mackenzie (1993).

Adamowicz et al. (1998b) provide an overview of choice and ranking/rating experiments applied to environmental valuation. They argue that choice questions better predict actual choices than do rating questions because choice questions mimic the real choices individuals are continuously required to make, whereas individuals rank and rate much less often.

Although CV and stated-choice methods both provide unique avenues for economic valuation, neither method alone would help us accomplish our goals of using one survey instrument to evaluate the three alternatives to the status quo and to obtain a full ranking of the programs. As a result, the Team developed a *hybrid* approach to measure total value. This approach, discussed in more detail in the next section, allowed the Team to address the methodological issues discussed

above and provided the opportunity to explore a new approach to estimate total values for environmental goods.

## **2.5 A Hybrid Stated-Preference Approach for Total Value Estimation**

The hybrid approach we implemented maintained some of the simplicity associated with CV. A full attribute-based survey could have been used to evaluate more than one program to expand MPAs and more than one program to repair ship injuries. However, we did not need to make the valuation exercise that complex in order to achieve project objectives. Valuing only one program for MPA expansion, one for ship strike repairs, and one for both made the effort somewhat comparable to a traditional CV study. On the other hand, we were able to adapt ABMs to summarize the information presented to respondents in a single table that allowed them to review relevant information and make easy comparisons across the alternatives. Such comparisons should help them to more thoroughly explore their preferences and values at the beginning of the valuation exercise and hence make better-informed choices.

Choice questions - and rating/ranking questions - normally describe the alternatives in terms of a relatively small number of characteristics. For example, Opaluch et al. (1993) characterize noxious facilities in terms of seven characteristics; Adamowicz et al. (1998b) use six characteristics to describe recreational hunting sites; Johnson and Desvousges (1997) use nine characteristics to describe electricity generation scenarios; Mathews et al. (1997) use seven characteristics to describe fishing sites; Morey et al. (1999a) use six characteristics to describe mountain bike sites; and Morey et al. (1999b) use two characteristics to characterize monument preservation programs.

In our study, each alternative was characterized by three attributes: whether there was a program to repair damages to coral reefs from ship strikes, whether no-fishing zones would remain at 1% of the coral reef ecosystems or be increased to 25%, and the cost to the respondent, to be assessed as an increase in federal taxes each year.

Using an internet survey, we were able to preserve the traditional stated-choice format, yet obtain a full ranking of four alternatives. Through focus groups and cognitive interviews, we found that most respondents had little or no difficulty with choice questions involving up to four alternatives. The first choice question, a version of which is presented in Figure 2.1, asked respondents to choose their most preferred alternative from a choice set containing four alternatives. This is similar to a traditional stated-choice question. But then, thanks to internet administration, we were able to show each respondent the remaining three alternatives - those that were not chosen as most preferred in the first choice question. They were then asked to

	<u>Current Program</u>	<u>Reef Repair Program</u>	<u>No-Fishing Zones Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
<b>Added federal taxes paid by your household each year<sup>5</sup></b>	\$0	\$55	\$45	\$100
<b>Which program is your most preferred?</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>

**Figure 2.1. First choice question from the survey instrument.**

choose their most preferred alternative from the remaining three. Once this choice was made, a new screen presented respondents with their remaining two alternatives and asked them to choose their most preferred (see Chapter 4 and Appendix A).

The first alternative in Figure 2.1, labeled the “Current Program,” was the status quo; nothing would be done about overfishing or ship damage, and the cost is zero. The Current Program was always the first alternative presented. In Figure 2.1, the second column involves only repair of ship damage - no-fishing zones remain at 1% and the cost is \$55. The third column would increase no-fishing zones to 25% but no ship damages would be repaired. The cost in this version is \$45. Finally, the fourth alternative involved both additional no-fishing zones and repair of ship damages, and the cost is \$100.

---

5. The figure provided here is an example of 1 of the 16 versions of the survey. The only attribute that varies between each version is the cost. The Current Program is always \$0 and the alternative programs are always greater than \$0.

Based on experience gained in several previous studies involving choice questions, giving respondents a direct opportunity to choose to do nothing new and pay nothing is helpful. In a properly designed study, some respondents will not prefer any of the alternatives involving changes from the status quo that will cost them the specified amounts of money. Forcing them at the outset to choose between two or more alternatives, none of which they like, can alienate respondents and lead to unreliable responses. Including the status quo as an explicit choice allows them to immediately express such feelings.

Within a given survey, the dollar costs of each alternative remained the same. This avoided the confusion that might have been introduced if costs were varied from one choice question to the next within the same survey. Varying the costs in order to estimate WTP was accomplished by having different versions of the survey with different cost structures. The different versions of the survey were randomly assigned to different respondents. The construction of the cost combinations in different versions of the survey is explained in Appendix B.

As noted, once follow-up choice questions were completed, a complete ranking of the four alternatives was obtained. We maintained the traditional choice question format, which asks only that the respondents choose their most preferred alternative from a choice set, yet through internet administration of follow-up choice questions, the full ranking was obtained.

## References

- Adamowicz, W., D. Dupont, and A. Krupnick. 2004. The value of good quality drinking water to Canadians and the role of risk perceptions: A preliminary analysis. *Journal of Toxicology and Environmental Health* 67:1825- 1844.
- Adamowicz, W., J. Louviere, and M. Williams. 1994. Combining revealed and stated preference methods for valuing environmental amenities. *Journal of Environmental Economics and Management* 26:271- 292.
- Adamowicz, W., P. Boxall, M. Williams, and J. Louviere. 1998a. Stated preference approaches for measuring passive use values: Choice experiments and contingent valuation. *American Journal of Agricultural Economics* 80:64- 75.
- Adamowicz, W.L., P. Boxall, J. Louviere, J. Swait, and M. Williams. 1998b. Stated preference methods for valuing environmental amenities. In *Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EC and Developing Countries*, I. Bateman and K. Willis (eds.). Oxford University Press, London, UK. pp. 460- 479.

- Beggs, S.D., N.S. Cardell, and J. Hausman. 1981. Assessing the potential demand for electric cars. *Journal of Economics* 4:87- 129.
- Bohnsack, J.A. and J.S. Ault. 1996. Management strategies to conserve marine biodiversity. *Oceanography* 9(1):73- 82.
- Boyle, K.J. 2003. Contingent valuation in practice. In *The Economics of Non-market Goods & Resources: A Primer on Nonmarket Valuation*, P.A. Champ, K.J. Boyle, and T.C. Brown (eds.). Kluwer Academic Publishers, Dordrecht. pp. 111- 168.
- Breffle, W.S. and R.D. Rowe. 2002. Comparing choice question formats for evaluating natural resource tradeoffs. *Land Economics* 78(2).
- Breffle, W.S., E.R. Morey, R.D. Rowe, and D.M. Waldman. 2005. Combining stated-choice questions with observed behavior to value NRDA compensable damages: A case study of recreational fishing in Green Bay and the Lower Fox River. In *The Handbook of Contingent Valuation*, D. Bjornstad, J. Kahn, and A. Alberini (eds.). Edward Elgar Publishing, Northampton, MA.
- Davis, G. 1998. Seeking sanctuaries. *National Parks and Conservation Association Magazine* pp. 41- 42.
- Dye, T.S. and T.R. Graham. 2004. Review of Archaeological and Historical Data Concerning Reef Fishing in Hawaii and American Samoa. T.S. Dye & Colleagues, Archaeologists, Inc., Honolulu, HI. February 17.
- Freeman III, A.M. 2003. *The Measurement of Environmental and Resource Values: Theory and Methods*. (2nd edition). Resources for the Future, Washington, DC.
- Gan, C. and E.J. Luzzar. 1993. A conjoint analysis of waterfowl hunting in Louisiana. *Journal of Agricultural and Applied Economics* 25(2):36- 45.
- Gell, F.R. and C.M. Roberts. 2002. *The Fishery Effects of Marine Reserves and Fishery Closures*. World Wildlife Fund, Washington, DC.
- Gulko, D. 1998. *Hawaiian Coral Reef Ecology*. Mutual Publishing, Honolulu, HI.
- Holmes, T.P. and W.L. Adamowicz. 2003. Attribute-based methods. In *A Primer on Nonmarket Valuation*, P.A. Champ, K.J. Boyle, and T.C. Brown (eds.). Kluwer Academic Publishers, Dordrecht. pp. 171- 220.

Johnson, F.R. and W.H. Desvousges. 1997. Estimating stated preferences with rated-pair data: Environmental, health, and employment effects of energy programs. *Journal of Environmental Economics and Management* 34:79- 99.

Johnson, F.R., W.H. Desvousges, E.E. Fries, and L.L. Wood. 1995. Conjoint Analysis of Individual and Aggregate Environmental Preferences. Triangle Economic Research Technical Working Paper No. T-9502, Carey, NC.

Kanninen, B. (ed.). 2007. *Valuing Environmental Amenities Using State Choice Studies*. 1st Edition. Springer Publications. Dordrecht, The Netherlands.

Kline, J. and D. Wichelns. 1996. Measuring public preferences for the environmental amenities provided by farmland. *European Review of Agricultural Economics* 23:421- 436.

Krupnick A. and M.L. Cropper. 1992. The effects of information on health risks valuations. *Journal of Risk and Uncertainty* 5:29- 48.

Lareau, T.J. and D.A. Rae. 1989. Valuing WTP for diesel odor reductions: An application of contingent ranking technique. *Southern Economics Journal* 55(3):728- 742.

Layton, D. and G. Brown. 1998. Heterogeneous Preferences Regarding Global Climate Change. Presented at NOAA Applications of Stated Preference Methods to Resource Compensation Workshop, Washington, DC.

Louviere, J.J., D.A. Hensher, and J. Swait. 2000. *Stated Choice Methods: Analysis and Application*. Cambridge University Press, Cambridge, UK.

Mackenzie, J. 1993. A comparison of contingent preference models. *American Journal of Agricultural Economics* 75:593–603.

Magat, W.A., W.K. Viscusi, and J. Huber. 1988. Paired comparison and contingent valuation approaches to morbidity risk valuation. *Journal of Environmental Economics and Management* 15:395–411.

Mathews, K.E., W.H. Desvousges, F.R. Johnson, and M.C. Ruby. 1997. Using Economic Models to Inform Restoration Decisions: The Lavaca Bay, Texas Experience. TER technical report prepared for presentation at the Conference on Restoration of Lost Human Uses of the Environment, Washington, DC. May 7–8.

Meester, G.A., A. Mehrotra, J.S. Ault, and E.K. Baker. 2004. Designing marine reserves for fisheries management. *Management Science* 50(8):1031- 1043.

Milgrom, P. 1993. Is sympathy an economic value?: Philosophy, economics, and the contingent valuation method. In *Contingent Valuation: A Critical Assessment*, J.A. Hausman (ed.). North Holland, New York. pp. 417- 435.

Morey, E.R., T. Buchanan, and D.M. Waldman. 1999a. Happy (hypothetical) Trails to You: The Impact of Trail Characteristics and Access Fees on a Mountain Biker's Trail Selection and Consumer's Surplus. Working paper, University of Colorado, Boulder.

Morey, E.R., K.G. Rossmann, L. Chestnut, and S. Ragland. 1999b. Estimating E[WTP] for reducing acid deposition injuries to cultural resources: Using choice experiments in a group setting to estimate passive-use values. Chapter 10 in *Valuing Cultural Heritage: Applying Environmental Valuation Techniques to Historic Buildings, Monuments and Artifacts*, S. Narvud and R.C. Ready (eds.). Edward Elgar Publishing, Cheltenham, UK and Northampton, MA.

Morikawa, T., M. Ben-Akiva, and D. McFadden. 1990. Incorporating Psychometric Data in Econometric Travel Demand Models. Prepared for the Banff Invitational Symposium on Consumer Decision Making and Choice Behavior.

Opaluch, J.J., S.K. Swallow, T. Weaver, C.W. Wessells, and D. Wichelns. 1993. Evaluating impacts from noxious facilities: Including public preferences in current siting mechanisms. *Journal of Environmental Economics and Management* 24:41–59.

Rae, D.A. 1983. The value to visitors of improving visibility at Mesa Verde and Great Smokey National Parks. In *Managing Air Quality and Scenic Resources at National Parks and Wilderness Areas*, R.D. Rowe and L.G. Chestnut (eds.). Westview Press, Boulder, CO. pp. 217- 234.

Roberts, C.M., J.A. Bohnsack, F. Gell, J.P. Hawkins, and R. Goodridge. 2001. Effects of marine reserves on adjacent fisheries. *Science* 294, November 30. Available: <http://www.sciencemag.org>.

Ruby, M.C., F.R. Johnson, and K.E. Mathews. 1998. Just Say No: Assessing Opt-Out Options in a Discrete-Choice Stated-Preference Survey of Anglers. TER Technical Working Paper No. T-9801. Triangle Economic Research, Durham, NC.

Sanchirico, J. 2000. Marine protected areas: Can they revitalize our nation's fisheries? *Resources* 140:6- 9.

Sanchirico, J.D. 2004. Designing a cost-effective marine reserve network: A bioeconomic metapopulation analysis. *Marine Resource Economics* 19(1):November.

Sanchirico, J.D. 2005. Additivity properties in metapopulation models: Implications for the assessment of marine reserves. *Journal of Environmental Economics and Management* 49(1):January.

Sladek Nowlis, J. and B. Bollermann. 2002. Methods for increasing the likelihood of restoring and maintaining productive fisheries. *Bulletin of Marine Science* 70(2):715- 731.

Sladek Nowlis, J. and C.M. Roberts. 1999. Fisheries benefits and optimal design of marine reserves. *Fishery Bulletin* 97:604- 616.

Swait, J., W. Adamowicz, and J. Louviere. 1998. Attribute-Based Stated Choice Methods for Resource Compensation: An Application to Oil Spill Damage Assessment. Prepared for presentation at the Natural Resources Trustee Workshop on Applications of Stated Preference Methods to Resource Compensation, Washington, DC. June 1- 2.

Viscusi, W.K., W.A. Magat, and J. Huber. 1991. Pricing environmental health risks: Survey assessments of risk-risk and risk-dollar trade-offs for chronic bronchitis. *Journal of Environmental Economics and Management* 21:32- 51.

---

## 3. Development of the Survey Instrument

This chapter describes the steps taken to develop the Coral Reef Valuation Study survey instrument. Development included conducting focus groups, designing the survey information, obtaining external peer reviews, obtaining OMB clearances, performing one-on-one interviews, pretesting, and finalizing the survey. Each step is described below. Note that several of these steps were performed multiple times (e.g., one-on-one interviews).

### 3.1 Focus Groups

Focus groups were used to develop basic survey concepts and refine the Team's understanding of the general population's experience and familiarity with and understanding of coral reefs and issues affecting coral reefs.

Three rounds of structured interviews in a focus group setting – two sessions per round with seven to nine participants per session – at different locations across the United States were conducted between January 2003 and January 2004. For the first round, Team members interviewed 13 people on January 16, 2003, in Honolulu, Hawaii. The second round was held on October 28, 2003, in Madison, Wisconsin, where 21 people were interviewed. Questions were asked to determine participants' perceptions and understandings of coral reefs and what additional information they would like to know about coral reefs. Then, risks to reefs were discussed and participants' views of the threats were elicited. Finally, various options for managing coral reefs were discussed and the value of the management options was explored.

On January 5, 2004, 19 individuals were interviewed in San Diego, California, for the third and final round of focus groups. The purpose of this round was to determine how the mainland public would respond to the following questions:

1. Should a higher priority be placed on restoring overfished ecosystems of the MHI or on protecting pristine ecosystems of the NWHI?<sup>1</sup>
2. How important is it to increase the percentage of coral reef ecosystems that will be maintained in no-fishing areas for the NWHI and for the MHI?

---

1. The Team did not address this research question in the final survey instrument, which was sent to the internet panels in 2009. We were precluded by OMB from including the NWHI as part of the choice questions. In the final survey instrument, the NWHI was used solely as a substitute.

3. How much money should be spent to enforce regulations relating to no-fishing areas?
4. How much money would participants be willing to pay to restore a reef damaged by a shipwreck?

Participants were informed about the composition and importance of coral reef ecosystems in general and of the coral reef ecosystems in Hawaii in particular. Additional questions were asked after this information was presented in order to determine if the information had been communicated successfully. Then, the moderator led a discussion to determine participants' opinions regarding various management options of coral reefs. Concepts of value for management options were then explored.

Based on the findings from these three rounds of focus groups, the Team began development of the full survey instrument.

### **3.2 June 2004 One-on-One Interviews**

We conducted three rounds of one-on-one interviews in Denver, Colorado, and Washington, DC, in June 2004, and interviewed 26 respondents. These interviews were conducted in preparation of the first pretest.<sup>2</sup> About half of the participants took a self-administered paper and pencil survey; the other half took a verbal protocol survey. Participants were asked to spend about 20 to 30 minutes on the self-administered survey. They were encouraged to put an "X" next to any part of the survey that they felt was unclear or that they did not understand. After the surveys were completed, one-on-one interviews were conducted to debrief each participant on any issues identified with the survey. By enabling respondents to complete the full survey before being interviewed, respondents were able provide immediate and focused feedback. Necessary revisions were made to the survey between rounds of one-on-one interviews.

For the verbal protocol survey, participants were encouraged to read the information out loud and to talk about the survey with the interviewer who wrote down the respondents' comments. After completing the survey, the interviewer asked a series of probing questions to see how the participant felt about the survey and whether certain points were clearly addressed. Again, necessary revisions were made to the survey between rounds of one-on-one interviews.

---

2. OMB approval for the first three rounds of one-on-one interviews was not required. We conducted these interviews in Denver on June 10, 2004 (interviewed 9 people), and in Washington, DC, on June 17, 2004 (interviewed 9 people), and June 22 and 23, 2004 (interviewed 8 people).

### **3.3 Initial Design of Survey Information**

Based on what we learned from our collaboration with NOAA, other scientists, and stakeholders, as well as from the focus groups and one-on-one interviews, the Team continued with development of the full survey instrument. The instrument was designed to provide sufficient information such that all respondents would be able to answer all questions without any complications and within about 30 minutes.

Because not every respondent was familiar with coral reefs in Hawaii, the Team was careful to include information that would be needed to make informed choices in the valuation exercises and to test this information in the focus groups. The Team also designed the questions needed to generate the data for valuation, including SP questions and questions relating to the variables to be included in the survey.

#### **3.3.1 Physical/natural science panel**

To ensure that the scientific information provided to survey respondents was up-to-date and accurate, the Team reviewed the literature on issues regarding coral reef ecosystem management and drafted issue papers,<sup>3</sup> developed questions to identify additional issues and opinions on the scientific issues relating to coral reefs, and convened a panel of scientists<sup>4</sup> to review all scientific information in the survey. This panel was asked to evaluate the issue papers, identify major issues facing Hawaii's coral reef ecosystems, identify the most important issue(s) affecting coral reefs in Hawaii, provide scientific facts to describe the goods and services from coral reef ecosystems that people would care about (ecosystem services), and, most important, describe how these ecosystem services would change under different policy and management protection scenarios.

This panel also reviewed the 2005 pretest instrument.

### **3.4 External Peer Reviews**

The survey instrument and related materials (e.g., underlying economic theory, experimental design) then underwent three formal rounds of independent peer review.

---

3. The issue papers presented an overview of coral reefs and their status in Hawaii, as well as information on fishing impacts, natural and artificial reefs, invasive species, pollution, and MPAs.

4. Panel members included Dr. Alan Friedlander (fisheries ecologist, Ocean Institute, Waimanalo, Hawaii), Dr. Richard Grigg (professor of oceanography, University of Hawaii), Dr. Charles Birkeland (biologist, University of Hawaii), and Dr. Paul Jokiel (biologist/coral ecologist, University of Hawaii).

The first NOAA peer review was conducted in November 2004 by Professor Richard Carson of the University of California at San Diego, an expert in the field of nonmarket valuation and survey methods, and Professor Stanley Presser of the University of Michigan, an expert in survey research and cognitive psychology. This review took place after the initial instrument had been developed but before the final instrument was completed to allow for incorporation of comments. Based on comments provided by Drs. Carson and Presser, the survey instrument was revised and tested.

The second NOAA review, also by Drs. Carson and Presser, was conducted prior to finalization of the pretest survey instrument in March 2005. Based on this review, the Team determined that the survey instrument was ready for field testing through a pretest.

Prior to pretesting, as part of the Information Collection Request, OMB performed a comprehensive review of the survey instrument, experimental design, and sampling and analysis plans. OMB made a preliminary request for information from NOAA on the incentive compatibility of a choice experiment. In response, the Team developed a memorandum on the issue for OMB review.

Dr. Jon Krosnick, a social psychologist and survey researcher at Stanford University, evaluated the general readability and clarity of the survey instrument.

### **3.5 2005 OMB Clearance**

In order to conduct the first pretest using KN's established internet panel, we submitted the required paperwork to OMB as required by the Paperwork Reduction Act. We included a discussion of the motivation for the overall survey format, survey question justification, and information placing this survey in the context of similar surveys that had already conducted. OMB then granted approval to conduct the first pretest.<sup>5</sup>

### **3.6 2005 Pretest**

The purpose of a pretest was to test the survey instrument in the field where the main survey would be conducted. The pretest also gave an indication of expected response rates and helped to identify any issues with the survey instrument that had not been revealed during the development and design stages.

KN administered the coral reef pretest from August 10 to August 31, 2006, and produced 216 completed surveys.

---

5. OMB control number 0648-0531, expired September 1, 2006, ICR Reference Number: 200507-0648-003.

### **3.7 2008 OMB Clearance**

After receiving and analyzing the first pretest results and after considering suggested revisions to the survey instrument from NOAA, an additional pretest was conducted before the full survey was administered to a national sample. A request was submitted to and approved by OMB to conduct a second pretest, several rounds of one-on-one interviews, and the main survey. Approval was conditional on providing OMB with a simplified briefing of pretest results and any proposed changes to the survey instrument or implementation plan.<sup>6</sup>

### **3.8 April 2009 One-on-One Interviews**

Two rounds of one-on-one interviews of 32 individuals were conducted in Denver, Colorado, and Washington, DC, in April 2009. These two rounds were performed in preparation for the second pretest.<sup>7</sup> Participants were invited to a facility where they took the survey via the cognitive interview process. These intense one-on-one interviews lasted from 30 to 90 minutes.

### **3.9 2009 Pretest**

KN administered the second pretest from April 23 to May 12, 2009. A total of 225 surveys were completed. Results were used to refine the final survey instrument and experimental design.

### **3.10 Finalization of the Survey Instrument**

Based on findings from the 2009 pretest, wording changes were made to the coral reef valuation survey instrument (see Appendix A).

In Chapter 5 we discuss the actual field administration of the survey to representative samples of the U.S. population.

---

6. OMB control number 0648-0585, expires March 31, 2012, ICR Reference Number: 200903-0648-007.

7. OMB approval was obtained to conduct these last two rounds of one-on-one interviews and to interview up to 32 respondents. These interviews were conducted in Denver on April 1 and April 2, 2009 (interviewed 16 people) and in Washington, DC on April 7 and April 8, 2009 (interviewed 16 people).

---

## 4. Structure and Content of the Final Survey Instrument

This chapter presents the section-by-section wording of the final Coral Reef Valuation Study survey instrument.

The survey instrument has seven sections. The first section (Screens 1 through 5) briefly introduces the topic of the survey, tests whether respondents have audio capabilities on their computers, and provides a warm-up question. The second section (Screens 6 and 7) familiarizes respondents with the survey format, content, and purpose. The third section (Screens 8 through 18) describes baseline conditions of Hawaiian coral reefs (i.e., conditions before overfishing and ship strikes). The fourth section (Screens 19 through 30) describes one of the threats to coral reefs on the MHI: overfishing. It also describes a plan to alleviate the pressure from overfishing by increasing the size of no-fishing zones. The fifth section (Screens 31 through 38) explains the impacts of another threat to coral reefs: ship strikes. It also presents a plan to repair coral reefs damaged by ship strikes. The sixth section (Screens 39 through 48) shows respondents the Current Program and several alternative programs and asks them to choose their most preferred programs. The seventh section (Screens 49 through 68) asks a series of debriefing questions. Actual screen shots of the administered survey are provided in Appendix A.

### 4.1 Section 1. Instructions and Warm-up

Screen 1 begins the survey by letting respondents know that the survey will include questions about coral reefs and that they will have an opportunity to provide comments at the end of the survey. It also thanks people in advance for their participation.

This survey will include questions about coral reefs. If you like, you can give us your comments about any or all of today's questions at the end of this survey.

Thank you for your help!

The next three screens deal with audio. Screen 2 informs respondents about the upcoming audio clip on Screen 3, tells them that the upcoming audio clip is not related the content of the survey, and reminds respondents to turn on their audio speakers.

On the following screen, you will hear a short music file. The music is not related to the subject matter of this survey. It is only used to find out whether your Internet device allows you to hear audio files.

Before you proceed, please make sure that the speakers of your Internet device are turned on.

Screen 3 tests whether panel members have audio capability to determine which version of the survey they will receive. Respondents hear a short, 18-second clip of music.

Please listen to the entire music file before pressing the “Next” button to continue your survey.

Screen 4 asks respondents whether they heard the audio clip. Did you hear the music file?<sup>1</sup>

If respondents answer “yes” to this question, they are directed to Screen 4a. This screen informs them that some instructions are also given by audio and that they should turn up their audio. Respondents are also reminded to read the screen carefully, even if audio is provided.

Later in the survey, some instructions are given with additional audio explanations. Please have your audio on to receive instructions. Please read each screen carefully, even if audio is provided.

Those who answered “no” or “not sure,” who did not have speakers, or who could not hear the audio clip did not have any audio throughout the rest of the survey. (In fact, the audio was used only as a supplement for the choice question descriptions on screens 41 and 42.)

Screen 5 presents respondents with questions from the nationally representative GSS,<sup>2</sup> which are placed at the beginning of the survey to serve both as a warm-up and to provide information to help evaluate potential attitudinal differences between the respondents to our survey and respondents to the GSS. We presented the GSS questions in the survey in the same manner as they are presented in the GSS (see question wording below). These warm-up questions ask respondents whether they think that we spend too much, too little, or about the right amount on space exploration, the environment, health, assistance to big cities, law enforcement, drug rehabilitation, and education. Half of the respondents see the problem category descriptions just

---

1. Respondents could answer “yes,” “no,” or “not sure” for this question.

2. See Chapter 6 for a discussion of the GSS.

described.<sup>3</sup> The other half were asked the same question but saw different problem category descriptions: spending on the space exploration program, improving and protecting the environment, improving and protecting the nation's health, solving the problems of big cities, halting the rising crime rate, dealing with drug addiction, and improving the nation's education system.

We are faced with many problems in this country, none of which can be solved easily or inexpensively. Below are some of these problems. For each one, please indicate if you think we are spending too much money on it, about the right amount, or too little money on it.

## 4.2 Section 2. Introduction

Section 2 introduces the topic of the survey: management options for coral reefs in Hawaii. Screen 6 tells respondents that the survey will give them information about a program and that the government wants to hear their opinions about whether to start this new program, which would require taxpayer money.

### MANAGEMENT OPTIONS FOR CORAL REEFS IN HAWAII – WHAT IS YOUR OPINION?

Sometimes the Government considers starting a new program. The Government does not want to start a new program unless people are willing to pay for it. One way for the Government to find out about this is to give people like you information about a program in a survey like this, so you can make up your own mind about it.

To ensure respondents did not think the survey designers were endorsing any particular views, respondents were told that different people have different views about the program.

Some people think the program they are asked about is not needed; others think it is. We want to get the opinions of all kinds of people.

Respondents then learned about the particular program addressed in this survey. This part of Screen 6 also tells them that their opinions are important and that the survey will provide them with some information to answer questions.

---

3. The versions were randomized across surveys. The category descriptions are described in the GSS as the "standard" and "variant" wording version of the spending questions.

The particular program addressed in this survey involves coral reefs in Hawaii. The federal government is considering options to increase the protection of coral reefs around Hawaii, but it is not sure if it should do more, because this will require more government spending paid for by taxpayers.

Even though you may not be familiar with this issue, as a taxpayer your opinions matter. We will provide you with information to help you answer the questions. Through this survey, government officials will consider your opinions, along with information from scientists and planners, when deciding what more, if anything, to do.

At the bottom of Screen 6, panel respondents are informed that their participation is voluntary and respondents are provided an opportunity to obtain more information.

Your participation is voluntary.

If you would like more information about your rights as a survey participant, please click [here](#). S

Screen 6 explicitly identifies NOAA as a U.S. government agency funding the survey. The NOAA logo is prominently displayed on the initial screen of the survey as is the OMB control number and expiration date.



This survey is funded by the National Oceanic and Atmospheric Administration, which is a U.S. government agency charged with making decisions about coral reef management for the United States.

OMB NO.: 0648-0585  
Expiration 03/31/2012

Coral Reef Economic Valuation Final Survey Approval

Respondents who checked the box near the bottom of Screen 6 were directed to Screen 6a. Screen 6a provides information about the policies regarding survey participation and efforts to protect respondents' privacy. Respondents are also provided an 800-telephone number to call if they have any questions.

You may skip any questions that you do not wish to answer. You will not be disqualified from participation in other surveys. As always, your identity will not be reported or linked to any data resulting from the study. All of the terms and conditions described in the Privacy and Term of Use Policy that you received with your Internet access equipment are in effect. If you have questions about this survey, you may contact Panel Relations at (800) 782-6899.

Screen 7 informs respondents that this survey will present information about coral reefs, including pictures and maps. Respondents also learn that they can move forward or backward in the survey through links provided on the lower left corner of each screen and return to wherever they were in the survey before linking to any information.

In this survey, you will be presented information about coral reefs, including pictures and maps.

For upcoming screens, if you want to review information that you saw earlier, you can go back by clicking the “Previous Information” button on the screen. When you are done reviewing the information, you can return to where you were in the survey.

### 4.3 Section 3. Description of Baseline Conditions

Section 3 presents information about coral reefs and coral reef ecosystems using text and an illustration. The text in Screen 8 describes what a coral reef ecosystem is and where coral reefs are found, highlighting the types of marine animals found on and near coral reefs. These pictures were intended to build some interest in the survey and to remind people about what they may have seen on television or in magazines about coral reefs.

Below is a picture of a coral reef ecosystem from Hawaii, including various types of coral and fish.



Coral reefs are found throughout the world in ocean waters less than 300 feet deep.

- Coral reefs are made of connected skeletons of millions of small animals called corals.
- Coral reef ecosystems include the coral reefs, neighboring areas of sea bottom, ocean waters, and many kinds of fish, plants, and animals nearby.

- Coral reef ecosystems provide a place to live for many ocean species including fish, sea turtles, seals, dolphins, shrimp, octopuses, sea snails, sea plants, and sea birds.
- Most coral reef ecosystems are in water less than 60 feet deep.

This information is followed by a question on Screen 9 asking how often a respondent has read or heard about coral reefs. The responses to this question can be used to differentiate survey respondents' level of previous familiarity with coral reefs.

How often have you read or heard about coral reefs, either in U.S. waters or elsewhere?<sup>4</sup>

Screen 10 then asks how many times respondents have been to a coral reef in the United States or elsewhere.

About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason?

If a respondent has been to a reef before, he/she is asked on Screen 10a where this visit occurred.

Where have you visited a coral reef?<sup>5</sup>

On Screen 11, respondents learn that 10% of coral reefs in the United States are found around the Hawaiian Islands; most other coral reefs are found around Florida. They also learn that the Hawaiian Islands are commonly divided into two groups: the MHI and the NWHI.

About 10% of coral reef ecosystems in the U.S. are around the Hawaiian Islands; most of the rest are around Florida.<sup>6</sup>

The Hawaiian Islands are commonly grouped into the Main Hawaiian Islands and the Northwestern Hawaiian Islands, as shown on the next screen.

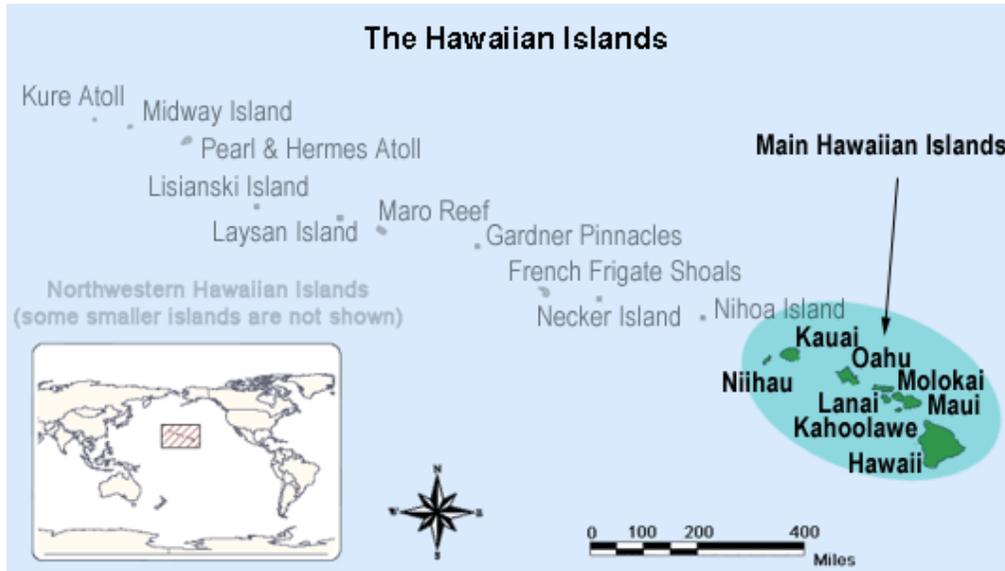
---

4. The response categories for this question were “not often at all,” “slightly often,” “moderately often,” “very often,” and “extremely often.”

5. Response categories included “Florida,” “Puerto Rico or the U.S. Virgin Islands,” “Other Caribbean, Gulf of Mexico, or Atlantic Ocean locations,” “Hawaii,” “Pacific Ocean locations other than Hawaii,” and “Other (specify).”

6. Rohmann et al. (2005) estimate that the MHI and NWHI represent approximately 7.6% of coral reefs within the U.S. territorial seas and the economic exclusive zone (inside the 10-fathom depth curve).

A map appears on Screen 12 to show respondents the location of the MHI. The text below the map communicates some basic information about the MHI and the reefs around them.



The Main Hawaiian Islands are eight larger islands, where nearly all of Hawaii's people live.<sup>7</sup>

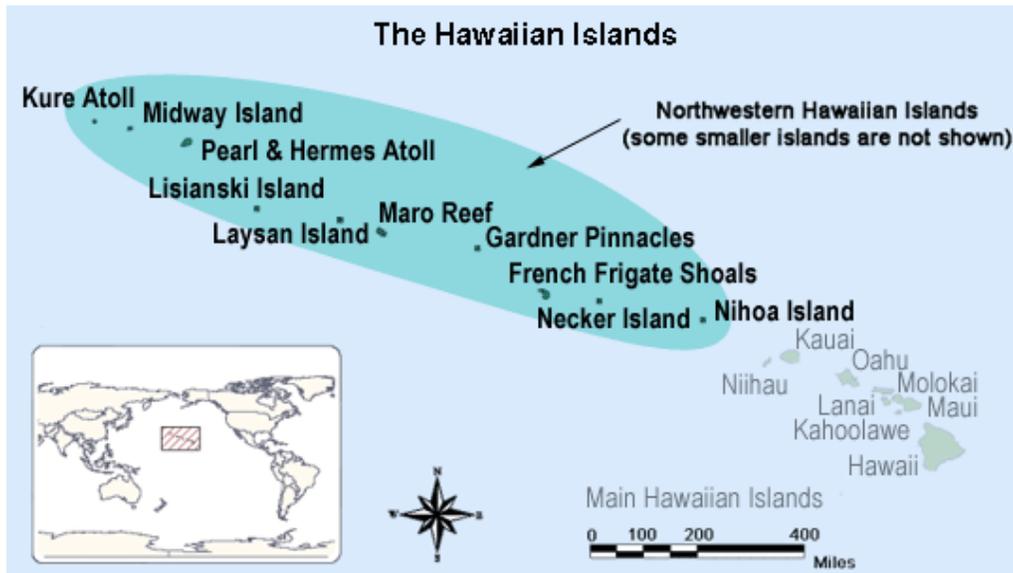
- These islands are surrounded by about 300,000 acres<sup>8</sup> of coral reef ecosystem.
- These coral reefs are heavily used for recreation (fishing, boating, diving, and snorkeling), for commercial fishing, and for cultural and religious activities by native Hawaiian people.

Screen 13 then shows another map of the Hawaiian Islands that highlights the NWHI. The text below the map describes more about the NWHI. In order to evaluate respondents' preferences for restoration of coral reef ecosystems around the MHI, we felt that respondents needed to know about nearby coral reef ecosystems, particularly given that the coral reef ecosystems around the NWHI are in near pristine condition.

---

7. Friedlander et al. (2005).

8. Rohmann et al. (2005).



The Northwestern Hawaiian Islands consist of many small, mostly uninhabited islands that stretch 1,500 miles northwest of the Main Hawaiian Islands (about the same distance as from Miami to Boston).<sup>9</sup>

- These islands are surrounded by about 400,000 acres<sup>10</sup> of coral reef ecosystem.
- This area was made a National Monument in 2006.<sup>11</sup>

Screen 14 then asks whether respondents have ever lived in Hawaii.

Have you ever lived in Hawaii, or have you never lived in Hawaii?<sup>12</sup>

Screen 15 asks whether respondents have ever visited Hawaii.

Have you ever visited Hawaii, or have you never visited Hawaii?<sup>13</sup>

---

9. NOAA (2007) states that the NWHI extend for 2,000 kilometers, or about 1,242 miles (1,242 miles was rounded to 1,500 miles to give respondents a more familiar and comparable distance from Miami to Boston).

10. Rohmann et al. (2005).

11. Federal Register Notice (1998).

12. Response categories include “Yes, I have lived in Hawaii” and “No, I have never lived in Hawaii.”

13. Response categories include “Yes, I have visited Hawaii” and “No, I have never visited Hawaii.”

Screen 16 asks how likely respondents are to visit Hawaii in the next 10 years.

In the next 10 years, how likely is it that you will go to Hawaii?<sup>14</sup>

The questions on Screens 14 through 16 are used to segment those whose values might include direct economic use value versus those whose values would hold pure passive economic use values.

On Screen 17, respondents see four scenes from coral reefs around Hawaii. These include pictures of schools of fish near reefs, sea urchins common in Hawaii, a variety of shallow coral, and giant trevally often seen in Hawaiian waters. These pictures provide a transition between answering questions and providing the next bit of information. These pictures were inserted to break up the survey with material that would maintain interest.



**Schools of fish live near reefs**



**Sea urchins are common in Hawaii**



**A variety of shallow coral**



**Giant trevally are often seen in Hawaiian waters**

---

14. Response categories include “I definitely will not go to Hawaii,” “I probably will not go to Hawaii,” “I may or may not go to Hawaii,” “I probably will go to Hawaii,” and “I definitely will go to Hawaii.”

Screen 18 then highlights two reasons why coral reef ecosystems around Hawaii are unique: (1) 25% to 50% of the species found around the Hawaiian Islands do not occur anywhere else in the world and (2) the NWHI reefs are in a remote location and still in a relatively unaltered natural state (i.e., mostly untouched by humans).

The coral reef ecosystems around the Hawaiian Islands are unique.

- One-fourth to one-half of the many corals, fish, and other marine species found around the Hawaiian Islands are found nowhere else in the world.<sup>15</sup>
- The Northwestern Hawaiian Island coral reefs are in a nearly natural condition; there are few large coral reef ecosystems anywhere in the world that remain so untouched by humans.

## 4.4 Section 4. Overfishing

This section introduces overfishing as the first of two main threats to coral reef health in the MHI.<sup>16</sup>

Screen 19 first describes what is meant by “overfishing” and the ways that it can affect annual catches of reef fish, size of fish, fish reproduction, and types of fish around the MHI.

### OVERFISHING

Overfishing occurs when more fish are caught than an ecosystem can replace. Overfishing injures Hawaiian coral reef ecosystems.

Because of overfishing around the Main Hawaiian Islands:

- Total annual catches of reef fish have fallen by about 90%.
- Few fish grow to be large.

---

15. See Gulko et al. (2000) and DeMartini and Friedlander (2004).

16. Clark and Gulko (1999) found that about 80% of nearshore fish in the MHI are overfished. Gulko et al. (2000) found that overfishing is one of the main threats to coral reefs on the MHI, particularly on O’ahu. Jennings and Kaiser (1998) and Jackson et al. (2001) also found that although pollution, coastal development, invasive species, and global climate change all impact coral reefs, fishing is the most pervasive and direct threat to coral reefs and other coastal ecosystems.

- Fish reproduction is low because there are fewer large fish. Large female fish produce more eggs.
- There are fewer plant-eating fish that keep algae from smothering the coral reefs. The coral reefs are less able to support other marine life and less able to recover from other stresses like storms or pollution.

Screen 20 then tells respondents that there is currently not a lot of fishing around the NWHI. As a result, the NWHI coral reef ecosystem has a more natural system with more fish and a larger variety of fish than the MHI coral reef ecosystem. Respondents also learn that the NWHI are permanently protected from overfishing due to its National Monument status.

Around the Northwestern Hawaiian Islands:

- Currently, there is very little fishing.
- This coral reef ecosystem is in a natural condition, with many more fish and a larger variety of fish than around the Main Hawaiian Islands.
- Many large fish, seals, and other species at the top of the food chain still live here, whereas they have been greatly reduced around the Main Hawaiian Islands.
- As a National Monument administered by the federal government and the State of Hawaii, the Northwestern Hawaiian Islands are permanently protected from overfishing.

Drawings appear on Screen 21 to show respondents current conditions at the MHI and how the MHI looked before overfishing occurred. By seeing the two drawings side by side, respondents can see that under conditions before overfishing occurred, there were more reef fish and healthier coral ecosystems than under current conditions. Because overfishing is not occurring at the NWHI, a similar screen was not used to show a before-and-after shot for the NWHI.

The following drawings represent current conditions in the Main Hawaiian Islands and how they would have looked before overfishing.

Current conditions of coral reefs around the Main Hawaiian Islands



Conditions of coral reefs around the Main Hawaiian Islands before overfishing



A solution to the overfishing problem in the MHI – implementation of no-fishing zones – is then described on Screen 22. Respondents learn what no-fishing zones would do to reduce the impacts of overfishing, that this management tool has been effective in other locations such as Florida to help improve coral reef health, and that other activities such as recreational diving can still occur in no-fishing zones.

#### A SOLUTION TO OVERFISHING IN THE MAIN HAWAIIAN ISLANDS: NO-FISHING ZONES

No-fishing zones can be used to prevent or limit overfishing in the Main Hawaiian Islands. No-fishing zones are areas of the ocean where fishing is not permitted.

- Where overfishing has occurred, no-fishing zones will allow the number, size, and variety of fish to increase inside the zones.<sup>17</sup> More fish means that there will also be more seals, sea birds, and other marine life.

---

17. Gell and Roberts (2002) summarized results from 16 case studies around the world and found that marine reserves lead to increases in abundance, body size, biomass, and reproductive output of exploited species.

- When nearby areas remain open to fishing, fish from within no-fishing zones migrate and increase the number, average size, and varieties of fish in areas outside the no-fishing zones.<sup>18</sup>
- No-fishing zones have been effective in rebuilding coral reef ecosystems in other places such as Florida.<sup>19</sup>
- Snorkeling, diving, and similar activities are allowed in no-fishing zones.

The text on Screen 23 then highlights some undesirable consequences associated with developing no-fishing zones, including additional government spending, potential loss of commercial fishing jobs, and displacement of recreational fishing. Presenting this information demonstrates to respondents that protection comes at a cost.

However, no-fishing zones can have undesirable effects:

- Commercial fishing jobs may temporarily be lost until catches increase.
- Recreational fishing has to be relocated away from the no-fishing zones.
- Federal government spending on enforcement will be required because many of the reefs are managed by the federal government. The State of Hawaii will pay its fair share of enforcement costs for reefs in state waters.

Following the discussion of no-fishing zones, Screen 24 asks respondents whether they agree with statements about three issues: commercial fishing jobs, sport fishing opportunities, and federal government involvement.<sup>20</sup> This question serves two purposes. First, it breaks up the presentation of important information and, second, it provides additional information to assess respondents' preferences for protecting coral reefs via no-fishing zones.

Below is a list of statements. Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements.

---

18. Gell and Roberts (2002) find that in Florida, for example, recreational fishermen were catching larger fish outside the Merritt Island Wildlife Refuge.

19. Gell and Roberts (2002) cite that the Merritt Island National Wildlife Refuge, the Sanctuary Preservation Areas, and the St. Lucian reserves all provide benefits inside and outside the marine reserves.

20. The specific statements were: "Protecting jobs of commercial fishermen is more important than protecting Hawaiian coral reefs," "Protecting recreational fishing is more important than protecting Hawaiian coral reefs," and "The federal government should take an active role to protect Hawaiian coral reefs."

Next, Screen 25 tells respondents about a proposal to increase no-fishing zones from the current 1% to a new level of 25% of the coral reef ecosystems around the MHI.

### OPTIONS TO INCREASE NO-FISHING ZONES AROUND THE MAIN HAWAIIAN ISLANDS

There are options for increasing no-fishing zones around the Main Hawaiian Islands. Currently, about 1%<sup>21</sup> of the coral reefs around the Main Hawaiian Islands are included in no-fishing zones. One option being discussed would increase the no-fishing zones around the Main Hawaiian Islands to 25%<sup>22</sup> of the coral reefs.

More details about this option are shown on the next screen.

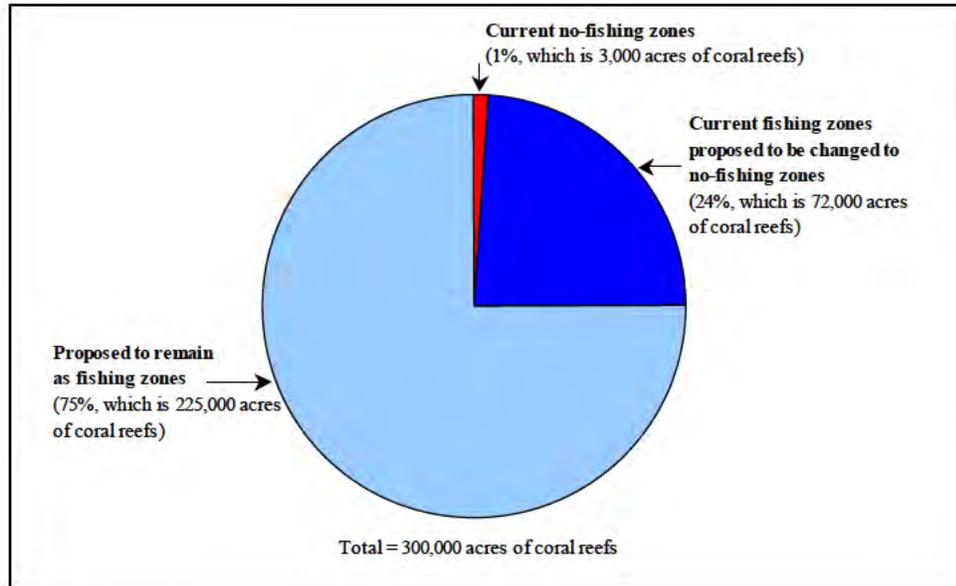
Screen 26 uses a pie chart to show the current level of coral reefs protected by no-fishing zones in Hawaii (1%), the proposal to increase this area to 25% (an increase of 24%), and the proposed area that would be left unprotected by no-fishing zones (75%). In addition to presenting this information in percentage terms, the actual areas of ocean currently protected (3,000 acres), the additional area proposed to be protected (72,000 acres), and the area proposed to remain unprotected (225,000 acres) are also shown on the chart. Presenting this information in acres and percentages helps respondents understand the scale of the area that would be protected by the no-fishing-zones program.

---

21. Gulko et al. (2000). The actual figure is less than 1%, but we used “about 1%” as a baseline to simplify the scenario.

22. In order for these protected areas to provide any fisheries benefits, 20–30% of the reef area needs to be protected from exploitation (Sladek Nowlis and Roberts, 1999; Sladek Nowlis and Bollermann, 2002). Gell and Roberts (2002, p. 6) make a similar finding, “the most convincing success stories come from places in which between 10 and 35% of fishing grounds have been protected.”

Main Hawaiian Islands Option: Increase no-fishing zones from current 1% up to 25% of coral reefs.



Screen 27 presents some advantages of increasing the area of no-fishing zones around the MHI, such as increasing the amount of fish and other marine life during the first three years, increasing the amount of fish caught outside the no-fishing zones within three to five years, increasing the total amount of reef fish caught each year, and improving the quality of recreation and the religious and cultural uses by the Hawaiian natives.

Some reasons for increasing no-fishing zones around the Main Hawaiian Islands:

- Inside the no-fishing zones, fish and other marine life would begin to increase during the first three years.<sup>23</sup>
- Beginning in three to five years after no-fishing zones are established, scientists expect that the amount of fish caught outside the no-fishing zones would begin to increase.<sup>24</sup>

---

23. Polunin and Roberts (1993), Russ and Alcala (1996a, 1966b), Wantiez et al. (1997), and Gell and Roberts (2002) find that marine reserves generally produce detectable increases in fish after two to three years of protection.

24. Gell and Roberts (2002) find that benefits to fishermen can be detected as early as three to five years after protection.

- In about 10 years, the total amount of reef fish caught each year in the Main Hawaiian Islands would increase from 10% to about 50% of historic levels.
- The entire Main Hawaiian Island coral reef ecosystem would be healthier, support more marine life, improve the quality of recreation, and improve religious and cultural uses by native Hawaiians.

To balance out the information provided on Screen 27, Screen 28 presents some of the disadvantages of increasing the area of no-fishing zones around the MHIs, such as high enforcement costs and prohibition of commercial and recreational fishing within the no-fishing zone. Presenting the advantages as well as the disadvantages helps to ensure that a balanced and neutral presentation on these issues is given to respondents. This screen also reminds respondents that the NWHI are already protected from overfishing. The purpose of this last bullet is to remind respondents about substitutes. Theory and practice dictate that for respondents to reveal their true preferences, they need to be aware of such substitutes.

Some reasons for not increasing no-fishing zones around the Main Hawaiian Islands:

- Enforcement costs will be high. Part of the costs would be paid for by all U.S. taxpayers through increased federal taxes. The rest of the costs would be paid for by the State of Hawaii.
- Recreational and commercial fishing will not be allowed within the no-fishing zone.
- The coral reef ecosystem around the Northwestern Hawaiian Islands is already protected from overfishing.

Screen 29 uses illustrations to compare conditions in 10 years (1) if no-fishing areas continue to protect only 1% of coral reefs and (2) if no-fishing areas are increased to protect 25% of coral reefs.

COMPARING CORAL REEF CONDITIONS AROUND THE MAIN  
HAWAIIAN ISLANDS

Conditions in about 10 years  
if 1% of the coral reefs remain protected  
by no-fishing zones



Conditions in about 10 years  
if no-fishing zones are increased to  
protect 25% of the coral reefs



Screen 30 then asks respondents if they have any comments about the information provided so far. Respondents typed their answers in the space provided. The purpose of this question was to give respondents an opportunity to express any thoughts about the material presented so far and to break up the flow of the survey.

Do you have any comments about the information provided so far?

## **4.5 Section 5. Ship Accidents**

Section 5 introduces ship accidents as another threat to coral reefs around the MHI.

Screen 31 tells respondents more about the frequency of ship accidents. Ship accidents occur about 10 times a year in the MHI and can significantly impact a localized area of the reef.

## SHIP ACCIDENTS

Ship accidents are another cause of injuries to coral reefs around the Main Hawaiian Islands.<sup>25</sup>

On average, about 10 accidents occur each year<sup>26</sup> where private and commercial boats and ships lose control, often in storms. While these ships rarely sink, they do damage coral reefs.

Screen 31 also presents four bullet points about ship accidents. These bullet points explain where most ship accidents occur, the severity of injuries to coral reefs from these accidents, the amount of reefs injured in an average year, and the amount of time it takes for nature to fully repair these injuries. This section describes the effects of ship groundings in the MHI and highlights the fact that natural recovery of the reefs from these groundings typically takes about 50 years. During this time, a reef's health, and many of the coral reef-associated activities such as snorkeling and diving, may be affected. The ship grounding scenario provides a description of localized impacts on ecosystem health, contrasting with the broader effects associated with overfishing. It is included to help elicit a range of values for the types of management actions that are available to help improve coral reef health in the MHI.

- These accidents usually occur around the Main Hawaiian Islands, where most ship traffic occurs.
- Severe injuries to the coral reefs usually range from a few square feet to an acre (an acre is about the size of a football field).
- In an average year, a total of about 5 acres of coral reefs are injured around the Main Hawaiian Islands.
- It typically takes about 50 years for nature to fully repair these injuries.<sup>27</sup> This means that activities like fishing, diving, and snorkeling may be affected for many years.

---

25. See Gulko (2002).

26. Based on the average number of reported vessel groundings between January 1998 and November 2001.

27. The value of 50 years was used based on discussions with a coral reef ecologist, Joe Shittone, at NOAA's Office of National Marine Sanctuaries (personal communication, September 16, 2004).

Screen 32 uses two illustrations to show respondents an (1) MHI coral reef without any damage from ship accidents and (2) MHI coral reef where a ship accident has occurred.

Main Hawaiian Island coral reefs where no ship accident has occurred



Area of coral reef where a ship accident has occurred



Screen 33 serves to break up the text and to see whether respondents have heard about, read about, or seen where ship accidents have injured coral reefs in Hawaii or elsewhere.

Have you ever heard about, read about, or seen where ship accidents have injured coral reefs in Hawaii or elsewhere?<sup>28</sup>

Next, Screen 34 tells respondents that management actions, such as planting living coral from coral farms into injured areas and restoring injured coral that is still alive, could help the reef recover faster after ship accidents (10 years rather than 50 years). This section explains that these actions have been effective in other locations, such as Florida, in restoring the reefs in a much shorter period compared to natural recovery.

---

28. Response categories were “yes” and “no.”

OPTIONS TO REPAIR CORAL REEFS INJURED FROM SHIP ACCIDENTS  
AROUND THE MAIN HAWAIIAN ISLANDS

Actions can be taken to help coral reefs recover faster after ship accidents, such as planting living coral from coral farms into injured areas and restoring injured coral that is still alive.

- With repairs, injured coral reefs typically recover in about 10 years, rather than in about 50 years with natural recovery.
- These types of repairs have been successful around Florida and elsewhere.

The next screen, Screen 35, tells respondents that the federal government, with the State of Hawaii, is considering a new program to repair ship injuries to coral reefs that would repair about 10 sites (about 5 acres) each year.

The federal government, with the State of Hawaii, is considering a program to repair ship injuries to coral reefs around the Main Hawaiian Islands. About 10 sites, totaling about 5 acres, would be repaired each year.

Respondents are told that it is not possible to make boat and ship owners pay for repairs because it is often difficult to track which ship caused the injury. This information helps avoid protest amongst respondents who think it was unfair for them to pay for the injuries because the boat and ship owners are responsible.

As part of the proposed program, boat and ship owners will be required to pay for such repairs. However, it is often not possible to find those who caused the injuries or to collect payment from the persons responsible.

To be consistent with the section on overfishing, the survey presents the advantages and disadvantages of the coral reef repair program. Screen 36 starts by presenting the advantages.

Some reasons for a coral reef repair program:

- These sites would recover in about 10 years, rather than in about 50 years with natural recovery.
- This program would help maintain Hawaii's coral reef ecosystems and would reduce the impacts from ship accidents to recreation and other activities.

Screen 37 lists some of the disadvantages of this program, such as the small amount of reefs repaired each year compared to the actual number of coral reefs around the MHI.

Some reasons against a coral reef repair program:

- Since the Main Hawaiian Islands have about 300,000 acres of coral reefs, 5 acres injured by ship accidents each year is only a very small percentage.
- A program like this would require additional costs beyond what can be collected from the ship owners that caused the damage.
- Part of the costs that are not paid by ship owners would be paid by all U.S. taxpayers through increased federal taxes. The rest of the costs would be paid by the State of Hawaii.

In order to break up the text, Screen 38 then asks respondents if they have any comments about the information provided so far.

Do you have any comments about the information presented so far?

## **4.6 Section 6. Stated-Preference Questions and Follow-up Evaluation**

In Section 6, respondents are asked to identify which combination, if any, of the management actions they prefer. The two management actions (no-fishing zones and restoration of ship accident damages) are summarized, and a series of SP questions is asked.

Screen 39 first reminds respondents who reported that they could hear the audio clip from Screen 3 to make sure their speakers are turned on.<sup>29</sup> This screen also provides instructions for re-playing or pausing the audio.

For the next few screens you will be provided with some audio instructions. Please make sure your audio is turned on.

If you want to listen to the audio again, press the “Play” button that looks like this: ► on the upcoming screens. If you want to pause the audio, click the button that looks like this: ||.

---

29. This screen is shown only to those respondents who answered “yes” to the question on Screen 4.

Next, Screen 40 introduces the concept of choosing among alternative programs.

Which Program Do You Prefer?

The following questions ask you to choose among alternative programs that have different combinations of actions to protect and restore coral reef ecosystems around the Main Hawaiian Islands, at different costs to you.

Introductions of the programs begin on Screen 41 with a description of the Current Program, or the status quo, via text shown on the screen and audio.<sup>30</sup> In addition to teaching respondents about the Current Program, this screen teaches respondents how to read the choice tables. Row 1 always presents the percent of coral reefs (and corresponding acres in parentheses) protected by no-fishing zones. Row 2 always presents the acres of coral reefs repaired from ship injuries per year. The last row always shows the added federal taxes paid by households each year. For the Current Program, 1% of coral reefs are protected by no-fishing zones, no acres of coral reefs are repaired from ship injuries, and \$0 would be added to federal taxes each year.

*In each question, the Current Program describes the reef management actions that are currently in place and the expected results if these are continued.*

*In Row 1: The Main Hawaiian Islands no-fishing zones are kept at the current 1% of the coral reefs. The number of fish and the quality of the reefs will continue to decline.*

*In Row 2: Ship injuries to coral reefs around the Main Hawaiian Islands are not repaired. Currently, ship accidents injure about 5 acres each year. It takes about 50 years for these reefs to recovery naturally.*

	<u>Current Program</u>
% of coral reefs protected from no-fishing zones. (acres)	<b>1% protected</b> <b>(3,000 acres)</b> Declining marine life.
Acres of coral reefs repaired from ship injuries per year.	<b>No acres repaired</b> Injuries last about 50 years
Added federal taxes paid by your household each year	\$0

---

30. The audio recording on Screen 41 reads the text in italics to respondents who said they could hear the audio clip from Screen 3. These respondents also saw the text in addition to hearing it. Respondents without audio capability only saw the text on this screen.

*The last row shows the additional cost paid by your household each year: With the current program, there will be no additional actions, and therefore no added federal taxes paid by your household to protect and restore coral reef ecosystems around the Main Hawaiian Islands.*

*When you are finished reviewing this table click on the NEXT button*

The first choice question is presented to respondents on Screen 42. This screen explains the Current Program and the three alternative programs using bullets as well as a table. Additionally, those with audio capabilities hear the text in italics via the audio clip. The Current Program is always the status quo: no new no-fishing zones in the MHI, no additional efforts to restore vessel grounding damages, and no additional taxes. The Full Program includes a combination of increasing no-fishing zones in the MHI to 25% and repairing 5 acres of reefs injured because of ship strikes each year, which results in the greatest increase in new taxes. The No-Fishing Zones Program protects 25% of coral reefs around the MHI, and the Reef Repair Program repairs 5 acres of coral reefs each year damaged by ship accidents. Both programs involve some increase in taxes.

*The table below includes the Current Program and three alternative programs that do more and cost more than the Current Program.<sup>31</sup>*

*The three alternatives to the Current Program are: the No-Fishing Zone Program; the Ship Repair Program; and the Full Program.*

*The Full Program is summarized on the far right hand side of the table<sup>32</sup>:*

- The Full Program protects 25% of the coral reefs from overfishing AND each year repairs 5 acres of coral reefs from ship accidents.*

---

31. The Current Program is always shown on the far left-hand side of the table.

32. The Full Program is always shown on the far right-hand side of the table.

*In between the Current Program and the Full Program the two other alternative programs are summarized.<sup>33</sup>*

- *The No-Fishing Zones Program: This program would protect 25% the coral reefs around the Main Hawaiian Islands, but would do nothing to repair reef damage from ship accidents.*
- *The Ship Repair Program: This program would repair 5 acres of coral reefs from ship accidents each year, but would do nothing more to protect coral reefs from overfishing.*

*Each of these alternatives to the Current Program would cost your household additional federal taxes each year as shown in the bottom of the table.*

Respondents are reminded to consider the effectiveness of each management option, the cost, and the other things they could spend the money on instead.

*Remember, if you spend money for one of the programs that does more, that money won't be available for you to buy other things. If you do not want to do more and spend more to protect coral reefs in the Main Hawaiian Islands, you should check the Current Program as your most preferred program.*

Respondents are asked to specify which of the four programs is their most preferred by checking one box.<sup>34</sup> The text just before the table on Screen 42 explains that the highlighting represents where the program actions are different from the Current Program.

*After you carefully review the four programs, and the costs to your household under each program, please check which of the four programs you most prefer.*

*The highlighted boxes show where the program actions are different from the current program.*

---

33. The order in which the No-Fishing Zone and Reef Repair programs were shown in the table was randomized.

34. If respondents click “next” before choosing a program, they will be directed again to Screen 42 with a note at the top asking them to please answer the question.

	<u>Current Program</u>	<u>Reef Repair Program</u>	<u>No-Fishing Zones Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each year</u> <sup>35</sup>	\$0	\$55	\$45	\$100
Which program is your <u>most preferred</u> ?	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>

*Once you are done reviewing these alternative programs, please check the box for the program you most prefer.*

As part of the survey design process, we developed an experimental design that identifies 16 versions of the choice question. See Appendix B for the full experimental design for this study.

As has become standard practice in SP studies, we introduce a “certainty question” to gauge how certain respondents are of their answers. As part of the survey design, we randomly assigned respondents to one of three certainty question formats: a certainty question after each choice

---

35. The table provided here is an example of 1 of the 16 versions of the survey. The only attribute that varies between each version is the cost. The Current Program is always \$0 and the alternative programs are always greater than \$0.

question, after just the first choice question, or after just the last choice question.<sup>36</sup> After respondents choose their most preferred program on Screen 42, Screen 43 shows them their selection and asks how sure they are that among the four alternatives presented, the program they chose is their most preferred. Answers to this question allow the research team to better understand the overall confidence that respondents had in their answers and whether respondents were taking the choice task seriously.

The table below provides an example of what the table and certainty question looked like, assuming a respondent chose the Reef Repair Program as their most preferred of all four programs.

	<u>Current Program</u>	<u>Reef Repair Program</u>	<u>No-Fishing Zones Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each</u> year	\$0	\$55	\$45	\$100
Which program is your <u>most preferred</u> ?		<b>X</b>		

---

36. Fifty percent of respondents see a certainty question after each choice question, 25% see one after just the first choice question, and 25% see one after just the third choice question.

You chose the Reef Repair Program as your most preferred program of these four programs. How sure are you that among these four programs, the Reef Repair Program is your most preferred?<sup>37</sup>

Screen 44 then asks respondents to provide a brief comment explaining why they chose the program they did. This information can help distinguish between true zero values and protest answers. This question also provides a space for respondents to comment on their answers to the first choice question. This can provide insights into the individual's thought process and subsequently help identify valid and invalid responses. Third, it provides the opportunity for individuals to express how they feel about being asked this type of question. This is especially important for those respondents who clearly dislike some element of the question. This comment question is not repeated for other choice questions because experience indicates little additional information is gained from repeating the question.

Please provide a brief comment that helps us understand why you chose the Reef Repair Program as your most preferred.<sup>38</sup>

Next, Screen 45 presents respondents with the three programs they did not choose as their most preferred from Screen 42 and asks them to check which of the remaining three programs they prefer.

---

37. Response categories include "Not sure at all," "Slightly sure," "Moderately sure," "Very sure," and "Extremely sure."

38. Appendix I provides a full listing of the open-ended responses to this question for both panels.

Now that you have told us which program you most prefer, consider the remaining three programs. Of the remaining three programs, which program do you prefer?<sup>39</sup>

	<u>Current Program</u>	<u>No-Fishing Zones Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each year</u>	\$0	\$45	\$100
Of these three, which program do you prefer?	<b>C</b>	<b>C</b>	<b>C</b>

---

39. If the respondent chose the Current Program on Screen 42, he/she received an alternate wording here. The alternate wording is, “You chose the Current Program with no additional cost to your household as your most preferred program. If you had to choose among the remaining three programs, which would you prefer?” The purpose of this alternate wording is to acknowledge that a respondent who chose the Current Program as his/her first choice did not want the government to take any further actions, even though the choice format forces him/her to rank the remaining three alternatives.

Fifty percent of respondents saw Screen 46, which asks them again how sure they were that among the remaining three choices, the one they chose on Screen 45 is their most preferred.

	<u>Current Program</u>	<u>No-Fishing Zones Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each year</u>	\$0	\$45	\$100
Of these three, which program do you prefer?		<b>X</b>	

You chose the No-Fishing Zone Program as your most preferred program of these three programs. How sure are you that among these three programs, the No-Fishing Zone Program is your most preferred?<sup>40</sup>

The final choice question is presented on Screen 47. It asks respondents which program they prefer of the remaining two programs. Asking respondents to identify their most preferred and next most preferred, and then their preferred from the remaining two programs, provides a complete ranking of all the programs in each choice set. Complete rankings provide potent information on preferences that will be very useful in data analysis and value estimation.

---

40. Response categories include “Not sure at all,” “Slightly sure,” “Moderately sure,” “Very sure,” and “Extremely sure.”

Of the remaining two programs, which program do you prefer?<sup>41</sup>

	<u>Current Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household each year	\$0	\$100
Of these two, which program do you prefer?	<b>C</b>	<b>C</b>

---

41. If a respondent chose the Current Program on Screen 42, he/she would see alternate wording, “If you had to choose between the remaining two programs, which would you prefer?”

Screen 48 presents the final certainty question. Twenty-five percent of respondents saw this question only after the third choice question.

	<u>Current Program</u>	<u>Full Program</u>
<b>% of coral reefs protected by no-fishing zones (acres)</b>	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
<b>Acres of coral reefs repaired from ship injuries per year</b>	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each year</u>	\$0	\$100
Of these two, which program do you prefer?	<b>X</b>	

You chose the Current Program as your most preferred program of these two programs. How sure are you that between these two programs, the Current Program is your most preferred?

## 4.7 Section 7. Debriefing Questions

This final section of the survey presents respondents with a series of questions to determine what they were thinking when they chose their most preferred programs. It also asks several attitudinal and other types of questions.

Screen 49 begins this section by telling respondents that they will be asked some questions about what they were thinking when choosing the programs they prefer.

Following are some questions about what you were thinking when you chose your preferred programs.

Screen 50 asks respondents whether they believe overfishing has caused the changes in coral reefs they were told about earlier.

When you chose your most preferred programs, did you think that overfishing contributed to the changes in Hawaii’s coral reef ecosystems we told you about or did you think it did not contribute to those changes?<sup>42</sup>

Screen 51 then asks how serious the effects of overfishing would be without additional no-fishing zones.

If no-fishing zones are NOT put in place, how serious did you think the effects of overfishing would be on the coral reef ecosystem around the Main Hawaiian Islands?<sup>43</sup>

Screen 52 asks how effective no-fishing zones would be if adopted.

When you chose your preferred programs, how effective did you think that no-fishing zones would be in restoring fish and other marine life in the coral reef ecosystem around the Main Hawaiian Islands?<sup>44</sup>

With respect to ship accidents, Screen 53 asks the respondents to evaluate how serious the effects of ship accidents are on the MHI coral reef ecosystem.

When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands?<sup>45</sup>

Screen 54 asks respondents how effective they thought the Reef Repair Program would be in speeding up recovery.

When you chose your preferred programs, how effective did you think that repairing injuries from ship accidents would be in speeding up recovery of the coral reef ecosystem around the Main Hawaiian Islands?<sup>46</sup>

---

42. Response categories include “Overfishing did contribute to the changes” and “Overfishing did not contribute to the changes.”

43. Response categories include “Not serious at all,” “Slightly serious,” “Moderately serious,” “Very serious,” and “Extremely serious.”

44. Response categories include “Not effective at all,” “Slightly effective,” “Moderately effective,” “Very effective,” and “Extremely effective.”

45. Response categories include “Not serious at all,” “Slightly serious,” “Moderately serious,” “Very serious,” and “Extremely serious.”

46. Response categories include “Not effective at all,” “Slightly effective,” “Moderately effective,” “Very effective,” and “Extremely effective.”

Screen 55 asks respondents if they thought recovery would take more than, less than, or about 10 years under the Reef Repair Program.

When you chose your most preferred programs, did you think that repairs of injuries to coral reefs after ship accidents would help reefs recover in about 10 years, more than 10 years, or less than 10 years?<sup>47</sup>

The questions asked on Screens 56 and 57 are used to evaluate the validity of the survey instrument. These questions elicit respondent attitudes about the proposed programs in the instrument, various groups and institutions in the United States, and their environmental attitudes.

When you chose your most preferred programs, did you think that your household would pay the tax amount stated, or did you think you would pay more than that amount, or less than that amount?<sup>48</sup>

Screen 57 asks respondents how much confidence they have in the people who run the U.S. government, university scientists, large corporations, and newspapers.

Please tell us how much confidence you have in the following groups and institutions in this country. In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in<sup>49</sup>:

Screen 58 asks how respondents feel about increasing federal taxes to protect coral reefs around the MHI.

How do you feel about increasing federal taxes to protect coral reefs around the Main Hawaiian Islands?<sup>50</sup>

Screen 59 asks whether respondents would like to pay for new programs through higher income taxes or through higher prices.

---

47. Response categories include “About 10 years,” “More than 10 years,” and “Less than 10 years.”

48. Response categories include “The amount stated,” “More than the amount,” and “Less than the amount.”

49. Response categories include “No confidence at all,” “A little confidence,” “A moderate amount of confidence,” “A lot of confidence,” and “A great deal of confidence.”

50. Response categories include “Strongly oppose,” “Somewhat oppose,” “Neither oppose nor favor,” “Somewhat favor,” and “Strongly favor.”

There are different ways for people to pay for new programs to protect the environment. One way is for the government to pay the cost. This will raise everyone's taxes. The other way is for businesses to pay the cost. This will make prices go up for everyone.

If you had to choose, would you prefer to pay for new environmental programs through higher income taxes or through higher prices?<sup>51</sup>

Screen 60 asks respondents to indicate whether, and to what extent, they think of themselves as environmentalists.

Would you say you think of yourself as not an environmentalist at all, slightly an environmentalist, a moderate environmentalist, a strong environmentalist, or a very strong environmentalist?<sup>52</sup>

Screen 61 asks respondents to state how they react to several statements provided below the question. The statements were (1) cost should not be a factor when protecting the environment; (2) I found it difficult to select which programs I preferred; (3) there was not enough information for me to make informed decisions about doing more to protect coral reefs in Hawaii; (4) I was concerned that the federal government cannot effectively manage coral reefs; (5) I should not have to pay more federal taxes to protect coral reefs around Hawaii; and (6) the public's views as expressed in this survey should be important to the government when it chooses how to manage coral reefs in Hawaii.

We would like to learn more about how you reacted to the questions that asked you to choose between various combinations of no-fishing zones and ship accident repair programs. Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements.<sup>53</sup>

---

51. Response categories include "Through higher income taxes," "Through higher prices," and "No preference."

52. Response categories include "Not an environmentalist at all," "Slightly an environmentalist," "A moderate environmentalist," "A strong environmentalist," and "A very strong environmentalist."

53. Response categories include "Strongly disagree," "Somewhat disagree," "Neither agree nor disagree," "Somewhat agree," and "Strongly agree."

Screen 62 asks whether anyone in their household paid any federal income taxes in 2008. If respondents clicked the next button before answering this question, they were diverted back to Screen 62 and asked to answer the question. If they refused for the second time, they were diverted to Screen 63.

Did anyone in your household pay any federal income taxes last year, 2008?<sup>54</sup>

Screen 63 provides respondents with an opportunity to provide any remaining comments about the survey.

Please add any other comments you would like to make to help us understand your views about coral reefs in Hawaii and your responses to this survey.

Screen 64 asked if respondents took this survey via WebTV or a personal computer.

Are you taking this survey via a WebTV or a personal computer (PC)?<sup>55</sup>

This is followed by a question on Screen 65 that asks for information on the equipment used by respondents to participate in the survey. This will allow assessment of differences in survey responses by capabilities in receiving survey information.

How is your computer (i.e., the computer via which you are taking this survey) connecting to the Internet?<sup>56</sup>

Finally, Screen 66 reminds respondents that the survey is eliciting information useful to NOAA and other agencies to estimate the value of coral reef ecosystems; it does not necessarily represent actual government policy. These statements were developed in consultation with the State of Hawaii and NOAA's National Marine Sanctuary Program (NMSP). Peer reviewers were adamant that these statements not be presented until respondents had completed and submitted their survey responses.

To be sure we are clear ...

The National Oceanic and Atmospheric Administration, in cooperation with other federal and state agencies, is looking at ways to help protect coral reef ecosystems around the Hawaiian Islands. A wide variety of options are possible, in addition to the ones

---

54. Response categories include "Yes," "No," and "Not sure."

55. Response categories include "WebTV" and "PC."

56. Response categories include "Dialup modem," "ISDN line," "Cable modem," "Digital Subscriber Line (DSL)," "Wireless," "Satellite Dish," and "T1/T3 Line."

discussed in this survey. Any future decisions on specific protection and enhancement alternatives will take into consideration the views of the public, the results of scientific studies, and advice of marine and other scientific experts.

Screen 67 thanks respondents for participating and reassures them that all of their answers were recorded. It also lets them know that they will receive their check in the mail soon after they complete the survey.

Thank you very much! We have recorded all of your responses. They are very important to us, and as a small thank-you, we will mail a \$10 check to you soon. We look forward to your next survey, for July, later in the month.

If you have any comments about any part of the survey, please write them below.

The final screen in the survey, Screen 68, again thanks respondents for completing the survey. Once the respondents see this screen, they can no longer go back to review their responses.

Thank you for completing this survey. We have successfully received your responses.

## References

- Clark, A.M. and D. Gulko. 1999. Hawaii's State of the Reefs Report, 1998. Department of Land and Natural Resources, Honolulu, HI.
- DeMartini, E.E. and A.M. Friedlander. 2004. Spatial patterns of endemism in shallow-water reef fish populations of the northwestern Hawaiian Islands. *Marine Ecology Progress Series* 271:281–296.
- Federal Register Notice. 1998. Exec. Order No. 13089, 63 Fed. Reg. 32701, June 16, 1998.
- Friedlander, A., G. Aeby, R. Brainard, A. Clark, E. DeMartini, S. Godwin, J. Kenyon, R. Kosaki, J. Maragos, and P. Vroom. 2005. The state of coral reef ecosystems of the northwestern Hawaiian Islands. In *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005*, J. Waddell (ed.). NOAA Technical Memorandum NOS NCCOS 11. pp. 270–311.
- Gell, F.R. and C.M. Roberts. 2002. *The Fishery Effects of Marine Reserves and Fishery Closures*. World Wildlife Fund, Washington, DC.
- Gulko, D.A. 2002. Vessel Groundings in Hawai'i: Threats and Impacts to Nearshore Coral Reefs. Draft. Hawaii Department of Land & Natural Resources, Honolulu.

- Gulko, D., J. Maragos, A. Friedlander, C. Hunter, and R. Brainard. 2000. Status of coral reefs in the Hawaiian archipelago. In *Status of Coral Reefs of the World: 2000*, C. Wilkinson (ed.). Australian Institute of Marine Science, Cape Ferguson, Queensland. pp. 219–238.
- Jackson, J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Botsford, B.J. Bourque, R.H. Bradbury, R. Cooke, J. Erlandson, J.A. Estes, T.P. Hughes, S. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner, and R.R. Warner. 2001. Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293:629–638.
- Jennings, S. and M.J. Kaiser. 1998. The effects of fishing on marine ecosystems. *Advances in Marine Biology* 34:201–352.
- NOAA. 2007. Report on the Status of Marine Protected Areas in Coral Reef Ecosystems of the United States. Volume I: Marine Protected Areas Managed by U.S. States, Territories, and Commonwealths. NOAA Technical Memorandum CRCP 2. NOAA Coral Reef Conservation Program, Silver Spring, MD.
- Polunin, N.V.C. and C.M. Roberts. 1993. Greater biomass and value of target coral-reef fishes in two small Caribbean marine reserves. *Marine Ecology Progress Series* 100:167–176.
- Rohmann, S.O., J.J. Hayes, R.C. Newhall, M.E. Monaco, and R.W. Grigg. 2005. The area of potential shallow-water tropical and subtropical coral ecosystems in the United States. *Coral Reefs* 24:370–383.
- Russ, G.R. and A.C. Alcala. 1996a. Do marine reserves export adult fish biomass? Evidence from Apo Island, central Philippines. *Marine Ecology Progress Series* 132:1–9.
- Russ, G.R. and A.C. Alcala. 1996b. Marine reserves: Rates and patterns of recovery and decline of large predatory fish. *Ecological Applications* 6(3):947–961.
- Sladek Nowlis, J. and B. Bollermann. 2002. Methods for increasing the likelihood of restoring and maintaining productive fisheries. *Bulletin of Marine Science* 70(2):715–731.
- Sladek Nowlis, J. and C.M. Roberts. 1999. Fisheries benefits and optimal design of marine reserves. *Fishery Bulletin* 97:604–616.
- Wantiez, L., P. Thollot, and M. Kulbicki. 1997. Effects of marine reserves on coral reef fish communities from five islands in New Caledonia. *Coral Reefs* 16:215–224.

---

## **5. Implementation of the Final Survey**

This chapter describes the processes followed to recruit for the two internet panels, the sample design, the data collection process, the administration period, the completed cases by panel, and the calculated response rates. The final survey instrument was administered to two independent internet panels: the American National Election Study (ANES) and Stanford University's Face-to-Face Recruited Internet Survey Panel (FFRISP). The ANES and FFRISP internet panels were part of a larger research project (designed by KN and Abt SRBI - a subsidiary of Abt Associates - in cooperation with Professor Jon Krosnick of Stanford University and others) to evaluate the representativeness of RDD-recruited internet panels. This research project was funded under a grant from the National Science Foundation (NSF). KN administered the coral reef survey instrument to the ANES and FFRISP research project panels.

### **5.1 Selection and Sample Design**

KN recruited the ANES internet panel and Abt SRBI recruited the FFRISP internet panel. KN selected the ANES sample using RDD telephone methodology, providing a probability-based sample of U.S. telephone households (96% of population with a land line). Abt SRBI selected the FFRISP sample using in-person recruiting methods, providing a multistage probability sample of residential mailing addresses. The ANES and FFRISP web-enabled panels comprise both internet and non-internet households. For non-internet households in the ANES panel, professional installers provided MSN TV 2 devices; FFRISP households received a laptop and broadband internet access.

Data were collected from the full ANES and FFRISP panels. In both panels, each household had an equal probability of entering the sample (except for households without working telephones, which will have a zero probability of entering the telephone sample).

The discussion in Sections 5.1.1- 5.1.3 describe the selection and sample design for the two internet panels in more detail.

#### **5.1.1 ANES sampling design**

The sample universe of the ANES panel is the U.S. citizen population age 18 and older as of November 4, 2008. Teenagers who turned 18 prior to or on November 4, 2008, were included in the sample. The ANES panel was recruited using list-assisted RDD sampling techniques on the sample frame consisting of the entire U.S. residential telephone population. Only those banks of telephone numbers (consisting of 100 telephone numbers) that had zero directory-listed phone

numbers were excluded. The ANES panel sample is a stratified RDD sample of all residential phone numbers in the United States (including Alaska and Hawaii). Only two strata are necessary. The strata were defined by whether an address could be found for the telephone number using a service that provides the highest match rate available. The proportion of all telephone numbers for which a valid postal address could be recovered was about 70%. The sample of phone numbers was selected with equal probability within the two pre-identified strata. Stratum 1 included all phone numbers that could be matched with postal addresses. Stratum 2 included the remaining phone numbers that could not be matched beforehand to postal addresses. All numbers drawn from Stratum 1 were kept in the sample. One half of the numbers, randomly selected from Stratum 2, were kept in the sample.

Approximately 10 days prior to calling sampled phone numbers, households with address-matched telephone numbers were sent an advance mailing that informed them that they had been selected to participate in the Monthly Special Topics Study. The Stanford University Principal Investigator signed the advance letters. The respondents were told that the study was being conducted on behalf of Stanford University, with collaboration from the University of Michigan and funding from the NSF. The advance mailing, which included a \$2 cash incentive, explained that participation in the study was voluntary and that there was a wide range of studies that they could take part in as representative of many people like themselves. The mailing also cited their burden as one survey per month. The advance letter also included answers to frequently asked questions that respondents might have.

Extra follow-up was done with the initial-refusal households, including use of a special refusal conversion package. The refusal package contained a refusal letter tailored to the reason for refusal. A monetary incentive of \$5 was enclosed. However, in anticipation of some final refusals even with conversion efforts, respondents selected for the study were provided framed 8"×10" certificates of appreciation. A special 1-800 number specific to the study was also available for the households to call with questions or to authenticate the legitimacy of the study.

A short interview (10 minutes) was conducted with eligible, cooperating households. The interview included selected questions from national surveys to measure the attitudes of study respondents, as well as questions to gather identifying and contact information needed by KN. The interview was conducted with a randomly selected person age 18 or older as of November 4, 2008. If the selected study member was a minor, then parental consent to interview the minor was obtained on the phone from a parent or legal guardian. The telephone interviewer administering the recruitment survey instrument documented the consent.

### 5.1.2 FFRISP sampling design

Abt SRBI drew a multistage probability sample of residential mailing addresses. A sampling frame based on the U.S. Postal Service (USPS) mailing addresses allowed for the selection and enrollment of a sample of eligible households in the panel. This address frame is referred to as the Delivery Sequence File (DSF). The target population covered the 48 contiguous states and Washington, DC.

Research on the use of the DSF as an address-sampling frame for area probability samples has focused on the relative merits of using Census administrative units (e.g., blocks, block groups, tracts, counties) or USPS units (e.g., ZIP codes, carrier routes). For example, at the 2007 Joint Statistical Meetings, papers on the use of the DSF focused on geo-coding errors associated with assigning DSF addresses to Census geographic units such as block groups. The use of USPS Zip code carrier routes does not suffer from this problem, but it is more difficult to apply the half-open interval in the field to add missed housing units to the sample.

The basic design involved self-weighting, stratification, probability proportional to size sampling, and multiple stages. Abt SRBI used four stages of sampling. In the first stage, they chose 60 three-digit ZIP code areas<sup>1</sup> from a sampling frame of all three-digit ZIP code areas in the 48 continuous states and Washington, DC. Principal sampling units (PSUs) were sorted by geography (nine Census Divisions), metropolitan status, and total number of residential addresses. A systematic sampling scheme was applied with probabilities of selection being proportional to the total number of residential addresses in the three-digit ZIP code area. Some three-digit ZIP code areas may be sufficiently large to have more than one selection.

In the second stage, they sampled two five-digit ZIP codes per three-digit ZIP code area for 120 total. Abt SRBI did this by preparing a complete list of five-digit ZIP codes in each PSU, sorting them in numerical sequence (which reflects geography) and selecting two ZIP codes by systematically using probabilities proportional to the total number of residential addresses in each ZIP code.

In Stage 3, Abt SRBI sampled two carrier routes per ZIP code for a total of 240. They prepared a complete list of carrier routes in each ZIP code area, sorting them in numerical sequence to reflect geography, and selected two carrier routes systematically using probabilities proportional to the total number of residential addresses in each carrier route.

In Stage 4, the final stage, Abt SRBI obtained a complete list of all residential addresses in each of the 240 carrier routes. A systematic sample of addresses was drawn from each carrier route. The target number of completed household interviews, the expected response rate, and the

---

1. For example, the three-digit ZIP code for Boulder, Colorado, is 803XX.

expected vacancy rate determined the sample size of addresses per carrier route. The initial sample size of residential addresses was in the range of 1,300 to 1,400 housing units.

The target sample size for the study was approximately 990 completed household interviews for the FFRISP panel. The sample was limited to households, with group quarters excluded from the eligible target population.

## **5.2 Data Collection Process**

This section describes the data collection process for the two internet panels. For each internet panel, respondents took a self-administered survey, which allowed them to complete the surveys at their convenience and own pace, in the comfort and privacy of their homes. The electronic survey system supports the inclusion of video, audio, and graphics in the questionnaire. Respondents could break off and return to complete an interview during a second or later session. The electronic data collection tracks how long respondents spent on each screen.

KN administered both internet panels, primarily because of their data-capture survey system. This system, owned by KN, was designed to meet the specific needs of web-based surveys. The system supports all types of questions commonly used in complex, computer-based interviewing systems. It uses advanced scripting techniques for customization of individual questions to meet the needs of researchers proposing innovative designs. The data capture platform supports the complexity and type of questions proposed in our study, including multimedia graphics and voice-over presentation.

The system also supports the importation of auxiliary data, such as demographic information collected as part of the screening.

### **5.2.1 ANES and FFRISP data collection procedures**

Respondents participated in the survey using a home-based PC connected to the internet, a personal laptop computer with internet service, or a web-capable appliance such as the MSN TV 2 with internet service. Because our survey was one part of a larger scientific study, it was possible to give a web-capable appliance and/or internet access to panelists who did not already have them. Non-internet households participating in the ANES panel received MSN TV 2 internet and Media Player and internet service at no cost to them. For the FFRISP panel, non-internet households received laptops with broad band internet access at no cost to them.

### 5.3 Administration Period

Data collection for the ANES panel began on June 4, 2009, and ended on July 9, 2009. Data collection for the FFRISP panel began on June 4, 2009, and ended on October 27, 2009.

### 5.4 Completed Cases by Panel

Table 5.1 shows the number of completed cases for each panel along with the total number of cases in the pooled dataset. The total number of cases in the pooled dataset is simply the sum of completed cases from each panel.

**Table 5.1. Completed cases by panel**

<b>Panel</b>	<b>Completed cases</b>
ANES	2,335
FFRISP	942
Pooled	3,277

### 5.5 Response Rates

Below we provide descriptions of the overall panel response rates. For each rate, we multiply our survey completion rate by the panel response rate to determine the final Coral Reef Survey Instrument response rate by panel.

#### 5.5.1 ANES response rate statistics

The Coral Reef Survey was administered to the entire ANES panel. In development of the ANES panel for the national elections study, a number of recruitment steps were followed. Initial recruitment interviews in the ANES panel were completed with 2,371 of the 12,809 sampled telephone numbers. Completion of a recruitment interview is the operational definition of joining the panel. All sample cases fall into one of four categories: completed interviews (2,371), eligible nonresponse (808), unknown eligibility (5,601), and not eligible (4,029). Completed interviews are broken down into three categories: those completed through the standard telephone interview (2,222), those who initially refused but were converted to a completed interview (85), and those who completed the interview through the internet (64).

}	Response rate (AAPOR response rate 3) <sup>2</sup> :	31%
}	Refusal rate (estimated):	38%
}	Cooperation rate (estimated):	34%
}	Contact rate (estimated):	92%

Table 5.2 summarizes the disposition of the ANES panel recruitment sample.

**Table 5.2. Final case-level disposition of ANES panel study recruitment sample**

<b>Disposition</b>	<b>Number</b>
Total sampled telephone numbers	12,809
Completed interviews	2,371 <sup>3</sup>
Standard telephone interview	2,222
Refusal conversion interview	85
Internet-only recruitment interview	64
Eligible nonresponse	808
Eligible non-contacts	0
Eligible contacts not complete	808
Refusals, post-selection	558
Language barrier, post-selection	16
Physical or mental impairment, post-selection	25
MSN TV 2 setup not possible, post-selection	19
Respondent never available, post-selection	190
Unknown eligibility	5,601
Contacts	4,063
Refusals, pre-selection	2,376
Informant pre-selection contact, but never available	1,288
Language barrier, pre-selection	291
Physical or mental impairment, pre-selection	93
MSN TV 2 setup not possible, pre-selection	15
Non-contacts	1,538
Computer/fax tone (on all attempts)	241
No answer (on all attempts)	198
Information never available, non-contact, pre-selection	1,099

2. The American Association for Public Opinion Research.

3. Note that 2,335 of the 2,371 respondents who completed the recruitment interviews went on to complete the survey instrument.

**Table 5.2. Final case-level disposition of ANES panel study recruitment sample (cont.)**

<b>Disposition</b>	<b>Number</b>
Not eligible	4,029
Disconnected phone	3,457
Non-residential/business/government	518
Number changed	11
No age-eligible U.S. citizen in household	43

Source: ANES staff analysis of the 2008- 2009 ANES Panel Study sample file.

### **5.5.2 FFRISP response rate statistics**

The overall response rate for the FFRISP panel was 41% (AAPOR response rate 4).

---

## 6. Comparability of the Internet Panels

This chapter compares the two internet panels based on responses to attitudinal questions and demographic characteristics. We received 3,277 completed surveys: 2,335 from the ANES panel and 942 from the FFRISP panel. In this chapter we present summary statistics for attitudinal and demographic questions for the two panels (Sections 6.1 and 6.2, respectively). We then compare the two panels' responses and the pooled sample responses to those from two independent nationally representative samples. For each section, we present summary statistics for each panel, the pooled sample, and the nationally representative sample.

### 6.1 Attitudinal Questions

As described in Chapter 4, the survey presents respondents with questions from the GSS to evaluate potential attitudinal differences between the respondents to our survey and respondents to the GSS. We also use responses to these questions to evaluate potential differences across the two panels. The questions ask, "We are faced with many problems in this country, none of which can be solved easily or inexpensively. Below are some of these problems. For each one, please indicate if you think we are spending too much money on it, about the right amount, or too little money on it." The categories are space exploration, the environment, health, assistance to big cities, law enforcement, drug rehabilitation, and education.

Following the format used in the GSS, respondents in our survey were presented questions using two versions, referred to in the GSS as the standard version and the variant version. The variant wording asks the same question but with slightly longer category names. The versions were randomized across surveys, with each respondent being asked the question with either the standard or variant wording, and the categories were presented in random order within each version.

Tables 6.1 and 6.2 present summary statistics for responses to these questions for the two panels, the pooled sample, and the GSS for both the standard and variant wording questions, respectively.<sup>1</sup> A column of differences between the pooled sample and the GSS is also presented. Responses across the two panels are similar. Compared to the GSS, the pooled sample has fewer respondents answering "too little" across all categories and versions; many of these differences are significant. Responses in the pooled sample differed most from the GSS in respondents' attitudes toward spending on the environment, with 26.4% and 19.1% fewer respondents answering "too little" for the standard and variant wording versions, respectively.

---

1. Due to rounding, percentages may not add to 100%.

**Table 6.1. Comparison of responses to attitudinal questions across the two panels, the pooled sample, and the GSS – standard wording (%)**

	ANES	FFRISP	Pooled	GSS	Pooled – GSS
<b>The space exploration program</b>					
Too little	11.5	13.4	12.1	13.6	-1.5
About right	52.7	47.2	51.1	50.9	0.2
Too much	35.8	39.3	36.9	35.5	1.4
<b>Improving and protecting the environment</b>					
Too little	41.2	41.4	41.2	67.6	-26.4***
About right	43.5	45.8	44.2	24.5	19.7***
Too much	15.4	12.8	14.6	7.9	6.7***
<b>Improving and protecting the nation's health</b>					
Too little	56.3	57.3	56.6	77.1	-20.5***
About right	32.4	33.7	32.8	18.1	14.7***
Too much	11.2	9.0	10.6	4.8	5.7***
<b>Solving the problems of the big cities</b>					
Too little	28.8	33.0	30.1	48.5	-18.5***
About right	51.5	51.4	51.5	38.6	12.9***
Too much	19.6	15.6	18.4	12.9	5.5***
<b>Halting the rising crime rate</b>					
Too little	42.3	42.1	42.2	61.7	-19.5***
About right	51.6	50.7	51.4	31.5	19.9***
Too much	6.1	7.2	6.4	6.8	-0.4
<b>Dealing with drug addiction</b>					
Too little	38.1	41.7	39.2	57.3	-18.1***
About right	47.4	44.0	46.4	32.6	13.8***
Too much	14.4	14.2	14.4	10.1	4.3***
<b>Improving the nation's education system</b>					
Too little	64.1	68.5	65.5	70.8	-5.4**
About right	25.7	23.1	24.9	23.3	1.6
Too much	10.2	8.4	9.7	5.8	3.8***

\*\*\* Indicates significance at the 99% confidence level.

\*\* Indicates significance at the 95% confidence level.

\* Indicates significance at the 90% confidence level.

**Table 6.2. Comparison of responses to attitudinal questions across the two panels, the pooled sample, and the GSS – variant wording (%)**

	ANES	FFRISP	Pooled	GSS	Pooled – GSS
<b>Space exploration</b>					
Too little	12.9	6.8	11.2	15.1	-3.9**
About right	41.5	44.7	42.3	43.1	-0.7
Too much	45.7	48.5	46.4	41.8	4.6*
<b>Environment</b>					
Too little	49.5	43.9	48.0	67.1	-19.1***
About right	36.9	43.3	38.6	23.4	15.2***
Too much	13.6	12.9	13.4	9.6	3.8**
<b>Health</b>					
Too little	60.4	63.9	61.3	75.4	-14.1***
About right	24.8	24.0	24.6	13.4	11.2***
Too much	14.8	12.1	14.1	11.2	2.9*
<b>Cities</b>					
Too little	11.6	15.1	12.5	21.9	-9.3***
About right	48.1	43.6	46.9	45.1	1.7
Too much	40.3	41.3	40.6	33.0	7.6***
<b>Crime</b>					
Too little	41.2	37.7	40.2	53.9	-13.7***
About right	51.1	50.3	50.9	37.0	13.9***
Too much	7.7	12.0	8.9	9.1	-0.3
<b>Drugs</b>					
Too little	30.3	35.3	31.6	49.5	-17.9***
About right	51.5	48.8	50.8	37.6	13.2***
Too much	18.2	15.9	17.6	12.9	4.7***
<b>Education</b>					
Too little	68.3	70.2	68.8	76.5	-7.7***
About right	24.2	26.3	24.7	18.6	6.1***
Too much	7.5	3.5	6.5	4.9	1.5

\*\*\* Indicates significance at the 99% confidence level.

\*\* Indicates significance at the 95% confidence level.

\* Indicates significance at the 90% confidence level.

Both of these differences are significant at the 99% confidence level. These results suggest that respondents in the pooled sample collected in 2009 are less willing to increase public spending than the U.S. population represented in the 2008 GSS survey.

## 6.2 Demographic Questions

In this section, we compare the demographic characteristics for each of the two panels, the pooled sample, and the 2006–2008 ACS, which is administered by the Census between the decennial census. Each survey firm collected demographic characteristics during the recruitment process and used these to weight the two panels to be representative of the U.S. population.<sup>2</sup>

Table 6.3 presents demographic characteristics for each panel, the pooled sample, and the ACS. A column of differences between the pooled sample and the ACS is also presented. In general, the demographic characteristics follow similar patterns across the two samples, with a few exceptions. The distributions of household income and marital status differ across the two panels. However, the distributions of most other variables are similar. Differences between the pooled dataset and ACS are mostly significant, though many of the differences are small in absolute terms.

**Table 6.3. Comparison of demographic characteristics across the two panels, the pooled sample, and the ACS (%)<sup>a</sup>**

Category	ANES	FFRISP	Pooled	ACS	Pooled – ACS
<b>Gender</b>					
Female	52.7	53.0	52.8	51.4	1.5
Male	47.3	47.0	47.2	48.6	–1.5
<b>Age</b>					
15 to 19 years	5.5	3.8	5.0	9.0	–4.0***
20 to 24 years	5.8	6.2	5.9	8.7	–2.8***
25 to 34 years	12.5	17.9	14.1	16.7	–2.6***
35 to 44 years	20.2	18.7	19.8	17.9	1.8**
45 to 54 years	21.2	21.1	21.2	18.2	2.9***
55 to 59 years	9.4	10.6	9.7	7.6	2.2***
60 to 64 years	6.5	7.7	6.9	6.0	0.9*
65 to 74 years	12.6	11.3	12.2	8.1	4.1***
75 to 84 years	4.7	2.6	4.1	5.5	–1.5***
85 years and over	1.6	0.2	1.2	2.2	–1.0***

2. See Appendix C for more information on sample weighting.

**Table 6.3. Comparison of demographic characteristics across the two panels, the pooled sample, and the ACS (cont.)**

<b>Category</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>	<b>ACS</b>	<b>Pooled – ACS</b>
<b>Education</b>					
Less than 9th grade	0.6	0.8	0.7	6.4	-5.7***
9th to 12th grade, no diploma	8.9	10.7	9.4	9.1	0.4
High school graduate (includes equivalency)	31.1	30.6	30.9	29.6	1.4
Some college, no degree	21.6	22.2	21.8	20.1	1.7*
Associate's degree	9.0	8.8	9.0	7.4	1.5***
Bachelor's degree	19.2	15.5	18.2	17.3	0.8
Graduate or professional degree	9.5	11.4	10.1	10.1	0.0
<b>Annual household income</b>					
Less than \$9,999	2.7	4.0	3.1	7.2	-4.0***
\$10,000 to \$14,999	3.0	4.0	3.3	5.5	-2.2***
\$15,000 to \$19,999	2.8	4.3	3.2	5.3	-2.1***
\$20,000 to \$24,999	5.3	7.2	5.9	5.3	0.6
\$25,000 to \$29,999	4.9	5.7	5.2	5.3	-0.1
\$30,000 to \$34,999	3.9	3.7	3.8	5.3	-1.5***
\$35,000 to \$39,999	11.1	12.3	11.4	4.9	6.5***
\$40,000 to \$49,999	7.6	8.6	7.9	9.3	-1.4**
\$50,000 to \$59,999	10.3	7.2	9.3	8.4	1.0
\$60,000 to \$74,999	13.2	11.6	12.7	10.4	2.3***
\$75,000 to \$99,999	14.4	14.6	14.5	12.5	2.0**
\$100,000 to \$124,999	8.2	6.7	7.7	7.8	0.0
\$125,000 to \$149,999	4.8	3.7	4.5	4.5	0.0
\$150,000 to \$199,999	7.8	6.4	7.4	8.5	-1.1*
<b>Marital status</b>					
Married	66.7	60.6	65.0	50.2	14.8***
Widowed	17.0	3.0	13.0	6.3	6.6***
Divorced	8.4	13.3	9.8	10.6	-0.8
Separated	4.0	1.9	3.4	2.2	1.2***
Never married	4.0	21.2	8.9	30.8	-21.9***

**Table 6.3. Comparison of demographic characteristics across the two panels, the pooled sample, and the ACS (cont.)**

Category	ANES	FFRISP	Pooled	ACS	Pooled – ACS
<b>Household size</b>					
1	9.4	14.0	10.7	27.5	-16.8***
2	36.5	35.5	36.2	33.2	2.9***
3	20.5	19.4	20.1	15.9	4.2***
4	18.4	17.0	18.0	13.6	4.4***
5	9.5	7.2	8.8	6.2	2.6***
6	3.8	3.9	3.8	2.2	1.6***
7+	1.9	3.0	2.4	1.3	1.0***

\*\*\* Indicates significance at the 99% confidence level.

\*\* Indicates significance at the 95% confidence level.

\* Indicates significance at the 90% confidence level.

a. The differences between the ACS and the individual and pooled datasets can be explained by the different weighting methodology used for the ANES and FFRISP datasets. First, each panel was weighted using a different representation of the U.S. population; ANES responses were weighted using the Current Population Survey (CPS) and FFRISP responses were weighted using the ACS. Second, the set of demographic variables used to generate the weights differed between the two panels. For example, FFRISP included housing status, presence of children, and household size, whereas ANES did not. Third, some of the variables used by both panels to generate the weights were categorized differently. For example, ANES used four age categories (18- 29, 30- 44, 45- 59, and 60 and older), while FFRISP only used three (18- 34, 35- 54, and 55 and older). Given these differences in weighting methodology, the pooled weighted sample is not directly comparable to either the ACS or CPS.

## 6.3 Summary

Responses to the attitudinal GSS questions in the two panels are similar across each panel, with one exception: for all categories of spending, the pooled dataset had fewer respondents indicating that “too little” money was being spent, as compared to the national GSS sample. A comparison of the demographic information across the two panels shows more variation (Table 6.3). Many differences between the pooled dataset and ACS are statistically significant, though the datasets match reasonably well on gender and education.

The remainder of this report presents results using the pooled dataset. Appendix D provides model results by individual dataset along with the likelihood ratio tests (LRTs) that compare model estimates using several combinations of the underlying datasets.

---

## 7. Distribution of Choices and Tests of Validity

This chapter presents the responses to the choice questions and shows that the results are generally consistent with people's beliefs and characteristics. This chapter also presents an analysis of the certainty questions and looks at the relationship between certainty and choice behavior. The percentages reported in this chapter use the pooled, weighted data; the number of observations reported are unweighted.

### 7.1 Distribution of Choices

This section presents the distribution of choices for the various programs presented in the survey instrument: the Current Program, the No-Fishing Zones Program, the Reef Repair Program, and the Full Program. Table 7.1 shows the distribution of responses across programs for each choice question and presents the aggregate percentage of respondents who chose an Alternative Program over the Current Program (i.e., the status quo).<sup>1</sup> The first choice question (Q10) asked respondents: "Which program is your most preferred?"; the second choice question (Q13) asked respondents: "Of these three, which program do you prefer?"; and the final choice question (Q15) asked respondents: "Of these two, which program do you prefer?" Respondents' fourth choice is implied; it is the remaining program not chosen in Q15. This question format allows us to have a full ranking of the different programs. For the first choice, the Full Program received the largest proportion of votes, with 32.6% of respondents choosing it. The proportions were close for respondents choosing the Current Program and No-Fishing Zones Program as their most preferred, with 26.3% and 27.3%, respectively. The Reef Repair Program received the smallest proportion of votes at 13.9%. Approximately 73.7% of respondents chose an Alternative Program over the status quo.

Table 7.2 presents the distribution of responses to Q10 for each version of the survey.<sup>2</sup> The relative and absolute costs for each program vary across the 16 versions, as shown in Table 7.2. Each respondent received a version randomly, where the probability of receiving any version equaled 1/16.

---

1. In this chapter we use "status quo" and "Current Program" interchangeably.

2. As noted in Appendix B, there were 16 versions of the choice questions.

**Table 7.1. Responses across programs for each choice question**

	<b>Current program</b>	<b>No-fishing zones program</b>	<b>Reef repair program</b>	<b>Full program</b>	<b>Alternative program over current program</b>
First choice (Q10)	26.3%	27.3%	13.9%	32.6%	73.7%
Second choice (Q13)	11.3%	39.3%	28.1%	21.2%	88.7%
Third choice (Q15)	11.7%	28.2%	44.7%	15.4%	88.3%
Fourth choice	50.7%	5.3%	13.2%	30.8%	49.3%

**Table 7.2. Responses to Q10 based on survey version**

<b>Version</b>	<b>Program alternative</b>	<b>Cost</b>	<b>% who chose as most preferred in Q10</b>
1	Current program	\$0	28.2
	No-fishing zones program	\$45	21.8
	Reef repair program	\$35	13.5
	Full program	\$75	36.5
2	Current program	\$0	26.3
	No-fishing zones program	\$45	31.9
	Reef repair program	\$55	10.0
	Full program	\$100	31.8
3	Current program	\$0	27.7
	No-fishing zones program	\$45	29.5
	Reef repair program	\$95	12.6
	Full program	\$130	30.2
4	Current program	\$0	16.7
	No-fishing zones program	\$45	33.2
	Reef repair program	\$135	11.4
	Full program	\$160	38.7
5	Current program	\$0	26.8
	No-fishing zones program	\$75	25.5
	Reef repair program	\$35	17.1
	Full program	\$110	30.6

**Table 7.2. Responses to Q10 based on survey version (cont.)**

<b>Version</b>	<b>Program alternative</b>	<b>Cost</b>	<b>% who chose as most preferred in Q10</b>
6	Current program	\$0	23.9
	No-fishing zones program	\$75	31.6
	Reef repair program	\$55	9.4
	Full program	\$125	35.1
7	Current program	\$0	24.0
	No-fishing zones program	\$75	34.9
	Reef repair program	\$95	8.1
	Full program	\$150	33.0
8	Current program	\$0	23.9
	No-fishing zones program	\$75	41.7
	Reef repair program	\$135	14.5
	Full program	\$200	19.8
9	Current program	\$0	22.3
	No-fishing zones program	\$110	14.7
	Reef repair program	\$35	21.6
	Full program	\$135	41.4
10	Current program	\$0	26.5
	No-fishing zones program	\$110	22.3
	Reef repair program	\$55	17.0
	Full program	\$145	34.2
11	Current program	\$0	28.3
	No-fishing zones program	\$110	25.2
	Reef repair program	\$95	13.9
	Full program	\$200	32.6
12	Current program	\$0	32.7
	No-fishing zones program	\$110	37.0
	Reef repair program	\$135	5.3
	Full program	\$245	25.0
13	Current program	\$0	27.2
	No-fishing zones program	\$170	13.6
	Reef repair program	\$35	22.3
	Full program	\$185	36.9

**Table 7.2. Responses to Q10 based on survey version (cont.)**

<b>Version</b>	<b>Program alternative</b>	<b>Cost</b>	<b>% who chose as most preferred in Q10</b>
14	Current program	\$0	30.3
	No-fishing zones program	\$170	16.2
	Reef repair program	\$55	20.2
	Full program	\$215	33.3
15	Current program	\$0	25.4
	No-fishing zones program	\$170	25.4
	Reef repair program	\$95	13.4
	Full program	\$265	35.8
16	Current program	\$0	31.0
	No-fishing zones program	\$170	29.7
	Reef repair program	\$135	11.9
	Full program	\$300	27.3

## **7.2 Tests of Validity**

This section looks at whether respondents' acceptance of the scenario presented in the survey and whether respondents' beliefs and attitudes are consistent with their stated choices.

The previous section showed the responses to the choice questions by program. In this section, we confine our analysis to respondents' first choices and group the choice responses into two categories: preference for an Alternative Program or preference for the status quo.

### **7.2.1 Scenario acceptance**

This section presents responses to questions that evaluated respondents' acceptance of the coral reef management scenarios presented in the survey. It also shows how respondents' choices for an Alternative Program versus the status quo varied according to their acceptance of the management scenarios. We find that respondents, in general, accepted the various aspects of the scenarios, and, as expected, respondents who found the management scenarios more credible were also more likely to choose one of the alternatives to the status quo as their most preferred program.

## Program effectiveness

### *No-Fishing Zones Program*

Q19 asked, “When you chose your most preferred programs, how effective did you think that no-fishing zones would be in restoring fish and other marine life in the coral reef ecosystem around the Main Hawaiian Islands?” The results show that 3.3% of respondents said “not effective at all,” 11.7% said “slightly effective,” and 35.5% said “moderately effective.” Nearly half of respondents thought the No-Fishing Zones Program would be “very effective” (37.5%) or “extremely effective” (10.7%).

**Table 7.3. When you chose your most preferred programs, how effective did you think that no-fishing zones would be in restoring fish and other marine life in the coral reef ecosystem around the Main Hawaiian Islands (Q19)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not effective at all	3.3	31.3 (87)
Slightly effective	11.7	43.6 (336)
Moderately effective	35.5%	68.4 (1,072)
Very effective	37.5	87 (1,273)
Extremely effective	10.7	93.2 (362)
Refused	1.2	46.5 (37)
Total	100.0%	

The more effective respondents thought the No-Fishing Zones Program would be, the more likely they were to choose an alternative to the status quo as their most preferred program. For example, whereas 31.3% of respondents who thought the no-fishing zones would be “not effective at all” chose an alternative to the status quo, 93.2% of respondents who thought no-fishing zones would be “extremely effective” chose an alternative to the status quo. Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(4.68, 14818.7) = 54.92$ ;  $p < 0.001$ ].

### ***Reef Repair Program***

Q21 asked, “When you chose your preferred programs, how effective did you think that repairing injuries from ship accidents would be in speeding up recovery of the coral reef ecosystem around the Main Hawaiian Islands?” The results show that 8.3% of respondents thought repairing injuries from ship accidents would be “extremely effective,” 23.3% thought it would be “very effective,” 37.1% thought it would be “moderately effective,” 24.3% thought it would be “slightly effective,” and 5.8% thought it would be “not effective at all” (see Table 7.4).

**Table 7.4. When you chose your preferred programs, how effective did you think that repairing injuries from ship accidents would be in speeding up recovery of the coral reef ecosystem around the Main Hawaiian Islands (Q21)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not effective at all	5.8	36.1 (178)
Slightly effective	24.3	59.4 (817)
Moderately effective	37.1	77 (1,136)
Very effective	23.3	86.8 (750)
Extremely effective	8.3	95.3 (251)
Refused	1.2	34.3 (35)
Total	100.0%	

As with the No-Fishing Zones Program, the more effective a respondent thought the Reef Repair Program would be, the more likely he or she was to choose an alternative to the status quo. Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(4.95, 15666.56) = 50.26; p < 0.001$ ].

### ***Time to reef recovery after repairs***

Q22 asked, “When you chose your most preferred programs, did you think that repairs of injuries to coral reefs after ship accidents would help reefs recover in about 10 years, more than 10 years, or less than 10 years?” The survey explained to respondents that the repaired coral reefs would

recover in 10 years rather than 50 years without any repairs. Most respondents thought reefs would recover in about 10 years (56.5%), while 30.6% thought it would take more than 10 years and 11.7% thought it would take less than 10 years.

Respondents who thought reef recovery would happen in about 10 years were the most likely to choose an alternative to the status quo (76.5%). Respondents who thought it would take more time were less likely to choose an alternative to the status quo (69.4%), as were respondents who thought it would take less time (73.2%). Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(2.99, 9452.87) = 4.46; p = 0.004$ ].

**Table 7.5. When you chose your most preferred programs, did you think that repairs of injuries to coral reefs after ship accidents would help reefs recover in about 10 years, more than 10 years, or less than 10 years (Q22)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
About 10 years	56.5	76.5 (1,835)
More than 10 years	30.6	69.4 (972)
Less than 10 years	11.7	73.2 (324)
Refused	1.3	54.3 (36)
Total	100.0%	

### ***Program cost***

Q23 asked, “When you chose your most preferred programs, did you think that your household would pay the tax amount stated, or did you think you would pay more than that amount, or less than that amount?” The results show that 46.3% of respondents thought they would pay the amount stated, 32.9% thought they would pay more, and 19.5% thought they would pay less.

Respondents who thought they would pay the amount stated were the most likely to choose an alternative to the status quo (78.9%), and respondents who thought they would pay less were the next most likely to choose an alternative to the status quo (78.6%). Respondents who expected to pay more were the least likely to choose an alternative to the status quo (64.5%). Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(3, 9486.65) = 18.51; p < 0.001$ ].

**Table 7.6. When you chose your most preferred programs, did you think that your household would pay the tax amount stated, or did you think you would pay more than that amount, or less than that amount (Q23)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
The amount stated	46.3	78.9 (1,511)
More than the amount	32.9	64.5 (1,037)
Less than the amount	19.5	78.6 (586)
Refused	1.3	42.9 (33)
Total	100.0%	

### **Judgments about seriousness of problem**

#### ***Contribution of overfishing to problem***

Q17 asked, “When you chose your most preferred programs, did you think that overfishing contributed to the changes in Hawaii’s coral reef ecosystems we told you about or did you think it did not contribute to those changes?” Most respondents thought that overfishing did contribute (86.7%); 12.1% thought that overfishing did not contribute.

Respondents who thought overfishing did contribute to the program were more likely to choose an alternative to the status quo. The results show that 77.9% of respondents who thought overfishing contributed to the problem chose an alternative to the status quo, and 46.6% of respondents who did not think overfishing contributed to the problem chose an alternative to the status quo. Respondents who thought overfishing did contribute to the problem were significantly more likely to choose an alternative to the status quo [ $F(1.99, 6301.43) = 46.89$ ;  $p < 0.001$ ].

**Table 7.7. When you chose your most preferred programs, did you think overfishing contributed to coral reef change ecosystems we told you about or did you think it did not contribute to those changes (Q17)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Overfishing did contribute	86.7	77.9 (2,812)
Overfishing did not contribute	12.1	46.6 (328)
Refused	1.2	38.6 (27)
Total	100.0%	

### *Seriousness of problem*

Q18 asked, “If no-fishing zones are NOT put in place, how serious did you think the effects of overfishing would be on the coral reef ecosystem around the Main Hawaiian Islands?” The result is that 15.1% of respondents thought the effects would be either “not serious at all” or “slightly serious,” 30.1% thought it would be moderately serious, and 54.1% thought it would be very or extremely serious.

As expected, respondents who thought the effects would be more serious were more likely to choose an alternative to the status quo. For example, respondents who thought the effects would be “extremely serious” chose an alternative to the status quo 92.7% of the time, whereas respondents who thought the effects would be “not serious at all” chose an alternative to the status quo 22.4% of the time. Respondents who thought the effects of overfishing were more serious were significantly more likely to choose an alternative to the status quo as their most preferred program [ $F(4.96, 15701.21) = 64.24; p < 0.001$ ].

Q20 asked, “When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands?” The results show that 32.9% of respondents thought the effects were “not serious at all” or “slightly serious,” 34.5% thought the effects were “moderately serious,” and 31.3% thought the effects were either “very serious” or “extremely serious.”

**Table 7.8. If no-fishing zones are NOT put in place, how serious did you think the effects of overfishing would be on the coral reef ecosystem around the Main Hawaiian Islands (Q18)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not serious at all	3.2	22.4 (95)
Slightly serious	11.9	47.9 (337)
Moderately serious	30.1	63.9 (902)
Very serious	36.2	86.1 (1,221)
Extremely serious	17.9	92.7 (586)
Refused	0.7	35.6 (26)
<b>Total</b>	<b>100.0%</b>	

When respondents perceived ship accidents to be more serious, they were more likely to choose an alternative to the status quo as their most preferred program. For example, respondents who thought ship accidents were “extremely serious” chose an alternative to the status quo 94.3% of the time. Respondents who thought ship accidents were “not serious at all” chose an alternative to the status quo 32.6% of the time. Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(4.96, 15705.51) = 46.45; p < 0.001$ ].

**Table 7.9. When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands (Q20)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not serious at all	7.9	32.6 (259)
Slightly serious	25.0	66.2 (838)
Moderately serious	34.5	75.7 (1,080)

**Table 7.9. When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands (Q20) (cont.)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Very serious	22.6	86 (696)
Extremely serious	8.7	94.3 (251)
Refused	1.4	58.8 (43)
Total	100.0%	

## 7.2.2 Construct validity

In this section we evaluate variables that we expect to be associated with respondents' likelihood of choosing an alternative over the status quo. We evaluate several variables that potentially influence respondents' choices, including respondents' characteristics (i.e., demographic variables), respondents' familiarity with coral reefs, their attitudes about the environment, and their attitudes about taxes. In the subsequent section, we present results of a multivariate analysis that explores the relationship between these variables and the likelihood of a respondent choosing an alternative over the status quo.

### Respondent demographics

#### *Education*

Approximately 31% of respondents were high school graduates with no further education and over half (59.1%) of respondents had some college education or more; 10% of respondents did not complete high school.

Overall, respondents with higher education were a little more likely to choose an alternative to the status quo. On average, respondents who did not graduate high school chose an alternative to the status quo 66.6% of the time, while high school graduates chose an alternative to the status quo 70.4% of the time, and respondents with more than a high school degree (some college, no degree; associate's degree; bachelor's degree; master's degree; or professional or doctorate degree) chose an alternative to the status quo 76.9% of the time. Responses to the education question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(9.87, 31026.22) = 2.26; p = 0.013$ ].

**Table 7.10. Respondent education levels**

<b>Response</b>	<b>% of sample (N = 3,146)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
No formal education	0.1	100 (2)
5th or 6th grade	0.0	0 (0)
7th or 8th grade	0.5	84.1 (8)
9th grade	0.9	49.6 (14)
10th grade	2.0	57.7 (37)
11th grade	3.8	71.7 (46)
12th grade no diploma	2.7	69.5 (42)
High school graduate	30.7	70.4 (574)
Some college, no degree	21.4	71.7 (834)
Associate degree	9.0	77.1 (316)
Bachelor's degree	18.4	78.5 (720)
Master's degree	7.2	83.6 (392)
Professional or doctorate degree	3.1	80.6 (155)
Refused	0.2	59.3 (6)
Total	100.0%	

### *Home ownership*

Most respondents own their home (76.9%), fewer rent (15.9%), and fewer still have an arrangement other than owning or renting (7.0%). Respondents in this last group have the highest likelihood of choosing an alternative to the status quo (81.4%), while homeowners have the lowest likelihood (73.2%). Responses to the home ownership question did not differ significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(2.83, 8459.96) = 1.8; p = 0.149$ ].

**Table 7.11. Respondent home ownership**

<b>Response</b>	<b>% of sample (N = 2,995)</b>	<b>% of respondents choosing a program over status quo (base unweighted N)</b>
Own	76.9	73.2 (2,344)
Rent	15.9	76.7 (504)
Some other arrangement	7.0	81.4 (142)
Refused	0.2	58.6 (5)
Total	100.0%	

### *Employment status*

Most respondents were working, either as a paid employee (53.2%) or self-employed (10.7%). The total of unemployed respondents was 6.2%, either as a temporary layoff (1.0%) or looking for work (5.2%). In addition, 17.1% of respondents were retired, 4.4% were disabled, and 8.3% had some other reason for not working.

Respondents who were employed, either as a paid employee or self-employed, had a relatively high probability of choosing a program as their most preferred (75.4% and 72.1%, respectively). However, respondents on a temporary layoff had the highest probability of choosing a program as their most preferred at 81.3%. Retirees chose an alternative to the status quo the least, at 69.5%. The differences between employment status and program selection were not statistically significant [ $F(6.47, 20492.13) = 1.17; p = 0.319$ ].

**Table 7.12. Respondent employment status**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Working – as a paid employee	53.2	75.4 (1,717)
Working – self-employed	10.7	72.1 (359)
Not working – on temporary layoff	1.0	81.3 (29)
Not working – looking for work	5.2	72.5 (129)
Not working – retired	17.1	69.5 (585)
Not working – disabled	4.4	71.9 (140)
Not working – other	8.3	74.4 (207)
Refused	0.1	0 (1)
<b>Total</b>	<b>100.0%</b>	

**Income**

There is a marginally significant monotonic change in the proportion of respondents choosing one of the alternatives as their income increases [ $F(18.27, 55,523.25) = 1.57; p = 0.056$ ]. We find that 69% of respondents making less than or equal to the sample median income (\$55,000) chose an alternative over the status quo, whereas 74% of respondents earning more than \$55,000 chose an alternative over the status quo. This difference was not statistically significant [ $F(1, 3,260) = 4.58; p = 0.032$ ].

**Table 7.13. Respondent income**

<b>Response</b>	<b>% of sample (N = 3,040)</b>	<b>% of respondents choosing a program over status quo (base unweighted N)</b>
\$0- < \$5,000	1.5	68.7 (45)
\$5,000- \$7,499	1.0	76 (30)
\$7,500- \$9,999	0.6	70.8 (23)

**Table 7.13. Respondent income (cont.)**

<b>Response</b>	<b>% of sample (N = 3,040)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
\$10,000- \$12,499	1.4	69.3 (41)
\$12,500- \$14,999	1.9	60 (52)
\$15,000- \$19,999	3.2	60.5 (91)
\$20,000- \$24,999	5.8	68.6 (142)
\$25,000- \$29,999	5.1	65.3 (136)
\$30,000- \$34,999	3.7	75.5 (119)
\$35,000- \$39,999	11.2	63.1 (305)
\$40,000- \$49,999	7.8	71.5 (256)
\$50,000- \$59,999	9.2	77.3 (272)
\$60,000- \$74,999	12.5	74.2 (380)
\$75,000- \$84,999	7.0	74.1 (216)
\$85,000- \$99,999	7.2	71.4 (233)
\$100,000- \$124,999	7.6	74.5 (242)
\$125,000- \$149,999	4.4	74.2 (148)
\$150,000- \$174,999	2.8	88.4 (86)
\$175,000 or more	4.4	74.4 (167)
Total	98.3%	

Approximately 1.8% of respondents provided responses to a category with a broader income range and are not presented in this table.

### ***Marital status***

Of respondents, 64.8% were married, 13.0% were widowed, 9.7% were divorced, 3.3% were separated, and 8.9% were never married. Of never married respondents, 82.0% chose an alternative to the status quo, the most of any category. Widowed respondents follow, at 78.3%, and divorced respondents were least likely to choose an alternative to the status quo, at 71.8%. Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(4.61, 14573.14) = 2.27; p = 0.05$ ].

**Table 7.14. Respondent marital status**

<b>Response</b>	<b>% of sample (N = 3,159)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Married	64.8	71.9 (1,972)
Widowed	13.0	78.3 (312)
Divorced	9.7	71.8 (438)
Separated	3.3	71.9 (151)
Never married	8.9	82.0 (275)
Refused	0.4	77.1 (11)
Total	100.0%	

### ***Taxpayers***

Respondents were asked, “Did anyone in your household pay any federal income taxes last year, 2008?” Results show that 86.5% of respondents had and 8.5% had not and 4.9% were not sure.

Respondents who did not pay federal income taxes chose an alternative to the status quo 74.2% of the time, whereas 73.9% of respondents who did pay federal income taxes chose an alternative to the status quo. These differences between respondents who answered “yes,” “no,” or “not sure” were not statistically significant [ $F(2.66, 8431.14) = 0.55; p = 0.624$ ]. When responses for respondents who refused to answer the question were included, the differences were not statistically significant [ $F(1.98, 6246.61) = 2.58; p = 0.524$ ].

**Table 7.15. Did anyone in your household pay any federal taxes last year, 2008 (Q29)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Yes	86.5	73.9 (2,787)
No	8.5	74.2 (263)
Not sure	4.9	68.1 (112)
Refused	0.1	66.5 (5)
Total	100.0%	

### **Respondents' familiarity with coral reefs**

#### *Heard about coral reefs often*

Q1 asked, "How often have you read or heard about coral reefs, either in U.S. waters or elsewhere?" Results show that 34.3% of respondents had heard about coral reefs not often at all, 30.0% had heard slightly often, and 25.2% had heard moderately often. Few respondents had heard of coral reefs very often (8.8%) or extremely often (1.3%).

Overall, respondents who had heard more about coral reefs were more likely to choose an alternative to the status quo. Respondents who heard about reefs "very often" chose an alternative to the status quo 87.3% of the time, and respondents who heard about reefs "extremely often" chose an alternative to the status quo 92.1% of the time. Respondents who heard about reefs "not often at all" chose an alternative to the status quo the least, at 64.8% of the time. Responses to this question differed significantly between respondents who chose an alternative to the status quo as compared with respondents who chose the status quo [ $F(4.56, 14430.6) = 14.78; p < 0.001$ ].

**Table 7.16. How often have you read or heard about coral reefs, either in U.S. waters or elsewhere (Q1)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not often at all	34.3	64.8 (1,025)
Slightly often	30.0	73.9 (953)
Moderately often	25.2	79.4 (849)
Very often	8.8	87.3 (279)
Extremely often	1.3	92.1 (54)
Refused	0.3	90.4 (7)
Total	100.0%	

***Frequency of visits to coral reefs***

Q2 asked, “About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason?” Results show that 52.8% of respondents had never visited a coral reef, 24.3% had visited once or twice, 13.7% had visited three to seven times, and 7.9% had visited at least eight times.

As we expected, respondents who visited coral reefs the most were also the most likely to choose an alternative to the status quo as their most preferred. Respondents who had visited at least eight times chose an alternative to the status quo 86.8% of the time, respondents who had visited three to seven times chose an alternative to the status quo 76.6% of the time, respondents who had visited once or twice chose an alternative to the status quo 79% of the time, and respondents who had never visited chose an alternative to the status quo 68.9% of the time. These differences in program preferences over visit frequency were statistically significant [ $F(3.61, 11442.62) = 9.66$ ;  $p < 0.001$ ].

**Table 7.17. About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason (Q2)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
0 times	52.8	68.9 (1,584)
1–2 times	24.3	79.0 (772)
3–7 times	13.7	76.6 (471)
At least 8 times	7.9	86.8 (311)
Refused	1.3	53.3 (29)
Total	100.0%	

***Lived in Hawaii***

Q4 asked, “Have you ever lived in Hawaii, or have you never lived in Hawaii?” Results show that 97.0% of respondents had never lived in Hawaii; 2.8% had lived in Hawaii. Respondents who had lived in Hawaii were more likely to choose an alternative to the status quo as their most preferred – 77.8% versus 73.5% for respondents who had never lived in Hawaii. These differences were not statistically significant [ $F(1.92, 6090.36) = 0.36; p = 0.687$ ].

**Table 7.18. Have you ever lived in Hawaii, or have you never lived in Hawaii (Q4)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Yes, I have lived in Hawaii	2.8	77.8 (96)
No, I have never lived in Hawaii	97.0	73.5 (3,066)
Refused	0.2	78.1 (5)
Total	100.0%	

### ***Likely to visit Hawaii***

Q5 asked, “In the next 10 years, how likely is it that you will go to Hawaii?” Results show that 38.4% of respondents either definitely or probably will not go to Hawaii, 31.7% may or may not go to Hawaii, and 29.7% either probably or definitely will go to Hawaii.

As we expected, the more likely a person is to go to Hawaii, the more likely he or she is to choose an alternative to the status quo as most preferred. Those who responded that they “definitely will not go to Hawaii” chose an alternative to the status quo 60.5% of the time, whereas those who responded that they “definitely will go to Hawaii” chose an alternative to the status quo 83.5% of the time. These differences in program preferences across likelihood of visiting Hawaii were statistically significant [ $F(4.9, 15514.38) = 15.2; p < 0.001$ ].

**Table 7.19. In the next 10 years, how likely is it that you will go to Hawaii (Q5)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
I definitely will not go to Hawaii	10.6	60.5 (291)
I probably will not go to Hawaii	27.8	64.6 (888)
I may or may not go to Hawaii	31.7	77.5 (1,017)
I probably will go to Hawaii	19.1	82.6 (621)
I definitely will go to Hawaii	10.6	83.5 (342)
Refused	0.2	46.2 (8)
Total	100.0%	

### **Respondent attitudes about the environment**

#### ***Importance of costs when protecting the environment***

Q28a asked how much respondents agree with the statement, “Cost should not be a factor when protecting the environment.” Results show that 45.0% either strongly or somewhat disagreed, 36.1% somewhat or strongly agreed, and 18.3% neither agreed nor disagreed.

Overall, the more a respondent agreed with this statement, the more likely he or she was to choose an alternative to the status quo. Respondents who strongly agreed with this statement chose an alternative to the status quo 85.4% of the time, whereas respondents who strongly disagreed chose an alternative to the status quo 51.2% of the time. Respondents who somewhat agreed chose an alternative to the status quo 88.2% of the time, and respondents who somewhat disagreed chose an alternative to the status quo 73.1% of the time. Respondents who neither agreed nor disagreed chose an alternative to the status quo 68.9% of the time. These differences in program preferences over level of agreement with this statement were statistically significant [ $F(4.92, 15583.48) = 29.21; p < 0.001$ ].

**Table 7.20. Cost should not be a factor when protecting the environment (Q28a)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Strongly disagree	17.3	51.2 (544)
Somewhat disagree	27.7	73.1 (908)
Neither agree nor disagree	18.3	68.9 (533)
Somewhat agree	25.9	88.2 (846)
Strongly agree	10.2	85.4 (315)
Refused	0.7	63.2 (21)
Total	100.0%	

### *Appropriateness of current spending on environment*

Q2D1b and Q2D2b asked for respondents' opinions on public spending on the environment using two different versions. For each version, respondents were asked whether they thought we are spending "too little," "too much," or "about the right amount." The first version asked for respondents' opinions on "Current spending on the environment." The second version asked for respondents' opinions on "Current spending on improving and protecting the environment." In the first version, the most common response was "too little" (48.4%). However, in the second version, the most common response was "about the right amount" (44.3%). And 13.1% of those responding to the first version and 14.3% of those responding to the second version thought we were spending "too much."

For both versions, respondents who thought we were spending “too little” were also the most likely to choose an alternative to the status quo as their most preferred, with 83.7% for the first version and 85.3% for the second. Respondents who thought we were spending too much chose an alternative to the status quo the least often: 49.9% for the first version and 48.2% for the second. The differences in program preferences over opinions about current spending on the environment were statistically significant for both versions [version 1:  $F(2.75, 4,354.9) = 24.78$ ;  $p < 0.001$ ; version 2:  $F(2.54, 4,015.65) = 18.16$ ;  $p < 0.001$ ].

**Table 7.21. Current spending on the environment (Q2D1b)?**

<b>Response</b>	<b>% of sample (N = 1,583)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Too little	48.4	83.7 (777)
About the right amount	37.9	68.5 (583)
Too much	13.1	49.9 (212)
Refused	0.7	84.3 (11)
Total	100.0%	

**Table 7.22. Current spending on improving and protecting the environment (Q2D2b)?**

<b>Response</b>	<b>% of sample (N = 1,584)</b>	<b>% of respondents choosing a program over status quo (base unweighted N)</b>
Too little	40.7	85.3 (688)
About the right amount	44.3	71.7 (679)
Too much	14.3	48.2 (213)
Refused	0.7	64.5 (4)
Total	100.0%	

## *Environmentalist*

Q27 asked, “Would you say you think of yourself as not an environmentalist at all, slightly an environmentalist, a moderate environmentalist, a strong environmentalist, or a very strong environmentalist?” More respondents considered themselves “not an environmentalist at all” or “slightly an environmentalist” than considered themselves “a strong environmentalist” or “a very strong environmentalist”: 41.3% versus 17.7%. “Moderate environmentalist” was the most common response, at 40.6%.

**Table 7.23. Would you say you think of yourself as not an environmentalist at all, slightly an environmentalist, a moderate environmentalist, a strong environmentalist, or a very strong environmentalist (Q27)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not an environmentalist at all	12.2	54.4 (319)
Slightly an environmentalist	29.1	68.4 (855)
A moderate environmentalist	40.6	78.4 (1,374)
A strong environmentalist	14.6	84.2 (483)
A very strong environmentalist	3.1	93.9 (127)
Refused	0.4	20.4 (9)
Total	100.0%	

As could be expected, the stronger an environmentalist a respondent considers himself or herself, the more likely he or she is to choose an alternative to the status quo as most preferred. For example, 93.9% of respondents who consider themselves very strong environmentalists chose an alternative to the status quo as their most preferred, whereas 54.4% of respondents who consider themselves “not an environmentalist at all” chose an alternative to the status quo. These differences in program preferences over identification as an environmentalist were statistically significant [ $F(4.7, 14891.48) = 22.45; p < 0.001$ ].

***Trust government or university scientists***

Q24 asked, “Please tell us how much confidence you have in the following groups and institutions in this country. In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in the following?” They were then asked to rate their confidence in “The people who run the U.S. government” (Q24a) and “university scientists” (Q24b).

**Table 7.24. How much confidence do you have in the people who run the U.S. government (Q24a)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
No confidence at all	19.8	52.8 (600)
A little confidence	32.1	74.6 (999)
A moderate amount of confidence	34.8	79.7 (1,183)
A lot of confidence	10.9	88.5 (312)
A great deal of confidence	2.1	84.6 (61)
Refused	0.4	47.7 (12)
Total	100.0%	

Results show that 51.9% of respondents had “no confidence at all” or “a little confidence” in the people who run the U.S. government. And 13.0% had “a lot” or “a great deal” of confidence, while 34.8% had a moderate amount of confidence. We find that, in general, the greater a respondent’s confidence in government, the higher the likelihood the respondent will choose an alternative to the status quo. Although the probability of voting yes does not increase monotonically as confidence increases, respondents with a lot or great deal of confidence are more likely to choose an alternative to the status quo (88.5% and 84.6%, respectively) than respondents who have no confidence or a little confidence (52.8% and 74.6%, respectively). These differences in the probabilities of choosing a program over different levels of confidence in government were statistically significant [ $F(4.76, 15057.34) = 24.61; p < 0.001$ ].

Results also show that 21.6% of respondents had “no confidence at all” or “a little confidence” in university scientists, and 37.9% had “a lot of confidence” or “a great deal of confidence” in university scientists. Also, 39.8% of respondents had a moderate amount of confidence in university scientists.

As respondent confidence in university scientists increases, so does the probability of choosing a program over the status quo. For example, respondents with “a great deal of confidence” in university scientists chose an alternative to the status quo as their most preferred alternative 89.4% of the time, whereas respondents with “no confidence at all” chose an alternative to the status quo as their most preferred 29.7% of the time. These differences in preferences for programs over levels of confidence in university scientists were statistically significant [ $F(4.93, 15596.25) = 33.5; p < 0.001$ ].

**Table 7.25. How much confidence do you have in university scientists (Q24b)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
No confidence at all	4.3	29.7 (123)
A little confidence	17.3	60.7 (506)
A moderate amount of confidence	39.8	72 (1,236)
A lot of confidence	29.5	85.6 (999)
A great deal of confidence	8.4	89.4 (280)
Refused	0.7	67.2 (23)
Total	100.0%	

## **Respondent attitudes about taxes**

### ***Should not have to pay more to protect coral reefs***

Q28e asked respondents to indicate their level of agreement with the statement, “I should not have to pay more federal taxes to protect coral reefs in Hawaii.” Results show that 31.2% of respondents strongly or somewhat disagreed with the statement, 42.6% somewhat or strongly agreed with the statement, and 25.2% neither agreed nor disagreed.

As we expect, respondents who agree with this statement are less likely to choose a program over the status quo. For example, respondents who “strongly agree” with the statement chose an alternative to the status quo 33.3% of the time, whereas respondents who “strongly disagree” with the statement chose an alternative to the status quo 87.2% of the time. These differences in preferences for programs over opinions about paying additional taxes to protect coral reefs were statistically significant [ $F(4.81, 15215.26) = 83.73; p < 0.001$ ].

**Table 7.26. I should not have to pay more federal taxes to protect coral reefs in Hawaii (Q28e)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Strongly disagree	11.6	87.2 (410)
Somewhat disagree	19.6	94.8 (716)
Neither agree nor disagree	25.2	85.3 (732)
Somewhat agree	21.3	73.4 (637)
Strongly agree	21.3	33.3 (648)
Refused	1.0	73.5 (24)
Total	100.0%	

***Favor increasing federal taxes to protect coral reefs***

Q25 asked, “How do you feel about increasing federal taxes to protect coral reefs around the Main Hawaiian Islands?” Results show that 32.8% of respondents strongly or somewhat oppose paying more taxes, 42.9% somewhat or strongly favor paying more taxes, and 24.0% neither oppose nor favor.

As expected, the more respondents favor paying more taxes the more likely they are to choose an alternative to the status quo as their most preferred. Respondents who strongly favor paying more taxes chose an alternative to the status quo 99.5% of the time, and respondents who strongly oppose paying more taxes chose an alternative to the status quo 19.2% of the time. These differences in preferences for programs over opinions regarding paying additional taxes were statistically significant [ $F(4.82, 15274.93) = 151.68; p < 0.001$ ].

**Table 7.27. How do you feel about increasing federal taxes to protect coral reefs around the Main Hawaiian Islands (Q25)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Strongly oppose	17.3	19.2 (574)
Somewhat oppose	15.5	57.6 (460)
Neither oppose nor favor	24.0	79.9 (641)
Somewhat favor	30.8	97.6 (1,031)
Strongly favor	12.1	99.5 (450)
Refused	0.4	52.6 (11)
Total	100.0%	

***Higher taxes or higher prices to fund programs***

Q26 asked, “If you had to choose, would you prefer to pay for new environmental programs through higher income taxes or through higher prices?” Respondents most commonly indicated “no preference” (39.8%). Of those that chose between the two options, 20% chose higher income taxes and 39.4% chose higher prices.

Respondents who prefer to pay for programs through higher taxes were also more likely to choose an alternative to the status quo as their most preferred (91.4%). Those who preferred higher prices chose an alternative to the status quo 73.5% of the time, and those with no preference chose an alternative to the status quo 66.1% of the time. The differences in preferences for programs over preferences for payment mechanism were statistically significant [ $F(2.93, 9269.52) = 39; p < 0.001$ ].

**Table 7.28. If you had to choose, would you prefer to pay for new environmental programs through higher income taxes or through higher prices (Q26)?**

<b>Response</b>	<b>% of sample (N = 3,167)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Through higher income taxes	20.0	91.4 (659)
Through higher prices	39.4	73.5 (1,316)
No preference	39.8	66.1 (1,169)
Refused	0.8	19.3 (23)
Total	100.0%	

### 7.3 Certainty

After respondents chose their most preferred program in Q10, Q13, and Q15, they were asked how certain they were of their choices in the corresponding certainty questions: [Q11], [Q14], and [Q16]. For example, [Q11] asked, “You chose the [Answer to Q10] as your most preferred program of these four programs. How sure are you that among these four programs, the [Answer to Q10] is your most preferred?” Results show that 50% of respondents were asked all three certainty questions, while 25% were asked only [Q11] or [Q16].

As shown in the second column of Table 7.29, 19.2% of respondents were either “not sure at all” or “slightly sure” about their response to Q10. Results show that 34.4% were “moderately sure” and 46.1% were either “very sure” or “extremely sure.” Respondents who were “moderately sure” about their choice in Q10 were most likely to choose an alternative to the status quo (79.6%), whereas respondents who were “not sure at all” were least likely to choose an alternative to the status quo (51.5%). The proportion of respondents choosing an alternative to the status quo differs by how certain respondents were about their choice. These differences are statistically significant [ $F(4.78, 11391.15) = 9.54; p < 0.001$ ].

**Table 7.29. Certainty of choice in Q10 [Q11]**

<b>Response</b>	<b>% of sample (N = 2,383)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not sure at all	7.7	51.5 (146)
Slightly sure	11.5	78.8 (252)
Moderately sure	34.4	79.6 (797)
Very sure	28.4	73.2 (722)
Extremely sure	17.7	67.3 (458)
Refused	0.3	39.7 (8)
Total	100.0%	

Table 7.30 shows 24.9% of respondents were either “not sure at all” or “slightly sure” about their response to Q13 (“Of the remaining three programs, which program do you prefer?”). Results show that 33.4% were “moderately sure” and 41.3% were either “very sure” or “extremely sure.” Respondents who were “extremely sure” about their choice in Q13 were most likely to choose an alternative to the status quo (94.6%), whereas respondents who were “not sure at all” about their choice were least likely to choose an alternative to the status quo (87.5%). Respondents who chose an alternative to the status quo as their most preferred choice are not significantly more certain about their choice [ $F(4.54, 7125.1) = 1.27; p = 0.278$ ].

As shown in the second column of Table 7.31, 26.7% of respondents were either “not sure at all” or “slightly sure” about their response to Q15 (“Of the remaining two programs, which program do you prefer?”). Results show that 33% were “moderately sure” and 39.9% were either “very sure” or “extremely sure.” Respondents who were “extremely sure” or “very sure” about their choice in Q15 were most likely to choose an alternative to the status quo (94.3% and 90.3%, respectively), whereas respondents who were “slightly sure” about their choice were least likely to choose an alternative to the status quo (84.9%). The proportion of respondents choosing an alternative to the status quo in Q15 differs by how certain respondents were about their choice. These differences are statistically significant [ $F(4.86, 11401.53) = 3.71; p = 0.003$ ].

**Table 7.30. Certainty of choice in Q13 [Q14]**

<b>Response</b>	<b>% of sample (N = 1,571)</b>	<b>% of respondents choosing an alternative to the status quo (unweighted N)</b>
Not sure at all	7.8	87.5 (113)
Slightly sure	17.1	88.2 (232)
Moderately sure	33.4	90.2 (528)
Very sure	26.2	88.2 (434)
Extremely sure	15.1	94.6 (256)
Refused	0.4	77 (8)
Total	100.0%	

**Table 7.31. Certainty of choice in Q15 [Q16]**

<b>Response</b>	<b>% of sample (N = 2,347)</b>	<b>% of respondents choosing an alternative to status quo (unweighted N)</b>
Not sure at all	10.6	86.1 (237)
Slightly sure	16.1	84.9 (333)
Moderately sure	33.0	85.3 (735)
Very sure	21.8	90.3 (570)
Extremely sure	18.1	94.3 (463)
Refused	0.4	100 (9)
Total	100.0%	

Table 7.32 shows the distribution of certainty responses by choice question. Results show that 19.2% of respondents were either “not sure at all” or “slightly sure” about their response to Q10 compared to 24.9% and 26.7% of respondents for Q13 and Q15, respectively. Similarly, 46.1% of respondents were either “very sure” or “extremely sure” about their responses to Q10 compared to 41.3% and 39.9% of respondents for Q13 and Q15, respectively. This demonstrates a declining rate of certainty over the choice questions. Respondents were most certain about their first choice and least certain about their third choice. The distributions of certainty responses across [Q11], [Q14], and [Q16] are statistically different [ $F(9.76, 86,508.00) = 5.91; p < 0.001$ ].

**Table 7.32. Certainty by choice question**

<b>Response</b>	<b>% of sample, [Q11] (N = 2,383)</b>	<b>% of sample, [Q14] (N =1,571)</b>	<b>% of sample, [Q16] (N =2,347)</b>
Not sure at all	7.7	7.8	10.6
Slightly sure	11.5	17.1	16.1
Moderately sure	34.4	33.4	33.0
Very sure	28.4	26.2	21.8
Extremely sure	17.7	15.1	18.1
Refused	0.3	0.4	0.4
Total	100.0%	100.0%	100.0%

## 7.4 Conclusion

Overall, across the range of tests presented above, the likelihood of choosing an Alternative Program over the Current Program (status quo) was responsive to respondents’ acceptance of the scenarios and their characteristics and beliefs.

---

## 8. Model Estimation and Willingness to Pay

As explained at the outset, the overall goal of this project was to estimate the total values that the U.S. public places on the protection and restoration of degraded coral reefs of the MHI. We considered two problems: widespread, chronic degradation at the ecosystem level that has followed from the forces commonly referred to as “economic development” (e.g., overfishing, nonpoint source pollution) and much smaller, localized, but more traumatic injuries to the reefs (e.g., injuries from ship strikes, oil and toxic spills, urban pollution). This, in turn, required scenarios that individuals filling out our survey could understand and find plausible. No-fishing zones and ship strikes served this purpose. To be realistic, the scenarios were based on current scientific knowledge to the extent possible. We did not evaluate actual proposals to expand no-fishing zones around the MHI to 25% of the reefs or to establish a ship-strike damage repair program. These were merely tools or case studies to get at what really matters: the total values of substantial protection and restoration of large-scale ecosystems and more localized injuries to reefs.<sup>1</sup>

This chapter presents the final results. In the first section, data from application of the attribute-based questions and other questions in our survey are used to arrive at a final model to use in valuation. Then, later sections report value estimates at the household and aggregate levels.

### 8.1 Final Model and Variables

As described in Chapter 2, the Team applied an attribute-based approach using a stated choice format in which respondents provided a full ranking of four alternative programs, one of which was the status quo (the Current Program). There are several estimation techniques that economists can use to analyze such data.<sup>2</sup> For the final analysis, the Team used a rank-ordered probit model, which fits respondents’ program choices into a utility-theoretic framework that is used to estimate WTP.<sup>3</sup>

---

1. The phrase “substantial protection and restoration” implies an important caveat. Complete restoration to pristine conditions may not be technically feasible at this time and would be of limited policy relevance. No fishing zones would improve fish catches from 10% to 50% of historic levels and make the entire reef ecosystem healthier, support more marine life, improve the quality of recreation, and improve religious and cultural uses by native Hawaiians.

2. Appendix D, Section D.2, includes a review of these techniques.

3. In the Team’s view, this is the most appropriate model for analyzing these ranked choices for two primary reasons. First, because three of the four alternatives in the choice set involve programs with a similar goal – to protect and/or repair coral reefs in the MHI – preferences for these alternatives are expected to be correlated.

As discussed in Appendix E, the model presented here only allows us to estimate WTP for the specific programs proposed. We are not able to estimate marginal WTP for varying levels of program attributes. This is due to the fact that we limited our program descriptions to scenarios that were deemed reasonable by our science advisors. The model presented here cannot extrapolate beyond the actual scenarios posed in the survey.

In analyzing stated choices, economists assume that the differences across respondents' choices are attributable to variation in both observed characteristics (e.g., respondents' demographic characteristics and/or responses to survey questions), as well as unobserved, random variation. Our model includes several variables to account for the variation in observed respondent characteristics. These include variables such as whether the respondent will visit Hawaii in the future, whether the respondent is an environmentalist, and the number of times a respondent has visited a coral reef, as well as demographic variables, such as income, education, marital status, and home ownership. To select these variables as the final model variables, we followed a process that began by considering the full set of variables that were significant in Section 7.2. We excluded attitudinal and management scenario variables because these variables might be "endogenous" variables, that is, variables that might be caused *by* respondents' program choices (or by an unobserved variable that is highly correlated) rather than simply causes *of* those choices. The model variables are defined and described in Tables 8.1 and 8.2,<sup>4</sup> and the estimation results of the rank-ordered probit model are presented in Table 8.3.<sup>5,6</sup>

---

(See Appendix E, footnote 3, for more discussion of this issue.) Second, the fourth alternative in the choice set (the Full Program) is a combination program that is equal to the sum of the two individual programs (No-Fishing Zones Program plus Reef Repair Program). Thus, any unexplained variation in preferences for that program is likely to represent some combination of the unexplained variances for the individual programs. Therefore, the error variance for the combined program might be larger than the individual-program variances. In other words, the error terms might be heteroskedastic. (See Appendix E, footnote 4, for more discussion of this issue.) The rank-ordered probit model accommodates these issues by allowing for correlation and heteroskedasticity in the unexplained variances across alternatives. The rank-ordered probit model has been discussed in the literature for many years (Hajivassiliou and Ruud, 1994; Train, 2003) but has rarely been applied in practice due to its computational complexity. One recent paper that applies the rank-ordered probit model is Schechter (2010).

4. See Appendix F for a complete breakdown of the demographic variables: education, income, marital status, and home ownership. See Appendix H for a breakdown of responses to the other model variables.

5. The pooled dataset has 3,277 observations; 94 observations were dropped from the analysis because the respondents did not answer any part of the ranking sequence. If respondents answered the initial ranking question, Q10, but did not answer the follow-up ranking questions, Q13 or Q15, then all remaining alternatives in the choice set at the point of the nonresponse were treated as ties for that observation. This left 3,183 observations for our final analysis.

6. The model was estimated using the "asprobit" command in Stata 10. See Appendix E, footnote 5, for details on the algorithm Stata used to estimate this model.

**Table 8.1. Variables used in the rank-ordered probit model**

	<b>Variable definition</b>
<b>Alternative-specific variables</b>	
Fish	A variable indicating the no-fishing zones program appeared in the chosen alternative
Reef	A variable indicating the reef repair program appeared in the chosen alternative
Cost	The cost to the household of the alternative
<b>Individual-specific variables interacted with the no-fishing zones program</b>	
Income X Fish	Equals the respondent's income divided by \$1,000 interacted with alternatives that include the no-fishing zones program, 0 otherwise <sup>a</sup>
Education X Fish	Level of education interacted with alternatives that include the no-fishing zones program, 0 otherwise <sup>b</sup>
Married_own X Fish	A dummy variable that equals 1 if the respondent stated that he or she is married and owns a home interacted with alternatives that include the no-fishing zones program, 0 otherwise
Strong environmentalist X Fish	A dummy variable that equals 1 if the respondent said that he or she was at least a "strong environmentalist" interacted with alternatives that include the no-fishing zones program, 0 otherwise
Very strong environmentalist X Fish	A dummy variable that equals 1 if the respondent said that he or she was a "very strong environmentalist" interacted with alternatives that include the no-fishing zones program, 0 otherwise
Def_visit X Fish	A dummy variable that equals 1 if the respondent stated that he or she will "definitely" visit Hawaii in the next 10 years interacted with alternatives that include the no-fishing zones program, 0 otherwise
Times X Fish	Equal to the number of times the respondent has visited coral reefs interacted with alternatives that include the no-fishing zones program, 0 otherwise <sup>c</sup>
<b>Individual-specific variables interacted with the reef repair program</b>	
Income X Ship	Equals the respondent's income divided by \$1,000 interacted with alternatives that include the reef repair program, 0 otherwise
Education X Ship	Level of education interacted with alternatives that include the reef repair program, 0 otherwise
Married_own X Ship	A dummy variable that equals 1 if the respondent stated that he or she is married and owns a home interacted with alternatives that include the reef repair program, 0 otherwise

**Table 8.1. Variables used in the rank-ordered probit model (cont.)**

	Variable definition
Strong environmentalist X Ship	A dummy variable that equals 1 if the respondent said that he or she was at least a “strong environmentalist” interacted with alternatives that include the reef repair program, 0 otherwise
Very strong environmentalist X Ship	A dummy variable that equals 1 if the respondent said that he or she was a “very strong environmentalist” interacted with alternatives that include the reef repair program, 0 otherwise
Def_visit X Ship	A dummy variable that equals 1 if the respondent stated that he or she will “definitely” visit Hawaii in the next 10 years interacted with alternatives that include the reef repair program, 0 otherwise
Times X Ship	Equal to the number of times the respondent has visited coral reefs interacted with alternatives that include the reef repair program, 0 otherwise

a. See Appendix D, footnote 2, for more information on how income categories were defined and how missing responses were imputed.

b. See Appendix F for a complete breakdown of the education variable. For modeling purposes, the education variable was re-centered around the median response of 10, or “some college.” In other words, education, which ranged in levels from 1 to 14 in the original dataset (see Table 8.2), was reduced by 10 so that it ranged from -9 to 4 for the analysis. This means that, in the final model, respondents who have education levels at “high school graduate” or below have predicted WTPs that are below the “base” amounts, or the amounts predicted by the estimated program-specific constants. Those who are college graduates or above have predicted WTPs that are above these “base” amounts. This re-centering does not affect overall model results. It simply shifts the values between the education coefficients and the alternative-specific constants.

c. Fourteen respondents said they had visited coral reefs more than 100 times. For modeling purposes, these responses, which represent less than 1% of the data, were capped at 100.

**Table 8.2. Summary of variables included in the final model (N = 3,277)**

Variable	Mean	Standard deviation	Min	Max
Income	\$64,196	\$49,620	\$2,500	\$225,000
Education	10.14	1.86	1	14
Married_own	0.53	0.50	0	1
Strong environmentalist	0.17	0.38	0	1
Very strong environmentalist	0.03	0.17	0	1
Def_visit	0.30	0.46	0	1
Times	3.21	11.11	0	100

**Table 8.3. Rank-ordered probit estimation results**

<b>Covariate</b>	<b>Coefficient</b>	<b>Standard error</b>	<b>z</b>	<b>P &gt;  z </b>	<b>95% confidence interval</b>	
Cost	-0.002	0.000	-5.440	0.000	-0.003	-0.001
Fish	0.245	0.086	2.850	0.004	0.076	0.413
Ship	0.071	0.068	1.040	0.296	-0.062	0.204
<b>Variables with the no-fishing zones program</b>						
Income X Fish	0.002	0.001	2.280	0.023	0.000	0.003
Education X Fish	0.049	0.019	2.650	0.008	0.013	0.086
Married_own X Fish	-0.179	0.059	-3.030	0.002	-0.294	-0.063
Strong environmentalist X Fish	0.691	0.103	6.700	0.000	0.489	0.893
Very strong environmentalist X Fish	0.440	0.186	2.370	0.018	0.075	0.805
Def_visit X Fish	0.333	0.098	3.400	0.001	0.141	0.524
Times X Fish	0.007	0.002	2.760	0.006	0.002	0.012
<b>Variables with the reef repair program</b>						
Income X Ship	-0.000 <sup>a</sup>	0.001	-0.210	0.834	-0.001	0.001
Education X Ship	-0.020	0.015	-1.310	0.189	-0.050	0.010
Married_own X Ship	-0.167	0.057	-2.940	0.003	-0.279	-0.056
Strong environmentalist X Ship	0.512	0.085	6.050	0.000	0.346	0.678
Very strong environmentalist X Ship	0.294	0.151	1.950	0.052	-0.002	0.591
Def_visit X Ship	0.333	0.103	3.240	0.001	0.131	0.534
Times X Ship	0.006	0.002	2.810	0.005	0.002	0.011
Insigma 3 <sup>b</sup>	-0.124	0.047	-2.630	0.008	-0.217	-0.032
Insigma 4	0.512	0.041	12.610	0.000	0.433	0.592
atanhr3_2	0.862	0.074	11.590	0.000	0.716	1.008
atanhr4_2	1.304	0.086	15.110	0.000	1.135	1.473
atanhr4_3	1.159	0.083	14.010	0.000	0.997	1.321
sigma1	1.000					
	(base alternative)					
sigma2	1.000					
	(scale alternative)					
sigma3	0.883	0.042			0.805	0.969
sigma4	1.669	0.068			1.542	1.808

**Table 8.3. Rank-ordered probit estimation results (cont.)**

Covariate	Coefficient	Standard error	z	P >  z	95% confidence interval	
rho3_2	0.697	0.038			0.615	0.765
rho4_2	0.863	0.022			0.813	0.900
rho4_3	0.821	0.027			0.760	0.867

Alternative = 1 is the alternative normalizing location.

Alternative = 2 is the alternative normalizing scale.

Log simulated-pseudolikelihood = -8,638.25.

a. The Income X Ship coefficient is -0.000129.

b. See Stata 10 manual [R] asprobit for an explanation of model-specific variables.

In addition to the final model presented here, we conducted a number of exploratory studies to consider additional factors or alternative approaches that might have affected choice responses. We found that these other factors and approaches did not lead to results that differed significantly from our final model. To summarize, we conducted the following exploratory studies:

- } The inclusion or exclusion of additional demographic covariates, as well as alternative specifications of the demographic covariates in the final model. Specifically, earlier runs of the model included variables for gender, age categories, and number of persons in the household, but these variables were found to be insignificant and were dropped from the final analysis to improve estimation efficiency. Estimation of average WTP is not significantly affected by the inclusion or exclusion of these additional covariates. We also estimated the model with a breakdown of the education variable into separate components so that different levels of educational attainment could have varying effects, but an LRT found that such a specification did not significantly improve model fit. Similarly, separating “married” and “own\_home” into two separate variables did not significantly improve fit.
- } Inclusion of separate coefficients representing the marginal utility of money income for different income groups. We found that different income groups might have, on average, different marginal values of money income and that models with separate parameters do not significantly change overall WTP estimation. To improve estimation efficiency, the final model includes one parameter representing the average marginal value of money income for the population. To estimate income effects, the model includes income as a covariate to explain program choices.

- } Estimating alternative model specifications. Several alternative models that we considered are discussed in Appendix D. We found that it was important to include both correlation and heteroskedasticity in the final model to obtain the best fit.
- } A study of how uncertainty affected responses. We found that excluding observations where the respondents were “not sure at all” of their responses did not give significantly different WTP results from those of our final model.

The model variables are summarized in Table 8.1. Three of the variables are specific to the alternative chosen (termed “alternative-specific”) and seven are characteristics specific to the individual respondent (termed “individual-specific”). To generate variation across alternatives, which is necessary for estimation, the individual-specific variables were interacted with the alternative-specific program variables (No-Fishing Zones and Reef Repair). The result is that there are separate individual-specific variables for each program, for a total of 14 such variables. Each variable serves as a shifter that measures the propensity of individuals with those characteristics to choose that specific program over the status quo.

Summary statistics for the individual-specific variables are presented in Table 8.2.<sup>7</sup>

Results of the rank-ordered probit model are presented in Table 8.3 and discussed below.<sup>8</sup> A Wald test on the 17 final model covariates cannot reject their joint significance ( $\chi^2_{(17)} = 263.44$ ,  $p < 0.001$ ). The pseudo-simulated log-likelihood at model convergence is  $-8,638.25$ .

The results indicate that planning to visit Hawaii in the next 10 years, being a strong and/or very strong environmentalist, and the number of times the respondent has been to coral reefs all have positive and significant impacts on the probability of a respondent choosing both the No-Fishing Zones and the Reef Repair programs. Most of the demographic characteristics are statistically significant at the 95% level or above. For example, the coefficient on income interacted with the No-Fishing Zones Program is positive and significant at the 95% level. This implies that there are positive income effects for this program. On the other hand, the coefficient on income for the Reef Repair Program is insignificant, implying that there are no significant income effects for this program. This may be due to the fact that the Reef Repair Program was generally offered at a lower cost, requiring less of a burden on a household budget. Being married and owning a home have significantly negative effects on both programs. These characteristics are likely to be

---

7. See Appendix D, footnotes 1 and 2, for details about how categorical variables were defined and how item nonresponses were imputed.

8. The estimated correlation matrix indicates that there is a strong positive correlation among error terms across the program alternatives and that the estimated variance terms indicate that the variance for the fourth alternative – the “full program” – is significantly larger than for the other programs. Both of these findings confirm prior expectations. See Appendix E for more discussion.

correlated with a lower disposable income, so the signs on these variables are not unexpected. Educational level has a positive and significant impact on choice of the No-Fishing Zones Program and an insignificant effect on the Reef Repair Program. The indicator variable for the No-Fishing Zones Program is positive and significant, but the indicator variable for the Reef Repair Program is not significant, implying that there is no measurable propensity to choose the Reef Repair Program over the status quo separate from any propensity that is explained by the above-mentioned variables.

The coefficient on program cost is negative and significant at the 99% level, indicating that money spent by the respondent negatively affects his or her utility, as expected from economic theory.

## 8.2 Per Household Values

The model just presented was used to arrive at per household values for Hawaiian coral reef ecosystem protection and restoration – as exemplified by no-fishing zones – and repair of smaller, localized damage to Hawaiian coral reefs – as exemplified by repair of injuries for ship strikes.

Using the parameter estimates presented in Table 8.3, we estimated mean WTP per household for each program. See Appendix E for details on estimating these values. Estimated mean WTP for each scenario, including the “full” program, are presented in Table 8.4, along with their estimated standard errors and confidence intervals. Estimated mean WTP for substantial protection and restoration of degraded MHI ecosystems is \$224.81 with a 95% confidence interval of \$161.72- 287.89. Estimated mean WTP for restoration of reefs after localized injuries is \$62.82 with a 95% confidence interval of \$20.23–105.40; estimated mean WTP for achieving both goals combined is \$287.62 with a 95% confidence interval of \$193.46–381.78.<sup>9</sup>

**Table 8.4. Mean WTP estimates (N = 3,183)**

<b>Program</b>	<b>Estimated WTP</b>	<b>Standard error</b>	<b>95% confidence interval</b>	
Protection and restoration of degraded MHI ecosystems	\$224.81	\$32.19	\$161.72	\$287.89
Restoration after localized injuries	\$62.82	\$21.73	\$20.23	\$105.40
Achieving both goals	\$287.62	\$48.04	\$193.46	\$381.78

9. As discussed in Appendix E, footnote 2, these estimates are likely to be conservative estimates. This is due to the fact that our model does not explicitly account for substitution effects. Instead, any substitution effects, which, if significant, are expected to be negative, are averaged into the program coefficients, thus decreasing our final estimates.

### 8.3 Elasticities and Marginal Effects of Variables on WTP

The probit model presented in Table 8.3 allows us to explore how estimated WTP would vary, on average, with respect to the demographic and other characteristics that are significant predictors of WTP. Specifically, we can use the model estimates to predict income elasticities, as well as other variables' marginal impacts on WTP. This type of analysis allows us to better understand how WTP might vary across the U.S. population.

In Table 8.5 we present the income elasticities of WTP.<sup>10</sup>

**Table 8.5. Income elasticity of WTP**

Program	Elasticity	Standard error	95% confidence interval	
Protection and restoration of degraded MHI ecosystems	0.22	0.11	0.01	0.43
Full program	0.17	0.08	0.01	0.34

The elasticity of WTP with respect to income for the ecosystem protection and restoration is 0.22, which means that a 1% (or 10%) increase in average income (which, from Table 8.2, is \$64,196 for the sample) would result in a 0.22% (2.2%) increase in WTP for that program. The elasticity of WTP for the combined program is 0.17. Both elasticity estimates are statistically significant at the 95% level. An elasticity was not estimated for restoration after localized injuries because income was not statistically significant in predicting WTP for that program.

Table 8.6 presents the marginal effects of the model variables on WTP.<sup>11</sup> The ecosystem protection and restoration has a “base” value of \$122.48. Each level of educational attainment increases WTP, on average, by \$24.63. Being married and owning a home decreases WTP, on average, by \$89.38. Being an environmentalist and/or a very strong environmentalist increases WTP, on average, by \$345.88 and \$220.31, respectively. WTP is also increased, on average, by \$3.37 for each time an individual took a trip to a coral reef. From Table 8.2, the number of times respondents visited coral reefs ranged from zero to 100, so this variable can increase WTP by as much as \$337, on average, for individuals who have visited coral reefs as often as 100 times.

---

10. Equation E.12 in Appendix E presents an expression for the income elasticity of WTP.

11. Equation E.13 presents an expression for the marginal effects of discrete variables, such as “strong environmentalist” on WTP.

**Table 8.6. Marginal effects of variables on WTP**

Variables	Coefficient	Standard error	z	P >  z	95% confidence interval	
Fish	122.48	34.95	3.50	0.00	53.98	190.98
Education X Fish	24.63	10.17	2.42	0.02	4.69	44.56
Married_own X Fish	-89.38	33.07	-2.70	0.01	-154.18	-24.57
Strong environmentalist X Fish	345.88	76.66	4.51	0.00	195.64	496.13
Very strong environmentalist X Fish	220.31	100.15	2.20	0.03	24.02	416.59
Def_visit X Fish	166.47	56.13	2.97	0.00	56.46	276.48
Times X Fish	3.37	1.33	2.54	0.01	0.77	5.97
Ship	35.41	30.95	1.14	0.25	-25.26	96.07
Education X Ship	-10.13	7.94	-1.27	0.20	-25.70	5.44
Married_own X Ship	-83.81	32.38	-2.59	0.01	-147.27	-20.34
Strong environmentalist X Ship	256.38	59.95	4.28	0.00	138.88	373.88
Very strong environmentalist X Ship	147.32	79.68	1.85	0.06	-8.85	303.50
Def_visit X Ship	166.49	57.47	2.90	0.00	53.84	279.14
Times X Ship	3.14	1.23	2.55	0.01	0.73	5.55

WTP for the restoration after a localized injury is increased significantly by being a strong and/or very strong environmentalist (\$256.38 and \$147.32, respectively), definitely planning to visit Hawaii in the next 10 years (\$166.47), and the number of times an individual has been to a coral reef (\$3.14 per time). WTP is significantly decreased, on average, by being married and owning a home (- \$83.81).

## 8.4 Aggregating Annual Household WTP to the U.S. Population

The estimated mean household WTP for ecosystem protection and restoration is \$224.81; mean household WTP for restoration after localized injuries is \$62.82; and mean household WTP to achieve both goals is \$287.62. The 2010 Census estimates that there were 116,716,292 households in the United States in 2010, the latest year estimates were available.<sup>12</sup> Using the mean household WTP estimates and the number of households in the United States, Table 8.7 presents the annual U.S. WTP for the three alternatives to the status quo.

12. This figure is based on the most recent estimates available from the 2010 Census.

**Table 8.7. Estimated annual U.S. WTP**

<b>Program</b>	<b>Estimated WTP</b>	<b>95% confidence interval</b>	
Protection and restoration of degraded MHI ecosystems	\$26,238,989,605	\$18,875,358,742	\$33,601,453,304
Restoration after localized injuries	\$7,332,117,463	\$2,361,170,587	\$12,301,897,177
Achieving both goals	\$33,569,939,905	\$22,579,933,850	\$44,559,945,960

## 8.5 Validity Assessment

How credible are these results? In more technical terms, this question comes under the general heading of “validity assessment.” WTP is very much like other concepts used in the social and behavioral sciences, such as human intelligence, competence in mathematics, creativity, and racial prejudice. In all such cases, real-world evidence has to be mustered to measure scientific constructs that cannot be observed directly because they exist in people’s minds (Bishop, 2003). Scientists’ inability to directly observe what they are trying to measure makes validity a pervasive issue throughout the social and behavioral sciences.

Validity assessments begin by considering the validity of the methods used. In essence, the question at this level is whether or not the methods used in a particular application are capable of producing valid estimates. It would make no sense to ask whether results from a specific application are valid if the overall methods used were deeply flawed. On the other hand, if the methods applied have an acceptable level of validity, then the next step in validity assessment is to ask whether those methods were correctly applied in the study in question.

What is known about the overall validity of methods used in our study? As explained in Chapter 2, the methods used here are a hybrid between conventional CV and attribute-based choice questions. Today, we are fortunate to have a very large base of scientific literature to draw on in considering the validity of CV. Since 1963, more than 6,000 papers and reports on CV have been published in the United States and many other countries, many of them in the peer-reviewed literature (Carson, Forthcoming). These studies provide a wealth of experience in applying the method and a large body of research on its validity. The result of this research is wide international acceptance of CV. In the United States, federal agencies such as OMB (2003) and U.S. EPA (2000) have approved the use of CV and developed guidelines on implementing it for policy analyses of environmental and natural resources issues. McCollum (2003) summarizes many instances where CV studies have influenced federal and state policies and regulations. See also Morgenstern (1997) and Bishop and Welsh (1999). A national panel of experts, NOAA’s Blue Ribbon Panel on Contingent Valuation (NOAA, 1993), determined that if conducted

properly, CV studies can provide valid results for natural resource damage assessments. Rules for damage assessment promulgated by the U.S. Department of Commerce (1996) and the U.S. Department of the Interior (1994) have explicitly authorized the use of CV in estimating damages from release of oil and chemicals into the environment.

This is not meant to imply that CV is free of controversy. An extended and, by and large, healthy scientific debate about the validity of the method continues. One branch of this literature dealing with so-called hypothetical bias deserves special mention since most work there is relatively recent and has been fairly influential. Studies on hypothetical bias have involved comparisons of hypothetical payments and actual payments, very often in laboratory experiments. List and Gallet (2001) and List and Shogren (2002) cite more than two dozen studies that compared hypothetical and real payments conducted before the year 2000, and Little and Berrens (2004) add to the list. More studies have been done since then (see, for example, Champ and Bishop, 2006; Johnston, 2006; Vossler and McKee, 2006; Christie, 2007; and Guzman and Kolstad, 2007). In most cases, average hypothetical WTP turned out to be larger than average values based on actual payments. List et al. (2004, p. 742) provide a succinct definition: “hypothetical bias is the difference between hypothetical and actual statements of value.”

The studies showing hypothetical bias have had one important feature in common. For respondents in their hypothetical treatments, survey designers have stressed that the valuation exercise was purely hypothetical. When researchers do that, the outcome has become predictable: if actual payments are taken as the standard for comparison, respondents to hypothetical questions will very often overvalue whatever is being offered.

Several remedies have been suggested for addressing hypothetical bias. To us, the most promising one involves making the valuation exercise “consequential.” Going back at least to Hoehn and Randall (1987) and Mitchell and Carson (1989), researchers on CV have stressed that the more realistic the valuation exercise is, the more likely are the results to be valid. If stressing that the exercise is hypothetical causes overvaluation, then the cure would seem to lie in encouraging respondents to believe that their expressions of WTP will affect whether or not the good they are valuing will be provided and how much they will actually pay. A growing body of literature has found that when CV exercises are consequential, hypothetical bias is eliminated, or at least greatly reduced. See Mitchell and Carson (1989), Champ and Brown (1997), Cummings and Taylor (1998), Vossler and Kerkvliet (2003), Vossler et al. (2003), Johnston (2006), Landry and List (2007), and Carson et al. (2008). Though it did not involve comparisons with actual payments, the recent paper by Herriges et al. (2010) also supports the proposition that making CV exercises consequential enhances validity.

Our study addressed the possibility of hypothetical bias by striving to make the valuation exercise consequential. After the programs were reviewed and just before the first choice question, the survey states:

Each of these alternatives to the Current Program would cost your household additional federal taxes each year as shown in the bottom of the table.

Remember, if you spend money for one of the programs that does more, that money won't be available for you to buy other things. If you do not want to do more and spend more to protect coral reefs in the Main Hawaiian Islands, you should check the Current Program as your most preferred program.

We stressed the same message when summarizing the cost attribute in each of the choice tables with the following words:

Added federal taxes paid by your household each year.

Nothing was said anywhere in the survey that could be interpreted as implying the programs or taxes were hypothetical.

Less is known about the validity of values inferred from stated choice and ranking questions. This is partly because the attribute-based approach is relatively new and partly because tests of validity are probably harder to conduct for attribute-based exercises compared to simpler CV exercises. However, ABMs are close relatives of CV. In our hybrid approach, the stated choice format was used partly as a way to summarize the information that was presented earlier in the survey. In addition, we sought to capitalize on what many researchers consider a strong point of this sort of format, namely, that it encourages respondents to make detailed comparisons of alternatives on an attribute-by-attribute basis. Since we did not endeavor to vary or value individual attributes, as is normally done in full-fledged attribute-based choice studies, issues associated with the validity of marginal valuation of attributes did not arise. This aligns validity assessment of our study more closely with the CV literature than would be true had we conducted a full attribute-based study.

In sum, the validity of CV is a topic of continuing research and discussion, as is true of any evolving scientific tool. However, progress so far has led to its wide acceptance. Although our approach changed how the information was presented compared to a conventional CV exercise, the link between our study and the large CV literature should not matter much to the validity of the hybrid approach.

Having considered the validity of CV as a method, we turn next to the second part of the validity assessment, consideration of whether results of our application are valid. The quality and reliability of WTP estimates are functions of both the quality of the underlying survey and the quality of the econometric analysis (Smith, 2007). To enhance the validity of the work, we employed:

- } A rigorous review process, including consultation with scientists to develop scientifically valid policy scenarios, and external peer reviews of the draft final report
- } Extensive focus groups, one-on-one interviews, and pretests to develop comprehensible language and to inform the final bid design (see Chapter 3)
- } Careful construction of the survey to ensure consequentiality and scenario acceptance (see Chapter 4)
- } State-of-the-art sampling techniques to develop appropriate probability weights (see Chapter 5 and Appendix C)
- } Construct validity analysis (Chapter 7) to test whether respondents' choices comport with expectations
- } State-of-the-art econometric modeling techniques (Appendix E).

To some, a value of close to \$300 per U.S. household per year for both programs may seem implausibly large. This is not an easy issue to address. After all, if we knew what reef restoration is worth, we would not have needed to do the study.

One way to consider questions of this kind is to see how our value estimates compare with values found in other nonmarket, ecosystem valuation studies. To do a complete review of all such studies would be a daunting task, requiring consideration of hundreds or even thousands of studies and careful weighing of their comparability to what we found. This would take us far beyond the scope of what was done here. However, even a brief review of the literature indicates there are many precedents in the literature for values per household that are comparable to ours. If we think in terms of orders of magnitude, many studies have value estimates in the hundreds of dollars per household per year.

Of greatest relevance would be total value studies involving the U.S. population. It turns out that such studies are rare, but there are some. To begin with a particularly stark example, Lee and Cameron's (2008) estimates of the mean WTP for an aggressive policy of climate change mitigation range from \$151 to \$353 per U.S. household *per month*, depending on how the money would be collected and how the costs of mitigation would be shared internationally. For comparison, Barrens et al. (2004) estimated several alternative values to U.S. residents of approval of the Kyoto Protocol under alternative assumptions. Their most conservative estimate is slightly less than \$200 per U.S. household per year, but other values are much higher. For example, if all respondents are assumed to have positive values, the estimate goes up to slightly more than \$800. Depending on assumptions and which of their subsamples is considered, their estimates run as high as \$1,500 per household per year.

Studies with a more regional focus have also found values in the hundreds of dollars. Banzhaf et al. (2006) estimated the per household total economic value to New York state residents of ecological improvements in the Adirondack Park from reduced acid rain to be between \$48 and \$154 annually depending on assumptions, including the discount rate and whether their base case (improvements in 600 lakes plus other ecological impacts) or scope case (improvements in 900 lakes plus more ecological improvements) was considered. They also cited a 1992 unpublished paper by Haefele et al. (1992) that estimated the total economic value to those living within a 500-mile radius of Asheville, NC, of protecting high-elevation forests in the Southern Appalachian Mountains from acid rain damage. That study found average annual WTP per household of \$134.

Other studies that have addressed ecosystem values include Stevens et al. (2000), which valued ecosystem management (“defined as ecologically based, sustainable management that blends environmental, social, and economic values” (Stevens et al. 2000) using both CV and conjoint analysis. Subjects were private nonindustrial forest owners in Massachusetts. Values ranged from \$86 to \$285 per year, depending on the valuation approach taken and modeling assumptions. Loomis et al. (2000) surveyed area residents along the South Platte River in Colorado and asked them about their values for restoring the river’s ecosystem through conservation easements. The average value was \$252 per household per year. Garber-Yonts et al. (2004) studied the value to Oregon residents of four different biodiversity programs in that state’s Coast Range. Three of the four programs had estimated per household annual values that exceeded \$100 per year: increasing areas devoted old growth forests had an average value of \$380, an endangered species habitat program had an average value of \$250 per year, and increasing protected salmon habitat had an average value of \$144.

Nunes et al. (2001) surveyed 61 studies done between 1983 and 1999 that valued biodiversity using a variety of methods. Most of these studies were done in the United States. Many CV-based values exceeded \$100 per year. Furthermore, the authors stressed that “most studies lack a uniform, clear perspective on biodiversity as a distinct concept from biological resources. In fact, the empirical literature fails to apply economic valuation to the entire range of biodiversity benefits. Therefore, available economic valuation estimates should generally be regarded as providing a very incomplete perspective on, and at best lower bounds, to the unknown value of biodiversity changes” (Nunes et al. 2001, p. 203).

Some studies from Australia have found similar values for environmental programs (Oxford Economics, 2009). For example, Imber et al. (1991) considered WTP to avoid the damages to Kakadu National Park from mining. Converted to 2009 AUD,<sup>13</sup> the resulting annual per household estimates ranged from A\$86 to A\$210 (Oxford Economics, 2009, p. 50) depending on modeling assumptions. Jakobsson and Dragun (2001) investigated the value to Victoria residents

---

13. The exchange rate between Australian and U.S. dollars is currently very close to unity.

of preserving the endangered species of that province. In 2009 AUD, the average annual per household value was estimated to be A\$164 (Oxford Economics, 2009, p. 50).

Two studies that consider the values for Australia's Great Barrier Reef have come to light. Rolfe and Windle (2010) examined the potential benefits (and costs) of improvements in ecosystem health of the Great Barrier Reef from reduced pollution, mostly from agriculture. They surveyed people from the watershed and from three Australian cities outside the watershed. Stated in terms of the marginal value of a 1% increase in the area of the reef in good ecological health, estimated values ranged from approximately 2010 A\$20 to A\$46 per household per year. They valued improvements in reef health of up to 9%, which clearly implies values in the hundreds of dollars per year for some of their policy scenarios. At the extreme, households within the watershed were estimated to have an annual value of more than A\$400. Oxford Economics (2009, p. 49) drew on other studies to estimate that protection of the Great Barrier Reef was worth slightly less than 2009 A\$60 per Australian household per year, but considered this estimate to be quite conservative for a number of reasons. Sensitivity testing indicated a "higher end" value of 2009 A\$115 per household per year (Oxford Economics, 2009, p. 67).

Our purpose is not to suggest that CV studies always find value estimates in the hundreds of dollars per household per year. Many studies have estimated smaller values. But we would suggest that the mere fact that we found values for MHI reef restoration in the hundreds of dollars per year is not grounds for doubting the validity of our results. There are many studies that have estimated similar values.

One other concern sometimes arises when considering the magnitude of values from CV studies. Some may find aggregate values like those reported earlier in this chapter implausible compared to private goods. Could substantial protection and restoration of MHI coral reef ecosystems really be worth more than \$26 billion per year? After all, given that there are 300,000 acres of reefs, this aggregate value averages out to more than \$86,000 per acre. The temptation at this point is to begin to make comparisons with the economic benefits per acre from terrestrial, privately owned real estate. On closer inspection, however, this line of reasoning is not very helpful. Modern economics draws a sharp distinction between private and public goods. When private goods are produced – as happens on private land – the benefits from such lands are "excludable." For example, if one landowner produces pineapples on an acre of land on Oahu, only that landowner can profit from production. Public goods – passive use values from coral reef ecosystems – are non-excludable. One person's enjoyment of those benefits does not diminish the benefits that others can enjoy simultaneously. In our case, many of the benefits of coral reef restoration and protection are non-excludable and non-rival. That is, if degraded coral reefs are restored and protected, no one can be barred from the passive use values this would generate. And, one person's enjoyment of the passive use benefits does not interfere with another person's enjoyment. For these reasons, the economic benefits from protection and restoration can

have much larger values per acre than would be true for private goods. Though this distinction is normally readily accepted in the classroom, it is often forgotten in the real world.

## References

- Banzhaf, H.S., D. Burtraw, D. Evans, and A. Krupnick. 2006. Valuation of natural resource improvements in the Adirondacks. *Land Economics* 82(3):445–464.
- Berrens, R.P., A.K. Bohara, H. Jenkins-Smith, C.L. Silva, and D.L. Weimer. 2004. Information and effort in contingent valuation surveys: Application to global climate change using national internet samples. *Journal of Environmental Economics and Management* 47:331–363.
- Bishop, R.C. 2003. Where to from here? In *The Economics of Non-market Goods & Resources: A Primer on Nonmarket Valuation*, P.A. Champ, K.J. Boyle, and T.C. Brown (eds.). Kluwer Academic Publishers, Dordrecht. pp. 537–566.
- Bishop, R.C. and M.P. Welsh. 1999. Contingent valuation: Incorporating nonmarket values. In *Better Environmental Decisions: Strategies for Governments, Businesses, and Communities*, K. Sexton, A.A. Marcus, K.W. Easter, and T.D. Burkhardt (eds.). Island Press, Washington DC. pp. 177–193.
- Carson, R. Forthcoming. *Contingent Valuation: A Comprehensive Bibliography and History*. Edward Elgar, Northampton, MA.
- Carson, R., T. Groves, and J. List. 2008. Probabilistic influence and supplemental benefits: a field test of the two key assumptions behind using stated preferences. Draft. Available: <http://www.aueb.gr/deos/seminars/Carson5-12-06.pdf>.
- Champ, P.A. and R.C. Bishop. 2006. Is willingness to pay for public goods sensitive to elicitation format? *Land Economics* 82(2):162–173.
- Champ, P.A. and T.C. Brown. 1997. A comparison of contingent and actual voting behavior. In *Proceedings from the W-133 Benefits and Cost Transfer in Natural Resource Planning, 10th Interim Report, Rocky Mountain Research Station, USDA Forest Service*. pp. 39–54.
- Christie, M. 2007. An examination of the disparity between hypothetical and actual willingness to pay using the contingent valuation method: The case of red kite conservation in the United Kingdom. *Canadian Journal of Agricultural Economics* 55:159–169.
- Cummings, R.G. and L.O. Taylor. 1998. Does realism matter in contingent valuation surveys? *Land Economics* 74(2):203–215.

- Garber-Yonts, B., J. Kerkvliet, and R. Johnson. 2004. Public values for biodiversity conservation policies in the Oregon Coast Range. *Forest Science* 50(5):589–602.
- Guzman, R.M. and C.D. Kolstad. 2007. Researching preferences, valuation and hypothetical bias. *Environmental and Resource Economics* 37:465–487.
- Haefele, M., R.A. Kramer, and T.P. Holmes. 1992. Estimating the total value of forest quality in high-elevation spruce-fir forests. In *Proceedings of the Conference: The Economic Value of Wilderness, General Technical Report*, Bowker, J. M. and Reed, P. C. (ed.). Southeastern Forest Experiment Station, Asheville, NC.
- Hajivassiliou, V.A. and P.A. Ruud. 1994. Classical estimation methods for LDV Models using simulation. In *Handbook of Econometrics, Volume IV*, R.F. Engle and D.L. McFadden (eds.). Elsevier Science B.V., Amsterdam. pp. 2384–2441.
- Herriges, J., C. Kling, C.C. Liu, and J. Tobias. 2010. What are the consequences of consequentiality? *Journal of Environmental Economics and Management* 59:67–81.
- Hoehn, J.P. and A. Randall. 1987. A satisfactory benefit cost indicator from contingent valuation. *Journal of Environmental Economics and Management* 14:226–247.
- Imber, D., G. Stevenson, and L. Wilks. 1991. A Contingent Valuation Survey of the Kakadu Conservation Zone. Resource Assessment Commission Research Paper No. 3, AGPS, Canberra.
- Jakobsson, K.M. and A.K. Dragun. 2001. The worth of a possum: Valuing species with the contingent valuation model. *Environmental and Resource Economics* 19:211–227.
- Johnston, R.J. 2006. Is hypothetical bias universal? Validating contingent valuation responses using a binding public referendum. *Journal of Environmental Economics and Management* 52:469–481.
- Landry, C.E. and J.A. List. 2007. Using ex ante approaches to obtain credible signals for value in contingent markets: Evidence from the field. *American Journal of Agricultural Economics* 89(2):420–429.
- Lee, J.J. and T.A. Cameron. 2008. Popular support for climate change mitigation: Evidence from a general population mail survey. *Environmental and Resource Economics* 41:223–248.
- List, J.A. and C.A. Gallet. 2001. What experimental protocol influence disparities between actual and hypothetical stated values? *Environmental and Resource Economics* 20:241–254.
- List, J.A. and J.F. Shogren. 2002. Calibration of willingness-to-accept. *Journal of Environmental Economics and Management* 43:219–233.

- List, J.A., R.P. Berrens, A.K. Bohara, and J. Kerkvliet. 2004. Examining the role of social isolation on stated preferences. *The American Economic Review* 94(3):741–752.
- Little, J. and R. Berrens. 2004. Explaining disparities between actual and hypothetical stated values: Further investigation using meta-analysis. *Economics Bulletin* 3(6):1–13.
- Loomis, J., P. Kent, E.M. Strange, K. Fausch, and A. Covich. 2000. Measuring the total economic value of restoring ecosystem services in an impaired river basin: results from a contingent valuation survey. *Ecological Economics* 33:103–117.
- McCollum, D.W. 2003. Nonmarket valuation in action. Chapter 13 in *A Primer on Nonmarket Valuation*, P.A. Champ, K.J. Boyle, and T.C. Brown (eds.). Kluwer Academic Publishers, Dordrecht.
- Mitchell, R.C. and R.T. Carson. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Resources for the Future, Washington, DC.
- Morgenstern, R.D. (ed.). 1997. *Economic Analyses at EPA: Assessing Regulatory Impact*. Resources for the Future, Washington, DC.
- NOAA. 1993. Natural Resource Damage Assessment under the Oil Pollution Act of 1990. Report of the NOAA Blue Ribbon Panel on Contingent Valuation. U.S. Department of Commerce. National Oceanic and Atmospheric Administration. *Federal Register* 58:4601–4614.
- Nunes, P.A.L.D. and J.C.J.M. van den Bergh. 2001. Economic valuation of biodiversity: Sense or nonsense? *Ecological Economics* 39:203–222.
- OMB. 2003. *Circular A-4: Regulatory Analysis*. Office of Management and Budget. September 17.
- Oxford Economics. 2009. Valuing the Effects of Great Barrier Reef Bleaching. Great Barrier Reef Foundation, Newstead, Queensland, Australia.
- Rolfe, J. and J. Windle. 2010. Assessing National Values to Protect the Health of the Great Barrier Reef. Environmental Economics Research Hub Research Report No. 72. Crawford School of Economics and Government, Australian National University, Canberra, Australia. October.
- Schechter, L. 2010. The apple and your eye: Visual and taste rank-ordered probit analysis with correlated errors. *Food Quality and Preference* 21:112–120.

Smith, V.K. 2007. Judging quality. In *Valuing Environmental Amenities Using Stated Choice Studies: A Common Sense Approach to Theory and Practice*, B. Kanninen (ed.). Springer, Dordrecht, The Netherlands.

Stevens, T.H., R. Belkner, D. Dennis, D. Kittredge, and C. Willis. 2000. Comparison of contingent valuation and conjoint analysis in ecosystem management. *Ecological Economics* 32:63–74.

Train, K.E. 2003. *Discrete Choice Methods with Simulation*. Cambridge University Press, Cambridge, UK.

U.S. Department of Commerce. 1996. National Oceanic and Atmospheric Administration. Natural Resource Damage Assessments, Final Rule. 15 CFR Part 990. *Federal Register* 61(4):439–510.

U.S. DOI. 1994. *Natural Resource Damage Assessments; Final Rule*. 43 CFR Part 11. U.S. Department of the Interior. *Federal Register* 59(58):14262–14288.

U.S. EPA. 2000. *Guidelines for Preparing Economic Analyses*. EPA 240-R-00-003. U.S. Environmental Protection Agency. September.

Vossler, C.A. and J. Kerkvliet. 2003. A criterion validity test of the contingent valuation method: Comparing hypothetical and actual voting behavior for a public referendum. *Journal of Environmental Economics and Management* 45:631–649.

Vossler, C.A. and M. McKee. 2006. Induced-value tests of contingent valuation elicitation mechanisms. *Environmental & Resource Economics* 35:137–168.

Vossler, C.A., R.G. Ethier, G.L. Poe, and M.P. Welsh. 2003. Payment certainty in discrete choice contingent valuation responses: Results from a field validity test. *Southern Economic Journal* 69(4):886–902.

---

## A. Coral Reef Survey Instrument

Screen shots from the Coral Reef Survey Instrument are provided below.

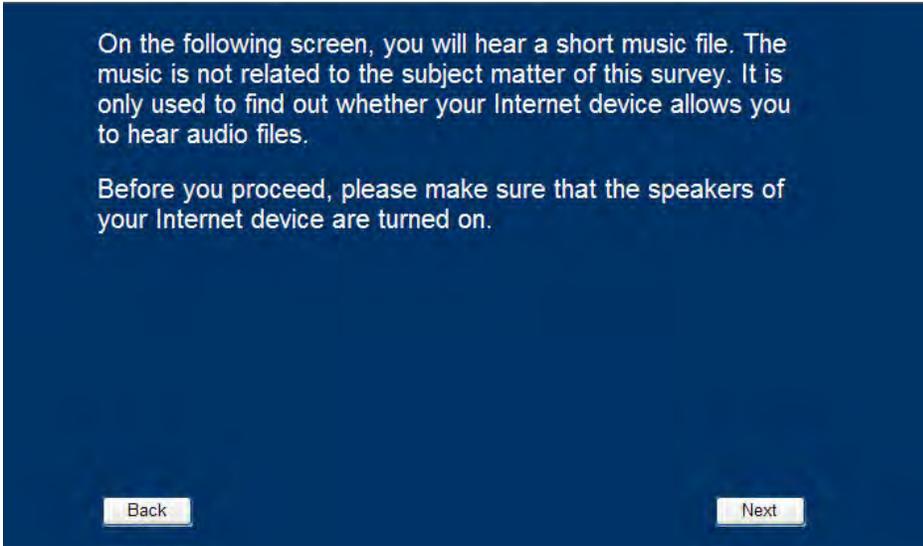
Screen 1



This survey will include questions about coral reefs. If you like, you can give us your comments about any or all of today's questions at the end of this survey.

Thank you for your help!

Screen 2

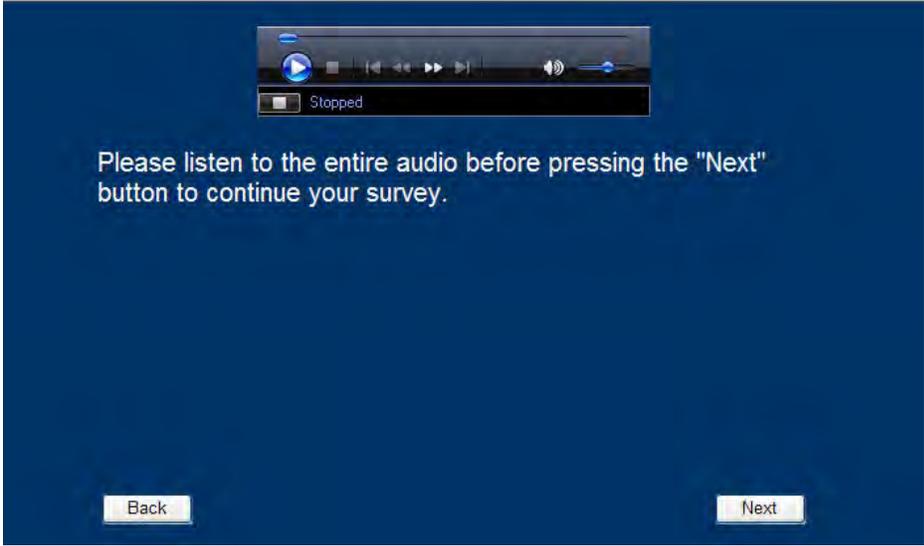


On the following screen, you will hear a short music file. The music is not related to the subject matter of this survey. It is only used to find out whether your Internet device allows you to hear audio files.

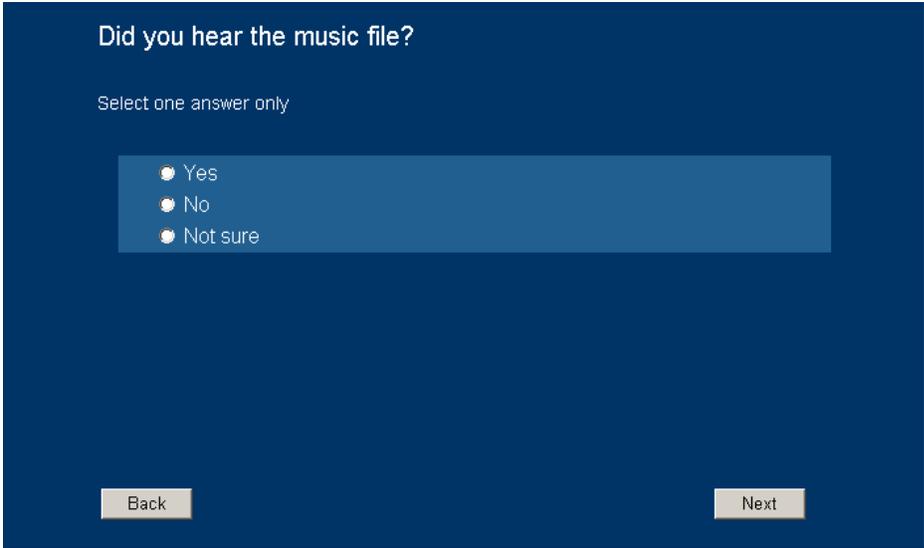
Before you proceed, please make sure that the speakers of your Internet device are turned on.

Back

Next



Screen 3



Screen 4

Later in this survey, some instructions are given with additional audio explanations. Please have your audio turned on to receive these instructions. Please read each screen carefully, even if audio is provided.

Back

Next

Screen 4a<sup>1</sup>

---

1. Respondents see Screen 4a only if they respond “Yes” to the question on Screen 4. If they respond “No” or “Not sure,” they will proceed to Screen 5 without seeing Screen 4a. Respondents who did not respond “Yes” would not receive any additional audio throughout the survey.

We are faced with many problems in this country, none of which can be solved easily or inexpensively. Below are some of these problems. For each one, please indicate if you think we are spending too much money on it, about the right amount, or too little money on it.

Select one answer from each row in the grid

We are spending:

	Too little	About the right amount	Too much
Improving and protecting the nation's health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solving the problems of the big cities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Halting the rising crime rate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The space exploration program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dealing with drug addiction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving and protecting the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving the nation's education system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Back

Next

Screen 5<sup>2</sup>

---

2. Half of the respondents in each internet panel saw Screen 5 (displayed above). The other half saw a slightly altered question with abbreviated problem categories (i.e., space exploration, the environment, health, assistance to big cities, law enforcement, drug rehabilitation, education). The order of response categories for both versions were randomized.

## MANAGEMENT OPTIONS FOR CORAL REEFS IN HAWAII - WHAT IS YOUR OPINION?

Sometimes the Government considers starting a new program. The Government does not want to start a new program unless people are willing to pay for it. One way for the Government to find out about this is to give people like you information about a program in a survey like this, so you can make up your own mind about it.

Some people think the program they are asked about is not needed; others think it is. We want to get the opinions of all kinds of people.

The particular program addressed in this survey involves coral reefs in Hawaii. The federal government is considering options to increase the protection of coral reefs around Hawaii, but it is not sure if it should do more because this will require more government spending paid for by taxpayers.

Even though you may not be familiar with this issue, as a taxpayer your opinions matter. We will provide you with information to help you answer the questions. Through this survey, government officials will consider your opinions, along with information from scientists and planners, when deciding what more, if anything, to do.

Your participation is voluntary.

If you would like more information about your rights as a survey participant, please click here. ■



This survey is funded by the National Oceanic and Atmospheric Administration, which is a U.S. government agency charged with making decisions about coral reef management for the United States.

OMB NO.: 0648-0585 Coral Reef Economic Valuation Final Survey  
Approval Expiration 03/31/2012

Back

Next

Screen 6

You may skip any questions that you do not wish to answer. You will not be disqualified from participation in other surveys. As always, your identity will not be reported or linked to any data resulting from the study. All of the terms and conditions described in the Privacy and Term of Use Policy that you received with your internet access equipment are in effect. If you have questions about this survey, you may contact Panel Relations at (800) 782-6899.

Back

Next

Screen 6a<sup>3</sup>

In this survey, you will be presented information about coral reefs, including pictures and maps.

For upcoming screens, if you want to review information that you saw earlier, you can go back by clicking the "Previous Information" button on the screen. When you are done reviewing the information, you can return to where you were in the survey.

Back

Next

Screen 7

---

3. Respondents see Screen 6a only if they checked the box on Screen 6. Otherwise, they were directed to Screen 7.

Below is a picture of a coral reef ecosystem from Hawaii, including various types of coral and fish.



Coral reefs are found throughout the world in ocean waters less than 300 feet deep.

- Coral reefs are made of connected skeletons of millions of small animals called corals.
- Coral reef ecosystems include the coral reefs, neighboring areas of sea bottom, ocean waters, and many kinds of fish, plants, and animals nearby.
- Coral reef ecosystems provide a place to live for many ocean species including fish, sea turtles, seals, dolphins, shrimp, octopuses, sea snails, sea plants, and sea birds.
- Most coral reef ecosystems are in water less than 60 feet deep.

Back

Previous Information

Next

Screen 8

How often have you read or heard about coral reefs, either in U.S. waters or elsewhere?

Select one answer only

- Not often at all
- Slightly often
- Moderately often
- Very often
- Extremely often

Back

Previous Information

Next

Screen 9

About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason?

Type in the number for the answer

times

Back

Previous Information

Next

Screen 10

Where have you visited a coral reef?

Select all answers that apply

- Florida
- Puerto Rico or the U.S. Virgin Islands
- Other Caribbean, Gulf of Mexico, or Atlantic Ocean locations
- Hawaii
- Pacific Ocean locations other than Hawaii
- Other (specify)

Back Previous Information Next

Screen 10a<sup>4</sup>

About 10% of coral reef ecosystems in the U.S. are around the Hawaiian Islands; most of the rest are around Florida.

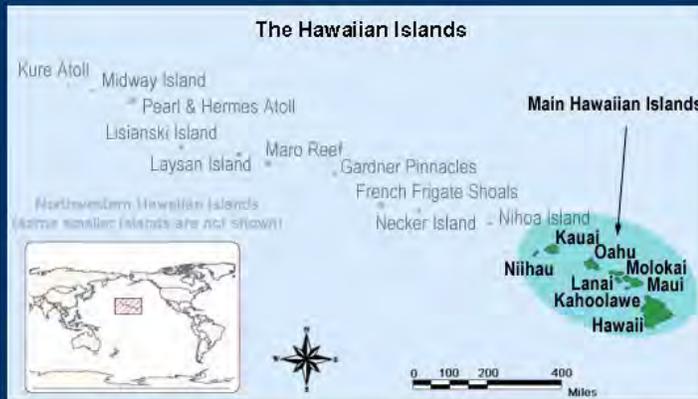
The Hawaiian Islands are commonly grouped into the Main Hawaiian Islands and the Northwestern Hawaiian Islands, as shown on the next screen.

Back Previous Information Next

Screen 11

---

4. Respondents see Screen 10a only if they enter a number greater than 0 on Screen 10. Otherwise, they move straight to Screen 11.



The Main Hawaiian Islands are eight larger islands, where nearly all of Hawaii's people live.

- These islands are surrounded by about 300,000 acres of coral reef ecosystem.
- These coral reefs are heavily used for recreation (fishing, boating, diving, and snorkeling), for commercial fishing, and for cultural and religious activities by native Hawaiian people.

Back

Previous Information

Next

Screen 12

### The Hawaiian Islands

The map displays the Hawaiian Islands chain. The Northwestern Hawaiian Islands, highlighted in light blue, include Kure Atoll, Midway Island, Pearl & Hermes Atoll, Lisianski Island, Laysan Island, Maro Reef, Gardner Pinnacles, French Frigate Shoals, Necker Island, and Niihoa Island. The Main Hawaiian Islands, shown in light green, include Kauai, Oahu, Molokai, Maui, Lanai, Kahoolawe, and Hawaii. An inset map shows the location of the Hawaiian Islands in the Pacific Ocean. A scale bar indicates 0, 100, 200, and 400 miles. A compass rose is also present.

The Northwestern Hawaiian Islands consist of many small, mostly uninhabited islands that stretch 1,500 miles northwest of the Main Hawaiian Islands (about the same distance as from Miami to Boston).

- These islands are surrounded by about 400,000 acres of coral reef ecosystem.
- This area was made a National Monument in 2006.

Back Previous Information Next

Screen 13

Have you ever lived in Hawaii, or have you never lived in Hawaii?

Select one answer only

- Yes, I have lived in Hawaii
- No, I have never lived in Hawaii

Back Previous Information Next

Screen 14

Have you ever visited Hawaii, or have you never visited Hawaii?

Select one answer only

- Yes, I have visited Hawaii
- No, I have never visited Hawaii

Back

Previous Information

Next

Screen 15

In the next 10 years, how likely is it that you will go to Hawaii?

Select one answer only

- I definitely will not go to Hawaii
- I probably will not go to Hawaii
- I may or may not go to Hawaii
- I probably will go to Hawaii
- I definitely will go to Hawaii

Back

Previous Information

Next

Screen 16

### Scenes from coral reefs around Hawaii



Schools of fish live near reefs.



Sea urchins are common in Hawaii.



A variety of shallow coral.



giant trevally

Giant trevally are often seen in Hawaiian waters.

Back

Previous Information

Next

Screen 17

The coral reef ecosystems around the Hawaiian Islands are unique.

- One-fourth to one-half of the many corals, fish, and other marine species found around the Hawaiian Islands are found nowhere else in the world.
- The Northwestern Hawaiian Island coral reefs are in a nearly natural condition; there are few large coral reef ecosystems anywhere in the world that remain so untouched by humans.

Back

Previous Information

Next

Screen 18

## OVERFISHING

Overfishing occurs when more fish are caught than an ecosystem can replace. Overfishing injures Hawaiian coral reef ecosystems.

Because of overfishing around the Main Hawaiian Islands:

- Total annual catches of reef fish have fallen by about 90%.
- Few fish grow to be large.
- Fish reproduction is low because there are fewer large fish. Large female fish produce more eggs.
- There are fewer plant-eating fish that keep algae from smothering the coral reefs. The coral reefs are less able to support other marine life and less able to recover from other stresses like storms or pollution.

Back

Previous Information

Next

Screen 19

Around the Northwestern Hawaiian Islands:

- Currently, there is very little fishing.
- This coral reef ecosystem is in a natural condition with many more fish and a larger variety of fish than around the Main Hawaiian Islands.
- Many large fish, seals, and other species at the top of the food chain still live here, whereas they have been greatly reduced around the Main Hawaiian Islands.
- As a National Monument administered by the federal government and the State of Hawaii, the Northwestern Hawaiian Islands are permanently protected from overfishing.

Back

Previous Information

Next

Screen 20

The following drawings represent current conditions in the Main Hawaiian Islands and how they would have looked before overfishing.

Current conditions of coral reefs around the Main Hawaiian Islands



Conditions of coral reefs around the Main Hawaiian Islands before overfishing



Back

Previous Information

Next

Screen 21

### A SOLUTION TO OVERFISHING IN THE MAIN HAWAIIAN ISLANDS: NO-FISHING ZONES

No-fishing zones can be used to prevent or limit overfishing in the Main Hawaiian Islands. No-fishing zones are areas of the ocean where fishing is not permitted.

- Where overfishing has occurred, no-fishing zones will allow the number, size, and variety of fish to increase inside the zones. More fish means that there will also be more seals, sea birds, and other marine life.
- When nearby areas remain open to fishing, fish from within no-fishing zones migrate and increase the number, average size, and varieties of fish in areas outside the no-fishing zones.
- No-fishing zones have been effective in rebuilding coral reef ecosystems in other places such as Florida.
- Snorkeling, diving, and similar activities are allowed in no-fishing zones.

Back

Previous Information

Next

Screen 22

However, no-fishing zones can have undesirable effects:

- Commercial fishing jobs may temporarily be lost until catches increase.
- Recreational fishing has to be relocated away from the no-fishing zones.
- Federal government spending on enforcement will be required because many of the reefs are managed by the federal government. The State of Hawaii will pay its fair share of enforcement costs for reefs in state waters.

Back

Previous Information

Next

Screen 23

Below is a list of statements. Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements.

Select one answer from each row in the grid

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Protecting jobs of commercial fishermen is more important than protecting Hawaiian coral reefs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Protecting recreational fishing is more important than protecting Hawaiian coral reefs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The federal government should take an active role to protect Hawaiian coral reefs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Back

Previous Information

Next

Screen 24

## OPTIONS TO INCREASE NO-FISHING ZONES AROUND THE MAIN HAWAIIAN ISLANDS

There are options for increasing no-fishing zones around the Main Hawaiian Islands. Currently, about 1% of the coral reefs around the Main Hawaiian Islands are included in no-fishing zones. One option being discussed would increase the no-fishing zones around the Main Hawaiian Islands to 25% of the coral reefs.

More details about this option are shown on the next screen.

Back

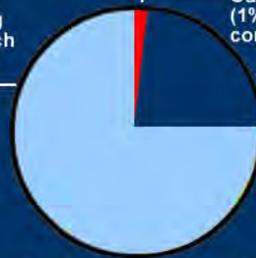
Previous Information

Next

Screen 25

Main Hawaiian Islands Option: Increase no-fishing zones from current 1% up to 25% of the coral reefs.

Proposed to remain as fishing zones (75%, which is 225,000 acres of coral reefs)



Current no-fishing zones (1%, which is 3,000 acres of coral reefs)

Current fishing zones proposed to be changed to no-fishing zones (24%, which is 72,000 acres of coral reefs)

Total = 300,000 acres of coral reefs

Back

Previous Information

Next

Screen 26

Some reasons for increasing no-fishing zones around the Main Hawaiian Islands:

- Inside the no-fishing zones, fish and other marine life would begin to increase during the first three years.
- Beginning in three to five years after no-fishing zones are established, scientists expect that the amount of fish caught outside the no-fishing zones would begin to increase.
- In about 10 years, the total amount of reef fish caught each year in the Main Hawaiian Islands would increase from 10% to about 50% of historic levels.
- The entire Main Hawaiian Island coral reef ecosystem would be healthier, support more marine life, improve the quality of recreation, and improve religious and cultural uses by native Hawaiians.

Back

Previous Information

Next

Screen 27

Some reasons against increasing no-fishing zones around the Main Hawaiian Islands:

- Enforcement costs will be high. Part of the costs would be paid for by all U.S. taxpayers through increased federal taxes. The rest of the costs would be paid for by the State of Hawaii.
- Recreational and commercial fishing will not be allowed within the no-fishing zone.
- The coral reef ecosystem around the Northwestern Hawaiian Islands is already protected from overfishing.

Back

Previous Information

Next

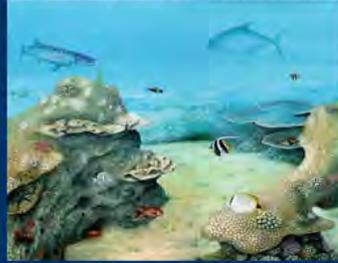
Screen 28

## COMPARING CORAL REEF CONDITIONS AROUND THE MAIN HAWAIIAN ISLANDS

Conditions in about 10 years  
if 1% of the coral reefs remain  
protected by no-fishing zones



Conditions in about 10 years  
if no-fishing zones are increased  
to protect 25% of the coral reefs



Back

Previous Information

Next

Screen 29

Do you have any comments about the information provided so far?

Please type in your comments

Back

Previous Information

Next

Screen 30

## SHIP ACCIDENTS

Ship accidents are another cause of injuries to coral reefs around the Main Hawaiian Islands.

On average, about 10 accidents occur each year where private and commercial boats and ships lose control, often in storms. While these ships rarely sink, they do damage coral reefs.

- These accidents usually occur around the Main Hawaiian Islands, where most ship traffic occurs.
- Severe injuries to the coral reefs usually range from a few square feet to an acre (an acre is about the size of a football field).
- In an average year, a total of about 5 acres of coral reefs are injured around the Main Hawaiian Islands.
- It typically takes about 50 years for nature to fully repair these injuries. This means that activities like fishing, diving, and snorkeling may be affected for many years.

Back

Previous Information

Next

Screen 31

Main Hawaiian Island coral reefs where no ship accident has occurred.



Area of coral reef where a ship accident has occurred.



Back

Previous Information

Next

Screen 32

Have you ever heard about, read about, or seen where ship accidents have injured coral reefs in Hawaii or elsewhere?

Select one answer only

- Yes
- No

Back

Previous Information

Next

Screen 33

### OPTIONS TO REPAIR CORAL REEFS INJURED FROM SHIP ACCIDENTS AROUND THE MAIN HAWAIIAN ISLANDS

Actions can be taken to help coral reefs recover faster after ship accidents, such as planting living coral from coral farms into injured areas, and restoring injured coral that is still alive.

- With repairs, injured coral reefs typically recover in about 10 years, rather than in about 50 years with natural recovery.
- These types of repairs have been successful around Florida and elsewhere.

Back

Previous Information

Next

Screen 34

The federal government, with the State of Hawaii, is considering a program to repair ship injuries to coral reefs around the Main Hawaiian Islands. About 10 sites, totaling about 5 acres, would be repaired each year.

As part of the proposed program, boat and ship owners will be required to pay for such repairs. However, it is often not possible to find those who caused the injuries or to collect payment from the persons responsible.

Back

Previous Information

Next

Screen 35

Some reasons for a coral reef repair program:

- These sites would recover in about 10 years, rather than in about 50 years with natural recovery.
- This program would help maintain Hawaii's coral reef ecosystems and would reduce the impacts from ship accidents to recreation and other activities.

Back

Previous Information

Next

Screen 36

Some reasons against a coral reef repair program:

- Since the Main Hawaiian Islands have about 300,000 acres of coral reefs, 5 acres injured by ship accidents each year is only a very small percentage.
- A program like this would require additional costs beyond what can be collected from the ship owners that caused the damage.
- Part of the costs that are not paid by ship owners would be paid by all U.S. taxpayers through increased federal taxes. The rest of the costs would be paid by the State of Hawaii.

Back

Previous Information

Next

Screen 37

Do you have any comments about the information presented so far?

Please type in your comments

Back

Previous Information

Next

Screen 38

For the next few screens you will be provided with some audio instructions. Please make sure your audio is turned on.

If you want to listen to the audio again, press the "Play" button that looks like this: ▶ on the upcoming screens. If you want to pause the audio, click the button that looks like this: ||.

Back

Previous Information

Next

Screen 39

### Which Program Do You Prefer?

The following questions ask you to choose among alternative programs that have different combinations of actions to protect and restore coral reef ecosystems around the Main Hawaiian Islands, at different costs to you.

Back

Previous Information

Next

Screen 40

*In each question, the **Current Program** describes the reef management actions that are currently in place and the expected results if these are continued.*

*In Row 1: The Main Hawaiian Islands no-fishing zones are kept at the current 1% of the coral reefs. The number of fish and the quality of the reefs will continue to decline.*

*In Row 2: Ship injuries to coral reefs around the Main Hawaiian Islands are not repaired. Currently, ship accidents injure about 5 acres each year. It takes about 50 years for these reefs to recovery naturally.*

	<b>Current Program</b>
% of coral reefs protected by no-fishing zones (acres)	<b>1% protected (3,000 acres)</b> Declining marine life
Acres of coral reefs repaired from ship injuries per year	<b>No acres repaired</b> Injuries last about 50 years
Added federal taxes paid by your household each year	<b>\$0</b>

*The last row shows the additional cost paid by your household each year: With the current program, there will be no additional actions, and therefore no added federal taxes paid by your household to protect and restore coral reef ecosystems around the Main Hawaiian Islands.*

*When you are finished reviewing this table click on the "next" button.*

Screen 41<sup>5</sup>

Back

Previous Information

Next

---

5. Those who said they could hear the audio on Screen 3 heard the words in italics read aloud to them in addition to seeing the text on the screen.

*The table below includes the Current Program and three alternative programs that do more and cost more than the Current Program.*

*The three alternatives to the Current Program are: the No-Fishing Zone Program; the Ship Repair Program; and the Full Program.*

*The Full Program is summarized on the far right hand side of the table:*

- *The Full Program protects 25% of the coral reefs from overfishing AND each year repairs 5 acres of coral reefs from ship accidents.*

*In between the Current Program and the Full Program the two other alternative programs are summarized:*

- *The No-Fishing Zones Program: This program would protect 25% the coral reefs around the Main Hawaiian Islands, but would do nothing to repair reef damage from ship accidents.*
- *The Ship Repair Program: This program would repair 5 acres of coral reefs from ship accidents each year, but would do nothing more to protect coral reefs from overfishing.*

*Each of these alternatives to the Current Program would cost your household additional federal taxes each year as shown in the bottom of the table.*

*Remember, if you spend money for one of the programs that does more, that money won't be available for you to buy other things. If you do not want to do more and spend more*

Screen 42

*to protect coral reefs in the Main Hawaiian Islands, you should check the Current Program as your most preferred program.*

*After you carefully review the four programs, and the costs to your household under each program, please check which of the four programs you most prefer.*

*The highlighted boxes show where the program actions are different from the current program.*

	<b>Current Program</b>	<b>Reef Repair Program</b>	<b>No-Fishing Zones Program</b>	<b>Full Program</b>
% of coral reefs protected by no-fishing zones (acres)	<b>1% protected (3,000 acres)</b> Declining marine life	<b>1% protected (3,000 acres)</b> Declining marine life	25% protected (75,000 acres) Increasing marine life More fish caught outside zone	25% protected (75,000 acres) Increasing marine life More fish caught outside zone
Acres of coral reefs repaired from ship injuries per year	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each</u> year	<b>\$0</b>	<b>\$95</b>	<b>\$75</b>	<b>\$150</b>
Which program is your <u>most</u> preferred?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Once you are done reviewing these alternative programs, please check the box for the program you most prefer.*

Back

Previous Information

Next

Screen 42 (cont.)<sup>6,7</sup>

6. Those who said they could hear the audio on Screen 3 heard the words in italics read aloud to them in addition to seeing the text on the screen.

7. If a respondent did not choose an answer, they were prompted to do so with the text, “We would like to have your answer to this question.” If they still did not answer, they moved forward to Screen 49. Additionally, respondents always see the Current Program in the first column and the Full Program in the last column. The order of the middle two columns, however, were randomized.

	<u>Current Program</u>	<u>Reef Repair Program</u>	<u>No-Fishing Zones Program</u>	<u>Full Program</u>
% of coral reefs protected by no-fishing zones (acres)	<b>1% protected (3,000 acres)</b> Declining marine life	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
Acres of coral reefs repaired from ship injuries per year	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household each year	<b>\$0</b>	<b>\$95</b>	<b>\$75</b>	<b>\$150</b>
Your most preferred program	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You chose Current Program as your most preferred program of these four programs. How sure are you that among these four programs, the Current Program is your most preferred?

Select one answer only

- Not sure at all
- Slightly sure
- Moderately sure
- Very sure
- Extremely sure

Back Previous Information Next

Screen 43<sup>8</sup>

8. The language on Screen 43 depends on how the respondent answered the question on Screen 42. In this example, a respondent chose the Current Program as his/her most preferred. If he/she had chosen the Reef Repair Program, the text on Screen 43 would read, “You chose Reef Repair Program as your most preferred of these four programs. How sure are you that among these four programs, the Reef Repair Program is your most preferred?” If he/she chose either of the other two programs on Screen 42, the language would also be different.

Please provide a brief comment that helps us understand why you chose the Current Program as your most preferred.

Type in the answer

Back Previous Information Next

Screen 44<sup>9</sup>

---

9. The wording on Screen 44 is also conditional on the response given on Screen 42.

You chose the Current Program with no additional cost to your household as your most preferred program. If you had to choose among the remaining three programs, which would you prefer?

	Reef Repair Program	No-Fishing Zones Program	Full Program
% of coral reefs protected by no-fishing zones (acres)	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
Acres of coral reefs repaired from ship injuries per year	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household <u>each year</u>	<b>\$95</b>	<b>\$75</b>	<b>\$150</b>
Of these three, which program do you prefer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Back Previous Information Next

Screen 45<sup>10</sup>

10. On Screen 45, respondents see the remaining three programs that he/she did not choose as his/her most preferred. The wording of this question, however, differs depending on whether a respondent chose the Current Program or any of the alternative programs. Wording for the Current Program is shown in this screen shot. Wording for any of the other programs was as follows, “Now that you have told us which program you most prefer, consider the remaining three programs. Of the remaining three programs, which program do you prefer?”

	Reef Repair Program	No-Fishing Zones Program	Full Program
% of coral reefs protected by no-fishing zones (acres)	<b>1% protected (3,000 acres)</b> Declining marine life	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
Acres of coral reefs repaired from ship injuries per year	<b>5 acres repaired</b> Injuries last about 10 years	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household each year	<b>\$95</b>	<b>\$75</b>	<b>\$150</b>
Your most preferred of these three	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

You chose the Reef Repair Program as your most preferred program of these three programs. How sure are you that among these three programs, the Reef Repair Program is your most preferred?

Select one answer only

- Not sure at all
- Slightly sure
- Moderately sure
- Very sure
- Extremely sure

Back Previous Information Next

Screen 46<sup>11</sup>

11. One quarter of the respondents saw this question after the first choice question only. Half of the respondents saw this question after each of the choice questions. One quarter of the respondents saw this question after the third choice question only.

If you had to choose between the remaining two programs, which would you prefer?

	No-Fishing Zones Program	Full Program
% of coral reefs protected by no-fishing zones (acres)	25% protected (75,000 acres) Increasing marine life More fish caught outside zone	25% protected (75,000 acres) Increasing marine life More fish caught outside zone
Acres of coral reefs repaired from ship injuries per year	No acres repaired Injuries last about 50 years	5 acres repaired Injuries last about 10 years
Added federal taxes paid by your household each year	\$75	\$150
Of these two, which program do you prefer?	<input type="radio"/>	<input checked="" type="radio"/>

Back Previous Information Next

Screen 47<sup>12</sup>

---

12. Alternate wording was used here if the respondent chose a program other than the Current Program on Screen 42. The alternate wording is, “Of the remaining two programs, which program do you prefer?”

	No-Fishing Zones Program	Full Program
% of coral reefs protected by no-fishing zones (acres)	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone	<b>25% protected (75,000 acres)</b> Increasing marine life More fish caught outside zone
Acres of coral reefs repaired from ship injuries per year	<b>No acres repaired</b> Injuries last about 50 years	<b>5 acres repaired</b> Injuries last about 10 years
Added federal taxes paid by your household each year	<b>\$75</b>	<b>\$150</b>
Your most preferred of these two	<input checked="" type="radio"/>	<input type="radio"/>

You chose the No-Fishing Zones Program as your most preferred program of these two programs. How sure are you that between these two programs, the No-Fishing Zones Program is your most preferred?

Select one answer only

- Not sure at all
- Slightly sure
- Moderately sure
- Very sure
- Extremely sure

Back

Previous Information

Next

Screen 48

Following are some questions about what you were thinking when you chose your preferred programs.

Back

Previous Information

Next

Screen 49

When you chose your most preferred programs, did you think that overfishing contributed to the changes in Hawaii's coral reef ecosystems we told you about or did you think it did not contribute to those changes?

Select one answer only

- Overfishing did contribute to the changes
- Overfishing did not contribute to the changes

Back

Previous Information

Next

Screen 50

If no-fishing zones are NOT put in place, how serious did you think the effects of overfishing would be on the coral reef ecosystem around the Main Hawaiian Islands?

Select one answer only

- Not serious at all
- Slightly serious
- Moderately serious
- Very serious
- Extremely serious

Back

Previous Information

Next

Screen 51

When you chose your preferred programs, how effective did you think that no-fishing zones would be in restoring fish and other marine life in the coral reef ecosystem around the Main Hawaiian Islands?

Select one answer only

- Not effective at all
- Slightly effective
- Moderately effective
- Very effective
- Extremely effective

Back

Previous Information

Next

Screen 52

When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands?

Select one answer only

- Not serious at all
- Slightly serious
- Moderately serious
- Very serious
- Extremely serious

Back

Previous Information

Next

Screen 53

When you chose your preferred programs, how effective did you think that repairing injuries from ship accidents would be in speeding up recovery of the coral reef ecosystem around the Main Hawaiian Islands?

Select one answer only

- Not effective at all
- Slightly effective
- Moderately effective
- Very effective
- Extremely effective

Back

Previous Information

Next

Screen 54

When you chose your most preferred programs, did you think that repairs of injuries to coral reefs after ship accidents would help reefs recover in about 10 years, more than 10 years, or less than 10 years?

Select one answer only

- About 10 years
- More than 10 years
- Less than 10 years

Back

Previous Information

Next

Screen 55

When you chose your most preferred programs, did you think that your household would pay the tax amount stated, or did you think you would pay more than that amount, or less than that amount?

Select one answer only

- The amount stated
- More than the amount
- Less than the amount

Back

Previous Information

Next

Screen 56

Please tell us how much confidence you have in the following groups and institutions in this country. In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in:

Select one answer from each row in the grid

	No confidence at all	A little confidence	A moderate amount of confidence	A lot of confidence	A great deal of confidence
The people who run the U.S. Government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
University scientists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Large corporations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Back

Previous Information

Next

Screen 57

How do you feel about increasing federal taxes to protect coral reefs around the Main Hawaiian Islands?

Select one answer only

- Strongly oppose
- Somewhat oppose
- Neither oppose nor favor
- Somewhat favor
- Strongly favor

Back

Previous Information

Next

Screen 58

There are different ways for people to pay for new programs to protect the environment. One way is for the government to pay the cost. This will raise everyone's taxes. The other way is for businesses to pay the cost. This will make prices go up for everyone.

If you had to choose, would you prefer to pay for new environmental programs through higher income taxes or through higher prices?

Select one answer only

- Through higher income taxes
- Through higher prices
- No preference

Back

Previous Information

Next

Screen 59

Would you say you think of yourself as not an environmentalist at all, slightly an environmentalist, a moderate environmentalist, a strong environmentalist, or a very strong environmentalist?

Select one answer only

- Not an environmentalist at all
- Slightly an environmentalist
- A moderate environmentalist
- A strong environmentalist
- A very strong environmentalist

Back

Previous Information

Next

Screen 60

We would like to learn more about how you reacted to the questions that asked you to choose between various combinations of no-fishing zones and ship accident repair programs. Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements.

Select one answer from each row in the grid

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Costs should not be a factor when protecting the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found it difficult to select which programs I preferred.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There was not enough information for me to make informed decisions about doing more to protect coral reefs in Hawaii.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was concerned that the federal government cannot effectively manage coral reefs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I should not have to pay more federal taxes to protect coral reefs around Hawaii.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The public's views as expressed in this survey should be important to the government when it chooses how to manage coral reefs in Hawaii.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

[Back](#)

[Previous Information](#)

[Next](#)

Screen 61

Did anyone in your household pay any federal income taxes last year, 2008?

Select one answer only

- Yes
- No
- Not sure

Back Next

Screen 62<sup>13</sup>

Please add any other comments you would like to make to help us understand your views about coral reefs in Hawaii and your responses to this survey.

Type in comments

Back Next

Screen 63

---

13. If a respondent did not choose an answer, they were prompted to do so with text, “We would like to have your answer to this question.” If they still did not answer, they moved forward to Screen 63.

Are you taking this survey via a WebTV or a personal computer (PC)?

Select one answer only

- WebTV
- PC

Back

Next

Screen 64

How is your computer (i.e., the computer via which you are taking this survey) connecting to the Internet?

Select one answer only

- Dialup modem
- ISDN line
- Cable modem
- Digital Subscriber Line (DSL)
- Wireless
- Satellite dish
- T1 / T3 line

Back

Next

Screen 65

**To be sure we are clear...**

The National Oceanic and Atmospheric Administration, in cooperation with other federal and state agencies, is looking at ways to help protect coral reef ecosystems around the Hawaiian Islands. A wide variety of options are possible, in addition to the ones discussed in this survey. Any future decisions on specific protection and enhancement alternatives will take into consideration the views of the public, the results of scientific studies, and advice of marine and other scientific experts.

Next

Screen 66

Thank you very much! We have recorded all of your responses. They are very important to us, and as a small thank-you, we will mail a \$10 check to you soon. We look forward to your next survey, for July, later in the month.

If you have any comments about any part of the survey, please write them below.

Any comments welcome!



Next

Screen 67

Thank you for completing this survey. We have successfully received your responses.

Screen 68

---

## B. Experimental Design

There are three programs other than the status quo in the Coral Reef Valuation Study survey: (1) increasing the no-fishing zones from 1% to 25% around the MHI (No-Fishing Zones Program), (2) repairing reefs from ship injuries so that injuries last 10 years rather than 50 years (Reef Repair Program), and (3) implementing no-fishing zones *and* repairing reefs from ship injuries (Full Program). Thus, there are two attributes for the survey: the percentage of MHI reefs protected and the years for reefs to be repaired from ship injuries. The individual programs, no-fishing zones and reef repair, have two levels apiece: the status quo or some positive action. As summarized in Table B.1, the alternative levels for no-fishing zones and reef repair are 25% of reefs protected versus 1% under the status quo and injuries being repaired in 10 years rather than the status quo of 50 years.

There are four possible combinations of attribute levels (referred to as alternatives) representing the combinations of programs: the status quo, no-fishing zones only, reef repair only, and the Full Program. Because there are only four possible combinations, it is possible to obtain a full ranking of a respondent's preferences using only one choice set (with four alternatives). We have assigned each attribute a vector of bid amounts to represent the cost of implementing the program to produce the desired attribute levels (Table B.1). The bid amounts were selected as follows:

- } We used the results from the 2009 pretest to create a distribution of predicted WTP estimates for the No-Fishing Zones and Reef Repair programs.
- } We simulated probabilities of respondents selecting each alternative using the parameter estimates from the pretest and randomized error terms.
- } We experimented with the bids to re-balance the predicted probabilities and to best capture the overall range of WTP values.

In the survey, the bid amounts are represented as the cost of implementing the individual programs. For the Full Program, we set the bid amount equal to the sum of the individual program costs minus a discount factor. The discount factor is included to provide more variation in prices in the dataset and to account for the fact that respondents generally expect "package" programs to cost less than the outright sum of the individual costs. The experimental design includes three discount factors: 0, 5, 10, and 20, which are assigned orthogonally across the different versions of the choice sets.

**Table B.1. Program attributes and associated levels**

<b>Attribute</b>	<b>Status quo level</b>	<b>Alternate level</b>	<b>Cost (\$)</b>
% of coral reefs protected by no-fishing zones	1	25	45, 75, 110, 170
Years for reefs to be repaired from ship injuries	50	10	35, 55, 95, 135

There are 16 possible choice sets for the main survey that contain all the different combinations of individual program costs. Each individual program cost level appears four times in the design matrix, and each time it appears it is paired with a different discount factor. Table B.2 presents the experimental design matrix.

**Table B.2. Experimental design matrix**

<b>Version</b>	<b>Current program</b>	<b>No-fishing zones program</b>	<b>Reef repair program</b>	<b>Full program</b>	<b>Discount factor</b>
1	\$0	\$45	\$35	\$75	\$5
2	\$0	\$45	\$55	\$100	\$0
3	\$0	\$45	\$95	\$130	\$10
4	\$0	\$45	\$135	\$160	\$20
5	\$0	\$75	\$35	\$110	\$0
6	\$0	\$75	\$55	\$125	\$5
7	\$0	\$75	\$95	\$150	\$20
8	\$0	\$75	\$135	\$200	\$10
9	\$0	\$110	\$35	\$135	\$10
10	\$0	\$110	\$55	\$145	\$20
11	\$0	\$110	\$95	\$200	\$5
12	\$0	\$110	\$135	\$245	\$0
13	\$0	\$170	\$35	\$185	\$20
14	\$0	\$170	\$55	\$215	\$10
15	\$0	\$170	\$95	\$265	\$0
16	\$0	\$170	\$135	\$300	\$5

---

## C. Sample Weights

This appendix describes how the sample weights were generated for each of the two panels and the pooled dataset. The weighting reports for each panel can be found at the end of this appendix. As a general overview, weights are used to adjust for sampling designs in order to generalize results to a population of interest. For the two panels used in this study, the results are weighted such that generalizations to the U.S. household population can be made.

Although the details of each panel's weights can be found in the respective reports, the weighting procedures for these two panels can be broken out conceptually into two components:

1. *Base weights.* These weights correct for deviations from an equal probability of selection design. For example, some households have more landlines than others. A standard method to adjust for the resulting unequal probability of selection is to weight multiple-line households by the inverse of the number of landlines.
2. *Panel demographic post-stratification weights.* These weights are used to address nonresponse and non-coverage biases. Non-coverage and nonresponse can lead to the over-representation of certain subgroups, or demographics, in a sample. Panel demographic post-stratification weights are usually generated using a technique known as raking, which allows the analyst to adjust the proportion of panel demographics to match an outside source, usually the Census. Additionally, extreme weights (high or low) can be adjusted using a methodology known as trimming, which is often done to reduce the variance of the weights. Often, the weights are rescaled so that they sum to the original sample size.

The final weights incorporate adjustments made in each of the above two components. The second component is done contingent on the first. Thus, the weights are produced successively using these steps. When data from each of the two panels were pooled together to form a single sample, the weights were also pooled. The FFRISP panel weights were first rescaled so that the average weight equaled 1, as was the case in the ANES panel. This was done by dividing each of the FFRISP weights by the mean weight. Without this rescaling, FFRISP records would have carried disproportionately higher weights than records from the other two panels.

## **C.1 ANES Weighting Report**



## **Field Report**

# **Coral Reef Protection Survey**

**Conducted for Stratus Consulting**

**Submitted to:  
David Chapman  
Colleen Donovan**

**July 23, 2009**

1350 Willow Road, Suite 102  
Menlo Park, CA 94025  
P: 650-289-2160  
F: 650-289-2001  
[www.knowledgenetworks.com](http://www.knowledgenetworks.com)

<b>Knowledge Networks Deliverable Authorization</b>			
Printed Name	Signature	Date	Title
J. Michael Dennis	<i>Mike Dennis</i>	Date 7/23/2009	SVP, Government and Academic Research

## Table of Contents

<b>CORAL REEF PROTECTION SURVEY .....</b>	<b>4</b>
INTRODUCTION .....	4
SAMPLE SIZE AND COMPLETION RATE.....	4
DATA FILE DELIVERABLES AND DESCRIPTIONS .....	4
KEY PERSONNEL .....	5
<b>METHODOLOGY .....</b>	<b>6</b>
INTRODUCTION .....	6
ANES RECRUITMENT METHODOLOGY .....	6
ANES SURVEY ADMINISTRATION .....	7
SAMPLE WEIGHTING .....	8
<b>APPENDIX A: QUESTIONNAIRE.....</b>	<b>11</b>
<b>APPENDIX B: CODEBOOK .....</b>	<b>44</b>

## Coral Reef Protection Survey

### Introduction

Knowledge Networks conducted a study focusing on peoples' opinions about protecting coral reefs around the Hawaiian Islands, on behalf of Stratus Consulting. The survey was conducted using the American National Election Studies (ANES) panel sample. This sample is comprised of U.S. citizens in the general population aged 18 or older as of November 4, 2008. The survey was fielded between June 4 and July 9, 2009.

Information on the initial and resulting sample sizes and the study completion rate is provided below.

### Sample Size and Completion Rate

Sampled	Completed Survey	Survey Completion Rate
3,630	2,335	64.0%

### Data File Deliverables and Descriptions

Data are provided in STATA format, and a sampling weight for each case is included in the final file. In addition to the data from the survey, selected demographic variables from the existing ANES panel data for respondents completing the Coral Reef Survey are included. These profile variables are owned by the ANES and are provided for analysis and reporting. It should be noted that age data are provided as of November 4, 2008, because this is the format in which the ANES program will release these data to the public.

A unique linking identification number (CASEID\_SO) is included with the data. This identification number will allow linking of cases in the file with released ANES public use files. More information and released data can be found at the following website:

[http://www.electionstudies.org/studypages/2008\\_2009panel/anes2008\\_2009panel.htm](http://www.electionstudies.org/studypages/2008_2009panel/anes2008_2009panel.htm).

The table on the next page shows the name and description of supplemental and profile variables included with the survey data. In addition to the listed items, a series of variables collected on other ANES waves that did not gather data specifically for ANES purposes are provided. It is important to note that the final version of these data for the ANES as a whole is still in the development and processing stage. Therefore, the variables ultimately released by the ANES may differ somewhat from those provided with the current file.

### Supplemental and Profile Variables

Variable Name	Variable Description
CaseID	Unique case identification number
CASEID_SO	ANES Case Linking ID Number
weight	Cross-Sectional Weights
tm_start	Interview start date and time
tm_finish	Interview finish date and time
PPGENDER	Gender
PPAGE	Age as of November 4, 2008
PPETHM	Race / Ethnicity
PPEDUC	Education (highest degree received)
PPRENT	Ownership Status of Living Quarters
PPINCIMP	HH Income
PPMARIT	Marital Status
PPHHSIZE	Household Size
PPWORK	Current Employment Status
PPSTATEN	State (numeric)
PPNET	Household Internet Access

### Key Personnel

Key personnel on the Perception of Economic Security Survey include:

Mike Dennis – Senior Vice President, Government & Academic Research. M. Dennis is based in the Menlo Park office of Knowledge Networks.

Phone number: (650) 289-2160

Email: [mdennis@knowledgenetworks.com](mailto:mdennis@knowledgenetworks.com)

Bill McCready – Vice President, Client Service. B. McCready is based in the Chicago office of Knowledge Networks.

Phone number: (312) 416-3682

Email: [bmccready@knowledgenetworks.com](mailto:bmccready@knowledgenetworks.com)

Charles DiSogra – Vice President, Chief Statistician. C. DiSogra is based in the Menlo Park office of Knowledge Networks.

Phone number: (650) 289-2185

Email: [cdisogra@knowledgenetworks.com](mailto:cdisogra@knowledgenetworks.com)

Rick Li – Project Director, Client Service. R. Li is based in the Menlo Park office of Knowledge Networks.

Phone number: (650) 289-2140

email: [rli@knowledgenetworks.com](mailto:rli@knowledgenetworks.com)

## **Methodology**

### **Introduction**

The ANES panel was recruited by Knowledge Networks using similar processes to those employed for recruitment to its KnowledgePanel<sup>SM</sup>, so that it is representative of the entire U.S. population. Full details regarding ANES panel methodology will be released by ANES project staff later in 2009. A brief overview of the methodology is provided below.

### **ANES Recruitment Methodology**

ANES panel members were randomly recruited by telephone and households were provided with access to the Internet and hardware if needed. Unlike other Internet research that covers only individuals with Internet access who volunteer for research, Knowledge Networks surveys are based on a sampling frame that includes both listed and unlisted phone numbers, and is not limited to current Web users or computer owners. ANES Panelists were selected by chance to join the panel; unselected volunteers were not able to join the ANES panel.

For the ANES panel, Knowledge Networks initially selected households using random digit dialing (RDD) sampling methodology. Once a household is contacted by phone and a household member is recruited to the panel by obtaining their e-mail address or setting up an e-mail address, panel members are sent surveys over the Internet using e-mail (instead of by phone or mail). This permits surveys to be fielded quickly and economically, and also facilitates longitudinal research. In addition, this approach reduces the burden placed on respondents, since e-mail notification is less obtrusive than telephone calls, and allows research subjects to participate in research when it is convenient for them.

Knowledge Networks' panel recruitment methodology uses the quality standards established by selected RDD surveys conducted for the Federal Government (such as the CDC-sponsored National Immunization Survey).

Knowledge Networks utilizes list-assisted RDD sampling techniques on the sample frame consisting of the entire United States residential telephone population. Knowledge Networks excludes only those banks of telephone numbers (consisting of 100 telephone numbers) that have zero directory-listed phone numbers. Two strata are defined using 2000 Census Decennial Census data that has been appended to all telephone exchanges. The first stratum has a higher concentration of Black and Hispanic households and the second stratum has a lower concentration relative to the national estimates. Knowledge Networks' telephone numbers are selected from the 2+ banks with equal probability of selection for each number within each of the 2 strata, with the Black and Hispanic stratum being sampled at a higher rate than the other stratum .

Telephone numbers for which Knowledge Networks is able to recover a valid postal address is about 60%-70%. The telephone phone numbers for which an address is recovered are selected

with certainty; 75% of the remainder are subsampled randomly. For the ANES panel, the address-matched telephone numbers were sent an advance mailing informing them that they were selected to participate in a monthly study sponsored by Stanford University, the University of Michigan, and the National Science Foundation.

Following the mailing, the telephone recruitment process began for all sampled phone numbers. Cases sent to telephone interviewers were dialed up to 90 days, with at least 19 dial attempts on cases where no one answered the phone and on phone numbers known to be associated with households. Extensive refusal conversion was also performed. Experienced interviewers conducted all recruitment interviews. The recruitment interview, which typically required about 10 minutes, began with the interviewer informing a household member that their household was selected to join the special panel study. If the household did not have a PC and access to the Internet, they were told that in return for completing monthly surveys, the household would be given an MSN TV2 set-top box and free monthly Internet access. All members of the household who were U.S. citizens aged 18 or older as of November 4, 2008 were then enumerated and one such household member was selected for participation on the panel. Some initial demographic variables and background information was then collected from this person.

Those RDD households that informed interviewers that they had a home computer and Internet access were recruited to the panel and asked to take their surveys using their own equipment and Internet connections. Those without Internet access were provided with an MSN TV2 unit, as noted above. Prior to shipment, each MSN TV2 unit was custom configured with an individual e-mail account, so that it was ready for immediate use by the selected panelist. Most panelists are able to install the hardware without additional assistance, though Knowledge Networks maintains a telephone technical support line and will, when needed, provide on-site installation. The Knowledge Networks Call Center also contacts household members who do not respond to e-mail and attempts to restore contact and cooperation. PC panel members provide KN with their e-mail account and their weekly surveys are sent to that e-mail account.

All new MSN TV2 panel members were sent an initial survey to confirm equipment installation and familiarize them with the MSN TV2 unit. For all new panel members, demographics such as gender, age, race, income, and education were collected in a follow-up survey to create a member profile.

### **ANES Survey Administration**

Active, eligible ANES panel members are invited to complete each monthly survey. Once assigned to a survey, members receive a notification e-mail on their MSN TV2 or personal computer letting them know there is a new survey available for them to take. The e-mail notification contains a button to start the survey. No login name or password is required.

E-mail reminders are sent to nonresponding panel members. If e-mail does not generate a response, a phone reminder is initiated. ANES panel members also receive \$10 for each survey that they complete to encourage participation.

## Sample Weighting

The design for an ANES panel sample begins as an equal probability sample that is self-weighting with several enhancements incorporated to improve efficiency. Since any alteration in the selection process is a deviation from a pure equal probability sample design, statistical weighting adjustments are made to the data to offset known selection deviations. These adjustments are incorporated in the sample's **base weight**.

There are also several sources of survey error that are an inherent part of any survey process, such as non-coverage and non-response due to panel recruitment methods and to inevitable panel attrition. We address these sources of sampling and non-sampling error using a **panel demographic post-stratification weight** as an additional adjustment.

Lastly, a set of **study-specific post-stratification weights** are constructed to adjust for sample design and survey non-response.

A description of these types of weights follows.

### The Base Weight

In an ANES panel sample, there are five known sources of deviation from an equal probability of selection design. These are corrected in the Base Weight and are described below.

#### 1. Under-sampling of telephone numbers unmatched to a valid mailing address

An address match is attempted on all the Random Digit Dial (RDD) generated telephone numbers in the sample after the sample has been purged of business and institutional numbers and screened for non-working numbers. The success rate for address matching is in the 60-70% range. The telephone numbers with valid addresses are sent an advance letter, notifying the household that they will be contacted by phone to join the ANES panel. The remaining, unmatched numbers are under-sampled at a rate of 0.75 as a recruitment efficiency strategy. Advance letters improve recruitment success rates.

#### 2. RDD selection proportional to the number of telephone landlines reaching the household

As part of the field data collection operation, information is collected on the number of separate telephone landlines in each selected household. A multiple line household's selection probability is down weighted by the inverse of its number of landlines.

### **3. Under-sampling of households not covered by the MSN<sup>®</sup> TV service network**

Certain small areas of the U.S. are not serviced by MSN<sup>®</sup>, thus MSN TV2 units cannot be used. We under-sample households in these areas and use other Internet Service Providers for their Internet access.

### **4. Oversampling of African- American and Hispanic telephone exchanges**

Knowledge Networks over-samples telephone exchanges with a higher density of minority households (uniquely African American and Hispanic) to increase panel membership for those groups. These exchanges are oversampled at approximately twice the rate of other exchanges. This over-sampling is corrected in the base weight.

### **5. Selection of one adult in a household with two or more adults**

For the ANES panel, participants are selected in two stages: households in the first stage and one eligible person per household in the second stage. A base weight selection correction is made by multiplying the selected person by the inverse of the number of eligible persons residing in the household.

## **The Panel Demographic Post-stratification Weight**

Once the study data are returned from the field, the final qualified respondent data are subjected to an additional post-stratification process to adjust for any non-response and non-coverage as a result of the study-specific sample design.

The primary purpose of this post-stratification adjustment is to reduce the sampling variance for any characteristics highly correlated with the representative study population's demographic and geographic totals (these are referred to as the population benchmarks). This adjustment also helps reduce bias due to survey non-response. The following benchmark distributions are generally utilized for this type of post-stratification adjustment:

- Gender: Female/Male
- Age: 18-29, 30-44, 45-59, 60+
- Race/ethnicity: white (non-Hispanic), black (non-Hispanic), other (non-Hispanic), Hispanic, 2+ race (non-Hispanic)
- Education: Less than high school, high school graduates, some college, college graduates
- Metro, Non-metro status

Comparable distributions are calculated using all completed cases from the field data. Since study sample sizes are typically too small to accommodate a complete cross-tabulation of all the survey variables with the benchmark variables, an iterative proportional fitting is used for the post-stratification weighting adjustment. This procedure adjusts the sample data back to the selected benchmark proportions. Through an iterative convergence process, the weighted sample data are optimally fitted to the marginal distributions.

After this final post-stratification adjustment, the distribution of the calculated weights are examined to identify and, if necessary, trim outliers at the extreme upper and lower tails of the weight distribution. The post-stratified and trimmed weights are scaled to the sum of the total sample size.

It is important to note that the final weighting process and calculations for the ANES as a whole are still in the planning stage. Therefore, the process and calculations ultimately used to develop ANES weights for data released by the ANES later in 2009 may result in weights that differ from those provided with the current file.

## **C.2 FFRISP Weighting Report**

Weighting Procedures for MRI National Sample: Month One Survey

July 14, 2009

The baseline survey consists of 1,000 respondents. Each baseline respondent was assigned a final weight (finalwgt) based on the weighting methodology developed by Tourangeau and Sakshaug (add reference?). The final step in their weighting approach involved raking on eight socio-demographic variables to control margins constructed from the 2007 American Community Survey PUMS.

A total of 989 baseline respondents completed the Month One survey. Using the final weight calculated for these 989 respondents as the input weight to the raking, we raked on the same eight control variables using the SAS Raking Macro, developed by Izrael et al. (2009). The raking algorithm converged when all of the weighted Month One sample percentages were within 0.001 of the corresponding ACS control percentages.

A reduction of the variability in the weights, as measured by the coefficient of variation of the weights, can be achieved by reducing a few large weight values and increasing a few low weight values. A weight-trimming procedure developed by Izrael et al. (2009) was implemented during the raking iterative process in order to ensure that: 1) a limit will be placed on high and low weight values in the final weights, 2) the convergence criteria were satisfied, and 3) the weights sum to the correct population total. The IGCV (Individual and Global Cap Value) method is based on the specification of global low and high weight cap factors, and individual low and high weight cap values. The global low cap value (GLCV) equals the mean of the input weights time a user specified factor less than one. The global high cap value (GHCV) equals the mean of the input weights time a user specified factor greater than one. The individual low and high weight cap values (ILCV and IHCV, respectively) are calculated separately for each respondent in the survey. The individual low cap value equals the respondent's input weight value time a factor less than one. The individual high cap value equals the respondent's input weight value time a factor greater than one. The IGCV method is implemented at each iteration after the raking adjustment procedure is applied to each control variable within that iteration. The following IGCV values were used:

1. Global low weight cap value factor: Mean input weight times 0.20
2. Global high weight cap value factor: Mean input weight times 5.0
3. Individual low weight cap value (ILCV) factor: Respondent's weight times 0.20
4. Individual high weight cap value (IHCV) factor: Respondent's weight times 5.00

Table 1 gives the weighted distribution of the Month One respondents before raking and the ACS control percentages. Table 2 gives the weighted distribution of the Month One respondents after raking and the ACS control percentages. Table 3 presents descriptive statistics on the final weights for the Month One survey.

*The weight variable is named wave1\_finalwgt.*

Table 1. Weighted distribution of Month One survey prior to raking and 2007 ACS PUMS control totals

Housing Status	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Own (1)	150637752.1	150206022	431729.75	72.600	72.392	0.208
Rent/Other (2)	56850931.85	57282662	-431729.75	27.400	27.608	-0.208

Presence of children	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Yes (1)	77943229.64	77627934	315295.45	37.565	37.413	0.152

	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Presence of children						
No (2)	129545454.4	129860750	-315295.45	62.435	62.587	-0.152

	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
# persons in HH						
1	29501677.42	29884910	-383232.58	14.218	14.403	-0.185
2	71867154.17	71754355	112799.17	34.637	34.582	0.054
3	40762366.86	40479829	282537.86	19.646	19.509	0.136
4	35628252.48	35807562	-179309.52	17.171	17.258	-0.086
5+	29729233.07	29562028	167205.07	14.328	14.248	0.081

	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Age						
18-34 (1)	61527694.79	61695916	-168220.81	29.654	29.735	-0.081
35-54 (2)	81104779.21	80998599	106180.43	39.089	39.038	0.051
55+ (3)	64856210.00	64794170	62040.38	31.258	31.228	0.030

	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Gender						
Male (1)	99495698.40	100199316	-703617.92	47.952	48.291	-0.339
Female (2)	107992985.6	107289368	703617.92	52.048	51.709	0.339

	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Hispanic Ethnicity						
Yes (1)	20165551.87	20299151	-133599.25	9.719	9.783	-0.064
No (2)	187323132.1	187189533	133599.25	90.281	90.217	0.064

	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
Race						
White (1)	163842338.4	163563502	278836.32	78.964	78.830	0.134
Black (2)	25296615.93	25296192	424.41	12.192	12.192	0.000
Other (3)	18349729.69	18628990	-279260.74	8.844	8.978	-0.135

Education	Input Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Input Weights	ACS Target % of Weights	Difference in %
<HS (1)	26017483.05	26221777	-204293.94	12.539	12.638	-0.098
HS graduate (2)	63865379.42	63997339	-131959.59	30.780	30.844	-0.064
Some college (3)	46045355.12	46069412	-24056.39	22.192	22.203	-0.012
College grad (4)	71560466.41	71200156	360309.92	34.489	34.315	0.174

Table 2. Weighted distribution of Month One survey after raking and 2007 ACS PUMS control totals

Housing Status	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
Own (1)	150206693.2	150206022	670.78	72.393	72.392	0.000
Rent (2)	57281990.82	57282662	-670.78	27.607	27.608	-0.000

Presence of children	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
Yes (1)	77627426.95	77627934	-507.24	37.413	37.413	-0.000
No (2)	129861257.0	129860750	507.24	62.587	62.587	0.000

# persons in HH	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
1	29885242.27	29884910	332.27	14.403	14.403	0.000
2	71754846.89	71754355	491.89	34.583	34.582	0.000
3	40479742.84	40479829	-86.16	19.509	19.509	-0.000
4	35807195.33	35807562	-366.67	17.257	17.258	-0.000
5+	29561656.68	29562028	-371.32	14.247	14.248	-0.000

Age	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
18-34 (1)	61695332.87	61695916	-582.74	29.734	29.735	-0.000
35-54 (2)	80998578.65	80998599	-20.12	39.038	39.038	-0.000
55+ (3)	64794772.48	64794170	602.86	31.228	31.228	0.000

Gender	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
Male (1)	100199479.2	100199316	162.92	48.292	48.291	0.000

Gender	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
Female (2)	107289204.8	107289368	-162.92	51.708	51.709	-0.000

Hispanic	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
Yes (1)	20299607.84	20299151	456.72	9.783	9.783	0.000
No (2)	187189076.2	187189533	-456.72	90.217	90.217	-0.000

Race	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
White (1)	163563566.1	163563502	64.05	78.830	78.830	0.000
Black (2)	25296164.05	25296192	-27.46	12.192	12.192	-0.000
Other (3)	18628953.85	18628990	-36.58	8.978	8.978	-0.000

Education	Output Weight Sum of Weights	ACS Target Total	Weighted Difference	% of Output Weights	ACS Target % of Weights	Difference in %
<HS (1)	26221776.99	26221777	-0.00	12.638	12.638	0.000
HS graduate (2)	63997339.00	63997339	0.00	30.844	30.844	0.000
Some college (3)	46069411.52	46069412	0.00	22.203	22.203	0.000
College grad (4)	71200156.49	71200156	-0.00	34.315	34.315	-0.000

Table 3. Descriptive Statistics of final weights for the Month One survey

Sample size	Sum of weights	Weight mean	Coefficient of variation of the final weights	Minimum weight	Maximum weight
989	207,488,684	209,796.445	0.59333	41959.3	1,042,172.2

#### Reference

Izrael, D., Battaglia, M.P., and Frankel, M.R. (2009). Extreme Survey Weight Adjustment as a Component of Sample Balancing (a.k.a. Raking). Proceedings of the SAS Global Forum 2009, Paper 247.

---

## D. Additional Analyses of Rank-Ordered Choice Data

This appendix presents additional analyses of the ranking sequence used in the survey. Section D.1 presents separate estimation results for the rank-ordered probit model for each dataset collected – ANES and FFRISP – and presents an LRT to consider whether or not the data can be pooled without significantly affecting parameter estimation. Section D.2 discusses the econometrics of several rank-ordered choice models and considers how the different model assumptions might affect WTP estimation. Section D.3 estimates a series of rank-ordered probit models and shows how the fully specified model of Chapter 8 represents the best fit for the rank-ordered choice data.

### D.1 Does Pooling the Data Affect Parameter Estimation?

Table D.1 summarizes the covariates used to estimate the rank-ordered probit model in Chapter 8 over the two datasets, ANES and FFRISP.<sup>1, 2</sup> None of the covariates are significantly different between the two datasets.<sup>3</sup>

---

1. Most discrete variables were defined as what respondents stated. For example, “married\_own” equals 1 if the respondent answered “married” to the marriage question and “own a home” to the home-ownership question. Respondents who refused to answer either of those questions were left with a value of zero for the “married\_own” dummy variable. The same approach was used for all other variables included in the model, with the exception of the education variable, “educ,” which was imputed to the median value of 10 (some college) for nonrespondents, and income, which is described in footnote 2. The final dataset for model estimation has 3,183 observations, which represents all respondents that completed at least part of the ranking sequence.

2. When respondents provided bracketed responses to the income question, we placed their income at the mid-point of their bracket for analysis. To assign respondents in the top income group, “Greater than \$175,000,” we referred to the 2009 ACS, which reports that of households with incomes greater than \$175,000, the median household is in the \$200,000 to \$249,999 range. We placed income for these respondents at the mid-point of this range: \$225,000.

A total of 237 respondents did not respond to the income question. For these observations, we used a hotdeck procedure, which randomly drew income responses from other observations in the dataset that were similar in terms of work status and educational attainment. Specifically, the procedure stratified over a work/not work binary variable and a binary variable for whether or not the respondent had at least an associate’s degree. This procedure allowed us to keep all observations in the dataset, while preserving sample variation.

We also applied the hotdeck procedure to observations that provided wide, open-ended brackets, such as “Greater than \$50,000.” A total of 31 respondents provided such open-ended brackets. For these cases, the hotdeck procedure randomly drew responses out of the set of observations that had income in the same open-ended bracket.

**Table D.1. Comparison of covariates by dataset**

<b>Variable</b>	<b>Mean</b>	<b>Standard error</b>	<b>95% confidence interval</b>	
<b>Income</b>				
ANES	64,677.740	1,344.307	62,041.980	67,313.510
FFRISP	63,001.340	1,785.135	59,501.240	66,501.430
<b>Education</b>				
ANES	10.165	0.055	10.058	10.273
FFRISP	10.068	0.079	9.914	10.223
<b>Married_own</b>				
ANES	0.534	0.014	0.505	0.562
FFRISP	0.510	0.019	0.473	0.547
<b>Strong environmentalist</b>				
ANES	0.166	0.010	0.146	0.186
FFRISP	0.184	0.015	0.155	0.212
<b>Very strong environmentalist</b>				
ANES	0.030	0.004	0.022	0.037
FFRISP	0.030	0.006	0.019	0.042
<b>Def_visit</b>				
ANES	0.301	0.013	0.275	0.327
FFRISP	0.283	0.017	0.249	0.316
<b>Times</b>				
ANES	3.161	0.240	2.689	3.632
FFRISP	3.338	0.423	2.509	4.166

3. Mean estimates for “married” are significantly different between the two datasets. Mean estimates for “own\_home” are not significantly different. To facilitate pooling, the two variables were combined for modeling purposes. A LRT on combining these two variables finds that it does not significantly affect estimation of the rank-ordered probit model.  $LRT = 3.41$ , which is less than the 0.05 critical value of a  $\chi^2_{(2)}$ , which is 5.99.

Table D.2 presents the results of the rank-ordered probit model for the two separate datasets.<sup>4</sup> Many covariates are significant at the 90% level with both datasets, including cost, the No-Fishing Zones Program dummy variable, Education X Fish, Strong environmentalist X Fish, Strong environmentalist X Ship, and Def\_visit X Ship. Several variables, however, are significant with the ANES dataset but not with FFRISP dataset, including Income X Fish, Married\_own X Fish, Married\_own X Ship, Times X Fish, Times X Ship, and Def\_visit X Fish. It is likely that the larger sample size of the ANES dataset is driving this difference in obtaining significance. The ANES dataset has 2,289 observations compared to 894 in the FFRISP dataset. The FFRISP dataset has two covariates – the Reef Repair Program dummy variable (“ship”) and Very strong environmentalist X Fish - that obtain significant t-statistics that the ANES dataset does not obtain.

**Table D.2. Rank-ordered probit model estimation results**

<b>Variable</b>	<b>ANES</b>	<b>FFRISP</b>
Cost	-0.002*** (-4.257)	-0.003*** (-4.584)
Fish	0.216** (2.475)	0.356*** (2.878)
Ship	0.029 (0.405)	0.204** (2.020)
<b>Variables with the no-fishing zones program</b>		
Income X Fish	0.001* (1.712)	0.002 (1.597)
Education X Fish	0.053** (2.176)	0.050* (1.829)
Married_own X Fish	-0.184** (-2.497)	-0.169 (-1.582)
Strong environmentalist X Fish	0.762*** (5.591)	0.542*** (3.614)
Very strong environmentalist X Fish	0.348 (1.607)	0.693* (1.846)
Def_visit X Fish	0.402*** (3.218)	0.169 (1.040)
Times X Fish	0.008*** (2.923)	0.004 (0.999)

4. In this appendix, estimation results for the variance-covariance matrices are presented in their transformed states. See Appendix E, footnote 5, for a discussion of how this transformation was made.

**Table D.2. Rank-ordered probit model estimation results (cont.)**

Variable	ANES	FFRISP
<b>Variables with the reef repair program</b>		
Income X Ship	0.000 (0.380)	-0.001 (-1.293)
Education X Ship	-0.013 (-0.640)	-0.026 (-1.091)
Married_own X Ship	-0.205*** (-2.841)	-0.068 (-0.727)
Strong environmentalist X Ship	0.621*** (5.523)	0.284** (2.318)
Very strong environmentalist X Ship	0.243 (1.335)	0.409 (1.425)
Def_visit X Ship	0.313** (2.436)	0.353** (2.058)
Times X Ship	0.007*** (2.736)	0.005 (1.314)
Insigma3	-0.119** (-2.087)	-0.144* (-1.791)
Insigma4	0.518*** (9.838)	0.507*** (7.369)
atanhr3_2	0.868*** (10.475)	0.838*** (7.452)
atanhr4_2	1.315*** (14.715)	1.269*** (10.203)
atanhr4_3	1.188*** (12.835)	1.057*** (8.966)
loglikelihood	-6,181.390	-2,440.570

t-stats are reported below the coefficient estimates in parentheses.

\*\*\* Indicates significance at the 99% confidence level.

\*\* Indicates significance at the 95% confidence level.

\* Indicates significance at the 90% confidence level.

To test the hypothesis that the two datasets do not differ significantly in terms of how they fit the rank-ordered probit model, an LRT can be conducted. The LRT compares the log-likelihood of the pooled model (found in Chapter 8) with the sum of the log-likelihoods from the two separate models. It is calculated as  $-2[\log-L_{\text{Pooled}} - (\log-L_{\text{ANES}} + \log-L_{\text{FFRISP}})]$ . Under the null hypothesis, it is distributed  $\chi^2_{(22)}$ . For these models, the calculated LRT is 32.60, which is less than the 0.05 critical value of a  $\chi^2_{(22)}$ , which is 33.92. We cannot reject the hypothesis that the two datasets do not differ in terms of the rank-ordered probit model. In other words, the two datasets do not differ significantly under this model. This result allows us to conclude that pooling the datasets to estimate the rank-ordered probit model, and ultimately WTP, is warranted. All subsequent analyses in this appendix and in Chapters 7 and 8 are therefore conducted on the pooled dataset.

## D.2 Alternative Choice Models

The rank-ordered probit model is used in Chapter 8 to model the responses to the ranking sequence - Q10, Q13, and Q15 - and then to estimate WTP. There are, however, several different econometric models that have been presented in the literature as possible approaches to fitting rank-ordered data. This section discusses these different models. Equation D.1 gives the probability of observing a full ranking of alternatives  $k, l, m,$  and  $n$  for individual  $i$ :

$$\begin{aligned} P_i &= P_i(U_{ik} > U_{il} > U_{im} > U_{in}) \\ &= P(e_{il} - e_{ik} < V_{ik} - V_{il}, e_{im} - e_{il} < V_{il} - V_{im}, e_{in} - e_{im} < V_{im} - V_{in}) \end{aligned} \quad (\text{D.1})$$

The assumption made about the underlying joint distribution of the error terms – the  $e$ 's – is what determines which of the econometric models will be employed to fit the data. Appendix E assumes the errors are distributed normal, which leads to the rank-ordered probit model, the model used to estimate WTP in Chapter 8. If, however, the assumption was that the error terms were distributed extreme value – a common assumption made in the literature – then the error differences would be distributed logistic. This makes the probability that individual  $i$  selects alternative  $k$  as the first alternative in the ranking sequence:

$$P_i = P_i(U_{ik} > U_{il}, U_{ik} > U_{im}, U_{ik} > U_{in}) = \frac{e^{V_{ik}}}{e^{V_{ik}} + e^{V_{il}} + e^{V_{im}} + e^{V_{in}}} \quad (\text{D.2})$$

This is the conditional logit model, which can be estimated based on the responses to Q10, ignoring the follow-up rankings.

The probability that individual  $i$  selects the full ranking of  $k$ ,  $l$ ,  $m$ , and  $n$  is:

$$P_i = \frac{e^{V_{ik}}}{e^{V_{ik}} + e^{V_{il}} + e^{V_{im}} + e^{V_{in}}} \times \frac{e^{V_{il}}}{e^{V_{il}} + e^{V_{im}} + e^{V_{in}}} \times \frac{e^{V_{im}}}{e^{V_{im}} + e^{V_{in}}}, \quad (\text{D.3})$$

which is the rank-ordered logit model (Hausman and Ruud, 1987). This model is sometimes referred to as “exploded logit” because of a counter-intuitive quirk: the conditional probabilities – the second and third terms in Equation D.3 – are identical to the unconditional probabilities, meaning that the data could just as well be set up as a sequence of three separate choices made by three separate individuals (Train, 2009). Essentially, a rank-ordered logit model does not accumulate statistical information about an individual as it fits that individual’s sequence of choices. The implications of this issue are discussed in more detail in Section D.3.

There are other well-known issues associated with estimating conditional or rank-ordered logit models. The first is the independence of irrelevant alternatives (IIA). IIA results from the assumption that errors across a choice set are independent or uncorrelated. If an alternative were added (or removed) from the choice set, the logit model would predict that the original (or remaining) alternatives would be chosen in the same proportions as before the addition (removal). This can lead to some counter-intuitive results, especially if one or more of the alternatives is a close substitute.

A second issue with the logit specification is that errors are assumed to be identically distributed, meaning that they must have equal variances. In this study, the fourth alternative – the Full Program - is the combination of alternatives two and three (the separate No-Fishing Zones and Reef Repair programs). One might expect the error variance for this fourth alternative to be larger than for the other alternatives; in other words, there might be heteroskedasticity across the choice set. The standard logit specification cannot accommodate this.

The rank-ordered probit model, on the other hand, does accommodate these issues. The joint normal assumption of probit allows error terms across the choice set to be correlated and to have different variances. Allowing for correlated error terms gives the rank-ordered probit model a way of keeping track of the sequence of choices made by the same individual: the rankings are not treated as separate choices. This is why rank-ordered probit is chosen as the most appropriate model for the type of data being examined in this study. There is, however, another model in the literature that overcomes the issues discussed above: the “mixed logit” or “random coefficients” model (Hensher and Greene, 2003; Train, 2009).

The idea behind mixed logit is that the coefficients – the  $\beta$ ’s – might vary across the population. In other words, there might be heterogeneity in preferences for the programs. The  $\beta$ ’s are generally assumed to be normally or log-normally distributed, but other distributions are possible

as well. Assuming a normal distribution, the probability of observing individual  $i$ 's ranking ( $k$ ,  $l$ ,  $m$ , or  $n$ ) becomes:

$$P_i = \int \frac{e^{V_{ik}}}{e^{V_{ik}} + e^{V_{il}} + e^{V_{im}} + e^{V_{in}}} \times \frac{e^{V_{il}}}{e^{V_{il}} + e^{V_{im}} + e^{V_{in}}} \times \frac{e^{V_{im}}}{e^{V_{im}} + e^{V_{in}}} g(\mathbf{b}|\mathbf{q}) d\mathbf{q} \quad (\text{D.4})$$

Because each individual is assumed to have a unique coefficient vector,  $\beta$ , the mixed logit model overcomes the problem of choices by the same individual being treated as separate choices made by separate individuals. The estimated coefficients link the sequence of choices an individual makes. Further, because of the more complex functional form, the mixed logit model overcomes the IIA problem. Mixed logit is also very flexible; in addition to random coefficients, the researcher can generate systematic errors by adding random, alternative-specific constants with means restricted to zero (Olsen, 2009). For example, to accommodate the potential higher variance for the fourth alternative, discussed above, the researcher could add a parameter to  $V_{i4}$  with zero mean and positive variance.

In preliminary examinations of the choice models, we found that a mixed logit model with correlated alternative-specific random parameters and parameterized, alternative-specific error terms predicts very similar WTP results to the fully specified rank-ordered probit model presented in Chapter 8. The Team chose to estimate the rank-ordered probit model because the model directly incorporates potential correlation and heteroskedasticity in its basic set-up. The significance of correlation and heteroskedasticity can be directly tested by looking at the t-statistics or by comparing nested models via the LRT. Section D.3 presents these tests.

### D.3 Model Estimation Results

In this section, the rank-ordered probit model is presented under a range of assumptions. We present the basic rank-ordered probit model under the assumption of homoskedasticity (constant error variance across alternatives) and zero correlation in error terms across alternatives. We also present the model under the assumptions of heteroskedasticity and correlation, respectively. LRTs are conducted to determine whether each of these assumptions is warranted. The LRT on the full model of Chapter 8 – that includes both assumptions of heteroskedasticity and correlation – is also presented and the conclusion is drawn that the full model is warranted for this application.

The second column in Table D.3 presents the estimation results for the basic (or restricted) rank-ordered probit model, with the restrictions being a constant error variance (homoskedasticity) and zero correlation among error terms across alternatives. The WTP estimates based on this model are presented in Table D.4.

**Table D.3. Rank-ordered probit model estimation results (N = 3,183)**

<b>Variable</b>	<b>Basic model</b>	<b>Model with heteroskedasticity</b>	<b>Model with correlation</b>	<b>Final model</b>
Cost	-0.002*** (-4.536)	-0.002*** (-5.699)	-0.002*** (-6.102)	-0.002*** (-5.437)
Fish	0.416*** (5.508)	0.423*** (5.757)	0.204*** (4.701)	0.245*** (2.845)
Ship	0.163*** (2.590)	0.283*** (4.607)	0.052 (1.411)	0.071 (1.044)
<b>Variables with the no-fishing zones program</b>				
Income X Fish	0.002** (2.445)	0.002** (2.329)	0.001** (2.537)	0.002** (2.279)
Education X Fish	0.080*** (3.790)	0.075*** (3.520)	0.040*** (2.871)	0.049*** (2.652)
Married_own X Fish	-0.210*** (-2.947)	-0.212*** (-3.035)	-0.139*** (-3.079)	-0.179*** (-3.031)
Strong environmentalist X Fish	0.797*** (7.252)	0.815*** (7.427)	0.523*** (7.155)	0.691*** (6.697)
Very strong environmentalist X Fish	0.524** (2.230)	0.521** (2.358)	0.332** (2.274)	0.440** (2.365)
Def_visit X Fish	0.369*** (3.212)	0.392*** (3.404)	0.244*** (3.316)	0.333*** (3.399)
Times X Fish	0.009*** (3.160)	0.009*** (3.081)	0.005*** (2.904)	0.007*** (2.762)
<b>Variables with the reef repair program</b>				
Income X Ship	-0.001 (-0.754)	0.000 (-0.501)	0.000 (-0.284)	0.000 (-0.210)
Education X Ship	-0.023 (-1.318)	-0.008 (-0.465)	-0.017 (-1.415)	-0.020 (-1.313)
Married_own X Ship	-0.178** (-2.538)	-0.181*** (-2.691)	-0.124*** (-2.873)	-0.167*** (-2.938)
Strong environmentalist X Ship	0.574*** (6.800)	0.573*** (6.671)	0.382*** (6.655)	0.512*** (6.048)
Very strong environmentalist X Ship	0.326* (1.868)	0.296* (1.765)	0.217* (1.917)	0.294* (1.945)

**Table D.3. Rank-ordered probit model estimation results (N = 3,183) (cont.)**

<b>Variable</b>	<b>Basic model</b>	<b>Model with heteroskedasticity</b>	<b>Model with correlation</b>	<b>Final model</b>
Def_visit X Ship	0.371*** (3.222)	0.356*** (3.147)	0.244*** (3.263)	0.333*** (3.237)
Times X Ship	0.008*** (2.907)	0.008*** (2.982)	0.005*** (2.878)	0.006*** (2.810)
lnsigmaP1		-1.028*** (-7.240)		
lnsigmaP2		0.319*** (7.191)		
atanhrP1			1.118*** (19.610)	
atanhrP2			1.028*** (20.784)	
atanhrP3			0.885*** (18.046)	
lnsigma3				-0.124*** (-2.633)
lnsigma4				0.512*** (12.614)
atanhr3_2				0.862*** (11.592)
atanhr4_2				1.304*** (15.113)
atanhr4_3				1.159*** (14.014)
Loglikelihood	-9,489.950	-9,170.380	-9,034.300	-8,638.250

t-stats are reported below the coefficient estimates in parentheses.

\*\*\* Indicates significance at the 99% confidence level.

\*\* Indicates significance at the 95% confidence level.

\* Indicates significance at the 90% confidence level.

**Table D.4. WTP results based on the four models**

	<b>WTP</b>	<b>Standard error</b>	<b>95% confidence interval</b>	
<b>Basic model</b>				
No-fishing zones program	\$292.57	\$46.80	\$200.85	\$384.29
Reef repair program	\$91.18	\$14.17	\$63.40	\$118.96
Full program	\$383.75	\$55.21	\$275.53	\$491.96
<b>Model with heteroskedasticity</b>				
No-fishing zones program	\$272.52	\$34.92	\$204.09	\$340.96
Reef repair program	\$138.03	\$17.42	\$103.88	\$172.17
Full program	\$410.55	\$50.31	\$311.94	\$509.15
<b>Model with correlation</b>				
No-fishing zones program	\$215.29	\$24.01	\$168.24	\$262.34
Reef repair program	\$54.13	\$11.65	\$31.29	\$76.97
Full program	\$269.42	\$28.78	\$213.02	\$325.82
<b>Final model</b>				
No-fishing zones program	\$224.81	\$32.19	\$161.72	\$287.89
Reef repair program	\$62.82	\$21.73	\$20.23	\$105.40
Full program	\$287.62	\$48.04	\$193.46	\$381.78

The third column in Table D.3 presents the estimation results for the rank-ordered probit model that allows for heteroskedasticity across alternatives. The estimable variance terms for the Reef Repair Program and the Full Program ( $\sigma_3$  and  $\sigma_4$ , respectively) are both significantly different from the assumed base variance of 1. Specifically, the variance term for the Reef Repair Program is significantly less than 1, implying a smaller error variance for this program, and the variance term for the Full Program is significantly greater than 1, confirming our prior hypothesis about this parameter. A LRT confirms that our prior expectation that relaxing the homoskedasticity assumption significantly improves model estimation. The calculated LRT is 639.14, which is well above the 0.05 critical value of a  $\chi^2_{(2)}$ , which is 5.99.

Table D.3, column 4, presents the results of the rank-ordered probit model under the assumptions of homoskedasticity (constant variance) but potentially non-zero correlations across alternatives. The estimable correlation terms (see Appendix E for details on estimability of the variance-covariance matrix under rank-ordered probit) are all significantly different from zero, indicating that estimation of this model is improved by relaxing the zero-correlation restriction. The LRT comparing this model to the basic model with no correlation is 911.3, which is well above the

0.05 critical value of a  $\chi^2_{(3)}$ , which is 7.82, confirming our prior expectation that there is correlation across alternatives.

To test whether both heteroskedasticity and correlation significantly affect model estimation, we conducted LRTs to compare the final model of Chapter 8. These calculated LRTs are:

- } The LRT comparing the basic rank-ordered probit to the final model of Chapter 8 is 1,703.4, which is well above the 0.05 critical value of a  $\chi^2_{(5)}$ , which is 11.07.
- } The LRT comparing the heteroskedastic model to the final model of Chapter 8 is 1,064.26, which is well above the 0.05 critical value of a  $\chi^2_{(3)}$ .
- } The LRT comparing the model with correlation to the final model of Chapter 8 is 792.10, which is well above the 0.05 critical value of a  $\chi^2_{(2)}$ .

These tests confirm our prior expectation that the fully specified rank-ordered probit model that allows for both correlation and heteroskedasticity in the error terms across alternatives is the best model to fit the ranked data collected in this study.

## References

- Hausman, J.A. and P.A. Ruud. 1987. Specifying and testing econometric models for rank-ordered data. *Journal of Econometrics* 34:83- 104.
- Hensher, D.A. and W.H. Greene. 2003. The mixed logit model: The state of practice. *Transportation* 30:133- 176.
- Olsen, S.B. 2009. Choosing between internet and mail survey modes for choice experiment surveys considering non-market goods. *Environmental and Resource Economics* 44:591- 610.
- Train, K.E. 2009. *Discrete Choice Methods with Simulation*. 2nd ed. Cambridge University Press, New York.

---

## E. The Rank-Ordered Probit Model

Following the random utility model framework, individuals are assumed to derive utility from (1) each of the coral reef protection programs presented in the survey and (2) all else. Both of these aspects of utility are assumed to have observable components and unobservable, random components. Utility can therefore be expressed as:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (\text{E.1})$$

or, more specifically:

$$U_{ij} = \beta_y y_i + \beta_F F_j + \beta_S S_j + \beta_{FS} F_j S_j + \beta_{X_i} X_i + e_{ij} \quad (\text{E.2})$$

where  $i$  represents the individual survey respondents ( $i = 1 \dots n$ );  $j$  represents the four program options in the survey (1 = status quo, 2 = the No-Fishing Zones Program, 3 = the Reef Repair Program, and 4 = the combination of programs 2 and 3);  $X_i$  is a  $k \times 1$  vector of individual-specific variables, including a 1 to allow for alternative-specific constant terms;  $y_i$  is individual  $i$ 's income;  $F_j$  and  $S_j$  are scalar indicator variables for whether or not the No-Fishing Zones and Reef Repair programs appear in alternative  $j$ ;  $\beta_y$  is the marginal utility of money income; and  $\beta_F$ ,  $\beta_S$ , and  $\beta_{FS}$  are each  $1 \times k$  vectors of the marginal contributions toward utility that individuals with the associated covariates derive from the specific programs.

Letting  $C_{ij}$  be the additional cost to individual  $i$ 's household of program alternative  $j$  ( $C = 0$  for Program 1, the status quo),<sup>1</sup> and using Equation E.2, individual  $i$ 's utility for the four programs are:

$$\begin{aligned} U_{i1} &= \beta_y y_i + e_{i1} \\ U_{i2} &= \beta_y (y_i - C_{i2}) + \beta_F X_i + e_{i2} \\ U_{i3} &= \beta_y (y_i - C_{i3}) + \beta_S X_i + e_{i3} \\ U_{i4} &= \beta_y (y_i - C_{i4}) + (\beta_F + \beta_S + \beta_{FS}) X_i + e_{i4} \end{aligned} \quad (\text{E.3})$$

---

1. The experimental design defined 16 cost scenarios that were offered randomly to different survey respondents. Importantly, a zero-cost program – the status quo – is included in all choice sets. This allows for the estimation of total WTP for the programs. See Appendix B for the full experimental design.

The No-Fishing Zones Program at 25% (as opposed to the status quo of 1%), the Reef Repair Program at 10 years of recovery time (as opposed to the status quo of 50 years), and the combination of the two programs are the only programs included in the choice sets. The policy variables,  $F_j$  and  $S_j$ , are therefore assumed to be binary, “dummy” variables – that is, they can take only the value of zero (for the status quo) or 1 (for the proposed program). This modeling constraint is imposed to conform to the science, which found alternative levels of the policy variables to be unrealistic.

Because of the limited array of policy programs offered, several constraints or limitations had to be imposed on our analysis. First, it had to be acknowledged that the estimated coefficients – the estimated  $\beta$ 's – only measure the total contributions that these specific policy changes would have on utility and therefore WTP. In other words, the model cannot be used to estimate the marginal contributions of alternative levels of the policy variables.

Second, inclusion of the interaction term  $\beta_{FS}$  in the utility function for the combination (“both”) program gives us a model that is observationally equivalent to one where the utility for each of the program alternatives is represented by a separate program “dummy.” In other words, inclusion of the interaction term gives the “both” alternative complete flexibility to be fitted to the data irrespective of the contributions that the separate programs,  $F_j$  and  $S_j$ , might make to that choice. This essentially boils the “both” alternative down to one that does not explicitly acknowledge the programs it is composed of. Basically, we lose potential information on how respondents valued the individual programs within the “both” alternative. This turned out to be an important issue when we conducted a preliminary analysis and found that the bid values on the individual programs did not do an adequate job of capturing the program values. The “both” program offered a wider range of bids for the two programs, and we found it to be important to the analysis to use this information explicitly. We therefore omitted the interaction term in our final analysis.<sup>2</sup>

Returning to Equation E.3, the  $e$ 's are the random components of utility and are assumed to be correlated and heteroskedastic across program alternatives. In other words, it is assumed that respondents will have unexplained aspects of their preferences for the programs that are likely to move in the same direction – either positive for all programs or negative.<sup>3</sup> Heteroskedasticity

---

2. This omission means that we use information gleaned from both the separate program alternatives and the “both” alternative to estimate total WTP for the two, separate programs. Analytically, we are combining the information we have about how people value the programs separately and how they value them jointly. Our estimates of WTP for each of the separate programs will therefore be underestimates of true WTP for those individual programs.

3. One interpretation of this assumed correlation is that different individuals' error terms might contain fixed error components that represent their support or non-support for “any program.” This fixed component would feed into the correlation across alternatives. The remaining component of individuals' errors would be specific to the programs offered in each alternative and independent both across and within individuals.

allows for the error variances to vary across alternatives. This allows for the possibility, for example, that the variance of alternative four might be different – probably larger – than the other alternatives.<sup>4</sup>

To estimate model parameters via the maximum likelihood method, the log-likelihood function is specified as the log of the probability that the specific rankings observed in the data would, in fact, occur:

$$\loglik = \sum_{i=1}^n \sum_{j=1}^4 \log P_{ij} I_{ij} \quad (E.4)$$

where  $P_{ij}$  is the probability that individual  $i$  will select program  $j$  and  $I_{ij}$  is an indicator function for whether or not individual  $i$  actually chose program  $j$ . The probability, for example, that individual  $i$  will select program  $k$  in the first round of the ranking exercise can be expressed as:

$$\begin{aligned} \text{Prob}(\text{individual } i \text{ chooses program } k) &= P_{ik} = P(U_{ik} > U_{ij}, \text{ for all } j \neq k) \\ &= P(V_{ik} + e_{ik} > V_{ij} + e_{ij}, \text{ } j \neq k) \\ &= P(e_{ij} - e_{ik} < V_{ik} - V_{ij}, \text{ } j \neq k) \end{aligned} \quad (E.5)$$

Equation E.5 is in the form of a cumulative density function (CDF) with random terms – the error differences – on the left-hand side of the inequality and a parametric function – differences in observable utilities – on the right-hand side.

Moving to the full sequence of choices, the probability of observing a full ranking of alternatives  $k, l, m$ , and  $n$  for individual  $i$  is:

$$\begin{aligned} P_i &= P_i(U_{ik} > U_{il} > U_{im} > U_{in}) \\ &= P(e_{il} - e_{ik} < V_{ik} - V_{il}, e_{im} - e_{il} < V_{il} - V_{im}, e_{in} - e_{im} < V_{im} - V_{in}) \end{aligned} \quad (E.6)$$

---

4. One way of interpreting heteroskedasticity is by discussion of the scale term. “Scale” is the inverse of the standard deviation, so higher variance for an alternative implies a narrower scale. Swait (2007) discusses the difficulty of interpreting the thinking behind individuals having varying scales across alternatives, but he notes that, analytically, the approach has merits. In our case, it might be that a potentially larger variance could be caused by omission of the interaction term discussed above. Essentially, we are reducing the ability of our model to explain the “both” choice by excluding this term. The larger, unexplained variation goes into the error term, increasing estimated variance. We thank a peer reviewer for making this observation.

which is in the form of a joint CDF in terms of error differences. To estimate model parameters then, an assumption must be made about the joint distribution of these error differences.

Under the rank-ordered probit specification, error terms, the  $\epsilon$ 's, are assumed to be jointly distributed normal with a mean of 0 and a variance-covariance matrix  $\Sigma$ . The matrix  $\Sigma$  is assumed to have non-identical diagonal terms (heteroskedasticity among alternatives) and non-zero, symmetric, off-diagonal terms (non-independence of preferences across alternatives). Error differences are therefore jointly distributed normal with a mean of 0 and a variance-covariance matrix that can be expressed as a quadratic function of  $\Sigma$  (see Train, 2003, pp. 162–163 for details).

Given these assumptions, Equation E.6 can be expressed as a multivariate normal CDF for each individual. These individual CDFs fit directly into the log-likelihood function (Equation E.4), which is maximized to estimate the parameters. In practice, the rank-ordered probit model can be estimated with the “asroprobit” command in Stata 10.<sup>5</sup>

Because Equation E.6 is based only on differences in parametric utilities rather than absolute measurements of the utilities, the model is invariant to “location.” That is, we could add or subtract the identical, fixed quantities from the utilities for each program and the same relative rankings would result. This means that we cannot estimate absolute utility levels for every program in the choice set. Rather, we can only estimate how the utilities vary *compared* to one particular program. Estimation therefore requires the selection of a base alternative to compare the other programs to. Selecting such a base alternative essentially reduces the model from a four-way to a three-way structure, with the variance-covariance being reduced from a  $4 \times 4$  to a  $3 \times 3$  matrix. Because this  $3 \times 3$  matrix is symmetric, it has six unique elements. In this study, the base alternative is selected as the status quo.

In addition to this “location” restriction, there is another restriction that must be made before the model is estimable; this one is based on the fact that we cannot independently estimate all of the standard deviations of the error terms. One must be fixed and all else is scaled to this fixed term. This is the same problem that we have with standard logit and probit models and is commonly discussed as the problem of identifying “scale.” Standard practice is to assign the value 1 to the

---

5. The algorithm that Stata 10 uses to approximate the multivariate normal function is called the GHK algorithm (Hajivassiliou and Ruud, 1994). Stata 10 uses a default setting of 200, which draws on the Hammersley sequence to approximate the distribution. The GHK algorithm does not estimate the variance-covariance matrix directly. Rather, to ensure that the matrix remains positive definite and that diagonal elements remain positive over the course of the maximization routine, a square-root transformation is taken on the Cholesky factorization of the variance-covariance matrix. A log transformation is taken on the diagonal elements of this matrix.

unidentified parameter. In this study, the standard deviation of the No-Fishing Zones Program is assigned this value.

This leaves five elements of the variance-covariance matrix that are identified: two variances and three covariances, or correlations. The scale alternative in this study is specified to be Alternative Two, and the standard deviation of Alternative Two is set to unity.

Once parameter estimates are available, individual  $i$ 's WTP for program  $j$  can be estimated as (omitting the interaction term):

$$WTP_{ij} = \frac{-(b_F F_j + b_S S_j) X_i}{b_y} \quad (E.7)$$

Once individual WTP amounts are estimated, mean WTP can be calculated by taking the mean of the individual estimates, weighted by the sample probability weights:

$$mean(WTP_j) = \frac{\sum_{i=1}^n w_i WTP_{ij}}{n} \quad (E.8)$$

where  $w_i$  is the sample probability weight for individual  $i$ .

Applying Equation E.7, Equation E.8 can be re-expressed as:

$$mean(WTP_j) = \frac{-(b_F F_j + b_S S_j) \bar{X}_w}{b_y} \quad (E.9)$$

where  $\bar{X}_w$  is the vector of the weighted means of the individual vectors,  $x_i$ .<sup>6</sup>

The estimated variance of mean WTP for program  $j$  can be calculated by applying the delta method (see Alberini et al., 2007):

$$var[mean(WTP_j)] = d_j \Phi var(b) d_j \quad (E.10)$$

---

6. The normal distribution is a symmetric distribution that covers the domain from negative to positive infinity. Error differences also span this range, and these affect the estimation of utility differences and therefore model parameters. Underlying the estimation of mean WTP then is the possibility that some individual, predicted WTP amounts could be negative, which is counter-intuitive. As Equation E.9 shows, however, mean WTP can be estimated based on the "average" individual; it is a measure of central tendency. So, while the normal assumption might provide counter-intuitive results for some individuals, it can be used to estimate the overall mean – the central tendency of the distribution – when the bulk of the distribution is in positive territory.

where  $var(\beta)$  is the estimated variance-covariance matrix of the estimated parameter vector ( $\beta_F$ ,  $\beta_S$ , and  $\beta_y$ ) and  $d_j$  is the  $j$ -specific value of the derivative of Equation E.9 with respect to the parameter vector. All elements of Equation E.10 are estimated using the maximum likelihood estimates of the parameters and, from Equation E.9, the weighted means of the covariates.

Ninety-five percent confidence intervals are estimated as:

$$CI_j = \text{mean}(WTP_j) \pm 1.96 \cdot SE[\text{mean}(WTP_j)] \quad (E.11)$$

where  $SE[\text{mean}(WTP_j)]$  is the square root of the variance of  $\text{mean}(WTP_j)$ .

The income elasticity of  $WTP_j$ , or the percentage change in  $WTP_j$  due to a percentage change in income, can be estimated as the ratio of the estimated program-specific coefficient on income over the coefficient on program cost, scaled by the ratio of mean income over mean estimated  $WTP_j$ . Specifically, the income elasticity of  $WTP_j$  is estimated as:

$$E = - \frac{\frac{\partial b_j^{income}}{\partial \text{mean}(income)}}{\frac{\partial b_y}{\partial \text{mean}(WTP_j)}} \quad (E.12)$$

The delta method can be used to estimate standard errors and confidence intervals.

For discrete variables, such as “being a strong environmentalist,” the marginal impact of the  $k$ th program-specific variable  $WTP_j$  can be estimated by taking the negative of the ratio of the  $k$ th program-specific coefficient over the coefficient on program cost:

$$E = - \frac{\frac{\partial b_j^k}{\partial b_y}}{\frac{\partial b_y}{\partial \text{mean}(WTP_j)}} \quad (E.13)$$

Again, the delta method is used to estimate standard errors and confidence intervals.

## References

Alberini, A., A. Longo, and M. Veronesi. 2007. Basic statistical models for stated choice studies. In *Valuing Environmental Amenities Using Stated Choice Studies: A Common Sense Approach to Theory and Practice*, B. Kanninen (ed.). Springer, Dordrecht, the Netherlands.

Hajivassiliou, V.A. and P.A. Ruud. 1994. Classical estimation methods for LDV models using simulation. In *Handbook of Econometrics, Volume IV*, R.F. Engle and D.L. McFadden (eds.). Elsevier Science B.V. 2383–2441.

Swait, J. 2007. Advanced choice models. In *Valuing Environmental Amenities Using Stated Choice Studies: A Common Sense Approach to Theory and Practice*, B. Kanninen (ed.). Springer, Dordrecht, the Netherlands.

Train, K.E. 2003. *Discrete Choice Methods with Simulation*. Cambridge University Press, Cambridge, UK.

## F. Demographic Variables

This appendix presents the categorical responses to the demographic questions used to generate the variables included in the final model in Chapter 8. Note that table percentages may not sum to 100 due to rounding and that sample sizes may vary due to item nonresponses.

**Table F.1. Frequency distribution for the education question**

Code	Education category	Frequency	Percent	Cumulative percent
	Refused	6	0%	0%
1	No formal education	2	0%	0%
2	1st, 2nd, 3rd, or 4th grade	0	0%	0%
3	5th or 6th grade	0	0%	0%
4	7th or 8th grade	9	0%	1%
5	9th grade	14	0%	1%
6	10th grade	38	1%	2%
7	11th grade	46	1%	4%
8	12th grade, no diploma	46	1%	5%
9	High school graduate – high school diploma or the equivalent (General Equivalency Diploma or GED)	600	18%	23%
10	Some college, no degree	869	27%	50%
11	Associate’s degree	328	10%	60%
12	Bachelor’s degree	735	23%	83%
13	Master’s degree	404	12%	95%
14	Professional or doctorate degree	157	5%	100%
Total		3,254	100%	

**Table F.2. Frequency distribution for income**

<b>Household income categories</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative percent</b>
Inapplicable	16	1%	1%
less than \$5,000	45	2%	2%
\$5,000 to \$7,499	30	1%	3%
\$7,500 to \$9,999	23	1%	4%
\$10,000 to \$12,499	41	1%	5%
\$12,500 to \$14,999	52	2%	7%
\$15,000 to \$19,999	91	3%	10%
\$20,000 to \$24,999	142	5%	14%
\$25,000 to \$29,999	136	5%	19%
\$30,000 to \$34,999	119	4%	23%
\$35,000 to \$39,999	305	10%	33%
\$40,000 to \$49,999	256	8%	41%
\$50,000 to \$59,999	272	9%	50%
\$60,000 to \$74,999	380	12%	62%
\$75,000 to \$84,999	216	7%	70%
\$85,000 to \$99,999	233	8%	77%
\$100,000 to \$124,999	242	8%	85%
\$125,000 to \$149,999	148	5%	90%
\$150,000 to \$174,999	86	3%	93%
\$175,000 or more	167	6%	98%
Less than \$20,000	1	0%	98%
20,000 to \$34,499	4	0%	98%
Less than \$35,000	3	0%	98%
\$35,000 or more	18	1%	99%
\$35,000 to \$49,999	6	0%	99%
\$50,000 or more	10	0%	100%
\$50,000 to \$99,999	11	0%	100%
\$100,000 or more	3	0%	100%
Total	3,056	100%	

**Table F.3. Frequency distribution for marital status**

<b>Marital status</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative percent</b>
Refused	11	0%	0%
Married	2,031	62%	63%
Widowed	317	10%	72%
Divorced	456	14%	86%
Separated	158	5%	91%
Never married	285	9%	100%
Total	3,258	100%	

**Table F.4. Frequency distribution for home ownership**

<b>Home ownership</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative percent</b>
Refused	6	0%	0%
Own	2,401	78%	78%
Rent	526	17%	95%
Some other arrangement (please specify)	149	5%	100%
Total	3,082	100%	

---

## G. Nonresponse Analysis

This appendix examines the issue of the representativeness of our pooled sample. The sample was formed by pooling the two internet panel samples, as discussed in Chapter 6. Although the samples were drawn with probability methods that, in expectation, give an unbiased representation of the populations from which the samples were drawn, nonresponse can make the sample unrepresentative. OMB is responsible for granting clearance for most federally sponsored surveys and has periodically issued standards and guidelines for statistical surveys carried out by the federal government and its contractors. The most recent guidelines (OMB, 2006) call for an examination of the effects of nonresponse on the representativeness of the sample whenever the response rate for a survey goes below 80%.<sup>1</sup>

We address nonresponse in two ways in this study. First, Chapter 6 looks at the survey respondents' demographic characteristics and attitudes and compares them to national, population statistics. Post-stratification sampling weights were developed to address any differences found between our survey sample and the full, national population. These weights are discussed in more detail in Appendix C. The post-stratification weights address any systematic, nonresponse bias that would otherwise exist in the sample due to the demographic differences. Once demographic differences are accounted for, however, there remains the possibility of sample selection bias, which would occur if there is any systematic and unobservable difference between the types of people who chose to respond to the survey. Of particular concern is the question of whether nonrespondents are people who are more likely to be uninterested in the survey topic and therefore less likely to be willing to pay for the policy programs. If this is the case, then the WTP estimates presented in this report could be upwardly biased.

Although there are no data available to specifically describe and address any underlying differences between survey respondents and nonrespondents (other than demographics), the ANES dataset has two variables that might serve as proxies for the idea that different respondents might be more or less interested in participating in the survey. The first variable is "duration," which is defined as the difference between the time that a respondent began taking the survey until the time that the respondent completed the survey. Although there may be a number of possible explanations for why a respondent did not complete the survey in one sitting, including that the respondent was busy, it is likely that at least some of these respondents were not particularly interested in the topic. Duration, expressed in hours, is summarized in Table G.1. Duration ranges from 3 minutes (0.05 of an hour) to about 31 days (750 hours), with a mean value of approximately 24 hours.

---

1. More specifically, guideline 1.3.4 states that a survey should "[p]lan for a nonresponse bias analysis if the expected unit response rate is below 80 percent (see Section 3.2.9)." Section 3.2.9 describes several types of analysis that can be done to conform to this guideline.

**Table G.1. Summary of duration and days delayed variables**

<b>Variable</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>95% confidence interval</b>	
Duration (hours)	23.850	81.593	0.050	750.417
Days delayed	6.309	7.532	0.000	34.000

The second variable is “days delayed,” which represents the number of days that respondents delayed starting the survey after the survey was issued to them. Like duration, we expect that at least some of the respondents who delayed taking the survey were at least potentially less willing to pay for the programs. From Table G.1, the days-delayed variable ranges from 0 to 34 days, with a mean of 6.3 days.

We tested the hypothesis that respondents with higher values for duration and days delayed have lower WTPs by including the two variables, each interacted with the No-Fishing Zones and Reef Repair programs, in the WTP model of Chapter 8. The model is presented in Table G.2. The days-delayed variable interacted with the Reef Repair Program is positive and significant, implying that respondents who delayed starting the survey might, in fact, have higher WTPs for that program, which contradicts our initial hypothesis. We therefore reject the hypothesis that days delayed might reduce WTP, at least for that particular program. The days-delayed variable interacted with the No-Fishing Zones Program is positive but not significant. Neither of the two duration variables are significant. We therefore find no evidence that either of these variables significantly reduces WTP for the programs.

**Table G.2. Nonresponse analysis estimation results**

<b>Covariate</b>	<b>Coefficient</b>	<b>Standard error</b>	<b>z</b>	<b>P&gt; z </b>	<b>95% confidence interval</b>	
Cost	-0.002	0.000	-4.320	0.000	-0.003	-0.001
Fish	0.160	0.087	1.830	0.068	-0.011	0.331
Ship	-0.039	0.074	-0.520	0.600	-0.184	0.106
Income X Fish	0.001	0.001	1.710	0.088	0.000	0.003
Education X Fish	0.055	0.024	2.300	0.022	0.008	0.103
Married_own X Fish	-0.170	0.073	-2.330	0.020	-0.313	-0.027
Strong environmentalist X Fish	0.757	0.135	5.620	0.000	0.493	1.021
Very strong environmentalist X Fish	0.347	0.214	1.620	0.104	-0.072	0.766
Def_visit X Fish	0.389	0.122	3.180	0.001	0.149	0.629
Times X Fish	0.008	0.003	2.990	0.003	0.003	0.014
Duration X Fish	0.000 <sup>a</sup>	0.000	0.330	0.741	-0.001	0.001
Days_delayed X Fish	0.007	0.005	1.440	0.149	-0.002	0.016

**Table G.2. Nonresponse analysis estimation results (cont.)**

Covariate	Coefficient	Standard error	z	P> z	95% confidence interval	
Income X Ship	0.000 <sup>b</sup>	0.001	0.360	0.717	-0.001	0.002
Education X Ship	-0.009	0.019	-0.450	0.654	-0.047	0.029
Married_own X Ship	-0.188	0.071	-2.650	0.008	-0.326	-0.049
Strong environmentalist X Ship	0.616	0.112	5.510	0.000	0.397	0.835
Very strong environmentalist X Ship	0.242	0.180	1.350	0.178	-0.110	0.594
Def_visit X Ship	0.298	0.126	2.370	0.018	0.052	0.544
Times X Ship	0.007	0.003	2.810	0.005	0.002	0.013
Duration X Ship	0.000 <sup>c</sup>	0.000	0.100	0.921	-0.001	0.001
Days_delayed X Ship	0.009	0.005	1.950	0.052	0.000	0.018
lnsigma3	-0.119	0.058	-2.040	0.042	-0.233	-0.005
lnsigma4	0.512	0.051	10.090	0.000	0.413	0.612
atanhr3_2	0.877	0.082	10.700	0.000	0.716	1.037
atanhr4_2	1.326	0.089	14.970	0.000	1.152	1.500
atanhr4_3	1.194	0.092	12.970	0.000	1.014	1.375
sigma1	1.000					
	(base alternative)					
sigma2	1.000					
	(scale alternative)					
sigma3	0.888	0.052			0.792	0.995
sigma4	1.669	0.085			1.511	1.844
rho3_2	0.705	0.041			0.615	0.777
rho4_2	0.868	0.022			0.819	0.905
rho4_3	0.832	0.028			0.767	0.880

Alternative = 1 is the alternative normalizing location.

Alternative = 2 is the alternative normalizing scale.

Log simulated-pseudolikelihood = -6,176.2284.

a. The Duration X Fish coefficient is 0.000145.

b. The Income X Ship coefficient is 0.000255.

c. The Duration X Ship coefficient is 0.000046.

## References

OMB. 2006. *Standards and Guidelines for Statistical Surveys*. Office of Management and Budget, Washington, DC.

---

## **H. Tabulation of Close-Ended Responses**

This appendix presents how respondents answered each question of the survey. In total, we received 3,277 completed surveys that comprise the pooled sample; 2,335 from the ANES internet panel and 942 from the FFRISP internet panel. The tables in this appendix show responses for the ANES, FFRISP, and pooled datasets, and are presented in the order in which the questions were asked.

Each table references the screen shots as defined in Appendix A.

**Table H.1. Answers to question S2A: Did you hear the music file? (Screen 4)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.4%	0.7%	0.5%
Yes	66.6%	53.2%	62.7%
No	30.6%	42.5%	34.0%
Not sure	2.4%	3.3%	2.7%
Not asked	0.0%	0.4%	0.1%

**Table H.2. Answers to question Q2D1a: Indicate if you think we are spending too much money, about the right amount, or too little money on space exploration (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.1%	0.2%
Too little	6.7%	3.3%	5.7%
About the right amount	21.6%	21.4%	21.6%
Too much	23.8%	23.2%	23.6%
Not asked	47.5%	52.0%	48.8%

**Table H.3. Answers to question Q2D1b: Indicate if you think we are spending too much money, about the right amount, or too little money on the environment (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.4%	0.3%	0.3%
Too little	25.8%	20.9%	24.4%
About the right amount	19.2%	20.6%	19.6%
Too much	7.1%	6.1%	6.8%
Not asked	47.5%	52.0%	48.8%

**Table H.4. Answers to question Q2D1c: Indicate if you think we are spending too much money, about the right amount, or too little money on health (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	0.1%	0.5%
Too little	31.2%	30.6%	31.1%
About the right amount	12.8%	11.5%	12.5%
Too much	7.7%	5.8%	7.1%
Not asked	47.5%	52.0%	48.8%

**Table H.5. Answers to question Q2D1d: Indicate if you think we are spending too much money, about the right amount, or too little money on assistance to big cities (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.0%	0.2%
Too little	6.0%	7.2%	6.4%
About the right amount	25.1%	20.9%	23.9%
Too much	21.0%	19.8%	20.7%
Not asked	47.5%	52.0%	48.8%

**Table H.6. Answers to question Q2D1e: Indicate if you think we are spending too much money, about the right amount, or too little money on law enforcement (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.5%	0.2%	0.4%
Too little	21.4%	18.0%	20.4%
About the right amount	26.6%	24.0%	25.8%
Too much	4.0%	5.7%	4.5%
Not asked	47.5%	52.0%	48.8%

**Table H.7. Answers to question Q2D1f: Indicate if you think we are spending too much money, about the right amount, or too little money on drug rehabilitation (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.4%	0.2%	0.3%
Too little	15.8%	16.9%	16.1%
About the right amount	26.8%	23.3%	25.8%
Too much	9.5%	7.6%	8.9%
Not asked	47.5%	52.0%	48.8%

**Table H.8. Answers to question Q2D1g: Indicate if you think we are spending too much money, about the right amount, or too little money on education (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.4%	0.3%
Too little	35.6%	33.4%	35.0%
About the right amount	12.6%	12.5%	12.6%
Too much	3.9%	1.7%	3.3%
Not asked	47.5%	52.0%	48.8%

**Table H.9. Answers to question Q2D2a: Indicate if you think we are spending too much money, about the right amount, or too little money on the space exploration program (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.5%	0.2%	0.4%
Too little	5.4%	6.9%	5.8%
About the right amount	24.8%	24.3%	24.6%
Too much	16.8%	20.2%	17.8%
Not asked	52.5%	48.4%	51.3%

**Table H.10. Answers to question Q2D2b: Indicate if you think we are spending too much money, about the right amount, or too little money on improving and protecting the environment (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.6%	0.3%	0.5%
Too little	19.3%	21.2%	19.9%
About the right amount	20.4%	23.5%	21.3%
Too much	7.2%	6.6%	7.0%
Not asked	52.5%	48.4%	51.3%

**Table H.11. Answers to question Q2D2c: Indicate if you think we are spending too much money, about the right amount, or too little money on improving and protecting the nation's health (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	0.4%	0.6%
Too little	26.4%	29.4%	27.3%
About the right amount	15.2%	17.3%	15.8%
Too much	5.3%	4.6%	5.1%
Not asked	52.5%	48.4%	51.3%

**Table H.12. Answers to question Q2D2d: Indicate if you think we are spending too much money, about the right amount, or too little money on solving the problems of big cities (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	0.4%	0.6%
Too little	13.5%	16.9%	14.5%
About the right amount	24.1%	26.3%	24.8%
Too much	9.2%	8.0%	8.9%
Not asked	52.5%	48.4%	51.3%

**Table H.13. Answers to question Q2D2e: Indicate if you think we are spending too much money, about the right amount, or too little money on halting the rising crime rate (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	0.3%	0.6%
Too little	19.8%	21.6%	20.3%
About the right amount	24.2%	26.0%	24.7%
Too much	2.8%	3.7%	3.1%
Not asked	52.5%	48.4%	51.3%

**Table H.14. Answers to question Q2D2f: Indicate if you think we are spending too much money, about the right amount, or too little money on dealing with drug addiction (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	0.2%	0.6%
Too little	17.9%	21.5%	18.9%
About the right amount	22.2%	22.6%	22.3%
Too much	6.8%	7.3%	6.9%
Not asked	52.5%	48.4%	51.3%

**Table H.15. Answers to question Q2D2g: Indicate if you think we are spending too much money, about the right amount, or too little money on improving the nation's education system (Screen 5)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.5%	0.3%	0.4%
Too little	30.2%	35.1%	31.6%
About the right amount	12.1%	11.9%	12.0%
Too much	4.8%	4.3%	4.7%
Not asked	52.5%	48.4%	51.3%

**Table H.16. Answers to question Q1: How often have you read or heard about coral reefs, either in U.S. waters or elsewhere? (Screen 9)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.9%	0.5%
Not often at all	34.4%	34.0%	34.3%
Slightly often	30.8%	27.8%	30.0%
Moderately often	24.4%	26.8%	25.0%
Very often	8.7%	8.6%	8.7%
Extremely often	1.4%	1.4%	1.4%
Not asked	0.0%	0.5%	0.1%

**Table H.17. Answers to question Q2: About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason? (Screen 10)**

<b>Response</b>	<b>ANES</b>
0	52.7%
1	14.2%
2	11.0%
3	4.5%
4	1.8%
5	5.1%
6	1.2%
7	0.2%
8	0.3%
9	0.1%
10	2.4%
11	0.0%
12	0.5%
13	0.0%
15	0.4%
20	1.3%

**Table H.17. Answers to question Q2: About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason (cont.)? (Screen 10)**

<b>Response</b>	<b>ANES</b>
25	0.2%
30	0.3%
35	0.1%
40	0.1%
45	0.0%
50	1.0%
55	0.0%
56	0.0%
60	0.0%
70	0.1%
75	0.0%
90	0.0%
100	0.6%
120	0.0%
200	0.1%
500	0.0%
900	0.0%
999	0.0%
999	1.6%

**Table H.18. Answers to question Q2: About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason? (Screen 10)**

<b>Response</b>	<b>FFRISP</b>
0	52.2%
1	13.6%
2	8.4%
3	6.6%
4	3.6%
5	3.9%
6	1.4%
7	0.3%
8	0.3%
9	0.0%
10	2.4%
11	0.1%
12	0.4%
15	1.0%
20	1.6%
23	0.1%
24	0.1%
30	0.2%
50	0.6%
90	0.2%
100	0.8%
150	0.1%
200	0.1%
999	0.1%
999	1.9%

**Table H.19. Answers to question Q2: About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason? (Screen 10)**

<b>Response</b>	<b>Pooled</b>
0	52.6%
1	14.0%
2	10.3%
3	5.1%
4	2.3%
5	4.7%
6	1.3%
7	0.2%
8	0.3%
9	0.1%
10	2.4%
11	0.0%
12	0.5%
13	0.0%
15	0.6%
20	1.4%
23	0.0%
24	0.0%
25	0.2%
30	0.3%
35	0.1%
40	0.0%
45	0.0%
50	0.9%
55	0.0%
56	0.0%
60	0.0%
70	0.0%
75	0.0%

**Table H.19. Answers to question Q2: About how many times have you been to a coral reef in the U.S. or elsewhere to fish, snorkel, scuba dive, view marine life, or for some other reason (cont.)? (Screen 10)**

<b>Response</b>	<b>Pooled</b>
90	0.1%
100	0.6%
120	0.0%
150	0.0%
200	0.1%
500	0.0%
900	0.0%
999	0.1%
999	1.7%

**Table H.20. Answers to question Q3a: Have you visited a coral reef in Florida? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	27.0%	24.5%	26.3%
Yes	18.7%	21.5%	19.5%
Not asked	54.3%	54.0%	54.2%

**Table H.21. Answers to question Q3b: Have you visited a coral reef in Puerto Rico or the U.S. Virgin Islands? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	38.0%	39.9%	38.6%
Yes	7.7%	6.2%	7.3%
Not asked	54.3%	54.0%	54.2%

**Table H.22. Answers to question Q3c: Have you visited a coral reef in other Caribbean, Gulf of Mexico, or Atlantic Ocean locations? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	25.3%	25.1%	25.2%
Yes	20.5%	20.9%	20.6%
Not asked	54.3%	54.0%	54.2%

**Table H.23. Answers to question Q3d: Have you visited a coral reef in Hawaii? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	28.9%	28.5%	28.8%
Yes	16.8%	17.5%	17.0%
Not asked	54.3%	54.0%	54.2%

**Table H.24. Answers to question Q3e: Have you visited a coral reef in Pacific Ocean locations other than Hawaii? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	37.3%	41.3%	38.5%
Yes	8.4%	4.8%	7.3%
Not asked	54.3%	54.0%	54.2%

**Table H.25. Answers to question Q3f: Have you visited a coral reef in Pacific Ocean locations in other locations (specify)? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	40.5%	39.8%	40.3%
Yes	5.2%	6.2%	5.5%
Not asked	54.3%	54.0%	54.2%

**Table H.26. Answers to question Q3g: Have you visited a coral reef in another location? (Screen 10a)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No	45.4%	45.8%	45.5%
Yes	0.4%	0.2%	0.3%
Not asked	54.3%	54.0%	54.2%

**Table H.27. Answers to question Q4: Have you ever lived in Hawaii, or have you never lived in Hawaii? (Screen 14)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.6%	0.4%
Yes	3.0%	2.2%	2.8%
No	96.6%	96.7%	96.6%
Not asked	0.0%	0.5%	0.1%

**Table H.28. Answers to question Q4a: Have you ever visited Hawaii, or have you never visited Hawaii? (Screen 15)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.0%	2.7%	1.5%
Yes	25.4%	23.8%	24.9%
No	70.6%	70.8%	70.7%
Not asked	3.0%	2.7%	3.0%

**Table H.29. Answers to question Q5: In the next 10 years, how likely is it that you will go to Hawaii? (Screen 16)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.2%	1.0%	0.4%
Definitely will <u>not</u> go	10.7%	10.1%	10.5%
Probably will not go	27.4%	28.6%	27.7%
May or may not go	31.6%	31.6%	31.6%
Probably will go	19.7%	17.6%	19.1%
Definitely will go	10.4%	10.7%	10.5%
Not asked	0.0%	0.5%	0.1%

**Table H.30. Answers to question Q6a: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with the statement, Protecting jobs of commercial fisherman is more important than protecting Hawaiian coral reefs (Screen 24)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	0.9%	0.8%
Strongly disagree	26.2%	26.4%	26.3%
Somewhat disagree	38.0%	33.9%	36.8%
Neither agree nor disagree	23.9%	23.9%	23.9%
Somewhat agree	9.6%	10.7%	9.9%
Strongly agree	1.5%	3.7%	2.2%
Not asked	0.0%	0.5%	0.1%

**Table H.31. Answers to question Q6b: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with the statement, Protecting recreational fishing is more important than protecting Hawaiian coral reefs (Screen 24)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.9%	0.9%	0.9%
Strongly disagree	48.1%	49.3%	48.5%
Somewhat disagree	25.7%	24.1%	25.2%
Neither agree nor disagree	18.6%	17.5%	18.3%
Somewhat agree	5.2%	5.3%	5.2%
Strongly agree	1.5%	2.4%	1.8%
Not asked	0.0%	0.5%	0.1%

**Table H.32. Answers to question Q6c: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with the statement, The federal government should take an active role to protect Hawaiian coral reefs (Screen 24)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.6%	0.9%	0.7%
Strongly disagree	8.3%	9.4%	8.6%
Somewhat disagree	9.4%	11.0%	9.9%
Neither agree nor disagree	16.6%	17.4%	16.8%
Somewhat agree	35.7%	32.6%	34.8%
Strongly agree	29.5%	28.1%	29.1%
Not asked	0.0%	0.5%	0.1%

**Table H.33. Answers to question Q8: Have you ever heard about, read about, or seen where ship accidents have injured coral reefs in Hawaii or elsewhere? (Screen 33)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.6%	0.9%	0.7%
No	26.0%	21.9%	24.9%
Yes	73.4%	76.7%	74.3%
Not asked	0.0%	0.5%	0.1%

**Table H.34. Which version of WTP amounts did the respondent receive?**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
1	6.2%	5.8%	6.1%
2	7.2%	5.7%	6.7%
3	6.3%	6.0%	6.2%
4	6.7%	6.3%	6.6%
5	6.1%	7.3%	6.5%
6	6.0%	5.8%	5.9%
7	6.1%	6.8%	6.3%
8	7.1%	5.5%	6.7%
9	6.6%	6.3%	6.5%
10	6.4%	4.3%	5.8%
11	6.4%	6.6%	6.5%
12	5.5%	7.1%	6.0%
13	6.5%	6.0%	6.3%
14	5.7%	5.8%	5.7%
15	5.2%	5.8%	5.4%
16	6.0%	8.2%	6.6%
Not asked	0.0%	0.6%	0.2%

**Table H.35. Which uncertainty questions did the respondent receive?**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Received Q12, Q14, Q16	49.1%	48.9%	49.0%
Received Q12 only	25.3%	23.6%	24.8%
Received Q16 only	25.7%	26.8%	26.0%
Not asked	0.0%	0.6%	0.2%

**Table H.36. Answers to question Q10: Which of the following is your most-preferred program? (Screen 42)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	2.0%	5.1%	2.9%
Current program	26.2%	23.7%	25.5%
No-fishing zones program	26.3%	26.6%	26.4%
Reef repair program	13.3%	13.9%	13.5%
Full program	32.2%	30.0%	31.6%
Not asked	0.0%	0.6%	0.2%

**Table H.37. Answers to question Q11: How sure are you that among these four programs, the [Answer to Q10] is your most preferred? (Screen 43)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.2%	0.2%	0.2%
Not sure at all	5.2%	6.2%	5.5%
Slightly sure	8.4%	7.8%	8.2%
Moderately sure	25.3%	22.6%	24.5%
Very sure	20.2%	20.5%	20.3%
Extremely sure	13.2%	11.1%	12.6%
Not asked	27.5%	31.6%	28.7%

**Table H.38. Answers to question Q13: If you had to choose among the remaining three programs, which would you prefer?<sup>1</sup> (Screen 45)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.5%	1.3%	1.5%
Current program	11.2%	9.9%	10.8%
No-fishing zones program	38.3%	35.6%	37.5%
Reef repair program	27.4%	25.5%	26.9%
Full program	19.6%	22.0%	20.3%
Not asked	2.0%	5.7%	3.1%

1. If a respondent chose the Current Program in Q10, the wording of Q13 read: “You chose the Current Program with no additional cost to your household as your most preferred program. If you had to choose among the remaining three programs, which would you prefer?”

**Table H.39. Answers to question Q14: How sure are you that among these three programs, the [Answer to Q13] is your most preferred? (Screen 46)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.2%	0.2%	0.2%
Not sure at all	3.1%	5.1%	3.7%
Slightly sure	8.5%	6.8%	8.0%
Moderately sure	16.1%	14.5%	15.6%
Very sure	12.1%	12.6%	12.3%
Extremely sure	7.5%	6.0%	7.1%
Not asked	52.5%	54.8%	53.1%

**Table H.40. Answers to question Q15: If you had to choose between the remaining two programs, which would you prefer?<sup>2</sup> (Screen 47)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.4%	0.0%	0.3%
Current program	10.4%	13.0%	11.1%
No-fishing zones program	27.5%	25.2%	26.8%
Reef repair program	43.3%	40.8%	42.6%
Full program	15.0%	14.0%	14.7%
Not asked	3.6%	7.0%	4.6%

**Table H.41. Answers to question Q16: How sure are you that between these two programs, the [Answer to Q15] is your most preferred? (Screen 48)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.2%	0.3%
Not sure at all	7.3%	8.4%	7.6%
Slightly sure	12.1%	10.2%	11.6%
Moderately sure	23.9%	23.1%	23.7%
Very sure	14.6%	18.1%	15.6%
Extremely sure	14.0%	10.5%	13.0%
Not asked	27.8%	29.6%	28.3%

---

2. If a respondent chose the Current Program in Q10, the wording of Q15 read: “If you had to choose between the remaining two programs, which would you prefer?”

**Table H.42. Answers to question Q17: When you chose your most preferred programs, did you think that overfishing contributed to the changes in Hawaii’s coral reef ecosystems we told you about or did you think it did not contribute to those changes? (Screen 50)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.2%	2.6%	1.6%
Overfishing did contribute	86.2%	84.7%	85.8%
Overfishing did not contribute	12.6%	12.0%	12.4%
Not asked	0.0%	0.6%	0.2%

**Table H.43. Answers to question Q18: If no-fishing zones are NOT put in place, how serious did you think the effects of overfishing would be on the coral reef ecosystem around the Main Hawaiian Islands? (Screen 51)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.0%	1.7%	1.2%
Not serious at all	3.2%	3.5%	3.3%
Slightly serious	12.2%	12.1%	12.2%
Moderately serious	29.9%	30.1%	30.0%
Very serious	35.6%	36.4%	35.8%
Extremely serious	18.1%	15.6%	17.4%
Not asked	0.0%	0.6%	0.2%

**Table H.44. Answers to question Q19: When you chose your preferred programs, how effective did you think that no-fishing zones would be in restoring fish and other marine life in the coral reef ecosystem around the Main Hawaiian Islands? (Screen 52)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.1%	2.9%	1.6%
Not effective at all	3.4%	3.2%	3.4%
Slightly effective	11.3%	13.3%	11.9%
Moderately effective	36.4%	34.1%	35.7%
Very effective	37.6%	35.1%	36.9%
Extremely effective	10.2%	10.8%	10.4%
Not asked	0.0%	0.6%	0.2%

**Table H.45. Answers to question Q20: When you chose your preferred programs, how serious did you think the effects of ship accidents are on the overall health of the coral reef ecosystem around the Main Hawaiian Islands? (Screen 53)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.4%	2.7%	1.8%
Not serious at all	7.9%	8.0%	7.9%
Slightly serious	24.8%	24.7%	24.8%
Moderately serious	34.1%	36.2%	34.7%
Very serious	22.6%	21.0%	22.1%
Extremely serious	9.2%	6.7%	8.5%
Not asked	0.0%	0.6%	0.2%

**Table H.46. Answers to question Q21: When you chose your preferred programs, how effective did you think that repairing injuries from ship accidents would be in speeding up recovery of the coral reef ecosystem around the Main Hawaiian Islands? (Screen 54)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.5%	1.8%	1.6%
Not effective at all	5.5%	7.3%	6.0%
Slightly effective	24.2%	24.1%	24.1%
Moderately effective	37.0%	36.9%	37.0%
Very effective	23.2%	22.8%	23.1%
Extremely effective	8.6%	6.6%	8.0%
Not asked	0.0%	0.6%	0.2%

**Table H.47. Answers to question Q22: When you chose your most preferred programs, did you think that repairs of injuries to coral reefs after ship accidents would help reefs recover in about 10 years, more than 10 years, or less than 10 years? (Screen 55)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.3%	2.4%	1.6%
About 10 years	56.1%	55.7%	56.0%
More than 10 years	30.8%	29.7%	30.5%
Less than 10 years	11.8%	11.6%	11.8%
Not asked	0.0%	0.6%	0.2%

**Table H.48. Answers to question Q23: When you chose your most preferred programs, did you think that your household would pay the tax amount stated, or did you think you would pay more than that amount, or less than that amount? (Screen 56)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.4%	2.8%	1.8%
Amount stated	45.5%	46.0%	45.6%
More than the amount	32.8%	32.0%	32.6%
Less than the amount	20.3%	18.6%	19.8%
Not asked	0.0%	0.6%	0.2%

**Table H.49. Answers to question Q24a: In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in: The people who run the U.S. Government? (Screen 57)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.4%	1.6%	0.7%
No confidence at all	19.3%	20.9%	19.8%
A little confidence	33.4%	29.3%	32.2%
Moderate confidence	34.8%	33.9%	34.5%
A lot of confidence	10.3%	11.3%	10.6%
Great deal of confidence	1.8%	2.4%	2.0%
Not asked	0.0%	0.6%	0.2%

**Table H.50. Answers to question Q24b: In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in: University scientists? (Screen 57)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.9%	1.0%	0.9%
No confidence at all	4.5%	5.0%	4.6%
A little confidence	17.8%	15.8%	17.2%
Moderate confidence	40.1%	40.1%	40.1%
A lot of confidence	28.8%	28.8%	28.8%
Great deal of confidence	7.9%	8.6%	8.1%
Not asked	0.0%	0.6%	0.2%

**Table H.51. Answers to question Q24c: In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in: Large corporations? (Screen 57)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.1%	1.8%	1.3%
No confidence at all	31.3%	36.5%	32.8%
A little confidence	42.3%	35.6%	40.4%
Moderate confidence	21.2%	21.3%	21.2%
A lot of confidence	3.2%	3.3%	3.3%
Great deal of confidence	0.8%	0.8%	0.8%
Not asked	0.0%	0.6%	0.2%

**Table H.52. Answers to question Q24d: In general, would you say you have no confidence at all, a little confidence, a moderate amount of confidence, a lot of confidence, or a great deal of confidence in: Newspapers? (Screen 57)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.1%	1.9%	1.3%
No confidence at all	27.2%	28.4%	27.5%
A little confidence	35.5%	36.3%	35.7%
Moderate confidence	28.0%	25.9%	27.4%
A lot of confidence	6.5%	5.7%	6.3%
Great deal of confidence	1.7%	1.1%	1.6%
Refused	0.0%	0.6%	0.2%

**Table H.53. Answers to question Q25: How do you feel about increasing federal taxes to protect coral reefs around the Main Hawaiian Islands? (Screen 58)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.5%	1.0%	0.7%
Strongly oppose	17.0%	18.4%	17.4%
Somewhat oppose	16.2%	14.4%	15.7%
Neither oppose nor favor	24.6%	23.9%	24.4%
Somewhat favor	29.6%	31.3%	30.1%
Strongly favor	12.1%	10.5%	11.7%
Not asked	0.0%	0.6%	0.2%

**Table H.54. Answers to question Q26: If you had to choose, would you prefer to pay for new environmental programs through higher income taxes or through higher prices? (Screen 59)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.2%	1.3%	1.2%
Higher income taxes	21.1%	15.9%	19.6%
Higher prices	40.0%	36.7%	39.1%
No preference	37.7%	45.5%	39.9%
Not asked	0.0%	0.6%	0.2%

**Table H.55. Answers to question Q27: Would you say you think of yourself as not an environmentalist at all, slightly an environmentalist, a moderate environmentalist, a strong environmentalist, or a very strong environmentalist? (Screen 60)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.6%	1.2%	0.8%
Not an environmentalist	11.6%	14.0%	12.3%
Slightly an environmentalist	30.3%	27.1%	29.4%
A moderate environmentalist	40.9%	38.8%	40.3%
A strong environmentalist	13.7%	15.3%	14.1%
A very strong environmentalist	3.0%	3.0%	3.0%
Not asked	0.0%	0.6%	0.2%

**Table H.56. Answers to question Q28a: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements: Costs should not be a factor when protecting the environment (Screen 61)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.8%	1.7%	1.1%
Strongly disagree	16.2%	19.3%	17.1%
Somewhat disagree	27.9%	26.0%	27.4%
Neither agree nor disagree	19.1%	17.6%	18.7%
Somewhat agree	26.3%	23.9%	25.6%
Strongly agree	9.7%	10.8%	10.0%
Not asked	0.0%	0.6%	0.2%

**Table H.57. Answers to question Q28b: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements: I found it difficult to select which programs I preferred (Screen 61)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.7%	2.2%	1.1%
Strongly disagree	18.3%	19.7%	18.7%
Somewhat disagree	20.4%	19.1%	20.0%
Neither agree nor disagree	25.1%	24.0%	24.8%
Somewhat agree	28.0%	26.4%	27.5%
Strongly agree	7.6%	8.0%	7.7%
Not asked	0.0%	0.6%	0.2%

**Table H.58. Answers to question Q28c: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements: There was not enough information for me to make informed decisions about doing more to protect coral reefs in Hawaii (Screen 61)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.4%	1.9%	1.5%
Strongly disagree	20.4%	21.8%	20.8%
Somewhat disagree	25.9%	24.3%	25.4%
Neither agree nor disagree	31.7%	26.3%	30.1%
Somewhat agree	15.9%	18.3%	16.6%
Strongly agree	4.8%	6.7%	5.4%
Not asked	0.0%	0.6%	0.2%

**Table H.59. Answers to question Q28d: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements: I was concerned that the federal government cannot effectively manage coral reefs (Screen 61)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.5%	1.9%	1.6%
Strongly disagree	6.7%	8.7%	7.3%
Somewhat disagree	14.7%	16.3%	15.2%
Neither agree nor disagree	31.9%	29.1%	31.1%
Somewhat agree	31.0%	28.7%	30.3%
Strongly agree	14.3%	14.7%	14.4%
Not asked	0.0%	0.6%	0.2%

**Table H.60. Answers to question Q28e: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements: I should not have to pay more federal taxes to protect coral reefs around Hawaii (Screen 61)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.0%	2.2%	1.4%
Strongly disagree	10.9%	12.4%	11.3%
Somewhat disagree	18.9%	20.5%	19.3%
Neither agree nor disagree	25.9%	24.1%	25.4%
Somewhat agree	22.1%	18.9%	21.2%
Strongly agree	21.2%	21.4%	21.3%
Not asked	0.0%	0.6%	0.2%

**Table H.61. Answers to question Q28f: Please indicate whether you strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree with each of the following statements: The public's views as expressed in this survey should be important to the government when it chooses how to manage coral reefs in Hawaii (Screen 61)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.8%	2.0%	1.1%
Strongly disagree	2.4%	3.2%	2.6%
Somewhat disagree	4.6%	6.8%	5.2%
Neither agree nor disagree	20.8%	19.0%	20.3%
Somewhat agree	34.7%	33.9%	34.4%
Strongly agree	36.8%	34.5%	36.2%
Not asked	0.0%	0.6%	0.2%

**Table H.62. Answers to question Q29: Did anyone in your household pay any federal income taxes last year, 2008? (Screen 62)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	0.3%	0.3%	0.3%
Yes	87.1%	83.6%	86.1%
No	8.2%	9.1%	8.4%
Not sure	4.5%	6.4%	5.0%
Not asked	0.0%	0.6%	0.2%

**Table H.63. Answers to question D1: How is your computer (i.e., the computer via which you are taking this survey) connecting to the internet? (Screen 65)**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
Refused	1.4%	2.5%	1.7%
Dialup modem	12.8%	3.8%	10.2%
ISDN line	1.8%	0.5%	1.4%
Cable modem	30.0%	29.3%	29.8%
Digital subscriber line (DSL)	28.5%	26.9%	28.0%
Wireless	20.6%	32.7%	24.1%
Satellite dish	1.6%	1.8%	1.7%
T1/T3 line	3.1%	1.9%	2.8%
Not asked	0.1%	0.6%	0.3%

**Table H.64. Answers to question D2: Are you taking this survey via a WebTV or a personal computer (PC)? (Screen 64)**

<b>Response</b>	<b>ANES</b>
WebTV	0.1%
PC	99.9%

**Table H.65. Answers to question D2: Are you taking this survey via a WebTV or a personal computer (PC)? (Screen 64)**

<b>Response</b>	<b>FFRISP</b>
PC	99.4%
Not asked	0.6%

**Table H.66. Answers to question D2: Are you taking this survey via a WebTV or a personal computer (PC)? (Screen 64)**

<b>Response</b>	<b>Pooled</b>
WebTV	0.1%
PC	99.7%
Not asked	0.2%

**Table H.67. Order of programs for respondents**

<b>Response</b>	<b>ANES</b>	<b>FFRISP</b>	<b>Pooled</b>
No-fishing zones program	52.5%	47.9%	51.1%
Reef repair program	47.5%	51.5%	48.7%
Not asked	0.0%	0.6%	0.2%

## I. Listing of Open-Ended Responses

Appendix I lists the open-ended responses for Q12, which asked respondents, “Please provide a brief comment that helps us understand why you chose [Answer to Q10] as your most preferred.” Q10 first asked respondents, “Which program is your most preferred?” A listing of all the responses to Q12 are provided in Tables I.1 and I.2 for the ANES and FFRISP panels, respectively. Note that all of the responses are conditional on what respondents chose as their most preferred program in A10. As such, their responses to Q10 are also included in each of the tables below. Also note that responses are presented as they were typed by the respondents.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Per household, \$75 is a lot of money for a project. This project could be adopted by a University or Volunteers. It does not need to be overseen by the Federal Government.
Full program	Protecting coral reefs particularly by preventing overfishing is a very responsible thing for us to do. Additionally repair ship damage while not as important should be done with perhaps a fee for boating or shipping in or around the Hawaiian Islands.
Full program	It accomplishes what is necessary
Full program	The cost now is nothing compared to what it will be in the future when the coral reefs begin to die off and the sea life is gone. It will be more costly in the end.
Current program	I'm an environmental scientist, and am aware of the many problems existing in the world today; however, due to the current administrations unbridled spending, which is damning to our economy, I must decline support of additional spending plans of any kind
Full program	I don't think anything is more important than the balanced function of nature. If we can pay for the coral reefs to come back sooner(10 vs 50yrs), maybe we won't have to pay as long to get things right again.
Current program	I chose this program because we are strapped now with Federal tax. the poor are suffering everyday and the government is cutting those programs.
Current program	Coral reefs are important. If local fishermen devastate the fish population, there will be less fish. With less fish there will be less fishermen. With less fishermen there will be less damage and more fish will reproduce until there is a natural balance
Full program	It seems like the best program to help the environment. I'd like to see it save 100 percent of the reefs however, not just 25 percent. It also pays for repairs from ship accidents.
No-fishing zones program	The additional 24% protected by no fishing zones will balance the length of time needed for recovery to injury. The cost of policing and recovering the cost of reef repair, which is likely not maliciously done, outweighs the benefit of an earlier recovery

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	The no-fishing zone will help the fish replenish themselves protect the reef from boat accidents and nets. Repairing the reefs is not cost-effective.
Current program	i BELIEVE THAT gOD CREATED THE CORAL REEFS AND IF THEY NEED TO BE REPAIRED MORE QUICKLY, HE WOULD DO IT. wE DONT NEED TO SPEND MONEY ON SOMETHING THAT CAN REPAIR ITSELF.
Current program	There are more pressing matters to deal with than to increase spending on this.
Full program	Even though \$245 is a lot of money for something I will never see, the cost goes for the betterment of the whole world. Of course, if you start adding elephants, and grassy wetlands, and seals and eradication of the emerald ash borer, each at \$245, the ch
Current program	I really don't see coral reefs as a big problem for the average mid-western citizen.
Current program	Our taxes are going out the window now with all of the government programs being implemented by the new administration. I am not sure how we are going to afford the bailouts, we need to figure out how to cut government instead of always increasing the siz
Ship repair program	Ideally I thing the complete program would be best!! I just think that citizins would have a hard time paying an additional \$110 per year for this. If economic times were different and so many people wern't struggling right now, I think I would respond
Current program	I pay taxes in my state to cover our issues and programs.
No-fishing zones program	I want to do SOMETHING but I don't want it to cost ME too much.
Full program	the faster the recovery, the faster job,nature and recreational recovery
Full program	This is the best option. I think the cost could be decreased by making the shipping persons pay the cost for damages
Full program	We need to protect the eco system for current and future generations. \$100 is not a huge amount when it covers a whole year. If there was a way to protect say 10% instead of 25% and fix 2-3 acres instead of 5, that would still help, but decrease the cost.
No-fishing zones program	The ship damage is so small compared to the no fishing zones. Start with one step, then go to the other one later. Americans don't want to be taxed so much at one time
No-fishing zones program	with the no fishing zone, you can keep the fishing down and the reef has time to repair it's self.
Current program	Although protecting the reefs are important the money spent on this right now is money that should be used for putting Americans back to work and healthcare for the unfortunate.
Full program	It is important to the environment and for continued improvements that we reduce the current damage to the coral reefs and also help fix the existing damage.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	Would like to have chosen the full program but could not due to the economy. I think the government should stop bailing out poorly run & failing banks & corporations and start bailing out the environment!
Current program	We are already being highly overtaxed
Full program	I believe we have a responsibility to protect the natural world, especially in those cases where we humans are so clearly the destroyers. Doing so will also provide jobs, perhaps some of these jobs to the fisherman. There is still so much we still don't
Current program	everything going smooth. i suppose
No-fishing zones program	best bang for the buck
Full program	the full program may be more costly but! do we really have a realistic choice
Current program	Tired of paying taxes for SOCIALIST PROGRAMS that don't or won't work without federal armies and take over.
Full program	Hawaii is unique among the states. we fought for it now protect it
Current program	I'm already taxed to death! I surely wouldn't choose even more!!!
Ship repair program	It is affordable
Current program	I'M SO TIRED OF THE LIBS TRYING TO FUCK THE AMERICAN PUBLIC OUT OF OUR HARD EARNED MONEY TO SAVE SOMETHING RIGHTNOE THAT GIVEN SOME TIME WILL COME BACK.
No-fishing zones program	Like most retired people, we are on a budget. I would like to see something done to save and preserve the coral reefs but, I feel I am limited in how much I can help
No-fishing zones program	I believe the State government should impose recreation or user tax increases before seeking federal funding beyond that which the National monument status requires.
Current program	I don't feel it is that important. There are more important things to spend our tax dollars on.
Full program	The oceans are the cradle of life. If we destroy the oceans we have destroyed the ability for life to survive on earth. Just that simple.
No-fishing zones program	I feel over fishing much more dangerous to reefs and fish than ship accidents.
Full program	IT IS VERY IMPORTANT TO PROTECT THE CORAL REEFS FROM BEING DSTROYED
No-fishing zones program	The additional cost versus benefit does not make sense for every house hold. If the ship repair program can be implemented via fines/charge backs to those who damaged it rather than tax payers, it would be better. Public should not pay for private damage
No-fishing zones program	I believe we should "help" our world so there is always plenty, not deplete and go looking for another place to destroy.
Ship repair program	It would help to repair little of the damages

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	balance of costs to natural repairs
No-fishing zones program	I puts the reef moving forward rather than continuing to decline
Current program	cost
No-fishing zones program	If I were confident the coral repair program would double as an educational program, I would support it. The 25% no-fishing area will improve fishing in a relatively short period richly repaying the expense.
No-fishing zones program	no
No-fishing zones program	If the reefs are worth preserving, the selected program is the more cost-effective.
Ship repair program	I thought \$75 & \$45 was a little high per household especially since we are both retired. What does Florida do?
Current program	i think we pay enough in government. taxes and all.
Full program	i have grandchildren i hope that for them there will be beautiful places left for them and their children to see,learn and to protect
Current program	The federal government is putting my grandchildren in debt. It's insane to talk about more spending.
Full program	Because our need to fish and sail boats are not more important than preserving nature. We are going to have to sacrifice for the good of the planet.
No-fishing zones program	I do not make much money because I am recovering from a broken neck and might need more surgery and have other medical problems. I am severely underemployed because of this. Would wish that we could take some money away from the military and use it for en
No-fishing zones program	This cost less and has high impact. The repair cost should come from shipman.
Current program	As my previous statement indicates I do not trust the government to finish a program once it starts. It would have to have a nonrenewal clause before I would consider it.
Current program	We need food on our table more than the coral reefs need repaired. Our federal government needs to stop spending so much.
Full program	gotta save the earth
Current program	do to state of economy families really can't afford it
No-fishing zones program	Increases marine life; damage done from ship wrecks is miniscule compared to entire acreage of reefs; don't want taxes to increase to double of this program
No-fishing zones program	IT IS THE BEST FOR ALL.
Full program	I firmly believe that the environment must be protected and that includes coral reefs

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I feel the small number of acres repaired under the ship damage is not worth the extra dollars.
Full program	Here in Calif. the fishing for cod is in terrible shape due to over fishing. Our salmon are in bad shape for the same reason. Do not let this happen in Hawaii to. Close down fishing to 50% and pay a little more.
No-fishing zones program	Minimal money added, improved result for coral reefs.
No-fishing zones program	As I stated earlier, I lived on Oahu and have visited since. It needs protection!
No-fishing zones program	probably because of the cost.
No-fishing zones program	No fishing zones should also cut down on damage to the reefs.
Full program	AS I said, we need to protect what we have, and it takes too long to repair itself
Full program	Ecosystems do not exist in isolation so if you help preserve the coral reefs the benefits climb up the food and environmental chains.
Current program	reef repair is not worth my \$35 25% no fishing zone makes sense, but I think State of HI should bear the most cost, not the US tax payer, so \$45 is too much. Among the options, pay nothing suits me the best. I don't mind pay, say \$10, but not \$45
No-fishing zones program	it will help do about half way which of what needs to be done
Current program	I feel the current program is adequate in relation to the overall acreage of the reefs.
Current program	I think there are silly programs that could be cut in order to spend on the coral reefs rather than adding to the taxes I pay
Current program	The current economy is terrible. My husband was laid off of his job of 14 years. For 3 months now, he has been unable to find a job. I am not employed; I take care of my aging parents. We cannot afford more taxes!
Full program	I just feel that in general we must do everything that we can to protect all facets of the environment. It is so important to our future.
Full program	Should we not manage and protect the earth's contribution to our well being? Perhaps we should focus on repairing nature, rather than support the stupid war in Iraq, as an example of wrong-headed governmental action.
Current program	With the economy in its current state, along with the issues we have as a country with poor healthcare, city infrastructures on the decline, etc., we do not need to be spending money on additional government programs. I appreciate the need to preserve our
Full program	what help them help all of us

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Reef repair only affects a small % of the damaged reefs and you can't charge the actual ships/owners that caused it. While it would be nice to be able to repair the impact of 'no-fishing zones' is greater.
No-fishing zones program	No fishing zones will help the coral reef and fish populations. The ship repair only covers a very small percentage of the coral reef, so does not seem as necessary.
Current program	\$\$
No-fishing zones program	Most benefit for the money.
Ship repair program	The cost of the program is more acceptable
No-fishing zones program	I believe overfishing is a huge problem; not convinced reef repair is a priority
No-fishing zones program	I am a Small fish and can pay and can pay a small fee to HELP!!!
No-fishing zones program	cost
No-fishing zones program	that would benefit more people.
Full program	its worth the cost to protect the reef
No-fishing zones program	I don't believe that Hawaii cannot recover costs from ship injuries. It doesn't have to be an all or nothing situation.
No-fishing zones program	Has the quickest impact for least amount of money. If this program is proven effective, people may be willing to go for the full program.
Full program	Restoration of these reefs is important to not only the ecology but the economy as well
Current program	not important in overall current economy
Current program	these costs should be borne by the state of Hawaii in the form of user fees for fishing, snorkeling, etc.
Current program	Why should a person in Illinois who never takes a vacation, works 2 jobs pay even more taxes. Increase the taxes to go there. I have a nice yard and no taxes help me.
Full program	the amount of money for a year does not sound like alot of money for what it does
No-fishing zones program	For a minimal household cost, enforcing the no fishing zone helps the majority of the coral reef ecosystem to rejuvenate itself. Although, the repair of boating accidents is important it is relatively small percentage of the reef that is effected and the
Full program	More protected; injuries last less time.
No-fishing zones program	Overfishing has been sited as the main cause of damage to the coral reefs both by your information and other sources. Damage by ocean-going vessels cannot be controlled, is less of a threat and cannot be compensated for adequately.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	I never met a tax that I would not pay if it had a result of improving a situation. I believe we are obligated to support such improvements and government is obligated to do as much as possible to eliminate waste or ineffective programs.
No-fishing zones program	I'd like to repair also, but \$185 is a lot of money. The last \$15 should be paid by visitors to Hawaii only. There is a lot of taxes on tourism. Let that pay for the repair program.
No-fishing zones program	increased fish population. Less money from household
No-fishing zones program	I think the no fishing zones is a good starting program and can be expanded if it provides a viable means to protect the coral reefs.
No-fishing zones program	Provides protection and growth to the reefs but is not the most expensive program
Full program	The benefits far exceed the costs relating to preserving the reefs for future generations.
Current program	We have to be very careful about spending our limited resources.
Full program	I think the reefs are worth 185 of inceased tax as long as it can be assured that the money will get the correct results
No-fishing zones program	i live in illinois, i will probably never see a coral reef. i think the people who will enjoy the coral reefs should pay for the majority of the cost.
Current program	I'm not sure how much money it would take, but, the best program should be adopted but USING THE FUNDS AND TAXATION OF THE STATE INVOLVED. as a Florida resident I would, of course, be paying more taxes----but they would not be from Fed Income Taxes.
Current program	its free
Full program	Nature needs to be protected, once it is gone it is gone. 200 dollars is a small price to pay for the beautiful and much needed coral reefs.
No-fishing zones program	WELL if there is a no fishing zone than the amount of ship damage should also decrease if the reeds are trully monitored.
Full program	Protection of reefs is a necessity for long term health of the sea life in the area. Repair is not as important, but I feel these costs could be recovered if the required effort and laws were implemented.
Current program	It's not specified whether the program's cost would be per month, or year, etc.
Current program	The additional programs seem to be expensive scams which will be costly to police and maintain while making minimal differences. Human habitation brings human distruction. There is already a coral reef "sanctuary" in place near Hawaii, That is enough.
Full program	This ecosystem is important to the Hawaiian islands and therefore to the ecosystem of the world. If we let these areas die, which they possibly will within the 50 years that are needed for much of the area to repair itself,they will very likely be gone fo

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I gave you my ideas on the changes, & how I'd go about implementing them, in the previous comment boxes. If I'm limited to your choices, then I prefer the Shipping Accident Repair program instead of the increase in the No Fishing Zone.
Full program	The cost to our environment and our way of life is higher if we do not do the maximum to protect these waters.
Ship repair program	has incremental value at least incremental cost...might also help to benefit fish, etc
Full program	Increasing marine life, plus 5 acres repaired (injuries last about 10 years), plus natural repair (50 last years) for free.
Current program	It seems that the state of Hawaii makes the most money off of this resource and therefore should pay for the corrections.
Ship repair program	It seems like a good alternative, and is less costly per household.
No-fishing zones program	I wish we could afford the full program but given the current state of the economy and the huge deficit we are incurring I don't think we can afford the additional money for the full program. But I am reluctant to maintain the status quo as I feel the pro
Full program	This is important to help preserve The coral reefs
Full program	only way to save reefs
Full program	We have an obligation to future generations to preserve and protect our natural heritage.
Full program	the reefs need repair, and nature takes too long to do it and the fish do not re-populate....thus affecting fishing....
Full program	Loss of the coral is permanent. Damage to the fisheries and the ocean may not conserve the earth for our grandchildren.
Full program	because it will restore all reefs quicker but it shouldn't cost tax payers
Current program	my choice is made due to current economics stopping activity around reef till the economy gets better would work for me and mine
Ship repair program	cost/benefit ratio
No-fishing zones program	Containing the cost of the program while getting the most return for the dollars spent.
Ship repair program	Taxes are what help to pay for needed things. If everyone doesn't pay their fair share these reefs in time will be in jeopardy.
No-fishing zones program	This program protects the coral reefs and increases marine life.
Current program	No increase in taxes
Full program	It is a small cost, the repairs are quicker and more complete, and allows the reefs to return to their previous balance in the ecosystem
No-fishing zones program	If we take from the environment, we should "give" to it or take care of it so that it can continue to provide more for us. While there will be short-term limitations, it seems that in the long-term, it will help to have placed a program in place. The No

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	we are paying for too much pork as it is. Who is going to help our retirement....fund social security for our kids...help our kids through school....enough is enough!
Full program	it is a minimal amount of money to spend per person for maxium good
No-fishing zones program	I feel the "no fishing" rule would have the biggest affect on the larger issue; however as I stated previously, I do beleive those who we know injure the corals should pay the cost to repair those areas they have injured, which may mean we can only repair
Full program	It is crucial for our Earth to protect the coral reefs and our oceans.
Full program	it seems necessary to adequately protect marine life.the feds would be the only entity capable of carrying out the program.my main concern would be the cost,as most federal programs usually wind costing more than originally intended.hawaii most pay thier
Current program	I PAY EHOUGH TAXES ALREADY SUPPORTING OTHER GOV PROGRAMS IF WE KEEP PAYING FOR OTHER PEOPLES PROBLEMS WE WILL BE TAX POOR & THEN WELL NEED THE TO SUPPORT US
Current program	Other programs are far too expensive. Any costs to preserve coral reefs should be borne solely by Hawaiins.
Full program	I think something needs to be done for both programs for coral reef health.
Current program	I guess because of the taxes, I'm a senior and life on a fixed income, I would love to vote for \$300. but have to settle for less. I truly feel the reefs should be protected and no fishing area uphelded
Current program	I have a hard enough time right now making ends meet. I don't want to pay anything more than I'm already paying
Full program	partial repair is insufficient and full repair is not that much more costly
Current program	I think that the reefs are protected enough already and money should be spent somewhere else.
Full program	The corral is beautiful and should be restored.
Full program	I believe it's important to protect the coral reef ecosystem. The additional costs wouldn't be excessive for my family, though I would hope any tax imposed for reef protection/repair would be progressive.
No-fishing zones program	Similar to our local freshwater conversation allocation
Current program	CANNOT AFFORD ANY ADDITIONAL TAX AT THIS TIME TO HELP WITH THE REEFS.
No-fishing zones program	If 25% area is left unfished the fish population will have a chance to grow. Fishing it all now will cause more problems down the road. We should be responsible keepers of the earth and leave something for our grandchildren. As for the repair of coral
No-fishing zones program	This topic is dull as dishwater tome; I'm having trouble concentrating, and frankly, I "guessed" which one I might prefer.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	So that future generations can have something and help to repair the damages that our generation has caused. we cannot keep destroying things without trying to rebuild. Too much moiney is spent on things that are not worthwhile
No-fishing zones program	it is the one that is moderate in price, allows more fish to be caught because of the increased fish population in the no fish area,spreading to the fishing area. I would prefer the full program, but the cost may be high for the average family.
Current program	Let Hawaii take care of her properties. Render to Caesar, etc.
Full program	I feel \$100 is an acceptable expenditure for my household to help with the problem, which I believe is inter-related to other environmental issues as well. (However, I recognize not all households would be able to pay \$100 per year without sacrifice.)
No-fishing zones program	I'd really like the last column but not the price tag
Current program	Times are hard right now, people need all the money they can get just live, I understand that it could effect the cost of buying fish...However a gov program normally has too much fluff built into the price of the program. I trust the free market system t
Current program	As I stated before we need to stay out of certain ecosystem type evolutions.
Full program	See Discover's "Planet Earth". Such beauty should be restored at any cost.
Full program	That approach makes the most environmental and economic sense
Full program	We have to protect the environment. We are losing too much to carelessness and there will be no corel reef in the future if this continues.
No-fishing zones program	Competition for tax money is high. There are other programs that I would like to see in place before we expend to much on this kind of program. A few dollars here and a few dollars there adds up to a lot or dollars. My selection gives us some improveme
Full program	as i commented earlier. we must be willing to sacrifice today in order to protrect tomorrow. if this eco system goes under where will we be?
Current program	The environment is one of my top priorities. I think that the coral reefs are important, but I would rather spend my money on programs that help clean up the air we breathe and the water we drink. Although, I vaguely remember that the coral reefs have som
Current program	my second choice would be to make 25% of the coral reefs into no-fishing zones but the reason I did not choose that option was because I felt \$170 per household per year was too high a price to pay, especially since there are already 400,000 acres of cora
Full program	i melieve the marine layer life is just a inportant to us, it is the fishes home, we have destructed so much of other naimals habitats for our own gain
Current program	Corals reefs are fascinating but I don't think that tons of money should be invested in to repairing them unless all the sudden they're getting extinct.
Full program	Protecting the enviornment for myself and my children is important to me. But what insurance would the taxpayers have that the monies collected by the goverment be used elsewhere.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	The economy is so bad and many people are struggling just to pay for basics, so though not my real choice, it is the most reasonable choice to make right now.
Full program	\$160 per year is a small amount to protect our future in the environment. We spend much more on fighting wars around the world.
No-fishing zones program	because it seem to be alright
Full program	To me it is worth me personally paying \$300 a year to protect the coral reefs and repair. For someone on a limited income, they would not feel the same, but because I know I can afford that a year, I am moderately comfortable with my answer.
Ship repair program	Reefs are in serious trouble!
Current program	We are retired and on fixed income.... all our taxes are going up. All food, medical and energy costs are going up while our income barely stays the same. We have no room for an additional tax or levy for programs and find when programs are supplied with
Full program	I guess you could say it is one way I can contribute to a worthy and vital cause among so many worthy and vital causes. I feel I would be doing something important for my fellow man, sort of like making a church contribution.
Full program	We need to protect the coral and increase the wildlife who live there.
No-fishing zones program	cost/benefit justifies that program.
No-fishing zones program	How essential is the fishing? What are the consequences of an enlarged protected zone? What are the other advantages of the coral reefs? etc.etc..... Based on available info ,I felt my choice represented the best value for the cost.
Full program	we need to protect our natural resources our existence depends on it.
Full program	I don't really have a reason because I don't know nothing about coral reef
No-fishing zones program	(1) Why is only a 25% offered as an option and not, say 12.5%? (2) it occurs to me that there may be regions where ships TEND to scratch out a reef over & over (say due to preferred shipping areas; or currents). If a particular area (say 1 acre) is repa
Full program	Because, in the long run, the Full Program would benefit the people economically more so than the other programs.
Full program	While I felt that we should support Education with additional money. Saving the coral reef would further educational programs and \$ 265 is just a drop in the bucket.
No-fishing zones program	5 acres is so small of an area. the no fishing program is more protection for the money.
Full program	If you are going to do something you might as well spend the money and do it right.
Current program	Considering the current US Budget deficit and current spending plans by the Obama administration we do not need any more Federal spending

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Less fishing helps the natural fish population, reduces the number of ships in the area that cause accidental damage, and puts more of the cost on the tourists that are there in the first place instead of the general population through increased taxes.
Full program	For it to cost only \$10 per month more in taxes to protect the reefs, I feel it's worth it.
No-fishing zones program	To give nature a chance to do what it can to repair itself. Most of nature is designed to survive if given the chance to do so.
Full program	My contribution is a small amount to protect what I believe is a must do program to keep Hawaii in the beautiful state it is in. The same holds true for us Floridians. "Save the Everglades"
No-fishing zones program	You would be spending 14 dollars a month to help out a place you live or may want to visit, when you break it down that is something we can do without getting the government involved and possibly paying more.
No-fishing zones program	I would be willing to help with coral reefs via tax \$\$, but not ship related coral reefs that are compromised.
Current program	Would possibly choose \$170 additional tax program in different economic environment.
Current program	Perhaps we could sell some of our stock in GM to fund this program. Perhaps we could prioritize this program against all others to decide its relative importance. Why is raising taxes the only alternative?
Ship repair program	quicker repairs
Full program	It is my belief that protecting the coral reefs and our ecosystem is much more important than the \$2 a day I spend on coffee.
No-fishing zones program	It is the best balance of use and protection and it provides a good balance of cost to the tax payer and protection of the reefs.
Current program	USA does not need to spend more tax dollars at this time on a program of this type versus human emergency needs in these times of a horrid economy.
Ship repair program	at this time we need to do something but not go over board till we can afford it
Current program	I have yet been able to see any government programs that are not wasteful and ill conceived.
Full program	Taking time to do things right in the long term means that we all need to sacrifice. If our country and its citizens had been responsible from the beginning in matters of protecting the environment and the economy we would not be facing the situation of
Full program	I don't think the cost is disproportionate to the benefits of repairing the reefs.
Full program	Seems the best option in the long run
Current program	I FEEL WE HAVE MORE IMPORTANT PROBLEMS THAN CORAL REEF REPAIR!
Full program	If we want a beautiful planet to live on, we have to become better stewards of our planet-Earth.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	provides the most protection at what I feel is a relatively modest cost per household
No-fishing zones program	Possibly with less fishing in the No-Fishing zones that will reduce ship and boat damage to the reef.
Full program	it is for a great cause and would create a healthier environment and would benefit all the people in the future and it would not cost each tax payer that much more per year
Full program	Because I believe saving the coral reefs is very important to Hawaii and its ecosystem.
No-fishing zones program	less tax dollars, but believe we need to something to help
Current program	The few pennies allotted to protect the great lakes are given because of the value of the fresh water therein, a commodity that benefits the nation as a whole. I also do not believe that the 12 foot wide scar left by a ships hull impacts a very large area,
Current program	Again, federal vs. local \$\$\$'s and % of reefs and already 400K acres of federally protected reefs.
Ship repair program	Once the coral reefs are gone the eco system will be gone, we need to do something
Current program	I am all for protecting our coral reefs but not at the expense of increased federal taxes. Get rid of other wasteful government programs and use that money instead.
Ship repair program	Willing to pay some but not all in this very tight economy.
Current program	We are being taxed too much and these programs need to find other ways to be funded. Such as a tax for those who are fishing in that area.
No-fishing zones program	This program represents a moderate cost to the American taxpayer while also protecting the coral reefs.
Full program	This is just not for the United States, but for the whole planet.
Full program	it is important to keep our eco system in tact.
No-fishing zones program	It was a toss up between this and the full program. I liked the idea of 25% being protected.
Ship repair program	We are already over taxed. Most of the programs are filled with corruption and few of the dollars actually end up where they were designated to go in the first place.
Full program	It will be cheaper in the long run than doing nothing. What will the fishermen do if all the fish are gone?
No-fishing zones program	The cost to taxpayers is the biggest reason I chose the No-Fishing Zones program. I believe the ones who cause the accidents should pay for the damage to the coral reefs.
Full program	Seems very important to curtail damage to the reef now. Continuing damage to reef could be irreparable.
No-fishing zones program	no reason
Full program	I do not want to see our ecosystems destroyed. All things in the natural world are linked to one another. I believe that these coral reefs serve an important purpose for people. More education about our natural world should be undertaken in addition to

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	The only alternatives were add'l tax payer money only therefore i had to vote none. Fees should come from commercial fishing, sport fishing fees, snorkeling fees, etc instead of the entire US tax base. If its becomes more expensive, then the end users
Ship repair program	reef repair should not be a burden to all tax payers.
Ship repair program	because the curreent administration ha already spent more money then we an afford and taxes are already to high.
Full program	I believe that the coral reef's are a pretty aspect of the ocean and if we let them die, then what else will we decide is not important anymore and let it die also.
Current program	We are broke
Current program	I don't care to be bothered about some slight damages to coral reefs in Hawaii. There are greater things that need to be taken care of.
No-fishing zones program	I think we should do something but the full program is too expensive for many people. The program I chose seemed to be more moderate.
Full program	We do a lot of destruction on our world. It has to stop somewhere.
Current program	We need less government, not more. God will fix the reefs!
Current program	no additional cost
Ship repair program	I think we are being taxed enough for the programs we have in place now. I don't know if I can afford that muchmore. I live pay check to pay check as it is now.
Ship repair program	It was the option that provided some action to repair the reef at the lowest cost to me.
No-fishing zones program	This has a greater overall effect with the least amount of spending.
No-fishing zones program	Prefer the full program but cost is very high per household.
Full program	If we set a goal to protect the ecosystem surrounding the Main Hawaiian Islands; that goal needs to be decisive and firm. Any other alternative is simply putting a band-aide on the problem. The \$245 yearly tax increase is not cheap, but this problem dem
Current program	I think asking the Federal Goverment, the people of the entire United States, to finance an issue that is so far removed from the purposes of government (safety and roads) is wrong. Please have the people that will benefit most directly from solving this
No-fishing zones program	Federal taxes are already burdonsome; the "no fishing" zone is a reasonable compromise between being overtaxed and underreefed.
Current program	My taxes are already too high. The government is already wasting trillions of dollars on unneeded programs (chiefly its foreign follies and empire building.) Shut down the war department (or even just curtail it moderately) and plenty of money will becom
No-fishing zones program	protects more without paying too much
Full program	It's is only \$125/year and the govt. wastes a lot more of my tax dollars than that on less worthy causes.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	since I don't live in Hawaii I do not get to see the wonders of coral. I do beleive that scuba divers and boater can pick up part of the fees instead of it all becoming the burden of the tax payer
Full program	protecting ecosystems is very important
Current program	There is no need to increase my taxes. Charge fees to the commercial and recreational fishing industry. That puts the costs where they belong.
Full program	i always feel that in all things that need fixing just as with a surgery if u want the best results in the long run u need to fix the whole package or u will be back later for further repairs after the job is completely done correctly u may only have to p
Full program	Neither of the other programs offer a good solution for the reefs, and do not do enough to solve the problem. If you are going to do something, make sure it is beneficial, not just a bandaid.
Full program	It seems tje best program to repair the damage before more damage which would be even more expensive to correct.
Full program	Because it is most needed.
Current program	I am not concerned with the Coral Reefs around Hawaii. I believe that the STATE government should be responsible for maintaining this system, NOT the Federal government.
Full program	Our Oceans are to important not to take as much action as needed
Full program	We have to change our behaviour of taking from the planet and give nothing back in return.
Current program	the reef repair is almost laughable in scope. the earth is a lot tougher than us little humans perceive it to be. the overfishing can be a problem, but the cost of TRYING to enforce overfishing laws seems to outweigh the overall benefit.
No-fishing zones program	well it just seems to me that fish will be caught and thats what i would be wanting but my mind would be open to another plan'
No-fishing zones program	I would like the \$125.00 program but you have to realize that we all do not have extra money. Much of our extra money goes for medical bills.
Ship repair program	Minimal amount of tax increase
No-fishing zones program	By having a no fish zone. The boating traffic would be reduced,there by reducing potential reef accidents in those areas,if the no fishing zones are in an area that has high or moderately high traffic.
Current program	Although I do think the reefs are important to our ecosystem, I don't think these programs would make enough of a difference to justify the cost. As you pointed out, ship accidents affect a very small portion of the reefs. I say let the reefs repair them
No-fishing zones program	We need more fish.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	U.S. Has bigger problems to deal with, It should be up to nato
No-fishing zones program	I would rather the sea animals live longer and repopulate.
Full program	I feel this is minimal cost for coral reef protection and something that definiately should be done!
Full program	If we break it we need to fix it. There are numerous long term advantages to repairing and protecting the reefs. We have to think long term.
Full program	we need to protect the coral reefs
Full program	Coral Reefs are one of nature's most spectacular areas, and we are all much the poorer if they decline. The monetary cost is well worth saving the reefs.
No-fishing zones program	actually don't want to pay more taxes at all- we don't even live there- so Hawaii should have the accountability- but 75 per YEAR is not too bad
Current program	At this time too many oher demands on our tax dollar.
Ship repair program	I think my choice represents a good compromise.
Current program	The government shuld stay out
Full program	We need to protect the fish and coral reefs so our children and their children will be able to enjoy the oceans.
No-fishing zones program	protect the riffs and nature will do the rest
Full program	That's the program that would repair and protect the reefs. That's a small amount to pay annually to protect the good.
No-fishing zones program	Cost to each household
Full program	The coral reefs are a national treasure and we should preserve them for future generations.
Full program	Even with prsent research we don't know how much our lives depend on this part of the ocean being healthy. Also 100 dollars does not buy much today..but this seems like a very good way to spend it.
No-fishing zones program	eventually repair on their own if protected
Current program	I believe that the enforcement costs of no-fishing zones appears to be very high. Also, the state should put in more funding. They could possibly have a tax on snorkeling, etc. that could help them fund this.
Full program	Reef MUST be protected as much as possible.
Current program	I beleive that we ( as American taxpayers) should not have to continue to higher taxes.
Full program	The program is a good start. East coast fisheries were lost for lack of govt. protection
Ship repair program	no comment

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It's a compromise between doing very little at no cost, and doing allot that will cost allot.
Full program	If we don't take a drastic effort to preserve our nature wealth today, when will it start and who will do it. The present is the right momment to start.If not, it will we all gone before we know it. Our children will only find and see these treasure in th
Ship repair program	I somehow cant believe that of the hundreds of millions of us taxpayers that the added cost per household will still be over \$100. Thats ridiculous, the government should be able to find a way to do more with less perhaps through partnering with nonprofit
No-fishing zones program	It seems like the best value for the money spent and should help protect more of the resource
Full program	Protecting the ecosystem as best we can is the only way to secure a reasonable future. Yes it will cost money now but its money in the bank of the future.
Full program	The oceans and all they hold are most important. Protecting the environment and limiting overfishing and coral degradation is needed for future generations
Current program	The only effective solution would be the full program.I would not like to pay the additional tax to repair a problem that has little or no effect on those in the other areas. Those who caused the problem should pay to fix it.
Current program	my like of knowledge
No-fishing zones program	The cost should be shared between the taxpayers and the companies that damaged the reefs. I think a taxpayer burden near \$100 will not be widely accepted.
No-fishing zones program	Whatever it takes to fix this problem! We are ruining all of our natural wonders in this country. What will be left for our children?
Current program	Doesn't cost anymore.
No-fishing zones program	I think it would benefit to build the marine life back, and the coral reef will come back on it's own, it just takes longer.
Full program	marine life is protected.the people can still fish outside the protected zone
Current program	our taxes are high enough & our current president plans on raising them even higher.
Full program	I saw a lot of the destruction in the Florida Keys in the mid 1970s.
Full program	Steps taken to help the environment will benefit the quality of life on this planet for all. Perhaps there will be no life left at all if we do not recognize and make necessary changes to preserve this planet.
Ship repair program	It seems right to me. To protect the reef.
No-fishing zones program	Least number of tax dollars - greater benefit to reefs
No-fishing zones program	Because if there are less boats FISHING then there stands to reason there will be LESS BOAT DAMAGE to the reefs
Full program	Quicker recovery + more fish = more efficient
Current program	I will not voluntarily agree to pay more taxes for anything!!!!!!!!!!
Full program	I think it is very important to protect our environment

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	It's a good but cheap way to help out.
Full program	It is important to protect our reefs and fish in these areas. I've been to Hawaii many times and would like to continue to enjoy its beauty while protecting the natural habitat of sea life. After all, it is the 50th state!
Ship repair program	It had some repair at a medium cost.
No-fishing zones program	There are many other ecosystems in our country (and world) that need protection and repair. Funding all of these projects at the top level is typically not feasible for most people. The No-Fishing Zones Program protects a larger area of habitat. And, b
No-fishing zones program	I prefer the environment to be kept at their natural state with no human intervention.
Ship repair program	There should be more cost to those who use the fishing areas
Current program	No cost
No-fishing zones program	seems the total ecosystem can support itself w/o the accelerated program. not enough info to be sure
Current program	The cost. I am disabled. If I were still working, and certainly in principle, I would love to see the Coral Reefs proected fully. I do not have the income to support my choice.
Full program	At a household cost of \$110 per annun, the benefits far outweigh the cost. As our tax money has the potential to be forever mismanaged, why not mismanage in a manner that will improve the environment, ecosystem and most importantly, the beauty of the pla
Current program	I would love to chose the full program, however I can't afford to pay any additional taxes due to poverty.
No-fishing zones program	cost to me - the reef still repairs itself, just takes longer to do so on it's own - for now, I'd rather not pay to repair, just to prevent
Full program	the time line is very important to improve the coral reefs.
Current program	While I value the beauty of the reefs, my personal current financial situation would not be able to support this burden for something that I may never experience. In 5 years I may feel differently.
Current program	throwing money at natures in balance is not always the right fix. Just make adjustments to mans activity
Current program	TOO MUCH GOVERNMENT EVERYWHERE...
No-fishing zones program	I really dont care AT ALL about this subject I just think we should probally do something to try to protect some of the reef. I've seen it and it pretty if nothing else let the future generation see it.
Current program	i see no need to pay for something i will never see or enjoy...let the people that visit pay..
No-fishing zones program	It seems to be the most practicle.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	Reef resources take a long time to recover. and will continue to decline. In the long term, fishing resources will recover to support MORE, not less fishing. (based upon the information provided in this survey)
Full program	Because the enviroment is one of our most precious gifts
Current program	we are taxed on so many things already. I honestly don't think we could afford anything else.
No-fishing zones program	It sounds like the quickest and least expensive way to enhance the coral reef system.
Full program	I felt that \$200 plus wasn't a huge amount to help preserve the coral reefs.
No-fishing zones program	I think intervention to improve the levels of fish is more critical than repairing the coral.
No-fishing zones program	none
No-fishing zones program	we need to heal reefs first
Full program	I care about protecting and enhancing ecosystems everywhere. The coral reefs seem especially valuable as they are such a small part of the earth.
Current program	I can not afford an increase of any knid
Ship repair program	would like to help but not too much
No-fishing zones program	This option will not only protect the reefs, but will have a direct beneficial effect on the fishing industry. Absent such a program, sport and commercial fishing may disappear. No brainer. On the other hand, there isn't money to do everything.
Ship repair program	realizing something must be done, but not willing to spend as much from my household income.
Full program	we should do the very best we can.
Full program	Our ecosystems need to be repaired as soon as possible to benefit the whole planet.
Current program	i don't have the additional money to spend on coral reefs in hawaii. i have a hard enough time supplying for my family and myself
Full program	Coral Reefs should be saved and protected. The full program provides the better options to do this.
Full program	over 12 months 100 dollars can make a large difference
Ship repair program	economic reasons
Current program	It's just too expensive for the average citizen
No-fishing zones program	I think the no Fishing-Zone is preferably because it will reduce extinction to the coral reefs, and prevent broken coral reefs from shipment.
Full program	because we should be doing all we can to help and a \$100 a year does't seem like that much and if we don't do anything we are destroying the future

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	If we are to protect the ocean floor we have to do more and spend more. In the long run all the people and ocean species benefit.
Current program	These are tough economic times. Even a small tax increase will continue to hurt our economy as a whole. I believe lower spending at this time is the answer to recovery. Once our economy recovers, these programs can be looked at again. Until then, I thi
No-fishing zones program	No-Fishing Zones seems to produce the most results with the least amount of money. I think there should be a "No Ship Zone" where the reefs are in more shallow water. The rate of return on the rebuilding reefs seems too slow and generally I have a probl
Full program	i feel they need the help
No-fishing zones program	sound is not right for my rig comes in one sentence segments i have 56k system everything was understandable just broken into small segments
No-fishing zones program	Based on the information provided, I feel that this is the best plan.
Full program	The environment needs to be fixed and saved. The people are the ones that have destroyed this, therefore they are liable to pay for its repair
Current program	Spend it on crumbling infrastructure and health.
No-fishing zones program	Fish population will rebound
Full program	There has been too much damage for too many years. It is time, nearly past time, to take steps to correct and protect. Nothing is free. And since everything is connected in the natural world, humans and human activities are the cause...the damage is the e
No-fishing zones program	The greater no fishing zone the better chance of the fish naturally helping out with the ecosystem of the coral reefs.
No-fishing zones program	Think \$75 extra a year for taxpayers is enough to pay. Would preferably like the whole program, but money is tight, I assume, for the average individual or family.
Current program	I am not familiar enough with coral reefs to make judgement.
Full program	It should be considered investment for future generations.
Current program	WE DO NOT HAVE THE MONEY. TAXES ARE TO HIGH AND UNDER THE CURRENT ADMINISTRATION THEY CAN ONLY INCREASE WITH THE PROGRAMS THAT ARE BEING PROPOSED AND THE BAIL-OUTS THAT KEEP COMMING OUR WAY LIKE THEM OR NOT.
No-fishing zones program	It's in the middle.
Full program	My family can cut back on other areas that are not as important as the World's Eco-system. We can wait one more year to buy new furniture, carpet, re-decorating a room, ect.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	It came down to doing nothing or doing it right. To pick a program that only addresses part of the problem is wasteful. Do it right or not at all.
Ship repair program	times are tough with the economy but I feel we still need to contribute
Current program	I'm actually not much interested in this topic
Full program	The cost is minimal compared to the eco protection provided by the funding.
No-fishing zones program	I am so afraid of what Obama has done in office in such a sort time. Our taxes are already going sky high due to all his new programs. Although I consider this project (saving the reefs) far more important than the majority of Obama's stimulus projects, I
No-fishing zones program	repairing a few zones are of no significance long term. Within this gross information, some eco scientists should decide the details on the where and what, but with the \$170 limit
No-fishing zones program	The impact is greater for the no-fishing program at a lower cost compared to the reef repair program and would mean less overall expense on an annual basis to the tax payer than if I chose the full program.
Ship repair program	the price is reasonable
Current program	I think the businesses that rely on the reefs should pay for their repair/protection. Why should I have to pay more taxes so they can get richer??? After all, they'll just call us "suckers"
Full program	I would rather spend \$245 a year to make sure that my children have coral reefs and a healthy planet then have everything depleted and have nothing for my kids. The fish and the ocean can't protect themselves from the boats and the fishermen.
Current program	Not enough information on current funding provided and its use. How about bigger fines to ship owners for damage and commercial no fishing zones.
Full program	ignoring or inadequately protecting the environment will be more costly for future generations(global effect) Enforcement and repair will provide jobs.
No-fishing zones program	The cost to taxpayers
No-fishing zones program	It sounds like the option that would make the most significant improvement. I do think, however, that the state of Hawaii should fund more of this and leave less for the taxpayers.
No-fishing zones program	Simply cost v benefit. What is broken, is broken. I dont want to pay for damages in the past but would like to do my best to prevent future occurrences.
Current program	I think our tax dollars should go to education
Full program	im all for marine life and protecting the coral reefs.
Current program	private business can fix reefs. there are plenty of fish and i need my money
Full program	I think it is the right way to go.
Current program	This is not a program that is important enough to raise taxes. We are paying too many taxes now, including all the extra taxes we are forced to pay for all those who cannot pay taxes. We need a national sales tax that inc ludes everybody and that might b

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	appears to provide the most benefit for the cost
Current program	Taxpayers are taxed to excess right now. I am sure that there are plenty of areas that our good politicians could make cuts to take care of the coral reef problem. It is unfortunate that politicians are generally no longer "For the People" & only look to
Full program	I think we need to do all we can to restore the damage done to the earth.
Current program	Due to the economy and the bail-out programs, the government needs to hold down spending and taxes.
Full program	I don't think any of these programs deals with prevention of future damage, but the full program would be most beneficial to the environment - thus humans - in the long run. they need to develop a better plan.
Full program	I think it is important to give full attention to the coral reef problem because otherwise we will be with out such beauty.
No-fishing zones program	I really don't know,
Current program	we don't need any more taxes
No-fishing zones program	Something should be done and the restricted fishing option is the most cost effective. The US taxpayer should not bear the cost of repair.
No-fishing zones program	Taxes, over all are too high. I feel good to protect all of area away form main islands, and some around tourist areas. Let state repair around tourist areas as states make money from tourist areas...
Full program	The other programs didn't do enough to repair what damage was done. If there were another one that could repair a damaged coral reef that weren't so expensive, that would be more preferred.
Full program	Not taking care of our marine life in the oceans affects us all - it is appalling to see the damage done to our coral reefs, the pollution and garbage strewn in our oceans. We should all become aware of how much we are destroying our beautiful earth by
No-fishing zones program	It doesn't seem that the repair program will have much of an effect, so it hardly seems worth it. The no-fishing program would have more of an impact, based on the information you provided.
Full program	none at this time
Ship repair program	\$35 A YEAR IS STILL OKAY BY EACH HOUSEHOLD EVEN WITH THE RECESSION.
Full program	Minimum cost for maximum results
Full program	While I hesitate to support another tax increase, it seems to make sense when the facts are provided.
Ship repair program	it increases taxes slightly and still is working to repair the reefs

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	If these are important issues, they must be solved by figuring out how to do so with no additional general fund tax money. Federal spending is already uber excessive. Work smarter... there should be no additional monies provided!
No-fishing zones program	The ecosystem needs to be protected.
Full program	because if we don't who will protect the planet
No-fishing zones program	because it will allow the reefs to reoperate and repair themselves with out a major financial burden to an already suffering house hold.
Current program	This not anything I think the paxpayers should have pay.
No-fishing zones program	most benefit for fewest dollars
No-fishing zones program	Seems worth it to protect additional area for the cost. While I agree it's important to rebuild the reefs, the cost seems too high for the benefit. I'd prefer to spend money to prevent the damage in the first place rather than to spend money fixing the
Full program	JUST LOOKED LIKE THE BETTER PROGRAM..
Current program	I beleive Hawaii should bear the added costs.
Full program	Protecting the coral reefs benefits everyone. the ecosystem of the ocean is very intertwined, and no one part can survive if another part is harmed so we need to do everything we can to protect the whole rather than just parts.
No-fishing zones program	The tax burden isn't as great. the coral will repair itself even though it is relatively slow. lastly, if there are designated passes for boats they won't damage the corals, which seems like a more logical solution to redirect boat traffic as opposed to
Current program	Per household the amount could be less.
Current program	not sure if the extra money would be used correctly
Current program	Chosen this program because of cost. other programs would mean a tax increase.
Full program	Basically, the health of the oceans and its ecosystems would cost me \$10 a month. I feel this investment is necessary across the globe to ensure the health of our planet. If people gave up their cigarettes, Frappacino's, etc, then they would easy have e
Current program	we are taxed to death here in chicago. let pres. obama take less trips with and without his family so we can pay for these programs.
Full program	I believe in the preservation of our lands and seas
No-fishing zones program	Although it would be ideal to have the full program in place, it seems that, given the funds required, the most important issue is to allow the health and quantity of marine life to restore itself to its natural level.
No-fishing zones program	Just \$\$\$. Not enough to help everything
Current program	This survey is entirely outside my ability to participate. My knowledge about topic is minimal.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I would rather save the fish then the small amount of the coral reef. The reef can repair itself but the fish can't reproduce itself.
No-fishing zones program	The reef will have a chance to repair itself and in the long run the fishing outside of the protected area will increase. It only makes sense to give back to an area that gives us so much.
No-fishing zones program	It would provide the most benefit for our tax dollars. After seeing the impact of that program we could revisit the second plan of repairing the damaged reefs.
Full program	because we have to do all we can to protect our land and shores including the coral reefs. This is for our grand children. They should be able to enjoy what we are taking for granted now.
No-fishing zones program	The Coral Reefs are so beautiful and should be protected ---- but throwing money at problems has not proved very successful in recent years.....
Current program	no
No-fishing zones program	There will always be some kind of damage done to the reefs, whether it is ship made or natural. I think it is damage repair is a little excessive.
No-fishing zones program	I really prefer no-fishing and no boats, but the cost would be too much. But these coral reefs are a natural happening and man continues to destroy them. they will have to fish elsewhere.
Full program	without marine life it will throw the whole ego system off so we need to preserve the system.
Current program	There is no reason to increase taxes on every American tax payer for the purposes stated.
No-fishing zones program	Believe it is best value for tax dollars spent and provides greater good for environment
Ship repair program	Those who damage the reefs should be fined heavily. This deterrent should increase the desired result without huge tax expenditures. Focus on enforcement.
No-fishing zones program	Fish is part of a healthy diet.
Current program	I think it should be the responsibility of the state of Hawaii and its people who control their waters and what is done in them and provide for its repair and upkeep.
Full program	We have only one world and we have failed miserably to protect it. Nature can rebuild if we give it a chance before it is too late.
Full program	I feel it is urgent and necessary to have the full program. Time and expense should not be spared in order to save our coral reefs. The future generation would be able to reap the benefits and enjoy the beauty and bounty of the sea. It just calls for som
Current program	the federal government is large enough already,also hawaii is old enough to take care of its own natural resorces.
Current program	I have no money for the coral reefs

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	first two do nothing to help, last is too costly
Full program	We need to be more aware of our eco-systems and how they benefit us before it is too late.
Full program	Like so many other environmental problems facing the earth I feel that we are in a race against time and that we might soon be reaching a tipping point (where it becomes too late to do anything to stop the decline of the global ecosystem). I have always f
No-fishing zones program	Taxpayers most affected by the impact of status quo should pay for the cost to improve the commercial, recreational and environmental interests. Commercial and recreational users should pay more taxes.
Full program	Would like to see the coral environment restored to its previous state as soon as possible.
Full program	I really think that we need to save the environment and wildlife
Current program	I feel we need to help, but with the way things are right now, i don't feel funds are available.
No-fishing zones program	Seems a waste of time to repair the reefs if there is such a decrease in fishing. It seems if we increase the fish to areas outside the no fishing zones, the boats/ships will go there and protect much of the reef from injury. The full program is just to
No-fishing zones program	To start a program the position I choosed provided help for half thr taxes that we need to pay.
No-fishing zones program	Easiest to implement with quicker results.
Full program	Just sound better
Current program	While sympathetic to the plight of the reefs, I feel the local economy should support the repair and maintenance of the reefs.
Current program	Keep the Gov. OUT
Full program	It covers both the declining habitat from overfishing and helps to restore reefs damaged by ship accidents.
Full program	A minuet cost amount for work of project.
Full program	because it protects so many acres and helps rebuild some that have been damaged
No-fishing zones program	It appears to be the most cost-effective option, most return for the money without costing tax payers too much more. The other options cost more. The ship repair is expensive and does not appear to give as much return on the dollar as no-fishing zones. In
Ship repair program	As a scuba diver the reef is one of the most amazing underwater sights.
No-fishing zones program	with no-fishing there will be less damage to reefs

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	The way I look at it you need to do both or there really is no balance to the ecosystem
Full program	IT DOES THE MOST GOOD FOR THE ENVIRONMENT AND IS NOT THAT MUCH MORE COST THAN THE OTHER \$200 vs 110.
Current program	doing more than the current plan sounds very good, but that's a lot in federal taxes to each household in the country for just one program in America. there are so many areas of spending waste causing trillions of dollars of debt. as good as this prog
Full program	we are wasting too many of our resoures and need too conserve and maintain them
Full program	Protecting ALL of the planet's ecosystems is priority one.
Full program	i would not mind paying 200 per year
Current program	I feel there things like highway & bridge repairs that are in greater need the tax money.
Ship repair program	It seems necessary to do something to repair the coral reefs rather than do nothing and maybe they can also tack on higher fishing restrictions and help also in this way
No-fishing zones program	The \$75 cost per household would be affordable and provide some action to help the problem.
No-fishing zones program	because if there is not any fish the eco system will not survive and in the near future a new process for making coral will be produced for faster recovery
Full program	We HAVE TO take action to protect the ocean, glad to see that our govt. is considering it. WE are retired, we can afford this 'Full Program' option, I know that many families could not agree as we can.
Ship repair program	We cannot fix everything that happens to nature due to the over population of humans. At this point, we can try to fix a little as we go and better manage what we have. No one has enough money to fix it all, yet we cannot afford to ignore the situation
Current program	no knowledge of current program
Ship repair program	some additional action needed but taxation is way out of balance already
Current program	Unfortunately the taxes in this country are too high and under the present administration they are not going to go down so I would not support any increases in the taxes on the American People.
Full program	i like fish and like to eat too....if we can bye the gas at 4.86 a gallon i think we can pay a small amount now and watch it grow it will have something down the road,,,,,or take the pople that have 1,000,000 and tax them more and give the ones that are sle
No-fishing zones program	Most logical with largest long-term benefits.
Full program	WE NEED TO PROTECT THE ECOSYSTEMS>
Ship repair program	It would help somewhat and I feel the full program is just too costly at this time.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	The reefs need everything we can do for them. But with money as tight as it is right now, the reef repair cost is what gives me pause. Absolutely go ahead with the no fishing zone. But then again, if ship companies will pay for the reef repair when the
Current program	With the current Administration spending money for bailouts instead of helping hungry and starving children and human beings with families that have lost their jobs, I think the money should be spent to help the economy more than going to repair coral reef
Ship repair program	The repair concept indicates to me that correctional action will be taken more quickly than the others.
Full program	I chose the full program because both can work and both should be carried out in order to help replenish the marine life (fish) and maintain jobs (commercial fishers, scuba/snorkeling tours, etc.). Bermuda has a program similar to the no-fishing zone except
No-fishing zones program	I think there should be an answer to this problem that is not so expensive to everyone in the US. I want fish and reefs protected but I want clean water, mountains not stripped mined and animals not endangered too. There has got to be ways to fix problem
Current program	because of no money out of pocket
Current program	I am opposed to an increase in federal taxes to pay for this program. I believe it should be a state responsibility.
Ship repair program	None
Current program	It's not the tax-payers problem in Ga. what happens in Hawaii.
Current program	Americans are over taxed already.
Full program	It not that great of a cost for such a cause.
Current program	that is a huge cost for all taxpayers. there should be a less expensive way to do this.
Current program	Taxes already too high not in favor of increasing taxes.
Full program	Coral reefs are an environmental concern that must be protected. I have seen damage in Florida and the Caribbean. It is, unfortunately, a problem that multiplies too fast.
No-fishing zones program	I think the cost of repairing reefs should fall on individuals and companies that boat around the islands. It should not be passed on to the public. Paying to implement a no fishing zone appears to be the lesser of all evils and will help replenish the p
Current program	I believe in saving nature, however, in weight of other items, protecting wildlife and nature is less important than other items such as helping those struggling - especially for the cost.
No-fishing zones program	After reviewing the cost of both programs it is clear that the No Fishing program is definitely needed and will do the most good for the money. The Coral Repair program, however, is too expensive for the minor good achieved. I agree with the argument th

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	I think the destruction of the oceans is a very pressing problem. This is a worthwhile investment in the future of our oceans, and it has concrete results.
Full program	Provides a safe and stable habitat for fish and the continue life of coral reefs
Full program	I currently have enough money to cover the extra cost to me per year. I don't consider myself an environmentalist, but I view this full program as a good way to protect and conserve our resources.
Full program	no
Current program	I have never seen a coral reef,however Environment should be protected. I would like to hear suggestions of incentives or fines or volunteer service as well as taxes as a solution.
Full program	That is the problem now doing things half ass. Lets try whole ass and get things done. /whole a-- is the cheapest in the long run. If it is not done now it will still have to be done later.
Full program	because i think we need to protect the enviroment some things need to stay and be maintained for the earth. we destroy to much in nature we keep taking and not putting anything back. before long there won't be anything to enjoy.
Current program	the costs are way too high.
Current program	I believe the enviornment is important,but, other programs need attention first.
Ship repair program	not too expensive and will take 10 years not 50 years.
Full program	what takes save reef
Full program	preservation of the environment is essential in maintaining the quality of life for everyone.
Current program	I am already paying too many taxes and, from what I understand, Obama's administration will be adding more!
No-fishing zones program	Ideally, I would like to be able to say yes to the highest tax increase program. But in the present economical situation, and living entirely on social security, that would cause undue hardship on our household.
Current program	economic times
Full program	the full program costs more, but in the long run, the reefs will come back to life faster
Ship repair program	at least some acres would be repaired, and in less time
Full program	No fishing zones protects the most coral, but it is only an extra \$15 dollars to upgrade to the full, so why not do that to fix the ship damage as well.
Full program	We are stewards of the environment and have an obligation to preserve it for future generations. The coral reefs are a national treasure that, once lost, cannot be recovered.
No-fishing zones program	Short-term pain for long-term gain.
Full program	Because if we don't start protecting/repairing now...there will be little left for our grand children and future generations.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	the damage should be repaired by whoever caused it. limit activities that cause damage even if not popular with the local population. stop govt spending!
No-fishing zones program	More acres of coral reef protected at a less expensive option.
Full program	The long-term prospect for making environmental improvement is appealing. The relatively small increase in taxes to pay for it would be worth the benefits accrued.
Full program	living on these islands means there is a responsibility to the environment that you live in. \$300/year is a small price considering the long term benefit.
Full program	I take a proenvironmental stance on most issues.
No-fishing zones program	The cost of the full program reflects adding the reef repair program, with a relatively small area of reef actually benefitted. The cost of the reef repair program given current economic conditions is not warranted.
Full program	It Just Needs To Be Done To Protect The Enviroment. \$145.00 Won't Make Or Break Anyone.
Current program	with the current budget deficit, I believe I'm already about \$4,500 in debt to the Government
Full program	Seems to be the best results for the money spent.
Full program	I believe we need to protect our resources. however I know that our federal government could and should reduce sending by cutting programs that are not needed. Example--education cost. I have seen TV shows were a principle has turned a school around witho
Full program	we need to protect our enviroment for our future we don't understand what can happen to our ecosystems if we don't do anything now
Ship repair program	the pace for repair seems faster and can create more fish
Ship repair program	It's a hard decision, so I made a compromise. I like the idea of the ships repairing what they destroy.
Current program	The state needs to control it's own destiny. Why shoud an Iowan taxpayer pay for the problem not reacted to by the state?
No-fishing zones program	Charge the boaters for water usage with a boat lisc. There are probably other options. What is done in FI? A lot of missing information
No-fishing zones program	feel this is the most efficient option-- creating no-fishing zones would increase the marine-life and this may help those areas injured by ships, and would cost less than putting both options into place
Full program	We can not ignore the declining fish populations now because of short term costs if we are to find a long term solution to the problem. If we don't do everything we can, commercial and recreational fishing will continue to decline.
No-fishing zones program	Actually, I would prefer the Full Program, if it entailed a re-employment program for the fishers who will be temporarily unable to harvest in the no-fishing zones. I'm not willing to pay additional taxes for reef repair if there is no provision for employ

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	We live on a fixed income and there are so many programs local, state and nationwide that require participation.
Current program	The American taxpayer cannot pay for all social problems. Each state probably has significant eco-issues that could use federal tax dollars. I also suspect if managed by the federal government, the proficiency of the program would probably be over-spent
No-fishing zones program	Seems to have the most impact on everyone involved.
Full program	To help the planet earth!
Full program	I believe it to be the best
Ship repair program	The extra cost when there are many problems in the USA at this time.
No-fishing zones program	It was moderate in costs, yet seemed to cover the most for the cost.
Current program	There has to be a better way to find a solution. We can not be taxed everytime we have to protect our envioment.
No-fishing zones program	The extra cost of the ship repair project is large, and the acres affected are a very small fraction of the area protected by increasing the protected area by a factor of 25. Besides, it is possible to add the ship repair program in the future if desired
Full program	Both programs are needed for the health of the planet.
Full program	Extreme control should be done to insure the money collected for the program be spent for repairing and transplanting the reefs only and not to benefit private companies out to "Save our Coral" and privately benefit from our tax money!!!
No-fishing zones program	Seems more efficient. Responsibility to citizens is determined before events. People will know they can't fish somewhere. The ship repair is a burden put on all by the accidents/mistakes of a few, which seems less fair.
No-fishing zones program	The program seems the most effective. I think repairing ship damage won't be necessary if we can increase the coverage of protected zones.
No-fishing zones program	It makes the most sebns to me. I fish and scuba dive and, although I'd hate to see more taxes being taken from me, I am strongly aware of the drastic changes in the ecosystems that have occurred over the last 20 years. We as humans have taken, and now we
No-fishing zones program	Less economic impact to my household while supporting a larger ecological goal. Reef replacement should be a user shared cost item.
Ship repair program	to take care for nature
Full program	Natural resources that arer not replaceable should be preserved
Full program	For not that much money per household, a lot can be done to protect the coral reefs. I would be willing to do that.
No-fishing zones program	With the no-fishing zones in the protected area , there will be fewer or zero boat accidents that destroy the coral.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	I think our environment is being damaged way too much and we should do all that we can to protect it.
Current program	Why should someone in Texas pay for problems in Hawaii? Let Hawaii pay for their own problems. Significantly increase the cost of a boat and a fishing license in Hawaii to pay for these problems. Increase taxes on tourists than come to Hawaii, especial
Current program	Having economic hard times. Cannot afford to pay more taxes.
No-fishing zones program	It seems to provide the most bang for the buck.
Full program	We must protect the oceans and marine life for future generations. Otherwise, our oceans will die.
Current program	We should have no added cost of government except to lower the population (number of people)!
Current program	This is not a program the Federal Government should be involved in. This a state issue and the state should have the freedom to address in the way they prefer. I live in New Jersey, we need to repair our beaches...My taxes should go there.
Current program	I don't know as said previously am not interested
No-fishing zones program	Because it seems to do the most in terms of preservation/restoration for the least amount of money. I would love to contribute the \$265 for the full program, but other issues of equal importance would also need support and funds are limited.
Ship repair program	Additional tax cost
Full program	IF and I stress IF my money really goes to the marine life, I do not have a problem with it. BUT my faith in this really happening is minimal.
No-fishing zones program	The simplest way to expand the marine life. I don't understand why the reef repair cost is \$35 and the 25% protection is 170, why is the far right only 185?
Full program	I would preferred the full program because it does the most, I am retired and live on a fixed income but for the future we sometimes have to make sacrifices
No-fishing zones program	I support maintaining a healthy environment over repairing a damaged one.
Full program	I believe we need to start investing more into our natural habitat as we are destroying it more and more each day and without it we would not exist. It seems the most important thing the government should invest in.
Ship repair program	Less cost to people in general
No-fishing zones program	it seems like the best choice because "you get the most bang for your buck" and seems the most fair to all taxpayers.
Current program	I personally don't want to spend any money for something I don't understand!
Full program	if protection isn't now it may be too late in the future
Full program	you have to stop people from over fishing areas and you have to protect the coral and help it heal it's self, because with out coral you have no fishing zones any way

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	I believe that "we" have done and/or allowed the damage and we should have to pay to help to repair it. Again, my real beef is why don't we see and care in the first place so that we are not always having to pay for damage that has been done. Do I want to
No-fishing zones program	the govt should make an appeal to marine biologists to get the reefs repaired. volunteer work does wonders in other areas, so why not here?
No-fishing zones program	No fishing zone will allow the fish population to increase, and cut down on the shipping accidents.
No-fishing zones program	Seems a place to start at least.
Full program	It is the way we take care of our land (farmland) for our great-grandchildren in the future. BUT Hawaii is the responsible PARTY --- repair of coral is SHIP owners responsibility not taxpayers -- no-fishing zone is Hawaii and 10-25% taxpayer. To me that
Full program	PLEASE SEE MY PREVIOUS COMMENT - I BELIEVE THAT I HAVE EXPLAINED THE BASIS FOR MY DECISION IN THAT COMMENT. ALSO, I FEEL THAT IF WE EXAMINE THE MONEY GIVEN AWAY BY THE FEDERAL GOVERNMENT FOR ABSOLUTELY RIDICULOUS REASONS AND RIDICULOUS PROGRAMS AND ALL O
Ship repair program	Reef repair will provide some much needed employment 50 years is too long to wait for repair.
Current program	This should be up to Hawaii to pay for this. Goveernment spending is already out of control and getting worse. Defense systems, terrorist control, education, health care and MANY other things are more important than the protection of more corral reefs!
Current program	The amount of money will be spent can do a lot to protect our environment. I would prefer spending it else where.
No-fishing zones program	fair cost . increase marine life
Current program	the economy is is still struggling right now and although this is an important topic to revisit, there are more pressing issues needing attention
Current program	I don't believe that the Fed. Gov. needs to be involved with more programs. I think money should be spent on more important programs like education, health, and roads.
Full program	For me, I feel \$100/year is a reasonable price to pay for enhancing and restoring marine ecosystems. My only question is would the program be unending, or would there be a decreasing cost over time to a phase out?
No-fishing zones program	Easiest one to enforce. 50 years to repair is only and educated guess but still a guess.
Full program	The cost is \$6.25 per month. Such an increase is less that what I waste each month. If limits are put on favorite projects of congressional people then monies would be available at no increase. This project would be of much greater value than some of t
Full program	Without the coral reefs the whole cycle of life is in jepordy

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	we have more important programs that needs our attention rght now.
Full program	Because it's necessary to sustain our ocean, which sustains us
Full program	If you are going to do a program do the one that gets the job done!
Current program	i feel that i dont live there and i shouldnt have to pay . plus i believe in mother nature and it will take care of its own
Current program	Coral reef protection is not of interest to me. Spending less money and having enough for living in retirement is. The less the government spends the more I will have.
No-fishing zones program	Accidents happen, caused by both man and nature, and nature is designed to react to that, so I don't feel as great a need for reef repair. Also, despite the successes that have been seen in Florida, history shows that man interfering with nature, however
No-fishing zones program	cuz it doesnt cost as much and the reef live longer before they get damaged in 50 yrs
Full program	the first option didn't provide enough protection. And if your'e going to pay \$175, why not \$215 and do the job right.
Full program	We vacation to Hawaii several times every year & understand the importance of protecting the reefs.
Current program	I believe this is a local and not a federal issue. I am aware of the costs of hotels, resorts, food and plane tickets to Hawaii. It is cheaper for my family to fly to Europe. I am very surprised that Hawaii is asking other states to solve this local issue
Ship repair program	Something more needs to be done, but my household is not willing to commit more tax money personally than I have already indicated.
Full program	I feel it is most important to recover the reefs while protecting them at the same time.
Current program	The taxpayers are overloaded right now with all the bailouts etc. This spending can wait until our economy improves.
Full program	I certainly CAN afford \$185.00 per year in Fed taxes even living entirely on Soc Sec as our total income. It will benefit everyone and should definitely be put into effect immediately. Thank you for asking my opinion!
Full program	It does both repair the reef and protect the no fishing zone.
No-fishing zones program	I am leary of Federal programs to fix something based on suppositions of the type presented.
No-fishing zones program	This is the least expensive way to protect the reefs. I feel more can be done by taxing all boats that use the waters around the reefs, so more funds can be available for reef repair.
Current program	taxpayers do not need to pay for this
No-fishing zones program	Provides the best benefit for the costs.
No-fishing zones program	No-Fishing zones would have a bigger effect than repairing ship accidents- I am willing to pay more in taxes to save a piece of nature that effects so much

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	We have to protect the environment and the earth's resources for our children and grandchildren.
No-fishing zones program	?
Ship repair program	Current economic climate makes me favor a less expensive program; hopefully, the future will loosen more money for funding.
No-fishing zones program	It provides long term benefit to a national treasure. Rebuilding the 5 acres of corral reef each year should be sustained by the boat and ship owners who use these waters and actually have the potential for doing the damage.
Current program	I am not against taking care of the reefs but the cost should be born by the people and the State of Hawaii.
Full program	I think that the oceans are over utilized and need to be managed aggressively to protect and enhance a valuable resource
Full program	It would only be about \$6.25 a month. I appreciate the coral reefs and love fish to eat!
No-fishing zones program	the no fishing zone program has no other source of revenue to support it, while the repair program can be supported somewhat by fining the ships that cause damage. This seems to me to be a way to protect the reefs while avoiding increasing taxes as much a
Ship repair program	I'm willing to do *something* to help protect reefs but ultimately, private enterprise who fish the areas should step up and do more.
No-fishing zones program	It is important to begin doing more. It is probably not reasonable to believe many people are interested in more expensive plans.
Current program	not sure
Current program	I am a Dairy Farmer. I am 1/2 owner of the farm and I have not had a raise since 1999. We are not getting paid enough to cover the bare expenses necessary to operate the farm. My salary has been cut in half and I can't afford to pay any more taxes. Benefi
Full program	Life is sacred. We are but caretakers... not "owners", and surely not "Gods".
Current program	I can definitely see where something needs to be done to improve and protect the coral reefs, but I can not afford more in taxes, as I am on a fixed income.
Full program	because it has more interesting.
Current program	With the increased living costs in the world today, and being retired and living on a fixed income, I would not be in favor of increasing taxes.
Current program	\$75 is way too much for American tax payers to pay for this program.
Full program	Reef accidents probably happen in the same areas and it would be necessary to repair these areas to have continuous habitat and not isolate and possibly destroy other areas. teh no-fishing zones are the most effective recovery agent but I think both are v

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	cost to individuals
Full program	I dont see much of a difference between paying 170 and 185 and truly something does need to be done and I dont believe just fixing the reefs without preserving the environment makes much sense.
Current program	I CAN'T AFFORD ANY MORE TAXES FROM THE SPEND HAPPY CLOWNS IN THIS ADMINISTRATION!
Full program	Protecting marine life is extremely important to the environment.
Ship repair program	It is the only one i like
No-fishing zones program	It provides sufficient protection for the coral reefs at a cost that is not too high.
Full program	Our oceans are in trouble from a number of things, most of which are caused by human carelessness,greed, and sometimes just plain ignorance. It is time people stopped thinking of themselves and helped mother nature out a little.
No-fishing zones program	It would seem this would be sufficient at the time.
No-fishing zones program	this will the fish to grow to its proper size and not allow ships come through the reefs
Full program	Nature deserves our collective full protection.
Full program	no
Full program	is the best way to keep life in the ocean, how will you feel if you lose your house and there's nothing you can do? that's how this creatures feel like too they're living things. we destroy they're homes and also eat them. shame on us.
Current program	Because this item is something that I do not in anyway want to pay for. This program is not important to me or anyone else for that matter and should not cost us a penny.
Full program	I believe we need to protect the reefs for future use and enjoyment. If this allows more fish caught outside the reefs it doesn't affect those that rely on fishing for a job.
Full program	Leaving the coral reef for future generation use is more important than the cost of the program.
Ship repair program	IT'S BETTER DO SOMETHING, THAN NOTHING. I JUST DO NOT TRUST THOSE WHO GO INTO MANAGING THIS PROGRAM TO DO WHAT THEY SAY THEY WILL DO. IT'S JUST A JOB TO THEM. NOT LOVE FOR THE EARTH.
No-fishing zones program	The info. you provided seemed to make it clear that the most cost effect approach/ max benefit is the one I chose.
Full program	Looks like it provides the most repair at the least amount of cost per household.
Ship repair program	It's the least expensive, but still provides a positive outcome versus doing nothing at all.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It seems to be the most helpful, yet costs the least amount for taxpayers.
Full program	Our planet is already in trouble. We can't let her continue to lose life force.
Full program	My tax dollars went too much into government welfare program which supports too many undeserved person. Reduce welfare spending can easily cover the cost of your program.
Ship repair program	i like a lot of americans have a fixed income. i would like to do more but my income wont let me.
Ship repair program	inexpensive
Current program	I am retired and live on a restricted budget, with no additional income.I can not afford any additional taxes.
No-fishing zones program	We waste huge amounts of tax money on political Pork spending. I see no hope to correct this in the near future. It is a waste to spend on \$\$\$ on the global warming farce. This is a good program and there should be monies taken from the wasted spending fo
Current program	cannot afford it
Full program	we must protect our environment at some positive level.
No-fishing zones program	Doing nothing is wrong - but raising taxes in this economy is also wrong. Not a real good solution.
No-fishing zones program	reefs will repair themselves over time
Current program	this is normal way the goverment thinks throw more money
Full program	\$100 is a small price to pay. We need to protect our environment.
No-fishing zones program	I believe the fee for repairs shoudl come from a fund that all who own a boat that utilized the area being discussed whould have to pay into on a regular basis. Not something that all tax payers should pay for.
No-fishing zones program	MOST EFFECTIVE IN MY OPIOION
Full program	First I believe there IS enough money for this program. Secondly, I believe that the companies must pay the for the full cost of repair. Our priorities are not in order especially when the previous administration squandered through greed billions and comp
Current program	Although it seems worthwhile, Americans are overtaxed and the money is wasted at an alarming rate by the federal government. I wouldn't willingly pay another nickel for these incompetent idiots to spend on anything.
Full program	I love MOther Earth
Current program	no
No-fishing zones program	need to protect for the future but there are many other ways to spend money - just ask Washington, they are spending, spending , spending right now

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I believe the No-Fishing Zones Program is beneficial to the entire ecosystem and will better our economy by providing more fish over time.
Ship repair program	The repaired reefs would help to increase marine and coral life at a quicker rate.
Full program	Long term benefits, environmental and likely economic, outweigh immediate costs.
Ship repair program	it helps with rebuilding of coral reefs and available money
Ship repair program	better to repair some damage than to allow everything to sit as it is we need to start somewhere
Full program	It is the best program to do the job to protect coral reefs.
Current program	Again, I feel that this is mainly a special interest project and that once some more federal funds are applied, there will be even less access to the coral reefs for recreation and fishing. On the one hand, protections should be in place but not at the
Full program	Besides the fact that there are few areas in the United States w/coral reefs, (besides Florida,) we should invest in keeping the the coral reef habitat as healthy as possible. Investments in the eco-system are difficult to measure over a short period of
No-fishing zones program	The added cost for protecting the 5 acres does not seem worth it. However, to really be sure, it would help to know how much that extra amount would buy in some other programs, such as science research or reducing the social security deficit that is coming
No-fishing zones program	It makes the most sense in protecting the wild life of the coral reef. Although the repair program is incrementally only a small increase it isn't needed and doesn't seem to me to give very much benefit. plus if you reduce the number of ships in around t
Full program	We must do all we can to preserve our natural resources and the environment.
Full program	We have damaged the natural environment enough. It is time to do some repairing.
Current program	Shipping tariffs or taxes on those DIRECTLY benefiting from the program or causing the problem should be the solution.
No-fishing zones program	I think there are many benefits to the no-fishing zones, but do not see much of a benefit to repairing 5 acres per year.
No-fishing zones program	This seems a nice, less expensive alternative to helping the ecosystem recover.
Full program	Quality of life upon this planet is suffering due to human actions, including over use and neglect. Restoration of natural environments are more than pretty - they allow diversity of life forms to flourish and help restore all forms of life in the ocean,
Full program	my children and so on and so forth need those areas of natural resources they may have cures or disease there
Full program	I feel it is important that we keep our world in good condition for our grand children
Current program	any burden on the tax payer is too much.
Full program	it's worth saving

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	We could not afford \$200 extra a year in taxes. Money is extremely tight for so many people right now. I think that the reef no-fishing zones and repair are very important, but can't afford to fund it.
No-fishing zones program	Ideally, the full program would do the most good but realistically the average American family probably cannot bear the additional \$300 cost. There are so many other worthy environmental causes that also need attention. Any increase in taxes will need t
Ship repair program	of course...less cost to MY household!!!!
Ship repair program	It's only right to do something to preserve our planet. Doing nothing about it is immoral. We should do all we can to preserve the beauty of nature.
Current program	There going to do what ever they want , no matter what I say or type.
Full program	Having snorkeled in these waters, I want my children to see them in their most vibrant, beautiful state. The oceans need to stay well to keep our world balanced. Coral reefs are an important ecosystem.
Full program	We have to begin to pay what is necessary to keep our earth healthy. For too many years we have not truly paid the full cost of our actions.
Full program	I see the value in protecting the coral reefs whether or not I live there or visit there often. If we do not make plans today to protect our planet, tomorrow may be too late. The money is worth it to me.
Full program	As the population grows so does the demand for food. The full program would help in keeping up with the demand for fish products. It will also help in maintaining healthy environment which will sustain coral. Plus need to look at maintaing the proper wa
No-fishing zones program	no particular reason
No-fishing zones program	no fishing on boating more protestion
No-fishing zones program	seems the most cost effective at this point in time
Full program	I think it is very important to correct the damage we have done to the natural world in which we live. The full program was the only one that helped both with the overfishing problem as well as the injured coral reef problem. Both of these issues would no
Current program	I think with the current economic down-turn, it would be a major strain for the average american family to pay more in federal tax dollars in order to save coral reefs around the Hawaiian Islands.
Current program	cost. I would prefer to increase the no fishing zone as my second choice. the no fishing and rebuilding would be even better-but cost has become very important to me

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It brings systemic change. I am concerned about cost, and so the repair seems to me to not add enough value, especially on top of the no overfishing. I'd still be curious whether for \$44 we could do 10% no overfishing and get impact, even if more limited.
Current program	While I agree that action should be taken, I think the burden should be on the local government, not the federal taxpayers. I believe the federal actions currently taken in the Northern Hawaiian Islands are more than adequate.
Full program	\$135 per year is a small amount to pay in light of the benefit received. Please note that I am an avid SCUBA enthusiast.
No-fishing zones program	Most effective use of money
Full program	Because is going to protect everything, not only a portion.
No-fishing zones program	No fishing zones seem to be the best at both preventing further damage and renewing what is there. If not done, the reefs will continue to decay and disappear eventually. Whereas the repair program while it makes the renewal of the coral quicker, doesn'
Ship repair program	The government is taxing us more than we can afford as it is. We will also have to pay for Obama failed bail out programs. We have to pick our fights, the middle income can only keep paying more than its fair share for so long.
No-fishing zones program	its seems better for the whole in the long run & having more safe zones will help reduce the amount of boating accidents the cost is doable
Full program	I think proactive efforts to preserve reefs around the main islands would have a long-term trickle-up effect on both local fishing jobs and environmental health.
Current program	Because there other programs did not offer a better alternative for the price.
Full program	If you dont protect and conserve you will not have nothing in the future. You need to repair coral so fish could reproduce
No-fishing zones program	I see this option as an reasonable compromise with the benefits of the increase in the no-fishing zones and the attendant increase in costs/taxes being acceptable.
No-fishing zones program	As far as cost, it seems to be more important to have the no fishing ban, as opposed to the smaller amount of damage that ships cause. The cost is too great with both measures.
Current program	I do not think this is a matter for the federal government - it is Hawaii's land/water and should be cared for, paid for and use allocated by the people of Hawaii.
No-fishing zones program	Increasing tax cost play a major role in my decision,not that I think this is the best solution.
No-fishing zones program	Implement the no fising program, monitor and make changes
Full program	As a scuba diver and snorkeler on vacation, the experience of observing first-hand the fishlife and coral should be kept available for generations.
Full program	do it

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Preservation for the future. Hawaii's economy. Fear of overtaxation.
Ship repair program	Because I do not have a lot a money to help the Reef repair program
Current program	The federal Gov. can't keep spending money, the taxpayers can't keep losing their wages to the thieves in Washington DC. Let the local gov., citizens,and busineses that are related take care of their own unique situations.
No-fishing zones program	i think it is important to protect the reefs but i don't see why it matters that damage is repaired in 10 rather than 50 years, so long as the ultimate result is the same.
Full program	i feel it is the best suited for this to repair and protect and fas reaction gets better results sooner
No-fishing zones program	I chose no fishing zones with no repair as my choice because without no fishing zones the coral reefs will never recover but with only 5 acres damaged by shiprecks with 75,000 protected, I feel that's a low enough number. Try to get more money from the sh
Ship repair program	The program tha costs the most is the best - but the cost is too high.
Current program	This is a Hawaiiin State issue. The economy is terrible right now. I wouldn't expect Hawaiians to pay for conservation of our cactuses in Arizona. People are hurting financially now- BIG TIME, This is not the time for special interests and government bure
Full program	It is important to recognize what has happened to the ecosystem and have the courage to take measures to remedy it. A bit of belt tightening now will provide a better system faster. If the system continues to decline as is known now there is a chance of
No-fishing zones program	I feel that this program will allow more development of the reefs and more fish to grow. If there is no fishing, wouldn't there be less damage to the reefs?
Full program	As with all of natures beauties and usefulness, if it is not cared for it is lost. This problem has progress this far only because man did not start caring when he should have.
Full program	Life comes from the ocean. We need to sustain the ocean in order to continue the existance of humankind.
No-fishing zones program	I feelthis will give the biggest return in the shortest amount of time. There should be alternative ways of paying for the coral repair.
Ship repair program	Importance of livelyhood for commercial fishermen. Reef repair would help restore coral and provide jobs while not severely penalizing commerce.
No-fishing zones program	limiting fishing is unlikely to have unintended consequences - commercial fishermen will have the greatest economic impact - but if the fish population increases in ten years it would be advantageous to the commercial fishermen.
Full program	Current is too minimal for long-term repair. Full program is needed because the problems need to be addresses aggressively.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Provides an increase in fish that spills over into the fishing zones thus helping commercial fishermen.
Current program	less money
Full program	Our planet is in enough trouble as it is. Anything to improve conditions is preferred.
No-fishing zones program	the improvement in marine life
No-fishing zones program	I receive no benefit from these programs. So I feel that people who benefit from this should pay the larger part of the cost. We as tax payers pay too much taxes for government programs now. We pay for welfare and other government programs now.
Current program	the gov't is too big now and needs to quit spending money, it's broke!!!! Pay off debt and live within our means like every private citizen should do. Are you kidding, where is all this money supposed to come from????
No-fishing zones program	It seems more realistic than the full program
Full program	Do something positive now to ensure a lifetime of coral reefs.
Full program	I DON'T LIKE ANY OF THE IDEAS PRESENTED. A TAX INCREASE IS A LAST EFFORT. I WILL PERSONALLY LOBBY CONGRESS TO SEE THAT THOSE THAT DO THE DAMAGE MUST PAY THE COST. I AM ABOUT 95% SURE THAT THESE DAMAGES ARE ALREADY COVERED UNDER PRESENT TORT LIABILITY LAWS.
Full program	It doesn't make sense to me to not repair the damage, although I think if possible the person responsible should pay.
Current program	No comment.
Current program	I am completely fed up with government using part of my tax money to run programs that have no benefit to me or my family.
Full program	\$130 / year will not make a huge difference in my life. However, this assumes no other programs will be funded with additional taxes. If very many such programs were added, I would probably feel very stretched and frustrated, especially if I am being ta
Full program	The coral reefs on this planet are among the most diverse areas for life. Our actions are reducing diversity in all areas. We need to change this by instituting programs such as described here.
Ship repair program	The reef project should have been brought to life, way before asking for more tax money, from the tax payers. There is becoming too much emphasis on needs for taxes to increase, to many reasons "Now" that have been discovered.
No-fishing zones program	Let nature repair the damage.
No-fishing zones program	there is no right answer. if less fishing is allowed it would decrease ship accidents and leave a window of preservation for our future generations to consume and enjoy for many years to come.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	WE need to fix what we as humans have destroyed.
Current program	I'm from MI. we don't have jobs here,because of auto industry gone.
Full program	not alot of money to protect the reefs, they are very beautiful
Full program	We must do everything we can to protect the environment. But those who use it and damage it should be the ones to pay for it. There are environmental issues all over the world and each person should help in their own areas.
Current program	this is not a government involvement issue
Current program	DON'T WANT TO PAY ADDITIONAL TAXES
No-fishing zones program	The cost is less.
Ship repair program	spend the money on the repair, instead of spending money on drugs for the people that never heal. the reels would in time.
Full program	Both made sense to rebuild this ecosystem more quickly
Current program	this is almost as ignorant as it gets. The government, which is always running in the red and cannot make an intelligent decision on most things wants to now stick its nose in this part of our environment. Too bad it does not care for pre-born children
Full program	We need to fix this planet. I really believe Hawaii should fix this mess they created without federal help.
Current program	I feel the current program protects enough of the reefs, fishermen need to make aliving.
Current program	We are currently unemployed and are already in the 38% tax bracket.
Full program	The Beauty of nature is transcendental
No-fishing zones program	Cost seems very high
Full program	If the cost per year is only \$150. per year it is minimal for the the program with the greatest benefit
Current program	I don't believe I have enough information to conclude that it is the Federal Governments responsibility to do more from the general tax base.
Current program	cannot afford any more taxes right now
Full program	because it helps take care of the problem
Full program	we need to protect out enviroment.. we are detroying the planet and as in inhabitants we are charged with protecting it and fixing the problems we cause.
No-fishing zones program	To repair an acre or so is relatively expensive for the benefit. The area would repair itself eventually.
Full program	I love to fish and if you dont protect there habitat people like me wont get to enjoy all that fishing has to offer. I will pay a little more to protect the sport of fishing for my kids.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Reducing the fishing will also help minimize the ship damage to the reefs and is not introducing potentially unfriendly coral artificially into the reefs. Cost per household is minimal for saving something so important.
Full program	The cost is not that much and i think it is the best program possible . you pay for what you get
Full program	The reef system is a vital part of the ocean ecosystem...
Current program	again knowledge and not money. restrictions would work fine. just like planting a crop rotate.
Full program	I just think it is the right thing to do. The cost of the program should be graduated so the wealthier taxpayers should pay the bulk of the extra taxes.
Current program	It is the only program that seems not to want to increase federal household taxes, which i am against
No-fishing zones program	It seems it would be the most cost effective plan while protecting marine life.
No-fishing zones program	It seems to strike a balance of ecological, and financial needs
No-fishing zones program	The Cost/Benefit consideration for the reef repair not not provide and adequate return on investment (my opinion).
No-fishing zones program	Reducing overfishing seems like a reasonable approach.
No-fishing zones program	It does something rather than nothing but costs the lest, (other than 0 spent on changing nothing.) Hawaii should cover most of the expense to save their reefs.
No-fishing zones program	no fishing zones appears to be the most effective and most economical plan to make a difference.
Full program	we can greatly reduce foran aid ,and take care of our own needs
Current program	not willing to pay more taxes
Current program	money to be spend on other thing more important
Current program	Our household, with the state of our nation's economy, is not able to give up \$75-200 with of taxes right now for this program.
Ship repair program	Cost, I would prefer the full program but other federal programs regarding health and human services are more important
No-fishing zones program	seem like a reasonable cost benefit approach. The 5 repaired acres of 300,000 acres of coral seems expensive on a relative basis.
Full program	Coral reefs and the sea life that lives in them seem to be an important resource both biologically and economically. \$100 a year seems is a small price to pay so that visitors can continue to enjoy the reefs and people can continue to make their living f
No-fishing zones program	Increasing the amount of no-fishing zone area would seemingly result in less boat damage longterm anyway.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Currently my household is run on a tight income schedule. I like the other programs as well and would like to do more, but I don't think financially my household income can support that.
No-fishing zones program	because at this time the economy is in a sad shape & families are having a hard time feeding themselves.
No-fishing zones program	with less fishing there will be less damage
No-fishing zones program	The increase from no-fishing zone to ship damage repair seems extremely steep. I would support it if the cost didn't seem so high...multiplied by each household that seems to be quite an expense. I do support having ships pay for their damage.
No-fishing zones program	I think this program will be the program that will be supported in our current times.
Current program	I refer again to the fact we , the tax payer are burdened enough with over spending by the gov't alternative solutions need to be found
Full program	I think its a win win for coral, marine life, fishing etc.
Ship repair program	compromise - mid range
Current program	If Hawaii people want to save their coral reefs they should pay for it themselves.
No-fishing zones program	Moderate cost with slow but eventual regrowth of ship damaged reef.
Full program	we can protect our corral life better before its to late
Current program	Money spent on other programs will not be available to address other issues, such as education and health care, which I feel are more important.
No-fishing zones program	I think letting nature take care of itself the way it intended without man over doing everything like we do for the almighty dollar will be best.
Current program	I believe the State of Hawaii should be allowed to handle the problem instead of the Federal Government.
Full program	the cost per year is small for the tax payer and would help to improve the environment.
Full program	I think it is important to protect this valuable habitat. \$245 per household does not seem like too much money to protect a sensitive habitat that cannot be moved or created somewhere else.
Current program	It is the least costly to US taxpayers.
No-fishing zones program	I thank the country is in a terrible debt situation now and we do not need any more debt added to the budget.
No-fishing zones program	Loss due to ship accidents not significant enough to justify the cost.
Full program	Having visited the Hawaiian Islands and seeing the beautiful reefs and knowing how important that is for the tourists and how important the fishing business is to the islanders, both must be protected.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I feel there are more important things to spend our tax money on.
Current program	this island belong to Hawaii people, they need to take care of there island themself
Ship repair program	cost to people
Current program	I am for anything that doesn't generate an additional cost to tax payers.
No-fishing zones program	cost
No-fishing zones program	It is the most cost effective method of improvint the health of the HI corral reefs.
No-fishing zones program	With a knowledge of how the Federal Gov spends money and mandatory \$ amount required I felt the no fishing was best. I really can't afford any more taxes, My state wage is about 50% of the federal wage for exactly the same job. Federal money to State m
Full program	pres obama and our government can increase our spending x4 in 3 mths on bailouts w/out any plans for payback...at least this money spent would go for some benefit!
Full program	There are very few, if any, environmental programs I do not support. The Earth has taken care of life on this planet since the Big Bang. The Human Race should have been taking care of our planet all along, but we have not. It is past time for us to mak
Current program	tired of taxes
No-fishing zones program	Reefs will regenerate in time, marine life needs more immediate help.
Full program	I'm all for what helps the enviroment and wouldn't like for the fish and other sea life to be gone someday.
Full program	I have seen first hand the decline of the reefs over the last 20 years
No-fishing zones program	I think that if a portion of the coral reefs are protected at a cost that people will tend to take better care of what they have rather then spending more money. If the coral reefs aren't protected even after a smaller fee is imposed on the public then t
Full program	we need to do all we can to protect our environment.... it's that simple..
No-fishing zones program	With the Northwest section protected, believe that the Main Islands should be protected from overfishing but that ship damage should be paid for by whoever caused the damage, whether by company or insurance which could be required of all ships entering po
Current program	other things more imporent.
No-fishing zones program	It's important to look at the whole effect of losing the coral reef. The loss of fish, and the sea creatures. It is all interconnected.
Full program	protect and preserve
Full program	man upsets the balance of nature...man must realize the consequences of what he is doing; cease those behaviors; repair damage if possible and prevent future imbalances and destruction
Current program	More government control, puts people out of work and we are taxed enough as it is.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	We as tax payers already pay out to much.
No-fishing zones program	I didn't choose the full program, because unless ships stop coming to HI, there will be a constant maintainance of the repairs, year after year.
No-fishing zones program	The most pressing problem right now is the decreased number of fish. Possibly in the future the reef can be repaired, rather than throwing the whole charge at us now, when our taxes are already going to increase to repair the economic system.
Current program	State and contributions from residents of Haw. can pay for it.
Full program	I really want them repair, I'm just not sure if we should foot the bill. I support the restoration of the reefs. I believe the govern of the reefs are essential. The current protected acreage will not alleviate the current ravish of the corals. Even as
Current program	I don't want to pay more taxes and the Federal government does not have the money to increase spending. Just like a household, if you don't have the money, you make spending adjustments.
Current program	Don't want to pay any more taxes.
Full program	Even though our taxes would go up I strongly believe that money should be spent to save the coral reefs.
Current program	I believe the state of Hawaii should make and pay for which program they prefer. It should be the states decision to decide which they prefer, fishing, tourism, or preserving the environment.
Current program	cost to taxpayers
No-fishing zones program	While it is more expensive than fixing the coral, I believe the no fishing zones program would be the most effective for the money.
Full program	I have been to Hawaii and it is the one place in the US that is not comercialized and I would like it to stay the way it would be if we were never there in the first place.
Ship repair program	I think this reasonable to protect our beautiful reefs
Full program	I put a high value on protecting coral reefs and marine environments. Beach vacations are the ONLY type of vacation that I ever go on. I'm a certified SCUBA Diver. I've seen coral reef decay first hand. It's very important to me to do anything I can t
Current program	Fix encoms , Low & midel class are tax to much ,inserince up , gas up ,state and local bugites a shambels. those tax's are gowing up. JOBS ,ECNOMEY. HELOE CAN YOU SEE US NOW.
Full program	It is important for us to protect our planet, in all ways, in all areas. It is part of our responsibility to our future generations.
Full program	It would make sense to try to restore as much as possible of the coral reefs for future benefits. Why can't the gov't review & cancel some obsolete programs to make room for new ones.
Current program	American people don't have the extra money to pay extra taxes for something that we will not benefit from by not living in that state. We're taxed enough.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	The amount listed is a small price to pay to restore human damage to the reefs. If we lose the reefs, there will be major catastrophic ocean changes.
No-fishing zones program	Still some protected with little cost from me and repairs did not seem too productive anyway.
No-fishing zones program	you get the most bang for your buck
No-fishing zones program	As the marine life grows the reefs will repair their selves naturlly
Full program	I wouldn't notice \$110 missing and it would help protect the fish.
Full program	A coral reef is an entire world of its own. I don't think \$200 to help preserve them is asking too much.
Current program	sPEND NO MORE MONEY
Full program	This would cost me about \$12 monthly and that is little to protect an ecosystem in danger.
Current program	Because it cannot be an ethier or choice all possible alternatives must be explored.I'm not against the programs just the way funding is proposed.Many tourists come to the islands.Useage is the leading factor of the deteration of the coral reefs.A foot p
Current program	people that damaged this reefs should pay for them not taax payers that never go there
No-fishing zones program	you get the most bang for your buck so to speak. however, i still think to get everyone on board with a program like this, you should change the 25% to 10%or 15% in the beginning of the program.
Current program	our taxes are high enough already
Full program	Protecting and maintaining the earth's ecosystems is important even if we may never visit that part of the world. I leve in the Great Lakes water shed. Twentyh percent of the world;s freshwater is here but most of the world will never visit here.
Full program	AGAIN I BELIEVE WE NEED TO TAKE CARE OF THE REEFS BECAUSE THEY ARE A PART OF OUR FOOD SUPPLY IF WE DON'T TAKE CARE OF THE THEN WE WILL RUN OUT OF FOOD.
Current program	I don't know
Current program	I have very little travel or "investment" in Hawaii waters.
No-fishing zones program	I think with the no fishing I would get the biggest effect for cost-the ship accidents are hard to find the guilty party and I may be held to more cost and it sounds like accidents will continue to happen
Ship repair program	so we dont pay any more taxes but protectthe program in place
Full program	There will be more fish in the ocean.
No-fishing zones program	As indicated before the cost of the reef repair may be allocated through additional surcharges and taxes related to marine activities both individually and commercially. In regards to the increase in the no fishing zone, a more the adequate portion is sti

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	Natural resources should be protected at all costs. We have only one planet and we should be more responsible in taking care of it.
Current program	MN State and federal taxes are already through the roof! Our family cannot afford more taxes, despite the fact I believe God's creation and the eco system need protection.
Full program	Feel we need to do all we can to help the environment.
Current program	It requires no tax increase or borrowing, and employes no additional bureaucrats
Current program	national debt is too high now.
No-fishing zones program	I felt it was better than doing nothing. I was not convinced that repairs could be enforced or sustained as easily
Current program	I don't want to pay additional taxes to fund this program
Full program	Right or wrong, I feel my tax dollars support all manner of programs that are unnecessary and/or waste countless dollars paying overinflated prices for items to run these programs, ect.
No-fishing zones program	it seems like the most doable at this time
Ship repair program	I feel this would lessn furthr loss as we learn more of what is critical to protect the ocean without too much cost financially.
Full program	The last option is the most hopefuland I think we had better start acting responsibly toward our planet.
Current program	People or companies that damage should be found and made to pay. The average tax payer should not have to pay at all for anothers ignorance.
Ship repair program	It depends on the damage and who responsilbe.
Full program	Without a comprehensive approach to repairing the damages done to the reefs, they will continue to decline; we may only be slowing that decline by this approach, in any case.
No-fishing zones program	25% is reasonable and I have witnessed the decline in sea life in Hawaii over the years.
No-fishing zones program	fish can be caught further away from the reef and maybe they can find a different route to travel back and forth and not go near the reefs and not have a many boat accidents to the reefs
Full program	Coral Reefs are an amazing and beautiful part of the world that which have existed way before humans arrived. It would be unthinkable not to prevent more damage to such a wonderful living ecosystem. There should not be a price tag associated with regulati
Current program	Cannot justify taxes for a program like this when there are so many other urgent things that need the money
Full program	Why not protect 100%??

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	It is important that we protect our coral reefs and stop over fishing. The reef repair is maybe not as essential, but we should try to ensure that the area of reefs is not declining from year to year. Especially if man is responsible for the damage, we
Full program	coral reefs are vitally important to the ocean's ecosystem and thus we should do whatever we can to protect them because once they are destroyed they won't be coming back and it will be a tremendous loss to the environment.
Current program	SAving the reefs is very important, but when ever the Federal Government gets involved the wasted money is incredible. The idea that it will cost each American household anywhere from \$95 on up with what, nearly 200 million households in the US, a year is
Current program	State of Hawaii should provide the money to take care of the coral reefs
No-fishing zones program	It makes sense to protect from overfishing, as it is likely to pay off in the long run with more fish in the future. The cost to do both programs is too much and those who live in the area and use the area need to be willing to solve that problem without
Ship repair program	As with most people, adding extra taxes to our current tax woes doesn't help us. I'm sure this is important, but most can't afford anymore taxes added on to what we already pay!
Current program	As I said above, think Hawaii should pay for its coral reef repairs as the other U.S. states do. Hawaii alone will reap the rewards from tourists, etc.
Ship repair program	no
Full program	I feel we need to act now to ensure our worlds future. I hope we leave our children & grandchildren the rightkind of mesage!
No-fishing zones program	no-fishing is 25% for \$170 versus 5/300000 (very small percent) for \$95
Full program	Program costs will be worth the protection of the reefs for later generations.
Full program	Because I'm a scuba diver and the protection of the reefs is very important to me.
Full program	nature made it - man destroys it . I think if nothng history has shown once something is gone it is lost forever.
No-fishing zones program	given the status of our economy. As much as I would like to help with more I must consider my yearly income and taxes paid.
Current program	there are more important isses I would rather see my money spent on, even though I do see the benefits of trying to protect these coral reefs.
Full program	I think the program is important. I also think that alternatives to expensive federal programs can eventually be found that may reduce the tax burden without negatively impacting the effects on the reefs.
Current program	people need to learn to leave things alone.
No-fishing zones program	The shipping companies should be held accountable. All companies that want to use that body of water should pay a service fee.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Government should not spend money on coral reefs, or limit people's use with no-fishing zones. Government needs to stop wasting its people's money on "NOTHING".
Full program	\$135 is not that much money to fix this problem and I would have no issue paying it.
No-fishing zones program	In a time of recession and historic job loss, the cost of the No-Fishing Zones, per household, is moderate when compared to the Full Program, and the impact of No-Fishing is greater (and more immediate) when compared to the Ship Accident Repair proposal.
No-fishing zones program	Cost boaters causing reef damage should pay for that, collect what money you can and use it to repair what you can-the cost for 5 acres seems HIGH per tax payer A no-fishing zone would protect those areas and wildlife would benefit
No-fishing zones program	The cost is not so high that it would effect my budget. The total package would.
Current program	the government is spending to much money already
Full program	It's important, but I still beleive that the costs incurred from ships accidents to repair the damaged reefs should be on the shipping company.
Full program	Beacuse it seems to be the most effective
No-fishing zones program	As I understand it, it would be a much more effective use of our tax dollars to protect the coral reefs.
Current program	People are taxed to heavily now. With the economy so bad. The state of Hawaii needs to allocate money itself for protection and rehabilitation of their coral reefs. It is very important, but I don't feel every taxpayer in America should pay for it.
Current program	i am on a fixed income and careful about adding expenses to my life.
No-fishing zones program	I am willing to pay less than \$100. I hope that with the no fishing zones program that fewer ships would damage the coral reefs.
Full program	This is a very minimal amount to pay to protect the coral reef for our children and grandchildren to enjoy.
Full program	Need to keep repairing the damage to the enviornment. Reckless actions don't fix themselves.
Current program	can't afford more taxes.
Current program	none
Current program	I do not live in Hawaii. Add that 135 on the tourism tax.
Full program	We, the Government, give approximately 200 Million each year to several countries in Africa; i.g. Chad, and they have not improved one bit. Only the war lords see the money. If we can WASTE money like that we can surely spend money on something for US t
No-fishing zones program	Like the idea of protecting and encouraging more fish. Ship damage seems minimal and often ships are sunk to help reefs grow and establish themselves.
No-fishing zones program	easy soution

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	Fishing and shipping should pay all the cost for increasing non fishing areas and restoring the reefs.
Full program	\$145.00/year is a reasonable price to pay to protect the eco-system for future generations.
No-fishing zones program	It increases the amount of fish to be caught
No-fishing zones program	When we have more fish and damaged zone should be able to recover faster
No-fishing zones program	more acres protected
No-fishing zones program	We must protect the coral reefs and I thought that people in general would find it easier to support the No Fishing Zone program. When you ask too many things people tend to not do anything even though they may support one thing.
No-fishing zones program	allow the coral reefs and fish to multiply and re-establish themselves
Full program	It would increase more fish. It would help the environment. Everything is like a cycle. If we break a cycle then things start dying and out of order.
Full program	I believe NOT doing the maximum to protect the coral reefs will be far costlier in the long run for both recreational users of the area as well as commercial users. The commercial fishing and tourism industries both rely on the healthy ecosystems in Hawaii
Full program	The first two plans were meaningless and the last plan was only \$10 more a year than the next choice.
No-fishing zones program	because \$300 a year is a LOT, but what \$170 a year can do to help the environment is a LOT too.
No-fishing zones program	There would be more no fishing zones. Let the boaters that damage the reefs pay for the repairs. Put a tax on boaters.
Full program	Nature needs all the help it can get in regard to human damage.
No-fishing zones program	TO IMPROVE MARINE LIFE
Full program	b/c the health of the oceans is imperiled and efforts to restore coral focus energy in an area that needs our full attention. The oceans are becoming so acidified the corals and other shell creatures are in danger of dissolving. I would rather my tax do
Current program	Surely there are more alternatives to solve this problem. I am very concerned when we offer to give our government more money to throw at problems.
No-fishing zones program	Gives the most impact per dollar spent.
Ship repair program	the cost

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I think you are taking the wrong direction on this. The fishermen who want to fish in the area should pay and the ships who use the area (dock in the area) should pay for damage. I buy a fishing license each year to pay for costs of the program which wo
Full program	It is my impression that the coral reefs are an absolute, essential component to all life forms and it reflects another way to foster an ecological balance in our waters which has been seriously damaged over the years
Full program	we need to preserve and repair our coral reefs for future generations to enjoy
Ship repair program	no comment
Current program	I am struggling as it is now. I would love to help but don't think I can
No-fishing zones program	Prohibit commercial fishing, which does the most harm. This will allow the system to grow naturally. Perhaps prohibit a greater percentage.
Ship repair program	helps repair damage in less time
Current program	no comment
Full program	For my economic circumstances, \$215/year extra (< \$20/mo.) seems pretty cheap to protect what I consider a very important resource.
No-fishing zones program	The expense of reef repair does not seem justified at a cost of \$115.00 per year times approximately 111 million households in the U.S. If the reef can repair itself in 50 years and about 5 acres each year are damaged, then only at most, 250 acres would
Current program	JUST FORGET THE WHOLE THING!
No-fishing zones program	I feel that program would best serve the Hawaiian coral reefs without adding too much of a tax payer responsibility.
Full program	I have only heard a little about the impact of coral reefs on marine life and our (humans) lives as well, but I understand that it is a large impact, and I know the importance of preserving and conserving nature. While there is a doubt in my mind as to wh
Full program	when you do more you get more
No-fishing zones program	larger no-fishing zones will allow the reproduction process to be more naturally fulfilled.
Ship repair program	The cost was in the middle range and would allow for reef repair that would aid in faster recovery time for reef injury.
Ship repair program	Tax increase to my household
Current program	no more tax increase
Current program	We face many many more tax-spending issues than this. Our wages are worth less and less, and actually CUT 10% this year. We can't afford all this, we live paycheck to paycheck and barely manage monthly expenses.
No-fishing zones program	No fishing zone will bring about population increases in marine life, also less traffic in these areas might result in less coral damage, in this area. In the mean time local govt. can pay for the coral repair and study the no fishing zone impact on coral da

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I pay more than my fair share in taxes every year. I am not willing to pay additional taxes until something is done about the current government and it's out of control spending.
No-fishing zones program	will benefit future gen.with moderate cost
Current program	Money.
Current program	There are so many expenses our country needs to pay towards. \$110 a year per family for just that one need is a lot of \$
Full program	I am not fearful of new taxes. I think we need to look at the big picture. however, I have more income than most. and no dependents that I need to support.
Full program	because there is no reason, why not to use all resources available, to curb this problem.. our earth should be top priority
Ship repair program	The cost is something I could afford and it is doing some good that is helping the efforts in some way.
Ship repair program	Cost impact. Do not like the idea of having to travel further to fish.
No-fishing zones program	reasonable compromise. perhaps other areas of greater cost could be reexamined to provide assistance.
No-fishing zones program	No fishing zone- To me it would be the coral reefs to have a better chance to increase in the animal life. the ecosystem would have a better increase in life . I am sure the noaa will have other changes in the next 10= yrs.
Full program	It seems like the best solution
Full program	you still need marine life as it also helps our enviroment and the coral reef provide protection for smaller fish and it is also a food source
No-fishing zones program	What prompted/stimulated this survey instead of comparable survey for other geographical regions of similar concern ?
Current program	put a 1%tax on the tourest people I can't afford any more money from my household
Full program	We are only Visitors on Earth.
Ship repair program	With the economic decline of our country, these tax dollars can be put to better use in an economic stimulus plan or other program that will help those who are suffering. The reef program is a worthwhile cause but a luxury most of us can not afford during
No-fishing zones program	For \$45 it seemed to have a better payback than the repair option. Most people will not want to pay the \$130 for the full program and the proposal would fail. I did not realize the programs would cost us that much.
Full program	Seems like the way to do this is all or nothing
Current program	Cost savings, the frequency of visits to Hawaii, and subrogaion should be sought out from the ships ins co.
Full program	it helps to increase marine life and shorten time of repair

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	It's Hawaii's problem. People that live in desirable areas should pay higher costs - they get a better return in quality of life. They have beaches, climate, scenery, better leisure time choices and sports options - many more things than someone in the
No-fishing zones program	minimize taxes
Ship repair program	My previous comments indicate my interest in doing "something" to aid the program but I cannot do or commit to do something that for our standard of living would put additional hardships on my family
Current program	Not that I don't care about the coral reefs, but it bothers me that someone like me has to help foot the bill for things like damage caused by someone else, or by an industry that continues to misuse and overfish the waters.
No-fishing zones program	To save and enhance marine life.
Full program	I am a scuba diver, and know from seeing other sites where coral reefs have been destroyed, that if you wait too long to help in the recovery of the reef, it cannot be done. It seems like a VERY reasonable cost to taxpayers to make these improvements. F
No-fishing zones program	No comment.
Current program	don't care
Current program	Now is not the time to increase spending on programs that may hinder the jobs of people in need. How many people are you willing to see go hungry to repair coral damage? It appears that the existing programs are working to preserve the other islands alre
Current program	We are already paying way too much taxes in this country. Illinois is one of the highest tax states in the country. They are hiking up the income taxes again very soon.
Current program	As I said earlier, We are being TAXED ENOUGH right now-Although I do care about the natural environment that GOD gave us...
Current program	Again - bad timing now to be asking for money when our country is struggling with larger issues.
Current program	because we need all our household money to live on. Our tax dollars are more important for other things that the coral reef program. Example, health care for elderly & others.
Ship repair program	I feel it is a good alternative to help start the repair of the reefs without too much stress on households.
Ship repair program	This one seems to be a happy medium that is neither the least expensive nor the most expensive. I really don't feel that most Americans would miss that amount of money over a years time.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I think environmental issues are very important, however, in these tough economic times my household can't afford any additional tax burdens. Especially ones that benefit a particular state. Sorry.
Current program	We don't have enough money to pay for all the programs right now. How can we, in this current economy, commit to spending more of OUR money???
No-fishing zones program	cost
No-fishing zones program	I think the cost are way off, if it cost \$95 per house hold, per year it would be billions of dollars. I chose the fishing protection brather than reef repare because i feel the reef repair was not worht hth cot / benefit.
Ship repair program	I can afford. It may not fix the problem but the problem didn't occur over night.
No-fishing zones program	Ideally, I would love to do the whole thing, but realistically I must choose the program I feel will do the most good for the \$\$ I can afford.
Full program	Environment is an important investment to me
Current program	sounds like a good plan
Full program	Because money spent will likely have the biggest positive result and would likely eliminate additional dollars needed later if it is done in half measures. Quite honestly grow some balls and make a goddamn decision and stop pandering
Full program	The reefs are priceless resources that must be protected at all costs
Full program	In the long run, the Full Program will benefit our children and grandchildren. We may live to see it, but we owe our children the ability to see this type of marine life.
Ship repair program	I can participate at the cost level and hope that repairs will aid in most areas
Current program	IF 5 acres/year are destroyed and it takes 50 years to restore itself, a maximum 250 acres of 300,000 acres is destroyed or under various stages of recovery at maximum destruction or 8/10,000s of the coral reef,e.g., there is no risk to the destruction of
No-fishing zones program	I believe it is the most workable program and one thatwould show results very quickly.
Current program	Private donations should be collected for these types of projects, not taxing people more.
Current program	The citizens and business of this country are always looking to the government to bail them out of everything. As citizens we do have to take responsibility for our own actions; such as ship owners paying for the damage they cause to the ecosystem. Also,
Full program	I believe the coral reef system has a significant impact on the environment and we need to do all we can to protect it.
No-fishing zones program	this program will help all of the reef be restored to it's natural state over time; as well as ship scars heal more quikly.
No-fishing zones program	the no fishing program seems the wisest choice

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	For the amount the Full Program would cost, this is little hardship on my part for a program that will do so much good to the Hawaiian ecosystem.
Current program	The state of Hawaii should be financially responsible for any program that directly and solely benefits the state.
No-fishing zones program	if you slow amount of fishing you will decrease the amount of boats therefore hopefully reduce ship/boat damage to reefs - its aplace to start
No-fishing zones program	The best value for the dollar spent.
Ship repair program	It is the least out of the pocket for taxpayers
Ship repair program	If you protect 25% more of the Hawaiian waters, fishermen will then over-fish in the remaining 74% of the waters and the 25 % won't really make much of a difference. If you repair the reefs then you have a better chance of collectively helping the ecosystem
Ship repair program	IDONT HAVE BUT I THINK THAT IT WOULD BE GOOD
Ship repair program	The amount of money yearly and 10 years.
No-fishing zones program	Cost
Full program	for a little bit more money more area will be saved
Full program	Many people pay high taxes for things they have no idea about. This would actually be something worth spending the money on, and it's proactive. At least for me it would make me feel better about myself, knowing I'm helping out our environment.
No-fishing zones program	I wonder if there might be alternative ways to reduce ship accidents that typically occur.
Full program	once the coral and fish are gone it would coast much more to bring them back then to maintain them now
Full program	i am a scuba diver and earn a good living
Current program	I believe the state of hawaii should pay to limit fishing.
Current program	No one in right mind would agree to pay more taxes to the fed. Would this even be necessary if you stopped giving up foreign aid to countries that don't need it and sustaining and unsustainable global empire? Of course not. The fed doesn't have our intere
Full program	Doing nothing means eventually the coral reefs will disappear. \$160 spread out over one year averages less that 50 cents a day. It will ensure the Hawaiian Islands stay healthy and beautiful for future generations to enjoy.
Full program	It offers the highest protection and the cost per year is not that high per family
Current program	The government should foot the cost of this repair. It is their lack of regulation that has lead to the unwise destruction on the coral reef. They should foot the bill at NO cost to the tax payer living in the United States and not Hawaii.
Full program	Offered the most protection available

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	If the no fishing zones are increased then reef damage should be declining in at least those areas.
Ship repair program	keep the beauty in Hawaii and 50 yrs is a long time with out repair.
No-fishing zones program	I feel it would benifit the reefs more than the full program and would be reasonable to the tax payers
Current program	The American tax payer cannot pay for every states problems. Small states, like my own, has it's own problems to deal with. We pay enough taxes. The government should not expect the us to try to fix every problem.
Current program	I pay enough taxes.
No-fishing zones program	I just really dont understand it
Current program	We can't afford any new taxes at this time.
Full program	because it protects the coral reef and it gives it treatment
No-fishing zones program	Over fishing is a problem all over the world, if it is checked then mother nature can still recover. Go after the people who exploit our natural resourses and not the rest of the population.
Full program	Get done and move on
Current program	With all the other problems in the states - war, crime, education - we should put our money toward those situations.
Current program	I don't think tax payers should have to pay for this.
Current program	I really don't want my taxes to go up any, will people in Hawaii vote to improve the eco-system in ND if we need help here? It seems selfish, but I think that is most people's nature.
Current program	BECAUSE OF THE COST INVOLVED
No-fishing zones program	By choosing no-fishing zones, there would be less to repair from damage by ships.
Full program	hawaii, and coral reefs, are wonderful natural areas that "progress" seems to be irreparably f*ing up. they are worth saving within reason "as are"--however, access to the public needs not be limited, such as can happen w/ caves(understandably)
Full program	We have to think to the future and saving this ecosystem is a step towards that; we cannot just think about money fishermen are making now; man is nature's greatest barrier and cause of extinction in species and I don't want to be a part of more damage to
Current program	Family and friends are out of work at this time.
Current program	This program is too removed from me. There are more pressing problems closer to my home.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I chose the No-Fishing Zones Program as my most preferred because the sooner the fishing is stopped the faster the coral reefs can repair themselves, and bring back the healthy coral life. Also, no-fishing zones means no boats which can damage the coral
Current program	the waste with these type programs and the current financial condition
Full program	Must maintain coral ecosystem
No-fishing zones program	more would be protected, in which i find to be important. The more we are able to protect the more we can preserve and manage the beauty of the ocean waters.
Full program	for \$75.00 ( hopefully per year ) the cost is well worth it for the benefits. We spend much more for a dinner nite out. So eat home one of those nites.
Current program	There are probably better ways to fund this program than by taxing citizens on the other side of the world. Why not tax the recreational and commercial fishermen? Why not tax the ships and boats that come and go from the Hawaiian Islands?
Full program	we have been neglecting our environment for a long time if we were on top of this from the beginning we wouldn't need these extensive programs
Full program	while I don't like to spend my tax money to help areas that I may never visit, it is for the betterment of everyone across thne country
Current program	can not afford any higher taxes
No-fishing zones program	biggest bang for the buck
Full program	i believe that many of the earths most beautiful natural wonders are slowly being destroyed and we need to do all that we can to keep these things safe for future generations to enjoy
Full program	Congress needs to do something to protect the coral reefs. They should go thru and eliminate some of the stupid things they are spending our money on.
Current program	no more government waste.....we can't afford it.
No-fishing zones program	Believe reef repair could receive funding from levy on all ship/boats utilizing the USA territorial waters surrounding the State of Hawaii. Those responsible for the damage should foot the bill for repair. ~\$150 per taxpaying household in the US is a
Ship repair program	Middle of the road
No-fishing zones program	I feel it is important to maintain more coral reefs instead of the current 1 %.
Ship repair program	``I THINK THIS IS THE BEST WAY
Ship repair program	This questionnaire is patronizing.
Ship repair program	I like them all, but money is a factor
Full program	I am not at all opposed to paying taxes for worthwhile goals. I believe in the maximum utility of social programs.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I believe fishing causes the greatest harm to the largest area - as opposed to the shipping accidents, which is much milder in comparison.
Full program	It makes the most sense. Spending the money now will save money in the future.
No-fishing zones program	As it may hurt the fishing industry at first, the fish will return in larger quantities. Meanwhile, if the areas continue to be overfished, the quantities will continue to decline, eventually hurting the fishing industry permanently. \$75 a year doesn't se
No-fishing zones program	It makes sense to protect more of the reefs (from future injury/fishing) but it is really expensive to inforce it!
No-fishing zones program	It's better than the current program and costs the least for taxpayers
Full program	I believe we have to work on many fronts to repair damage to our environment that has been caused by greed of human beings. When we start spending our money on Mother Earth and her children rather than bombs and war, the entire planet will be safer and mo
Ship repair program	have you ever seen a coral reef
Full program	it gives the most protection
Current program	don't want to pay \$110/year for other choice
No-fishing zones program	No fish zone will help maintain and increase fish life ect. It would also be the natural way in maintaining the coral reef versus "man made" repairs.
No-fishing zones program	I would actually prefer the Full Program but didn't because of costs. i can imagine there are many other environmental-type programs in this country that need our support. There is a limit to my financial support.
Full program	Restoring the reefs is most important to our ecological system and has many benefits for the enfronment
No-fishing zones program	best taxpayer dollar for overall result
No-fishing zones program	Based on John Stuart Mill's and Jeremy Bentham's "Greatest Happiness Principle": The greatest happiness for the greatest number. Five acres of repair in the grand scheme of things is not that much acreage. If it could be accomplished by collecting from
No-fishing zones program	It seems to offer the most protection for a reasonable amount of money.
No-fishing zones program	if there is no fishing there are no boats and there would be no accidental injury to the coral.nature would take care of the situation.
No-fishing zones program	it is at least a start to helping with saving the coral reefs
Full program	minimal cost vs most benefit
No-fishing zones program	Doing something is better than nothing and do not want to continue on the current path. The cost does seem rather high just to enforce this program.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I think that the percentage damaged by ships is insignificant, but a no-fishing zone would be beneficial and have a substantial effect.
Current program	The govt is spending money they don't have. They are taxing us to death. My pension is half of what I worked hard for. It would be nice to improve the corral reefs but the govt has messed any chance of improvement
Full program	Corral reefs form a basic ecosystem that underpins life and biodiversity in the coeans.
Full program	I believe that the ecosystems of the ocean and coral reefs are important to the survival of aquatic live, thus are important to everthing outside the oceans. I would also like to have my children and great grandchildren be able to experince the beauty of
Full program	The reefs are very impotant on many levels. This area must be protected and that protection will come at a cost that I am willing to help with...
No-fishing zones program	no fishing zone makes the reefs stronger and should also decrease the amount of boat damage to reefs. a healthier reef sould recover faster from remaining boat strikes
Current program	no taxes added to my current ones. If i have to pay more taxes I may as well quit work
No-fishing zones program	I would hope that measure would cut down on the number of ships in those areas as well, extending the benefit of the program
Current program	I personally could afford the \$200 top protection effort, but what about all the people right now who are struggling to get by? The economy needs to improve before we can ask people to commit to this. Maybe a very rich celebrity would throw some money a
Current program	i am for the full program, but no at a cost to myself. the government nexts to cut internal spending, and bank bailouts and use the tax money for the right things. taxes are already to high and the only people making out are the politians.
No-fishing zones program	because the coral reefs will repair itself in time and maybe by extending the no fishing zone less ships and vessels will come in destroying the coral reefs
Full program	would like the areas protected and repaired
No-fishing zones program	seems that cost of ship damage of reefs is not done by those who do the damage. In other words, I think the ships responsible for the damage should pay not others.
Full program	\$15 a month... People waste more than that on crap they do not need (sodas, cigarettes, junk food, etc...) I have no problem with taxes as long as I know that tax money is being spent on something important like the environment.
Ship repair program	Not as costly and decreases the repair of the reefs from 50 years to 10 years. That's a significant difference.
Current program	My tax money should not be used for coral reefs in Hawaii. There are other more important uses for my taxes.
Current program	I was bamboozled into the CURRENT PROGRAM choice... I commented earlier on severe penalties for violation of the 25% no fishing zones. Flooding the area with useless FEDS is NOT the answer.....

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It seems that this should be a state issue rather than a matter for the federal government. Any of these programs suggested will increase my federal tax obligation. While I would very much like to protect the coral reefs, I simply cannot afford to pay mo
Current program	already pay enough taxes for things that do not really have anything to do with me or the area i live in
Full program	We have to start repairfring our environment instead of continuing damaging it. The coral Reef eco system is part of our environment. I can forgo \$75.00 of spending a year.
No-fishing zones program	If money weren't so tight, I would have chosen the full program. However, I believe protecting 25% of the reef and allowing it to return to its natural state is important because it will allow that many more people to enjoy the true nature of a coral ree
No-fishing zones program	The no fishing program is the one I believe will help preserve and strengthen the coral reefs for the least cost, thereby getting more support. We have other much more pressing issues and I was looking for an alternative to the nothing approach.
Current program	I agree with no fishing zones but instead of 25% how bout 10% until our economy gets better. It's a start somewhere.
No-fishing zones program	most bang for the buck.
Full program	The amount of tax money spent did not seem like a whole lot, and programs to protect and repair the enviroment are important to me.
Current program	no cost shown
Ship repair program	All our household can afford in this horrible recession and HIGH gasoline prices.
Full program	To paraphrase Will Rogers, protect coral reefs, they ain't makin' 'em anymore.
Full program	After consideration, I have decided that my limited income would still be sufficient to allow this extra tax. Although I will not live long enough to see the improvement, it is time to start the healing process for the planet.
Current program	Although I understand the seriousness of this program, I also think there are far more programs needing our help, i.e. healthcare or poverty.
Full program	If we do not save and increase what we have now eveything else will also go.
Current program	I am not willing to pay for Hawaii's coral reef program. Despite the fact that I agree with the full program I am not willing to pay for it. My household cannot be expected, along with others, to take care of the problems of everyone. Obama wants to socia
No-fishing zones program	This one offers the biggest bang for your buck and is money well spent. The damage repair is wasted money, as 50 years for natural regrowth is a small amount of time with the big picture of life on earth.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Most easily-implemented action, most immediate and maximum result without high cost; use current laws to force companies to pay for damages or equip ships with safety devices.
No-fishing zones program	Price. Ship Damages should be paid by the shipping industry and the cost to the shipping industry paid by higher cost to the consumer.
Current program	no money now for food! I need the extra not taken out of taxes
Current program	I dont want to pay a dime that is not my problem
No-fishing zones program	cost effective for the amt. of protection provided to the reefs. more palatable than the higher cost option!
Current program	I don't believe the people should pay for it, cut spending in not needed programs and use the money from that
Full program	I believe we need to preserve our planet's ecosystems.
No-fishing zones program	It could easily and quickly be implemented (given funding), it would cover a much larger area than is currently covered (creating a bigger impact), and I believe the coral reefs need protection.
No-fishing zones program	to protect the coral
No-fishing zones program	more balanced between environment and commercial uses
Full program	This environmental situation is critical. I am one of this individuals that takes the tack that we do not pay enough taxes.If we are able, we should fund these programs.
Ship repair program	There isn't mich known about the Reef Repair Programs to give an equal amount of study.
Full program	I think protecting and repairing the coral reefs is worth the extra taxpayer costs. I think it is very important to have a good ecosystem in the coral reef areas around Hawaii.
Ship repair program	cost and reef repair
No-fishing zones program	I believe that if we keep fisherman out of the area, the reefs and fish will recover naturally.
Full program	My household consists of two adults. Our income is a combination of social security and teacher retirement for one of those adults. There is also a small income from teaching piano lessons. However, I believe so strongly that we need to restore our ree
No-fishing zones program	I am willing to aid in this effort, but I cannot afford the \$ in the full program. I feel it is more important to improve the overall health of the reef systems by limiting fishing than just fixing damaged coral.
Current program	it has work so far /

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	We cannot ignore fragile ecosystems just because they are not in "our" backyard. The destruction of an ecosystem effects all other ecosystems. We have a responsibility to take care of this earth for future generations.
Current program	i think it would be best for all involved.
Current program	I think the current program will work if the right poeple is running the program.
Current program	I don't want to pay any more in taxes.
Full program	i feel we need to help preserve our earth now so it is here for our kids and their kids to see its beauties.
No-fishing zones program	No fishing zone enforcement would help regenerate and protect several thousand acres of reef, far more then would be damaged or repaired under the more expensive program.
Full program	I feel it is a minimal amount to pay in extra taxes to keep,what I believe is an important ecosystem,"healthy".
Full program	Its too important the cost should be spread out though the year not all due at once.
Current program	It should be the ships,and the states project.
Current program	that seems like way too much money to me that could be spent on programs to help the people of the US
No-fishing zones program	in my opinion, damages done by overfishing and fisherman trawling the ocean floor are a lot graver than reef damages done by ships.
No-fishing zones program	ultimately, everything gets fixed - it just takes a little longer and takes less from my bank account.
No-fishing zones program	The No-Fishing zone will allow the ecosystem to repair it self.
Full program	For the cost it is the best plan. I spend more than that amount per year on items that won't last and benefit others.
No-fishing zones program	Marine life would be increased and more fish would be caught outside the zone.
Current program	govt pisses away enough money, no need to raise taxes
No-fishing zones program	The no fishing zone seems to give more protection for dollar than the complete program.
Current program	cost
Full program	The amount paid in one year seemed acceptable & helpful.
Full program	Just seems like best for the protection and rebuilding
No-fishing zones program	PEOPLE WILL NOT DISTURB THE REEFS.
No-fishing zones program	we need to protect the fishing zones so that we will increase the wildlife(fish and live coral) to help the ocean and its inhabitants

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	One has to maintain all manner of things from buildings, infrastructure, our health and that should include the health of ecosystems the support the natural order of our existence that relies on sources of the oceans bounty of food and recreation.
Ship repair program	Because it's a start. Also in the future there may be more efficient and economical ways to accomplish the overall goal of extending no-fishing zones while at the same time repair the reefs as accidents occur.
No-fishing zones program	Even though I would love to protect I also have to consider my family and the toll the economy has already taken with another huge hit it would devastate us.
Current program	we can barely feed the family and i think that the ships that damage the coral reefs should pay to have it fixed. If it is that big of a deal why don't they put up no fishing signs and boatings signs. we are unemployed and these democrates are worried abo
No-fishing zones program	If there are 125 million households in the U.S., at \$110 each simply to enlarge and then enforce no-fishing areas, that would be almost \$14 billion EACH YEAR. That would buy a really big enforcement fleet. I presume requiring insurance to pay for reef dam
No-fishing zones program	it just seems to be the most logical way of restoring the reefs naturally
Full program	It will be the best one for the protection of the food chain.
Ship repair program	I have gone snorkeling in coral reef areas and it is a beautiful site. As explained from this questionnaire, there is more to coral reef that meets the eye. I would like my kid's kids to be able to see the beauty of coral reefs like I have
Full program	I lived in Hawaii as well as growing up on the Gulf of Mexico. I am very marine life oriented and would not hesitate to pay to keep the coral reefs in their natural state.
No-fishing zones program	Provides a more active solution without the a very expensive price tag.
Full program	I think it is very important to protect our oceans. With out this precious ecosystem,there is no fish. I believe that \$75.00 is a small price to pay.
No-fishing zones program	Because what's \$45 a year? I don't know how it works, but I would imagine that fisherman would take quite a bit out of the reefs, since it's their job. I'd rather there be a limit, than to repair reefs.
Current program	There are serious health and welfare and safety issues which must be taken care of first.
No-fishing zones program	Cost. No fishing zones need to be inforced so there is an expected cost. Reef damage by ships should be charged to the operator.
No-fishing zones program	The No-fishing zone program is more cost effective and enforceable.
Full program	To protect and repair the damage we have caused.
Current program	Our economy is in a shambles. The federal government is spending us into oblivion. It won't matter what the coral reefs are like in 50 years, if our economy is not fixed in the next few years!!!!!!!!!!!!

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	The cost benefit is far greater with this program. A much larger area than 5 acres per year is affected for a reasonable cost.
Ship repair program	If the information is true, the Reef Repair program is beneficial for the future.
Current program	Man's just going to have to learn from their mistakes, and pay the price for their actions. These aren't the last, and we can't continue floating every ship in the harbor -- especially in these financially challenging times.
No-fishing zones program	with a no fishing zone u would then prevent the reefs from getting damaged and then yet preventing anymore cost to the taxpayer for having to pay for anymore funding to build more reefs
Ship repair program	Appears to be a middle of the road program. Resonable and helpful
Full program	I have stated before, that the coral reefs are part of a ecosystem the reaches far beyond the mainland of hawaii. I think that the Full Program will repair the damage sooner plus a larger area even though tax payers will be paying more money. Man is the
Current program	Currently we cannot afford anything which will cost the taxpayers more.
No-fishing zones program	The reefs need more protection and I find it real hard to believe that it will cost \$135/year/family for the repair program. Someone is definately inflating some #'s to benefit from this.
Full program	If our generation is the one screwing up the world then why shouldn't we be the ones who fix it. I am not in favor of having our grandkids fix the things that are being screwed up in our generation.
Current program	i feel the money they would ask for is far and beyond the nessesary need. i am very very skeptical of any more taxes of ANY kind ever being used right and the money really being in line with the need
Ship repair program	The cost was the main issue
Full program	We must accept the repsonsibility for being good stewards of mother earth
No-fishing zones program	I am willing to pay a little more in taxes to improve the health of the coral reefs but I think the government should greatly reduce it's wasteful spending of our taxes so that more money can be spent on environmental projects as opposed to ridicules bo
Ship repair program	It sounded like a good program without to much money taken from taxpapers.
Ship repair program	As I am retired and on a limited income I chose one of the least expensive even though I though it didn't do enough to save the reefs.
Current program	t learn more abot the state.
Full program	The most important objective to me is the restoration of the largest area of natural habitat as possible. Without this habitat, the rest of the conversation is moot.
Full program	We have to start to protect the Earth so that my kids and their kids can see all of its beauty.
No-fishing zones program	i think i didnt understand the question i dont think prohibiting fishing is a good idea
Ship repair program	Because of personal costs! Can't afford to pay more at this time !

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	It would only take 10 yrs to repair
No-fishing zones program	future of our grandkids
Current program	it seems everything depends on the tax payer.
No-fishing zones program	Would provide a greater improvement per \$ spent.
No-fishing zones program	Increasing 'no fishing' zones will increase the health of the coral reefs, somewhat offsetting the affect of damage from ships when considered as a percentage of damage to the total amount of healthy coral.
Full program	Coral reefs are an important natural resource. I suspect the additional tax cost per household you indicate is not correct.
No-fishing zones program	it makes the most sense to me
Full program	damage to environment by human activity is extensive around globe; mankind must be more responsible. USA is biggest culprit and financially most able to offset damage and provide leadership internationally.
Current program	I feel that the United States has enough bigger problems trying to get the economy out of this recession. More tax dollars puts a bigger stain on all Americans, including hawaiian residents.
Current program	\$110 dollars a year seems quite expensive when multiplied out for every taxpaying household in the U.S. I would be happy to pay up to an additional \$20-30 per year maximum.
Current program	this program is not on my list as things i worry about.
Current program	can not afford for my taxes to raise i am already working for near nothing
Current program	California children in public schools are ranked 48 nationally. I spent thousands of dollars to educate my children in private schools.....coral reefs in Hawaii are not very high on my list of priorities. How about research for cancer or Alzheimer's Dis
Full program	I feel that it is vitally important to protect the coral reefs and the population of fish. In the long run, the preventive measures will benefit everyone. Nothing is free and so we have to sacrifice a couple of hundred dollars each year to protect our e
Full program	We should do are part to protect the coral reefs.
Current program	I really dont think it would cost each american household that much money for 25% of the reefs to be protected. If it does then I would have to say that the money is being misused and most of it probably is not even going to the coral reefs.
Current program	This program in its current state may need to be abandoned by the gov't to save dollars not represented as additional spending. If I looked at a budget, Nat'l parks would probably be one of the first things I would consider leaving in place. But not ad

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	The Fed is spending us into so much debt I am not sure we will ever recover. As stated before the Fed. does not manage money well at all. When do we say ENOUGH is ENOUGH? If we ran our homes like the Fed runs the government we would all be bankrupt.
No-fishing zones program	the fish will grow larger
Full program	We must take responsibility for the damage we are doing to our enviroment. If we lose the coral reefs we may never get them back. All of us know the decline in our quality of life due to this loss
No-fishing zones program	more protection
Ship repair program	because if the coral reefs are not repaired fish would leave also tourist.
Current program	Tired of taxes constantly going up
No-fishing zones program	Ship damage is small, and the coral will come back. there is not justification to spend other peoples money. The no-fishing program will help repopulate, and that will put some money back into the tax payer pocket when fishing improves in the future
Current program	We are talking about coral reefs in Hawaii. Can't see that I will be going there in the near future. I would rather the government spend more money on education and health care or providing funding that would pay teachers more money.
Ship repair program	you would be doing some thing to help but not to out spend our selves
Full program	More fish in the long run. That is what the fishermen actually would benefit from the most.
No-fishing zones program	the no fishing zone allows the fish to remain in a protected area regardless of whatever happens in the other areas.
Ship repair program	this would allow some repairing to the ocean by man which is some what faster than the ocean repairing itself
Full program	the weakest link of our environment is the early warning of the disaster that may come
No-fishing zones program	It provides a solution without costing me as a taxpayer much more money.
Full program	The cost is less than a dollar a day over a year period and we can afect a change with it. Soon will not be able to reverse it no how much money we have for it.
No-fishing zones program	If people can see the impact of the no fish zone they may be willing to change jobs from fishing to snorkleing or scub trips for visitors.
No-fishing zones program	no comment
No-fishing zones program	It seemed to be more effective in the long-term; I am willing to pay more in taxes to improve natural resources, which are of instrinic value to me.
Full program	The cost between the partial program and the full program was not that much so why not go all the way to save that environment

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	The taxpayers cannot continue to pay more and more taxes
Full program	it is important for each of us to understand what we have done to the earth and the oceans.
No-fishing zones program	It seems the most cost efficient program and is more controlable than hunting down ship owners.
No-fishing zones program	The no fishing zones would protect a much larger area.
Full program	see previous comment
Full program	This makes good judgement to save the fish and other animals, but they need to watch out for greedy people.
Full program	I really not sure but I feel that something has to be done or there want be anything for anyone in the years to come.
Current program	less money for tax payers
No-fishing zones program	Most of the benefit for little more than half the cost; ship owners should be taxed for repairs, not general public. If ships are commercial, they can pass costs on (or try to)
Full program	I believe the full program is necessary for ensuring that these ecosystems are maintained and potentially restored. The tax liability is a small price to pay to ensure that these coral reefs and ecosystems are not lost forever. Our planet is more important
Full program	I believe we should do everything possible to preserve our environment, whether it is above or below ground. I want my grandchildren & future generations to enjoy the earth & feel our generation should do what we can to make sure they inherit a clean ear
No-fishing zones program	Managing the fish population will be critical for future fishing needs and benefit both the fishing industry and the reef. Technology over time may make damage to the reef less server and it will grow back in 50 years.
Current program	not a tax payers problem
Current program	With the economy down & health care so expensive, I don't think most taxpayers would want 145more taxes to pay each year for the Hawai coral reefs.
Current program	I do not mind paying more taxes if is going to help mankind. Right now, with the economy the way it is : It is taking all a make and then some just to get by. We are overtaxed as it is.
Full program	I feel money spent on the reef and the fish helps the whole planet
Ship repair program	With current economic conditions that is what i would be willing to support at this time.
Current program	I feel that there is a vast expanse of coral reef in the pacific and protecting a small amount just to make a few people feel better about our existance on earth is not worth the expense.
Current program	Feel that paying more taxes is unacceptable.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Many acres are already protected and we have too large a federal deficit and our taxes are already going to skyrocket under the present administration.
No-fishing zones program	The cost is reasonable and provides a good cost vs. benefit balance. the full program is too much during these hard economic times.
Current program	DONT WANT HIGHER TACES
Full program	I feel if we don't do what we can now to regenerate renewable resources to sustain us in the long term than it will cost us more either to replace those resources if that is even possible or try to fix them when we have no other alternative and it would c
Full program	Seemed like the best one!
Full program	Extra tas dollars is worth protecting the environment
Ship repair program	moderately priced yet provides services
Current program	I have very little confidence in any endeavor we entrust too our government when any money is involved. Greed has been and will continue to be our failure to properly respond to a problem. In this case, inaction is better than action.
No-fishing zones program	130 additional cost is substantial for one household.
Ship repair program	I can't afford the best It is the best that I know I can pay for. Everyone wants a BMW but not every one can afford one, and I am not willing to get into debt and not be able to help my family if the need be.
Current program	the whole reason for choosing the current program is to keep the tax level where it is. I do not want to pay more taxes.
Ship repair program	I'm not sure myself why I chose this because I'm not a swimmer and no very little about the ocean depths.
Full program	Protects marine life.
Current program	I'm an older gentleman on a very fixed income with many many health care costs. I really don't have any extra money to be saving coral reefs.
No-fishing zones program	I would like to protect the coral reefs, but I think we are already spending tooooo much money = higher taxes.
No-fishing zones program	Our taxes are high enough. The no fishing zones wil help protect the reefs. The reefs will repair themselves even if it takes 50 years.
Full program	Because coral reefs are dying and I am an ex-diver who wants future divers to enjoy what I have enjoyed. If this will help, I don't mind paying.
No-fishing zones program	It seems like a worthwhile project, while the addition of the reef repair following shipping damage would result in little additional benefit. It's too bad there aren't a range of percentages to choose from, however; is 25% the value at which the decline
Full program	I do not agree that the "current program" costs nothing. In fact I believe that would be the most costly program in the end. How is the death of a beautiful and productive resource that can never be revived to be compared to a relatively small monetary ex

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	We are overtaxed as it is. The most important thing is people, not marine life. I think it is going to take more than what humans can do to throw off the eco-system so badly that it destroys our life.
Full program	I would like to see money spent fixing what is clearly broken
Current program	i can see the need for repair but i am living on social security and need no more taxes.
No-fishing zones program	We need to first spend our money with controlling/protecting the area first. It doesn't make any sense to replace coral when the activity level is still high.
Current program	I would be in favor of increasing the no fishing zone... I am not in favor of repairing the coral reefs 5 acres at a time(I think the cost for this outweighs the benefit!)...But overall in the country right now the Federal Government has more than they c
Full program	Our planet will ultimately cease to exist unless we take responsible action to aid the environment.
No-fishing zones program	Because of the amount of increase of fish caught in 10 years
Current program	More study should be done before adding more taxes to everyone. Other solutions to solve the problems.
Ship repair program	cost was the deciding factor.
Current program	low cost to tax payer
Full program	My household is not going to be individually taxed for these programs. It's up to the federal government to allocate where taxes are spent. I would advocate this program and hope the government would cut out some of its wasteful spending.
Full program	I LOVE THE BEAUTY OF NATURE AND THE DIFFERENT KINDS OF LIVING SPECIES, ANYTHING TO HELP OUT THE SURVIVAL OF THESE TWO THINGS IS WORTH IT TO ME, AT ANY PRICE.
No-fishing zones program	NO FISHING ZONES MAY PREVENT FURTHER DAMAGE TO REEFS DUE TO FEWER SHIPS IN THOSE AREAS. THESE REPAIRS SHOULD DEMINISH OVER HE YEARS AND THE ADDITIONAL TAXES ONLY BECOMES A SLUSH FUND FOR POLITICIANS
Current program	If the economy was better I would have checked off yes.I am concerned with keeping my morgage paid and our other bills paid. Cost of healthcare is so high now I don't take home enough as it is.
No-fishing zones program	LIMET the fishing and in time it will get better
Current program	Because this administration has chosen to create a 12 trillion dollar debt, we don't have the money to take care of coral reefs. See the admin to find out why I don't have any tax money left.
Full program	To have a positive global impact, now and in the future, for less than 30 cents a day is a no brainer for me.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	\$135.00 per year is nothing compared to the long term benefits that it will provide. I am very happy enjoying the Florida Keys.
Full program	As previously stated - prevention is the most important action to take whether it's for your health, continued well-being or to do nothing and ultimately suffer disaster. Procrastination is the greatest cause of all human ultimate destruction.
No-fishing zones program	to me it sounds like the best for evryone concerned
Ship repair program	I wish I could afford to pay more but my husband had been laid off from his job because the plant has closed and I am unable to work
Full program	I would be willing to help pay for this but still feel that the ship owners and fishermen should be held greatly responsible. If you use it or abuse it then you should take care of the damages.
No-fishing zones program	Think it is best program but may also would suggest using fines paid by owners of ships damaging coral to be used for coral repair without added money. Also may want to have no navigation areas in areas where coral is easily harmed by ships.
No-fishing zones program	Over fishing is something that does not self repair without intervention while coral damages do. Additionally, the areas identified as no-fishing zones could also overlap some of the areas that have damage; therefore, the damage could repair while the fi
Current program	I already typed my reasoning for choosing the present program. Sorry about the coral reefs, they are beautiful and I am sure to those who fish ,dive and snorkel appreciate them more than I do. I am a person of lower means and cannot afford to take care o
Full program	It is important to sustain and repair this ecosystem for future generations.
No-fishing zones program	it was the cheapes way to do something that would help the reefs
No-fishing zones program	I selected the option regarding increasing the no-fishing zones because it will naturally allow nature to correct the problem more expeditiously than if nothing is done. Also, it is not too expensive on a yearly basis. If people will need to be hired to
Full program	I am willing to pay more so that the Federal government can afford to take a leadership role in protecting the environment. This is our habitat--if it is gone, we are gone. The cost is worth it.
Current program	How were the costs estimated? I am leery of government spending programs that usually end up costing more than originally projected. Spending should be covered within the federal and state budgets. I believe I am taxed heavily enough. As it is, taxes wi
Full program	Because this program makes the most progress in repairs and maintenance which is desperately needed.
No-fishing zones program	It has the possibility of sharing the cost with other countries.
Full program	I am in favor of saving our environment and are willing to pay more to do so.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	The Full Program is the only one that will enhance and protect these coral reefs to the highest degree out of the four choices. My idea is to increase no-fishing zones and make these ships fish farther out where they cannot damage the reefs in the first pl
No-fishing zones program	Every year Mother Nature gives and takes away. An apple tree produces better if pruned, a few acres every year are allowed to go through a death and birth process, I believe the health of the entire system would benefit
Full program	I would prefer that my tax dollars are used for this program over a lot of other programs. But, I would hope that boaters in Hawaii would somehow pay for the boating repairs. Maybe a port tax or registration / insurance fee.
Current program	nocomment
Current program	We have enough government spending as it is. Let nature take care of itself.
Full program	we need to repair our reefs at whatever cost it demands
Full program	My money is currently being spent on activities that I see of feel offer no benefits to the future. I strongly feel this will be a positive outcome for the future generations.
Full program	the islands should be protected
No-fishing zones program	I am more interested to see protection of the coral reefs and an increase in marine life. If it declines any further it would greatly affect tourism and the enjoyment of fishing.
Full program	I think that americans can afford \$110.00 per year to save the coral reefs
Full program	I believe that our oceans are what run our world and thier health is of the greatest importance in our responsibility to our planet.
Full program	we need to save this beautiful planet for future generations
Full program	I beleive we need to take care of our planet. Commercial fishing needs to be protected and one way to insure future crops is to protect the nurseries now.
Current program	If our economy was in better shape, I would go for the full blown program. However, with everything/everyone suffering to some extent, right now I believe it needs to stay as is.
Full program	\$100. dollars spread out over a year is not that much more than what is being taken out now. And it doesn't make since to do the 25% no fishing if you don't make repairs.
No-fishing zones program	I think that if this was tried and evaulated each year to see if natural reef repair was happening because there was less fishing and a healthy reef system this might be enought in the long run. If this program was put in effect and there was still reef l
No-fishing zones program	WE CAN'T DO BOTH SO LETS DO THE MAIN PROBLEM BUT I WOULD STILL HAVE THE BOATERS PAY FOR DAMAGE DONE TO THE CORAL REEFS
Full program	\$75.00 a year sounds like a reasonable amount to help protect and restore the coral reefs around Hawaii. I also feel that both programs need to be implemented, not one program over the other.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	The federal Govt would be protecting the coral by not allowing fishing. The coral reef over time would recover. There continues to be alot of coral reef acreage. Americans would not have to spend alot each year for these results to happen.
No-fishing zones program	it protects 75000 acres
No-fishing zones program	Keeps fishermen out of water, thus protecting echosystem.
Full program	I feel the full program will help maintain our coral reefs because if you just do some programs it will not help.
No-fishing zones program	Most cost effective
Full program	Someone has to do it.
Full program	We spent the money in crap we dont need, so better help the earth
No-fishing zones program	sometimes household money is not spent very wisely so better the government take it and put it to some use whether it be for coral reefs or health care
Full program	Protecting our environment is more important to me than \$75
Current program	There are a lot of issues in the US that are more critical and in need of enchancements over this one.
Full program	I believe firmly in restoring the earth for my grandchildren and future generations. I have been driving a Hybrid car for four years, recycling for 10 years, and recently purchased a battery powered lawnmower. I do what I can.
Current program	While the protection of the reefs are important, I feel that at this time there many more important programs that should be funded first.
No-fishing zones program	The no fishing zone would limit boat traffic and therefore boat damage.
Full program	I think it is most important to give back to nature and save the environment but I also thought that the tax amount shown wss within reason.
Full program	My previous comments should explain. This is an extremely difficult decision for me.
Current program	I am a working person that is still on a fixed income. I feel that the citizens in that area should put more money into that to correct that promblem. I am quite sure that there are more important things that needs our funding than this situation
No-fishing zones program	This program sets aside the largest percentage of no-fishing zones, yet does not cost taxpayers too much annually.
Current program	I do not want to pay more taxes.
No-fishing zones program	it is a step in the right direction.
Full program	Even tho it would be additional money from my household, I believe the benefits far outweigh the cost.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	I was thinking about the cost in taxes, and how the Reef Repair Program would cost less. However, if they repaired the reef, it would provide a more suitable environment for marine life. This might help alleviate declining marine life.
No-fishing zones program	It was mid-way in expense and protection.
Full program	the reefs need protection and who knows how long they have gone already. plus it is probably going to all kinds of red tape in the government. it has to be done ASAP.
Full program	In the scheme of things, \$110 a year is not that much to preserve a threatened ecosystem.
Current program	This is a bad time to increase Federal taxes. I can afford to pay the \$150 for the full program but too many families cannot.
Full program	I believe that we have a responsibility to preserve unique ecosystems for future generations of wild life and human life. \$A fee of 150 bucks per year (though you neglected to say for how long... infinity?)is a small price to pay to hold on to a rare envi
No-fishing zones program	it is cost effective. I would like to spend \$45 for the better future. Repaire seems to be expensive.
Full program	The relative cost difference is small between the small protection and higher protection program, The best positive effect at the beginning of restoration/protection would give a better outcome in the end.
Full program	Cues God put man in charge of the earth, He made it betifull. We've messed up big time. We should do what we can to protect and take good care of God's wonderful green earth. Besides the Bible says that if we are faithful in the little things, He'll ma
Current program	It is of no charge to us and there are many other things in the world to worry about then coral reefs. Maybe im just not understanding the total benefit of how they make our lives better.
No-fishing zones program	The small percentage of gain from the other programs.
Full program	145.00 is not that much. and it is proctecting something that we will want to keep years from now.
No-fishing zones program	best option for me--however i feel it will be unpopular with state of economy
Current program	hawaia should pay for this program
Current program	With the current economy as it is right now, I dont feel that the coral reef in Hawaii is my main concern. If the outlook for my childrens future was different I would feel differently. But at this time I feel that more concern should be put on protecting
Full program	less than \$15.00 per month, a bargain.
Full program	We need to realize that nothing is done without cost. Years of fishing and neglect has brought us to this point.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I want to preserve the environment
No-fishing zones program	Most of the damage from ships I would assume are in areas used by ships and this would concentrate the damage to specific areas. These areas are probably where most of the fishing takes place. By banning fishing in 25% of these areas, the damage will be
Current program	Cost ~ Everything cost wise to live has gone way beyond anything a household can bear. Overfishing in these areas will decline as the cost to operate a boat becomes excessive and only the very rich will be able to fish and afford fuel and maintenance. Fi
Current program	There are many other necessary problems taxpayers should be spending their money on.
Full program	If the problem is not resolved now, it will further erode and cost more in the future.
No-fishing zones program	i think we should protect more of the coral reef than we do currently. I also believe that ship owner should pay to repair damage coral reef that they caused.
Current program	That is \$45 out of my pocket, for damages caused by others. Not my problem
No-fishing zones program	A good fix at a reasonable cost with less invasion of the coral reef ecosystem.
Full program	The environmental impact of the Full Protection program is the best thing for the environment of the entire planet let alone the Hawaii Islands. The future preservation of this planet must be effective for future generations.
Current program	I just feel the are better things for my tax dollars to go to rather than for Coral Reefs in Hawaii
Ship repair program	The repair will enhance the recovery if damage done by human concerns. The support of the fish and wildlife in the area is irrelevant if the base coral reef continue to disintegrate.
No-fishing zones program	See previous remarks. I would support an alternate method of repairing the reefs, ie through private boat owners paying a license fee
Full program	The coral reefs are important to the ecosystem. If allowed to be over fished and not repaired, they will eventually disappear.
No-fishing zones program	I am willing to help the environment, but I think that the fisherman and people who use it should pay to take care of it. I live in the forest, I pay for programs to help my forest and they have recently increased the fees for entrance to our state park
Full program	The cost of the program does not put an overwhelming burden on my finances and it will do the most to help protect and repair the reefs.
Full program	I chose the full program because if we do not protect our ecosystem now it will not be here for our children and so on. Also our government spends money on so much CRAP it would be nice for them to help something that is worthwhile.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	People can't always control for Boating accidents. Steps do need to be taken to protect and improve the quality of the reefs.
Full program	o be certain, additional taxes will be a difficult thing for me and many others. I also am aware of how much of my tax money goes to "out there " types. The environment, especdiall what this is present, is more important to me. We are stewards of God's cr
Full program	\$200 a year to save important parts of our environment for our children's and the worlds future seems worth doing even for someone like me who is now unemployed and will have to watch where my money goes. It is cheaper to save then to try to restore when
Full program	unique ecosystem needs attention
Full program	The More We Protect The Better Off We Are In The Long Run!
Ship repair program	its the most logical thing to do to protect the coral reef and our oceans
No-fishing zones program	Without going the full plan, the no-fishing plan saves more of the coral reef.
Full program	it seems like the best way to help protect and save the reefs
Current program	I can't afford \$95 increase in taxes, but I would gladly pay \$50 to protect the marine life
Full program	We must protect our precious natural resources. Once wiped they are gone for ever. This is a better investment than many of the places our tax dollars go.
No-fishing zones program	more fish and marine life protected,
Full program	I was leaning towards option 2 only but the cost increase is so low that I'd go for option 4.
Ship repair program	I belive the industry that is causing the damage should pay for all the repairs.
Current program	The cost per year is high and the country is deeply in debt. The economic situation is so sensitive to every new initiative or enhanced effort. People are still losing their homes and the repair of the coral reef is hard to justify when you see the face
Full program	I believe that if we don't protect the oceans, mankind cannot survive.
Current program	don't need any more taxes during thisn economic time
No-fishing zones program	No fishing zones will benefit the reef as well as have the potential to increase tourism which will increase state revenue. The cost is moderate. A \$200 increase is too much. Maybe ships should be required to have technologies that allow them to naviga
No-fishing zones program	i FEEL THAT IF WE PROTECT THE REEFS FROM OVERFISHING, IT WOULD HELP BALANCE OUT THE DAMAGE FROM SHIP ACCIDENTS
No-fishing zones program	From the information provided, no-fishing zones can have a significant impact on coral reef restoration. I am not convinced of the value of ship damage repair; a preventive program could have more benefits long term if it were feasible. I also feel that
Current program	Have no interest in this subject matter and don't feel necessary to pay for this

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	This is by far the most cost-effective program, as it can be expected to improve the ecosystem around all of the coral reefs around the main Hawaiian islands for less than the cost to repair an infinitesimally small portion of the coral reefs from ship da
No-fishing zones program	This option appears to provide the most return on investment.
No-fishing zones program	most cost effective way to preserve the most reef area
Full program	It doesn't seem like the Reef Repair Program would make that big of a difference. The full program is only \$25 more than the No Fishing Zones program so that seems worth it.
No-fishing zones program	While it would be nice to have both programs, the most urgent seems to be protecting the marine life in the no-fish zones. It may take a long time for the damaged areas to be restored naturally, but in the economic times we are in it would be most likely
Full program	I believe that humans are responsible for repairing the damage they have caused the earth and that we cannot put this off any longer. I would prefer to pay only \$75 or \$95, but those programs don't fully address the problem. I also think that fishing comp
Ship repair program	There are a lot of things my taxes need to pay for that are higher priority
No-fishing zones program	I'm thinking that if more of the reef is in a no fishing zone, less boats would be in the area to cause potential damage to the reef, taking the percentage of damaged reef down.
No-fishing zones program	we should learn to only take what is necessary and not over fish areas. in addition I believe we should "pay as we go" so those who want to fish or cause damage should be paying additional costs to offset what the govt(us) spends the govt(us) should not b
Current program	Given the current economic recession, my household cannot afford an increase in taxes, much less to pay for coral reef protection in Hawaii. I'm already concerned about how taxpayers like myself are going to be asked to pay for Obama's Economic Stimulus
Full program	we need tp protect the coral reefs from further destruction
Full program	As I stated before I think there are other federal programs that should be done away with and this program only costs \$2 a week to maintain an amazing habitat for sea life!
Current program	Although this is a nobal project it is an inappropriate use of the US taxpayers money.
Full program	i think we should protect reefs and do some repair as we can
No-fishing zones program	Why the \$170 what is the action to be done?
Current program	I don't really know anything about this stuff. It doesn't really interst me.
Full program	Coral is so slow to grow that expensive measures to protect them are justified, and they are irreplaceable.
Full program	we need to ensure we have fish in the future. wehave our oceans to protect our reefs.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	\$185 is not much to keep the oceans ecosystem in place.
Current program	Just a guess.
Full program	Just seemed like a the best choice
No-fishing zones program	I feel it would be the easiest to implement.
No-fishing zones program	Seems like the most cost effective method and doesn't cripple fishing industry.
No-fishing zones program	we cannot afford a huge increase in federal taxes right now. we would choose the more aggressive protection program if we could.
Full program	coral reefs need to be protected by the Federal Gov - they are national treasures - the cost is nominal for these reefs - protect them and repair them
Full program	Because I can afford it and it's for a great cause....but I'm not sure less well-off families should be asked to help with the "repair" part.
Full program	Beacue we waste so much money for things that are not as important as saving the coral reefs.
No-fishing zones program	because I'm an advocate of protecting the natural enviroment as much as possible
Current program	The costs associated with the other choices are outrageous. With todays technology to think spending this much money per taxpayer per year is outrageous. Try getting someone with some business sense to come up with better alternatives. Not acceptable.
Full program	It seems relatively inexpensive to gain the most benefit to the coral reefs through a combined program which likely will have synergistic effects.
Current program	Hawaii should deal with this problem without the federal money. They should come up with their own program that they can fund.
No-fishing zones program	we need to protect the ecosystem
Current program	because the coral reef will always have activities going on such as ships and fishing and really theres no way to damage the whole reef is there?
Current program	taxes
Ship repair program	\$35 isn't so much to pay each year but I'm still not sure of my choice..
Full program	I chose the Full Program because it is very important to protect the coral reef and its ecosystem. I do not mind paying for this program. Our children will benefit from our sacrifice.
Current program	with todays economy it is hard to pay more taxes
Full program	i choose the full program because it has all the options and can do more than the other two alone. the current program is not acceptable.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I am currently unemployed. The economic stability is uncertain and I can't afford an extra \$200 missing from my income.
No-fishing zones program	I feel as a it is only partially the responsibility of the nation to support these programs, and Hawaii's responsibility for the rest. I feel protecting the area etc. is good for national taxes etc. and the state can come up with a program for repairing t
Full program	Protecting the coral reefs around the world is extremely important. Since the difference between the No Fishing Zones program & the Full Program is less than \$50, I support the Full Program to help do our utmost to protect the coral reefs. Although I pref
Current program	While I agree that the option to increase the no-fishing zones to 25% seems to have short and long-term advantages, I'm not sure the American taxpayer needs to pay that cost. Are there ways to generate that revenue from the commercial fishermen, tourists
No-fishing zones program	No fishing zones should also lower accident damage to the reefs
Full program	to solve all the coral reef and fish problems.
No-fishing zones program	I really prefer a better hybrid program. I.E. 20% no go zone and a 2.5% repair rate. However, I made my choice because it appears that the no go zone provides more bang for the buck. Even though it cost more, funny. I tend to think that government money
Full program	The coral reefs show the amazing creativity of God and His purposeful design.
No-fishing zones program	i think its a good idea
Ship repair program	it provides some support
No-fishing zones program	need for fish is important and dont want to spend \$300 . make a new program. 15% no fishing and 2 acres repair reefs.
Full program	we need to start protecting the earth now or our children will pay the price later
Current program	I believe there are a lot more important things that are in need of government funding then the coral reef. Fish are in danger in their own environment with other predator fish
No-fishing zones program	Cost and how will they repair the ship damage? Will that repair cost more damage to the coral reef? You don't say how the repair is obtained..
No-fishing zones program	Even though there is no repair, I feel it is the best solution. More fish outside of the coral reef zone and 25% more protection, while keeping the cost of tax dollars to a more economical number. And still the coral reef is repairing itself only it wil
Current program	I'm already taxed enough and o one helps me repair my land due to drought and storm
No-fishing zones program	I think that would be the easiest to implement.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I would like the full program because I am concerned about the environment. There are many other programs that the government may want to increase taxes for. This is just one. I think there are other ways to raise money to protect the reefs than to increase
Full program	It sounds like it is going to do the most to protect and correct. I selected Moderately Sure of my decision because I'm concerned the money would be used correctly to accomplish the program goals.
Full program	I feel that the reefs are an important part of our environment and should be preserved and repaired
No-fishing zones program	Seems to make sense for the future of commercial fishing and the future of the jobs that come with it.
Current program	No increase in taxes.
Full program	Recovery would be in 10 years instead of 50.
Current program	That is an amazing amount of money (135/300 PER HOUSEHOLD). I am against interfering by repairing the reefs. If left alone, nature will repair itself. I can see increasing some no fishing zones. But it can be accomplished through posted signs, notifyi
No-fishing zones program	It seems to make the greatest difference with the least cost to taxpayer.
Full program	It seems a small cost per person to help repair and maintain the health of our ecosystem. If we don't began to take care of our ecosystem we will eventually have no potable water, food to eat, temperate climate to live in etc.
Current program	The money would be better spent on health issues.
No-fishing zones program	As per my earlier comment. The amount of benefit seems much, much greater, relative to the amount that has to be spent.
Current program	We are paying too much taxes and that's enough.
Current program	the money should come from those who benefit from such enterprises that are causing the damage, ie: fisherman and boaters that use the area
No-fishing zones program	somewhat cost effective every tax supported program wants more of the pie
Full program	I have been to hawaii. We have to look at long term not the short term solution. From what I have seen here I prefer your full program!
No-fishing zones program	It is the biggest bang for the buck.
No-fishing zones program	The additional cost to each household is moderate and the benefits are great
Full program	we need to do more to protect our ecosystem
Full program	It our world. We need to make sure that we are taking care of it. I'm sure that I benefit from these coral reefs in some way.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	know nothing about this subject.
Ship repair program	As I mentioned before, native Hawaiians fish-snorkel style-spear fishing and I think, culturally they need access to that. The reef repair program allows some fishing and helps the reef renewal through the repair program and is not as extreme as either ot
No-fishing zones program	I feel that this gives the most benefit for the cost, and protection for the reefs is definitely needed.
Ship repair program	Less expensive but still provides some help
Current program	Choosing one of the other plans would increase spending and lose jobs at the same time. It is more important to save jobs than the coral reef
Ship repair program	seemed like the best idea
Current program	cost too much
No-fishing zones program	If it were a 3 year fix, I probably would have chose the \$145.00 plan. I feel something needs to be done to protect it, but I'm not comfortable spending that year after year.
No-fishing zones program	By supporting the no-fishing zones option, there is a greater chance of more plant and animal life in the coral reef ecosystem. I didn't choose the ship repair option or the full program, because the reef WILL eventually repair itself. The fish populati
No-fishing zones program	Most cost effective
Current program	I am sympathetic about the problems of the coral reefs. The coral reefs are beautiful and very beneficial also, but at these times, it is difficult to accept any further tax deductions.
No-fishing zones program	i the government should take a more active role in protecting the reef systems but i don't the financial burden should fall soley on the taxpayer
Full program	People cause the problem people should pay for the program
No-fishing zones program	Seemed to be most cost effective way of helping increase marine life. Ship repair fixes too little too slowly.
Full program	Coral reef preservation is important for the worlds oceans.
Current program	The added cost should be raised by private donations, not mandatory tax increases, or the goverment should reallocate current taxes to pay for the new programs from funds that are spent on other special interest that are less important.
No-fishing zones program	economically that would be the best....how much can the american people keep giving
No-fishing zones program	I would like to see more fish but I feel that we should seek another source of revenue.
Current program	Because federal programs are unending and while this may be a worthwhile project I'd rather see the money spent on health care. I know people who work for NOAA the good ones are great and the bad ones are never fired

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I like to bring the ecosystem to a balance. Right now according to the information given, fishes and other marine life are reduced due to overfishing. Give it some time to recover then we can adjust so it is not a permanent issue that will affect jobs
Current program	It is not a time to add federal programs that will add more burden to the taxpayers.
Current program	Cost effective
Current program	NOT INTERESTED AT ALL IN PAYING ANYMORE TAXES
Full program	125 dollars is not alot of money to give to coral reefs
No-fishing zones program	I think that will help enough but not hurt my pocket book to much with the way the economy is I barley get a pay ck as it is..
Full program	to sustain the ecological climate of Hawaii
No-fishing zones program	to keep boat traffic down
Full program	I believe in providing a living planet to future generations. I'd rather have fewer "things" and a viable ecosystem that sustains future generations. It's all a matter of priorities.
Full program	We should do anything within our power to protect the world' s oceans
Full program	best value and most benefical
Current program	until our country recovers from the current status we need to put this program on HOLD, hopefully soon we can re-look at these types of programs.
No-fishing zones program	not too much money for us to help the reefs
No-fishing zones program	It has the best cost to benefit ratio.
Full program	We could lose these reefs forever if we don't start protecting them, we already do enough to harm the enviroment.
No-fishing zones program	no fishing=no damage by boats
Current program	Taxes are too high now
Current program	i will most likely never visit,most of the people in the us will not visit. we would be paying for something we will never see.
No-fishing zones program	I would prefer to select both the no-fish and the coral reef repair program but the cost seems too high for each taxpayer yearly.
No-fishing zones program	because no zones have been repaired
Full program	the no-fishing is a must, and I'd prefer 30 or 35% over the 25%. The reef has to be repaired. Losing 5 acres a year, with a recovery of 50 years, means less reef, fewer marine life, and worsening conditions for the remeainder of the reef causing further d

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	We need to have ongoing programs to protect the natural "wonders" that we have. Many people travel to Hawaii for recreation which provides income for the people who live there.
Full program	It will make the most impact.
Full program	\$75 is a small price to pay to restore the important resource of Hawaiian coral reefs. Furthermore the future recovery of the fishing resources will provide some additional tax base.
Full program	I chose the full program because marine life would multiply and also damage the has been done by the shipwrecks will be repaired and extended for up to 10 years.
Full program	The Coral Reefs are part of the balance to our earth's system. We don't want to be out of balance, do we?
Full program	it is very nice would like to see it someday god put it here lets do something right for once and take care of it trying to do this the right way may our leaders in country how to use brain in away that help us all not just them
Full program	Adding \$75 to my tax debt is not that much of a big deal. Americans in the Northeast spend more money than that each year going to Dunkin Donuts or Starbucks every day. I think that we need to do something to protect the coral reefs and the fish because
Full program	I believe that humans need to take a more active role in preserving our planet. I have learned in my biology class and my US history class that sometimes the extinction of some of our life forms has long lasting and negative impacts on the earth. Someti
Ship repair program	because ofthe taxes being \$55,the othertaxes was high.
Full program	I definitely support the no-fishing zone program, but I was somewhat unsure of the repair program, especially given its higher cost. Ultimately, however, I would feel less guilty as a human and a tourist if I knew there was a program in place to repair d
Current program	Primarily because of the economic climate of our country right now. It seems that our government is willing to throw our tax dollars to companies as so called subsidies, that are mostly ending up as bonuses for the morons who broke these companies to star
Full program	I believe in preserving the beautiful wild places that we are so fortunate to have in the United States, including the coral reefs of Hawaii. Preserving these reefs is well worth the money.
No-fishing zones program	Work on future plans rather than repairing former damage
Current program	i am tired of always being taxed
No-fishing zones program	less fish to catch -less boats to damage
Full program	the earth needs our help. 265 is not that much spread over one year.
Current program	We have other needs for the money in this country that are more important at this time.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	If people have to pay to protect the reefs from overfishing and damage, perhaps they would then take better care with recycling and dumping in the oceans as well.
Full program	itmakescent
Full program	things will continue to decline until measures are taken
Ship repair program	I can't afford to be tax much more!
Full program	I believe it is important to protect the ecosystem of the coral reefs.
Full program	a lot of our world can learn from this
Ship repair program	I feel that the increase in fish growth is very important for fishermen and tourists.
Full program	IF WE DO NOT IMPROVE THE ENVIRONMENT AROUND US, BEFORE LONG THE ENVIRONMENT MAY NOT BE ABLE TO SUPPORT US!
Full program	This can turn into a more serious problem if we do not take the double attack approach. Without the coral reefs there will not be enough food. My understanding is that the sea provides most of their nutrition and venue for jobs and exports.
No-fishing zones program	My choice protects the majority of the reefs being considered for added protection.
No-fishing zones program	the coral reef repair program only affects a small area but at a fairly significant cost compared to no fishing zone program
Full program	I believe the environment should be saved for future generations. They need to see the environment in its natural habitat not in an aquarium or textbook.
Full program	both are needed to protect a vital natural resource, and cost an extra \$185.
Full program	If you are going to repair and restore this ecosystem, do it right. WHY BOTHER TO DO IT HALF WAY OR PARTIALLY? THAT IS ABSURD TO EVEN CONSIDER.
Full program	The amount is small for a large benefit to the coral reef ecosystem.
No-fishing zones program	i love the reefs, and would like them to be around for my kids and grandkids
No-fishing zones program	fishing as recreational is not mandatory
Current program	I feel as if I pay enough taxes already. If it came out to a few dollars a month, that's one thing. Also, this is important, but is no way directly related to me. This problem was caused mostly by the inhabitants of the Main Islands. Wouldn't they want to
Full program	in my opinion, we've been selfish enough for far too long with our mass consumption
Current program	WHO CARES!!!!
No-fishing zones program	You can deplete any natural resource. It would be foolish to destroy something as valuable for greed.
Ship repair program	It's a cost effective compromise.
Current program	I don't want to spend any money on this
No-fishing zones program	if a no fishing zone is created, there will be less ships in the area to cause damage.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	preservation ad reparations are necessary
Ship repair program	cheapest. economy is bad here now, unfortunately, money is to tight to expend that much. but it is important....
Full program	Reefs need to be repaired and do we really need all this fishing ?
No-fishing zones program	ship damage is a small percentage of the reefs. no fishing will allow the sytem to get back to normal.
Ship repair program	starting to repair small amount of acreage
Ship repair program	With economy today, I chose the Reef Repair Program because it does help save the coral reef and helps repair it a little also. Although I feel that this is a very important cause for the future, I would like to see more money put into the health care sy
Full program	it will do the most to protect nature
Ship repair program	only now, in these hard times would I say that this issue is only worth \$35 to me. There must be some common ground between \$35 and \$175-185. How about 15% acreage?
Current program	I Have no comment at this time.
No-fishing zones program	let fish populations thrive ,witch will take a while ,this will inturn let the reif start to repair itself
No-fishing zones program	cost and use of tax money
Full program	because it inportant to thje planet erath where we live at im this age and time it will help us in the long run for the humane race.
Full program	The oceans are VERY important to our survival. They take care of us and we should take care of them!
Current program	I don't need any more tax assessments.
Full program	The whole ecosystem could be completely thrown off if something drastic is not done. These reefs and marine animals are here for a reason.
Full program	\$200 per year is a small price to pay to avoid destroying more of the planet's ecosystem, and to repair the damage that has already occurred.
Full program	The cost is not prohibitive and the importance of maintaining the coral reefs in as pristine a condition as possible is paramount
Full program	i fill it is needed to the the under sea world.
No-fishing zones program	THE REPAIR TO SHIP ACCIDENTS IS ONLY 10 YEARS AND ONLY 5 ACRES A YEAR IS COVERED. FOR THE EXPENSE OF APPROX \$100.00 TO DO THIS, IT WOULD SEEM NOT THAT MUCH REPAIR WOULD BE FAR-REACHED OVERALL.
Current program	It doesn't cost anything extra
Current program	Because we have to many bills to worry about paying more.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	While I do feel protecting the environment is a worthwhile cause, there are other more important programs that need to be put in place and that will require additional taxpayer funding. Taxpayers are just not able to help with everything.
No-fishing zones program	Greatest potential for increasing coral life, for the least amount to the taxpayer.
No-fishing zones program	It would show a far greater benefit to all involved, in the long run. There is, however, no reason that it should cost so much to just keep people out of a zone. Enforcement could be paid for by fines to violators.
No-fishing zones program	the results will be visible in a short time and I feel I can afford an additional \$45 but not \$100
No-fishing zones program	25% of coral will be protected, giving opportunity for increasing marine life in general, and specifically reduce overfishing, which will benefit in several areas.
Full program	The cost to taxpayers on an annual basis seems minimal compared to the benefits.
Current program	I think the government is doing enough spending bailing out people who can't control their own spending in the first place.
Ship repair program	Its important to repair the reefs and not have them repair themselves in 50 years!
Full program	BECAUSE I THINK THAT MARINE LIFE IS VERY IMPORTANT TO OUR ECOSYSTEM. NOT HAPPY ABOUT HAVING TO HELP FOOT THE BILL.
Current program	Due to our present economy I don't think there is much room to expand programs till we get the economy stable.
Current program	money
No-fishing zones program	The No fishing program is the most cost effective in terms of dollars spent and most impact for those dollars
Current program	the cost doesn't out weigh the benefits significantly more
No-fishing zones program	Don't believe the additional money to include ship repair is justified by the size of the area affected.
Ship repair program	something has to be done, and soon
No-fishing zones program	Decline of fish populations is a certainty as of now,i.e.,Fla red snapper;shipping accidents are unknown quantity
No-fishing zones program	so life is increased and that life can do the natural repairing.
Current program	More pressing issues of the main populace, need to be addressed. Also see my previous comments.
Current program	I feel we are already paying enough money out of our pocket as tax payers, the economy is very stressful now in these days to be adding more money out of our pocket.
No-fishing zones program	It seems like the most cost effective and most likely to succeed.
Full program	The Coral Reef area needs to be enlarged and the repairs need to be made to it as well.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I think the most important thing we need to do now is protect our marine life. I see the value of correcting ship damage; however, our economy is not at a place that we can do both.
Ship repair program	doing something to help without that much more increase in cost
Current program	the tax amount
Current program	I cannot afford higher taxes
Current program	it is very hard to desire less spending for me and more taxes paid by me. I think the coral reefs should be protected and repaired, but I also believe there is not enough immigration personnel protecting our borders, but when do the costs stop. It just
Current program	present economic conditions
Full program	the only reason we are here is because of the earth how can you put a price on that.
No-fishing zones program	Increased taxes might be proposed to pay for health care and that's important too
No-fishing zones program	It seems to protect the larger areas and perhaps do the better good for the money spent; also it seems the more likely to get support from the broader public, in my opinion.
No-fishing zones program	It appears to provide more protection than repair of the reefs and, of course, the costs are much less.
Ship repair program	i just feel that that would be the best
No-fishing zones program	it will cost me the least in order to help out a little. At this time, the economy sucks so bad that this would be all I am willing to help out with.
Full program	you either care about mother earth or you don't. what's worse? this or the rain forest being destroyed?
Full program	For once I would like my tax dollars to go for something I believe in.
Current program	it just sounds better i guess
No-fishing zones program	It provides a greater benefit for the amount of tax dollars spent.
No-fishing zones program	I feel that if no fishing is allowed in the region, damage to coral reefs due to ships and the like will decrease accordingly. In other words, no fishing will decrease the traffic of ships in the area.
Full program	It protects the reefs and helps to rebuild them.
No-fishing zones program	its the least amount of money spent without spending zero dollars
Full program	The Full Program protects and restores, giving the most benefit to the marine life and human enjoyment. I do NOT believe, however, that the cost of \$185 per household each year forever is necessary. The government does not need to raise our taxes. They
Ship repair program	It won't cost that much and would help regeneration faster.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	no fishing zones would lessen the amount of accidents in the area requiring less repair. the cost is less than half of the full program. it may take longer for the coral to repair itself but eventually the repair would occur. i also think that the state
Full program	We need to repair what we destroy or eventually we will be left with nothing as we will surely damage it faster than it can repair itself.
Full program	I think we have a moral obligation to future generations to preserve natural resources.
No-fishing zones program	It's more cost-effective; ship repair program is prohibitively expensive for benefits provided.
No-fishing zones program	More bang for the buck
Current program	can't bleed from a turnip... Pay too many taxes now
Ship repair program	i thought it was a ok program.
Full program	If you do not do something, the reefs will no longer exist. The more you do to protect. The more you will have them. You can't wait 50 years to rebuild a reef. The boats that tear up the reefs should be responsible to fix them.
Full program	Whatever cost is required to repair human damage to the natural environment is o.k. by me. Hopefully then we would spend less on war! Also climate change is exacerbating all environmental conditions.
No-fishing zones program	The fishing will recover to usable levels in 10 years and will maintain itself thereafter. The repair option is a continuing drain and needs a more preventative solution rather than a fix it solution.
Current program	i would love to be able to choose the program that expands the no fishing area protecting the reef and helps repair the damaged areas however, \$175.00 a year i cannot afford. i would be able to afford \$75.00. prices are getting higher, my salary is not. t
Full program	Coral reefs are a delicate and important ecosystem that affect not only marine environments, but also those on land. The balance of nature needs to be protected; when humankind causes damage, humankind has an ethical responsibility to repair that damage
Full program	What is Hawaii doing about their own reefs??and secondly the US cannot take care of the world although we have assisted in messing it up throughout the centuries. Hawaii needs to step up and take care of their own reefs and get out of this capitalistic m
Full program	I think that coral reefs are a fragile and important part of an ecological system. In this day of minimal environmental support vs enormous military expenditures I vote for the environment hands down.
Full program	more protection
No-fishing zones program	I feel it is the best option for protecting the marine life.
Current program	Current program.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	The Northern reefs are already protected.
Current program	We have many other enviromental issues to address first.
No-fishing zones program	Theoretically--All should be done to protect the reefs, however financially in individual households \$150 is a large amount of a family's income especially when there are so very many programs that are important to all of us. If it was the only program n
Full program	I think it's important for the Islands. My family really enjoys going there. We should protect this for future generations. My son has lived since August of 2008, and loves it. Also the federal government could cut somewhere else to pay for some or all
No-fishing zones program	It is the most far-sighted approach. If we protect the coral reefs now then we will see great improvement in a few years and everyone will benefit including commercial fisherman who make their living on the water. Although I wish I could choose to suppo
Full program	It just needs to be done!
Current program	Ther eis a program in place; I cannot afford to pay any add'l for something I do not actively use nor support. It is what it is.
No-fishing zones program	WE ARE ALREADY OVER TAXED, \$45 PER HOUS HOLD SEEMS LIKE ALOT. HOW MUCH TOTAL IS THIS?
No-fishing zones program	More acres will be protected in the proposal. The repair should be done by the shipping industry who does the damage. Paying \$55 extra per year for repair of only 5 acres doesn't sit well with me.
Current program	We are on a fixed income.
Full program	we must protect the environment
Current program	Surely this survey was developede before Obama decided to quadruple the debt.
Full program	It is a cause worth supporting and the ecosystem needs help.
Ship repair program	Repairing the reef would probably invite other marine life, thus increasing the amount of marine life in the area.
Full program	25% is really not enough, but is a good start. I am willing to pay more to get more areas protected and restored now. How can we allow the damaged reef to go untreated to wait 50 YEARS? That would be totally irresponsible and ignorant
Full program	This country has a habit of helping every Tom Dick and Harry all around the world and our people are paying the price. I think it is time for this country to do something to help the upcoming generations so they may have some of the beauty the ones in the
Current program	this is another bill americans just can't afford property tax, school tax, the price of gas, the price of food is steadily going up and these are the necessities we have to draw the line somewhere. more and more of our money is going to things that just do

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	The protection of our natural resources needs to be addressed more stringently than it is currently & after this program is implemented it can be reviewed again for effectiveness & cost
Full program	Though I don't like the cost, this program is the most beneficial.
Full program	Once the coral reefs are damaged, we won't be able to get them back. It is worth it to me to save the coral reefs.
Ship repair program	this program would still be able to help out with the reef repair , which still would more then likely to have the fish to start moving back in to the reef again.....
Ship repair program	It would help the coral reef, but seems to put the costs to the businessmen more under their own control. (Paying for accidents rather than being limited on ocean access.)
Full program	realizing the small cost to me as a taxpayer i think the benefits out weigh the costs if the cost is accurate.
No-fishing zones program	Most return for the dollar. Repair is nice but the area is small compared to the total. Make responsible ship owners pay when they can be identified; they are insured for this type of accident.
Current program	I don't think the reef repair program has a significant impact and, if necessary, any costs for that program should be handled by direct costs to commercial shipping in the impacted areas (e.g. insurance). I would like to see more no-fishing zones but th
Current program	I prefer the program for \$170 but I expect it to cost \$15 per year not \$170. \$170 per household to protect the no fish zone? Something is wrong with that program. I don't believe the Feds can do anything efficiently. That is the problem.
Current program	Tax payers are suffering enough we have not more monies to pay for taxes The government need to fix more immediate problems with America and maybe this can be fixed later
No-fishing zones program	Cheaper cost
Full program	We need to save our land and seas, and even though I don't live in Hawaii, this really affects all of us.
Full program	If the difference is only \$50 per year, the full program makes the most sense. Why would you choose to help only a little? As a general thought, I'm not usually a condoner of federal government programs like this because so many politicians use it for the
Current program	no taxpayer monies
Full program	This is a very important resource. I have been diving/snorkling for 30 years and the reefs are dieing. We need to take care of this resource before it is gone.
Current program	I opted for the current program because other means to raise this money that involve the need for governmental and private sector workers to think harder and smarter need to be researched.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	Our environment and the ecosystems that make up our environment are very important. I believe each Americans duty is to preserve the delicate balance between the ecosystems we inhabit.
Ship repair program	It was the least expensive
Full program	because it protects ur marine life and coral reefs and the repair takes 10 nyears instead of 50 years
Full program	At some point the fish will be gone. There will be no need for fishermen. Animals that feed on the fish from the coral regions will then disappear. The ecosystem will be completely off kilter.
Current program	Because it is time that someone said enough, everyone wants money for something. For those who care about the coral reefs let them pay. California, cares about everything and is bankrupt,(I will give you an IOU if that works) its time to draw some lines i
No-fishing zones program	seems to make the most sense based on information provided
No-fishing zones program	The reefs would improve with a lower cost than the full program.
Current program	no cost
Current program	I don't believe the Coral Reefs are in as much peril as the govt. would have us believe; plus I don't believe ANYTHING our govt. tells us anymore. All they want to do is invent more ways to separate us from what little money we have. The IMPOSTOR in th
No-fishing zones program	I believe that the increased no-fishing zone is the best federally sponsored program of the four. The state of Hawaii should look into alternative methods of fund raising to repair the coral reef than taxpayer money.
Full program	as a environmentalist : ifeel that we can not spend enough money on protecting our planet
Full program	I am totally for protecting and repairing the ecosystems for generations to come.
No-fishing zones program	I want to help the coral reefs but my family also has other needs and I am not sure we could afford to pay much more in taxes.
Full program	I preferred the Full Program because I have heard that 70% of our oxygen comes from the ocean. This would help not lower our amount of oxigen.
Current program	The current administration will bankrupt the taxpayers with new spendind programs we will not get a chance to vote on. We cannot agree to fund any new or more expensive programs. We could save enormous amounts of money with cuts to our federal budget.
Full program	We only have one planet. If we do not take care of it, then our kids will suffer. I can afford \$20 a month if I had to.

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It costs less than the 245 dollar one and the way the Fed's boof money I do not want to contribute to their corruption
Current program	The residents of Hawaii and those who visit the state, and therefore may directly benefit from healthier reefs around the main islands, should bear the full cost of this maintenance. This is not something the residents of the rest of the US should be burdened with
Full program	the amount of money to pay for a full program is worth it to me
Ship repair program	50 years is too long of a recovery period.
Full program	we lose nature we lose the world God gave us
Full program	If things aren't taken care of now, they won't be there later. Trying to be pro-active rather than re-active.
Current program	none
Full program	It's worth protecting the coral reefs.
Current program	We do not need any more tax increases
Current program	The coral reefs have been there for hundreds of years. Another 10 to 15 years won't make that much difference. In the mean time I believe there are more important issues the government should spend OUR money and their time on.
Current program	we can not afford more taxes
Ship repair program	It had a 10 year recovery plan and was still very affordable.
Full program	I figured that you really could not do one without the other. I would think each effort by itself would be a waste. If you're going to do it... DO IT RIGHT!!! You get what you pay for...
No-fishing zones program	i think it will be too difficult to get ship/boat owners to pay for repairs. Plus they will repair themselves slowly.
Current program	More government intervention in the reefs is not the solution. More government intervention in the reefs will have injurious unforeseen consequences to the wildlife.
Current program	I don't feel we are able to keep spending more and more \$\$\$\$ on federal programs.
Full program	if we do nothing for the coral reefs around the Hawaiian mainland we lose everything including the fish.
No-fishing zones program	iam not a fishing type
Current program	i think enough is being done already; or perhaps if a different program was issued, it would be better in which the tax budget was less than \$15 or \$20 only for increasing the no-fishing zones
Current program	The government is spending enough money on similar programs. I would like for them to spend money on finding cures for diseases and helping homeless people.
Current program	I chose the current program because it does not affect me as a taxpayer more so it is not a nation wide program and safer too.
No-fishing zones program	Ship accidents are a small percentage and could be controlled with markers and no ship zones instead

**Table I.1. Why ANES respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	Taxes
Full program	I think it is worth it to try and restore the environment back to a similar environment before people started ruining it
Ship repair program	it seems to be the most sufficient way to solve the problem
Current program	I DO NOT FEEL THAT THE BENEFIT OF THESE REEFS SHOULD BE PAYED FOR WITH FEDERAL FUNDS. HAWAII SHOULD FOOT THE BILL—THEY ARE THE ONES PROFITING FROM THE REEFS.
Full program	most beneficial to the reefs
No-fishing zones program	most benefit for moderate cost
Full program	In the final analysis my choice would be the most preferential and would eventually cost less when those people who would be most responsible would follow the law and procedures to make sure not to put the coral reefs in danger.
Full program	The costs still seems minimal compared to the benefit.
Current program	Hawaii should be taking care of their reefs without US Gov assistance.
No-fishing zones program	this is an easy solution, that doesn't require expensive solutions. the cost is only for enforcing this rule.
Ship repair program	because coral reefs are very important to the survival of the ocean sea life.
Full program	without help reefs will be gone
Full program	the costs pale in comparison to the costs we all pay when there are no USA coral reefs. besides i would rather pay more for reefs than for ILLEGAL WARS, WARS ON DRUGS OR FIGHTING ILLEGAL IMMIGRATION!

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	\$\$\$
Full program	\$135/yr is nothing,for what can be done to heal the reefs per person,we will profit in the end.
Full program	\$150 dollars a year isn't too much to pay in order to get the eco system in better shape.
Current program	\$185 sounds steep for all household to pay. Find another payee and i gladly support the most green program
No-fishing zones program	\$200 a year is a lot of money. It seems like in this economy you have to make hard choices
Full program	\$215 sounds like a lot of money to me, if I am going to pay the government that much extra every year I do not think that coral reef rehabilitation is the most important issue on my list. On the other hand something does need to be done, so that left the next option where at least some of the reefs are protected.
Full program	\$25 more is nothing conpared to \$1000 spent on houseing market
No-fishing zones program	\$300 per household for a full program is alot of money for just one program benefiting only one area. Higher fees for Commercial and sport fishing and a enviromental fee for ships entering the harbors would make the persons profiting from and causing the problems shoulder more of the responsibility.
No-fishing zones program	\$75 dollars a year seemed like too much. I chose 2 acres instead of 1 because that would cost only \$10 more than the 1 acre.
Ship repair program	5 acres are repaired and it less federal taxes coming out of my income
No-fishing zones program	75 seems to be a reasonable amount to spend and for me to pay. I waivered, though, between the full program and the no-fishing zone. The repair program really doesn't have the short or long-term impact.
No-fishing zones program	A little expensive,but probably worth it
Full program	Again this is a no brainer. If Hawaii wants to fish then they need fish. Without repair and at LEAST 25% no fishing areas they won't have fish!
Current program	again we need to repair this country we can not afford to repair coral reefs when people are dying and homeless
Current program	Again you can't feed the people in the next town, when your struggling to feed your own family.
Full program	All natural habitats are vital to human life in one way or another and were created by God. Humans have no right to destroy any of these environments much less not do any repairs that we can
Full program	All things in life that are worth any value usually have a price tag attached.
Full program	Although I agree in the 'Full Program' there is no need for any added taxes.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Although I do feel we need to protect. Again i bring up the fact that at this time we can not afford this. Our educations system is failing, and many families are out job because of budget. I think that adding this to our yearly spending will greatly hurt some families. I think that this program should be held at bay for now.
No-fishing zones program	Although ship injuries cause damage to the ecosystem, the coral reefs eventually repair themsleves. There are relatively few ship injuries.
Current program	As a Michigan resident I enjoy the lakes and streams locally. Hawiians need to learn to take care of their own waterways.
Full program	As a scuba diver I feel it is necessary to protect the oceans.
Ship repair program	As a sport fisherman, goverment has already taken away fisheries that I used to fish and I haven't heard that there has been any increase in fish in those areas.
Current program	as i have already stated we are an overtaxed nation paying for lazy people that vote for politicians that are only interested in getting rich
Full program	as i said before we need to protect our oceans and corals as much as possible if this is what it takes then so be it, and maybe these peoplewho make 100.000 ayear maybe they need to to donate some of their cash for this cause.
Current program	as I said in my last remark, I do not feel that the taxpayer should have to carry that load, we allready carry a lot,the federal government could also come up with another lottery to help cover the cost of the reefs, as long as the people get some financial satisfaction out of it. And instead of putting out so much money to other countries, LET'S TAKE CARE OF OUR OWN COUNTRY FOR A CHANGE.
Full program	AS LONG AS THEIR PREPARING THE REEF
Full program	As presented the 'Full Program' indictes a quicker recovery time, with a larger area of maintenance. Of course the question would be 'who is really responsible for the the cost?' .....It would seem as if the shipping companies would open to creating insurance,contributions than fines.....a ah ..ahmmm....ahh.er.....why me? I live in Florida.
No-fishing zones program	As the reefs will heal eventually, repairing them dosen't seem as vital to their survival.
No-fishing zones program	At least no more damage will be done in these areas
Full program	At the current rate of ship scarring there will be 250 total acres of damaged coral reef every year (5 acres x 50 years). This seems somewhat significant, I would expect that most scars appear again and again in the same areas. To save money I would suggest only repairing areas with significant scars and ignoring the very small scars. I think the no fishing zone are more crucial than repairing the scars. I would be curious to find out if the rate of scarring is expected to increase.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	At this point in my economy, I do not have the resources to pay for someone else's greedy chosen way of life. I do feel that something should be done about the coral; however I think that the law should be looked at. I would like to add, I am willing to contribute some of my savings to save a precious piece of our World. We should be ashamed at the treatment that we show to ocean. Do these fishermen think that we can just order up a new food source. What is wrong with these LAWS???
No-fishing zones program	at this time it seems like a good starting point without too much cost to the tax payer, see how this works and then add repairs if needed
No-fishing zones program	because
Current program	because all the programs cost money expect that one and right now no one can afford that but the rich people of the world
Full program	Because at \$11 per month its important to protect the coral reefs.
Full program	Because even if it costs the tax payer a little more, it's worth it.
No-fishing zones program	Because I believe that we can't continue letting the coral reef around The United States decline. However, I believe that there are many federal programs that can be cut or reduced to help pay for the cost required.
Current program	Because I explain before if we are not reaching to obtain out off the industries who benefit the most of this waters for monetary help, why would the tax payer always have to pay the consequences!!
Current program	Because I feel I am taxed too much already. and the federal government needs to step out of programs. The government are too heavily involved and thus we are spread too thin.
Ship repair program	Because i feel it not only protects the reef but doesnt spend to much money to repair the reef.
Full program	Because I said so. Now do it!
Full program	BECAUSE I THINK IT IS NEEDED.
Current program	Because I think the people that travel to Hawaii every year should pay a tax on their plane ticket and fishers should pay a higher licensing fee. Increasing the fisher's boat licensing or commercial licensing should serve the purpose of raising money while also creating barriers to entry. In Hawaii specifically, I guess it would also help me to know how much commercial fishing contributes to the Hawaiian economy. Also, all of the tourism companies that use the ocean can donate or charge a higher amount of fees for the snorkel cruise or dinner cruise, or parasailing. People who do not want to go to Hawaii or will not be able to go to Hawaii will not want to pay an additional \$45 to \$100 per year for a luxury they will not enjoy.
Current program	because i think there is more important things
No-fishing zones program	because i think this the natural way to recovery corals

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	because if the reefs of the world are happy, I am happy. Our reefs are a good place to start.
No-fishing zones program	Because is reasonable for everibody.
Current program	because it has no federal tax impact on citizens.
No-fishing zones program	because it is important
Full program	Because it is important to ehlp preserve the coral reefs
Full program	Because it is needed to restore a healthy echo system in the coral reefs
Ship repair program	Because it is the most affordable for most households.
Full program	Because it offers the most FOR the coral reefs at a very reasonable price to the taxpayers.
No-fishing zones program	Because it provides a better overall solution and still keeps cost down for the average family.
Current program	Because it seems effective, so why change it?
No-fishing zones program	Because it still allows people to fish but at the same time have more control of the area
Ship repair program	Because it was a moderate amount of money to each household in this time of problems and yet it does something.
Full program	because it will protect the fish and wild life that surround the coral reef
Ship repair program	because it will repair the coral reefs by acres
Full program	Because it would do the most and I'd rather my tax dollars be spent on that than other things.
No-fishing zones program	Because it would increase the amount of fish is the are as well as protect the coral reefs in that area. This increase in fish size and amount would also help the fishermen outside the protected area to be able to continue to work. I love nature and would hate to see the ocean life extinquished because we do nothing to protect the reefs
No-fishing zones program	Because it's the cheapest way to go for my money and at the same time it's helping.
No-fishing zones program	because no fishing zones will help the coral reefs and sea life to increase and it won't seem like a burden to the tax payers.
Current program	because of being on a fixed income I am unable to pay anything more in taxes if offered the choice
Current program	Because of our state of economy, I do not want to spend any more of our house hold expense.
Ship repair program	because of tax reasons
No-fishing zones program	Because of the general decline of the fish population and how the food chain is affected caused by overfishing and I think this is a good start and maybe down the line start doing he repairs.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Because of the statement I wrote earlier. If ships had passages similar to truck shipment, they would not destroy all of the reefs, their shipments would only be delivered in certain sections of the islands.
No-fishing zones program	because the cost was affordable
Ship repair program	Because the federal government should pay for the program, not the people, or make the people who damage it pay.
Current program	because there will be 0 federal taxes
Ship repair program	because without reef there wouldn't be any beaches and fishing
Ship repair program	Because, in this time of "Ressionion" I am not sure what I would be able to afford. I would say more if I new that I could afford it.
No-fishing zones program	being from maine i love the ocean so we must try to protect it
Current program	BEING FROM TENN. I DO NOT WANT TO SEE MY TAX MONEY GOING TO SAVE SOME FISH.MAYBE SOME FARM LAND BUT NOT FISH.
No-fishing zones program	Benefits of enforcing expanded No Fishing Zones are clear. Even if jobs are lost in the short term, failure to act will cause job loss anyway. Five acres of ship damage each year is relatively small compared to the total 300,000 acres and will reheel themselves, just more slowly. I'd rather let nature do the repair - she makes fewer mistakes than humans!
No-fishing zones program	Best bang for the buck.
No-fishing zones program	Best return for the money spent
No-fishing zones program	best use of money for most impact
Full program	best way to recover
No-fishing zones program	By increasing the no fishing zone,you allow increase in sealife,thus repopulating the area. This can go a long way. The economy is not good now so I think spending further money would be a strain. Maybe there should be a docking zone and no boat zone to allow regrowth.
Current program	cannot afford higher taxes
Current program	can't afford additional expense in current economic conditions. Once an expense is started we have no guide to when expensemay decrease or mre likely increase.
Current program	Can't afford the other programs.
Ship repair program	cause it was the interesting
Full program	cause you can protect teh reefs better
Ship repair program	cheapest option short of nothing

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	Commercial or private ships or boats should not be within the No-Fishing Zones. Therefore, no need for repairs. The No-Fishing Zone protects 75,000 acres, while the Ship Repair Program repairs 5,000 acres
Full program	common sense
Ship repair program	Coral reef seams to be an important matter to me
Current program	Coral reefs are beautiful and great for the environment, I personally cannot afford any more taxes.
No-fishing zones program	cost benefit of no fishing zones is better. The ship repair program seems proportionally too expensive
No-fishing zones program	Cost effective.
No-fishing zones program	Cost is fair and to only repair 5 acres does not seem worth the extra expense
Ship repair program	Cost per family.
No-fishing zones program	cost to benefit ratio
Current program	Costs should be paid for by increased costs to visitors to the islands using those facilities(fishing,snorkeling etc.)
No-fishing zones program	Declining fish and marine life effects more areas of Hawaii's economy from tourism I would think.
Ship repair program	Do not know just how much help is really needed
Current program	do not that much about it
Current program	does not cost me anything
Ship repair program	Does something but costs the least
No-fishing zones program	does something without costing me too much
Current program	dont have one
Current program	Don't need any more taxes to pay
Full program	dontno
Ship repair program	Due to my research I find this to be the best alternative.
No-fishing zones program	economics, low income level
Current program	Education and other programs need more funding. If my house hold taxes are to be increased I would prefer the money be spent in areas other then coral reef protection.
Full program	Ending the continued destruction of the environment (coral reefs or otherwise) in unacceptable.
Full program	Environment is more important than any single person's priorities. A ruined environment is a ruined future, and there is no price on preserving the future.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Even with 50 years for reefs to repair themselves, at a rate of 5 damaged acres per year, less than one tenth of 1% of reef would be damaged. As for the fishing, the citizens and politicians of Hawaii need to determine how best to use the ecosystem, trying to balance protecting the reefs against the costs both in money spent, and economic ramifications. Basically, Hawaii should control this issue, not the Federal government.
Full program	every thing that helps is my thought's
No-fishing zones program	Expanding no fishing zones will have its own ecological benefits and restore the reefs and wildlife and benefit fisherman in the long run. I believe the ship damage is minimal.
Current program	Federal tax dollars no state programs could be used much more effective. As far as repairing the damaged coral instead of working solutions to help reduce boating accidents is democratic federal government stupidity
Full program	feel ships should help fix the area they caused problems with and believe no fishing zones would be better for people living in those areas in years to come
No-fishing zones program	feel that is enough
No-fishing zones program	Fewer ships would be in the area and hopefully less damage would occur, making it less necessary for repairs. In addition, it is less cost per household.
No-fishing zones program	fish life is important
No-fishing zones program	fishing companys can make man made reefs elsewhere, were they can catch fish:like a fish farm. I do this myself in the waters of maryland with old christmas trees.
No-fishing zones program	fishing decline is at a crisis level. 5 accidents a year seem like not so much given the size of the area. I would prefer a tax on dock fees or such to target boat users of this area, rather than a federal tax for the boat users damage.
Full program	for current and future protection.
No-fishing zones program	for the time being protecting the wildlife in the zone is the least expense to the taxpayer - at the same time doing something to replace some of the ecosystem.
No-fishing zones program	Full program best, but too costly. Seems the no fishing would have the biggest impact.
No-fishing zones program	future generations should be able to view the coral reefs
No-fishing zones program	gets stuff done without taxing the most money
Ship repair program	good to repair and cost less
Current program	have no funds to assist Hawaii's coral reefs
Current program	having to pay extra is a hard pill to swallow especially right now when the economy has been slow

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Hawaii should pay to protect and repair the reefs. Hawaii reaps the benefits of the reefs.
Current program	Hawaii thrives on tourism. For Hawaii to remain a popular destination for people, the state should become responsible for the preservation of its reefs and fish population.
No-fishing zones program	Helps more than the repair program but does not cost as much as the full program
Full program	Helps the environment, and coral reefs are a very important part of Earth.
Ship repair program	how is the percentage made up
Full program	how many accidents those Hawaii have
Full program	I agree however I do not agree that someone in West Virginia or New York should pay for this. Again this should be a state funded program NOT a Federal program
Current program	I always seem to pay higher taxes for something I never benefit from, so who's helping me! Their own state should be responsible for concerns.
No-fishing zones program	I am concerned about declining fish populations, it is an issue that I have some familiarity with. I am unfamiliar with coral reef repair and I don't have enough information to judge whether it is worth the cost. The coral reefs do repair themselves, so it is not a total loss and therefore seems less threatened. I am a bit unclear as to why the damage is occurring and wonder if something could be done to prevent the damage in the first place (this may appear ridiculous to someone who knows more, but it does reflect my current knowledge).
Current program	I am not informed enough
Current program	I am not opposed to protecting the reef. I am opposed to higher taxes. The federal government wastes so much money on unnecessary and/or ineffective things; they should redirect some of the funds already in play to protect the reef.
Current program	I am tired of being taxed and my wage stays the same
Full program	I believe if something can be saved we should do our best to do it.
Full program	I believe \$300.00 a year is a small price to pay to protect and repair these natural wonders.
Full program	I believe a lot of effort should be put into this program and money.
Ship repair program	I believe it's the most important for many reasons saving us from global warming possibly finding cures for things we never thought possible and my list goes on and on
Full program	I believe natural beauty should be protected. It is a good investment.
Full program	I believe that \$135 a year is a small price to pay to protect the coral reefs and living things that are such a large part of the cycle of life. As humans, we are the ones destroying we should be the ones to repair.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	I believe that coral reefs must be maintained and saved from overuse by people. I think \$75 is a very small amount. Overfishing has to stop everywhere. Not just Hawaii. People who say that without it they have no way to make a living better go back to school.
No-fishing zones program	I believe that increasing the No-Fishing Zone will itself reduce some of the 5 acres of coral damaged annually.
No-fishing zones program	I believe that it is better for repair to the natural eco system be from a natural source rather than man made. I believe that if people try to repair we may inadvertently cause issues damage unintended.
Current program	I believe that the islands should increase taxes on the people visiting and making money there
No-fishing zones program	I believe the most can be done for the money spent and will offset repair to ship damaged reef.
Current program	I believe the state of Hawaii is perfectly capable of creating and implementing its own programs and policies to meet the goal of protecting and restoring the state's coral reefs. The federal government need not intervene.
No-fishing zones program	I believe there should be a separate program for damage and repair of coral which would include law enforcement and responsibility placed on those doing harm to the reef.
Full program	I believe this is a valuable asset and should be protected
Full program	I believe we must do everything possible to protect our world especially many of these beautiful and important areas. We want other generations to have the use of and enjoyment of this type of natural beauty.
Full program	I believe we must go with the most efficient program
Full program	I believe we need to repair the coral reefs as well as increase marine life.
Full program	I can afford the 75 bucks, so for me I think this program is worth it.
Full program	I can afford to reduce household expenditures by \$25 a month in order to maintain/repair the coral reef ecosystem.
Full program	I can alot about Hawaii and its natural resources...I'd pay much more to protect it.
No-fishing zones program	I cannot believe it would cost that much for each houshold to protect and repair the reefs. Lots of jobless people right now would do it for less than expensive contractors.
No-fishing zones program	I can't afford more taxes, but I think less fishing is imperative.
Current program	i cant pay taxes as they are!
Ship repair program	I choose the Reef Repair Programme because I believe after readin g all the information that, that programme would be the one best for all concerned.,
Current program	I choose this one because I have been laid off, If I was rich , I think that I could have choosen somehting where I can pay 300, But I bet if there weree to be a fund raiser you will raise millions.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I chose the current program because I feel we must solve some of our problems in different ways than just going to the tax payer. I am not sure that the only way to fix a problem is to create a bigger Federal program and tax more. Whoever is proposing this project needs to start thinking out of the box. The tax dollar is not the best solution to every problem. Whatever happened to American ingenuity?
Full program	I chose the full program because it has the greatest positive impact on safeguarding and maintaining healthy coral reefs in Hawaii at only a minimal cost for me as a taxpayer.
No-fishing zones program	I chose the no-fishing zone program only because it would allow possibly more fish population to increase and decrease the injuries to the coral reef. I feel it's the best of all choices and helps ease the frustration of all parties involved. No one would really get a better deal than the other.
No-fishing zones program	I chose the no-fishing zones program as the best of the choices even though I thought it wasn't a good choice because it increases the fish production by more than it needs to be increased at the expense of fishermen's jobs. In principle I prefer the option because it requires short term losses for long term gains. This would be true in a less ambitious version of the same option. I can imagine other ways of solving the injury from ships problem that wouldn't involve asking taxpayers for more money. Also, \$110 seems manageable, whereas over \$200 seems like it might hurt people less fortunate than myself. I want to promote the health of the ocean because I consider it our greatest resource. That's why I wouldn't leave our current policy in place. Somehow I suspect this survey doesn't really have anything to do with coral reefs per se but with the underlying principles it draws upon.
No-fishing zones program	I chose the No-Fishing Zones program because it proved to be the most ecologically and economically sound choice.
Ship repair program	I chose the slower one because I would like to see that we ALL participate. \$130 per household is a burden to many families. With the slower program, we will be more willing to carry these costs; and the costs are really imperative to saving an IMPORTANT part of our environment. No part of our environment should be forgotten if we are to survive and enjoy our planet for many years to come.
No-fishing zones program	I compared the estimated costs with the possible benefit by looking at the number of acres affected. My first choice was the no-fishing zones program, but the full program was a close second.
Current program	I disagree with any kind of tax raise
Current program	I do not live in Hawaii, and this is a State issue, not a Federal issue. If Hawaiians want to pay more to protect their coral reef, then they should vote for it and have it passed at the state level.
Current program	I do not want to pay out of my pocket for the current program

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I don't believe the indigent, elderly and those working people who struggle to put meals on the table and pay bills would like being assessed \$245 a year for the coral reefs. Let the travel councils, fishing companies , and leisure tax from those who have money for such extravagance as travel in todays world pay to keep these reefs in pristine condition ( which is the way I think they should be!)
Current program	I dont care about the coral reefs ill never see them and we are all taxed enough already
No-fishing zones program	I don't have an outstanding intrinsic connection to the coral reefs, but I do appreciate the genetic and biologic diversity as well as commerical and social assets such an area offers. It also seems more sustainable to curb fishing in the area rather than repair a small amount of the reef each year.
Current program	i dont have money for something i have no interest in
Current program	i dont know i just liked it
Current program	i dont need to pay any more in taxes
No-fishing zones program	I don't really understand all of this stuff and this is not important to me
Ship repair program	i dont think that taxpayers should pay for this program! or any of the four programs, but i do think that the ships that cause the damage should pay for it to be repaired
Full program	I don't think the \$160 per year is that big of a deal based on my household income. I'd rather spend the money on something that helps the environment vs. helping other countries we are at war with!
Current program	I don't think the Fed Gvt should be responsible and I don't think taxing everyone is the answer. Hawaii has a legitimate need to protect and repair the reef systems, as does Florida. I feel that if people were made aware of the issue and ASKED to contribute (donate) that most people will donate some money. some more than others. Based on what money is donated the organization tasked with doing the work can determine how to best use the money. If they misuse or waste the money, we voluntary donors can decide if there is a better alternative to donate our money to. If the Gvt take the money there is no accountability and no choice.
Current program	i don't think the taxpayer should pay such a price. with the economy the way it is. People can barely live from day to day, or paycheck to paycheck. How much more can the government take from us. The bale out big companies and foreigner. but not your u.s. citizens
Full program	I don't want to wait for 50 years for my grandchildren to see the coral reefs--- especially if they are not protected now, they will all be gone.
Full program	I expect to have grandchildren. Everything I can do to preserve any part of the planet at current stages is really important, more important than anything other than health care that I spend money for.
Full program	I favored the full program because I believe it is very important to protect and maintain marine life and its ecosystems

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I feel it is not too much money for a great gain. The ship wreck is expensive for 5 acres/year. If you protect 25%, hopefully, the ship wrecks will decrease as well. I do feel, they should fine when a ship wreck is found and the owner of the vessel is indentified. You then can repair those damaged reefs.
No-fishing zones program	I feel like it would do the most good in the long run. And we need to get funds from ships to repair the damage they cause, However we need to control our own over use of natural resources.
Current program	I feel like more emphasis should be placed on funding education in the United States rather than trivial matters such as this.
No-fishing zones program	I feel somewhat responsible for the aid to this program, however I feel the state of Hawaii should take more responsibility because it affects them more.
Full program	I feel that it is more important to restore and preserve this earth that we have been blessed with. It was money that drove people to destroy it, so money should be what is used to restore it.
Full program	I feel that the coral reefs need to be protected and restored
Current program	I feel the cost of the program would be too much for everyone; it should be affordable if you expect EVERYONE to pay. People visiting and boating taxes like I mentioned above could cover the majority of the cost. I think at the cost you had listed that you would have no chance of passing that nationwide. Some people will never visit or can't afford to travel there and will not be willing to pay \$100.00.; doesn't seem like a lot but a lot of Americans live paycheck to paycheck and would not vote for the this. I would vote on a \$25.00 a year tax.
Full program	I feel the madness has to be stopped somewhere and if it has to start with me and my generation then so be it. But, I also feel that the federal government should start doing more than it is doing to not only save the coral reef, but other natural resources.
No-fishing zones program	I feel the program should be funded by the state not Federal funds but I also feel it is important to protect the coral reefs to some extent
Full program	I figured the federal government is going to tax me for things anyway, maybe it will be nice for a change on something I think is important or something I actually have a choice on.
Full program	I fill that it is the most preferred for me
Full program	I have a passion for the ocean it was hear well before any of us were and the money spent is important to me
No-fishing zones program	i have never thought about this issue. after reading about it, this seems to me to be the best answer
Current program	i have yet to learn about it and i am curious on the subject.
Full program	I just think that you should do what you can to preserve the natural beauty of life.
No-fishing zones program	i just thought that 75 dollars a year was a bit much
Current program	i know nothing abouthow to care or repair the reefs

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I like the no-fishing zones because 25% of the coral reefs are protected. I like the idea of a larger amount of area protected.
Full program	I live in northern California 20 min. from the ocean. When I was a child, there was very little ocean wildlife. In the last 15 years, I have seen populations of geese, pelicans, seals, sea lions, dolphins and otters increase. I believe in preserving wildlife in other areas for future generations. I actually would prefer a no overfishing, no boats on coral reefs program to the full program you discuss here!
Full program	i love to here about coral reefs at hawaii
Current program	i need the money to take care of my kids
Full program	I now donate approximately \$2000 to a variety of charities. I consider protecting the reefs around Hawaii as a sort of charitable donation. If I find that paying \$200 more in taxes is negatively affecting my financial status, I can shift money from some fringe charities I now contribute to. I would do this by weighing the impact I think the charities have against the impact I think the reef protection and restoration would have.
Ship repair program	i picked the repair program, because it helps some, due to the economy, people just cant pay more right now.
No-fishing zones program	I prefer no fishing zone for recreational use, but still open for commercial use. I believe program is best alternative to protect more at a lower cost.
Full program	I prefer the full program because it is only \$130 for the whole year. Divided by 12 is really nothing and you are saving a great deal of the environment!!
Full program	I prefer the No fishing program, but decided that the extra cost was not that much more for the full program and the full program would benefit the coral reef ecosystem in both ways.
Ship repair program	i really don't know
No-fishing zones program	I think funding no fishing zones could help better with less effect on the common household. The state of Hawaii i think can think of more cost efficient ways to repair(ship accident)in the reefs by using recyclable materials like other countries do.
Current program	I think it can be done with fund-raising, eco-groups and tourist fees. I don't think the only answer is to raise taxes.
No-fishing zones program	I think it is important to try to preserve and increase the amount of the natural coral reef eco system, and the no fishing zones seems like the best way, and 25% is a fair amount.
Current program	I think it should be the decision of the individual to contribute to certain programs than have to pay more taxes. We are already taxed enough. The government just needs to stay out of our lives.
No-fishing zones program	i think it will be more successful
Ship repair program	I THINK IT WILL HELP THE REEF RE PAIR, AND IT DOES ABOUT THE SAME AS TH OTHERS WITHOUT PAYING SO MUCH...

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I think it's fair. Every taxpayer could be responsible for protecting from fishing but I feel the boat owners of any seaworthy craft should be responsible for any damage they might do.
Full program	I think its important to improve our environment. I can afford \$185 annually to help improve the corral reef and I think most people can as well.
Ship repair program	I think its important to keep these coral reefs safe.
No-fishing zones program	I think it's important to protect the area. It would be helpful to have the full program, but the money issue keeps me from picking that one.
No-fishing zones program	i think its wrong to continue to fish there i also think that Man should leave the ocean alone all toghter let it heal natrually on its own
Full program	I think that doing all we can to traffic the area around reefs and limiting fishing will help greatly
Full program	I think the corel reefs should be protected in as many ways as possible and the cost is not too high to help achieve this
No-fishing zones program	I THINK THE NO FISHING ZONE IS BETTER BECAUSE I THINK IT HELPS THE MOST ACREAGE AND IT'S THE CHEAPEST.
No-fishing zones program	I think the no fishing zones will in itself, reduce damage to reefs. Also, the cost of damages should be paid by those who do the damage.
Full program	I think the only way to properly repair the reefs is the full program...
Full program	I think they need to be repaired
No-fishing zones program	I think they need to have the no fishing zone percentage higher to maintain the good fishing for years to come. There is so many acres of reef that I don't think 5 acres a year will hurt it
No-fishing zones program	I think they should find a way to make the shipping companies pay when they injure the coral reefs. I think there is a possible way.
Ship repair program	I think this is a never ending problem. You cold pump all kinds of money to fix these problems and it would never end. Since the Northwest Islands are protected and are thriving that will have to be the area saved. With all the traffic in and out of the Hawaiian Islands there is not enough money to protect them.
Current program	I think we need to conserve finances at this time instead of spending more & more - instead of taxing households use some of the surplus that was spent on all the "gadgets" in the news this week before fiscal budget ends!!
No-fishing zones program	I think we need to do something, but the cost is high. more needs to come from the commerical fishng industry
Full program	I think we need to do what we can to help the situation.
Current program	I think we spend more money in places that i dont feel is needed, so why change it.
No-fishing zones program	I think, in the long run, this would benefit everyone. Maybe, other measures could be put in place to reduce the number of ship accidents.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	I understand the importance of protecting coral reefs and was prepared to select the 25% no-fishing zone until I saw the cost. I would much prefer to spend that amount of money on education and health care for those who need it.
Ship repair program	i want the eco system and marine life to thrive
Ship repair program	I want to have something done, but the current economic situation in my household cannot handle much of an increase at this time. My wife is losing her job and we live in a county with an 11% unemployment rate.
No-fishing zones program	I want to protect what the earth provided to a certain extent, not at the expense of jobs and human cost. As far as the damage done by ships, I think it's ok to let the the reef heal itself.
Current program	I want to see the the problems fixed, but right now cant see how I can afford the extra money. I also think that I could come up with another program that would be closer to me if I "had" to up the money for something. I would like to see something done about the reef problems though.
Ship repair program	I was basically looking at the amount paid by tax payers. With the economy the way it is, this money used can be put to good use in so many other areas. We are currently dealing with a large percentage of homelessness in the U.s and other countries.
No-fishing zones program	I weighed the costs and benefits, taking into consideration the number of acres protected v. occurrences of ship accidents that cause injuries to the reefs.
Full program	i will prefer a clean waters,then eating fish
Full program	i wood like my kids to see them in my life time
No-fishing zones program	I would like the ecosystem to become healthy, but do not want to burden families at this time when the economy is so bad.
Ship repair program	I would like to change my survey to full
Current program	i would like to help out this program but monies for me at this time is hard
No-fishing zones program	I would like to see coral repair also, but chose the program that was the cheapest cost to my household because at this time, it is difficult to imagine paying more for something that I will not see in the near future. THis choice allowed low cost, but also some type of help.
Full program	I would like to see some of my tax dollars actually go for something worthwhile and important for once. We pay a huge amount of taxes due to be small business owners.....it would be nice if a portion of those taxes went to a cause like saving the planet for my children and grandchildren. The problem isn't just how much we pay in taxes but how that tax money is spent. I think a reorganization in tax spending is a good idea.
Full program	I would like to see the ecosystem brought back to as close to normal as possible, but would like to know about more possibilities .

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	I would like to see the marine life numbers increase, but don't feel like the repairs program is necessary for this to occur. In this time of economic crisis, I don't wish to voice approval for increasing anyone's taxes unless it is absolutely necessary. The increase in marine life nos. would help the commercial fishermen in the future.
Ship repair program	I would like to see the reefs get healthy at a minimal cost.
No-fishing zones program	I would opt for a scaled down version of the full program if it were available.
Ship repair program	I would prefer the Full Program. However, due to the cost I chose the reef repair program. Based on the amount of my annual federal taxes, the cost for this one program seems extremely high.
Current program	I would rather give my money to help our schools.
Full program	I would rather spend money on the coral reefs than in the bail out of GM and Chrysler.
Current program	I wouldn't want to pay that much each year for it. I did not see in the presentation any concrete evidence. I only saw a sketch of what they think it will look like in 10 years.
No-fishing zones program	I'd pay as little as possible, but pay something to help the situation.
No-fishing zones program	Ideally I would favor a program designed by the federal government to prevent overfishing and repair coral reefs but funded in part by taxes AND a special program to create funds another way like an educational/work program.
Full program	If 75.00 a year from every taxpayer would get the reefs back like they were in only about 10yrs, it is worth it. That is less than 7.00 a month to be able to show our grandchildren how beautiful the reefs are and educate them on the benefits that they give to our planet.
Full program	If I could help to save nature for a small amount I definitely would feel that it is money well spent. Afterall, how much of my tax money is going to projects that I don't know or even care about????
Ship repair program	if it boost economy and improve our environment at the same time, i dont see why we are not funding this, and stem cell reserch
Full program	If nothing is done the problem will become greater and take more funds to fix in the future, choosing either partial option will only fix part of the problem. The problem is known, the cure is known, it would be irresponsible not to do more to protect the coral reefs. The benefits are for more than just residents of Hawaii.
Full program	If the condition of the reefs continues to worsen at the present rate, they will soon be gone forever and fishing as well as their beauty and the lives of many creatures will never be replaced
Current program	If the coral reefs break-down, they will evolve into something else. This is what happens in the world. Bottom line:I can't afford an extra \$300 per year.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	If the information that has been given to me is correct and unbiased, then I would choose the No-Fishing Zone program because it will inevitably help the Hawaiiin people without restricting too much of the fishing areas. To include replacing damaged coral reef, it would cost more money for taxpayers and fisherman....and it's only a small percentage of the acreage that gets damaged.
No-fishing zones program	If the reefs are protected,they will repair themselves because they are a living system.
Full program	If we can't do this for our eco system then we are just jeperdizing our future.
Full program	If we continue to just put a bandaid on the problem, it could be detrimental to other forms of marine life and if it works for Hawaii and the positive outcome is quicker, then other areas of the world experiencing the same problem may look at this more seriously and can justify to their people using Hawaii as an example of the success of the program.
Full program	if we do not protect our oceans we will not have any
Ship repair program	If we don't repair the reefs and prevent overfishing, the consequences to future generations will be monumental. commercial fishermen can go elsewhere or find other employment, we can't replace extinct coral
Full program	If we dont start takeing better care of our mestakes we will have no wonderfull things to injoy. It seems like a lot of money and is but some day Id like to take my fameily there some day and if its mostly destoryed that would be horrrable.
Full program	if we keep destroying the corral reefs without repairing them the ocean will be in bad shape as we know it.
Full program	IF YOU CHOOSE TO LIVE ON A ISLAND' YOU SHOULD EXPECT HIGHER TAX'S. THE REEFS BRING LIFE TO THE ISLANDS. THATS WHY PEOPLE CHOOSE TO VACATION THERE.
Full program	If you protect the reefs you should want to repair them too. Only doing part of the job still makes leaves the ecosystem out of balance.
No-fishing zones program	Ik think these are valuable properties which should be preserved in a larger amount, because we may not always have them.
Full program	I'm an outdoors person and believe we should do everything possible to protect our enviroment
No-fishing zones program	Im for marine life.
Current program	i'm really not sure myself. i don't really understand it but am trying to learn about it.
Current program	I'm sick of spending dollars that don't help me. Where is my program?
Full program	importantforcoanandfish
Full program	In a year I am willing to give up \$100 to a program that has such far reaching effects. I know that people with tight money issues would not choose it and I would understand.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	in favor of the 25% no fishing and for \$3.00 more per month it is well worth repairing the reefs as much as possible.
Ship repair program	increase life and reef to regenerate
No-fishing zones program	increase marine life
No-fishing zones program	Increase the no fishing zone and chose not to fix ship accidents. Not too many ship accidents a year. Are the ship accidents from fishermen?
No-fishing zones program	Increasing taxes to cover costs for environmental protection is an acceptable tax increase for me. Increasing taxes to cover costs for damages caused by a specific incident and a specific individual is not. Those costs should be recovered from the responsible party or parties.
Current program	It a state problem.
No-fishing zones program	It appears that is the one that gets the most bang for the dollars spent. Also , always the program will always cost more than originally planned. It never fails when the gov't starts a program. Plus the costs will escalate and will not be controlled..
Full program	It appears to have the biggest impact in the shortest amount of time.
Current program	it cost the less
Ship repair program	It does require some tax money to repair these ecosystems in which we have contributed to damaging and I believe that we should be responsible in the costs of repairing. The program I choose is the one that would fit my budget. I would of loved to pick the full program however.
Current program	it doesn't cost me anymore taxes than i already pay
No-fishing zones program	it encourages new growth
No-fishing zones program	It got the most results with the least amount of money
Full program	it help more than the othere 3 programs
Full program	It helps to recover as well as replenish the sea
Full program	It is \$110 a year to help balance the eco system. It's a good investment that if truly honored should pay dividends.
No-fishing zones program	It is a reasonable cost with a fairly high impact.
Full program	It is clear to me that the full program is the optimal choice for restoring the Hawaii coral reefs to their pre-pollution condition. \$130 is a small price to pay for doing that.
Full program	it is important
Full program	It is important that alternative sources of food be developed in the Hawaiian islands this will spur just such an effort. Many of the fishing jobs will return when the reefs recover.
Full program	IT IS NEEDED TO CHANGE THE WAY CORAL REEFS ARE PROTECTED

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Ship repair program	it is not that important for use to be worrying about it so much. yet i feel as if it should have some sort of attention. america has much more to worry about.
No-fishing zones program	It is the best way for a reef to recover, but I still think this should focus on commercial fishing. Recreational fishing can be managed.
Ship repair program	it is the cheapest and eventhough i dont leave there i think it a part of the world that we need to worry about. i think we all should play a part of getting a better world for our kids.
No-fishing zones program	It is the cheapest option and with no fishing zones, less ship wrecks and activity should be a byproduct.
Full program	It is the most beneficial to the coral reefs in Hawaii and hopefully the long term effects would out weigh the cost per household...
Current program	it is very expensive to do relatively nothing
Full program	it is very important to maintain the reefs for the future. we are always destroying our inviorment and it is time to step up to the plate, and maintain and repair the damages we have caused to our planet that we have caused. so it will be there for the future generations to explore and learn.
Full program	It just maks sense, and it's cheaper in the long run. The difference in dollars is too small if considered cost/benefit
No-fishing zones program	It makes more economic sense
Full program	it most reliable and it also fixes some damages.
No-fishing zones program	it protect more area of protection than the current one but need to add more repiar area
No-fishing zones program	It protects a larger percentage and also provides for more fishing in other places.
No-fishing zones program	It protects more area and hopefully reduces the amount damage caused by ships. Therefore, we might not need the extra money for repair. That being said I feel the federal government wastes most of our tax dollars as it is and I am confident a regular tax paying citizen with common sense could find the money elsewhere in the federal budget without the need for additional taxation.
No-fishing zones program	It protects most of the coral reef at a cost Americans can afford
No-fishing zones program	it protects the future for our growing families because it will greatly improve our ecosystem
No-fishing zones program	It protects the most area for the smallest amount of money. I think that the full \$245 is a small amount, but I am unwilling to earmark more monies toward the reefs until more money is spent on education.
Full program	It provides the most direct and comprehensive benefit to the reef in both repair and "restocking" of natural wildlife.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	It seem logical to preserve Gods creation rather than destroy it.
No-fishing zones program	it seem ok
Current program	it seem to be the most logicaly one
Ship repair program	it seems like a good amount of money to help the program, \$ 200 seems a little high...
No-fishing zones program	It seems like it will do the most good. Lacking a numerical estimate of the anticipated total gain or loss of reef under the proposed plans makes this hard to know for sure. I thought it sounded more effective before I saw the tax increases and then the fact that the tax increase was less for that plan cemented my decision.
No-fishing zones program	It seems like it will help the reefs tremendously and it is a little cheaper than the full program
Full program	it seems like it would make the most difference in maintaining and improving the reefs. \$300 sounds like a lot of money for something you may not be able to see, but i think we need to do what we can to preserve the environment. Maybe I may not get to Hawaii to see the reefs, but I would like for them to exist for my children or grandchildren.If you look at it as a monthly amount of \$25 it doesn't seem like so much. it would also give me more incentive to go to see it.
Ship repair program	It seems like the answer for everyone. A \$35 increase is much easier to absorb, the injured areas are repaired, not completely but it is at least something and there will still be the no fishing zones.
No-fishing zones program	It seems like the best answer for the comparative cost. However, it still seems quite expensive and unrealistic. \$170 per household when there are several million households? That sounds excessive.
Current program	It seems like the job is bing done, there are sensiive ecosystems all throughou the US and the money needs to be spread around. I live in the New England coastal zone and am more concernec about our eco systems, over fishing and over clamming. There are no resources curently avaialable to protect against our problems. Not as beautiful as the Hawaiian coral reefs but equally important.
No-fishing zones program	It seems like there will be less ships in the area so there probably won't be as big a need for reef repairs.
No-fishing zones program	It seems likely to be effective to reduce degradation of marine life.
No-fishing zones program	It seems the easiest to make happen
No-fishing zones program	It seems to be broad yet affordable.
Full program	it seems to do the most good.
No-fishing zones program	It seems to have the quickest benefit at the least cost.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It seems to help with damage via protection for the future and is thus uninvasive.
No-fishing zones program	It seems to protect more fish and it's only costing the tax payer an extra 75 dollars a year. I don't think that repairing the coral reef is really that beneficial
No-fishing zones program	It seems to provide the largest overall benefit for the money involved. Although I'm not sure any increase in taxes is good at this point in the economy, I do believe this is the right thing to do long term
No-fishing zones program	It seems you get the most for your extra money with this program.
Ship repair program	It significantly reduces the amount of time for the reef to recover & cost less than protecting 25% of the reef.
No-fishing zones program	It solves a problem that nature will never solve on its own. Control of over-fishing is a necessity if fishing is to remain a viable source of food. Cost of regulation of any industry should generally be borne by that industry and in this case passed on to people who eat seafood. If the industry becomes non-competitive that is just too bad. The tax payers can pick up the cost after the industry is gone.
Ship repair program	It was the program I thought was both helpful for the reef, and helpful for the taxpayer.
Full program	It will be something of good use.
Current program	it will cost me no money. i am single and almost never use the system but i pay a lot in taxes. schools, being the biggest. NO NEW TAXES!!!!
Full program	it will give all parties involved a fair chance to utilize the ocean and protect the coral reefs.
Ship repair program	It will give the area a chance to repair itself and not be as costly as the full program.
No-fishing zones program	It will give the fish time to build back up and naturally help the reefs! And humans don't need all that space just to fish!
No-fishing zones program	It will have the most impact over time. It's a tough decision because it will put many fishermen out of work until fish population is increased
Ship repair program	it will help repair damaged reefs without increasing the no fishing zone
No-fishing zones program	It will increase fishing in the area eventually, and the coral reef will always repair itself. Five acres out of hundreds of thousands is not really that much. Plus the cost is not that high.
Ship repair program	It would be nice to pick the full program but with the economy the way it is at this time, some people cannot afford higher taxes. We should start by repairing what is damaged first then later talk of protecting more reef when the economy gets better and more households could afford to pay more taxes.
Current program	it would cost a lot of money for these programs that we do not have.
Ship repair program	It would help a little and may be affordable for tax payers. It is better than no help at all.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It would protect 25% of the coral reefs, which in turn would increase fish and other sea life, also it would be less taxes paid.
No-fishing zones program	It's a compromise.
No-fishing zones program	Its a good start for reef protection and the results can be studied and analyzed over a period of time to determine how effective the program is/was. It does not increase the tax burden as much as the full program, but it does provide a good value (in reef acreage terms) compared to the Reef Repair program. I am not for any type of taxation, but when your state livelihood depends on tourism soooo much, I think its imperative that one of the main, natural tourist attractitions stay healthy and vibrant for generations to come.
No-fishing zones program	It's a good start, with best bang-for-the-buck option. Frankly, I'd like to see these types of options/choices with other aspects of our lives. "I'll take less crime for \$200, Alex." Ha!
No-fishing zones program	Its a program that allows us to help with the coral reef problems to some extent, and increase the amount of fish in the ecosystem for future dependencies of local fishing while increasing our taxes to about 6 dollars a month, a tax that is some what affordable.
Full program	It's a small price to pay yearly to keep the coral reefs protected and to increase marine life. Our childrens' children may never see this beauty if we have to wait 10-50 years for repairs and increased marine life.
Full program	its easy kick them father from shore
Full program	It's in order to protectour ocean life.
No-fishing zones program	It's less costly to protect the system from injury than to repair it.
Full program	Its not a lot of money per year and help to save the reefs
Full program	It's not a lot of money to pay per year.
Full program	It's only \$100 a year so that is \$8.33 a month added on. This money is going to something productive and to actually help the environment. It is the same cost if someone were to purchase a meal from a fastfood restaurant once a month, which as Americans usually occurs a lot more then that. So giving up one whopper meal a month to help sace the coral reefs is reasonable.
Ship repair program	its still helping the coral reefs but still leaves some money for other projects.
Full program	It's the most beneficial although costly to taxpayers

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	It's the right thing to do. If we destroy our environment, we should correct it. The reason I'm slightly unsure is that \$170 per household is a significant amount of money - considering the number of items elsewhere in this country that we ALSO need to be taking care of. I can imagine similar cases being made by several other environmental causes, where we have made mistakes that need correcting. And it just seems like more money per household than needed to correct the problem without further education on the public's behalf.
Current program	its working a little is the amount you pay is that for there state or every state
Ship repair program	Itt seems to be the most reasonable of all
Current program	I've never been to a coral reef so I will not see the value of having to pay for something I've never experienced!
Current program	less cost from my pocket; most taxpayers will never go to Hawii. Funds should come from fees charged to tourist.
No-fishing zones program	Less expensive than the full program and if there's no fishing there it removes the ships that cause the damage and marine life will flourish.
Ship repair program	less money
Current program	LESS MONEY FOR OTHER PROGRAMS THAT ARE MORE IMPORTANT
No-fishing zones program	Less tax and more fish in the future.
No-fishing zones program	lest cost with more results
No-fishing zones program	Let nature heal on its own and spend less money. We have no money to spend as you can tell by the devastating effects on the economy. If there is a "no fishing zone program" The reefs should be able to heal on their own. To reflourish a good amount of sea-life back into these reefs it is going to take about 50 years anyway.
No-fishing zones program	liked it
Full program	looks like the best for everyone
Full program	Many American are reluctant to pay additional taxes if they feel the "won't be able to spend the money in theor households" as the audio suggested, In the long run it's easier to pay for the protection plan now to provide jobs, protect the environment, and restore the fishing industry at the same time. Moreover, many people visit Hawaii and appreciate the natural beauty and resources of the state. By improving the natural balance the its resources, local and federal governments increase the chances of more tourism to the state; therefore more funding from state revenue.
Full program	marine life would return sooner because reef would return sooner.
No-fishing zones program	mediocre taxes for a better ecosystem
Full program	money not seen before hand won't hurt but will help a worthy cause.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	money is tight. if fisherman have no soul ,why blame me.
No-fishing zones program	money was the only reason. my real preference would be the most comprehensive. i would suggest raising fees on boat and ship registrations.
No-fishing zones program	More bang for the buck to limit fishing than repair ship damage
No-fishing zones program	More bang for the buck.
Current program	More money should be spent on healthcare instead of Coral Reef activities.
Ship repair program	most affordable for myself, and is doing something to help coral reef life...instead of doing nothing
No-fishing zones program	most bang for the buck. as stated earlier, a mix of "pool" funds,ship owner fines, and as a last resort,few taxpayer dollars should be used to do repairs to reefs. dive clubs???
No-fishing zones program	Most cost effective and a more "permanent" solution to the primary issue.
No-fishing zones program	most cost-effective for the benefits.
Ship repair program	Most could not afford the complete repair, so a partial repair would be in order
No-fishing zones program	Most people cannot afford to pay higher taxes at this time.
Ship repair program	Most people cannot afford to save the coral reefs at this time. They are worried about saving their homes and not losing their jobs. The program I chose is a start in the right direction for at least some improvement in the future.
Ship repair program	mostly to balance the eco system
Current program	My economic situation is such that I can't afford another taxing. Maybe in the future I'll change my mind.
No-fishing zones program	My family is on a very tight budget right now and I cannot commit to anything further, however the right answer is obviously the most costly. It is imperative that the ships/boats are restricted from the reef in order for it to have a chance at rebuilding itself- with or without the added "help". There really is no point in spending the money to repair the reef from damage caused by boat accidents if the boats will continue to be allowed in the reef. The reef will continue to die off as well as be destroyed by the boating accidents.
Full program	My household can afford \$160 per year in additional taxes. I want my children to have the opportunity to see the coral reefs of Hawaii. Hawaii and the coral reefs are a national asset and treasure worth preserving.
Current program	n/a
No-fishing zones program	Natural processes will repair the reef Limit the fishing and there will be less ships to damage reefs, and more fish to balance the ecosystem.
Full program	Nature shouldnt be harmed and what has been done to harm it should be fixed.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	need to protect all of our enviroment
Full program	needs to be done
Full program	neither of the programs provides full protection. There will still be 75% sising allowed and only 5 acres of reef repair. But at least it's something.
Ship repair program	no
Ship repair program	no
Ship repair program	no
No-fishing zones program	no
Ship repair program	no
Ship repair program	no
Current program	no
No-fishing zones program	no
Current program	no
Current program	NO COST, BETTER FOR THE ECONOMY
Current program	no extra cost
No-fishing zones program	no fishing protects a greater percentage than the repair program. The ships causing damage should be held more accountable for repairs. Or different ways to raise money for repairs.
No-fishing zones program	No Fishing zone would have more square acreage impact
No-fishing zones program	No fishing zones can protect the reef because no boats and fisherman can be where the reef is.
No-fishing zones program	No Fishing Zones would be easier to "police" and enforce. It is helping the issue some at a low cost to tax payers
Current program	no more taxes??
Current program	No new federal government programs; no new per capita expenses; no new bureaucracy; no additional intrusion into our lives. The coral reelfs are geologically transient phenomena, as are the fish and the other species that live on the reefs. let them live or die or evolve as nature allows.
Current program	NO reason
Current program	No Tax increases.
Full program	no...
Current program	nocomment

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	No-fishing zones would have great impact on the coral reef ecosystems as a whole. Although reef repair has value, it's lower overall ecosystem impact does not seem to justify the cost. Money would be better spent preventing ship accidents in the first place.
Full program	none
Current program	none
Ship repair program	none
Full program	none
Ship repair program	none
Ship repair program	not at all
Current program	not interested in tax increase
Current program	Not real sure about all the programs.
Full program	Not Really
No-fishing zones program	not shure why
Ship repair program	not sure
No-fishing zones program	not sure
No-fishing zones program	Not sure because I really didn't like any of them 100 %.
Ship repair program	not sure the public would accept paying more, when in fact the majority of the U.S. population will probably never visit the coral reefs of the Hawaiian Islands.
No-fishing zones program	Not too high of a cost, seems to have a higher impact than the ship repair
Current program	notsure
Full program	Ocean impacts are one of the most serious and egregious violations of our environment caused by human irresponsibility and we should be willing to chip in to help repair the damage.
Full program	Once again, I am a willing American when it comes to spending money on our environment. That is all I think I need to say about that. Hello...we won't be able to survive without it!!!!!!!!!!!!!!!!!!!!!!!!!!!!
No-fishing zones program	Other options available to reduce ship accidents: bonding of commercial/private ships, mandatory insurance, coast guard/navy patrol, designated shipping lanes, etc.)
Full program	Otherwise the seas will be destroyed
Current program	Our country waists a lot of money on stupit programs. The people who fish and play in these waters should take responsible actions for the corrals.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	Our taxes are high enough and so is the federal budget. If repairs need to be made the fishing industry, which includes people who make their living from the coral reefs and people who pleasure fish should pay for the repairs to protect the coral reefs. Revenue can be generated by increases license and other fees already associated with their business or hobby.
No-fishing zones program	OVER FISHING SEEMS TO BE A PROBLEM
No-fishing zones program	Overfishing seemed to be a problem, and with no-fishing zones, those waters will be protected.
Current program	Paying more taxes
No-fishing zones program	Pleases both economy and environmentalists. Its a good compromise
Full program	preservation of the reefs is important
Full program	Preserve as much as possible. Build fish farms for the fishermen to work so everyone wins. Don't over think it just do it!
No-fishing zones program	probably would do the most to protect for the cost
Full program	Program seems worthwhile. Taxes often go to much less useful/desirable programs and entities that we have no choice in.
Full program	protect as much of the planet we can for our grandchildren
No-fishing zones program	protect our natural resources
Full program	protect the enviroment
Ship repair program	protecting nature - I am ok with pay 50 cents a day for it
Full program	Protection of coral reefs and all other ecosystems is of tantamount importance to all organisms on Earth.
Full program	Protection of the ecosystem protects the existence of the world. It would be nice to put the money into areas that are not damaged and force boats into the damaged areas.
No-fishing zones program	Protects sea creatures and helps us get some to help us survive, both by giving us something to eat and money to get other resources to help us survive.
No-fishing zones program	Protects the reef eco system allwoing marine life to thrive. Attempting to recover funds for ship strikes will be difficult and could cost more than the recovered worth
No-fishing zones program	provides most cost effective program
No-fishing zones program	put tax on ships and boats in that water - whoever enters that part of the water
Ship repair program	reasonable cost

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	reef coral aren't that important to me and just wasting money on something that can be used on something more useful like on charities or children with cancer or children who are struggling to get fed not on coral reefs.
No-fishing zones program	reefs will grow back and i have seen no fishing zones working. the damage should be charged to the owner of the vessel that caused the damage.
Current program	Refer to the input I gave before. Don't charge the households, charge the fishermen who get violations, the watercraft owners at registration time, this includes all boat and ship owners.
Current program	right now I feel the government should be concentrating on righting the economy and job loss of the American people and this situation with the coral reefs could be revisited at a later, more stable time.
Current program	right now my husband is laid off and i can't find a job. we have 6 kids and are struggling to just try to pay our bills. having to pay more taxes would make it even harder for us to stay afloat. we are barely afloat now
Full program	right thing to do
Full program	rotecting the coral is very important. i would need further information about what would be done to prevent future ship/boat injuries.
Current program	save tax money
Full program	save the reef and fish its up to us to protect it.
Current program	Save the starving kid in the inner city, the world is far from perfect. If your going to solve all the worlds problems start in the continental US, when all is well and perfect we can then set our goals on coral in Hawaii,moose in Alaska, and the rediculous minnow in California.
Full program	saving the coral reefs and their eco-systems benefits us all. the responsibility is ours to preserve them for future generations.
Full program	Saving the natural beauty and health of the Earth, and all inhabitants, is more important in my opinion than a few dollars extra each month.
No-fishing zones program	seem good
Ship repair program	seems like a good alternative.
No-fishing zones program	Seems to be the most cost effective.
No-fishing zones program	seems unnecessary to replace areas injured by ships;with new no-fish rules, there should be less damage
Full program	Simply put, I value life over money, and I wouldn't mind spending \$125 to save a large piece of nature.
Current program	Small percentage of reefs being damaged
No-fishing zones program	so that we can perserve our fish and the coral in the reef

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	So that you would have more living fish
No-fishing zones program	Some effort made to preserve coral but due to current economy, taxpayers need to have every possible dollar funneled back to their household. Too many people are without jobs to increase taxes too drastically.
No-fishing zones program	some personal cost but not to high, overall agree with this program
No-fishing zones program	Something must be done. Economically, times are tough, So,I have chosen the most comprehensive plan
Current program	sounds like an excuse to raise taxes
Full program	sounds the best
No-fishing zones program	Supply more fish which would increase commercial fishing and jobs.
Current program	Tax payers can't handle more taxes now. Maybe later when people are back to work. Who pays for enforcement of the current program?
No-fishing zones program	Tax the users and those that can negatively impact these issues. This is similar to charging for airport usage. Useage taxes ought to cover these costs.
Current program	Taxes are already high. My needs are bigger than coral reef in Haiwaai.
Current program	taxes are bad all ready
Current program	taxes are out of hand, no more
Current program	Taxes in America are out of control.
Current program	Taxes was \$0
Full program	that was the only avaiable option that sounded somewhat reasonable.
Ship repair program	thats the one i prefer
Current program	THE AMERICAN PEOPLE ARE ALREADY TAXXED ENOUGH AND THE PROGRAM SEEMS TO WORK
Current program	the american taxpayer has enough expense of his own at these hard times to afford this program but maybe if things pick up in the econmoy. it should be considered.
Current program	The American taxpayer is over-burdened. Nature will repair itself, it will just take longer than it would if there were new steps taken to address it.
No-fishing zones program	The amount of damage done by ship wrecks is not enough to justify the expense. I imagine implementing the no-fishing regulations would reduce the amount of boat traffic and thereby reducing the amount of damage done by ship wrecks.
Full program	the amount per year is reasonable
Current program	The answer is in my previous comment
Full program	The area is one of such outstanding natural beauty that it must be preserved. I have snorkeled and taken a small submarine dive in Mauii and was very aware of the lack of acquatic life in the area due to the reef conditions. This area must be available for our descendants to enjoy, preferably in a better condition than they currently are!

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	the audio is not working, it says it downloads and then it will say getting media. I think that the ideas are good to help the reefs but again this is not a federal issue but the states
Current program	The average household or taxpayer can barely make ends meet as it is. I would prefer to protect 25% of the reefs without the repairs to the 5acres. I dont want to have to pay taxes to do so. Everyday my family is forced to give up something or do without something in order to pay our bills. It all started with the outrageous gas & oil prices. It has ruined our economy to the point that average people are worried about everyday life. We can not worry about coral reefs. Sacrifices are being made daily. I'm afraid the coral reefs are the least of our worries.
No-fishing zones program	The benefits are obvious. With the ship repair program, I do not have enough information on this program to say yes. I would like to see long term data as well as repair methods. It is always better to protect and preserve than it is to do nothing.
Full program	The coral reef is very important for our environment and the cost to society will be beneficial.
Current program	The coral reefs around the other islands are doing fine the way they are.
Current program	the coral reefs have survived for many years on their own, the future preservation of the world in a whole would be a more natural way of preserving everything...
No-fishing zones program	the cost
Full program	The cost is little compared to good it will do.
Full program	The cost is not that great per house hold per year. It that is all that would be required from each house to protect the reefs than I feel it would be worth it to help out. More taxes for more benefits to the people.
No-fishing zones program	The cost is reasonable and there will fish outside of the zones to be caught.
Full program	The cost to my household for the year is economical compared to the damage.
Current program	The cost to visit Hawaii is not affordable, and the taxed funds should come from the tourist and not from those who could never afford to go there.
Full program	The Earth is worth it.
Full program	The ecosystem of the Hawaiian Islands is a natural treasure for the US and we should all pay some share to protect and improve the natural beauty
Current program	The federal Government and the state of Hawaii both have a responsibility to create a program that DOES NOT dip into our pockets. I really feel that something should be done to protect the coral reefs, however, the Gov, wastes so much of our tax dollars now, they need to find more responsible and efficient ways to address these real problems.
No-fishing zones program	The full one would be great but that is too much money in taxes
Full program	The full program is better to protect coral reefs and marine wild life.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	The full program is most beneficial. Even though it cost more money in the short run, in the long run, it will provide more jobs and therefore raise more taxes for the federal government. In the process it will preserve the environment and increase the availability of seafood for better health.
Full program	The Full Program should eliminate the problems we having.
Full program	the full program will help the most.
Full program	The full program will maintain the coral reef eco system. This in turn will provide more fish for jobs and tourism. In the long run the \$160 will help repair a broken eco system, protect our environment, stimulate the economy with more fish in the non protected area. With more fish there is more fishing, more production and more tax money generated to promote other programs and reduce my taxes.
Full program	the full program would offer more protection and restoration.
Current program	the government takes enough of our money i dont live there i live in delaware i dont think they would want to pay for the protection of chickens in delaware so let the people who live in that state have a state tax to cover it unless i will get a trip out there dont tax me
Current program	The government already takes approx. 40% of my households income because of taxes. I don't want to give the government anymore of my money. The government needs to spend money more wisely.
Full program	the investment will produce revenue in fishing (after the ecosystem has a chance to recover) and tourism.
Ship repair program	the invironment for fieh
Full program	the longer yiu wait to make repair the bigger mess u have
No-fishing zones program	The long-run benefits of the no-fishing zones may be enough to help sway the public's opinion in support of the program as well as out weigh the short-run sacrifices.
No-fishing zones program	The no fishing option sounds like a win-win situation. The reef repair sounds like pork. Both cost estimates sound too high.
Full program	The ocean is always in a fine balance and I feel that this is one of our major areas we lack in environmental causes. I think improving the reefs are not only good for the environment, but also good for tourism and overall health of the Hawaiian Islands.
Current program	the people who make their living off the coral need to take care of their problem.
Ship repair program	the program shows concern for the eco system to continue to grow with the help of all people who live an do not live there.
Full program	the proposed price for the premium support is relatively inexpensive for my income range.
Full program	the reef are vital perhaps I am more passionate about this because I have lived there and have seen their beauty.
Full program	the reef deserves to be protected and if its not people will loose their jobs anyway over time but i dont think it is fair for all of hawaii to pay for it

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	The reef repair program although cheaper has less of an impact than the overfishing program. However, the overfishing program will add too much cost to Federal taxes. Therefore neither option is optimal for me. The most expensive program adds more than I am comfortable paying to help repair the coral reef ecosystem.
Ship repair program	The Reef Repair Program seems the most cost-effective, and it also seems that no-fishing zones in such a large area would be hard to enforce
Full program	The reefs are an invaluable environmental treasure that we can not sit back and let die out. We need to be proactive to maintain and nourish our water ecosystems to prevent their extinction.
Full program	The reefs are important. \$300.00 per household seems high. I would hope we could find ways to solve this problem without spending this much money.
Ship repair program	the reefs need to be saved, simple as that
No-fishing zones program	The repair program appears meaningless in size, and repair will happen by itself eventually (no permanent damage is done)
No-fishing zones program	The ship damage is the smaller percentage, and where possible, the ship owners or state should pay.
Current program	The ships that use it and damage it should be the ones to pay for the repairs whatever the cost.
Ship repair program	The tax cost is low and there are benefits for the reef.
Current program	The total cost for the whole program is not given...only the cost per household; how many households are there in the U.S.? I do not trust groups which play creatively with costs; how much is currently spent on the reefs?
Current program	the USA has real matters to address, then a damaged species on the ocean bottom that will repair itself in 50 years, if we damage larger percent then it can naturally repair, then action might need to be taken, at this time we need to put our money in our health care, and create jobs, tax foreign imports, stop wasting money on things with 0 return
No-fishing zones program	The value is greatest. Long-term effects hold more value and will give the biggest return on investment.
No-fishing zones program	There are many areas in the world that are overfished. This seems the best area for reliable enforcement of nofishing as it is the U.S.
Current program	There are more important issues currently that need to be addressed before this coral reef program should be talked about.
Current program	There is already too much federal spending. Taxes are too high already
No-fishing zones program	there is plenty of reef available for species to thrive. if more is protected from fishing the creatures will be more plentiful and there will be a healthier ecosystem
No-fishing zones program	There will be a larger area protected and more fishes will be caught in the areas outside the protected zone while keeping the cost of protecting the environment low for the Federal Government and the taxpayers

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	They can build up naturally and sustain itself naturally. When you try to repair it it's just going to continuously get damaged and won't really help much.
Current program	They should know it will fix it self so leave it alone.
Full program	they should protect our fishes
No-fishing zones program	think that is the program
Full program	This is a issue that needs immediate attention and major funding. WE need to save our coral reefs.
Full program	this is needed before we lose something for our grandchildrens children to see--once gone it can never be replaced
No-fishing zones program	This options seems to do the most to improve the situation with the cost to the household falling within a moderate expenditure.
Full program	This program goes furthest in protecting the coral reefs and the cost is less than \$1.00 a day.
Current program	this program makes the most sense for society
No-fishing zones program	This program seems to have the biggest benefit.
No-fishing zones program	This program seems to have the greatest impact on the environment in the shortest period of time.
No-fishing zones program	This seems more cost effective. I believe in protecting the ecosystem but spending an extra \$35 dollars a year for only five acres of repairs is not something I am willing to do.
No-fishing zones program	This seems to be the program that will give the most "bang for my buck". It will be economically advantageous for all in the longrun as well as being ecologically responsible.
Current program	this should be picked up by the stste of Hawaii
No-fishing zones program	this will help the fish matting population
No-fishing zones program	This would repair naturally with not to much money. I think the full program is the best, not sure that the taxpayer needs that extra burden.
Current program	Those are extremely high taxes on my personal income for an area that I may visit once every 30 years.
Current program	Those who are privileged to live in these areas must protect and teach the future generations to protect their resources.
Full program	Time to stop coral dlamage; wait it may be more costly later

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	To be honest - I was shocked at the cost per household. I really believe in protecting our environment - but we have so many other needs in this country. \$170 per household seems very steep to me. I felt protecting the fish to be the priority over rebuilding the reef quicker. Maybe there could be a preventative campaign for boating accidents injuring the reef.
Full program	to do one without the other negates the one you have done. do it all and preserve what we have.
No-fishing zones program	To have some protection to the coral reefs at a low cost.
Full program	To insure that fishermen have jobs far into the future it would seem to me that coral reef protection is a necessity.
Ship repair program	to keep for future
Ship repair program	To keep marine life you have to kelp nature. BY repairing the reefs is the only way.
Full program	To preserve a system that I have yet to see so that my grandkids may go in the future is worth 130 dollars. We waste so much money on other trivial things.
Full program	to preserve marine life.
Ship repair program	TO PROTECT FISH AND MARINE LIFE, THE SEA
Full program	To protect the coral reefs and continue the environment clean up
Full program	to save and help to rebuilt the damage in ten years and also save a lot of money on taxes that a family can afford to pay theirs bills on taxes.
Full program	To say nothing of the importance of keeping plants and animals alive, healthy and in continuance, it is in the best interests of the people who use the reefs and the tourist economy of Hawaii. No reef, then diminished recreation, food and beauty from that source. Government is the only agency that can deal with this issue properly.
Current program	Too many people in this country need health care (insurance), people are homeless right now--the whole dismal financial picture. When that improves my choice could change. Right now it has to be people over environment.
Full program	Two hundred dollars in the scheme of things does not seem to be very much and it seems the full program is the best option we have. It's not just now that we need to be concerned about - we are stewards of this planet!
Full program	two-hundred dollars does not go far in today's world. One can throw that amount away on most anything. We can not afford to use our dollars only for consumption. If money alone is what is needed to focus on the things that matter most and to attempt to reverse the harm done to our planet then let us all work and tithe to that end.
Full program	want to save it
Full program	we all need to start giving up a little to fix the years of abuse our environment has suffered at our hands
Full program	We are always building and destroying the planet. It's time we start taking care of the earth.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	We are dangerously close to destroying the natural resources and plant and animal life of our planet. And I've already seen, 10 years ago, diminished reef life off Maui. We have to save and restore what we can.
Current program	we are getting laid off everywhere cannot afford to bills must less more taxes...
No-fishing zones program	we are in debt to far now as a country. Stop spending money like water and we will have some to spend on things like this.
Full program	WE are the Keepers of the only Earth we have.
Full program	We are willing to pay \$110.00 a year, but we do concern the financial capability for other people. We will greatly support this program. We believe all of this effort will benefit to our next generation.
No-fishing zones program	We belive in leaving a better world to the next generation. r.f.
Full program	We can't let the underwater eco system fail.
Current program	WE do not need more taxes.
Full program	We have got to start reversing mans negative impact on our planet.
Current program	we have more important things to spend government money on.
Full program	We have to protect the reefs for our future generations, so the fishing industry can continue to maintain for years to come.
Full program	we have to start somewhere cleaning up what we have destroyed. I want things to be here for years to come, we need these things.
Ship repair program	We have to start somewhere to protect what we can.
Ship repair program	We live on a VERY limited buget and don't have a lot to repair reefs as much as I would preferr.
Current program	We must get out of additional spending.
Full program	we must protect them
Current program	we need the money here and job here.let work on helping the little people
Full program	We need to do everything we can to restore all parts of the environment that have been damaged by humans.
Full program	We need to do more for the ecosystem
Full program	we need to look at the future.we have destroyed enough. if we don't start repairing the damage we've done we will not have a future. this includes all of our natural resources
No-fishing zones program	We need to make an impact on reducing commercial fishing,but not to locals.reduce the fishing we reduce the boat traffic reducing damaged coral.
Full program	We need to protect our environment!
Full program	We need to protect the coral rrefs for hawaiiis beaty we need to tourism to keep hawaii beatiful

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Full program	WE NEED TO PROTECT THE THINGS WE HAVE NOW SO THEY WILL BE THERE FOR OUR KIDS AND THEIR KIDS AND THEIR KIDS. IF WE DONT START NOW WE MAY NEVER START OR WE MAY BE TOO LATE TO DO ANYTHING ABOUT IT. \$100 A YEAR DOESNT SEEM THAT MUCH TO PROTECT THE REEFS.
Full program	We need to start becoming respectful and responsible stewards of our enviroment. It's .30 cents a day, you can't buy a cup of coffee for that but you could help feed more people with the replenishment of fish in the ocean.
Full program	We need to stop the damage to the reefs ASAP in order to prevent further damage to the eccosystems.
Ship repair program	we need to.
Full program	we only have one planet!
Current program	we pay enough taxes and have issues pertaining to the united states people whom i think shoudl come first
Current program	We the American people do not need to pay any more taxes at all.
Current program	well put together
Current program	We're in a recession. With worries on government taxing my health insurance, rising fuel taxes, and my paycheck shrinking due to less people shopping I don't believe I'll have the money to pay to help the coral reef's off Hawaii. I believe the coral reef is important but Hawaii might be stuck with the bill.
No-fishing zones program	What about the injury to taxpayers' wallets from Obama's outrageous spending? How long will it take to pay the debt off? I bet it's longer than 50 years. Preserving our coral reefs are a priority, but how are people able to enjoy them and appreciate them enough to act if they don't have the money to travel to an expensive place, such as Hawaii.
Full program	whatever it takes to increase marine life and to prevent for natural life to be able to live without danger
Current program	when am i ever really gonna go see the coral reefs. plus the feds take enough money from us
Full program	When compounded - once the reefs are gone - they are gone. I believe Hawaii should pay due to tourism monies.
Full program	When you consider the cost for the entire year and the help that it would provide it seems like an okay proposal if we are being given all of the facts.
No-fishing zones program	While I would be willing to pay \$100 for the full program, this cost seems very large for the average US taxpayer who is not likely to visit Hawaii. Health care for all is a higher priority for me.
Ship repair program	While I would like to see more done-the fact remains that we are already paying a lot in taxes every year and simply cannot afford to fund everything
No-fishing zones program	whoever made out this form omitted one column \$0 dollars to the taxpayer and 25% reef protection, and reef repair. if the goverment can use may tax dollars to bail out the auto industry the goverment can do the same for the reefs.

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
No-fishing zones program	why continue to repair ship damaged reefs when they continue to get damaged. let a few ship go down and use them for fish habitat and keep the shipping lanes open.
Full program	Why not...we can do it all, right. If I had to choose between this and other specific programs then my answer might be different.
Current program	Why should I pay for this? Does hawaii pay for anything to protect Colorado wildlife or to preserve things in other states?
Current program	With the current economy, it's very hard to add more spending to a very small budget where we have to choose what to do/buy because the money is not enough.
Current program	with the economic downturn it is already too hard to pay the bills. Stopgiving so much federal money to support and insure immigrants and there would be more federal money to take care of our environment and ecosystems. We should also stop spending money to "fix" other countries and worry about fixing our own country and helping hard working tax paying Americans.
No-fishing zones program	with the economy as it is now it would be hard to take all that money away from other programs
Current program	with the recession our country is in at this time ,we cannot afford to take on any more. There are too many things in life more important at this point in time. Sorry, but true.
No-fishing zones program	with the size of the area why not keep 25 percent no fishing a move the area every so many years to build it back up
Full program	WOULD LIKE GRAND KIDS TO BE ABLE TO SEE THE REEFS
Full program	you are also helping huminaty
Ship repair program	You are doing something to help, but not limiting sport fishing. Commercial fishing should be limited!
Current program	you haven't stated the overall anticipated costs. and why is it when people are obviously hurting financially and the country is in a financial crisis that government wants to tax us yet even more. Instead charge lots of fees for recreational use of those areas, license fees, boating fees, docking fees, tax recreational water gear like water skis, scuba gear and so on. People who don't use those areas should not have to pay for the abuse of those that do. The answers cannot always be taxes. When does it end? When we're taxed to the point we have nothing left to live on or to put away for our future? HELLO!

**Table I.2. Why FFRISP respondents chose their most preferred program**

<b>Most preferred program</b>	<b>Response</b>
Current program	You provided only one funding source option (Federal Taxes). There are other funding sources: The overfishing issue could be addressed by commercial fishing fees or increases. That way the source of the problem is taxed not US. Such fees are used to fund the management of other fish habitates. Fees for commercial boating operation in the area of concern can be used to generate revenue to facilitate the reef repairs. Allocate the cost of the repair to the entities that caused the damage. For recreation divers, permit fees could also be established to help repair the reefs due to Scuba Diving impacts. I am not interested in spending \$1 more of our Federal (tax) money on any program (unless it is for the direct defence of our country) until the national debt is retired and the US once again owns its financial assets and we have gotten our house in order. Then, and only then, can we fund such optional projects.



United States Department of Commerce

**Rebecca M. Blank**

Acting Secretary

National Oceanic and Atmospheric Administration

**Dr. Jane Lubchenco**

Administrator

National Ocean Service

**David Kennedy**

Assistant Administrator





NOAA  
**CORAL REEF**  
CONSERVATION PROGRAM



NOAA  
**CORAL REEF**  
CONSERVATION PROGRAM