Puerto Rico Coral Reef Ecosystem Valuation

Technical Appendix: Non-market Economic Value by Reef Using Visitors on Puerto Rico's Coral Reef Ecosystems, An Attributes Approach

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Acknowledgements

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Any errors are the sole responsibility of the authors.

Foreword

We are fortunate to be able to drop into the remarkable world of coral reefs, diving through crystal blue water into forests of branching corals, swaying sea fans and schools of brightly colored reef fish. It is a truly unique and exhilarating experience. This underwater world provides other benefits as well - beautiful white sandy beaches, protection from stormy seas, and delectable seafood. But this vibrant beauty, along with its ecosystem benefits, is under constant threat and continued decline. Year after year since the 1970's, chronic declines and event-driven losses of coral ecosystems have been documented around the globe. The causes vary, but most declines are linked to high-temperature events that can be aggravated by local pressures such as overfishing or sediment and pollutants in terrestrial runoff. To protect reef systems, or even to stem the ongoing deterioration, requires commitment and urgent action to reduce anthropogenic stresses. However, such actions will be taken only when decision-makers are clearly aware of the value of coral reefs to economy and society. Healthy coral reef ecosystems are essential to economic benefits from fisheries, tourism, marine biodiversity, natural products discovery and shoreline protection, as well as cultural benefits like aesthetics, art and stewardship. As reefs have declined, so have the benefits they provide. This is a fact that decision-makers must recognize to properly weight their decisions affecting coral reefs.

Placing value on an ecosystem is not a trivial task. Whereas some of the benefits of an ecosystem have economic components determined in the marketplace, such as the value of fish landings, others are not valued through market pricing. In fact, many highly valued environmental goods and services, such as clean air and water or healthy fish and wildlife populations, are not traded in markets. To estimate non-market value requires approaches that determine how much people would be willing to pay for a particular attribute or characteristic. The six reports presented in this series document a non-market valuation of reef attributes assembled from survey responses of reef-visitors in Puerto Rico. The importance of this survey is to characterize the value of reefs so that individuals and organizations can be fully aware of the consequences of decisions, large and small, that affect coral reefs. Wanting to protect coral reefs, to preserve their unique beauty, is not sufficient; knowing why they should be protected imparts a stronger argument for ensuring their survival.

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Preface

This report is part of a six volume series on the socioeconomics of visitor use of Puerto Rico's coral reef ecosystems. The project was sponsored and funded by the U.S. Environmental Protection Agency (EPA), Office of Research and Development. EPA is developing a decision-support tool to evaluate restoration alternatives in the Restoration Management Plan for the Guanica Bay Watershed in southwest Puerto Rico. Several teams were in charge of different ecosystem services (benefits humans receive from coral reef ecosystems). Ecosystem services for coral reef included recreation-tourism, food supply (commercial fishing and consumptive motive of recreational fishing), ornamentals (aquarium trade), pharmaceuticals, and property values from storm protection. Although the EPA decision-support tool was limited to the coral reefs off southwest Puerto Rico, public scoping determined that for recreation-tourism information was need for the entire island's coral reef ecosystems, so this study covers all of Puerto Rico, but due to costs, this study was limited to visitor use of Puerto Rico's coral reef ecosystems. Future studies will address resident's use of Puerto Rico's coral reefs.

This report is Volume 5 of the six volume series. In addition, is a technical appendix detailing the methods used in estimating the non-market economic values of coral reef ecosystem attributes. Details are provide on sampling methodologies, sample weighting, questionnaire and experimental design, model estimations and use of the model in estimating the economic value of attributes under different scenarios. This report is intended for peer reviewers and for researchers that would like to implement the methods used in other geographies.

Volume 1 presents a socioeconomic profile of reef using visitors to Puerto Rico. Estimates are presented on the total amount of visitation measured in person-trips (visits) and intensity of visitation measured in person-days. The concepts of person-trips and person-days are defined and as with many measurements, separate estimates are provided by season (summer and winter). Extensive profiles are presented on activity participation for reef using activities and non-reef using activities for reef using visitors. An extensive set of appendix tables provides details by activity type, region and season. Puerto Rico was divided into five regions for estimation of activity use. Intensity of use is measured in person-days for selected reef using activities by region and season.

Volume 2 addresses the economic contribution/impact of visitor reef user's expenditures in Puerto Rico on the Puerto Rican economy. Estimates of total visitor spending by category are used in the IMPLAN input-output model for Puerto Rico to estimate the impact of these expenditures on the Puerto Rican economy in terms of output/sales, valued-added (gross regional product), income and employment, including multiplier or "ripple effects" of the spending by reef using visitors.

Volume 3 addresses importance-satisfaction ratings by reef using visitors on 25 natural resource attributes, facilities and services. The importance-performance four-quadrant analysis is used to place items as to their relative importance and satisfaction.

Volume 4 is a technical appendix detailing the sampling methods and estimation for items measured and presented in Volumes 1 to 3.

Volumes 6 presents' results for example scenarios using estimated models detailed here.

Chapter 1: Introduction

Purpose

This report provides documentation on the methods used to estimate non-market economic use values included in Leeworthy et al. (2018e, forthcoming). This report is intended for peer reviewers and others who would like to replicate the study in other areas or extend the study to the residents of Puerto Rico.

The report is part of a six volume series of reports on reef-using visitors to Puerto Rico in year 2016-17. Volume 1 (Leeworthy et al., 2018a) provides visitor profiles on amount of use by type of recreation activity for reef and non-reef activities and by five regions and two seasons (summer and winter). In addition, profiles by season are presented for demographics of visitors, spending profiles and special issue questions to address community and policy/management issues.

Volume 2 (Leeworthy et al., 2018b) provides estimates of the economic impact/contribution of reef-using visitor spending on the Puerto Rican economy in terms of output/sales, value-added (gross regional product), income, employment and tax revenues generated by the visitor spending, including multiplier impacts.

Volume 3 (Leeworthy et al., 2018c) provides estimates of the importance-satisfaction ratings for 25 natural resource attributes, facilities and services by reef-using visitors. A five-year retrospective analysis is also conducted on the satisfaction ratings and expectancy-discrepancy analysis is presented to provide additional explanation of the satisfaction scores.

Volume 4 (Leeworthy et al., 2018d) is a technical appendix documenting the sampling methodologies and estimation methods used in volumes 1 to 3.

Volume 5 (Leeworthy et al., 2018e, forthcoming) presents five policy/management scenarios using the final model estimated and presented in this report.

Background

In 2009, the U.S. Environmental Protection Agency (EPA) Office of Research Development (ORD) developed an "Ecosystem Services Research Program" and an "Ecosystem Studies: Coral Reef Research Implementation Plan" (Bradley et al., 2009). The plan used the Driving forces, Pressures, State, Impact, and Response (DPSIR) framework to integrate ecological, social, economic, and decision sciences. Major ecosystem services selected for study included fishing, tourism and recreation, shoreline protection and pharmaceutical products. The geographic focus was on the U.S. coral reef regions of the Caribbean Sea, Atlantic Ocean, including (Florida Keys and Southeast Florida), Puerto Rico, and the U.S. Virgin Islands.

In 2010, NOAA's Coral Reef Conservation Program funded the development of a management plan for the restoration of the Guanica Bay Watershed in Southwest Puerto Rico (CRCP 2010). In 2011, EPA/ORD followed up with efforts to develop a decision-support tool to evaluate the

benefits and costs of restoration management plan. The decision-support tool would essentially quantify the DPSIR Model for all the ecosystem services provided by the coral reef ecosystem affected by the Guanica Bay Watershed. Separate teams were developed to work on the economics of each ecosystem service.

In 2013, EPA met with the Director of NOAA's Office of National Marine Sanctuaries (ONMS) and requested that ONMS Chief Economist, Dr. Vernon R. (Bob) Leeworthy, lead the economic valuation of the tourism and recreation ecosystem service. NOAA/EPA entered an Interagency Agreement to conduct a study on Puerto Rico's tourism-recreation uses of Puerto Rico's coral reef ecosystems.

In 2013, NOAA/ONMS and EPA conducted a series of meetings with to develop community support for the project. Local business leaders, federal and Territorial government agencies, and non-government organizations attended meetings held around the entire island. From this process, it was determined that tourism-recreation would be addressed for the entire island's coral reef ecosystems, not just the southwest area corresponding to the Guanica Bay Watershed. Following the community meetings, NOAA/ONMS entered a contract with the University of Puerto Rico, Mayaguez to conduct surveys of reef-using visitors in Puerto Rico.

Chapter 2: Survey Methodology

All federally funded surveys or surveys in which a federal agency has approval authority must have U.S. Office of Management and Budget (OMB) approval. This process is a minimum of 150 days and can often take longer in complicated projects that require focus groups and pre-tests in designing the survey. This project was a complicated survey and focus groups, one-on-one interviews and pretests were used in designing the questionnaires and supporting survey materials.

On-site Sample

The final survey design used an on-site sample of reef-using visitors stratified across five regions and types of reef use. The results from a stratified random sample of visitors at the San Juan Airport was used to stratify the on-site sample (See Leeworthy et al., 2018d). On-site sampling sites included dive shops, snorkeling shops, marinas, charter boat/guide fishing operations, beaches and parks where reef-using visitors accessed the coral reefs. Students from the University of Puerto Rico were trained to conduct the surveys. A sample of 776 reef-using visitors was obtained from October 2016 through May 2017.

Survey Response Rate. For a person to qualify for the survey, they had to be a non-resident of Puerto Rico that had done at least one reef-using activity (See, Exhibit 1: Blue Card for the list of reef-using activities). In addition, they had to meet exit conditions. They had to be ending their trip to Puerto Rico the day of the interview or before noon the next day. The reason is that we did not want visitors to speculate on what activities they did. A tally sheet was designed to screen out qualified reef-using visitors. From the tally sheet, 90 percent of reef-using visitors completed the survey. Given the high response rate, we think the probability of non-response bias is extremely low.

Sample Weighting. Although sample weighting was not required for adjusting for potential non-response bias, the samples were not representative across seasons due to late approval of surveys and limited funding. The sample was weighted using the population estimates of reef-using populations by season in Leeworthy et al. (2018d).

Sample Size for Non-market Economic Value Estimation. As noted above, we completed interviews with 776 reef-using visitors to obtain information on the willingness to pay for changes in conditions of coral reef attributes. How this sample size was determined is explained under the section "Experimental Design".

Designing the Survey Questionnaire and Experimental Design

Characterization of the Decision Problem. As discussed in Chapter 1, the survey was designed to address the priorities of EPA/ORD coral reef research plan and their decision-support tool for the Guanica Bay Watershed Restoration Management Plan addressing the tourism-recreation ecosystem service provided by Puerto Rico's coral reef ecosystem. In addition, to meet wider community needs, the scope was extended to the entire island's coral reef ecosystem. The attribute approach to valuation was selected so we could estimate reef-using visitor preferences for different coral reef attributes using the dollar metric.

The attribute approach to economic valuation has historically used travel cost random utility models to value natural and cultural resources by looking at how site choices are related to the cost of access and the levels of resource attributes across sites. The problem faced by users of these models is that site characteristics (attributes) are often highly correlated resulting in multi-collinearity and the inability to identify statistically significant estimates of attribute importance (Hanemann et al., 2004). Economists using random utility theory to address this problem (Louviere, Hensher and Swait, 2000 and 2009) adapted the stated preference method used by psychologists. This method uses experimental design to allow for orthogonal (uncorrelated) estimates of attribute values and thus identification of statistically significant effects of attributes on economic values. Therefore, we chose this approach in designing our questionnaire and experimental design.

Choice of Attributes and Attribute Levels. There were five steps used in the process of selecting attributes to test attribute importance: 1) review of the literature; 2) NOAA/EPA monitoring data on Puerto Rico's coral reefs; 3) EPA Science Panel at EPA/ORD for levels of attributes relevant to policy/management changes; 4) focus groups and one-on-ones to test what attributes were important to reef-using visitors in Puerto Rico and what levels of those attributes would change their economic values; and 5) a pre-test of the survey to test the findings of the focus groups and one-on-ones and to design the dollar bids for alternative bundles of attributes offered.

Review of the Literature. In 2012, NOAA/ONMS obtained a volunteer student intern, Bernd Geels, to conduct a literature review on coral reef attributes. The primary focus was on studies that addressed the economic value of reef attributes, but was extended to cover any social science on reef attributes. Although many studies have been conducted on coral reef valuation, only two studies were found that addressed any coral reef attribute values.

Wielgus (2003) addressed coral cover, coral and fish diversity, fish abundance and water clarity/visibility for SCUBA divers in the Red Sea. Parsons and Thur (2008) addressed coral cover, coral and fish diversity and water clarity/visibility for SCUBA divers in Bonaire.

NOAA/EPA Monitoring Data. NOAA and EPA conduct island-wide monitoring of Puerto Rico's coral reef ecosystem and report data on different reef attributes. We worked with EPA scientists in analyzing the monitoring data for attributes we thought reef-users might value. The range of observed conditions across the island and across time gave us a realistic range of attribute conditions from which to form low, medium and high conditions for most attributes.

EPA Science Panel and Attribute Condition Levels. We needed input from the Science Panel, since our approach defined the "Status Quo" as the low condition of reef attributes. In addition, it is the condition of reef attributes that would be expected in 10 to 20 years, if current policy/management actions were maintained. The EPA Science Panel provided us with the levels of reef attribute conditions that defined the "Status Quo" or low condition using the NOAA/EPA monitoring data. It is important to note that the high condition is not defined as a "pristine" condition. This would not be considered a condition level that could be reached with any reasonable policy/management alternatives.

Another important issue had to be addressed by the EPA Science Panel. Some measurements that scientists make needed to be calibrated to how reef-users would understand them. For example, water clarity is measured by scientists via extent of light penetration. We had the scientists provide a conversion from ranges of light penetration to feet of visibility. Feet of visibility or the "VIZ" is a common expression of water clarity among snorkelers and SCUBA divers.

Focus Groups and One-on-one Interviews. The University of Puerto Rico-Mayaguez conducted two focus groups and more than a dozen one-on-one interviews. Focus groups were difficult to assemble with visitors. Two sessions where visitors were recruited resulted in no one showing up. Therefore, the strategy was shifted to conducting one-on-one interviews.

The objectives of the focus groups and One-on-ones were as follows:

1. Identify reef attributes people care about when they recreate on Puerto Rico's coral reefs.
2. Identify levels of conditions of each attribute that would affect their economic value for coral reef use.
3. Check to see if Illustrations and Scientific Bullets describing reef attribute conditions were consistent (i.e. tell the same story).
4. Identify any reef attributes not in the current list of attributes and their levels, if they affect their economic values.
5. For what attributes not in the illustrations are visual aids needed.
6. Maximum willingness to pay for different attribute conditions. This to provide a starting point for designing the dollar bids for the pre-test choice questions.
7. Check to see if payment vehicle for willingness to pay might include some biases or result in scenario rejection.

A set of focus group materials was developed by NOAA, EPA and the University (See Exhibit 2):

1. Focus Group Task/Script
2. Definition of coral reef ecosystems and conditions.
3. Reef activities list.
4. Attributes important to different recreation activities on the reefs (Table focus group members fill-out).
5. Attribute levels and if willingness to pay changes attribute levels (Table focus group members fill out).
6. Illustrations of coral reef conditions (Low, Medium and High). See Exhibit 1.
7. Willingness to Pay Card.
8. Demographics Card.

Focus Group and One-on-One Results.

Task 1: Identify reef attributes people care about when they do recreation activities on Puerto Rico's coral reefs.

- Visitors thought we should consider surfing, wind surfing, kite boarding and paddle boarding as reef using activities. Visitors mentioned issues of clean water that is healthy for swimming as an additional important attribute and that depth of coral reefs was important. They thought that sponges and soft corals could be combined for diversity and abundance.

Task 2: Identify levels of conditions of each attribute that would affect their economic values for coral reef use.

- Visitors thought the levels of each attribute were good and moving from low to medium conditions and medium to high conditions would change their economic values. There was one possible exception and that was soft corals and sponges. Several focus group members thought that more soft corals and sponges would increase their economic values even though the scientific information provided suggests that they are predominant where water quality conditions are of lower condition and hard corals are significantly reduced or eliminated.

Task 3: Illustrations and Scientific Bullets - Are they consistent (i.e. tell the same story)?

- Visitors agreed that the illustrations and scientific bullets were giving a consistent story on the relative condition of reef attributes. Some wanted to see more soft corals and sponges in the low condition illustration. This is being done.

Task 4: Reef Attributes not included in illustrations – Do we need some visual aids for these attributes?

- Visitors wanted us to add depth of the reefs and water cleanliness (healthy for swimming or not healthy for swimming and no visual aids were needed for these attributes.
- Visitors wanted some photos in the introduction of hard corals (stony corals), soft corals and sponges, fish and invertebrates, and mega fauna (large animals/predators) that one might see on a Puerto Rican coral reef.
- Visitors thought we needed an additional visual aid for the issue of crowding. They thought that it did not have to include number of boats on the water or number of people in the water, but should just have different number of people such as on a beach in Puerto Rico. Some even said it did not necessarily have to be a beach in Puerto Rico. We took a picture of a Puerto Rican beach a Photo-shopped in different numbers of people to the three different levels of crowding that have affected people's satisfaction ratings in other studies.
- Visitors did not think a visual aid was needed for water clarity/visibility, the bullet descriptions were sufficient.

Task 5: Bid Amounts for Willingness to Pay for different reef conditions

- Visitors understood the task after the explanation was provided that it was not natural to reveal their maximum willingness to pay, but we needed them to help us design the survey by providing their maximum willingness to pay. Results were surprising.
- Moving from low to medium attribute conditions ranged from $20 to $240 with a mean of $86.43 and median of $70. Actual numbers (20, 25, 50, 70, 100, 240). Moving from medium to high attribute conditions ranged from $40 to $240 with a mean of $115.71 and a median of $100. Actual numbers (40, 80, 100, 150, 240).

Task 6: Background Questions about themselves.

- No issues emerged with demographics.

Pre-test. The On-site questionnaire was pretested at 26 sites around the island between May 28 and June 22, 2016. One hundred and ninety-six (196) completes were obtained. The average time was within the 15-20 minute limit. A main objective of the pre-test was to design the prices for the choices. See Exhibit 3 for the questionnaires and supporting materials.

Our optimal design called for six different dollar bid amounts. The optimal design simply assigned a dollar bid price level as 1, 2, 3, 4, 5 or 6. Our task was to design the dollar amounts associated with each of the price levels. The pretest used eight versions of the survey whereas the final On-site survey had 18 versions with two choices per version. We used nine different prices ($30, $60, $95, $125, $190, $250, $375, $500, $750, and $1,000). Prices are increases to the household per trip in their total trip costs. These prices were assigned to different combinations of attributes (alternatives within a choice set). Each choice has three options: 1) A=Status Quo, which includes all attributes at the low level with a cost of $0; 2) B=mix of attribute levels at a price greater than $0, and 3) C=mix of attributes at a price greater than $0. Table 2.1 shows the prices assigned to each version and each choice within a version, while Table 2.2 shows the levels of attributes for each option and choice for each version.

Table 2.1. Prices used in the Pretest by Version, Choice and Option

		Choice 1			Choice 2	
Version	A	B	C	A	B	C
1a	$0	$500	$1,000	$0	$750	$750
1b	$0	$500	$500	$0	$250	$250
2a	$0	$250	$500	$0	$375	$375
2b	$0	$250	$250	$0	$125	$125
3a	$0	$125	$250	$0	$190	$190
3b	$0	$125	$125	$0	$60	$60
4a	$0	$60	$125	$0	$95	$95
4b	$0	$60	$60	$0	$30	$30

A=Status Quo

Table 2.2. Pretest Attribute Condition Levels by Version, Choice and Option

		Choice 1			Choice 2	
Version	A	B	C	A	B	C
1a	All Low	All M	All H	All Low	6M &6H	6H & 6M
1b	All Low	6L & 6 H	6H & 6L	All Low	6M &6H	6H & 6M
2a	All Low	All M	All H	All Low	6M &6H	6H & 6M
2b	All Low	6L & 6 H	6H & 6L	All Low	6L & 6M	6M & 6L
3a	All Low	All M	All H	All Low	6M & 6H	6H & 6M
3b	All Low	6L & 6 H	6H & 6L	All Low	6L & 6M	6M & 6L
4a	All Low	All M	All H	All Low	6M & 6H	6H & 6M
4b	All Low	6L & 6 H	6H & 6L	All Low	6L & 6M	6m & 6L

L=Low, M=Medium, and =High

Generally, as prices increased the percent choosing the option declined, holding mix of attributes constant. All those presented with the lowest dollar amount never selected the Status Quo, so for our final survey we set our lowest dollar amount (price level 1) to $60. For $60, we had some choosing the Status Quo thus avoiding the "fat tails" problem. Not everyone one selected the Status Quo for the highest dollar amount so price level 6 was set to $1,000. For price levels 2 to 4, we approximately doubled the price levels with price level 2=$125, price level 3=$250, and price level 4=$500. For price level 5, we went halfway between price level 5 and price level 6 or $750. This method of setting prices has worked in many applications in the past.

Experimental Design

With three levels for seven attributes, two levels for three attributes and six levels for price, 104,976 possible combinations of attribute levels would be required in a full factorial design. Thus, we had to use a fractional factorial design. We used the SAS macros %choiceff and %mktex provided in Johnson et al. (2007). This resulted in an orthogonal and balanced design with 36 combinations of attributes and price levels. A blocking factor of 18 was used since our pre-test determined that reef-users on-site could only do two choices per respondent. Each choice question had the "Status Quo" which always set the attributes to the "Low" level and the cost per household per trip set to $0 (an opt-out option). Each choice also included an option B and an option C, both of which was a mix of "low", "medium", and "high" conditions for seven of the attributes, a mix of "low" and "high" for three attributes, plus a positive price in the range of the prices stated above. See Exhibit 1 for the final questionnaires and supporting materials used in the survey. The options or alternatives were generic, not labeled (Louviere, Hensher and Swait, 2009).

Sample Sizes Required for Statistical Efficiency

In Orme (1998), the following formula is found for determining the minimum sample size for a given design:

N = 500 * NLEV/(NALT*NREP)

Where,

N = minimum sample size required

NLEV = the largest number of levels in any attribute (here 6 for the number of prices)

NALT = number of alternatives (options) per choice set (not including the Status Quo), (here 2)

NREP =number of choice sets per respondent (here 2)

Therefore, in our design, a minimum sample size of 750 is required for statistical efficiency. Our total sample size was 776, but as discussed in Chapter 3, elimination of six observations due to incomplete information and 68 protestors reduced our sample size for estimation to 702.

Chapter 3: Definitions of Variables used in Models and Model Estimations
Definition of Model Variables

Natural Resource Attributes.

In defining variables to be used in model estimations, we first began by considering three methods of coding natural resource attribute variables: linear, dummy and effects coding. In linear coding, all the natural resource attributes are coded as 0=Status Quo or Low Condition, 1=Medium Condition and 2=High Condition. The problem with this approach is that it assumes that as natural resource conditions improve from the "Status Quo" or "Low" condition, the dollar value of the attribute increases at a constant amount. The better economic argument would be to assume declining marginal utility with increases in the quality of natural resource conditions, so this approach was abandoned in model estimations.

The dummy variable and effects coding approaches for coding the natural resource attributes do not force the relationship and can allow for constant, increasing or declining marginal utility. Hasan-Basri and Karim (2013) and Bech and Gyrd-Hansen (2005) discuss the pros and cons of dummy versus effects coding. We abandoned the effects coding approach based on advice from Dr. Barbara Kanninen (Kanninen 2015).

Ultimately, a dummy variable approach was used. For eight of the eleven attributes, (Stony Coral, Soft Coral, Consumptive Fish, Ornamental Fish, Invertebrates, Water Clarity, Depth of the Reef, and Crowdedness) consisted of "status quo" or low level, medium level and high level whereas three attributes (Sport Fish, Large Wildlife, and Water Cleanliness) lent more to binary outcomes "status quo" or low level and high level. Opportunity to see/catch sport fish was interacted with whether or not the individual was a fisherman because of the likelihood that only fisherman would have a willingness to pay for sport fish and due to fisherman's small percentage of the sample (3.25%). This could result in some underestimation since snorkelers and SCUBA divers might want to see sport fish. The detailed descriptions provided to respondents in the questionnaires of the natural resource attributes and the "Status Quo" or Low Condition, the Medium Condition, and the High Condition are in Table 3.1.

Table 3.1 Attribute levels

Status Quo (Low)	**Medium**	**High**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
L: No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
L: Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
L: Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
L: Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
L: No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
L: No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)		**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
L: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)		**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
L: Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**H:** Clarity/Visibility: Greater than 50 feet
L: Cleanliness: Not healthy for Swimming		**H:** Cleanliness: Healthy for swimming
L: Depth of Reefs: Greater than 60 feet	**M:** Depth of Reefs: 20 to 60 feet	**H:** Depth of Reef: Less than 20 feet
L: Crowdedness: 21 or more people	**M:** Crowdedness: 11 to 20 people	**H:** Crowdedness:0 to 10 people

- If the medium level is left blank that option only had high or status quo levels.

Price and Income.

Price.

Price refers to the per trip cost to the household for each alternative option and its development was discussed above in the focus group and pre-tests. The cost per trip would be paid by all visitors and residents to Puerto Rico through an increase in prices of goods and services. The payment vehicle was defined for respondents in the information sheet provided in the questionnaire (Exhibit 1). There were six prices randomly assigned in the optimal design to different alternatives: $60, $125, $250, $500, $750, and $1000. This was the per trip cost to the household for alternative options. For the Status Quo or all conditions at the "Low" condition (opt out choice) was always priced at $0. For estimation, price was scaled to thousands of dollars (Price1000).

Income.

Table 3.2: Derivation of annual household income

Category	Description	Range Midpoint
1	Less than $5,000	$2,500
2	$5,000 to $9,999	$7,500
3	$10,000 to $14,999	$12,500
4	$15,000 to $19,999	$17,500
5	$20,000 to $24,999	$22,500
6	$25,000 to $29,999	$27,500
7	$30,000 to $34,999	$32,500
8	$35,000 to $39,999	$37,500
9	$40,000 to $44,999	$42,500
10	$45,000 to $49,999	$47,500
11	$50,000 to $59,999	$55,000
12	$60,000 to $74,999	$67,500
13	$75,000 to $99,999	$87,500
14	$100,000 to $149,999	$125,000
15	$150,000 or more	$200,000

Household Income Categories takes on 15 different ranges of before taxes income and "refused" to answer. These 15 ranges are listed above (Table 3.2) along with the range midpoint rounded to the nearest dollar.

However, due to the 29.13% rate of "refusal" to answer (Table 3.3) it was necessary to predict missing income levels. In order to predict these missing values demographics were concatenated from three datasets: Pretest onsite, onsite, and airport. A negative binomial model, using sex, race, age, age squared, reason for visit, and ethnicity (Spanish, Hispanic, or Latino) was run.

Similar to Poisson model, the negative binomial model can be used with integer data. However, the negative binomial relaxes the assumption that the mean equals the variance. The coefficients of this model were then used to predict categories of income (1-15) rounded to the nearest integer for those who did not provide income. The negative binomial model is included in Exhibit 4.

A new variable (Income) was generated by replacing all "refused" to answers in D6 with the predicted incomes. This variable was then used to generate a numeric variable (IncomeCont) with each category number being replaced by the range midpoint scaled by $1000 for model estimation purposes.

In lieu of per capita income, which is a better indicator of willingness to pay than household income (Alberini, Longo and Veronesi, 2006) per vacationer income, was used. This new variable (IncomeCont_Per_Vac) was generated by dividing the numeric variable by the number of people in a group (NUMPEP).

Table 3.3: Percentage of income responses (D6)

Category	Description	Percentage
1	Less than $5,000	1.57
2	$5,000 to $9,999	3.41
3	$10,000 to $14,999	0.92
4	$15,000 to $19,999	1.57
5	$20,000 to $24,999	1.18
6	$25,000 to $29,999	2.23
7	$30,000 to $34,999	2.23
8	$35,000 to $39,999	6.82
9	$40,000 to $44,999	7.22
10	$45,000 to $49,999	8.01
11	$50,000 to $59,999	8.01
12	$60,000 to $74,999	8.4
13	$75,000 to $99,999	8.14
14	$100,000 to $149,999	5.91
15	$150,000 or more	5.25
16	Refused	29.13

Reef Depth and Crowdedness

Options B and C for all surveys were generated to minimize correlation between attributes and insure orthogonal design. However, due to a large number of attributes, reef depth and crowdedness were constructed as a composite attribute (they were presented to respondents with the same levels so they were not treated independently i.e. they are perfectly correlated).

Therefore, we cannot identify the separate effects of depth and crowdedness, but we include the composite variable to control for omitted variables bias since in the focus groups and pretest visitors said both attributes were important to them.

Issues Affecting Sample Sizes for Model Estimation

Protestors.

In stated choice modeling, it is important to identify "Protestors". Protestors are respondents who reject the survey's scenario. These individuals will not reveal their true willingness to pay and need to be removed from the sample population. In order to identify these protestors a thorough analysis was run using an eight question Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Three of these questions were pertinent to whether the individual was a protestor as well as one yes or no question:

i) I found it difficult to select an option of reef conditions I preferred. (1-5)
ii) I was concerned that the Puerto Rico government cannot effectively manage coral reefs. (1-5)
iii) I should not have to pay more to protect or restore coral reefs in Puerto Rico. (1-5)
iv) Did you believe the information by coral scientists that in 10 to 20 years if current management practices continue that nearly all the coral reefs in Puerto Rico would be in a poor or low condition? (yes or no)

We incorporated the individual's choice of options to see if they selected the status quo for both response. If an individual chose 4 (somewhat agree) or 5 (strongly agree) for I-III and the status quo for both options they were labeled a protestor. They were also labeled a protestor if they chose no for question IV. This signaled that the individual did not believe in the status quo option and thus rejected our scenario.

Table 3.4 Respondent Protestors

Protest statements	Possible protestors
I found it difficult to select an option of reef conditions I preferred.	20.20%
I was concerned that the Puerto Rico government cannot effectively manage coral reefs	57.70%
I should not have to pay more to protect or restore coral reefs in Puerto Rico	32.20%
Chose option "A" for both choices	20.10%
Chose 4 or 5 for all three and option "A" for both choices	6.80%
Did you believe the information by coral scientists that in 10 to 20 years if current management practices continue that nearly all the coral reefs in Puerto Rico would be in a poor or low condition?	2.10%
Protestor	8.80%

Sample Sizes Used in Model Estimations and Descriptive Statistics

For model estimation, there were originally 4,620 (770 times 6) observations with complete information. However, after dropping the 68 (408 observations or 68 times 6) protestors the number of observations fell to 4,212. A mean comparison test was run to determine if the protestors were statistically different from the sample population. Protestors had significant differences with on average higher household income, cared less about the environment, were older, were more likely to be male, and were more likely to be white. However, there was no statistical difference between Hispanic, Latino, and Spanish respondents and non-Hispanic, non-Latino, and non-Spanish respondents.

Table 3.5 Demographics for Protestors and Non-Protestors

Variable Name	Mean	Standard Deviation	N
IncomeCont (NonProtestor)	64.44	41.72	4248
If Protestor	72.13	44.39	408
Age10 (NonProtestor)	3.981	1.239	4170
If Protestor	4.45	1.256	402
D3 (NonProtestor)	0.4893	0.491	4206
If Protestor	0.5441	0.4987	408
D4 (NonProtestor)	0.2311	0.4216	4206
If Protestor	0.2059	0.4048	408
D5a (NonProtestor)	0.6776	0.4674	4206
If Protestor	0.7206	0.4493	408
C16 (NonProtestor)	3.345	0.9591	4170
If Protestor	2.985	1.081	396

See definitions of variables in Table 3.7.

Three types of models were estimated: Conditional logit (CL), Nested Choice Logit (NL) and Mixed Logit or Random Parameters (RP). Only the final models selected are presented here. The latter two were estimated since none of the specifications for the CL passed the Hausman-McFadden IIA test for the assumption of independence of irrelevant alternatives (Hausman and McFadden, 1984). However, not passing the IIA assumption should not be of much concern, as

the alternatives "can plausibly be assumed to be distinct and weighted independently in the eyes of each decision maker (Long and Freese 2006, p. 243).

As the survey was developed to present respondents with distinct scenarios to choose from, it is reasonable to accept this model specification. Therefore, we maintain it as providing a possible legitimate model and use it along with the NL and RP models to provide a range of results.

One benefit of the NL and RP models is that they allow for heterogeneity and address the IID violation of constant variance for the observed portion of the variance (Louviere, Hensher and Swait, 2009). So the NL and RP models allow for heterogeneity and address the IID violation.

For the NL model, the respondent is assumed to first decide between the status quo or "not the status quo". If they choose "not the status quo", they then choose between the remaining options (B and C in this case) (Wielgus et al., 2003).

For the RP Model, the normal error structure was assumed. Price was fixed and all other variables were random. Only six variables (Dummy_High_Water_Cleanliness, Dummy_Medium_ Stony_Coral, Dummy_Medium_Consumptive_Fish, Dummy_High_Invertebrates Dummy_ High_Large_Wildlife, and Dummy_Medium_Water_Clarity) that were treated as random had significant coefficient on their standard deviations (SDs) (Table 3.11). This means that for these variables there is significant heterogeneity among households for these attributes.

Applied work similar to our own for the MNL model can be found in Sorice et al. (2005), for the NL model (Wielgus et al. 2003) and for the RP model (Wallmo and Lew 2012).

We do not present the math behind each of the model specifications. These can be found in Louviere, Hensher and Swait (2009). We used STATA Version 15 (StataCorp, 2017) to estimate all three models.

Table 3.6 Descriptive Statistics

Variables	Description of Variables	Mean	Standard Deviation	Min	Max	Observations
Price1000	This variable is the price of the various choices, scaled by $1000	0.2856	0.3436	0	1	4248
Dummy_High_Water_Cleanliness	This is a “0” or “1” dummy variable for if the choice has a high level of water cleanliness	0.4673	0.499	0	1	4248
Dummy_Medium_Stony_Coral	This is a “0” or “1” dummy variable for if the choice has a medium level of stony coral	0.2272	0.419	0	1	4248
Dummy_High_Stony_Coral	This is a “0” or “1” dummy variable for if the choice has a high level of stony coral	0.2182	0.4131	0	1	4248
Dummy_Medium_Soft_Coral	This is a “0” or “1” dummy variable for if the choice has a medium level of soft coral	0.2472	0.4314	0	1	4248
Dummy_High_Soft_Coral	This is a “0” or “1” dummy variable for if the choice has a high level of soft coral	0.2333	0.423	0	1	4248
Dummy_Medium_Consumptive_Fish	This is a “0” or “1” dummy variable for if the choice has a medium level of consumptive fish	0.2425	0.4286	0	1	4248
Dummy_High_Consumptive_Fish	This is a “0” or “1” dummy variable for if the choice has a high level of consumptive fish	0.2149	0.4108	0	1	4248
Dummy_Medium_Ornamental_Fish	This is a “0” or “1” dummy variable for if the choice has a medium level of ornamental fish	0.2403	0.4273	0	1	4248
Dummy_High_Ornamental_Fish	This is a “0” or “1” dummy variable for if the choice has a high level of ornamental fish	0.2173	0.4124	0	1	4248

Table 3.6 Descriptive Statistics (continued)

Variables	Description of Variables	Mean	Standard Deviation	Min	Max	Observations
Dummy_Medium_Invertebrates	This is a “0” or “1” dummy variable for if the choice has a medium level of invertebrates	0.2321	0.4222	0	1	4248
Dummy_High_Invertebrates	This is a “0” or “1” dummy variable for if the choice has a high level of invertebrates.	0.2229	0.4163	0	1	4248
Dummy_High_Large_Wildlife	This is a “0” or “1” dummy variable for if the choice has a high level of large wildlife.	0.3244	0.4682	0	1	4248
Dummy_High_Sport_Fishers	This is a “0” or “1” dummy variable for if the choice has a high level of sport fish interacted with if a person is a fisherman.	0.0111	0.1047	0	1	4248
Dummy_Medium_Water_Clarity	This is a “0” or “1” dummy variable for if the choice has a medium level of water clarity.	0.2321	0.4222	0	1	4248
Dummy_High_Water_Clarity	This is a “0” or “1” dummy variable for if the choice has a high level of water clarity.	0.225	0.4177	0	1	4248
Dummy_Medium_Crowdedness	This is a “0” or “1” dummy variable for if the choice has a medium level of crowdedness.	0.2326	0.4225	0	1	4248
Dummy_High_Crowdedness	This is a “0” or “1” dummy variable for if the choice has a high level of crowdedness.	0.2392	0.4266	0	1	4248

Table 3.7 Descriptive Statistics Demographics

Variables	Description of Variables	Mean	Standard Deviation	Min	Max	N
IncomeCont	The midpoint of income scaled by $1,000, then divided by the number of vacationers	63.20	41.52	2.5	200	4170
Age10	The respondents age divided by 10	3.981	1.239	1.8	8	4170
AGE10SQ	The respondents age divided by 10, then squared	17.38	10.92	3.24	64	4170
D3	Gender male "1" female "0"	0.4892	0.4999	0	1	4170
D4	Spanish, Hispanic, or Latino "1" not Spanish, Hispanic, or Latino "0"	0.2317	0.4216	0	1	4170
D5a	White "1" nonwhite "0"	0.6791	0.4669	0	1	4170
C16	What level of environmentalist are you using a 5 point Likert scale 1(not an environmentalist at all) 5(a very strong environmentalist)	3.346	0.9635	1	5	4122

Model Specifications

For all three specifications CL, RP, and NL the model was of the form:

Selection=B_1*Price1000+B_2*Dummy_High_Water_Cleanliness+B_3*Dummy_Medium_Stony_Coral+B_4*Dummy_High_Stony_Coral+B_{5*}Dummy_Medium_Soft_Coral+B_6*Dummy_High_Soft_Coral+B_7*Dummy_Medium_Consumptive_Fish+B_8*Dummy_High_Consumptive_Fish+B_9*Dummy_Medium_Ornamental_Fish+B_{10}*Dummy_High_Ornamental_Fish+B_{11}*Dummy_Medium_Invertebrates+B_{12}*Dummy_High_Invertebrates+B_{13}*Dummy_High_Large_Wildlife+B_{14}*Dummy_High_Sport_Fishers+B_{15}*Dummy_Medium_Water_Clarity+B_{16}*Dummy_High_Water_Clarity+B_{17}Dummy_Medium_Crowdedness+B_{18}*Dummy_High_Crowdedness ***(1)***

Price has been scaled by $1000 so that its values take on a similar range of values to the other dummy variables, mainly 0 to 1. The dummy variables are all 1 if the option contains that level of that attribute and zero otherwise. However, due to the small percentage of the sample population who participated in a fishing activity (3.25%), the dummy variable for sport fish has been interacted with respondents who participated in some fishing activity.

Demographics were not included in this model specification. While an alternative specification including demographic was run and is reported in Exhibit 5 our benchmark results (Tables 3.8-3.11) omit them.

In order to include demographics Exhibit 5 the alternative specification constant (ASC) with zeros for option “A” and ones for options “B” and “C” was constructed. The ASC was then interacted with demographics in order to allow for within variation between demographics, which do not vary for a respondent. However, when a Pearson correlation was run the ASC was highly correlated with the other dummy variable and thus we chose to omit demographics. In addition, only total household income was significant and the fact that this had to be estimated for over 29% of the sample, significant measurement error of this variable justifies not including it.

As noted previously, we dropped respondents who rejected our scenario, “protestors”. However, dropping these protestors reduced our sample below the 750 threshold to 702 respondents. As a result, we do not meet the minimum surveyed from the optimal design. This is a relatively small difference so we do not believe this is likely to affect our results, due both to how close we are to the threshold and because our results are largely consistent with economic theory. However, to dissuade any concerns we have included the full sample (770) in Exhibit 5.

.

Table 3.8 Conditional Logit (CL)

Variable	Coefficient	Robust Standard Error	Z	P>|Z|	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Price1000	-3.37***	0.207	-16.3	0.000	-3.78	-2.97
Dummy_High_Water_Cleanliness	0.871***	0.094	9.22	0.000	0.686	1.06
Dummy_Medium_Stony_Coral	.053	0.09	0.59	0.553	-0.123	0.23
Dummy_High_Stony_Coral	.176**	0.087	2.02	0.043	0.005	0.346
Dummy_Medium_Soft_Coral	.115	0.087	1.32	0.186	-0.056	0.287
Dummy_High_Soft_Coral	.155	0.098	1.58	0.113	-0.037	0.348
Dummy_Medium_Consumptive_Fish	.092	0.09	1.02	0.309	-0.085	0.268
Dummy_High_Consumptive_Fish	.283***	0.094	2.99	0.003	0.098	0.468
Dummy_Medium_Ornamental_Fish	.022	0.086	0.26	0.797	-0.147	0.192
Dummy_High_Ornamental_Fish	.209**	0.097	2.15	0.032	0.018	0.4
Dummy_Medium_Invertebrates	.287***	0.086	3.31	0.001	0.117	0.456
Dummy_High_Invertebrates	.277***	0.091	3.05	0.002	0.01	0.456
Dummy_High_Large_Wildlife	.278***	0.071	3.95	0.000	0.14	0.417
Dummy_High_Sport_Fishers	.621*	0.324	1.91	0.055	-0.015	1.26
Dummy_Medium_Water_Clarity	.148	0.095	1.56	0.119	-0.038	0.334
Dummy_High_Water_Clarity	.17*	0.098	1.74	0.083	-0.022	0.362
Dummy_Medium_Crowdedness	.022	0.092	0.24	0.814	-0.158	0.202
Dummy_High_Crowdedness	.176*	0.102	1.72	0.085	-0.024	0.376
Observations	4,212					
Clusters	704					
Pseudo Log likelihood (full)	-1324					
Chi-squared(18)	367.96					
Chi-squared Significance	0					
Pseudo R^2	.1414					

*P<.10, **P<.05, ***P<.01

Table 3.9 Nested logit (NL)

Variable	Coefficient	Robust Standard Error	Z	P>|Z|	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Price1000	-3.26***	0.206	-15.8	0.000	-3.67	-2.86
Dummy_High_Water_Cleanliness	.783***	0.083	9.48	0.000	0.621	0.945
Dummy_Medium_Stony_Coral	.102	0.078	1.30	0.193	-0.052	0.255
Dummy_High_Stony_Coral	.179**	0.071	2.50	0.012	0.039	0.319
Dummy_Medium_Soft_Coral	.178**	0.077	2.33	0.020	0.028	0.329
Dummy_High_Soft_Coral	.191**	0.082	2.33	0.020	0.03	0.352
Dummy_Medium_Consumptive_Fish	.127*	0.074	1.72	0.086	-0.018	0.271
Dummy_High_Consumptive_Fish	.317***	0.078	4.04	0.000	0.163	0.47
Dummy_Medium_Ornamental_Fish	.020	0.072	0.28	0.779	-0.121	0.161
Dummy_High_Ornamental_Fish	.215***	0.078	2.74	0.006	0.061	0.369
Dummy_Medium_Invertebrates	.240***	0.075	3.19	0.001	0.092	0.388
Dummy_High_Invertebrates	.257***	0.076	3.40	0.001	0.109	0.405
Dummy_High_Large_Wildlife	.293***	0.058	5.02	0.000	0.179	0.408
Dummy_High_Sport_Fishers	.608**	0.259	2.34	0.019	0.099	1.12
Dummy_Medium_Water_Clarity	.193**	0.079	2.43	0.015	0.037	0.348
Dummy_High_Water_Clarity	.188**	0.079	2.38	0.018	0.033	0.343
Dummy_Medium_Crowdedness	.102	0.086	1.20	0.231	-0.07	0.27
Dummy_High_Crowdedness	.283***	0.098	2.90	0.004	0.092	0.475
Dissimilarity Parameter						
Status quo	1	.			.	.
Other	0.777	0.007			0.586	0.967
Observations	4,212					
Clusters	704					
Pseudo Log likelihood (full)	-1322.8					
Chi-squared(18)	331.16					
Chi-squared Significance	0					

*P<.10, **P<.05, ***P<.01

Table 3.10 Random Parameter Logit (RP) Mean

Variable	Coefficient	Robust Standard Error	Z	P>|Z|	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Mean						
Price1000	-6.60***	1.79	-3.69	0.00	-10.1	-3.1
Dummy_High_Water_Cleanliness	1.73***	0.54	3.2	0.00	0.669	2.79
Dummy_Medium_Stony_Coral	.014	0.231	0.06	0.95	-0.44	0.468
Dummy_High_Stony_Coral	.341	0.211	1.62	0.10	-0.072	0.754
Dummy_Medium_Soft_Coral	.252	0.221	1.14	0.25	-0.181	0.684
Dummy_High_Soft_Coral	-.52	0.247	-0.21	0.83	-0.536	0.431
Dummy_Medium_Consumptive_Fish	.172	0.247	0.7	0.48	-0.311	0.656
Dummy_High_Consumptive_Fish	.661**	0.294	2.24	0.02	0.084	1.24
Dummy_Medium_Ornamental_Fish	.295	0.221	1.34	0.18	-0.137	0.728
Dummy_High_Ornamental_Fish	.300	0.233	1.29	0.19	-0.156	0.757
Dummy_Medium_Invertebrates	.708**	0.334	2.12	0.03	0.053	1.36
Dummy_High_Invertebrates	.729**	0.34	2.14	0.03	0.062	1.4
Dummy_High_Large_Wildlife	.313*	0.182	1.72	0.08	-0.045	0.671
Dummy_High_Sport_Fishers	1.54*	0.892	1.73	0.08	-0.206	3.29
Dummy_Medium_Water_Clarity	-.006	0.245	-0.02	0.98	-0.487	0.475
Dummy_High_Water_Clarity	.354	0.229	1.55	0.12	-0.093	0.8
Dummy_Medium_Crowdedness	.033	0.213	0.15	0.87	-0.385	0.45
Dummy_High_Crowdedness	.056	0.223	0.25	0.80	-0.381	0.494

*P<.10, **P<.05, ***P<.01

Table 3.11 Random Parameter Logit (RP) Standard Deviation

Variable	Coefficient	Robust Standard Error	Z	P>|Z|	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Standard Deviation						
Dummy_High_Water_Cleanliness	2.86***	0.929	3.08	0.00	1.04	4.68
Dummy_Medium_Stony_Coral	1.85*	1.03	1.8	0.07	-0.166	3.86
Dummy_High_Stony_Coral	-.686	1.47	-0.46	0.64	-3.58	2.21
Dummy_Medium_Soft_Coral	.560	0.611	0.92	0.35	-0.637	1.76
Dummy_High_Soft_Coral	.832	0.778	1.07	0.28	-0.693	2.36
Dummy_Medium_Consumptive_Fish	1.77**	0.781	2.27	0.02	0.244	3.31
Dummy_High_Consumptive_Fish	-.212	0.592	-0.36	0.72	-1.37	0.948
Dummy_Medium_Ornamental_Fish	-.154	0.5	-0.31	0.75	-1.13	0.827
Dummy_High_Ornamental_Fish	1.07	0.771	1.39	0.16	-0.442	2.58
Dummy_Medium_Invertebrates	-.177	0.447	-0.4	0.69	-1.05	0.7
Dummy_High_Invertebrates	-1.14*	0.639	-1.78	0.07	-2.39	0.116
Dummy_High_Large_Wildlife	-1.24*	0.704	-1.77	0.07	-2.63	0.134
Dummy_High_Sport_Fishers	1.45	1.52	0.96	0.33	-1.53	4.44
Dummy_Medium_Water_Clarity	2.25***	0.795	2.83	0.00	0.694	3.81
Dummy_High_Water_Clarity	.203	0.397	0.51	0.61	-0.575	0.98
Dummy_Medium_Crowdedness	.093	0.528	0.18	0.86	-0.942	1.13
Dummy_High_Crowdedness	.636	0.585	1.09	0.27	-0.511	1.79
Observations	4,212					
Pseudo Log likelihood (full)	-1281.8					
LR Chi-squared(17)	85.07					
Chi-squared Significance	0					

*P<.10, **P<.05, ***P<.01

Table 3.12 Condensed results

Variables	CL	NL	RP	Not Sig (3)	Not Sig (2)	Sig (2)	Sig(3)
Price1000	3+	3+	3+				✓
Dummy_High_Water_Cleanliness	3+	3+	3+				✓
Dummy_Medium_Stony_Coral	0+	0+	0+	✓			
Dummy_High_Stony_Coral	2+	2+	0+			✓	
Dummy_Medium_Soft_Coral	0+	2+	0+		✓		
Dummy_High_Soft_Coral	0+	2+	0-		✓		
Dummy_Medium_Consumptive_Fish	0+	1+	0+		✓		
Dummy_High_Consumptive_Fish	3+	3+	2+				✓
Dummy_Medium_Ornamental_Fish	0+	0+	0+	✓			
Dummy_High_Ornamental_Fish	2+	3+	0+			✓	
Dummy_Medium_Invertebrates	3+	3+	2+				✓
Dummy_High_Invertebrates	3+	3+	2+				✓
Dummy_High_Large_Wildlife	3+	3+	1+				✓
Dummy_High_Sport_Fishers	1+	2+	1+				✓
Dummy_Medium_Water_Clarity	0+	2+	0-		✓		
Dummy_High_Water_Clarity	1+	2+	0+			✓	
Dummy_Medium_Crowdedness	0+	0+	0+	✓			
Dummy_High_Crowdedness	1+	3+	0+			✓	

Table 3.12 shows the results from all three models in a more user friendly way. The number (0-3) is the level of significance for that variable in that model where 0+=P<.10, 1+=P<.05, 2+=P<.01 and 3+=P<.001.

- The sign is the sign of the coefficient.
- Not Sig(3) is not significant for all three models
- Not sig(2) is not significant in two of three models
- Sig(2) is significant in two of three models
- Sig(3) is significant for all three models.

Non-significant Variables or Weak Results.

Only three variables are not significant across all three models (medium stony coral, medium ornamental fish, and medium crowdedness). For all three of these variables their respective high level was significant in at least two models. This indicates that respondents had polarizing preferences for these attributes either exhibiting a strong preference and seeking out the high level or no preference and making their decision based on other attribute levels and/or price. Perhaps there are two or more distinct types of visitors in Puerto Rico. One who directly interact with the reef, whose primary purpose is diving and exploring the coral reefs. These people would prefer the high level for stony coral, ornamental fish, and crowdedness. A second group who

interact with the coral reef more indirectly through fishing, swimming, glass bottom boat rides, etc. this group may have less of a preference for stony coral, ornamental fish, and crowdedness.

Four variables were only significant in one of the three models (soft coral medium, soft coral high, consumptive fish medium, water clarity medium). The lack of significance for soft coral is most likely the result of the structure of the survey. The attribute levels for soft coral are monotonically decreasing in the number of sponges and stony coral for ascending levels of attributes. The rational for structuring the survey in this way is that an abundance of soft corals is an indication of an unhealthy coral reef because soft coral thrive in conditions that are unfavorable for stony coral. However, soft coral is generally vibrant in color and for some respondents may be more desirable than stony coral, which is generally less vibrant. These two different types of respondents, within direct coral users, may have eroded significance for soft coral both at the medium and high level, and as we will address below, change the interpretation of the marginal value of this attribute.

The lack of significance for medium consumptive fish may be because of the small percentage of the population who participated in some fishing activity (3.25%) and those individuals seeking out the high level of consumptive fish instead, while non-fishers having no preference. Similarly medium water clarity may have been a priority for divers (27.57%), but not for non-divers.

Six of the seven attributes with low levels of significance are medium level attributes, and there are only seven attributes that have a medium level. Only medium invertebrates was significant. It is possible that the number of different attributes presented coupled with the number of distinct levels overwhelmed some respondents, who then reduced a more complicated situation down to a simpler one. This cognitive overload may have resulted in some respondents ignoring medium levels and only valuing low or status quo versus high level attributes. Although this issue was addressed with focus groups and a large scale pre-test, this problem was not discovered in the design stage of the survey. Focus groups, one-on-ones and the pre-test concluded that visitors did think their values would change with changes in the levels of attributes presented. Thus, an alternative explanation might be that the dummy variable construction causes problems with multi-collinearity and the inability of detecting statistically significant effects for all level changes. How reef-users responded to the soft corals would seem to indicate they were looking very closely at the specifications for individual attributes across the levels.

Significant Model Variables

The ten remaining attribute levels were significant in at least two of the three models. High water cleanliness was a priority for respondents. Water cleanliness was highly significant across all three models and had strictly the greatest coefficient for any attribute. This makes intuitive sense because the high level, water is healthy for swimming, as opposed to the low level, water is not healthy for swimming, is a fairly universally desirable quality for both direct and indirect coral reef users. Not only is it important for any respondent who plans to spend time in the water, it is also potentially correlated with other desirable coral reef attributes.

Medium invertebrates and high invertebrates were significant for all three models. For two of the models (NL, RP) medium invertebrates exhibited diminishing marginal utility. This is consistent with economic theory. However, the coefficients for medium invertebrates and high invertebrates are very similar within each model.

The variable for the high level of sport fish interacted with if the respondent is a fisher was significant across all three models. Thus, fisherman sought out high levels of sport fish.

The remaining six attributes (high stony coral, high consumptive fish, high ornamental fish, high large wildlife, high water clarity, and high crowdedness) were significant for at least two of the three models and had strictly positive coefficients.

Price

Price is the most important explanatory variable in a valuation model. It is fundamental to be able to estimate a negative and statistically significant coefficient on price as theory would dictate (construct validity). Price was scaled to thousands of dollars (Price1000) to put in on the same scale as other variables, which aids estimation. In all three models price was negative and significant, thus validating the model. To estimate marginal willingness-to-pay for each model attribute one divides the coefficient on the attribute by the negative of the price coefficient.

Marginal Willingness to Pay

For the estimated models, the marginal willingness to pay (MWTP) can be calculated for each natural resource attribute to assess relative importance. MWTP here is the change in value at movement from the low condition (Status Quo) to the medium condition or from the low condition to the high condition. One can subtract the value at the movement form low to medium from the movement from low too high to derive the value of the movement from medium to high. With these three measurements one can then assess if there is declining marginal utility (i.e., that the marginal value of moving from the medium to high condition level is less than the marginal value of moving from low to medium). The formula for MWTP is the attribute's coefficient divided by the negative of the price coefficient (Louviere, Hensher and Swait, 2009; Green, 2007). The results for the MNL, NL, and RP models are summarized in Tables 3.9, 3.10, and 3.11, respectively.

Table 3.13 Annual Household Marginal Willingness to Pay using the CL Model

Variable	Low to Medium	Medium to High	Low to High
Water Cleanliness			$258.46
Stony Coral	$15.73	$36.50	$52.23
Soft Coral	$34.12	$11.87	$45.99
Consumptive Fish	$27.30	$56.68	$83.98
Ornamental Fish	$6.53	$55.49	$62.02
Invertebrates	$85.16	-$2.97	$82.20
Large Wildlife			$82.49
Sport Fish			$184.28
Water Clarity	$43.92	$6.53	$50.45
Crowdedness/Depth	$6.53	$45.70	$52.23

Table 3.14 Annual Household Marginal Willingness to Pay using the NL Model

Variable	Low to Medium	Medium to High	Low to High
Water Cleanliness			$240.18
Stony Coral	$31.29	$23.62	$54.91
Soft Coral	$54.60	$3.99	$58.59
Consumptive Fish	$38.96	$58.28	$97.24
Ornamental Fish	$6.13	$59.82	$65.95
Invertebrates	$73.62	$5.21	$78.83
Large Wildlife			$89.88
Sport Fish			$186.50
Water Clarity	$59.20	-$1.53	$57.67
Crowdedness/Depth	$31.29	$55.52	$86.81

Table 3.15 Annual Household Marginal Willingness to Pay using the RP Model

Variable	Low to Medium	Medium to High	Low to High
Water Cleanliness			$262.12
Stony Coral	$2.12	$49.55	$51.67
Soft Coral	$38.18	-$116.97	-$78.79
Consumptive Fish	$26.06	$74.09	$100.15
Ornamental Fish	$44.70	$0.76	$45.45
Invertebrates	$107.27	$3.18	$110.45
Large Wildlife			$47.42
Sport Fish			$233.33
Water Clarity	-$0.91	$54.55	$53.64
Crowdedness/Depth	$5.00	$3.48	$8.48

Marginal values for the random parameters model did not include standard deviations in calculation. Standard deviations only used to indicate heterogeneity.

The highest average MWTP going from the low level of the attribute to the high level are water cleanliness, sport fish, consumptive fish, and invertebrates.

The lowest average MWTP going from the low level of the attribute to the high level are soft coral, crowdedness, and stony coral. With the average MWTP for soft coral being by far the lowest at $8.60. This is consistent with some respondents having a positive MWTP for increases in the attribute level of soft coral while others having a negative MWTP for increases in the attribute level of soft coral. In other words, the latter group prefers more soft coral.

Final Approach

Given the variability of results across models, we decided to follow the approach used in Leeworthy et al. (2018e), which is to average the model coefficients across model specifications. Further, even though all attribute level changes were not significant in all models, or even significant in any of the models, we maintain the full model with all 10 attributes and their levels. We drop a few results in the individual models before averaging because either the coefficients did not have the correct sign or the marginal value decreased going from a low level of condition to a higher level of condition. Only three results were dropped following this decision: CL model, Dummy_High_Invertebrates; NL model, Dummy_High_Water_Clarity; and RP Model, Dummy_Medium_Water_Clarity.

We maintain the soft corals coefficients even though they are negative in the RP model per the argument above that some prefer more soft corals despite the science that says more soft corals indicate a declining reef condition. The interpretation here is that some people would be willing to pay more for more soft corals not less soft corals. Another example of heterogeneity in preferences.

Results

The results of averaging model coefficients are summarized in Table 3.16. The average for the price coefficient is constant across changes in attribute conditions since it is used to calculate the marginal value of a change in reef attribute condition. Three of the reef attributes were binary i.e. they changed from only low to high condition (water cleanliness, opportunity to see large wildlife and the opportunity to see or catch a trophy sport fish). All other reef attributes have three levels of condition with the “Status Quo” being the low condition and changes are from the low to medium condition and from the low to the high condition.

Model Coefficients

Averaging the model coefficients leads to a model in which the coefficients increase moving from the "low to medium" condition to the "low to high" condition, except for soft corals as discussed above. This means that, except for soft corals, the model will predict that the marginal economic value will increase with improved reef attribute conditions (Table 3.17).

The highest value changes for improving reef attribute conditions from low to medium is for invertebrates. The lowest marginal value was for crowdedness/depth. Since crowdedness/depth was a composite attribute, we cannot conclude that crowding or congestion effects are significant.

Table 3.16. Average Model Coefficients

	Change in Attribute Condition	
Variable	Low to Medium	Low to High
Price	-4.410	-4.410
Water Cleanliness		1.128
Stony Coral	0.098	0.232
Soft Coral	0.182	-0.058
Consumptive Fish	0.130	0.420
Ornamental Fish	0.112	0.241
Invertebrates	0.412	0.421
Large Wildlife		0.295
Sport Fish		0.923
Water Clarity	0.171	0.237
Crowdedness/Depth	0.052	0.172

Marginal Economic Values

The highest value changes for improving reef attribute conditions from low to high are water cleanliness and the opportunity to see or catch a trophy sport fish. This was followed by invertebrates and consumptive fish. Therefore, even though reef fishing is a relatively low participation activity, the attributes that support it have relatively high value to most reef users. The marginal value for soft corals changes to a negative value. Here the interpretation is that reef users would be willing to pay, on net, $13.15 less for improving soft coral conditions to the highest level. Again, this is because some reef users have a higher value for more soft corals.

Table 3.17. Marginal Willingness to Pay Using Average Model Coefficients

	Change in Attribute Condition		
Variable	Low to Medium	Medium to High	Low to High
Water Cleanliness			$255.78
Stony Coral	$22.30	$30.31	$52.61
Soft Coral	$41.19	-$54.35	-$13.15
Consumptive Fish	$29.55	$65.76	$95.31
Ornamental Fish	$25.47	$29.25	$54.72
Invertebrates	$93.35	$2.12	$95.46
Large Wildlife			$66.82
Sport Fish			$209.30
Water Clarity	$38.66	$15.15	$53.82
Crowdedness	$11.87	$27.06	$38.93

Note: Negative value for soft corals means some people are willing to pay more for more soft corals. Improved condition was stated as a lower amount of soft corals (See Table 3.1).

Marginal Utility

By calculating the marginal economic values of a change in reef attribute conditions from medium to high allows us to assess whether there is constant, increasing or declining marginal utility in improving reef attribute conditions. Generally, economic theory would hypothesize declining marginal utility meaning as reef attribute conditions improve the marginal change in value will decline. In the case here, it will be the difference between the change from “low to high” and the change from “low to medium”. The direction of the change in marginal utility then is the comparison between the changes from “medium to high” with the change from “low to medium”. For declining marginal utility, we would expect the change from “medium to high” to be lower than the change from “low to medium”.

Declining marginal utility evidenced itself for only three of the seven reef attribute conditions where it could be tested (soft corals, invertebrates and water clarity). There is very little added value of improving the condition of invertebrates past the medium condition. For soft corals, there is a fundamental shift in preferences going from the medium to the high condition. All the rest of the reef attributes show increasing marginal utility. Normally this might present a problem when trying to apply results to actual policy/management. However, the scientific process of

defining the high condition provided an important constraint to the high condition. The high condition does not represent “pristine” conditions without the presence of man. The high condition was based on NOAA/EPA monitoring of the reefs around the island and realistic conditions were constructed that represented was what considered possible with changes in management/policy. Given this construct constraint, we think the results are plausible and can be used to evaluate protection and restoration actions that would result in reef attributes reaching the high condition.

Chapter 4: Total Annual Value for Changing Conditions

Approach.

In this chapter, the total valuation functions are used to evaluate changes in total non-market economic value for changes in the natural resource conditions. All changes are from the low condition (Status Quo) to higher conditions (e.g. medium or high), with the exception of model three, which examines the value going from medium to the high condition. The Status Quo (Low Condition) is not valued, only changes across attribute levels can be estimated with our chosen approach.

The model based on the averaging of coefficients across models as presented in Chapter 3 is used here to demonstrate the use of the model for three scenarios:

1. All natural resource attributes set to the medium condition.
2. All natural resource attributes set to the high condition.
3. All natural resource attributes moving from the medium level of the attribute to the high level of the attribute.
4. Natural resource conditions set to a mix of low, medium and high conditions.

The first model only incorporates the seven attributes (stony coral, soft coral, consumptive fish, ornamental fish, invertebrates, water clarity, and crowdedness) that had a medium level. The interpretation of this model is the value for visitors who participated in some coral reef activities value of an improvement from the status quo to medium attributes. The remaining three attributes are set at the low level.

The second model consists of all ten attributes moving from the status quo to the high level. However, because sport fish was interacted with percentage of the population who were fisherman, the aggregation of sport fish had to be devalued by the fisherman participation rate (3.25%).

The third model only incorporates the seven attributes (stony coral, soft coral, consumptive fish, ornamental fish, invertebrates, water clarity, and crowdedness) that had a medium level. The interpretation of this model is the value for visitors who participated in some coral reef activities value of an improvement from the medium condition to the high condition. The remaining three attributes are set at the low level.

The fourth model sets the seven attributes that had a medium condition level at their medium level and the remaining three attributes are set at their high condition level.

The functions estimate the average annual value or willingness to pay per household for those who visit the Puerto Rico and participated in coral reef activities. This is then aggregated for all households that visited Puerto Rico, which was estimated to be 352,822, which is equal to 1,171,368 person-trips of reef-using visitors divided, by the average number of people (3.32) the person representing the household was paying for on the trip.

Results

Status Quo to Medium.

For the seven attributes with a medium level, the MWTP per household who engaged in some coral reef activities, in Puerto Rico, the model predicts an annual average of $262.39 per reef-using household, which is $79.03 per person-trip. This yields an aggregate annual value of over $92.5 million (Table 4.1).

Table 4.1. Total Value Changes: Status Quo (Low Condition) to Medium Condition

Variable	Change in Marginal Value	Change in Total Aggregate Value [1]
Stony Corals	$22.30	$7,867,931
Soft Corals	$41.19	$14,532,738
Consumptive Fish	$29.55	$10,425,890
Ornamental Fish	$25.47	$8,986,376
Invertebrates	$93.35	$32,935,934
Water Clarity	$38.66	$13,640,099
Crowdedness/Depth	$11.87	$4,187,997
Total	**$262.39**	**$92,576,965**

1. 352,822 reef-using households (1,171,368 person-trips divided by 3.32 people in party person was paying for on the trip).

Status Quo to High.

For all ten attribute increasing from the status quo to high level, the MWTP per household who engaged in some coral reef activities, in Puerto Rico, the model predicts and annual average of $909.60 per reef-using household, which is $212.98 per person-trip. The results have to be adjusted for sports fish since only 3.25% of reef-users are fishermen. This yields an aggregate annual value of over $249 million (Table 4.2).

Table 4.2. Total Value Changes: Status Quo (Low Condition) to High Condition

Variable	Change in Marginal Value	Change in Total Aggregate Value [1]
Water Cleanliness	$255.78	$90,244,811
Stony Corals	$52.61	$18,561,965
Soft Corals	-$13.15	-$4,639,609
Consumptive Fish	$95.31	$33,627,465
Ornamental Fish	$54.72	$19,306,420
Invertebrates	$95.46	$33,680,388
Large Wildlife	$66.82	$23,575,566
Sport Fish	$209.30	$2,399,983
Water Clarity	$53.82	$18,988,880
Crowdedness/Depth	$38.93	$13,735,360
Total	**$909.60**	**$249,481,230**

1. 352,822 reef-using households (1,171,368 person-trips divided by 3.32 people in party person was paying for on the trip). For sports fish, 3.25% are fishermen.

Medium to High.

For the seven attribute who had a medium level increasing from that medium level to the high level, the MWTP per household who engaged in some coral reef activities, the model predicts and annual average of $115.30 per reef-using household, which is $34.73 per person-trip. This yields an aggregate annual value of over $40.6 million (Table 4.3).

Table 4.3. Total Value Changes: Medium to High Condition

Variable	Change in Marginal Value	Change in Total Aggregate Value [1]
Stony Corals	$30.31	$10,694,035
Soft Corals	-$54.35	-$19,175,876
Consumptive Fish	$65.76	$23,201,575
Ornamental Fish	$29.25	$10,320,044
Invertebrates	$2.12	$747,983
Water Clarity	$15.15	$5,345,253
Crowdedness	$27.06	$9,547,363
Total	**$115.30**	**$40,680,377**

Status Quo to Mixed Medium and High.

For the seven attributes that have a medium level increasing from status quo to medium and the remaining three attributes increasing from status quo to high, the model predicts and annual average of $739.90 per reef-using household, which is $161.87 per person-trip. The results have to be adjusted for sports fish since only 3.25% of reef-users are fishermen. This yields an aggregate annual value of over $189.6 million (Table 4.4).

Table 4.4. Total Value Changes: Status Quo (Low Condition) to Mixed Medium and High Condition

Variable	Change in Marginal Value	Change in Total Aggregate Value [1]
Water Cleanliness	$255.78	$90,244,811
Stony Corals	$22.30	$7,867,931
Soft Corals	$41.49	$14,638,585
Consumptive Fish	$29.55	$10,425,890
Ornamental Fish	$25.47	$8,986,376
Invertebrates	$38.66	$13,640,099
Large Wildlife	$66.82	$23,575,566
Sport Fish	$209.30	$2,399,983
Water Clarity	$38.66	$13,640,099
Crowdedness	$11.87	$4,187,997
Total	**$739.90**	**$189,607,337**

1. 352,822 reef-using households (1,171,368 person-trips divided by 3.32 people in party person was paying for on the trip). For sports fish 3.25% are fishermen.

Uncertainty

Research is emerging on incorporating uncertainty in model estimates Krupnick and Cropper (1992) and Vossler et al. (2003); however, there is no consensus on how to use measures of uncertainty in calibrating valuation estimates. Following each choice, the survey incorporated a question about the respondent's self-evaluation of their uncertainty (C8 and C12) of their response to the choice questions. A five point scale was used to measure uncertainty with 1=Not sure at all, 2=Slightly sure, 3=Moderately sure, 4=Very sure and 5=Extremely sure. Those who

were “not sure at all” or “Slightly sure” for both responses were dropped from the model. Thirteen respondents met this criterion.

The conditional logit model was re-run with this recoding. The result was more attributes were not significant but for those that were, the estimated values generally increased with two exceptions. This is opposite what is hypothesized by incorporating uncertainty i.e. that, by not incorporating uncertainty, estimates are biased upwards. The differences were not significant. We reject the approach of incorporating this kind of uncertainty in calibrating results.

Hypothetical Bias

In all stated preference work, researchers must address the potential for hypothetical bias. This was addressed in carefully designing the survey information through focus group work and pre-testing. In addition, the evaluation of protestors and dropping those who did not accept our scenarios and scientific information address this concern. Making the choice consequential is a key element in avoiding hypothetical bias Vossler and Evans (2009) and Bishop et al. (2011). We designed the payment vehicle to avoid hypothetical biases by choosing a payment vehicle that was believable and consequential (they would actually have to pay it). Therefore, we believe hypothetical bias, if it even exists, is not significant.

Chapter 5: Conclusions and Future Research

Conclusions

The stated preferences method using the choice framework is a good method for valuing multiple resource attributes, but it does have its limits in the number of attributes that can be evaluated from a single sample of people. Fractional factorial designs that yield orthogonal and balanced designs that estimate "main effects" can be successful in statistically identifying the importance of many attributes, especially in applications were interaction or cross effects are relatively unimportant.

The estimated models were generally successful in estimating the marginal value of changes in natural resource attributes for Puerto Rico households that engaged in some coral reef activities. There was heterogeneity in preferences, especially for soft corals. Reef-user preferences switched going from "low to medium" to "medium to high" and this was not expected. The valuation functions were sensitive to model specification. We believe averaging results across model specification is the best predictor of value rather than choosing one model result as better based on simple log likelihood ratio tests.

The results presented here will support management objectives including evaluating investments in environmental protection and restoration; damage assessments; and contribute to the deep research behind interpreting indicators used in evaluation of the recreation ecosystem service as is currently being done in sanctuary Condition Reports.

Future Research

Future research could incorporate the New Ecological Paradigm (NEP) (Dunlap et al. 2010 and Dunlap 2008). The NEP is a series of questions using a 7 point Likert scale that can help identify if a respondent is pro-environment or pro-development, Dominant Social Paradigm (DSP). Respondent's preference for the environment versus development has been shown to be a good indicator of WTP for outdoor recreation. This is especially important where issues of crowdedness or congestion effects are an important factor. Crowdedness was combined with reef depth so we were not able to address how crowdedness affected people's values for the coral reefs. Future research should try and address this aspect of reef use.

Species likeability scores could be used during the pretest. Having a better understanding of which species individuals find more appealing could help focus the attention of the survey and potential allow for fewer different attributes, thus avoiding cognitive overload. The distribution of likeability scores could also potential help identify species characterized with heterogeneous preferences. This was case here for soft corals. Focus groups, one-on-ones and a pre-test did not reveal these preferences. In addition, adding soft corals to the importance-satisfaction ratings In Leeworthy et al. (2018c), would have allowed additional understanding of the importance to reef users of soft corals.

Additional research could involve a non-static examination of the Puerto Rico coral reef. We could run some variant of this survey in the future. This would allow us to examine factors that change across time such as demographics, number of vacationers, participation rates, and seasons. Monitoring the quality of the coral reef, we could examine how these factors were influenced by changes in the current conditions of the coral reef.

The study could also be extended in the future to evaluate the preferences of residents of the island. A survey has been partially designed and not much work would be required to finalize the design and implement. This would provide a more complete valuation of Puerto Rico's coral reefs for recreation.

A national study could also be designed to look at the non-use or "passive" economic use value component of the coral reef ecosystem. Often these values far exceed the direct use values as estimated here.

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Exhibit 1: Questionnaires and Survey Materials

- Tally Sheet
- Blue Card – Reef Activity List
- Respondent GREEN Card
- Coral Reef Illustrations (Low, Medium and High)
- Crowding Photos (Low, Medium and High)
- Coral Reef Definitions and Conditions Card
- Visitor's Economic Valuation Card
- Visitor's Management Solutions Card
- Visitor Choice Cards (Versions 1a to 9b)
- Visitor On-site Questionnaires
  (Example:Versions 1a)

Tally Sheet
Airport Survey

Hello, I am from the University of Puerto Rico and we are doing a survey on recreation-tourism in Puerto Rico. Those who complete the survey will be entered into a sweepstakes/lottery to win free vacation prizes. **(Hand respondent gift brochure).**

1. Are you a permanent resident of Puerto Rico?

☐ Yes — Thank you. We are only interviewing nonresidents of Puerto Rico. (Place tic mark in column 4)

☐ No — Are you ending your trip to the Puerto Rico today?

- ☐ Yes — ☐ No — Thank you. We are only interviewing people at the end of their trip to the Puerto Rico. (Place tic mark in column 5)

→ Did you do any recreation/tourist activities on the coral reefs on this visit to Puerto Rico? (show recreation/tourist activity Blue Card)

- ☐ No — Thank you. We are only interviewing visitors that did recreation/tourist activities on coral reefs. (Place tic mark in column 6)
- ☐ Yes

Will you participate in a short 20-30 minute interview about your visit to Puerto Rico?

- ☐ No — Thank you. (Place tic mark in column 7)
- ☐ Yes — (Place tic mark in column 8)

1	2	3	4	5	6	7	8
Site	Date	Time Period	Permanent Resident	Non Exit Visitor	Non Reef Using Recreating/ Tourist	Reef User Recreating Visitor Refusal or Language	Reef Using Recreating Visitor Interviewed

REEF ACTIVITIES LIST

Number	Water-based Activities
	Snorkeling
100A	Snorkeling from charter/party boat (pay operation and includes snorkeling tours)
101A	Snorkeling from a rental boat
102A	Snorkeling from private boat (your boat or friend or relative's boat)
10A	Snorkeling from shore
	Scuba Diving
200A	Scuba diving from charter/party boat (pay operation)
201A	Scuba diving from a rental boat
202A	Scuba diving from a private boat (your boat or friend or relative's boat)
11A	Scuba diving from shore
	Special Activities while Snorkeling or Scuba Diving
300	Diving for lobsters
301	Underwater photography
303	Spear fishing
	Fishing – Inshore or Light Tackle Fishing
404A	Fishing from charter/party boat or guide (pay operation) – inshore or light tackle
405A	Fishing from rental boat – inshore or light tackle
406A	Fishing from a private boat (your boat or friend or relative's boat) – inshore or light tackle
	Other Fishing
407A	Other fishing from charter boat (pay operation, usually six persons or less)
408A	Other fishing from party or head boat (pay operation, charge per person)
409A	Other fishing from a rental boat
410A	Other fishing from a private boat (your boat or friends or relative's boat)
14A	Fishing from shore (beach, bank, pier, bridge, jetty, dock)
	Viewing Nature and Wildlife
500A	Glass bottom boat rides (pay operation)
501A	Inshore boating excursions (pay operation/guided service/NOT FISHING, including kayaking)
502A	Viewing nature and wildlife from private or rental boat
503	Bioluminescent Bays
504	Ocean kayaking
505	Whale watching
	Other Activities on the Reefs
13A	Surfing
15A	Swimming
18A	Paddle boarding, wind surfing or kite boarding

Blue Card

RESPONDENT CARD

ABOUT THE INFORMATION YOU PROVIDE STATEMENT

Your participation in this interview is voluntary. There are no penalties for not answering some or all of the questions, but since each interviewed person will represent many others not interviewed, your cooperation is extremely important. This study is being conducted by the University of Puerto Rico – Mayaguez Puerto Rico Sea Grant, the National Oceanic and Atmospheric Administration and the U.S. Environmental Protection Agency. Uses of the information include the evaluation of present recreation uses and planning for future visitation. At the end of the study any materials identifying you as an individual will be destroyed.

This is a cooperative research project of the Puerto Rico Tourism Company the National Oceanic and Atmospheric Administration and the U.S. Environmental Protection Agency. Public reporting burden for this collection of information is estimated to average 4 minutes including time for reviewing instructions, searching existing data sources, gathering and maintaining the data need, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to U.S. Department of Commerce, Clearance Officer, Office of Chief Information Officer, Rm. 6625, 14th and Constitution Avenue NW, Washington, DC 20230. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subject to penalty for failure to comply with, a collection of information subject to requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

SECTION 1: Primary Purpose of Trip to Puerto Rico

A Recreation or vacation
B Visit family or friends
C Business trip
D Business and pleasure
E Other (specify)

SECTION 2: Race (Select All that Apply)

A White
B Black or African American
C American Indian or Alaska Native
D Asian
E Native Hawaiian or Other Pacific Islander

SECTION 3: HOUSEHOLD INCOME CATEGORIES (Annual Income before taxes)

A Less than $5,000
B $5,000 to $9,999
C $10,000 to $14,999
D $15,000 to $19,999
E $20,000 to $24,999
F $25,000 to $29,999
G $30,000 to $34,999
H $35,000 to $39,999
I $40,000 to $44,999
J $45,000 to $49,999
K $50,000 to $59,999
L $60,000 to $74,999
M $75,000 to $99,999
N $100,000 to $149,999
O $150,000 or more

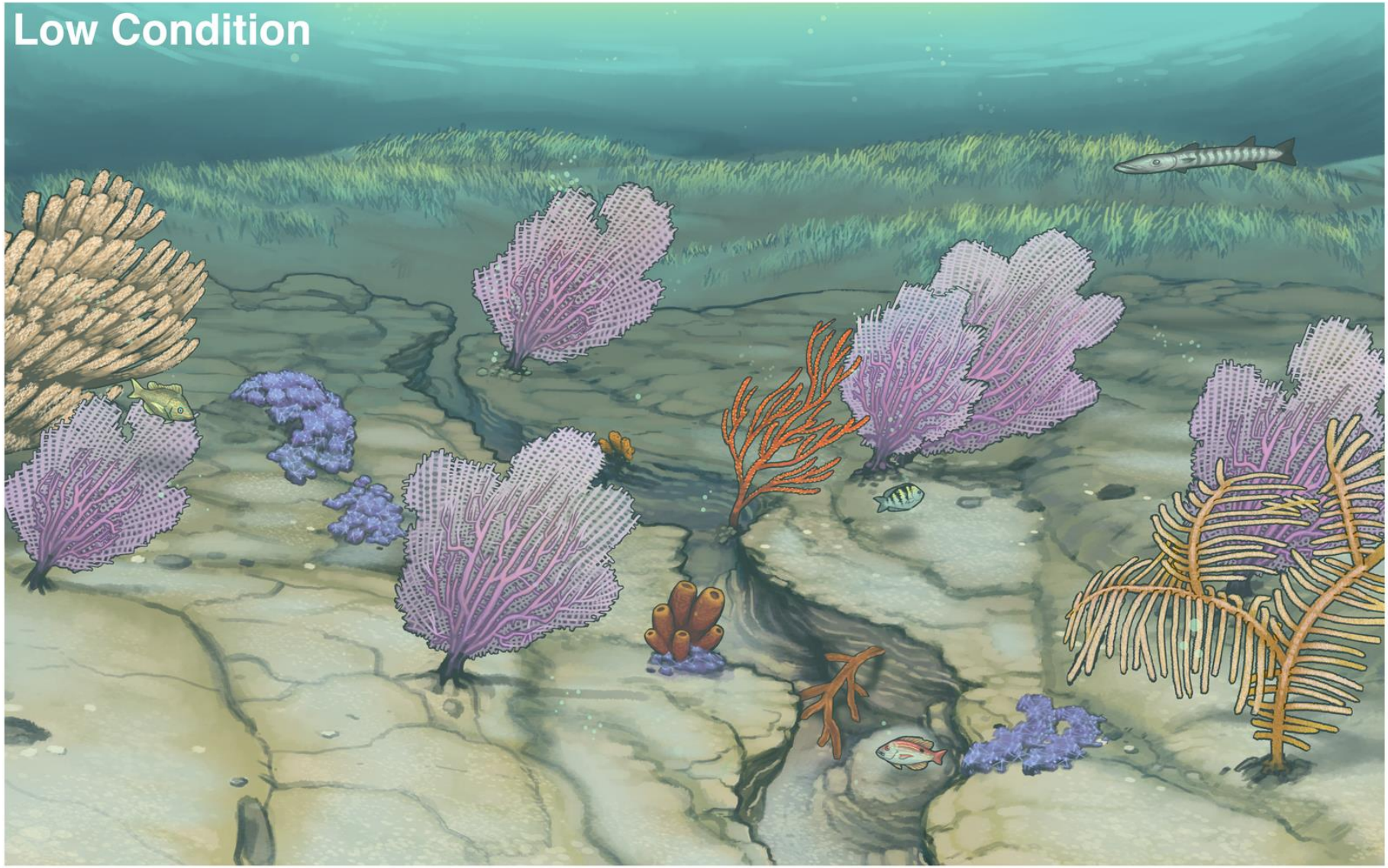

Illustration by Daniel Irizarri Oquendo

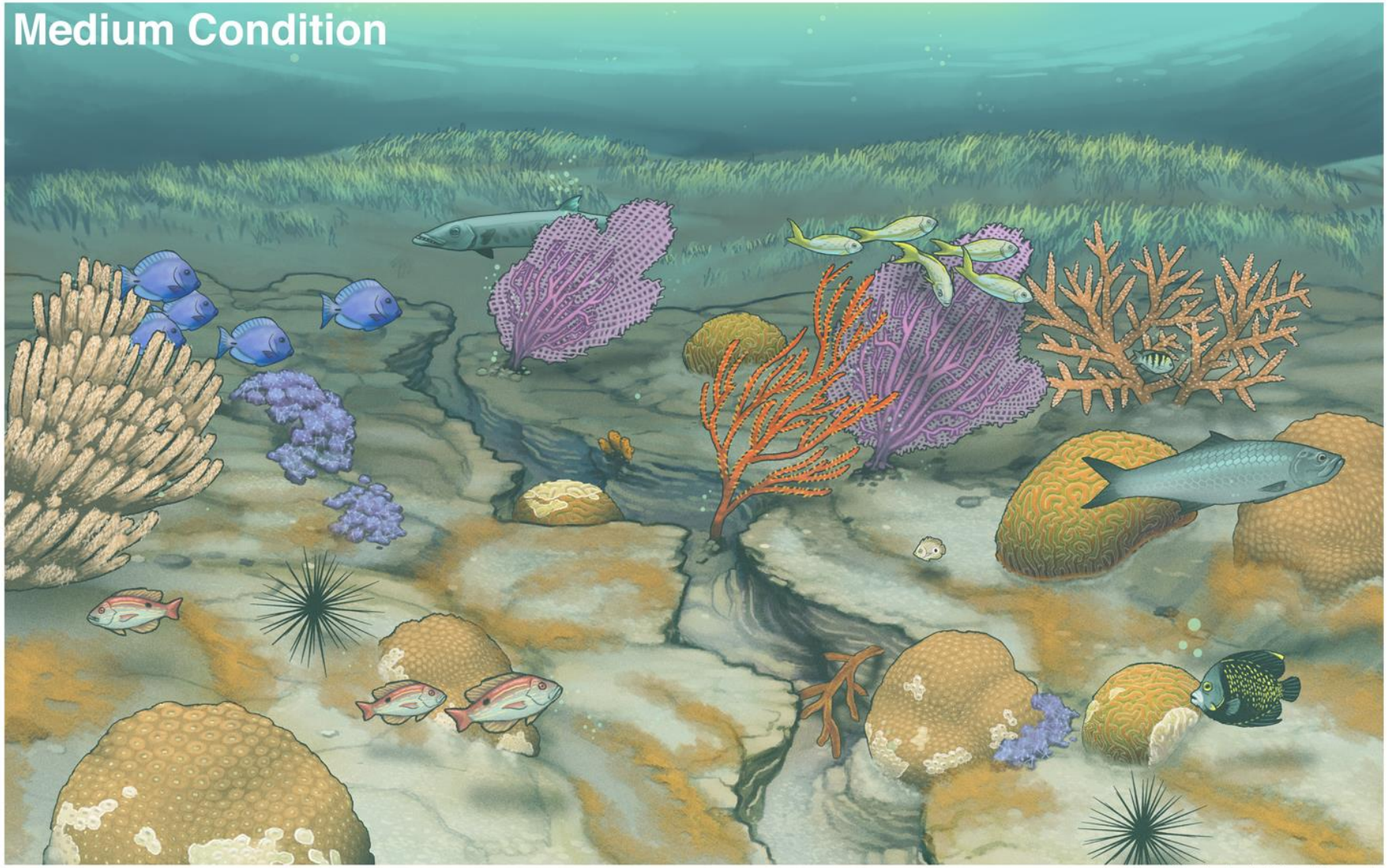

Illustration by Daniel Irizarri Oquendo

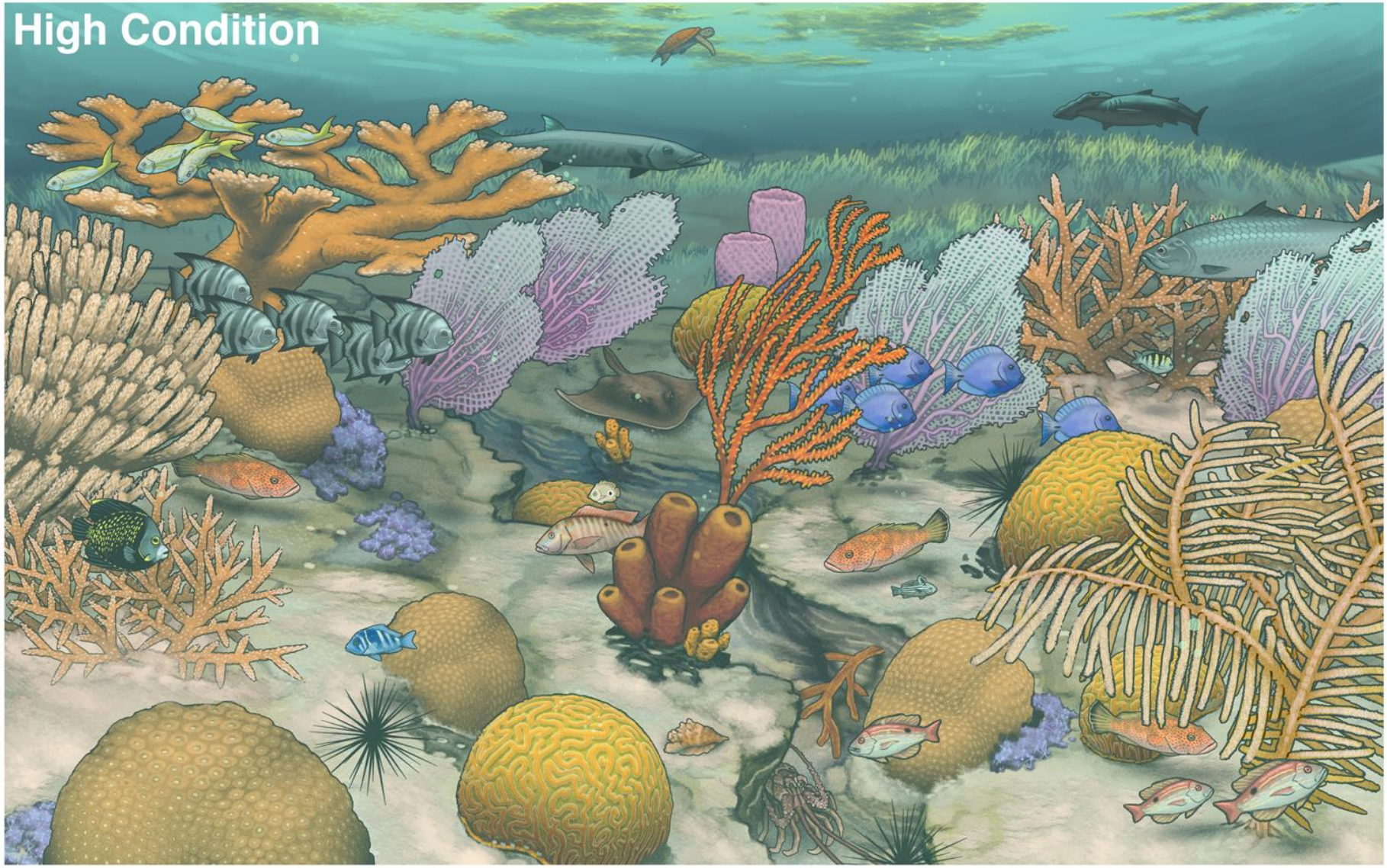

Illustration by Daniel Irizarri Oquendo

VISITORS - ECONOMIC VALUATION CARD

SECTION 1. How sure are you that the option you chose as your most preferred among the three options is your most preferred?

Select one answer only

a. Not sure at all
b. Slightly sure
c. Moderately sure
d. Very sure
e. Extremely sure

SECTION 2. Would you prefer to pay for new environmental programs through higher taxes, the cost of incentives to businesses and households, or through higher prices?

Select one answer only

a. Through higher taxes
b. Through the cost of incentives to businesses and households
c. Though higher prices
d. No preference

SECTION 3. 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

a. Not an environmentalist at all
b. Slightly an environmentalist
c. A moderate environmentalist
d. A strong environmentalist
e. A very strong environmentalist

-------flip over to the other side-----

SECTION 4. Agreement with Statements

Statement	**Strongly Disagree (a)**	**Somewhat Disagree (b)**	**Neither agree nor disagree (c)**	**Somewhat Agree (d)**	**Strongly Agree (e)**
Costs should not be a factor when protecting the environment.	☐	☐	☐	☐	☐
I found it difficult to select an option of reef conditions I preferred.	☐	☐	☐	☐	☐
I was concerned that the Puerto Rico government cannot effectively manage coral reefs.	☐	☐	☐	☐	☐
I should not have to pay more to protect or restore coral reefs in Puerto Rico.	☐	☐	☐	☐	☐
The public's views as expressed in this survey should be important to the Puerto Rico government when it chooses how to manage coral reefs.	☐	☐	☐	☐	☐
I understood the different alternatives presented in each choice question.	☐	☐	☐	☐	☐
The different reef attribute levels in each alternative were clear and I was able to distinguish the difference across the "Status Quo" and alternatives B and C in making my choice.	☐	☐	☐	☐	☐
The illustrations of coral reef conditions helped me distinguish the low, medium and high conditions for all reef attributes.	☐	☐	☐	☐	☐
The pictures of different levels of crowding helped me distinguish low, medium and high crowding conditions.	☐	☐	☐	☐	☐
The government should use incentives to businesses and households to pay for environmental protections instead of regulations that result in higher prices or taxes to businesses and households.	☐	☐	☐	☐	☐

SECTION 5. How certain are you that additional funding would achieve the goals of protecting the environment?

Select one answer only.

a. **Very certain**
b. **Certain**
c. **Somewhat certain**
d. **Uncertain**
e. **Very uncertain**

VISITOR'S - MANAGEMENT SOLUTIONS CARD

- **If current management practices continue in the future (Status Quo), in 10 to 20 years scientists expect that all but the few areas that are receiving special protection will be in a poor or low condition with respect to the corals, sponges, fish, and water clarity/visibility. If rules and regulations are not enforced even the specially protected areas will be in poor or low condition.**

- **If management is changed to improve reef conditions, it will require both public and private investments to protect and restore the coral reef ecosystems, which would include enforcement of rules and regulations.**

- **In the next section of the survey, you will be presented with several sets of coral reef ecosystem conditions. There is an estimated cost to your household per year that would be required to achieve each condition.**

- **The cost per trip is based on the costs that will be paid by businesses and households to pay for investments that protect and restore the coral reef ecosystems like improved sewage treatment, filtering and cleaning urban run-off, erosion control from agricultural areas and development projects, installation of mooring buoys to protect reefs from anchor damage, restoration of reefs, and enforcement of rules and regulations.**

- **The costs per trip would be paid by all residents and visitors to Puerto Rico through increased prices of goods and services. This might also include increases in local sales taxes to cover government costs to pay for protection and restoration.**

- **The Option A: Status Quo (No change in management), will cost your household nothing ($0 per year), but will result in low reef condition on all of Puerto Rico's coral reef ecosystems, except for the few specially protected areas if rules and regulations are enforced.**

- **You will always have the option of choosing the Status Quo (Option A).**

- **Remember when making your choices on how much you are willing to pay that you only have so much income and if you pay to improve reef conditions you will have less to spend on other goods, services, and social issues that are important to you.**

- **Also, even under the low conditions there are three coral reefs within Puerto Rico that have strong protections that you could use, in addition to coral reefs outside Puerto Rico.**

Version 1a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**H:** Healthy for swimming	**H:** Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$125**	**$60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 1a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$500**	**$250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 1b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**H: Crowdedness:** 0 to 10 people
$0	**$750**	**$1,000**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 1b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**M: Crowdedness:** 11 to 20 people
$0	**$500**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**L: Crowdedness:** 21 or more people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) with 20 or more per square meter (mostly urchins).	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$60**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**H: Crowdedness:** 0 to 10 people
$0	**$60**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**H: Crowdedness:** 0 to 10 people
$0	**$250**	**$500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No Macroinvertebrates (conch, lobster or urchins)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$500**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**M: Crowdedness:** 11 to 20 people
$0	**$60**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**M: Crowdedness:** 11 to 20 people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$250**	**$60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 5a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$500**	**$250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 5a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$1,000**	**$750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 5b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$125**	**$60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 5b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$1,000**	**$750**
(Cost to your household per year)	(Cost to your household per year)	(Cost to your household per year)

Version 6a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$750**	**$500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 6a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$60**	**$250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 6b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**H: Crowdedness:** 0 to 10 people
$0	**$60**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 6b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$250**	**$500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 7a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$250**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 7a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit,	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$500**	**$250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 7b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**H: Crowdedness:** 0 to 10 people
$0	**$125**	**$60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 7b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$500**	**$1,000**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 8a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**H: Crowdedness:** 0 to 10 people
$0	**$500**	**$1,000**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 8, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$250**	**$500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 8b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L: Crowdedness:** 0 to 10 people
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$250**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 8b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$60**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 9a, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with 75 to 100% of legal size to keep.	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L:** Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**L: Depth of Reefs:** Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**L: Crowdedness:** 21 or more people	**M: Crowdedness:** 11 to 20 people
$0	**$250**	**$60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 9a, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per square meter with	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$1,000**	**$500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 9b, Choice 1

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**L:** No stony corals, only soft corals and sponges
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per square	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter
No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per square meter.
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$250**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 9b, Choice 2

Option A: Status Quo – No changes in management (All Low Conditions)	**Option B**	**Option C**
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per square meter Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per square meter. Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per square meter. 1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per square meter with up to 50% of legal size to keep.	**L:** Up to two species of consumptive fish for a total of 3 fish per square meter with no fish of legal size to keep
Up to 3 species of tropical/ornamental fish with a total of 3 fish per square meter	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).	**L:** No Macroinvertebrates (conch, lobster or urchins)
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**L:** Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**L:** Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 20 to 60 feet	**H: Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**H: Crowdedness:** 0 to 10 people
$0	**$60**	**$125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

OMB Approval #: 0648-07130
Expiration Date: 4/30/2018

On-site Survey – Version 1a

On-site Survey Number: _____

Screening Criteria: 1) Visiting PR and did reef activities
(See Tally Sheet) 2) Meets Exit condition

Site: _____ _____ _____ _____
Month Day Time

Number of People in Party: _____ (# of people)

1. (a) How many people in your party are ages 18 or older? _____ (# of People)

   (b) How many people in your party are under 18?) _____ (# of People)

2. Where is your primary residence?

   _____ _____ _____ _____
   City or Nearest City County State Zip Code

   Country: _____

   - ○ U.S.A
   - ○ Canada
   - ○ Mexico
   - ○ Central Am./South Am.
   - ○ Australia/Oceania
   - ○ Japan
   - ○ Other Far East
   - ○ United Kingdom
   - ○ Other Europe
   - ○ Middle East
   - ○ Africa
   - ○ Other

3. On this trip to the Puerto Rico, when did you first arrive? _____ _____ _____
   Month Day Time

4. Including this trip, how many times have you visited Puerto Rico for all recreation/tourist reef activities in the last 12 months, that is since (date last year)?

   _____
   Times

5. Including this trip, how many days have you spent in Puerto Rico where you did some recreation/ tourist reef activities in the last 12 months?

   _____
   Days

If overnight visitor, hand respondent maps of Puerto Rico. If not overnight visitor, skip to next section.

6. Looking at the map, could you tell me how many nights you spent **on this trip** to Puerto Rico in

   Region 1_____ Region 2_____ Region 3_____ Region 4_____ Region 5 _____
   # nights # nights # nights # nights # nights

1

Interviewer: Make sure if answer to Q.4. is greater than one, that answer to Q.6. is not equal to Q.5.

Part B: Coral reef use in the Puerto Rico during this trip.

Hand respondent Blue Card with Activities List for reef use and maps of the Puerto Rico Regions

B1. Which activities did you or someone in your household do on natural/coral reefs during this trip in northwest Puerto Rico (Region 1), southwest Puerto Rico (Region 2), southeast Puerto Rico (Region 3), northeast Puerto Rico (Region 4) and the islands of Culebra and Vieques (Region 5)?

If respondent did not do anything in a region, check the box indicating no reef use in the region

B2. Did you, yourself, do (*read activity)* during this trip in Region 1, Region 2, Region 3, Region 4, Region 5.

B3. How many others in your party did each activity on the reefs in Region 1, Region 2, Region 3, Region 4, Region 5 during the past 12 months?

B4. On how many different days did you, yourself, participate in each activity on the reefs in Region 1, Region 2, Region 3, Region 4, Region 5 during this trip?

Note: Count any part of a day as a whole day for each activity.

B5. How many different dives did you, yourself, make for each type of diving activity you did on the reefs in Region 1, Region 2, Region 3, Region 4, Region 5 during this trip?

Diving activities include all snorkeling and scuba diving activities on the Blue Card-Activities List (Reef)

A dive is defined as an entry and exit from the water to snorkel or scuba dive

Please refer to Questions B1 – B5 when filling in the tables on the following two pages

There is one table for each of the five regions of the Puerto Rico
(Region 1, Region 2, Region 3, Region 4, Region 5)

Interview Number:

☐ **No Reef Use**

Region 1

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # dives
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			

☐ **No Reef Use**

Region 2

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # of dives
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			

☐ **No Reef Use**

Region 3

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # of dives
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			

Interview Number:

☐ **No Reef Use** **Region 4**

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # days	**B5** Respondent # of dives
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____

☐ **No Reef Use** **Region 5**

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # of dives
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____

Part C. Economic Valuation of Puerto Rico's Coral Reef Ecosystems

In this section of the survey, I will first present to you some definitions and scientific facts about Puerto Rico's coral reef ecosystems. I will then present you with different reef conditions and the cost to your household to achieve those conditions. I will then ask you to choose among a set of different conditions and the cost to your household.

First, here are some definitions of what we mean by coral reefs and coral reef ecosystems.

Hand respondent the Reef Definitions and Conditions Information Card.

Please read the Reef Definitions and Conditions Card.

C1. Do you have any questions about these definitions or reef conditions?

After answering questions, show respondent cards with examples of the kinds of stony corals, soft corals, sponges, fish and macroinvertebrates that have been observed on Puerto Rico's coral reef ecosystems.

After respondent finishes viewing the cards, present the Management Solutions card.

Please read the information on the card and tell me when you are done.

C2. Do you have any questions before we proceed?

After answering respondents questions, proceed.

C3. Did you believe the information by coral scientists that in 10 to 20 years if current management practices continue that nearly all the coral reefs in Puerto Rico would be in a poor or low condition?

a. Yes
b. No (Go to C4)

C4. If we don't change current management practices (Status Quo), do you think that the coral reefs conditions in 10 to 20 years in Puerto Rico will

a. Stay the same
b. Improve
c. Worsen

I now will present to you a set of reef conditions at different prices and will ask you for your most preferred option.

The Status Quo means no change in the management of the coral reef ecosystems and choosing this option will cost your household nothing ($0), but will result in the poorest or lowest conditions of coral reef ecosystems on all Puerto Rico's coral reefs, except a few places that are already specially protected.
In each set of options, you will always have the option of choosing the Status Quo as your most preferred option.

Remember when making your choices on how much you are willing to pay that you only have so much income and if you pay to improve reef conditions you will have less to spend on other goods, services, and social issues that are important to you.
Also, even under the low conditions there are three coral reefs within Puerto Rico that have strong protections that you could use, in addition to coral reefs outside Puerto Rico.

Hand the respondent the card with Choice Set Number 1.

Please review the three options. Option A is the Status Quo and costs you Nothing, but all reef conditions are in a low condition. For Option B, two reef conditions are at a low level, one at the medium level and eight at the high level of condition and will cost your household $125 per trip. For Option C, four reef conditions are at the low level, five at the medium level and one is at the high condition and this will cost your household $60 per trip.

C5. Which option do you prefer? _____

C6. How many days would you use Puerto Rico's Coral Reefs under the reef conditions for the option you prefer? _____ (number of days per year)

C7. Please provide a brief comment that helps us understand why you chose the option as your most preferred option? _____
_____

Hand respondent the Economic Valuations Card

C8. How sure are you that the option you chose as your most preferred among the three options is your most preferred, not sure at all, slightly sure, moderately sure, very sure, or extremely sure? Please refer to Section 1 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select one answer only.
_____ (letter)

Hand respondent the card with Choice Set Number 2.

Please review the three options. Option A is the Status Quo and costs you Nothing, but all reef conditions are in a low condition. For Option B, three reef conditions are at a low level, one at the medium level and seven are at the high level and will cost your household $500 per trip. For Option C, four reef conditions are at the low level, two at the medium level and five at the high condition and this will cost your household $250 per trip.

C9. Which option do you prefer? _____

C10. How many days would you use Puerto Rico's Coral Reefs under the reef conditions for the option you prefer? _____ (number of days per year)

C11. Please provide a brief comment that helps us understand why you chose the option as your most preferred option? _____
_____

C12. How sure are you that the option you chose as your most preferred among the three options is your most preferred, not sure at all, slightly sure, moderately sure, very sure, or extremely sure? Please refer to Section 1 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select one answer only.
_____(letter)

C13. Did you understand that the dollar amount for each alternative was the per trip cost to your household?

a. Yes
b. No

C14. 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. Another way is for the government to create incentives for investment in environmental protection. Still another 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 taxes, the cost of incentives to businesses and households, or through higher prices? Please refer to Section 2 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select one answer only.
___ (letter)

C15. Who do you think should manage the additional funding obtained for reef management?

___ The Federal government ___ the Territorial government ____ Non Government Organization like The Nature Conservancy or Protectores de Cuencas, a local organization ___ Other (Specify _____

C16. 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? Please refer to Section 2 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select on answer only. ___ (letter)

C17. We would like to learn more about how you reacted to the questions that asked you to choose between various options of reef conditions. Please refer to Section 4 of the Economics Valuation Card. As I read each statement tell me the letter corresponding to your answer.

Check the box corresponding to the respondent's answer for each statement.

Statement	**Strongly Disagree (a)**	**Somewhat Disagree (b)**	**Neither agree nor disagree (c)**	**Somewhat Agree (d)**	**Strongly Agree (e)**
Costs should not be a factor when protecting the environment.	☐	☐	☐	☐	☐
I found it difficult to select an option of reef conditions I preferred.	☐	☐	☐	☐	☐
I was concerned that the Puerto Rico government cannot effectively Manage coral reefs.	☐	☐	☐	☐	☐
I should not have to pay more to protect or restore coral reefs in Puerto Rico.	☐	☐	☐	☐	☐
The public's views as expressed in this survey should be important to the Puerto Rico government when it chooses how to manage coral reefs.	☐	☐	☐	☐	☐
I understood the different alternatives presented in each choice question.	☐	☐	☐	☐	☐
The different reef attribute levels in each alternative were clear and I was able to distinguish the difference across the "Status Quo" and alternatives B and C in making my choice.	☐	☐	☐	☐	☐
The illustrations of coral reef conditions helped me distinguish the low, medium and high conditions for all reef attributes.	☐	☐	☐	☐	☐
The pictures of different levels of crowding helped me distinguish low, medium and high crowding conditions.	☐	☐	☐	☐	☐
The government should use incentives to businesses and households to pay for environmental protections instead of	☐	☐	☐	☐	☐

regulations that result in higher prices or taxes to businesses and households.					

C18. What condition are the reefs in that you personally visit or use?

a. **Low**
b. **Medium**
c. **High**

C19. How certain are you that additional funding would achieve the goals of protecting the environment? Please refer to Section 5 of the Economic Valuation Card and tell me the letter corresponding to your answer. Select one answer only. ___ (letter)

C20. Please provide us any other comments you would like to make to help us understand your views about coral reefs in Puerto Rico and your responses to this survey.

_____
_____
_____

Go to Part D: Demographics

Part D: Demographic Profile

In this final section, we need to know information about you and your household to make sure we have a representative sample of Puerto Rico visitors.

Again, your privacy will be protected and any information identifying you or your household will not be revealed to anyone.

Hand respondent Green Card

D1. Please refer to Section 2 on your green card and tell me which reason best describes the primary purpose of your trip to the Puerto Rico.

A Recreation or vacation
B Visit family or friends
C Business trip
D Business/pleasure
E Other (specify)

_____

Finally, for statistical purposes, we need to know a few things about yourself.

D2. In what year were you born? (Code last two digits) __ __

D3. Sex male ☐ female ☐

D4. Are you Spanish, Hispanic, or Latino? ☐ Yes ☐ No

D5. Please refer to Section 3 on your green card and tell me the letters corresponding to all the descriptors that describe your race.

A __ White

B __ Black or African American

C __ American Indian or Alaskan Native

D __ Native Hawaiian or Pacific Islander

D6. Please refer to Section 4 on your green card and tell me which of the income categories best describes your annual household income last year before taxes. Please give the letter on the card that is the closest.

a b c d e f g h i j k l m n o

refused

Thank You that is the end of our Survey.

If you would like to be included in the sweepstakes/lottery, if you could provide us contact information to award the prizes.

Telephone _____ e-mail _____

Mailing address: _____

Exhibit 2: Focus Group Materials

We received approval to conduct two focus groups of eight persons for each group for both residents of Puerto Rico and visitors to Puerto Rico who have used Puerto Rico's coral reefs for recreation (OMB Control Number 0648-0660, Expiration:02/29/2016).

The objectives of the focus groups were as follows:

1. Identify reef attributes people care about when they do recreation activities on Puerto Rico's coral reefs.
2. Identify levels of conditions of each attribute that would affect their economic value for coral reef use.
3. Check to see if Illustration and Scientific Bullets describing reef attribute conditions were consistent (i.e. tell the same story).
4. Identify and reef attributes not in the current list of attributes and their levels, if they affect their economic values.
5. For what attributes not in the illustrations are visual aids needed.
6. Maximum willingness to pay for different reef attributes' conditions. This to provide a starting point for designing the dollar bids for the pre-test choice questions.
7. Check to see if payment vehicle for willingness to pay might include some biases or result in scenario rejection.

A set of focus group materials was developed by NOAA, EPA and the University of Puerto Rico-Mayaguez. These are included here:

1. Focus Group Task/Script
2. Definition of coral reef ecosystems and conditions (CORAL REEF DEFINITIONS and CONDITIONS CARD.
3. Reef Activities List
4. Attributes important to different recreation activities on the reefs. Table focus group members fill-out.
5. Attribute levels and if willingness to pay changes with attribute levels. Table focus group members fill-out.
6. Illustrations of coral reef conditions (Low, Medium and High). See Exhibit 1.
7. Willingness to Pay Card.
8. Demographics Card.

FOCUS GROUP TASKS/SCRIPT

Task 1: Identify reef attributes people care about when they do recreation activities on Puerto Rico's coral reefs.

1. Start out with a definition of coral reef ecosystems. (Handout) Brief discussion answering questions about definition.

2. Handout list of attributes and activities. Attributes are rows and activities columns. Ask focus group members to check which attributes are important to them for which activities.

   After they have completed.

3. Ask about any attributes not on the list that are important to them. Discuss.

4. Ask about attributes on the list that they don't think are important. Discuss.

Task 2: Identify levels of conditions of each attribute that would affect their economic values for coral reef use.

1. Start out with all attributes at *Low* conditions, all attributes at *Medium* conditions, and all attributes at *High* Conditions (Handout with *Low*, *Medium* and *High* conditions for each attribute).

   Explain that the conditions were derived from EPA-NOAA research on Puerto Rico's coral reefs.

2. Have them check columns indicating if their values for reefs would change if each attribute condition changed from Low to Medium and from Medium to High.

3. For those attributes where moving from *Low* to *Medium* conditions would not change their values, discuss what levels conditions would have to reach to change their values.

4. For those attributes where moving from *Medium* to *High* conditions would not change their values, discuss what level conditions would have to reach to change their values.

Task 3: Illustrations and Scientific Bullets - Are they consistent (i.e. tell the same story)?
(Handout illustrations and scientific bullets of each reef condition).

1. Do the illustrations capture the conditions specified in the illustrations for each condition level (*Low*, *Medium* and *High*)?

2. Do the illustrations show significant differences across the *Low*, *Medium* and *High* conditions?

3. Do the illustrations show improvements in reef conditions moving from *Low* to *Medium* and *Medium* to *High* condition?

Task 4: Reef Attributes not included in illustrations – Do we need some visual aids for these attributes?

1. Water clarity/visibility
2. Number of other users on the reefs

Task 5: Bid Amounts for Willingness to Pay for different reef conditions

1. First provide handout with payment vehicle (i.e., how reef users will pay for reef protection and restoration). Discuss and answer any questions.

2. Determine *Maximum* amount they would be willing to pay per year to move from *Low* to *Medium* conditions on all of Puerto Rico's coral reefs?

   If all conditions could be maintained or increased from the Low condition to the *Medium* condition,

   What would be the maximum your household would be willing to pay per year and still maintain your current level of reef use? $ _____.

   If all conditions could be maintained or increased from the *Low* condition to the *High* condition,

   What would be the maximum your household would be willing to pay per year and still maintain you current level of reef use? $ _____.

3. Discuss the idea of willingness to pay improving reef conditions. What do they think are reasonable amounts? Open discussion. If they think the government can't be trusted to spend the money on protecting and/or restoring coral reefs, discuss how they think it should work. Should the money go into a trust fund that a non-governmental organization manages to protect and restore the reefs?

Task 6: Background Questions about themselves.

Activity on the Reefs

1. How many days have you used Puerto Rico's coral reefs during the last 12 months for your recreation activities? _____ (Number of days)

2. Handout Blue Card with Water-based Activities. Referring to the Blue Card, could you write down all the numbers for activities you do on Puerto Rico's coral reefs?

Demographics

1. Hand out the Demographics Card. Ask if they would write down the letter on the Green Card that best describes them. Age, Race, Education Level, Employment Status, Household Income

End. Thank them and handout any gifts or payment for attending.

CORAL REEF DEFINITIONS and CONDITIONS CARD

Definitions

Coral reefs are colonies of connected skeletons of millions of small animals called corals.

Coral reef ecosystems include the coral reefs, neighboring areas of sea bottom, ocean waters, sponges, algae, seagrasses and mangroves.

- **Coral reef ecosystems provide a place to live for many ocean species including, fish, sea turtles, conchs, lobsters, sponges, urchins, and marine mammals like dolphins and manatees.**

- **Most coral reef ecosystems in Puerto Rico are in water less than 60 feet deep.**

Conditions

- **Research by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) has measured the abundance and diversity (number of different species) of stony corals, soft corals, sponges, fish, macroinvertebrates (conch, spiny lobster, and urchins) on Puerto Rico's coral reefs.**

- **Measures of abundance and diversity were measured on how much was there per square meter of coral reef area.**

- **For abundance, the following measures were taken:**

  - **Stony corals: Percent (%) of hard-bottom covered per square meter and percent of the coral tissue is alive.**
  - **Soft corals and Sponges: Square centimeters per square meter of reef area.**
  - **Fish: Number per square meter.**

  Fish were classified into fish people eat (consumptive) and fish that people just view (Tropical/Ornamental fish). A few fish that normally would be classified as consumptive were not counted as consumptive because of ciguatera poisoning. Fish were also classified as Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, barracuda, jacks). Some of these may be known to have ciguatera poisoning but are still fun to catch.

  - **Consumptive fish: Puerto Rico has only a couple of species with limits on length to be legal for keeping (Yellowtail snapper, White Grunt, silk snapper, and black snapper). Some are permanently closed (Nassau grouper and Goliath Grouper). Still others have closed seasons (silk, vermillion, black and blackfin snappers Oct. – Dec.; mutton and lane snappers April-**

May; Red Hind Dec. –Feb.). We present the number of consumptive fish that meet legal size for keeping per square meter of reef area.

- **Tropical/Ornamental fish: Number of fish per square meter.**
- **Sport/Trophy fish: Opportunity to catch or see trophy fish on the entire reef not the number per square meter.**

- **Macroinvertebrates (conchs, spiny lobsters, and urchins): The number per square meter. For conchs, the maximum number observed was 33 per square meters, while for spiny lobster, the maximum observed was 7 per square meter. Urchins tend to be observed in much higher numbers. For Long-spined urchins, the maximum observed was 81 per square meter, while for smaller species of urchins as many as 375 per square meter have been observed. Seasonal closure of Queen Conch July – Sept.**

CORAL REEF ECOSYSTEM HEALTH

- **Urchins are known to increase the health of reefs for stony corals.**

- **Stony corals are dominant in the most healthy reefs.**

- **Soft Corals and Sponges tend to dominate in reef areas where the water quality is relatively poor. So scientists find that soft corals and sponges are more able than stony corals to thrive in relatively poor water quality and move into places where stony corals have died.**

- **Soft Corals and Sponges are often very colorful, serve as important habitat for fish, and help improve water quality by filtering nutrients that can reduce algal growth that can smother reefs and improve water clarity/visibility.**

- **Most of the coral reef ecosystems in Puerto Rico are currently in a fair to poor or low condition. Overfishing, water pollution, careless anchoring, and sediments from runoff from development and agricultural areas have been the most important factors damaging the coral reef ecosystems.**

Coral Reef Attributes Importance to Recreation Activities

Reef Attributes	Activities				
Corals and Sponges	SCUBA Diving	Snorkeling	Fishing	Glass-bottom Boat Ride Wildlife Viewing	Surfing, Windsurfing, Kite Boarding
Stony coral cover (percent of hard-bottom)					
Number of different species of stony corals					
Soft coral cover (percent of hard-bottom)					
Number of different species of soft corals					
Sponges (percent of bottom covered)					
Number of different kinds of sponges					
Fish and Wildlife					
Abundance of fish to eat					
Number of different species of fish to eat					
Abundance of fish to see (tropicals)					
Number of different species of fish to see					
Trophy/sport fish (lady fish, permit, bonefish, tarpon, snook, jacks)					
Number of species of macroinvertebrates					
Abundance of macroinvertebrates (conch, lobster, urchins)					
Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)					
Other					
Water clarity/visibility					
Number of other reef users					

WILLINGNESS TO PAY CARD

- **If current management practices continue in the future (Status Quo), in 10 to 20 years scientists expect that all but a few areas that are receiving special protection will be in a poor or Low condition with respect to the corals, sponges, fish, and water clarity/visibility. If rules and regulations are not enforced even the specially protected areas will be in poor or Low condition.**

- **If management is changed to improve reef conditions, it will require both public and private investments to protect and restore the coral reef ecosystems, which would include enforcement of rules and regulations.**

- **There is an estimated cost to your household per year that would be required to achieve each condition.**

- **The cost per year is based on the costs that will be paid by businesses and households to pay for investments that protect and restore the coral reef ecosystems like improved sewage treatment, filtering and cleaning urban run-off, erosion control from agricultural areas and development projects, installation of mooring buoys to protect reefs from anchor damage, reef restoration activities, and enforcement of rules and regulations.**

- **The costs per year would be paid by all residents and visitors to Puerto Rico through increased prices of goods and services. This might also include increases in local sales taxes to cover government costs to pay for protection and restoration.**

1. If all conditions could be maintained or increased from the Low to Medium condition.

   What would be the maximum your household would be willing to pay per year and still maintain your current level of reef use? $_____

2. If all conditions could be maintained or increased from the Low condition to the High condition,

DEMOGRAPHICS CARD

What is your age?

a. 16 – 24
b. 25 – 34
c. 35 – 44
d. 45 - 54
e. 55 - 64
f. 65 or older

What race do you consider yourself?

Select as many as apply

a. White
b. Black or African American
c. American Indian or Alaskan Native
d. Asian
e. Native Hawaiian or Other Pacific Islander

What is the highest level of education that you have completed?

Select one answer only

a. 8th grade or less
b. 9th to 11th grade
c. 12th grade. High School Graduate or equivalent (GED)
d. 13 to 15 years (some college or vocational training)
e. College Graduate
f. Graduate School, Law School, Medical School

What is your employment status?

Select all that apply

a. Unemployed
b. Employed full-time
c. Employed Part-time
d. Retired
e. Student
f. Homemaker
g. None of the above (specify) _____

What is your household income before taxes?

Select one answer only

a. Under $5,000
b. $5,000 to $9,999
c. $10,000 to $14,999
d. $15,000 to $19,999
e. $20,000 to $24,999
f. $25,000 to $29,999
g. $30,000 to $39,999
h. $40,000 to $49,999
i. $50,000 to $59,999
j. $60,000 to $74,999
k. $75,000 to $99,999
l. $100,000 to $149,999
m. $150,000 +

Exhibit 3: Pretest Questionnaire and Materials

Visitor On-site Questionnaire (Example Version 1a)

Tally Sheet (See Exhibit 1)

Blue Card – Reef Activities List (See Exhibit 1)

Respondent GREEN Card (See Exhibit 1)

Coral Reef Condition Illustrations (See Exhibit 1)

Crowding Photos (See Exhibit 1)

Coral Reef Definitions and Conditions Card (See Exhibit 1)

Economic Valuation Card (See Exhibit 1)

Management Solutions Card (See Exhibit 1)

Choice Cards (Versions 1a to 4b)

OMB Approval #: 0648-07130
Expiration Date: 4/30/2018

On-site Survey – Version 1a

On-site Survey Number: _____

Screening Criteria: 1) Visiting PR and did reef activities
(See Tally Sheet) 2) Meets Exit condition

Site: _____ _____ _____ _____
Month Day Time

Number of People in Party: _____ (# of people)

1. (a) How many people in your party are ages 18 or older? _____ (# of People)

   (b) How many people in your party are under 18?) _____ (# of People)

2. Where is your primary residence?

   _____ _____ _____ _____
   City or Nearest City County State Zip Code

   Country: _____

   - ○ U.S.A
   - ○ Canada
   - ○ Mexico
   - ○ Central Am./South Am.
   - ○ Australia/Oceania
   - ○ Japan
   - ○ Other Far East
   - ○ United Kingdom
   - ○ Other Europe
   - ○ Middle East
   - ○ Africa
   - ○ Other

3. On this trip to the Puerto Rico, when did you first arrive? _____ _____ _____
   Month Day Time

4. Including this trip, how many times have you visited Puerto Rico for all recreation/tourist reef activities in the last 12 months, that is since (date last year)?

   _____
   Times

5. Including this trip, how many days have you spent in Puerto Rico where you did some recreation/ tourist reef activities in the last 12 months?

   _____
   Days

If overnight visitor, hand respondent maps of Puerto Rico. If not overnight visitor, skip to next section.

6. Looking at the map, could you tell me how many nights you spent **on this trip** to Puerto Rico in

   Region 1_____ Region 2_____ Region 3_____ Region 4_____ Region 5 _____
   # nights # nights # nights # nights # nights

1

Interviewer: Make sure if answer to Q.4. is greater than one, that answer to Q.6. is not equal to Q.5.

Part B: Coral reef use in the Puerto Rico during this trip.

Hand respondent Blue Card with Activities List for reef use and maps of the Puerto Rico Regions

B1. Which activities did you or someone in your household do on natural/coral reefs during this trip in northwest Puerto Rico (Region 1), southwest Puerto Rico (Region 2), southeast Puerto Rico (Region 3), northeast Puerto Rico (Region 4) and the islands of Culebra and Vieques (Region 5)?

If respondent did not do anything in a region, check the box indicating no reef use in the region

B2. Did you, yourself, do (*read activity)* during this trip in Region 1, Region 2, Region 3, Region 4, Region 5.

B3. How many others in your party did each activity on the reefs in Region 1, Region 2, Region 3, Region 4, Region 5 during the past 12 months?

B4. On how many different days did you, yourself, participate in each activity on the reefs in Region 1, Region 2, Region 3, Region 4, Region 5 during this trip?

Note: Count any part of a day as a whole day for each activity.

B5. How many different dives did you, yourself, make for each type of diving activity you did on the reefs in Region 1, Region 2, Region 3, Region 4, Region 5 during this trip?

Diving activities include all snorkeling and scuba diving activities on the Blue Card-Activities List (Reef)

A dive is defined as an entry and exit from the water to snorkel or scuba dive

Please refer to Questions B1 – B5 when filling in the tables on the following two pages

There is one table for each of the five regions of the Puerto Rico
(Region 1, Region 2, Region 3, Region 4, Region 5)

Interview Number:

☐ **No Reef Use**

Region 1

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # dives
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			

☐ **No Reef Use**

Region 2

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # of dives
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			

☐ **No Reef Use**

Region 3

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # of dives
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			
	○			

Interview Number:

☐ **No Reef Use** **Region 4**

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # days	**B5** Respondent # of dives
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____

☐ **No Reef Use** **Region 5**

B1 Activity	**B2** Resp.	**B3** # Others	**B4** Respondent # of days	**B5** Respondent # of dives
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____
_____	○	_____	_____	_____

Part C. Economic Valuation of Puerto Rico's Coral Reef Ecosystems

In this section of the survey, I will first present to you some definitions and scientific facts about Puerto Rico's coral reef ecosystems. I will then present you with different reef conditions and the cost to your household to achieve those conditions. I will then ask you to choose among a set of different conditions and the cost to your household.

First, here are some definitions of what we mean by coral reefs and coral reef ecosystems.

Hand respondent the Reef Definitions and Conditions Information Card.

Please read the Reef Definitions and Conditions Card.

C1. Do you have any questions about these definitions or reef conditions?

After answering questions, show respondent cards with examples of the kinds of stony corals, soft corals, sponges, fish and macroinvertebrates that have been observed on Puerto Rico's coral reef ecosystems.

After respondent finishes viewing the cards, present the Management Solutions card.

Please read the information on the card and tell me when you are done.

C2. Do you have any questions before we proceed?

After answering respondents questions, proceed.

C3. Did you believe the information by coral scientists that in 10 to 20 years if current management practices continue that nearly all the coral reefs in Puerto Rico would be in a poor or low condition?

a. Yes
b. No (Go to C4)

C4. If we don't change current management practices (Status Quo), do you think that the coral reefs conditions in 10 to 20 years in Puerto Rico will

a. Stay the same
b. Improve
c. Worsen

I now will present to you a set of reef conditions at different prices and will ask you for your most preferred option.

The Status Quo means no change in the management of the coral reef ecosystems and choosing this option will cost your household nothing ($0), but will result in the poorest or lowest conditions of coral reef ecosystems on all Puerto Rico's coral reefs, except a few places that are already specially protected.
In each set of options, you will always have the option of choosing the Status Quo as your most preferred option.

Remember when making your choices on how much you are willing to pay that you only have so much income and if you pay to improve reef conditions you will have less to spend on other goods, services, and social issues that are important to you.
Also, even under the low conditions there are three coral reefs within Puerto Rico that have strong protections that you could use, in addition to coral reefs outside Puerto Rico.

Hand the respondent the card with Choice Set Number 1.

Please review the three options. Option A is the Status Quo and costs you Nothing, but all reef conditions are in a low condition. For Option B, all the reef conditions are at a medium level of condition and will cost your household $500 per trip. For Option C, all reef conditions are improved to the highest condition and will cost your household $1,000 per trip.

C5. Which option do you prefer? _____

C6. How many days would you use Puerto Rico's Coral Reefs under the reef conditions for the option you prefer? _____ (number of days per year)

C7. Please provide a brief comment that helps us understand why you chose the option as your most preferred option? _____
_____

Hand respondent the Economic Valuations Card

C8. How sure are you that the option you chose as your most preferred among the three options is your most preferred, not sure at all, slightly sure, moderately sure, very sure, or extremely sure? Please refer to Section 1 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select one answer only.
_____ (letter)

Hand respondent the card with Choice Set Number 2.

Please review the three options. Option A is the Status Quo and costs you Nothing, but all reef conditions are in a low condition. For Option B, some reef conditions are at a medium level and some at the high level of condition and will cost your household $750 per trip. For Option C, some reef conditions are at the medium level and some are improved to the highest condition and this will cost your household $750 per trip.

C9. Which option do you prefer? _____

C10. How many days would you use Puerto Rico's Coral Reefs under the reef conditions for the option you prefer? _____ (number of days per year)

C11. Please provide a brief comment that helps us understand why you chose the option as your most preferred option? _____
_____

C12. How sure are you that the option you chose as your most preferred among the three options is your most preferred, not sure at all, slightly sure, moderately sure, very sure, or extremely sure? Please refer to Section 1 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select one answer only.
_____(letter)

C13. Did you understand that the dollar amount for each alternative was the per trip cost to your household?

a. Yes
b. No

C14. 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. Another way is for the government to create incentives for investment in environmental protection. Still another 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 taxes, the cost of incentives to businesses and households, or through higher prices? Please refer to Section 2 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select one answer only.
___ (letter)

C15. Who do you think should manage the additional funding obtained for reef management?

___ The Federal government ___ the Territorial government ____ Non Government Organization like The Nature Conservancy or Protectores de Cuencas, a local organization ___ Other (Specify _____

C16. 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? Please refer to Section 2 of the Economics Valuation Card and tell me the letter corresponding to your answer. Select on answer only. ___ (letter)

C17. We would like to learn more about how you reacted to the questions that asked you to choose between various options of reef conditions. Please refer to Section 4 of the Economics Valuation Card. As I read each statement tell me the letter corresponding to your answer.

Check the box corresponding to the respondent's answer for each statement.

Statement	**Strongly Disagree (a)**	**Somewhat Disagree (b)**	**Neither agree nor disagree (c)**	**Somewhat Agree (d)**	**Strongly Agree (e)**
Costs should not be a factor when protecting the environment.	☐	☐	☐	☐	☐
I found it difficult to select an option of reef conditions I preferred.	☐	☐	☐	☐	☐
I was concerned that the Puerto Rico government cannot effectively Manage coral reefs.	☐	☐	☐	☐	☐
I should not have to pay more to protect or restore coral reefs in Puerto Rico.	☐	☐	☐	☐	☐
The public's views as expressed in this survey should be important to the Puerto Rico government when it chooses how to manage coral reefs.	☐	☐	☐	☐	☐
I understood the different alternatives presented in each choice question.	☐	☐	☐	☐	☐
The different reef attribute levels in each alternative were clear and I was able to distinguish the difference across the "Status Quo" and alternatives B and C in making my choice.	☐	☐	☐	☐	☐
The illustrations of coral reef conditions helped me distinguish the low, medium and high conditions for all reef attributes.	☐	☐	☐	☐	☐
The pictures of different levels of crowding helped me distinguish low, medium and high crowding conditions.	☐	☐	☐	☐	☐
The government should use incentives to businesses and households to pay for environmental protections instead of	☐	☐	☐	☐	☐

regulations that result in higher prices or taxes to businesses and households.					

C18. What condition are the reefs in that you personally visit or use?

a. **Low**
b. **Medium**
c. **High**

C19. How certain are you that additional funding would achieve the goals of protecting the environment? Please refer to Section 5 of the Economic Valuation Card and tell me the letter corresponding to your answer. Select one answer only. ___ (letter)

C20. Please provide us any other comments you would like to make to help us understand your views about coral reefs in Puerto Rico and your responses to this survey.

_____
_____
_____

Go to Part D: Demographics

Part D: Demographic Profile

In this final section, we need to know information about you and your household to make sure we have a representative sample of Puerto Rico visitors.

Again, your privacy will be protected and any information identifying you or your household will not be revealed to anyone.

Hand respondent Green Card

D1. Please refer to Section 2 on your green card and tell me which reason best describes the primary purpose of your trip to the Puerto Rico.

A Recreation or vacation
B Visit family or friends
C Business trip
D Business/pleasure
E Other (specify)

_____

Finally, for statistical purposes, we need to know a few things about yourself.

D2. In what year were you born? (Code last two digits) __ __

D3. Sex male ☐ female ☐

D4. Are you Spanish, Hispanic, or Latino? ☐ Yes ☐ No

D5. Please refer to Section 3 on your green card and tell me the letters corresponding to all the descriptors that describe your race.

A __ White

B __ Black or African American

C __ American Indian or Alaskan Native

D __ Native Hawaiian or Pacific Islander

D6. Please refer to Section 4 on your green card and tell me which of the income categories best describes your annual household income last year before taxes. Please give the letter on the card that is the closest.

a b c d e f g h i j k l m n o

refused

Thank You that is the end of our Survey.

If you would like to be included in the sweepstakes/lottery, if you could provide us contact information to award the prizes.

Telephone _____ e-mail _____

Mailing address: _____

Part C: Economic Value of Puerto Rico's Coral Reef Ecosystems – Version 1a, Choice Set 1

Option A: Status Quo – No changes in management	**Option B**: Coral Reefs In Medium Level of Condition	**Option C**: Coral Reefs in High Level of Condition
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.	25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	1 species of Macroinvertebrates with 1 to 20 per 10 square meters (urchins).	2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	Clarity/Visibility: 10 to 50 feet	Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	Cleanliness: Healthy for swimming	Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**Depth of Reefs:** 20 to 60 feet	**Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**Crowdedness:** 11 to 20 people	**Crowdedness:** 0 to 10 people
$0	**$ 500**	**$ 1,000**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version1a, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6M & 6H	**Option C**: 6H & 6M
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:**.Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates (urchins) with 1 to 20 per 10 square meters.	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H**: Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M**: Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**M:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$ 750**	**$ 750**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 1b, Choice 1

Option A: Status Quo – No changes in management	**Option B**: 6L and 6H	**Option C**: 6 H and 6L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**H**: Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$ 500**	**$ 500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 1b, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6L and 6 M	**Option C**: 6M and 6 L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M**: 4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**M:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 11 to 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$ 250**	**$ 250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Part C: Economic Value of Puerto Rico's Coral Reef Ecosystems – Version 2a, Choice Set 1

Option A: Status Quo – No changes in management	**Option B**: Coral Reefs In Medium Level of Condition	**Option C**: Coral Reefs in High Level of Condition
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.	25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	1 species of Macroinvertebrates with 1 to 20 per 10 square meters (urchins).	2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	Clarity/Visibility: 10 to 50 feet	Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	Cleanliness: Healthy for swimming	Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**Depth of Reefs:** 20 to 60 feet	**Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**Crowdedness:** 11 to 20 people	**Crowdedness:** 0 to 10 people
$0	**$ 250**	**$ 500**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2a, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6M & 6H	**Option C**: 6H & 6M
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:**.Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates (urchins) with 1 to 20 per 10 square meters.	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H**: Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M**: Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**M:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$ 375**	**$ 375**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2b, Choice 1

Option A: Status Quo – No changes in management	**Option B**: 6L and 6H	**Option C**: 6 H and 6L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**H**: Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$ 250**	**$ 250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 2b, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6L and 6 M	**Option C**: 6M and 6 L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M**: 4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**M:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 11 to 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$ 125**	**$ 125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Part C: Economic Value of Puerto Rico's Coral Reef Ecosystems – Version 3a, Choice Set 1

Option A: Status Quo – No changes in management	**Option B**: Coral Reefs In Medium Level of Condition	**Option C**: Coral Reefs in High Level of Condition
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.	25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	1 species of Macroinvertebrates with 1 to 20 per 10 square meters (urchins).	2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	Clarity/Visibility: 10 to 50 feet	Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	Cleanliness: Healthy for swimming	Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**Depth of Reefs:** 20 to 60 feet	**Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**Crowdedness:** 11 to 20 people	**Crowdedness:** 0 to 10 people
$0	**$ 125**	**$ 250**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3a, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6M & 6H	**Option C**: 6H & 6M
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:**.Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates (urchins) with 1 to 20 per 10 square meters.	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H**: Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M**: Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**M:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$ 190**	**$ 190**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3b, Choice 1

Option A: Status Quo – No changes in management	**Option B**: 6L and 6H	**Option C**: 6 H and 6L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**H**: Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$ 125**	**$ 125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 3b, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6L and 6 M	**Option C**: 6M and 6 L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M**: 4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**M:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 11 to 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$ 60**	**$ 60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Part C: Economic Value of Puerto Rico's Coral Reef Ecosystems – Version 4a, Choice Set 1

Option A: Status Quo – No changes in management	**Option B**: Coral Reefs In Medium Level of Condition	**Option C**: Coral Reefs in High Level of Condition
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per square meter	Up to 3 species of sponges for a total of 2 to 7 square centimeters per square meter.	1 species of sponges for a total of less than 2 square centimeters per square meter.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.	25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	1 species of Macroinvertebrates with 1 to 20 per 10 square meters (urchins).	2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	Clarity/Visibility: 10 to 50 feet	Clarity/Visibility: Greater than 50 feet
Cleanliness: Not healthy for swimming	Cleanliness: Healthy for swimming	Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**Depth of Reefs:** 20 to 60 feet	**Depth of Reefs:** less than 20 feet
Crowdedness: 21 or more people	**Crowdedness:** 11 to 20 people	**Crowdedness:** 0 to 10 people
$0	**$ 60**	**$ 125**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4a, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6M & 6H	**Option C**: 6H & 6M
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**M:**.Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters.	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.	**H:** Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M:** 4 to 10 species of tropical/ornamental fish with a total of 10 fish per square meter.	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per square meter.
No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates (urchins) with 1 to 20 per 10 square meters.	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H**: Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**M**: Clarity/Visibility: 10 to 50 feet
Cleanliness: Not healthy for swimming	**H:** Cleanliness: Healthy for swimming	**M:** Cleanliness: Healthy for swimming
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**M: Depth of Reefs:** 20 to 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**M: Crowdedness:** 11 to 20 people
$0	**$ 95**	**$ 95**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4b, Choice 1

Option A: Status Quo – No changes in management	**Option B**: 6L and 6H	**Option C**: 6 H and 6L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**H:** 5 to 17 species of stony corals covering more than 20% and up to 100% of hard-bottom with over 90% to 100% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**H:** 1 species of soft corals for a total of less than 4 square centimeters per 10 square meters.
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**H:** 1 species of sponges for a total of less than 2 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**H**: Up to 15 species of consumptive fish for a total of 100 or more fish per 10 square meters with 75 to 100% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**H:** 25 to 30 species of tropical/ornamental fish for a total of 20 to 100 or more fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**H:** 2 or more species of Macroinvertebrates (conch, lobster or urchins) 1 lobster, 1 conch, and 20 or more urchins per 10 square meters.
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**H:** Opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**H:** Opportunity to catch or see Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**H:** Clarity/Visibility: Greater than 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Depth of Reefs: Greater than 60 feet	**H: Depth of Reefs:** Less than 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**H: Crowdedness:** 0 to 10 people	**L: Crowdedness:** 21 or more people
$0	**$ 60**	**$ 60**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Version 4b, Choice 2

Option A: Status Quo – No changes in management	**Option B**: 6L and 6 M	**Option C**: 6M and 6 L
Corals and Sponges	**Corals and Sponges**	**Corals and Sponges**
No stony corals, only soft corals and sponges	**L:** No stony corals, only soft corals and sponges	**M:** Up to 4 species of stony corals covering 5 to 20% of hard-bottom with 60 to 90% live coral tissue.
Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**L:** Up to 4 species of soft corals for a total of 14 to 25 square centimeters per 10 square meters	**M:** Up to 3 species of soft corals for a total of 4 to 14 square centimeters per 10 square meters
Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**L:** Up to 4 species of sponges for a total of 7 to 15 square centimeters per 10 square meters	**M:** Up to 3 species of sponges for a total of 2 to 7 square centimeters per 10 square meters.
Fish and Wildlife	**Fish and Wildlife**	**Fish and Wildlife**
Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**L:** Up to two species of consumptive fish for a total of 3 fish per 10 square meters with no fish of legal size to keep	**M:** 3 to 6 species of consumptive fish for a total of 10 fish per 10 square meters with up to 50% of legal size to keep.
Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**L:** Up to 3 species of tropical/ornamental fish with a total of 3 fish per 10 square meters	**M**: 4 to 10 species of tropical/ornamental fish with a total of 10 fish per 10 square meters.
No Macroinvertebrates (conch, lobster or urchins)	**L:** No Macroinvertebrates (conch, lobster or urchins)	**M:** 1 species of Macroinvertebrates with 1 to 20 per square meter (urchins).
No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**M:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)	**L:** No opportunity to see large wildlife (sharks, rays, turtles, manatees, dolphins)
No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**M**: No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)	**L:** No opportunity to see or catch Sport/Trophy fish (ladyfish, permit, bonefish, tarpon, snook, jacks)
Water Conditions	**Water Conditions**	**Water Conditions**
Clarity/Visibility: Less than 10 feet	**M:** Clarity/Visibility: 10 to 50 feet	**L**: Clarity/Visibility: Less than 10 feet
Cleanliness: Not healthy for swimming	**M:** Cleanliness: Healthy for swimming	**L:** Cleanliness: Not healthy for swimming
Depth of Reefs: Greater than 60 feet	**M: Depth of Reefs:** 11 to 20 feet	**L: Depth of Reefs:** Greater than 60 feet
Crowdedness: 21 or more people	**M: Crowdedness:** 11 to 20 people	**L: Crowdedness:** 21 or more people
$0	**$ 30**	**$ 30**
(Cost to your household per trip)	(Cost to your household per trip)	(Cost to your household per trip)

Exhibit 4: Negative Binomial Model for Predicting Income

The on-site CUSTOMER Survey, which obtains the information for estimating the non-market economic values of coral reef attributes, had an item on-response rate of a little over 29% for househ9old incomes. A negative binomial model was estimated combining all the CUTOMER Survey data plus the airport survey data for all Puerto Rico's reef-using visitors to estimate household income (before taxes) for those who did not provide their household incomes. This was discussed in Chapter 3. Below is the model used.

Table E4.1. Negative Binomial Model for Predicting Income

Dependent Variable = D6 Household Income Explanatory Variable (X)	Coefficient	Standard Error	Z-Value	Significance Z-Value	Mean of X
D1VAC-Primary Purpose of Trip, Rec.-Vacation=1	.064**	0.023	2.79	0.005	0.737
D3 - Sex, Male=1	0.038**	0.019	2.03	0.042	0.481
D4, Hispanic=1	-.130***	0.022	-5.81	0.000	0.295
D5b - Black or African American = 1	-.053*	0.028	-1.91	0.056	0.144
D5c - Amer. Indian or AK Native=1	-.057	0.078	-0.73	0.465	0.018
D5d - Native Hawaiian or Pacific Islander=1	-.005	0.1	-0.05	0.964	0.009
Age10	.296***	0.042	7.05	0.000	4.092
Age10SQ	-.026***	0.005	-5.56	0.000	18.542
Constant	1.62***	0.093	17.45	0.000	
Number of Observations	1,439				
Log likelihood function	-4067.17				
Psuedo R-Square	0.0217				
Chi-squared	180.6				
Degrees of freedom	8				
Chi Significance level	.0000				

D1VAC=0, Primary Purpose of Trip not recreation-vacation

D5a=0, White or Other

* P<= 0.10, ** P<= 0.05, *** P<=0.000

Exhibit 5: Alternative Model Specifications with Demographics and Full Samples

Table A.1 Conditional logit all Respondents

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Price1000	-3.15***	0.195	-16.1	0.000	-3.54	-2.77
Dummy_High_Water_Cleanliness	.811***	0.09	8.97	0.000	0.633	0.988
Dummy_Medium_Stony_Coral	-.041	0.088	-0.46	0.642	-0.212	0.131
Dummy_High_Stony_Coral	.101	0.084	1.2	0.229	-0.064	0.267
Dummy_Medium_Soft_Coral	.051	0.083	0.62	0.537	-0.111	0.214
Dummy_High_Soft_Coral	.090	0.095	0.94	0.346	-0.097	0.276
Dummy_Medium_Consumptive_Fish	.058	0.089	0.66	0.510	-0.115	0.232
Dummy_High_Consumptive_Fish	.212**	0.092	2.3	0.021	0.031	0.393
Dummy_Medium_Ornamental_Fish	.004	0.085	0.05	0.961	-0.162	0.17
Dummy_High_Ornamental_Fish	.163*	0.093	1.75	0.081	-0.02	0.345
Dummy_Medium_Invertebrates	.235***	0.085	2.79	0.005	0.07	0.4
Dummy_High_Invertebrates	.226**	0.089	2.53	0.011	0.051	0.4
Dummy_High_Large_Wildlife	.228***	0.07	3.28	0.001	0.092	0.365
Dummy_High_Sport_Fishers	.561**	0.284	1.98	0.048	0.005	1.12
Dummy_Medium_Water_Clarity	.091	0.092	0.99	0.324	-0.089	0.271
Dummy_High_Water_Clarity	.103	0.095	1.08	0.279	-0.083	0.288
Dummy_Medium_Crowdedness	-.035	0.089	-0.39	0.699	-0.21	0.141
Dummy_High_Crowdedness	.092	0.098	0.94	0.345	-0.099	0.283
Observations	4,617					
Clusters	772					
Pseudo Log likelihood (full)	-1,462.3					
Chi-squared(18)	376.9					
Chi-squared Significance	0					
Pseudo R^2	0.1351					

Table A.2 Nested Logit all Respondents

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Price1000	-3.01***	0.194	-15.5	0.00	-3.39	-2.63
Dummy_High_Water_Cleanliness	.686***	0.073	9.44	0.00	0.54	0.828
Dummy_Medium_Stony_Coral	.048	0.071	0.68	0.49	-0.091	0.187
Dummy_High_Stony_Coral	.120*	0.063	1.92	0.05	-0.003	0.243
Dummy_Medium_Soft_Coral	.143**	0.066	2.15	0.03	0.012	0.273
Dummy_High_Soft_Coral	.144**	0.073	1.99	0.04	0.002	0.287
Dummy_Medium_Consumptive_Fish	.101	0.064	1.56	0.11	-0.026	0.227
Dummy_High_Consumptive_Fish	.267***	0.069	3.85	0.00	0.131	0.402
Dummy_Medium_Ornamental_Fish	-.004	0.064	-0.06	0.95	-0.129	0.122
Dummy_High_Ornamental_Fish	.175***	0.067	2.6	0.00	0.043	0.307
Dummy_Medium_Invertebrates	.176***	0.066	2.68	0.00	0.047	0.304
Dummy_High_Invertebrates	.199***	0.066	3	0.00	0.069	0.328
Dummy_High_Large_Wildlife	.255***	0.052	4.93	0.00	0.154	0.357
Dummy_High_Sport_Fishers	.542***	0.207	2.61	0.00	0.136	0.947
Dummy_Medium_Water_Clarity	.154**	0.069	2.24	0.02	0.019	0.288
Dummy_High_Water_Clarity	.132*	0.068	1.94	0.05	-0.002	0.266
Dummy_Medium_Crowdedness	.078	0.074	1.04	0.29	-0.068	0.223
Dummy_High_Crowdedness	.251***	0.087	2.89	0.00	0.081	0.421
Dissimilarity Parameter						
Status quo	1	.			.	.
Other	0.679	0.088			0.507	0.0851
Observations	4,617					
Clusters	772					
Pseudo Log likelihood (full)	-1,458.9					
Chi-squared(18)	298.47					
Chi-squared Significance	0					

Table A.3 Random Parameters Model all Respondents (Mean)

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Mean						
Price1000	-9.24***	2.02	-4.59	0.00	-13.2	-5.29
Dummy_High_Water_Cleanliness	2.13***	0.537	3.97	0.00	1.08	3.18
Dummy_Medium_Stony_Coral	-.331	0.329	-1.01	0.31	-0.976	0.314
Dummy_High_Stony_Coral	.501*	0.293	1.71	0.08	-0.073	1.08
Dummy_Medium_Soft_Coral	.267	0.322	0.83	0.40	-0.365	0.899
Dummy_High_Soft_Coral	-190	0.309	-0.61	0.53	-0.796	0.417
Dummy_Medium_Consumptive_Fish	-.049	0.317	-0.16	0.87	-0.671	0.573
Dummy_High_Consumptive_Fish	.945**	0.41	2.31	0.02	0.142	1.75
Dummy_Medium_Ornamental_Fish	.601*	0.349	1.72	0.08	-0.083	1.28
Dummy_High_Ornamental_Fish	.589*	0.332	2.77	0.07	-0.062	1.24
Dummy_Medium_Invertebrates	1.03***	0.384	2.68	0.00	0.276	1.78
Dummy_High_Invertebrates	1.08***	0.379	2.86	0.00	0.34	1.83
Dummy_High_Large_Wildlife	.31	0.248	1.25	0.21	-0.176	0.795
Dummy_High_Sport_Fishers	2.7**	1.3	2.08	0.03	0.152	5.25
Dummy_Medium_Water_Clarity	-.398	0.394	-1.01	0.31	-1.17	0.374
Dummy_High_Water_Clarity	.421	0.291	1.45	0.14	-0.149	0.991
Dummy_Medium_Crowdedness	-.192	0.302	-0.64	0.52	-0.785	0.4
Dummy_High_Crowdedness	-.522	0.337	-1.55	0.12	-1.18	0.138

Table A.4 Random Parameters Model all Respondents (SD)

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Standard Deviation						
Dummy_High_Water_Cleanliness	4.91***	1.21	4.07	0.00	2.54	7.28
Dummy_Medium_Stony_Coral	2.75***	0.958	2.87	0.00	0.875	4.63
Dummy_High_Stony_Coral	-0.98*	0.534	-1.84	0.06	-2.03	0.066
Dummy_Medium_Soft_Coral	-2.06***	0.73	-2.82	0.00	-3.49	-0.63
Dummy_High_Soft_Coral	.032	0.683	0.05	0.96	-1.31	1.37
Dummy_Medium_Consumptive_Fish	3.14***	0.874	3.6	0.00	1.43	4.86
Dummy_High_Consumptive_Fish	.022	0.603	0.04	0.97	-1.16	1.2
Dummy_Medium_Ornamental_Fish	.503	0.418	1.21	0.22	-0.315	1.32
Dummy_High_Ornamental_Fish	.111	0.527	0.21	0.83	-0.922	1.14
Dummy_Medium_Invertebrates	-.341	0.467	-0.73	0.46	-1.26	0.574
Dummy_High_Invertebrates	-1.24***	0.52	-2.39	0.01	-2.26	-0.224
Dummy_High_Large_Wildlife	2.24***	0.705	3.18	0.00	0.861	3.62
Dummy_High_Sport_Fishers	-1.6	1.1	-1.45	0.14	-3.75	0.557
Dummy_Medium_Water_Clarity	3.56***	1.07	3.33	0.00	1.46	5.66
Dummy_High_Water_Clarity	.572	0.439	1.3	0.19	-0.289	1.43
Dummy_Medium_Crowdedness	-.984*	0.542	-1.81	0.07	-2.05	0.079
Dummy_High_Crowdedness	-2.08***	0.699	-2.98	0.00	-3.45	-0.714
Observations	4,617					
Pseudo Log likelihood (full)	-1,389					
LR Chi-squared(17)	146.4					
Chi-squared Significance	0					

Table B.1 Conditional logit with Demographics and Protestors Dropped

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Price1000	-3.60***	0.220	-16.34	0.000	-4.03	-3.17
Dummy_High_Water_Cleanliness	.813***	0.127	6.39	0.000	0.564	1.06
Dummy_Medium_Stony_Coral	-.026	0.120	-0.22	0.829	-0.262	0.210
Dummy_High_Stony_Coral	.101	0.101	1.00	0.319	-0.098	0.300
Dummy_Medium_Soft_Coral	.046	0.113	0.41	0.685	-0.176	0.268
Dummy_High_Soft_Coral	.075	0.126	0.60	0.550	-0.172	0.322
Dummy_Medium_Consumptive_Fish	.035	0.116	0.30	0.761	-0.192	0.262
Dummy_High_Consumptive_Fish	.255**	0.104	2.47	0.014	0.052	0.458
Dummy_Medium_Ornamental_Fish	-.030	0.100	-0.30	0.763	-0.227	0.166
Dummy_High_Ornamental_Fish	.125	0.114	1.10	0.272	-0.098	0.348
Dummy_Medium_Invertebrates	.205*	0.105	1.94	0.052	-.002	0.411
Dummy_High_Invertebrates	.202*	0.112	1.80	0.072	-0.018	0.421
Dummy_High_Large_Wildlife	.293***	0.082	3.59	0.000	0.133	0.453
Dummy_High_Sport_Fishers	.627*	0.325	1.93	0.054	-0.010	1.263
Dummy_Medium_Water_Clarity	.114	0.112	1.01	0.311	-0.106	0.333
Dummy_High_Water_Clarity	.082	0.11	0.75	0.455	-0.133	0.297
Dummy_Medium_Crowdedness	-.019	0.114	-0.16	0.869	-0.241	0.204
Dummy_High_Crowdedness	.154	0.127	1.21	0.224	-0.094	0.402
IncomeCont_ASC	.013***	0.003	4.67	0.000	0.007	0.018
Age10_asc	-.716*	0.417	-1.72	0.086	-1.534	0.102
Age10SQ_asc	.074	0.047	1.57	0.117	-0.018	0.166
C16_ASC	.188**	0.086	2.18	0.029	0.019	0.357
D3_ASC	-.099	0.153	-0.65	0.515	-0.398	0.200
D4_ASC	.303	0.205	1.48	0.139	-0.098	0.704
D5a_ASC	-.002	0.180	-0.01	0.993	-0.355	0.352
ASC	.600	1.09	0.55	0.580	-1.533	2.726
Observations	4,113					
Clusters	686					
Pseudo Log likelihood (full)	-1,263.6					
Chi-squared(26)	376.3					
Chi-squared Significance	0.000					
Pseudo R^2	0.1611					

Table B.2 Nested logit with Demographics and Protestors Dropped

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Price1000	-3.43***	0.221	-15.51	0.000	-3.87	-3.00
Dummy_High_Water_Cleanliness	.666***	0.101	6.61	0.000	0.468	0.863
Dummy_Medium_Stony_Coral	.002	0.09	0.02	0.986	-0.179	0.182
Dummy_High_Stony_Coral	.082	0.079	1.04	0.300	-0.073	0.238
Dummy_Medium_Soft_Coral	.080	0.087	0.92	0.356	-0.090	0.251
Dummy_High_Soft_Coral	.077	0.094	0.81	0.416	-0.109	0.263
Dummy_Medium_Consumptive_Fish	.038	0.086	0.44	0.658	-0.130	0.206
Dummy_High_Consumptive_Fish	.262***	0.080	3.28	0.001	0.105	0.419
Dummy_Medium_Ornamental_Fish	-.065	0.079	-0.82	0.412	-0.220	0.090
Dummy_High_Ornamental_Fish	.122	0.083	1.46	0.143	-0.041	0.285
Dummy_Medium_Invertebrates	.120	0.085	1.40	0.161	-0.048	0.287
Dummy_High_Invertebrates	.137	0.088	1.56	0.118	-0.035	0.308
Dummy_High_Large_Wildlife	.284***	0.061	4.65	0.000	0.165	0.404
Dummy_High_Sport_Fishers	.572**	0.242	2.36	0.018	0.097	1.05
Dummy_Medium_Water_Clarity	.113	0.085	1.32	0.186	-0.055	0.280
Dummy_High_Water_Clarity	.063	0.084	0.76	0.448	-0.100	0.227
Dummy_Medium_Crowdedness	.028	0.090	0.31	0.756	-0.148	0.203
Dummy_High_Crowdedness	.252**	0.102	2.47	0.014	0.052	0.451
IncomeCont_ASC	.012***	0.003	4.67	0.000	0.007	0.018
Age10_asc	-.698*	0.408	-1.71	0.087	-1.50	0.102
Age10SQ_asc	.072	0.046	1.56	0.118	-0.018	0.162
C16_ASC	.183**	0.084	2.18	0.030	0.018	0.348
D3_ASC	-.098	0.149	-0.66	0.510	-0.390	0.194
D4_ASC	.293	0.199	1.47	0.141	-0.097	0.685
D5a_ASC	.002	0.176	0.01	0.992	-0.343	0.346
ASC	.822	1.03	0.80	0.425	-1.20	2.84
Dissimilarity Parameter						
Status quo	1	.			.	.
Other	.712	0.092			0.512	0.893
Observations	4,113					

Clusters	686					
Pseudo Log likelihood (full)	-1,261.1					
Chi-squared(26)	337.0					
Chi-squared Significance	0.000					

Table B.3 Random Parameter Logit Model with Demographics and Protestors Dropped (Mean)

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Mean						
Price1000	-6.990***	1.102	-6.34	0.000	-9.150	-4.830
Dummy_High_Water_Cleanliness	1.348***	0.315	4.28	0.000	0.731	1.966
Dummy_Medium_Stony_Coral	-.349	0.288	-1.21	0.226	-0.914	0.216
Dummy_High_Stony_Coral	.208	0.238	0.87	0.384	-0.259	0.674
Dummy_Medium_Soft_Coral	-.144	0.270	-0.53	0.593	-0.674	0.385
Dummy_High_Soft_Coral	-.433	0.300	-1.44	0.149	-1.022	0.155
Dummy_Medium_Consumptive_Fish	-.331	0.281	-1.18	0.238	-0.882	0.219
Dummy_High_Consumptive_Fish	.391	0.256	1.53	0.126	-0.110	0.893
Dummy_Medium_Ornamental_Fish	.044	0.237	0.18	0.854	-0.420	0.507
Dummy_High_Ornamental_Fish	.085	0.256	0.33	0.740	-0.417	0.588
Dummy_Medium_Invertebrates	.426	0.248	1.72	0.086	-0.060	0.913
Dummy_High_Invertebrates	.307	0.262	1.18	0.240	-0.205	0.820
Dummy_High_Large_Wildlife	.336*	0.183	1.83	0.067	-0.023	0.695
Dummy_High_Sport_Fishers	1.517*	0.782	1.94	0.052	-0.016	3.05
Dummy_Medium_Water_Clarity	-.132	0.267	-0.49	0.621	-0.654	0.391
Dummy_High_Water_Clarity	.024	0.251	0.09	0.925	-0.468	0.516
Dummy_Medium_Crowdedness	-.229	0.263	-0.87	0.384	-0.744	.287
Dummy_High_Crowdedness	-.320	0.301	-1.06	0.289	-0.911	0.271
IncomeCont_ASC	.022***	0.005	4.48	0.000	0.012	0.032
Age10_asc	-1.85**	0.812	-2.28	0.023	-3.44	-0.256
Age10SQ_asc	.205**	0.093	2.20	0.028	0.023	0.388
C16_ASC	.373**	0.154	2.42	0.015	0.071	0.675
D3_ASC	-.263	0.283	-0.93	0.352	-0.818	0.291
D4_ASC	.428	0.383	1.12	0.264	-0.323	1.179
D5a_ASC	-0.058	0.328	-0.18	0.859	-0.701	0.585
ASC	3.205	1.904	1.68	0.092	-0.527	6.936

Table B.4 Random Parameter Logit Model with Demographics and Protestors Dropped (SD)

Variable	Coefficient	Robust S.E.	Z	P>|Z|	95% LB	95% UB
Standard Deviation						
Dummy_High_Water_Cleanliness	2.809***	0.564	4.98	0.000	1.703	3.915
Dummy_Medium_Stony_Coral	.643	0.571	1.13	0.260	-0.475	1.762
Dummy_High_Stony_Coral	-.301	0.566	-0.53	0.595	-1.410	0.808
Dummy_Medium_Soft_Coral	1.032	0.575	1.80	0.072	-0.094	2.158
Dummy_High_Soft_Coral	1.536***	0.481	3.19	0.001	0.593	2.479
Dummy_Medium_Consumptive_Fish	1.777***	0.521	3.41	0.001	0.755	2.798
Dummy_High_Consumptive_Fish	.569	0.602	0.95	0.345	-0.611	1.748
Dummy_Medium_Ornamental_Fish	.826*	0.463	1.78	0.075	-0.082	1.733
Dummy_High_Ornamental_Fish	-.561	0.477	-1.17	0.240	-1.496	0.375
Dummy_Medium_Invertebrates	.3566	0.463	0.77	0.441	-0.550	1.263
Dummy_High_Invertebrates	-1.738***	0.529	-3.29	0.001	-2.775	-0.702
Dummy_High_Large_Wildlife	-.659*	0.370	-1.78	0.075	-1.384	0.066
Dummy_High_Sport_Fishers	-.293	2.384	-0.12	0.902	-4.965	4.379
Dummy_Medium_Water_Clarity	-1.635***	0.519	-3.15	0.002	-2.652	-0.618
Dummy_High_Water_Clarity	-.225	0.506	-0.44	0.657	-1.217	0.767
Dummy_Medium_Crowdedness	-.545	0.390	-1.40	0.162	-1.310	0.219
Dummy_High_Crowdedness	-1.24***	0.436	-2.85	0.004	-2.098	-0.389
Observations	4,113					
Pseudo Log likelihood (full)	-1,217.9					
LR Chi-squared(17)	91.4					
Chi-squared Significance	0.000					