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## WRITE-UP OF PRETEST RESULTS

### Purpose

The Coral Reef Valuation Study measures the public's preferences and valuation for protecting and restoring Hawaii's coral reef ecosystem. The results of the study will provide important information to the National Oceanic and Atmospheric Administration's Office of Response and Restoration, the State of Hawaii's resource managers, and other federal agencies that are actively managing the coral reef resources of Hawaii. To ensure that the information being developed is as useful as possible, these managers and other stakeholders have been involved in the design and development process undertaken to date.

The goal of the overall study is to obtain estimates of the general U.S. population's preferences and willingness-to-pay (WTP) to protect coral reef ecosystems in the Main Hawaiian Islands (MHI) and the Northwestern Hawaiian Islands (NWHI). The survey focuses on two of the most widespread threats to the reef ecosystems: overfishing and ship groundings. The survey presents three methods of protection: (1) restoration of the coral reef ecosystems of the MHI through establishing a special category of Marine Protected Areas (MPAs) known as Marine Reserves or no-fishing areas; (2) prevention of the future decline in the overall health of coral ecosystems from overfishing in the NWHI<sup>1</sup> (again through designation of no-fishing areas); and (3) restoration of coral habitats after vessel groundings. The survey uses a stated choice framework to evaluate respondents' willingness to trade off these actions against each other at different costs and against each other by taking no action.

As part of this study, we conducted a pretest of the survey instrument using the Knowledge Network's (KN's) Internet Panel. The pretest provided an opportunity to evaluate the survey instrument and obtain some simple results to help refine the main survey. This attachment presents the results of the pretest.

### Response rate

We calculated response rates using the panel recruitment response rate, the household profile rate, and the survey completion rate in order to provide the final response rate. The panel recruitment response rate reported by KN was 28.2%. The household profile rate — the percentage of households recruited where an adult completed the demographic profile survey — reported by KN was 57.1%. The survey completion rate, or the percentage of sampled cases that completed the web survey, reported by KN was 69.2% (216 completed surveys out of the 312 surveys sent out). To calculate the overall response rate, we multiplied the panel recruitment response rate by the household profile rate and the survey completion rate, to yield a response rate of 11.1%.

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1. This includes incorporating areas within the boundaries of the Northwestern Hawaiian Island Ecosystem Reserve established by President Clinton in Executive Order 13178 and as modified in Executive Order 13196.

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## Methods

The pretest consisted of a small-scale survey, designed for implementation in the Internet mode, with a sample of U.S. households (216 responses). KN administered the pretest survey to a random sample of its Internet Panel. We designed the pretest to provide information on two key issues: how well the survey would work under full field conditions and whether the preliminary range of dollar values used in the pretest would be suitable for the final survey. As is standard in survey development, the pretest results, along with the results from focus groups and cognitive interviewers and the research team's previous experience with nonmarket valuation of public goods, will inform the dollar values to be used in the final survey.

KN administered the pretest survey in two phases. In phase 1, KN verified that all survey programming, skip patterns, and other survey design features worked properly. Upon completion of the first 50 surveys, we analyzed the responses to ensure compliance with established quality assurance control measures. Upon successful completion of phase 1 of the pretest, KN administered phase 2 to the remaining sample to garner 156 additional responses. Given the selected implementation mode and budget constraint, this sample size was feasible and provided sufficiently large numbers of observations to support a simple summary statistical analyses of the data (e.g., means, medians, standard deviations, maximums, and minimums).

Given the pretest sample size, the pretest was limited to 6 survey versions, with respondents randomly assigned to a version. Next, dollar amounts were assigned by version: some versions had low costs and others had medium and high costs<sup>2</sup> to balance the design across the dollar range of interest.

## Results

### *General Social Survey comparison*

The instrument began with questions from the General Social Survey (GSS). The GSS is comprised of standard demographic and attitudinal questions, as well as questions about special interest topics. The GSS is conducted periodically and is considered authoritative when it comes to trends in demographic characteristics and attitudes of U.S. residents. The latest data currently available are from the 2006 GSS survey, however, we used results from the 2004 GSS survey since the coral reef survey was conducted in 2004. We drew on the GSS for questions about attitudes toward government spending on a number of social issues, including environmental issues. The GSS has several versions of this question. We used two of the versions — one short and one long — to compare our respondents to those who completed the GSS in 2004. We placed these questions at the beginning of the pretest instrument, before coral reefs had even been mentioned, both to serve as a warm-up to the survey and to provide information to evaluate potential differences between the respondents and the general public. Table 2.1 summarizes how the coral reef pretest respondents answered these questions compared to the GSS respondents in 2004 for the short version.

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2. Based on preliminary interviews and a range of \$0 (status quo) to \$101 to be tested in the pretest.

**Table 2.1. Comparison of the coral reef survey results to the 2004 GSS results for the short version**

Category	Survey	Are we spending too much, about the right amount, or too little on these categories?		
		Too much	About the right amount	Too little
Space exploration	Coral Reef Pretest	47%	39%	14%
	GSS	40%	42%	13%
The environment	Coral Reef Pretest	4%	32%	64%
	GSS	7%	27%	63%
Health	Coral Reef Pretest	7%	17%	76%
	GSS	7%	14%	77%
Assistance to big cities	Coral Reef Pretest	38%	41%	21%
	GSS	28%	41%	17%
Law enforcement	Coral Reef Pretest	7%	48%	45%
	GSS	9%	36%	52%
Drug rehabilitation	Coral Reef Pretest	14%	48%	38%
	GSS	11%	34%	49%
Education	Coral Reef Pretest	5%	16%	78%
	GSS	5%	17%	77%

Table 2.2 summarizes how the coral reef pretest respondents answered these questions compared to the GSS respondents in 2004 for the long version.

Few differences exist between how our respondents answered these questions compared to the 2004 GSS participants. Tests for statistical significance do not show any significant differences for the long version. For the short version, however, there are significant differences between the GSS and coral respondents for drug rehabilitation and assistance to big cities categories. For example, in the short version, more of our respondents feel that the government spends too much on drug rehabilitation and on assistance to big cities. Our proposed design includes GSS questions so that we can continue to compare our respondents to the population as a whole.

***Part I: Set-up***

The full survey is presented and its features are discussed in detail elsewhere in this document. As a brief summary, once the GSS questions were administered, respondents were presented with some background information on the purpose of the survey and the sponsors of the survey. Other issues such as whether the respondent had audio capabilities on the computer system were included for optional voice instructions during later parts of the survey. No survey questions were asked in this section.

**Table 2.2. Comparison of the coral reef survey results to the 2004 GSS results for the long version**

Category	Survey	Are we spending too much, about the right amount, or too little on these categories?		
		Too much	About the right amount	Too little
The space exploration program	Coral Reef Pretest	37%	50%	14%
	GSS	39%	43%	13%
Improving and protecting the environment	Coral Reef Pretest	9%	30%	61%
	GSS	7%	29%	62%
Improving and protecting the nation's health	Coral Reef Pretest	5%	23%	72%
	GSS	4%	17%	77%
Solving the problems of big cities	Coral Reef Pretest	16%	45%	40%
	GSS	12%	37%	40%
Halting the rising crime rate	Coral Reef Pretest	3%	35%	62%
	GSS	5%	35%	57%
Dealing with drug addiction	Coral Reef Pretest	11%	31%	58%
	GSS	9%	33%	54%
Improving the nation's education system	Coral Reef Pretest	5%	23%	72%
	GSS	5%	22%	71%

**Part II: Introduction**

After being provided with some basic coral reef facts, respondents were prompted to answer several questions on coral reefs. Table 2.3 summarizes how often respondents have read about or seen TV programs about coral reefs.

**Table 2.3. How often respondents have read about or seen TV programs about coral reefs, either in U.S. waters or elsewhere**

Response	Percent respondents
Never	24.7%
Sometimes, but not often	65.6%
Often	7.4%
Very often	2.3%

Respondents were then asked how many times they have ever been to a coral reef in the United States or elsewhere. Table 2.4 summarizes these responses.

For the respondents who had visited a coral reef, the locations of visits are summarized in Table 2.5.

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**Table 2.4. The number of times respondents have been to a coral reef in the United States or elsewhere (for example, to fish, snorkel, scuba dive, or view marine life)**

<b>Response</b>	<b>Percent respondents</b>
Never	63.3%
Once	12.6%
A few times (2-4 times)	16.7%
Several times (5-10)	4.2%
Many times (more than 10 times)	3.3%

**Table 2.5. Summary of locations where respondents have visited a coral reef**

<b>Response</b>	<b>Percent of respondents who have visited a coral reef</b>
Florida	36.7%
Puerto Rico or the U.S. Virgin Islands	12.7%
Other Caribbean, Gulf of Mexico, or Atlantic locations	45.6%
Hawaii	41.8%
Pacific Ocean locations other than Hawaii	24.1%
Other location	8.9%

About 3% of the respondents have lived in Hawaii. Of the respondents who have never lived in Hawaii, 27% have visited Hawaii. Table 2.6 summarizes how likely it will be that respondents will travel to Hawaii in the next 10 years.

**Table 2.6. Summary of how likely is it that respondent will go to Hawaii**

<b>Response</b>	<b>Percent respondents</b>
Not at all likely	35.0%
Somewhat likely	37.9%
Very likely	16.4%
Don't know	10.7%

### ***Part III: Overfishing***

After receiving a brief overview of overfishing in the MHI and NWHI and potential solutions to overfishing, respondents were prompted to answer several questions about fishing practices in Hawaii. Table 2.7 summarizes whether respondents feel that protecting jobs of commercial fishermen and protecting recreational fishing are more important than protecting Hawaiian coral reefs, as well as whether it is important for the federal government to take an active role in trying to protect the reefs.

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**Table 2.7. Summary of how respondents feel about these statements**

<b>Response</b>	<b>Protecting jobs of commercial fishermen is more important than protecting Hawaiian coral reefs</b>	<b>Protecting recreational fishing is more important than protecting Hawaiian coral reefs</b>	<b>It is important for the federal government to take an active role in trying to protect Hawaiian coral reefs</b>
Strongly agree	2.8%	2.3%	46.5%
Somewhat agree	7.9%	4.2%	31.2%
Neither agree nor disagree	20.5%	14.9%	13.0%
Somewhat disagree	36.3%	20.5%	4.7%
Strongly disagree	32.6%	58.1%	4.7%

Table 2.8 summarizes the degree to which respondents oppose or support increasing federal taxes to expand no-fishing zones in the MHI versus the NWHI. Just less than half of the respondents at least somewhat to strongly support the idea of increasing federal taxes to expand no-fishing zones around the NWHI. Nearly 25% of the respondents at least somewhat to strongly oppose increasing taxes for that purpose. Tests for significance show that there is no significant difference in the overall pattern between how respondents feel about increasing taxes to expand no-fishing zones around the MHI and the NWHI. In general, respondents support increasing federal taxes to expand no-fishing zones slightly more for around the MHI than for the NWHI.

**Table 2.8. Summary of how respondents feel about increasing federal taxes to expand no-fishing zones around the Main/Northwestern Hawaiian Islands**

<b>Response</b>	<b>Percent respondents</b>	
	<b>Main Hawaiian Islands</b>	<b>Northwestern Hawaiian Islands</b>
Strongly oppose	10.7%	11.7%
Somewhat oppose	7.9%	13.1%
Neither oppose nor support	27.6%	25.4%
Somewhat support	34.1%	31.5%
Strongly support	19.6%	18.3%

#### ***Part IV: Ship accidents***

Part IV of the survey begins with an introduction to ship accidents, which are one cause of physical injury to coral reefs. Table 2.9 summarizes whether respondents have heard about, read about, or seen where ship accidents have injured coral reefs. Tests for significance show that there is a significant difference in respondents' WTP increased taxes for increasing no-fishing zones around the MHI when compared to WTP to protect against ship accidents.

Respondents were then asked how they feel about increasing federal taxes to restore coral reefs injured by ships around the MHI. Table 2.10 summarizes their responses to this question.

**Table 2.9. Summary of whether respondents have heard about, read about, or seen where ship accidents have injured coral reefs in Hawaii or elsewhere**

Response	Percent respondents
Yes	22.3%
No	64.7%
Don't know	13.0%

**Table 2.10. How respondents feel about increasing federal taxes to restore coral reefs injured by ships around the Main Hawaiian Islands**

Response	Percent respondents
Strongly oppose	14.9%
Somewhat oppose	18.1%
Neither oppose nor support	27.0%
Somewhat support	31.2%
Strongly support	8.8%

***Part V: Choice questions***

The final section of the survey included a series of choice questions asking respondents to rank alternatives. In the jargon, each alternative is defined by a “bundles of attributes.” We used four attributes: the percentage of coral reef ecosystems in the MHI protected as no-fishing zones, the percentage of coral reef ecosystems in the NWHI protected as no-fishing zones, whether ship injuries to coral reefs are repaired, and the cost in higher taxes. Each attribute, in turn, could take on two levels: the status quo (i.e., 1% of coral reef ecosystems protected for the MHI, 5% of coral reef ecosystems protected for the NWHI, no new program to repair ship injuries, and zero cost) and changes from the status quo (i.e., 25% of coral reef ecosystems protected for the MHI, 100% protected for the NWHI, a new program to repair ship injuries, and a positive dollar amount). Each alternative consisted of some specified combination of these attributes. For example, an alternative might consist of 1% protection for the MHI (the status quo), 100% protection for the NWHI (a change from the status quo), no repair of coral reefs injured by ships (the status quo), and an annual cost of \$40.

Each choice question involved three alternatives. Alternative A was always the status quo for all attributes: no new no-fishing zones in the MHI or the NWHI, no additional efforts to restore damages from vessel groundings, and no additional taxes. Alternatives B and C posed some combination of management actions beyond the status quo and some increase in taxes. For each choice question, respondents were asked to identify their most preferred and their least preferred alternative. In this way, a complete ranking of alternatives for each of the choice questions could be identified. Six versions of the survey were developed, each with a different combination of choices in each of the three choice set questions. Table 2.11 illustrates how this worked by summarizing the first choice question in each of the six versions and the frequency with which alternatives were chosen as most and least preferred. In each of the six versions, later choice questions varied the attributes in each alternative and the cost. Each version was designed to

**Table 2.11. Selection of alternative protection programs, by version, for Choice Set 1**

	<b>Main Hawaiian Islands: % reef protected</b>	<b>Northwest Hawaiian Islands: % reef protected</b>	<b>Reefs repaired from ship injuries</b>	<b>Added taxes to your household each year</b>	<b>Percent preferring this alternative the most</b>	<b>Percent preferring this alternative the least</b>
<i>Version 1</i>						
Alternative A	1%	5%	No	\$0	18%	53%
Alternative B	25%	100%	Yes	\$80	61%	29%
Alternative C	25%	5%	No	\$30	21%	18%
<i>Version 2</i>						
Alternative A	1%	5%	No	\$0	12%	72%
Alternative B	25%	100%	Yes	\$40	62%	19%
Alternative C	1%	100%	No	\$15	26%	9%
<i>Version 3</i>						
Alternative A	1%	5%	No	\$0	28%	72%
Alternative B	25%	100%	Yes	\$101	56%	22%
Alternative C	25%	100%	No	\$100	17%	6%
<i>Version 4</i>						
Alternative A	1%	5%	No	\$0	30%	54%
Alternative B	25%	100%	Yes	\$40	51%	43%
Alternative C	1%	100%	Yes	\$20	19%	3%
<i>Version 5</i>						
Alternative A	1%	5%	No	\$0	16%	78%
Alternative B	25%	100%	Yes	\$60	63%	19%
Alternative C	1%	100%	No	\$20	21%	3%
<i>Version 6</i>						
Alternative A	1%	5%	No	\$0	27%	63%
Alternative B	25%	100%	Yes	\$70	36%	34%
Alternative C	25%	5%	Yes	\$40	36%	3%



avoid inconsistencies across the choice question. For example, within each version, alternatives that would do less always had a lower cost. The setup and responses to the second and third choice questions are reported below.

With the exception of respondents who received version 6 of choice set 1, a majority of respondents chose Alternative B as their most preferred alternative. In all versions, a majority of respondents chose Alternative A, the status quo, as their least preferred alternative. This points towards the conclusion that the dollar values for Alternatives B and C used in the pretest were likely too low, a conclusion that received further support in responses to the other choice sets across the various survey versions.

The survey includes an open-ended question following the first choice question to further probe why respondents chose a particular level of protection for Hawaiian reefs as their most preferred.<sup>3</sup>

To analyze the open-ended responses, we developed descriptive categories to group each of the open-ended responses. Categories were developed by first looking at the full set of open-ended responses, and then by categorizing them. Responses could fall into multiple categories. Table 2.12 shows the final categories and provides a rationale for selecting each category.

**Table 2.12. Description of open-ended response categories for the choice question**

<b>Category</b>	<b>Rationale for choosing the category</b>
1. It's the right thing to do/We have an obligation to do something.	Respondent's comments fell into this category if they specifically discussed the need to protect coral reefs as a responsibility for each citizen of the U.S., OR if they discussed the importance of protecting reefs because it is the right thing to do.
2. We need to protect reefs for future generations.	Respondents felt that we NEED to protect coral reefs for future generations to enjoy and use.
3. There is a trade-off between long-term and short-term costs for protection.	Respondents wrote about the need to pay for protection now in order to avoid further damage in the future. They also commented on the difference in price for protecting reefs now and in the future.
4. Does not want more taxes/Thinks we should consider other alternatives first/The cost is too high/Money should be spent on other things.	Respondents simply did not want to pay more taxes. Some felt that the tax was too high and that we should consider other alternatives first. Others felt that money would be better spent elsewhere.
5. Something needs to be done, but not too much.	This category of responses came from individuals who agreed that something needed to be done to help protect the reefs. They felt that doing something was preferred to doing nothing.
6. Find a compromise between cost and protection.	These individuals rationalized their responses by weighing the cost of protection against the benefits of protection.

3. The follow up to the choice question read, "Please provide a brief comment that helps us understand why you chose the alternative as most preferred and as least preferred in the previous question."

**Table 2.12. Description of open-ended response categories for the choice question**

Category	Rationale for choosing the category
7. We need to choose the alternative with the best benefit for the reef ecosystem and the individuals that depend on them.	Respondents felt that the reef ecosystem is important enough for citizens to pay more in taxes to protect them.
8. Protest/Does not believe the program could work.	These respondents were not convinced that any of the alternatives solve the reef problem or thought that protection should not cost as much.
9. Other	Responses that could not be combined into a specific category.

Across all six versions, the first choice question had full implementation of all the management actions (i.e., 25% protection for the MHI, 100% protection for the NWHI, implementation of a program to repair injuries from ship accidents). Alternative C returned at least one of these attributes to the status quo and had a low dollar price, which made it easy to match respondents' most preferred choice with their responses to the open-ended question about why they made that choice.

About 75% of respondents chose both a most and least preferred alternative in answering the first choice question. Most of these respondents chose B as their most preferred option and A, status quo, as their least preferred option (56.4%). Table 2.13 reports the frequency of responses by category and choice pattern.

**Table 2.13. Frequency of responses for respondents' most preferred and least preferred alternatives, by category**

Category	A most preferred, B least preferred	A most preferred, C least preferred	B most preferred, A least preferred	B most preferred, C least preferred	C most preferred, A least preferred	C most preferred, B least preferred
1. It's the right thing to do/We have an obligation to do something.	0	0	30	1	0	1
2. We need to protect reefs for future generations.	0	0	12	0	0	0
3. There is a trade-off between long-term and short-term costs for protection.	0	0	9	0	1	0
4. Does not want more taxes/Thinks we should consider other alternatives first/The cost is too high/Money should be spent on other things.	22	1	0	0	1	3
5. Something needs to be done, but not too much.	0	0	0	0	13	2
6. Find a compromise between cost and protection.	0	0	9	0	5	7
7. The best benefit for the reef ecosystem and the individuals that depend on them.	0	0	23	3	0	0

**Table 2.13. Frequency of responses for respondents' most preferred and least preferred alternatives, by category**

Category	A most preferred, B least preferred	A most preferred, C least preferred	B most preferred, A least preferred	B most preferred, C least preferred	C most preferred, A least preferred	C most preferred, B least preferred
8. Protest/Do not believe the program could work.	2	1	0	1	0	1
9. Other.	3	2	10	0	0	2
Total	27	4	93	5	20	16

Below we discuss the verbatim responses according to respondents' most preferred and least preferred management option:

**Alternative A most preferred/Alternative B least preferred:** These respondents tended to fall into Category 4. That is, they tended to object to taxes or feel that costs were excessive, or other such lines of reasoning. Of all the responses falling into Category 4, 81.5% chose A as most preferred and B as least preferred.

**Alternative A most preferred/Alternative C least preferred:** Only four respondents fell into this group.

**Alternative B most preferred/Alternative A least preferred:** Ninety-four respondents chose Alternative B as their most preferred option and Alternative A as their least preferred option. They represent 93.8% of responses in Category 1 (30 out of 32), 100% of responses in Category 2 (12 out of 12), 90% of responses in Category 3 (9 out of 10), 43% of Category 6 responses (9 out of 21), 88% of responses in Category 7 (23 out of 26), and 59% of responses in Category 9 (10 out of 17).

**Alternative B most preferred/Alternative C least preferred:** Only 3% (n = 5) fell into this group. Answers to the open ended responses tended to focus on justifying B as most preferred and do not provide insights on why doing nothing was preferred to alternatives that did not do as much as Alternative B.

**Alternative C most preferred/Alternative A least preferred:** A total of 19 respondents (12.1%) fell into this group. In their open ended responses, respondents in this group tended to fall into Categories 5 and 6.

**Alternative C most preferred/Alternative B least preferred:** A total of 16 respondents (9.7%) fell into this group. Their open ended responses were spread out among the categories, with some tendency to fall into Categories 6 and 8.

Tables 2.14 and 2.15 summarize respondents' rankings to the alternatives made in response to the second and third choice set questions, respectively.

**Table 2.14. Selection of alternative protection programs, by version, for Choice Set 2**

	Main Hawaiian Islands: % reef protected	Northwest Hawaiian Islands: % reef protected	Reefs repaired from ship injuries	Added taxes to your household each year	Percent preferring this alternative the most	Percent preferring this alternative the least
<i>Version 1</i>						
Alternative A	1%	5%	No	\$0	21%	67%
Alternative B	1%	100%	Yes	\$50	62%	24%
Alternative C	1%	100%	No	\$40	18%	9%
<i>Version 2</i>						
Alternative A	1%	5%	No	\$0	9%	79%
Alternative B	1%	5%	Yes	\$5	32%	9%
Alternative C	1%	100%	No	\$15	59%	12%
<i>Version 3</i>						
Alternative A	1%	5%	No	\$0	16%	69%
Alternative B	1%	5%	Yes	\$1	24%	3%
Alternative C	25%	5%	No	\$50	59%	28%
<i>Version 4</i>						
Alternative A	1%	5%	No	\$0	30%	62%
Alternative B	1%	5%	Yes	\$5	11%	11%
Alternative C	25%	100%	No	\$30	59%	27%
<i>Version 5</i>						
Alternative A	1%	5%	No	\$0	14%	79%
Alternative B	1%	5%	Yes	\$10	22%	5%
Alternative C	1%	100%	No	\$20	65%	16%
<i>Version 6</i>						
Alternative A	1%	5%	No	\$0	21%	67%
Alternative B	1%	100%	Yes	\$30	55%	3%
Alternative C	25%	5%	Yes	\$60	24%	30%

**Table 2.15. Selection of alternative protection programs, by version, for Choice Set 3**

	Main Hawaiian Islands: % reef protected	Northwest Hawaiian Islands: % reef protected	Reefs repaired from ship injuries	Added taxes to your household each year	Percent preferring this alternative the most	Percent preferring this alternative the least
<i>Version 1</i>						
Alternative A	1%	5%	No	\$0	26%	63%
Alternative B	25%	100%	No	\$70	59%	28%
Alternative C	1%	100%	No	\$40	15%	9%
<i>Version 2</i>						
Alternative A	1%	5%	No	\$0	15%	68%
Alternative B	25%	100%	No	\$35	56%	24%
Alternative C	25%	5%	Yes	\$25	29%	9%
<i>Version 3</i>						
Alternative A	1%	5%	No	\$0	22%	73%
Alternative B	25%	5%	No	\$50	5%	14%
Alternative C	1%	100%	Yes	\$51	73%	14%
<i>Version 4</i>						
Alternative A	1%	5%	No	\$0	31%	51%
Alternative B	25%	5%	No	\$15	36%	8%
Alternative C	25%	100%	Yes	\$85	33%	41%
<i>Version 5</i>						
Alternative A	1%	5%	No	\$0	18%	76%
Alternative B	25%	5%	No	\$30	34%	5%
Alternative C	1%	100%	No	\$80	47%	18%
<i>Version 6</i>						
Alternative A	1%	5%	No	\$0	24%	64%
Alternative B	25%	100%	No	\$50	39%	33%
Alternative C	25%	5%	Yes	\$40	36%	3%

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### *Econometric modeling of responses to the choice questions*

Using the data from the pretest, we estimated a rank order logit model, regressing the probability of selecting a specific alternative on the levels of protection from overfishing around the MHI and NWHI, whether ship injuries would be repaired, and the bid amount. Table 2.16 summarizes these results.<sup>4</sup> All coefficients have the expected sign and are highly significant. A strong preference for addressing problems of overfishing in the MHI is apparent from the results. Support is lowest for repairing ship injuries, with no-fishing areas for the NWHI receiving somewhat more support.

**Table 2.16. Rank order logit model results**

	<b>Parameter estimate</b>	<b>Standard Error</b>	<b>Standard Deviation</b>	<b>Z</b>	<b>P&gt; z </b>
Main Islands	0.0975	0.0040	0.1780	24.15	< 0.001
Northwest Islands	0.0191	0.0014	0.0598	14.09	< 0.001
Ship Injuries	0.0148	0.0017	0.0745	8.73	< 0.001
Household Cost	-0.0314	0.0030	0.1333	-10.39	< 0.001

Despite these encouraging results, any attempt to use them to estimate dollar values could be quite misleading. The problem is that large numbers of respondents chose alternatives with dollar costs toward the high end. This indicates that the distributions of probabilities coming out of the model are likely to suffer from “fat tails” on the right side that are not supported by data. Some higher dollar costs will be used in the final study to remedy this problem.

### *Attitudes about choice questions*

We asked respondents six follow-up questions regarding their attitudes about the choice questions. Table 2.17 summarizes responses to these attitudinal questions.

Table 2.18 summarizes significant correlations between responses to these attitudinal questions and answers to other questions in the survey. All relationships reported here are significantly correlated, at a 10% level or better. The correlations reveal consistent attitudes across questions; for example, those who believed that cost should not be a factor when protecting the environment supported paying higher taxes to restore reefs elsewhere in the survey.

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4. In this model, no-fishing zones are entered in continuous terms expressed as the percentage of total coral reefs protected. As a check on results, we also ran an effects coded model, rather than a continuous model, and the results were the same. The effects coded model coefficients are the marginal values of moving from one level to the next — which are the same as the coefficient reported above multiplied by the unit changes.

**Table 2.17. Summary statistics for responses to the six attitudinal follow-up questions**

Attitudinal statement	NOBS	Mean	Median	StdDev	Scale
Costs should not be a factor when protecting the environment	213	2.77	3	0.08	
I found it difficult to select my most preferred alternative	214	3	3	0.09	
There was not enough information for me to make informed decisions about doing more to protect coral reefs in Hawaii	213	3.56	3	0.07	1 = strongly agree 2 = somewhat agree 3 = indifferent
I am concerned that the federal government cannot effectively manage coral reefs	213	2.58	3	0.07	4 = somewhat disagree 5 = strongly disagree
I should not have to pay more federal taxes to protect coral reefs around Hawaii	214	2.94	3	0.09	
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	210	1.97	2	0.08	

Those who agreed with the statement “Costs should not be a factor when protecting the environment” also tended to support increasing federal taxes to expand no-fishing zones around the MHI and NWHI and restore coral reefs injured by ships around the MHI. They tended to disagree with the statement that they should not have to pay more federal taxes to protect coral reefs and to agree that the views of the public as expressed in the survey should be important in making decisions about Hawaii’s reefs.

Those who found it difficult to select their most preferred alternative tended to oppose increasing taxes to restore coral reefs around the MHI. They also believed that there was insufficient information to make informed decisions and did not want to pay more taxes to protect reefs.

If respondents did not believe there was sufficient information to make informed decisions, they tended to be less likely to expect to visit Hawaii in the next 10 years and opposed using federal taxes to restore reefs injured by ships. They also tended to agree that the federal government cannot effectively manage reefs and that they should not have to pay more federal taxes to protect the reefs.

Respondents who were concerned that the federal government cannot effectively manage coral reefs had a higher tendency to have visited coral reefs in the United States.

**Table 2.18. Summary of significant correlations between attitudinal and other variables**

<b>Attitudinal statement</b>	<b>Questions with significant correlations</b>	<b>Respondents who agreed with this statement also tended to:</b>
Q19a. Costs should not be a factor when protecting the environment	Q10a (-) <sup>a</sup> Q11a (-) Q14a (-) Q19e (-) Q19f (+)	<ul style="list-style-type: none"> <li>▶ Support higher taxes to expand no-fishing zones and restore reefs from ship strikes</li> <li>▶ Disagree with NOT paying more to protect coral reefs around Hawaii</li> <li>▶ Agree the public's opinions should be considered in management decisions</li> </ul>
Q19b. I found it difficult to select my most preferred alternative	Q14a (+) Q19c (+) Q19e (+)	<ul style="list-style-type: none"> <li>▶ Oppose increasing taxes to restore reefs after ship injuries</li> <li>▶ Believe there was not enough information for informed decisions</li> <li>▶ Not want to pay higher taxes to protect coral reefs around Hawaii</li> </ul>
Q19c. There was not enough information for me to make informed decisions about doing more to protect coral reefs in Hawaii	Q6 (+) Q14a (+) Q19_4 (+) Q19_5 (+)	<ul style="list-style-type: none"> <li>▶ Less likely to visit Hawaii in the next 10 years</li> <li>▶ Oppose increasing taxes to restore reefs after ship injuries</li> <li>▶ Concerned about the government's ability to effectively manage reefs</li> <li>▶ Not want to pay higher taxes to protect coral reefs in Hawaii</li> </ul>
Q19d. I was concerned that the federal government cannot effectively manage coral reefs	Q2 (-)	<ul style="list-style-type: none"> <li>▶ Never have visited a coral reef in the US</li> </ul>
Q19e. I should not have to pay more federal taxes to protect coral reefs around Hawaii	Q2 (+) Q6 (+) Q10a (+) Q11a (+) Q14a (+)	<ul style="list-style-type: none"> <li>▶ Never have visited a coral reef in the US</li> <li>▶ Not expect to visit Hawaii in the next 10 years</li> <li>▶ Oppose paying higher federal taxes to increase no-fishing zones and restore reefs</li> </ul>
Q19f. 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	Q6 (-)	<ul style="list-style-type: none"> <li>▶ Not expect to visit Hawaii in the next 10 years</li> </ul>

The scales for Q10a, Q11a, and Q14a ran from 1 for "strongly disagree" to 5 for "strongly agree." The scales in Q19 ran in the opposite direction. Hence, the expected signs or the correlation are negative.

Respondents who agreed that they should not have to pay more federal taxes to protect coral reefs around Hawaii were less likely to have visited a reef in the U.S., less likely to expect to visit Hawaii in the next 10 years, opposed to raising federal taxes to expand no-fishing zones around the MHI and NWHI, and opposed to raising federal taxes to restore reefs injured by ships around the MHI.



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Finally, respondents who agreed that the public's views should be considered by the government when managing coral reefs were more likely to expect to visit Hawaii in the next 10 years.

### *Influence of news media*

As the study was nearing the pretest stage, President Bush announced that a large area in the NWHI would become a national monument. This meant that no commercial fishing would be allowed, a fact that conflicted with what we told respondents about the possible need for further protection from overfishing in the NWHI. This had the potential of undermining the credibility of the choice questions in the eyes of respondents and we asked the following question to evaluate this risk: Have you heard or read anything about the Northwestern Hawaiian Islands in the past year?

Only nine respondents (4.2%) answered this question. Four of the nine participants who answered were aware that the NWHI had some type of protection (e.g., a sanctuary, monument, or national park).

Examples of their responses include the following.<sup>5</sup>

“That the government created a large no fishing sanctary North of Hawaii.”

“Just that a national park was being created there.”

“Pres. Bush signed an evironmental bill that would protect the islands.”

Only one of these participants knew that the U.S. President designated the NWHI as a national monument. The other five responses varied. Some participants learned about the islands from watching television shows like PBS. The remaining responses represent how participants feel about the threat to the islands – the MHI and NWHI – as well as general knowledge about the number of islands in Hawaii.

“Now is the time to protect the Northwestern Hawaiian Islands, not wait until they are compromisd.”

“Just that they are not in near as much danger as the main islands.”

“I very recently learned that there were 122 islands in Hawaii, and I did not know there were so many. These must mostly be in the Northwestern Islands.”

Hence, we concluded that the national monument announcement would not do much to undermine the validity of our study as it was designed.

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5. All responses are presented verbatim as we received them. The respondents entered this information themselves.

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### *Closing comments from respondents*

At the end of the survey, we asked respondents if they had any additional comments to help us understand their views about coral reefs in Hawaii and their responses to the survey. A question like this at the end of a survey allows respondents to have one final opportunity to tell us any idea or concerns that might otherwise have been unstated, or to restate a previous opinion. This question also may provide clues about whether participants' responses to the choice questions are consistent with their views about coral reefs in Hawaii.

To analyze the open-ended responses, we developed descriptive categories to group them. We developed categories by first looking at the full set of open-ended responses, and then developed potential categories. Table 2.19 shows the final categories and provides a description of the category meaning.

**Table 2.19. Description of response categories for additional comments**

<b>Category</b>	<b>Rationale for choosing the category</b>
1. Needs more information/never thought about coral reefs in Hawaii before.	Respondents did not feel that they could make an informed decision without more information, or respondents had never thought about the coral reefs in Hawaii before taking the survey.
2. Distrust of the federal government.	Respondents did not trust the federal government to put the money to good use (i.e., protecting the reefs).
3. Feel that we need to maintain a balance in nature.	These respondents feel like we need to make greater efforts to balance the effects of consumption of natural resources by taking measures to protect the reef ecosystem.
4. Feel that we have an obligation to protect reefs/we should protect reefs just like any other national resource.	Respondents feel that we need to protect coral reefs, regardless of the cost we incur.
5. Does not believe the program could work/does not care/protest.	Respondents do not feel that the program will have its desired effects on the reef ecosystem, or they do not care about reefs.
6. Other people have a responsibility to pay/cannot afford more taxes.	Respondents in this category feel that we need to consider the source of the problem (e.g., over-fishing, ship strikes) and tax the people causing the problem rather than creating a federal tax, or that the people visiting Hawaii should pay for the problem, or that they could not pay more in taxes.
7. Other	Responses that we could not combine into a specific category.

Only 23% (50 of 216) of the respondents provided comments for this question. Table 2.20 presents the frequency of responses for each category.

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**Table 2.20. Any closing comments respondents had about the survey**

<b>Category</b>	<b>Number of responses</b>	<b>Frequency of responses</b>
1. Needs more information/never thought about coral reefs in Hawaii before.	5	10%
2. Distrust of the federal government.	5	10%
3. Feel that we need to maintain a balance in nature.	6	12%
4. Feel that we have an obligation to protect reefs/we should protect reefs just like any other national resource.	13	26%
5. Does not believe the program could work/does not care/protest.	3	6%
6. Other people have a responsibility to pay/cannot afford more taxes.	7	14%
7. Other.	11	22%

## **Conclusions**

Overall, the pretest supported the soundness of the survey instrument and supported the use of internet mode administration. Comparisons with the GSS national survey showed that respondents to the Coral Reef survey were for the most part very similar to the national GSS respondents in terms of attitudes toward social policy issues. Answers to the choice questions were sufficiently coherent to support simple econometric models with significant coefficients of the expected signs on the various attributes despite the relatively small sample size. Comparing verbatim responses to the open-ended questions with responses to the first choice question showed a few anomalies, but not many. Our conclusion is that the instrument is ready to be finalized and that finalizing it should be straightforward.

The most surprising result was the lack of correspondence between attitudes toward government spending of our respondents and those of the national sample from the GSS, but this does not appear to have any implications for the soundness of our instrument.