

**JUSTIFICATION OF CHANGE
CORAL REEF VALUATION STUDY
OMB CONTROL NO. 0648-0585**

This request outlines the changes Stratus Consulting made to the Coral Reef Valuation Study survey (survey) since the April 2009 one-on-one interviews and the May 2009 pretest. It also includes the revised experimental design.

Changes made since the one-on-one interviews and the pretest

We completed 12 one-on-one interviews in Denver, CO and 17 interviews in Alexandria, VA in April 2009. In May 2009, Knowledge Networks administered the pretest survey to its Internet Panel to obtain 225 completed surveys. Stratus Consulting analyzed the pretest survey data using simple summary statistics and did not find any issues that required major adjustments for the final survey instrument. The bullets below summarize the changes Stratus Consulting made to the final survey since the one-on-one interviews and the pretest.

- ▶ We decided to provide audio *and* text to all respondents participating in the American National Election Study (ANES) and the Major Research Instrumentation (MRI) Internet Panels. During the one-on-one interviews, respondents were provided either with text only or audio only. When debriefed at the end of the interview, respondents who received audio indicated that they preferred having audio because it was different from what they were used to and it gave them more time to consider the survey content. At the same time, however, some people indicated they would have preferred to read the text on the screen. As a compromise, we chose to provide both options to all participants to the main survey.
- ▶ When analyzing the pretest results, we found that respondents seemed to anchor on the program they chose in the warm-up question (i.e., the first choice question asking respondents to make a trade-off between the Current Program and either the No-fishing Zone Program or the Reef Repair Program). For example, if the respondent had to choose between the current program and the reef repair program, and he/she chose the reef repair program, he/she was more likely to choose the reef repair program when choosing against all four programs. We decided to remove an actual choice decision in the warm-up section for the main survey and verbally describe the four choice options.
- ▶ We learned from the one-on-one interviews that the headings for some of the attributes in the choice questions were not entirely clear to respondents. To add further clarity, we changed some of the headings and wording in the choice tables. For example, the instrument used to say “Main Islands no-fishing zones: % of reef protected.” Some respondents found this confusing, so we changed it to “% of reef protected by no fishing zones (acres)” to add further clarity.

Revised experimental design for the final survey

The experimental design, as originally proposed in the OMB submission, has been modified by taking account of the results of the pretest. The three programs in the final Coral Reef Valuation Study survey remain the same: (1) increasing the no-fishing zones from 1% to 25% around the Main Hawaiian Islands (MHI) (protecting reefs), (2) repairing reefs from ship injuries so that injuries last 10 years rather than 50 years (repairing reefs), and (3) implementing no-fishing zones *and* repairing reefs from ship injuries (both). Thus, there are still 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, protecting reefs and repairing reefs, have two levels apiece: the status quo or some positive action. As summarized in Table 1, the alternative levels for protecting and repairing reefs are 25% of reefs protected versus 1% under the status quo, and injuries being repaired in 10 years rather than 50 years under the status quo.

Table 1. Program attributes and associated levels

Attribute	Status quo level	Alternate level	Cost (\$)
% reefs protected	1%	25%	45, 75, 110, 170
Years for reefs to be repaired from ship injuries	50	10	35, 55, 95, 135

The four possible combinations of attribute levels (referred to as alternatives) representing the combinations of programs also remain the same: the status quo, protecting reefs only, repairing reefs only, and both protecting and repairing reefs. 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 1). The bid amounts were selected as follows. We used the results from the pretest to create a distribution of willingness to pay (WTP) estimates for the no-fishing zones and reef repair programs. We then simulated probabilities of a respondent selecting each alternative using the parameter estimates from the pretest and randomized error terms. We experimented with the bids to rebalance the probabilities and to capture the overall range of WTP values.

The bid amounts represent the cost of implementing the individual programs. For the program that involves both protecting and repairing, the bid amount is equal to the total cost of the program (i.e., the sum of the individual project costs) plus a bundling adjustment. The bundling adjustment is included to test if respondents are willing to pay a different amount for the combination of programs (both protecting and repairing reefs) than for the individual programs separately. This allows us to estimate an interaction term and to test whether this interaction term is positive or negative.

Based on the pretest, the main study experimental design was modified slightly in terms of the bundling adjustments. The original design included two discounts (economies of scale) and one anti-discount (dis-economy of scale). Based on pretest results and questions during the cognitive

interviews, we decided to drop the anti-discount bundling and replace it with another positive discount. The overall statistical analysis approach is not affected by this change.

We have included four positive bundling adjustments to account for respondents who are willing to pay *less* than the combined cost of both programs to have both programs implemented. The bundling adjustments in this design are 0, 5, 10, and 20.

There are 16 possible choice sets (versions) for the final survey that contain all the different combinations of individual program costs. In each choice set, the cost of the combined program is the sum of the individual program costs plus a bundling adjustment. Each individual program cost level appears four times in the design matrix, and each time it appears it is paired with a different bundling adjustment. Table 2 reports the experimental design for the final survey.

Table 2. Experimental design for the final survey instrument

Version	Alternative	Protecting coral reefs (% of coral reefs protected)	Repairing coral reefs (years to recovery)	Cost (\$)
1	Status quo	1	50	0
	Protecting reefs only	25	50	45
	Repairing reefs only	1	10	35
	Both repairing and protecting reefs	25	10	75
2	Status quo	1	50	0
	Protecting reefs only	25	50	45
	Repairing reefs only	1	10	55
	Both repairing and protecting reefs	25	10	100
3	Status quo	1	50	0
	Protecting reefs only	25	50	45
	Repairing reefs only	1	10	95
	Both repairing and protecting reefs	25	10	130
4	Status quo	1	50	0
	Protecting reefs only	25	50	45
	Repairing reefs only	1	10	135
	Both repairing and protecting reefs	25	10	160
5	Status quo	1	50	0
	Protecting reefs only	25	50	75
	Repairing reefs only	1	10	35
	Both repairing and protecting reefs	25	10	110
6	Status quo	1	50	0
	Protecting reefs only	25	50	75
	Repairing reefs only	1	10	55
	Both repairing and protecting reefs	25	10	125
7	Status quo	1	50	0
	Protecting reefs only	25	50	75
	Repairing reefs only	1	10	95
	Both repairing and protecting reefs	25	10	150

Table 2. Experimental design for the final survey instrument (cont.)

Version	Alternative	Protecting coral reefs (% of coral reefs protected)	Repairing coral reefs (years to recovery)	Cost (\$)
8	Status quo	1	50	0
	Protecting reefs only	25	50	75
	Repairing reefs only	1	10	135
	Both repairing and protecting reefs	25	10	200
9	Status quo	1	50	0
	Protecting reefs only	25	50	110
	Repairing reefs only	1	10	35
	Both repairing and protecting reefs	25	10	135
10	Status quo	1	50	0
	Protecting reefs only	25	50	110
	Repairing reefs only	1	10	55
	Both repairing and protecting reefs	25	10	145

11	Status quo	1	50	0
	Protecting reefs only	25	50	110
	Repairing reefs only	1	10	95
	Both repairing and protecting reefs	25	10	200
12	Status quo	1	50	0
	Protecting reefs only	25	50	110
	Repairing reefs only	1	10	135
	Both repairing and protecting reefs	25	10	245
13	Status quo	1	50	0
	Protecting reefs only	25	50	170
	Repairing reefs only	1	10	35
	Both repairing and protecting reefs	25	10	185
14	Status quo	1	50	0
	Protecting reefs only	25	50	170
	Repairing reefs only	1	10	55
	Both repairing and protecting reefs	25	10	215
15	Status quo	1	50	0
	Protecting reefs only	25	50	170
	Repairing reefs only	1	10	95
	Both repairing and protecting reefs	25	10	265
16	Status quo	1	50	0
	Protecting reefs only	25	50	170
	Repairing reefs only	1	10	135
	Both repairing and protecting reefs	25	10	300