

# Puerto Rico Coral Reef Ecosystem Valuation

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## Technical Appendix Visitor Profiles

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# Puerto Rico Coral Reef Ecosystem Valuation

## Visitor Profiles: Reef Users

### Puerto Rico Coral Reef Ecosystem Valuation

#### Funding Partners

NOAA/NOS/ONMS

Office of National Marine Sanctuaries  
National Ocean Service  
National Oceanic and Atmospheric  
Administration

U.S. Environmental Protection  
Agency Office of Research and  
Development

#### Working Partners

##### ONMS/CSD

- Project leadership
- Develop survey & sample designs
- Provide economic analysis
- Produce reports

##### Ridge-to-Reefs

- Conduct sweepstakes lottery

##### University of Puerto Rico/ Sea Grant

- Conduct all surveys
- Data entry
- Project management

##### Puerto Rico Tourism

- Provide airport enplanement



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## 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. But 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.

William S. Fisher, Associate Director for Ecology  
National Health and Environmental Effects Research Laboratory  
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**Funding Partners.** A special thank you goes to Pat Bradley (now retired) from the U.S. EPA's Atlantic Ecology Division who got NOAA's Office of National Marine Sanctuaries (ONMS) to agree to have me lead this study. Moreover, to Dan Basta, former Director of ONMS (now retired), for agreeing to allow me to lead the project even though, we currently do not have a national marine Sanctuary in Puerto Rico. We would also like to thank Mitchell Tartt, Chief of the ONMS Conservation Science Division for his continued support of the project. In addition, we would also like to thank the rest of the U.S. EPA team involved in the project. Bill Fisher provided leadership as Director of the Gulf Ecology Division in providing the support of many in his staff. Bill was in charge of the development of a decision-support tool for the Guanica Bay Watershed Restoration Management Plan for which the recreation-tourism was a key component. Bill provided the funding for this effort and organized webinars on different components of the decision-support tool. Debbie Santavy and Susan Yee provided data and interpretation of the EPA/NOAA monitoring data on coral reef ecosystem attributes that were critical to our valuation effort. Debbie also provided maps for the different regions used in the surveys. Evelyn Huertas of EPA's Region 2 Caribbean Environmental Protection Division provided local coordination. Matt Weber at EPA's Western Ecology Division provided key technical advice in the survey's optimal design and economic valuation methods. Marisa Mazzotta from EPA's Atlantic Ecology Division provided review/advise on our economic valuation methods. Lenore Connell provided key administrative support in the EPA/NOAA Inter-agency Agreement and its amendments to conduct the project.

**Working Partners.** The major working partners were the University of Puerto Rico-Mayaguez and the Sea Grant Office located there. They were in charge of conducting all the surveys under contract to ONMS. When the project first got underway, Manuel Valdez Pizzini was the Project Lead, but early on was promoted to Dean and Ruperto Chaparro, Director of Puerto Rico Sea Grant Extension took over. Ruperto Chaparro, known locally as Chapa, was key to opening doors with the local community. It seems everyone on the island knows and respects Chapa and if Chapa endorses you, people will work with you, which for this kind of project is extremely valuable. Miguel del Pozo was the original Project Manager and conducted the focus groups and one-on-ones used to design the visitor survey questionnaires. After completing that task, Miguel left the University and we hired Glenis Padilla Plaza as the Project Manager. Glenis did a great job recruiting and training the many students that were used to implement the surveys and ensured good working relationships with all the organizations, especially Aerostar at the San Juan Airport. Glenis was also responsible for delivery of all survey data and documentation. Yullisa Garcia Lugo of Puerto Rico Sea Grant provided contract support. Daniel Irizari Oquendo did a great job in developing the illustrations of coral reef ecosystem conditions used in the survey. Michele Schare of Puerto Rico Sea Grant Extension provided local coordination with the business community as did Rafael Boglio, Coordinator of Interdisciplinary Center for Coastal Studies. Puerto Rico Tourism was another key working partner. Rafael Silvestrini provided the airport enplanement data critical to designing the airport surveys and for extrapolating airport survey sample estimates to population estimates. Rafael also shared Puerto Rico Tourism's past survey results so we could compare coral reef users with the general visitor population. In planning the study Michelle Bauza, Carolina Morales, Edgardo Afanador, Milda I. Luhring Gonzalez, Nilda Diaz Hiraldo and Naireisa Gines all provided their experience and guidance in visitor surveys.

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Many other government agencies, NGO's, businesses and business leaders provided project support. The Department of Natural and Environmental Resources of Puerto Rico (DNER) attended several meetings with us to hear about our project and offer advice on the types of information that would be useful to their agency. Meeting participants included Ernesto Diaz, Director of Coastal Zone Management Program, Craig Lilyestrom, Director of Marine Resources Division, Damaris Delgado, Director, Bureau of Coasts, Reserves & Refuges, Nilda Jimenez Marrero, Coordinator of Coral Reef Committee, Astrid J. Green Caceres of Public Outreach, Israel Umpierre, Assistant to the Secretary and Miguel Canals Sr. (Menqui), Guanica Dry Forest.

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College and John Vaugh from the College of William and Mary, entered all the data from the airport surveys, conducted QA/QC of the databases, developed tables & graphs and wrote first drafts of sections of the Socioeconomic Profiles report. DeMyra Harris developed tables & figures and wrote sections for the Importance-Satisfaction report. Chase Data also developed tables and wrote sections for the Economic Contributions report.

## 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 4 of the six volume series and is a technical appendix detailing the methods used in sampling and estimation for items presented in volumes one through three. Details are provide on sampling methodologies, sample weighting, analyses on non-response bias and methods of estimation of project measurements presented in volumes 1 to 3.

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.

The profiles presented in this report also include demographic profiles of the reef using visitors. Place of primary residence (country and within the U.S. the state) age, sex, race, ethnicity, and household income of the survey respondent are provided. Additional items include party size, second home ownership in Puerto Rico, length of stay, number of annual trips to Puerto Rico, number of days annually spent in Puerto Rico and numbers of nights spent in each region of Puerto Rico on the interview trip.

Expenditure profiles are also presented in terms of average expenditures per person per trip and expenditures per person per day by detailed spending category. The final section of this report addresses special issues identified through public scoping of the project. Special issues included private boats visitors keep in Puerto Rico, likelihood of return visits, cruise ship visits and their influence on making a non-cruise ship visit, visitor's preferences for the level of development, and visitor level of support for different natural resource management issues.

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.

Volumes 5 and 6 are fundamental to the EPA decision support tool. These reports address the non-market economic values of the coral reef ecosystems. Non-market economic values are the value people receive when consuming a good or service over and above what they pay to get the good or service. Economists refer to this as “consumer’s surplus. These are the appropriate values to include in damage assessments when suing responsible parties for damages to coral reefs and in public investments to protect and/or restore coral reef ecosystems. The attributes approach to valuation is used valuing changes in the condition of coral reef ecosystem attributes (e.g. coral cover, coral diversity, fish abundance and diversity, water clarity, and the opportunity to see large wildlife). Volume 5 presents results for example scenarios using estimated models, while Volume 6 is the Technical Appendix detailing the methods used in survey sampling and economic value estimation.

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# 1. Method of Estimating the Number of Person-trips (visits) and Person-days

The sampling design used in the Airport Survey allows us to estimate the number of person-trips to Puerto Rico made by non-residents of Puerto Rico by season. The measurement, “person-trips,” must be differentiated from the number of visitors and the number of visitor days.

**Concept of a Person-trip.** For any given day, the number of person-trips and the number of visitors is the same. However, once we expand the time for estimation beyond one day, then the possibility exists that the same person can make more than one trip (visit). Because we interview visitors as they are leaving Puerto Rico (ending their visit), we count someone each time they visit Puerto Rico. This is the concept of a person-trip or visit. We can use these two terms interchangeably.

**Number of Visitors.** The number of person-trips (visits) and the number of visitors are two measurements that have long been a source of confusion. For the two measurements to be equivalent requires that for the given time period of estimation that each person only makes one visit (trip). Although this is true for the vast majority of visitors, it is not true for all visitors. In Puerto Rico, visitors during the summer season (May 2016 – October 2016), made on average 1.34 trips annually, while visitors during the winter season (November 2016 – April 2017) made on average 1.36 trips annually. By dividing the total number of person-trips (visits) by the average number of trips (visits), for any given time period, we get an estimate of the separate number of visitors. That is, the separate number of different people that visited Puerto Rico during the given time period. We did not obtain the separate number of trips (visits) made by visitors each sampling season, so we cannot derive and estimate of the number of separate visitors by season. We can make such an estimate for the annual time; however, the estimate is not needed for purposes of this study. For purposes of this study, we want an estimate of the total number of person-trips (visits) during each season. This estimate allows us to extrapolate average trip expenditures per person into total expenditures during the given time period for estimation. In addition, when we estimate the percent of visitors that engaged in a certain recreation activity, we can extrapolate this into an estimate of the total number of visitors that did the activity during that time. In this case, we can also refer to them as the number of participants in an activity.

**Number of Person-Days.** Another useful measurement is the number of person-days. Each visit (trip) may have a different length of stay. For day-trips, the concept of a person-day and a person-trip are thus equivalent. However, many trips (visits) are for more than one day. In Puerto Rico, the average length of stay was 8.45 days per visit and 8.86 days per visit, for the summer and winter seasons, respectively. Multiplying the average length of stay by the total number of person-trips (visits) yields, an estimate of the total number of person-days for any given time. Dividing the estimate of the total number of person-days by the number of days in the time yields an estimate of the average number of visitors in the Puerto Rico for the average day during that time.

## Sampling Methodology

The complete project sampling methodology included two major samples. Sample one was the Airport Survey and sample two was the CUSTOMER Survey. Figure 1.1 shows the two samples and the objectives of each sample and sub-sample. The Airport survey had two sub-samples: the satisfaction and expenditure mailback surveys. For estimating total person-trips and person-days to Puerto Rico for coral reef use, the Airport Survey is all that is required. The Airport and CUSTOMER Survey are required to estimate person-trips and person-days by reef using activity, region and season.

As an island, Puerto Rico has limited ways in which visitors can access the island. In project planning, we determined that visitors that used Puerto Rico's coral reefs were accessing Puerto Rico almost exclusively through the San Juan Airport. Air enplanement (the number of passengers getting on flights leaving Puerto Rico) data is available from the Airport Authority. We obtained summaries by month so we could stratify our samples by season. Samples were also stratified by type of day (weekday and weekend) using flight schedules.

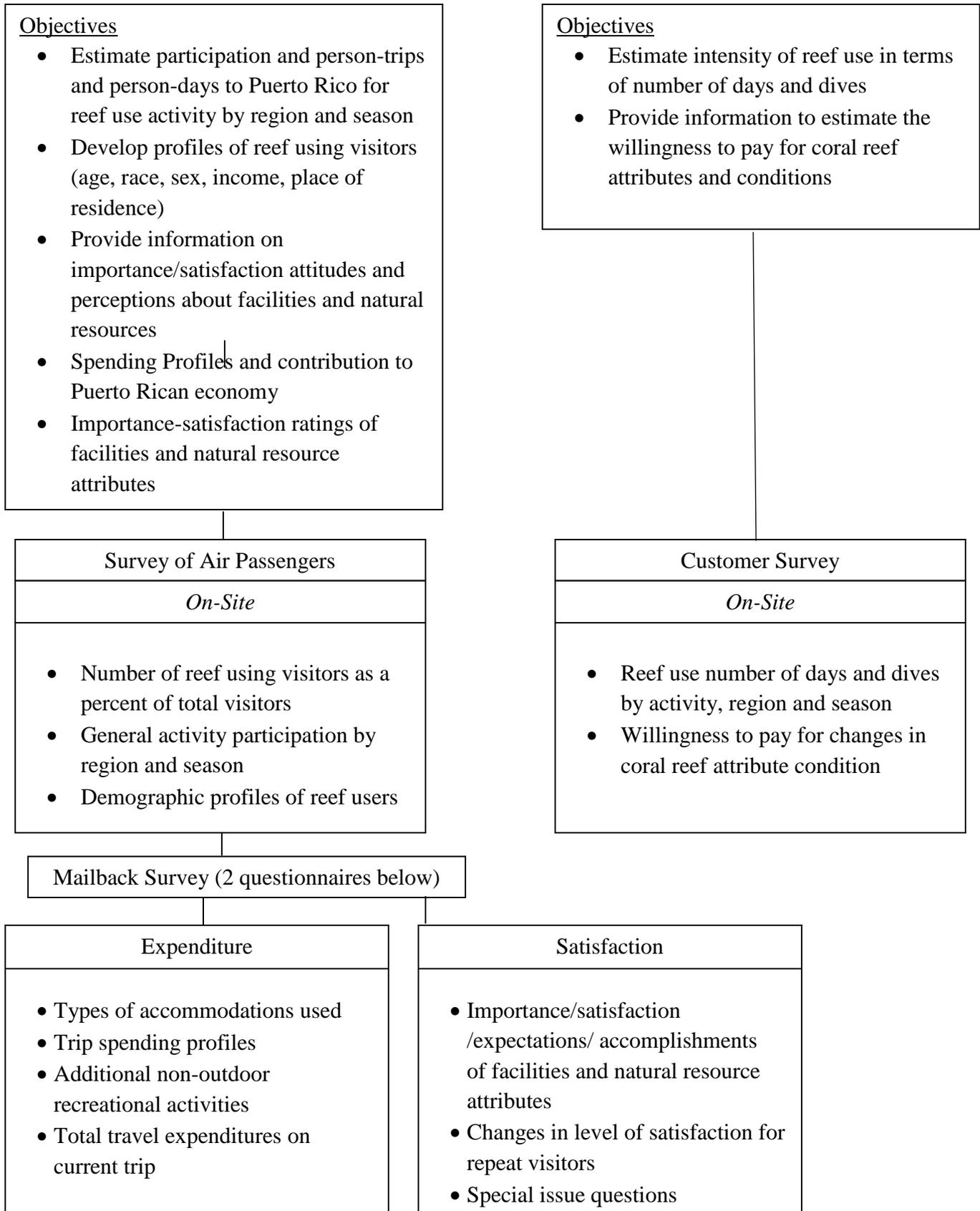
A Tally sheet (See Exhibit 1) was used for estimating the number of person-trips by recreating visitors and recreating visitors that did coral reef using activities. The Tally sheet contained a series of questions to screen out all those on flights leaving Puerto Rico who were non-residents of Puerto Rico and used the coral reefs for recreation. Those who were coral reef users were then asked if they participate in the survey.

Students from the University of Puerto Rico-Mayaguez were recruited and trained to conduct the surveys at the San Juan airport. They were provided security clearances through Aerostar. Students used the Tally Sheet with the Blue Card (Reef Activities) to screen plane passengers and they conducted the on-site interview in the lounge areas of the flights. The On-site survey questionnaire is in Exhibit 1.

**Person-trips.** Person-trips for coral reef use were estimated by combining the Tally sheets with the air enplanement data by season. For the entire study year (May 2016 – April 2017), there were 3,453,913 recreating visitors to Puerto Rico, 1,669,934 in the summer (May 2016 – October 2016) and 1,783,979 recreating visitors in the winter season (November 2016 – April 2017). No additional information was obtained from all recreating visitors since our study was focused on coral reef using visitors. From the Tally sheets, it was estimated that 37.59% of all passengers in the summer were reef-using visitors, while in the winter season 13.8% were reef-using visitors. This yielded estimates of 843,651 person-trips of summer reef-using visitors and 327,717 person-trips of winter reef-using visitors for a total annual estimate of 1,171,368 person-trips by reef using visitors (Table 1.1). Reef using visitors were 50.52% of all recreating visitors to Puerto Rico during the summer season and 18.37% during the winter season. Annually, reef-using visitors were 33.91% of all recreating visitors.

**Person-days.** To estimate the number of person-days that reef-using visitors spent in Puerto Rico by season required the use of the On-site survey. We estimated the average length of stay using information on the time of arrival and time of departure to Puerto Rico on the interview trip.

This information was used to estimate the length of trip measured in days. The sample average, by season, were then multiplied by the total estimated person-trips by season to get an estimate of the number of person-days in Puerto Rico. For the summer season, reef-using visitors spent 7,128,851 person-days in Puerto Rico, while in the winter they spent 2,903,573 person-days for an annual total of 10,032,424 person-days (Table 1.2). The annual estimate was used to “normalize” total spending estimates on a per person-day bases.



**Figure 1.1 Puerto Rico Coral Reef Ecosystem Valuation: Visitor Reef Users**

**Table 1.1 All Visitors and Reef Using Visitors by Season to Puerto Rico 2016-2017**

<b>Type of Visitor</b>	<b>Summer</b>	<b>Winter</b>	<b>Annual</b>
<b>All Recreating Visitors</b>	1,669,934	1,783,979	3,453,913
<b>Reef Using Visitors</b>	843,651	327,717	1,171,368
<b>Total Air Enplanement</b>			
<b>Passengers <sup>1</sup></b>	2,244,535	2,374,207	4,618,742
<b>% of Passengers-Recreating Visitors</b>	74.40	75.14	74.78
<b>% of Passengers-Reef Using Visitors</b>	37.59	13.80	25.36
<b>% of All Recreating Visitors - Reef Using Visitors</b>	50.52	18.37	33.91

1. Air enplanements include all people who get on planes leaving Puerto Rico, so it includes residents traveling, those on business travel, people passing through who just go on the cruise ships, and recreating visitors. Surveys were done to estimate the percent of passengers that were visitors who did recreation activities and those who did reef using activities.

**Table 1.2 Total Person-days of Visitation to Puerto Rico by Reef Using Visitors by Season 2016-2017**

<b>Season</b>	<b>Average Length of</b>	<b>Number of</b>	
	<b>Days (Days)</b>	<b>Person-trips</b>	<b>Person-days</b>
<b>Summer</b>	8.45	843,651	7,128,851
<b>Winter</b>	8.86	327,717	2,903,573
<b>Annual Total</b>	8.56	1,171,368	10,032,424

## 2. Sample Weighting

Chapter 1 discussed the sampling methodology for the Airport Survey as it relates to estimating the total number of person-trips (visits) and person-days by reef-using visitors to Puerto Rico. Again, Figure 1.1 shows the two major samples used in the project and the objectives of each sample.

### Airport Survey

The airport survey, in addition to the On-site sample at the San Juan Airport, had two sub-samples: the satisfaction and expenditure mailback surveys. All on-site passengers were asked if they would participate in the mailback surveys. They were shown a list of prizes that would be given out in a sweepstakes/lottery (see Exhibit 1). Respondents were told they would be entered multiple times in the sweepstakes/lottery if they filled-out and returned both mailback surveys.

**On-site Samples.** The summer season sample sizes were smaller than originally planned since administrative delays resulted in the University of Puerto Rico-Mayaguez from recruiting and training students. Originally, we wanted 500 completed surveys in each season for the on-site surveys. We achieved 364 completes on-site during the summer season and 1,659 for the winter season with an annual total of 2,203 completed interviews (Table 2.1). For estimates of annual averages for many profile measurements, seasonal weights were constructed. Sample weights for measurements from the on-site sample were derived by dividing the percent of person-trips for the population estimates by the percent of sample completed interviews for each season (Table 2.2).

**Mailback Samples.** As with the on-site survey, the summer season got off to a slow start and the mailbacks were not implemented during the main part of the season. Since the surveys were conducted through May 2017, some mailbacks were obtained from summer season visitors, but not enough to estimate separate seasonal components for any measure. For both the satisfaction and expenditure mailback surveys, only annual estimates were made using the weights for the mailbacks in Table 2.2.

**Table 2.1 Number of Completed Interviews by Sample and Sub-sample for Reef Using Visitors**

Sample/Sub-sample	Summer	Winter	Annual
<b>Airport Survey</b>			
On-site Survey	364	1,659	2,023
Satisfaction Mailback	17	158	175
Expenditure Mailback	13	146	159
<b>CUSTOMER Survey</b>			
On-site Survey	200	776	976

## Customer Survey

The CUSTOMER Survey was an on-site sample conducted at many sites throughout Puerto Rico. Sites included dive shops, marinas, parks, beaches, resorts, and other places where reef-using visitors access Puerto Rico’s coral reefs. The CUSTOMER Survey was a 15-20 minute interview with two major objectives. Objective 1 was to estimate person-days and number of dives for reef-using activities by region and season. Puerto Rico was divided into five regions for reef-using activity (See maps in Exhibit 1). The second objective, which will not be addressed here, will be addressed in a separate technical appendix (volume 6 of this series) on non-market economic values of coral reef use.

As with the Airport Survey, the CUSTOMER Survey had smaller samples for the summer season. Sampling weights were constructed for combining summer and winter samples for the non-market economic valuation. Weights were not need for estimating separate number of person-days and dives each season. The CUSTOMER Survey sample weights are in Table 2.2 and are derived in the same way as the Airport On-site survey weights.

**Table 2.2 Sample Weights by Sample, Sub-sample and Season**

<b>Sample/Season</b>	<b>Sample N</b>	<b>Sample %</b>	<b>Population N</b>	<b>Population %</b>	<b>Sample Weight</b>
<b>Airport On-site</b>					
<b>Summer</b>	364	17.99	843,651	72.02	4.0028
<b>Winter</b>	1,659	82.01	327,717	27.98	0.3412
<b>Annual Total</b>	2,023	100.00	1,171,368	100.00	
<b>CUSTOMER On-site</b>					
<b>Summer</b>	200	20.49	843,651	72.02	3.5147
<b>Winter</b>	776	79.51	327,717	27.98	0.3519
<b>Annual Total</b>	976	100.00	1,171,368	100.00	
<b>Airport Expenditure</b>					
<b>Summer</b>	13	8.18	843,651	72.02	8.8089
<b>Winter</b>	146	91.82	327,717	27.98	0.3047
<b>Annual Total</b>	159	100.00	1,171,368	100.00	
<b>Airport Satisfaction</b>					
<b>Summer</b>	17	9.71	843,651	72.02	7.4141
<b>Winter</b>	158	90.29	327,717	27.98	0.3099
<b>Annual Total</b>	175	100.00	1,171,368	100.00	

### 3. Methods of Estimating Activity Participation and Intensity of Use

In volume 1 of this series, Leeworthy et al. (2017a), many detailed appendix tables are provided on activity participation and use for reef and non-reef using activities reef-using visitors did while visiting Puerto Rico. Activity participation estimates included the number of participants (equal to person-trips) and the percent of participants by region and season. Intensity of use was only done for selected reef-using activities measured in person-days and number of dives. See Exhibit 1, the complete activities list for the detailed list of activities. The activities each have a three-digit code. Activity codes with a suffix “A” are activities for which person-days were asked on the CUSTOMER Survey. Days and dives could not be asked on the Airport Survey due to time constraints in the Airport Survey i.e. surveys at the airport had to be kept to 2 to 5 minutes because people get nervous when it gets close to the time of boarding.

*Activity Participation.* Activity participation was obtained from the Airport Survey using the On-site survey questionnaire, the activities list, and the maps of the five regions of Puerto Rico (Exhibit 1). Water-based activities were done by mode of access (e.g. shore, charter/party boat, rental boat or private boat). Many land-based activities were also asked and were summarized in volume 1 in the non-reef activities. Some water-based activities, such as offshore fishing, or boating activities were non-reef using activities.

Each respondent was asked for each activity they did in each region and how many others in their party did the activity in each region. To estimate a participation rate or the percent of all reef-using visitors that did an activity in a season in each region, the sample sum of the number in each party that did the activity was divided by the sample sum of the party size. The participation rate was then multiplied by the total person-trips by season (Table 1.1) to get the total number of participants in each region and season. Seasonal totals were then summed across seasons for estimation of annual total number of participants. Total annual participants in a given activity are then divided by the total person-trips (Table 1.1) to obtain annual participation rates.

*Double Counting.* One cannot generally add the number of participants or participation rates across activities since many people engage in many activities. To do so would be double counting. Estimates were made for aggregate activities (e.g. All Diving, All Snorkeling, All SCUBA Diving, All Fishing, Only Water-based Activities, etc.) without double counting.

In addition, in Leeworthy et al. (2017a), activity participation was presented from two perspectives. The first was what was described above, the percent of all reef-using visitors that did an activity in a region each season. The second perspective was to take the same number of participants and divide by the number of person-trips to each region to derive “within region” participation rates. This later presentation answers the question what percent of the visitors to a particular region do the activity in the region.

The results of all the estimations for activity participation are in appendix tables in Leeworthy et al. (2017a). For reef-using activity participation by region and season see Tables A.2 – A.7 and the within region reef-using activity by region and season see Tables A.8 – A.12. For non-reef

activities by reef-using visitors, see Tables A.25 – A.30 and the within region for non-reef activities see Tables A.31 – A.35. For special aggregate activities, see Tables A.36-A.41 and for the within region distributions see Tables A.42 – A.46.

***Intensity of Use.*** Intensity of use was measured by days or person-days of activity and number of dives for diving activities. This was only asked for selected activities (see Exhibit 1, Activities List) with three-digit codes with an “A” suffix. Average number of days and dives were estimated for each region and season and multiplied by the number of participants or person-trips for each activity. The samples were checked for outliers but none were found, so even though sample sizes were often small for some activities in some regions, the average did not have large variances. The average number of days and dives per activity, season and region are included in appendix tables in Leeworthy et al. (2017a). For the average days by activity, region and season see Tables A.13 – A.17 and for total days by activity, region and season see Tables A.19 – A.23. For the average and total number of dives by activity, region and season see Table A.24.

## 4. Non-response Bias Analyses for the Mailback Surveys

Chapter 2 described the various survey samples and mailback surveys used and the sample weighting methods applied to each sample. Here the focus is on analyses conducted to address the issue of non-response bias resulting from the use of mailback surveys. Nonresponse bias occurs when the group that responds to the mailback survey is different from the population for which you want to estimate certain measurements. The group that responds is different in that they have significantly different responses. For example, respondents to the mailback survey might have higher average expenditures per person per trip for lodging. Applying the higher average to all visitors would result in an overestimate of lodging expenditures. This overestimation would be referred to as non-response bias.

The approach used here for non-response bias had two steps. In step one, survey response rates were related to various socioeconomic factors. The research question is ‘Are the visitors that responded to the mailback survey any different from those that did not respond?’ Step 2 determines whether there is a relationship between socioeconomic factors and mailback question responses. For non-response, bias to exist requires not only that respondents to the mailback survey are different but that the same factors related to whether the visitor responded to the mailback are also related to mailback question responses. It is shown here that there is some non-response bias, but it is not significant (i.e. there is no statistically significant difference between weighted and unweighted estimates) in all the mailback surveys.

### Satisfaction Survey

The same process to determine if there was non-response bias for expenditure mailback surveys was applied for the satisfaction surveys. When regressing demographic variables on whether or not a person completed the mailback survey black and age variables were significant.

**Table 4.1 Estimation of Demographics on Whether or Not a Person Completed the Satisfaction Mailback**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	0.196	0.189	1.040	0.300	-0.175	0.567
<b>Hispanic</b>	-0.356	0.278	-1.280	0.200	-0.901	0.188
<b>Black</b>	-2.232	0.792	-2.820	<b>0.005</b>	-3.784	-0.680
<b>Asian</b>	-0.641	0.847	-0.760	0.449	-2.301	1.019
<b>White</b>	-0.850	0.686	-1.240	0.215	-2.194	0.494
<b>Age 10</b>	0.329	0.069	4.750	<b>0.000</b>	0.193	0.465
<b>Age 10 SQ</b>	-0.002	0.001	-1.680	0.094	-0.005	0.000
<b>Income</b>	0.015	0.028	0.530	0.597	-0.040	0.070
<b>Constant</b>	-2.005	0.774	-2.590	0.010	-3.522	-0.488

Observations: 741

LR = 60.77

Pseudo R-squared = .0787

**Table 4.2 Estimation of Demographics on Whether or not a Person Completed the Satisfaction Mailback**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t</b>	<b>P Value</b>	<b>95% Confidence Interval</b>	
<b>Sex</b>	0.175	0.190	0.920	0.356	-0.197	0.547
<b>Hispanic</b>	-0.413	0.278	-1.480	0.138	-0.959	0.132
<b>Black</b>	-2.113	0.763	-2.770	<b>0.006</b>	-3.608	-0.617
<b>Asian</b>	-0.647	0.834	-0.780	0.438	-2.282	0.988
<b>White</b>	-0.938	0.672	-1.400	0.163	-2.256	0.379
<b>Age 25- 34</b>	0.736	0.388	1.900	<b>0.058</b>	-0.024	1.497
<b>Age 35- 44</b>	0.900	0.432	2.090	0.037	0.054	1.746
<b>Age 45- 54</b>	1.320	0.400	3.300	<b>0.001</b>	0.537	2.104
<b>Age 55- 64</b>	1.917	0.391	4.900	<b>0.000</b>	1.150	2.683
<b>Age 65</b>	1.659	0.412	4.030	<b>0.000</b>	0.852	2.467
<b>Income</b>	0.006	0.029	0.210	0.835	-0.051	0.063
<b>Constant</b>	-1.536	0.758	-2.030	0.043	-3.022	-0.050

Observations: 757

LR = 68.84

Pseudo R-squared = .0882

The next step was to determine if black or age has a statistically significant outcome on the level of satisfaction or expectations that respondents have for various attributes and facilities that Puerto Rico offers.

**Table 4.3 Average Satisfaction Score**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t</b>	<b>P Value</b>	<b>95% Confidence Interval</b>	
<b>Sex</b>	0.029	0.132	0.220	0.829	-0.232	0.290
<b>Hispanic</b>	0.116	0.200	0.580	0.565	-0.280	0.512
<b>Black</b>	-0.206	0.574	-0.360	0.720	-1.341	0.928
<b>Asian</b>	-1.043	0.607	-1.720	0.088	-2.241	0.156
<b>White</b>	-1.064	0.485	-2.190	0.030	-2.023	-0.105
<b>Age 25- 34</b>	0.114	0.301	0.380	0.707	-0.481	0.708
<b>Age 35- 44</b>	-0.006	0.324	-0.020	0.985	-0.646	0.634
<b>Age 45- 54</b>	0.154	0.301	0.510	0.609	-0.441	0.750
<b>Age 55- 64</b>	0.381	0.296	1.280	0.201	-0.205	0.966
<b>Age 65</b>	0.528	0.306	1.730	0.086	-0.077	1.133
<b>Income</b>	-0.008	0.021	-0.400	0.687	-0.049	0.033
<b>Constant</b>	4.829	0.579	8.340	0.000	3.684	5.974

Observations: 160

Adjusted R-squared = .072

**Table 4.4 Average Expectation Score**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t</b>	<b>P Value</b>	<b>95% Confidence Interval</b>	
<b>Sex</b>	0.072	0.109	0.660	0.511	-0.144	0.288
<b>Hispanic</b>	-0.058	0.170	-0.340	0.735	-0.393	0.278
<b>Black</b>	0.645	0.474	1.360	0.175	-0.291	1.581
<b>Asian</b>	-0.571	0.501	-1.140	0.256	-1.561	0.419
<b>White</b>	-0.214	0.401	-0.540	0.593	-1.007	0.578
<b>Age 25- 34</b>	-0.410	0.248	-1.650	0.101	-0.900	0.080
<b>Age 35- 44</b>	-0.279	0.270	-1.030	0.304	-0.812	0.255
<b>Age 45- 54</b>	-0.260	0.249	-1.050	0.298	-0.753	0.232
<b>Age 55- 64</b>	-0.335	0.244	-1.370	0.172	-0.818	0.148
<b>Age 65</b>	-0.215	0.252	-0.850	0.396	-0.713	0.284
<b>Income</b>	0.014	0.017	0.820	0.411	-0.020	0.048
<b>Constant</b>	4.954	0.479	10.340	0.000	4.007	5.901

Observations: 158

Adjusted R-squared = .021

**Table 4.5 Average Accomplishment Score**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t</b>	<b>P Value</b>	<b>95% Confidence Interval</b>	
<b>Sex</b>	0.110	0.127	0.860	0.390	-0.142	0.361
<b>Hispanic</b>	-0.366	0.196	-1.870	0.063	-0.752	0.021
<b>Black</b>	0.675	0.629	1.070	0.285	-0.569	1.919
<b>Asian</b>	-0.491	0.647	-0.760	0.449	-1.770	0.788
<b>White</b>	-0.293	0.555	-0.530	0.599	-1.391	0.805
<b>Age 25- 34</b>	-0.331	0.284	-1.160	0.246	-0.892	0.230
<b>Age 35- 44</b>	-0.155	0.305	-0.510	0.613	-0.757	0.448
<b>Age 45- 54</b>	-0.166	0.285	-0.580	0.562	-0.729	0.397
<b>Age 55- 64</b>	-0.216	0.279	-0.770	0.440	-0.768	0.336
<b>Age 65</b>	-0.041	0.291	-0.140	0.889	-0.616	0.535
<b>Income</b>	0.026	0.020	1.330	0.184	-0.013	0.065
<b>Constant</b>	4.474	0.644	6.950	0.000	3.201	5.746

Observations: 156

Adjusted R-squared = .044

The results of the importance/satisfaction mailback analysis reveal that black and age do not statistically affect the rankings respondents have for the importance and satisfaction metrics. So the data was not weighted.

## Expenditure Survey

The first step was to test demographic factors against whether or not a person completed the expenditure Mailback survey. Table 4.6 and 4.7. Black and age are both significant at an alpha of 5%. The difference between the two tables is how age is calculated. Table 4.6 calculates the respondent's age divided by ten and uses this value squared. The second table, Table 4.7, uses dummy variables for categories of age.

**Table 4.6 Estimation of demographics on whether or not a person completed the expenditure mailback**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	0.14	0.20	0.72	0.47	-0.24	0.53
<b>Hispanic</b>	-0.24	0.29	-0.84	0.40	-0.80	0.32
<b>Black</b>	-2.18	0.80	-2.71	<b>0.01</b>	-3.76	-0.61
<b>Asian</b>	-0.78	0.89	-0.88	0.38	-2.52	0.96
<b>White</b>	-1.02	0.70	-1.45	0.15	-2.39	0.36
<b>Age 10</b>	0.39	0.07	5.26	<b>0.00</b>	0.24	0.53
<b>Age 10 SQ</b>	0.00	0.00	-1.63	0.10	-0.01	0.00
<b>Income</b>	0.03	0.03	1.01	0.31	-0.03	0.09
<b>Constant</b>	-2.42	0.80	-3.02	0.00	-4.00	-0.85

Observations: 741

LR = 66.35

Pseudo R-squared = .0909

**Table 4.7 Estimation of demographics on whether or not a person completed the expenditure mailback**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	0.13	0.20	0.65	0.52	-0.26	0.51
<b>Hispanic</b>	-0.30	0.29	-1.06	0.29	-0.87	0.26
<b>Black</b>	-2.07	0.78	-2.67	<b>0.01</b>	-3.59	-0.55
<b>Asian</b>	-0.81	0.88	-0.93	0.35	-2.53	0.91
<b>White</b>	-1.09	0.69	-1.59	0.11	-2.44	0.26
<b>Age 25- 34</b>	0.90	0.44	2.06	<b>0.04</b>	0.05	1.75
<b>Age 35- 44</b>	0.95	0.48	1.97	<b>0.05</b>	0.01	1.90
<b>Age 45- 54</b>	1.43	0.45	3.21	<b>0.00</b>	0.56	2.31
<b>Age 55- 64</b>	2.06	0.44	4.74	<b>0.00</b>	1.21	2.92
<b>Age 65</b>	2.06	0.45	4.57	<b>0.00</b>	1.17	2.94
<b>Income</b>	0.03	0.03	0.82	0.41	-0.04	0.09
<b>Constant</b>	-1.92	0.80	-2.40	0.02	-3.48	-0.35

Observations: 757

LR = 71.87

Pseudo R-squared = .0972

The next step was to test the demographics against expenditure categories to see if black or age had a significant impact on expenditures.

**Table 4.8 Total Trip Expenditures**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	165.499	754.740	0.220	0.827	-1327.773	1658.771
<b>Hispanic</b>	-302.260	1136.411	-0.270	0.791	-2550.676	1946.156
<b>Black</b>	-4586.316	3114.691	-1.470	0.143	-10748.810	1576.177
<b>Asian</b>	-2327.724	3766.903	-0.620	0.538	-9780.633	5125.185
<b>White</b>	-3860.132	2644.066	-1.460	0.147	-9091.481	1371.216
<b>Age 25- 34</b>	-391.735	1991.993	-0.200	0.844	-4332.942	3549.473
<b>Age 35- 44</b>	125.590	2098.217	0.060	0.952	-4025.784	4276.964
<b>Age 45- 54</b>	1525.992	1932.526	0.790	0.431	-2297.557	5349.542
<b>Age 55- 64</b>	511.330	1912.157	0.270	0.790	-3271.919	4294.578
<b>Age 65</b>	123.744	1917.015	0.060	0.949	-3669.117	3916.604
<b>Income</b>	175.739	125.091	1.400	0.162	-71.756	423.233
<b>Constant</b>	3807.364	3325.044	1.150	0.254	-2771.318	10386.050

Observations: 141

Adjusted R-squared = -.027

**Table 4.9 Total Puerto Rico Trip Expenditures**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	-524.734	372.604	-1.410	0.161	-1261.885	212.418
<b>Hispanic</b>	-27.018	580.440	-0.050	0.963	-1175.349	1121.313
<b>Black</b>	-3507.196	1542.570	-2.270	<b>0.025</b>	-6558.986	-455.407
<b>Asian</b>	-2774.154	1714.454	-1.620	0.108	-6165.996	617.689
<b>White</b>	-3259.121	1308.938	-2.490	0.014	-5848.699	-669.544
<b>Age 25- 34</b>	-228.875	956.557	-0.240	0.811	-2121.308	1663.558
<b>Age 35- 44</b>	171.675	1031.719	0.170	0.868	-1869.457	2212.807
<b>Age 45- 54</b>	345.845	952.208	0.360	0.717	-1537.985	2229.675
<b>Age 55- 64</b>	748.566	938.798	0.800	0.427	-1108.733	2605.864
<b>Age- 65</b>	587.347	941.063	0.620	0.534	-1274.434	2449.128
<b>Income</b>	48.098	61.385	0.780	0.435	-73.345	169.541
<b>Constant</b>	4392.659	1621.841	2.710	0.008	1184.040	7601.277

Observations: 142

Adjusted R-squared = .011

**Table 4.10 Total Hotel Expenditures**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	-203.363	300.588	-0.680	0.500	-797.915	391.189
<b>Hispanic</b>	-149.243	457.818	-0.330	0.745	-1054.788	756.303
<b>Black</b>	-4247.310	1257.294	-3.380	<b>0.001</b>	-6734.188	-1760.432
<b>Asian</b>	-3688.290	1396.490	-2.640	0.009	-6450.493	-926.087
<b>White</b>	-4196.930	1064.869	-3.940	0.000	-6303.199	-2090.661
<b>Age 25- 34</b>	-259.832	773.121	-0.340	0.737	-1789.036	1269.372
<b>Age 35- 44</b>	-183.236	841.174	-0.220	0.828	-1847.045	1480.573
<b>Age 45- 54</b>	360.198	773.073	0.470	0.642	-1168.912	1889.307
<b>Age 55- 64</b>	213.157	764.967	0.280	0.781	-1299.918	1726.232
<b>Age 65</b>	-40.385	767.121	-0.050	0.958	-1557.721	1476.951
<b>Income</b>	68.744	49.700	1.380	0.169	-29.562	167.049
<b>Constant</b>	4117.651	1317.652	3.120	0.002	1511.386	6723.917

Observations: 145

Adjusted R-squared = .057

**Table 4.11 Total Puerto Rico Hotel Expenditures**

Variable	Coefficient	Standard Error	t	P Value	95% Confidence Interval	
<b>Sex</b>	-204.974	302.265	-0.680	0.499	-802.842	392.894
<b>Hispanic</b>	32.230	460.371	0.070	0.944	-878.366	942.827
<b>Black</b>	-3251.090	1264.306	-2.570	<b>0.011</b>	-5751.839	-750.341
<b>Asian</b>	-2717.915	1404.279	-1.940	0.055	-5495.525	59.694
<b>White</b>	-3290.281	1070.808	-3.070	0.003	-5408.298	-1172.264
<b>Age 25- 34</b>	-385.573	777.433	-0.500	0.621	-1923.306	1152.161
<b>Age 35- 44</b>	-308.081	845.866	-0.360	0.716	-1981.170	1365.008
<b>Age 45- 54</b>	426.496	777.385	0.550	0.584	-1111.142	1964.134
<b>Age 55- 64</b>	183.834	769.234	0.240	0.811	-1337.680	1705.348
<b>Age 65</b>	42.977	771.400	0.060	0.956	-1482.821	1568.776
<b>Income</b>	54.048	49.978	1.080	0.281	-44.806	152.902
<b>Constant</b>	3284.074	1325.002	2.480	0.014	663.272	5904.876

Observations: 145

Adjusted R-squared = .020

**Table 4.12 Total Food Expenditures**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t</b>	<b>P Value</b>	<b>95% Confidence Interval</b>	
<b>Sex</b>	-26.067	152.363	-0.170	0.864	-327.434	275.301
<b>Hispanic</b>	-15.601	232.060	-0.070	0.947	-474.606	443.403
<b>Black</b>	-161.949	637.300	-0.250	0.800	-1422.502	1098.605
<b>Asian</b>	366.504	707.856	0.520	0.605	-1033.607	1766.615
<b>White</b>	34.113	539.763	0.060	0.950	-1033.517	1101.743
<b>Age 25- 34</b>	-137.861	391.881	-0.350	0.726	-912.987	637.265
<b>Age 35- 44</b>	-35.223	426.376	-0.080	0.934	-878.578	808.132
<b>Age 45- 54</b>	190.990	391.857	0.490	0.627	-584.088	966.068
<b>Age 55- 64</b>	53.358	387.748	0.140	0.891	-713.592	820.309
<b>Age 65</b>	240.516	388.840	0.620	0.537	-528.594	1009.626
<b>Income</b>	35.548	25.192	1.410	0.161	-14.281	85.378
<b>Constant</b>	62.363	667.894	0.090	0.926	-1258.706	1383.432

Observations: 145

Adjusted R-squared = .057

**Table 4.13 Total Puerto Rico Food Expenditures**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t</b>	<b>P Value</b>	<b>95% Confidence Interval</b>	
<b>Sex</b>	-29.891	150.872	-0.200	0.843	-328.309	268.528
<b>Hispanic</b>	-90.136	229.789	-0.390	0.695	-544.649	364.377
<b>Black</b>	-308.160	631.063	-0.490	0.626	-1556.378	940.058
<b>Asian</b>	194.466	700.929	0.280	0.782	-1191.944	1580.875
<b>White</b>	-134.023	534.481	-0.250	0.802	-1191.205	923.159
<b>Age 25- 34</b>	-131.112	388.046	-0.340	0.736	-898.653	636.429
<b>Age 35- 44</b>	-77.586	422.203	-0.180	0.854	-912.688	757.516
<b>Age 45- 54</b>	173.759	388.022	0.450	0.655	-593.734	941.252
<b>Age 55- 64</b>	35.743	383.953	0.090	0.926	-723.702	795.188
<b>Age 65</b>	245.072	385.035	0.640	0.526	-516.512	1006.655
<b>Income</b>	38.757	24.946	1.550	0.123	-10.584	88.099
<b>Constant</b>	209.829	661.358	0.320	0.752	-1098.312	1517.970

Observations: 145

Adjusted R-squared = .057

Once regressing demographics on various expenditure categories, the only statistically significant variable was black. The age variables were not significant in predicting expenditures in any of the categories tested. The last step to determine if the expenditures should have been

weighted was to see if there are differences in the confidence intervals for the weighted and unweighted data. The results are shown below. In all cases, the weighted versus unweighted data confidence intervals overlapped. Since there was overlap in the confidence intervals around the means of all expenditure categories, the expenditure data was not weighted for this analysis.

**Table 4.14 Confidence Intervals of the Selected Expenditure Means for Weighted and Unweighted Data**

<b>Variable</b>	<b>Orbs</b>	<b>Mean</b>	<b>Standard Error</b>	<b>95% Confidence Intervals</b>	
<b>Expenditures Total On Trip</b>	154	2077.03	124.30	1831.46	2322.60
<b>Expenditures Total On Trip Weighted</b>	154	2037.34	123.05	1794.24	2280.44
<b>Expenditures Total in Puerto Rico</b>	156	1599.44	114.39	1373.47	1825.42
<b>Expenditures Total in Puerto Rico Weighted</b>	156	1602.36	113.13	1378.88	1825.85
<b>Food Total in Puerto Rico</b>	158	486.14	38.84	409.44	562.85
<b>Food Total in Puerto Rico Weighted</b>	158	474.95	38.05	399.80	550.10
<b>Hotel Total in Puerto Rico</b>	158	427.56	54.56	319.79	535.32
<b>Hotel Total in Puerto Rico Weighted</b>	158	445.01	54.32	337.72	552.31

## **5. Methods of Estimating Economic Contribution/Impact to Puerto Rico's Economy by Reef-Using Visitors**

Here the methods are detailed on how estimates of spending by reef-using visitors were made and how they were used to develop estimates on the impact of the spending on the Puerto Rican economy for year May 2016 – April 2107. The IMPLAN input-output model was used to estimate the impact of spending on total output/sales, value-added, income and employment, including multiplier impacts.

### **Expenditures Per Person-trip and Total Annual Expenditures**

The expenditure mailback survey (see Exhibit 1) had two parts. In Part A, trip expenditures were obtained. In Part B, Annual Vacation Expenditures and Equipment Purchases were obtained.

In Part A – Trip Expenditures, expenditures were obtained in two columns. Column A asked for the total amount spent for the current trip by expenditure category and column B asked for the amount in column A that was spent in Puerto Rico. Expenditures in Column B were used to estimate the economic contribution/impact of the spending on the Puerto Rican economy.

Expenditures recorded in Part A were for the number of people the respondent was paying for on the trip. The number of people the expenditures covered was also obtained and used to estimate trip expenditures per person-trip. To obtain total expenditures, the average expenditures per person-trip were multiplied by the total annual number of person-trips by reef-using visitors (1,171,368, Table 1.1).

Expenditures recorded in Part B – Annual Vacation and Equipment Purchases were obtained in three columns. Column A were the total purchases made in the past 12 months anywhere, Column B were purchase made in the respondent's home county, and Column C were purchases made in Puerto Rico. Not all the purchases recorded in Column C were included in the estimation of the economic contribution/impact of reef-using visitor expenditures because the probability that anyone would purchase most of these items is so small that sample sizes obtained would not yield reliable estimates. Estimation was restricted to three expenditure categories from this section: Boat storage and marina fees, Condo and time-share fees and RV or trailer park fees. These fees were first normalized by dividing by the total annual trips to Puerto Rico in the year (Question 4 on the Airport on-site survey) and then by the number of persons the respondent was paying for to put on a per person-trip basis as with the trip expenditures. As with the trip expenditures, total expenditures was then derived by multiplying this average expenditure per person-trip by total person-trips (1,171,368, Table 1.1). The results are summarized in Table 5.1.

### **Expenditures Per Person-day**

For future analyses, it is useful to have expenditures normalized on a per person-day basis. In most policy/management contexts, estimates are available on how many person-days of activity are impacted positively or negatively by a proposed action. To obtain the economic impact on

the economy of the proposed action one can multiply the total person-days impacted by the expenditure profile of expenditures per person-day to get an estimate of total expenditures impacted. This total expenditure can then be inputted into the IMPLAN model to estimate the impact on output/sales, value-added, income and employment.

Here we divided the total expenditures in Table 5.1 by the total person-days of reef-using visitors (10,032,424, Table 1.2) to estimate expenditures per person-day. Note, this is different from calculating expenditures per person-day for each individual in the sample then taking the mean or average for the sample. The reason is that the calculation for each individual is a ratio of two variables with their own distributions. The advantage of our approach is you get a consistent aggregation from expenditures per person-day to total expenditures. Our approach is an after the fact calculation of expenditures per person-day since we simply divide total expenditures by total person-days. This is important because we derived our estimate of total expenditures by multiplying the sample average expenditure per person-trip times the total number of person-trips, not mean expenditures per person-day by total person-days.

**Table 5.1 Average Per Person-Trip Expenditures, Per Person-Day Expenditures and Total Expenditures**

Expenditure Category	Average Expenditure / Person - trip	Expenditures / Person-Day	Total Expenditures
<b>Lodging/Private</b>			
Hotel	\$286.45	\$33.45	\$335,536,255
Rental	\$82.56	\$9.64	\$96,711,551
Camp	\$0.00	\$0.00	\$0
<b>Lodging/Public</b>			
Hotel	\$9.50	\$1.11	\$11,131,874
Camp	\$2.45	\$0.29	\$2,870,239
<b>Food &amp; Beverages</b>			
Food and drinks consumer at restaurants and bars	\$233.13	\$27.22	\$273,080,670
Drinks consumed at bars and clubs during non-meal times	\$25.62	\$2.99	\$30,008,715
Food & Beverages purchased at a store for carry-out	\$60.92	\$7.11	\$71,357,700
<b>Transportation</b>			
Rental Automobile, motor home, trailer, motorcycle, etc	\$102.83	\$12.01	\$120,451,771
Gas & Oil = auto/RV	\$12.59	\$1.47	\$14,744,501
Repair & service - auto/RV	\$60.92	\$7.11	\$71,357,700
Parking fees & tolls	\$6.21	\$0.73	\$7,274,195
Taxi fare	\$13.37	\$1.56	\$15,666,204
Ferry	\$0.00	\$0.00	\$0
Train	\$0.00	\$0.00	\$5,818

**Table 5-1 Continued**

<b>Bus Fare</b>			
Package Tour	\$2.72	\$0.32	\$3,180,536
Any other bus fare	\$0.75	\$0.09	\$883,568
<b>Airline Fare</b>		\$0.00	\$0
Package Tour	\$69.39	\$8.10	\$81,279,925
Any other airline fare	\$58.00	\$6.77	\$67,934,249
<b>Boating</b>			
Boat, jet ski, wave runner, rental	\$3.50	\$0.41	\$4,104,960
Boat fuel and oil	\$0.00	\$0.00	\$0
Boat repairs	\$0.00	\$0.00	\$0
Boat launch fees	\$0.00	\$0.00	\$0
Boat slip fees or marina fees	\$0.09	\$0.01	\$103,432
Sailing charters or sunset cruises	\$34.93	\$4.08	\$40,913,846
<b>Fishing</b>			
Cut bait	\$0.00	\$0.00	\$0
Live bait	\$0.00	\$0.00	\$0
Daily or special fishing permits	\$0.00	\$0.00	\$0
Fishing lines, fly lines, fishnets, minnow traps	\$0.00	\$0.00	\$0
Charter/party boat, guide service	\$5.23	\$0.61	\$6,128,349
<b>Scuba Diving/Snorkeling</b>			
Rental fee for equipment	\$0.83	\$0.10	\$973,554
Charter/party boat, guide service	\$10.05	\$1.17	\$11,774,193
<b>Sightseeing</b>			
Sightseeing tours	\$4.93	\$0.58	\$5,777,973
Glass bottom boat rides	\$0.17	\$0.02	\$193,935
Excursions, kayak tours	\$12.11	\$1.41	\$14,183,966
Park Entrance fees	\$2.73	\$0.32	\$3,193,464
Admission to tourist, amusement, festivals and other commercial attractions	\$3.08	\$0.36	\$3,611,718
Food and drinks on sightseeing tours	\$2.77	\$0.32	\$3,250,352
<b>Other Activity Expenditures</b>			
Rental fee for recreation equipment	\$4.92	\$0.57	\$5,758,580
Guide service, tour. or outfitters	\$0.89	\$0.10	\$1,047,249
Admission to motion pictures, theatres, museums, etc	\$0.85	\$0.10	\$995,533
Admission to musical performances, concerts	\$0.00	\$0.00	\$0
Spa treatments	\$9.77	\$1.14	\$11,442,171
Fitness activities	\$0.15	\$0.02	\$180,815

**Table 5.1 Continued**

<b>Miscellaneous Expenditures</b>			
Film Purchases	\$0.10	\$0.01	\$116,361
Film Developing	\$0.00	\$0.00	\$0
Footwear	\$0.00	\$0.00	\$0
Clothing	\$32.98	\$3.85	\$38,626,703
Souvenirs and Gifts (not clothing)	\$41.99	\$4.90	\$49,189,795
<b>Services</b>			
Barber, laundry, and other personal services	\$1.43	\$0.17	\$1,672,238
Telephone, copying, fax, and other business services	\$0.29	\$0.03	\$340,162
Physician, dentist, and other medical services	\$3.69	\$0.43	\$4,327,183
		\$0.00	\$0
<b>Total Trip Related Expenditures</b>	<b>\$1,204.90</b>	<b>\$140.68</b>	<b>\$1,411,382,006.26</b>
<b>Durable Goods</b>			
Marina & Boat Storage	\$0.00	\$0.00	\$0
Condo	\$7.87	\$0.92	\$9,222,490
RV	\$0.92	\$0.11	\$1,077,946

### **Estimated Contribution/Impact of Spending on the Puerto Rican Economy**

The total expenditures made by reef-using visitors in Puerto Rico were fed into the IMPLAN input-output Model (Day 2011) for Puerto Rico. The IMPLAN Model data for Puerto Rico was purchased for this project. All estimates from IMPLAN were converted to 2017 dollars using the Consumer Price Index for all Urban Workers 1982-84 (U.S. Department of Labor).

#### ***Economic Measure Definitions for IMPLAN.***

IMPLAN model outputs reported here include output, value-added, income, and employment. The estimates for these measures include the “ripple effects” or “multiplier effects” from the initial spending by reef-using visitors. Table 5.2 contains the definitions for these measures.

**Table 5.2 IMPLAN Economic Indicators' Definitions**

<i>Indicator</i>	<i>Definitions and Relationships</i>
<b>Employment</b>	Total annual average jobs. This includes self-employed and wage and salary employees, and all full-time, part-time and seasonal jobs, based on a count of full-time/part-time averages over 12 months
<b>Labor Income</b>	Defines the total value paid to local workers within a region. Labor income is the income source for induced household spending estimations.
<b>Value Added</b>	Comprised of Labor Income, Indirect Business Taxes (IBT), and Other Property Type Income (OPTI), Value Added demonstrates an industry's value of production over the cost of its purchasing the goods and services required to make its products. Value Added is often referred to as Gross Regional Product (GRP).  Value Added = Labor Income + IBT + OPTI
<b>Output</b>	The total value of an industry's production, comprised of the value of Intermediate Inputs and Value Added. In IMPLAN, this is typically viewed as the value of a change in sales or the value of increased production. However, annual production is not always equal to annual sales. If production levels are higher than sales, surpluses become inventory. Because inventory does not drive additional impacts in the year it was produced, in IMPLAN, Direct industry sales = Direct Output.

Source: Day, 2011

***Impact Types.***

The IMPLAN model also reports the types of impacts for each economic measure: “direct”, “indirect” and “total” effects. The indirect and induced effects represent components of the “multiplier” process. The types of effects are defined in Table 5.3.

**Table 5.3 Impact Type Definitions**

<i>Type of Impact</i>	<i>Definition</i>
<b>Direct Effect</b>	The effect of spending by recreators at each business they purchased goods or services from within the study area.
<b>Indirect Effect</b>	The result of a sector purchasing goods and services to produce their product from other industries located within the study area.
<b>Induced Effect</b>	Results from spending of employee wages that stem from both the direct and indirect effects within the study area.

***Mapping Expenditure Categories to IMPLAN Model Sectors.***

The IMPLAN model has over 500 economic sectors. These sectors can be mapped into the North American Industrial Classification System (NAICS) codes used by the federal government in the U.S. national income accounts. A key step in implementing the IMPLAN model was to map each expenditure category into the appropriate IMPLAN sectors. Table 5.4 shows how the expenditure categories were mapped into the IMPLAN sectors using NAICS codes.

**Table 5.4 IMPLAN Expenditure Codes**

<b>Expenditure Category on Survey</b>	<b>IMPLAN Code</b>	<b>IMPLAN Description</b>
<b>Lodging/Private</b>		
Hotel	499	Hotels and motels
Rental	440	Real Estate
<b>Lodging/Public</b>		
Hotel	499	Hotels and motels
Camp	500	Other accommodations
<b>Food &amp; Beverages</b>		
Food and drinks consumer at restaurants and bars	501	Full-service restaurants
Drinks consumed at bars and clubs during non-meal times	503	All other food and drinking places
Food & Beverages purchased at a store for carry-out	400	Retail - Food and beverage stores
<b>Transportation</b>		
Rental Automobile, motor home, trailer, motorcycle, etc	442	Automotive equipment and leasing
Gas & Oil = auto/RV	402	Retail - Gasoline Stores
Repair & service - auto/RV	504	Automotive repair and maintenance
Parking fees & tolls	512	Other personal services
Taxi fare	412	Transit and ground passenger transportation
Train	412	Transit and ground passenger transportation
<b>Bus Fare</b>		
Package Tour	414	Scenic and sightseeing transportation and support activities
Any other bus fare	412	Transit and ground passenger transportation
Airline Fare		
Package Tour	466	Travel arrangement and reservation services
Any other airline fare	408	Air transportation
<b>Boating</b>		
Boat, jet ski, wave runner, rental	443	General and other consumer goods rental except video tapes and discs
Boat slip fees or marina fees	496	Other amusement and recreation industries
Sailing charters or sunset cruises	414	Scenic and sightseeing transportation and support activities
<b>Fishing</b>		
Charter/party boat, guide service	496	Other amusement and recreation industries

<b>Scuba Diving/Snorkeling</b>		
Rental fee for equipment	443	General and other consumer goods rental except video tapes and discs
Charter/party boat, guide service	414	Scenic and sightseeing transportation and support activities
<b>Sightseeing</b>		
Sightseeing tours	414	Scenic and sightseeing transportation and support activities
Glass bottom boat rides	414	Scenic and sightseeing transportation and support activities
Excursions, kayak tours	414	Scenic and sightseeing transportation and support activities
Park Entrance fees	493	Museums, historical sites, zoos and parks
Admission to tourist, amusement, festivals and other commercial attractions	494	Amusement parks and arcades
Food and drinks on sightseeing tours	503	All other food and drinking places
<b>Other Activity Expenditures</b>		
Rental fee for recreation equipment	443	General and other consumer goods rental except video tapes and discs
Guide service, tour. or outfitters	496	Other amusement and recreation industries
Admission to motion pictures, theatres, museums, etc	466	Travel arrangement and reservation services
Spa treatments	509	Personal care services
Fitness activities	497	Fitness and recreational sports centers
<b>Miscellaneous Expenditures</b>		
Film Purchases	398	Retail - Electronics and appliance stores
Clothing	403	Retail - Clothing and clothing accessory stores
Souvenirs and Gifts (not clothing)	406	Miscellaneous store retailers
<b>Services</b>		
Barber, laundry, and other personal services	509	Personal care services
Telephone, copying, fax, and other business services	398	Retail - Electronics and appliance stores
Physician, dentist, and other medical services	475	Offices of physicians
<b>Durable Goods</b>		
Condo	440	Real Estate
RV	442	Automotive equipment rental and leasing

## Economic Contributions by Study Area

The next several tables present the economic contributions resulting from the expenditures explained in Chapter 2. The contributions were estimated using IMPLAN. Table 3.3 shows the trip-related economic contributions. Tourist spending in Puerto Rico results in nearly 30,000 jobs being sustained and \$935 million in labor income. The value-added or regional domestic product was roughly \$1.3 billion dollars as a result of visitor spending in Puerto Rico. Table 3.4 presents the contributions from durable good expenditures (condos and RVs). This spending results in 74 jobs and roughly \$3.34 million in labor income.

**Table 5.5 Trip-Related Economic Contributions (2017\$)**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
<b>Direct Effect</b>	22,629	\$661,213,069	\$901,637,460	\$1,285,476,829
<b>Indirect Effect</b>	1,795	\$85,387,951	\$121,497,774	\$189,777,963
<b>Induced Effect</b>	5,043	\$189,351,059	\$322,348,161	\$489,378,653
<b>Total Effect</b>	29,467	\$935,952,079	\$1,345,483,394	\$1,964,633,445

**Table 5.6 Durable Good Related Economic Contributions (2017\$)**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
<b>Direct Effect</b>	30	\$1,675,379	\$6,579,497	\$10,377,721
<b>Indirect Effect</b>	26	\$992,102	\$1,430,958	\$2,105,245
<b>Induced Effect</b>	18	\$684,548	\$1,165,363	\$1,769,217
<b>Total Effect</b>	74	\$3,352,029	\$9,175,819	\$14,252,183

**Table 5.7 Total Economic Contributions from all Spending in Puerto Rico (2017\$)**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
<b>Direct Effect</b>	22,659	\$662,888,448	\$908,216,957	\$1,295,854,550
<b>Indirect Effect</b>	1,822	\$86,380,053	\$122,928,732	\$191,883,208
<b>Induced Effect</b>	5,061	\$190,035,607	\$323,513,524	\$491,147,870
<b>Total Effect</b>	29,542	\$939,304,108	\$1,354,659,213	\$1,978,885,628

## Multiplier Estimates

Using the total expenditures and the results of IMPLAN, multipliers can be developed. These multipliers tell us how much impact is generated per dollar of spending for labor income, value-added and output. For employment, the multiplier is the number of employees per \$100,000 in spending. The multipliers are derived by taking the total effect of trip-related expenditures and dividing by total trip-related expenditures. For employment, this number was then multiplied by 100,000. The same was done for the IMPLAN durable good results and durable good expenditures.

The multipliers can be used to estimate the economic impact of new spending projected from a project or management action. For example, suppose a marketing campaign increased trip-related spending by visitors to Puerto Rico by \$100,000. We would estimate that the spending would generate 1.53 more employees, \$49,000 in labor income, \$70,000 in value-added and \$102,000 in total output in the OC local economy.

**Table 5.8 Multipliers for Puerto Rico’s Trip Related Expenditures**

Type of Spending	Employment <sup>1</sup>	Labor Income <sup>2</sup>	Value-Added <sup>2</sup>	Output <sup>2</sup>
<b>Trip-Related</b>	1.53	0.49	0.70	1.02
<b>Durable Goods</b>	0.72	0.33	0.89	1.38

1. Number of employees per \$100,000 in spending

2. Dollars generated per dollar of spending

## Percent of Puerto Rico’s Economy

Using data from the Bureau of Labor Statistics, the percent of Puerto Rico’s economy supported by trip-related expenditures and durable good expenditures can be estimated. The next two tables present this information. Using BLS data, the total employment and yearly employment income from 2016 were estimated. The income was converted to 2017 dollars, since the IMPLAN estimates were in 2017 dollars, using the Consumer Price Index for all Urban Consumers.

**Table 5.9 Percent of Employment and Income in Puerto Rico from Trip-Related Expenditures in Puerto Rico**

	Employment	Wage Income
<b>Trip-Related</b>	29,467	\$935,952,079
<b>Puerto Rico Total<sup>1</sup></b>	888,207	\$24,734,305,351
<b>Percent of Puerto Rico</b>	3.32%	3.78%

1. This is the total employment or income earnings. (BLS, 2017).

**Table 5.10 Percent of Employment and Income in Puerto Rico from Durable Good Expenditures in Puerto Rico**

	<b>Employment</b>	<b>Wage Income</b>
<b>Durable Goods</b>	74	\$3,352,029
<b>Puerto Rico Total<sup>1</sup></b>	888,207	\$24,734,305,351
<b>Percent of Puerto Rico</b>	0.008%	0.014%

1. This is the total employment or income earnings. (BLS, 2017).

**Table 5.11 Percent of Employment and Income in Puerto Rico from All Expenditures in Puerto Rico**

	<b>Employment</b>	<b>Wage Income</b>
<b>Trip-Related and Durable Goods</b>	29,542	\$939,304,108
<b>Puerto Rico Total<sup>1</sup></b>	888,207	\$24,734,305,351
<b>Percent of Puerto Rico</b>	3.33%	3.80%

1. This is the total employment or income earnings. (BLS, 2017).

## **6. Methods of Estimating Importance-Satisfaction Ratings**

The general method of reporting and analyzing the 25 items in the importance-satisfaction items is described in Leeworthy et al. (2017c). There the four-quadrant analysis is described and presented along with bar charts and statistics (e.g. mean, standard error and number of observations) for each of the 25 items for importance and satisfaction. The report also presents results of comparisons of the satisfaction ratings for the 25 items in a five-year retrospective analysis. Those reef-using visitors that had visited Puerto Rico and used the coral reefs for recreation at least five years ago were asked to provide satisfaction ratings for the prior period. Current satisfaction ratings were compared with the retrospective ratings. Here we report the results of the paired t-tests conducted for those comparisons.

In addition, the report also reported the results of expectancy-discrepancy analysis on 25 items. Two of the items in the importance-satisfaction ratings were dropped (many different kinds of fish and sea life to catch and control of invasive species) and replaced by two new items (quality of restaurants and boat ramps/launching facilities separately from marina facilities). Expectancy-discrepancy analysis asks people to rate, on a five-point Likert scale, what their expectations were, and then, how their expectations were met (accomplishments). In theory, when people's expectations are not met it would lead to relatively low satisfaction scores. Here we report the results of paired t-tests on the differences between expectations and accomplishments.

### **Current Satisfaction Ratings versus Rating Five Years Ago Statistical Tests for Differences**

**Table 6.1 Current Satisfaction Ratings versus Ratings Five Years Ago**

<b>Item</b>	<b>Mean Difference</b>	<b>T-value<sup>1</sup></b>	<b>T-value Significance</b>	<b>N</b>
<b>1. Clear Water (high visibility)</b>	-0.0377	-0.42	0.67	53
<b>2. Clean Water for Swimming and Other Water-Based Activities</b>	-0.0962	-1.04	0.30	52
<b>3. Amount of Living Coral on the Reefs</b>	0.1538	0.85	0.40	26
4. Many Different Kinds of Fishes and Sea Life to View	0.4583	2.41	0.02	24
<b>5. Many Different Kinds of Fishes and Sea Life to Catch</b>	-0.0714	-0.56	0.58	14
<b>6. Control of Invasive Species</b>	-0.3636	-1.49	0.17	11
<b>7. Enforcement of Environmental Laws and Regulations</b>	-0.3461	-1.98	0.06	26
<b>8. Artificial Reefs (sunken ships, reef balls)</b>	-0.1538	-0.69	0.50	13
9. Easy, Abundant and Quality Beach and Shoreline Access	-0.3590	-3.57	0.00	39
10. Marina Facilities, Boat Ramps/ Launching Facilities	-0.4118	-2.38	0.03	17
<b>11. Mooring Buoys and Navigational Aids</b>	-0.4000	-1.50	0.17	10
<b>12. Value of Lodging</b>	-0.2105	-1.95	0.06	38
<b>13. Resorts with focus on Ecotourism</b>	-0.1429	-0.68	0.50	21
14. Availability of Public Restrooms	-0.4167	-3.63	0.00	48
15. Cleanliness of Streets and Sidewalks	-0.6226	-4.51	0.00	53
<b>16. Well Maintained Roads and Bridges</b>	-0.2708	-1.95	0.06	48
<b>17. Public Transportation</b>	0.1200	-0.72	0.48	25
<b>18. Parking</b>	-0.2561	-1.37	0.18	41
<b>19. Historic Preservation</b>	-0.1795	-1.23	0.23	39
<b>20. Education posters, signs, brochures</b>	-0.2286	-1.67	0.10	35
21. Availability of Tour Guides	-0.3636	-2.35	0.03	22
<b>22. Availability of Lifeguards for Beach Safety</b>	0.0000	0.00	1.00	29
<b>23. Customer Service and Friendliness of People</b>	-0.1321	-1.02	0.31	53
<b>24. Public Safety (areas with low crime rates)</b>	-0.1333	-1.23	0.22	45
<b>25. Good Maps and Signage for Road Navigation</b>	-0.1111	-0.82	0.42	45

1. Paired T-test in STATA Release 14. Differences were all normally distributed.

2. Variable names in bold were statistically different between the current and past rating.

## Expectancy – Discrepancy Analysis Statistical Tests for Differences

There were declines in all items. Statistical tests for differences in scores were performed using a paired t-test in SAS Version 9.4, PROC TTEST. Differences were normally distributed so the paired t-test was appropriate. All differences were statistically significant using the criterion of 0.05 level of less or the 95 percent confidence level, except for “Mooring Buoys and Navigational Aids”.

**Table 6.2 Expectancy – Discrepancy Analysis**

Item	Mean Difference	T- value <sup>1</sup>	Significance Level
<b>1. Marina Facilities</b>	0.6136	4.55	<0.0001
<b>2. Availability of Public Restrooms</b>	0.6739	6.39	<0.0001
<b>3. Public Transportation</b>	0.5844	3.74	0.0004
<b>4. Parking</b>	0.5588	4.66	<0.0001
<b>5. Cleanliness of Streets and Sidewalks</b>	0.3806	3.43	0.0008
<b>6. Boat Ramps/Launching Facilities</b>	0.3684	2.16	0.0372
<b>7. Well Maintained Roads and Bridges</b>	0.5704	5.37	<0.0001
<b>8. Value of Lodging</b>	0.4550	4.68	<0.0001
<b>9. Mooring Buoys and Navigational Aids</b>	0.3784	1.83	0.0749
<b>10. Good Maps and Signage for Road Navigation</b>	0.6154	5.60	<0.0001
<b>11. Educational Posters, Signs, Brochures</b>	0.6226	6.29	<0.0001
<b>12. Resorts with Focus on Ecotourism</b>	0.5676	4.21	<0.0001
<b>13. Availability of Lifeguards for Beach Safety</b>	0.7767	6.04	<0.0001
<b>14. Easy, Abundant, and Quality Beach &amp; Shoreline</b>	0.5069	6.24	<0.0001
<b>15. Enforcement of Environmental Laws &amp; Regulations</b>	0.3371	2.58	0.0116
<b>16. Public Safety</b>	0.3611	3.48	0.0007
<b>17. Customer Service and Friendliness of People</b>	0.1830	2.13	0.0344
<b>18. Availability of Tour Guides</b>	0.4767	4.52	<0.0001
<b>19. Historic Preservation</b>	0.4636	4.40	<0.0001
<b>20. Artificial Reefs</b>	0.3913	2.32	0.025
<b>21. Quality of Restaurants</b>	0.2980	3.74	0.0003
<b>22. Clear Water/High Visibility</b>	0.4839	6.21	<0.0001
<b>23. Clean Water for Swimming and Other Water-Based Activities</b>	0.5064	6.93	<0.0001
<b>24. Amount of Living Coral on the Reefs</b>	0.7635	4.90	<0.0001
<b>25. Many Kinds of Fish and Sea Life to View</b>	0.8824	6.33	<0.0001

1. Paired t-test using SAS Proc TTEST, Version 9.4.

## 7. Statistical Tests for Differences between Summer and Winter Reef-using Visitors

In Leeworthy et al. (2017a), several figures and tables were presented with comparative profiles for summer and winter reef-using visitors. The report noted when differences were statistically significant. Here the statistical tests that were performed are documented. In all tests, the judgment on statistically significant differences was significance of 0.05 or lower or the 95 percent confidence level.

**Continuous Variables.** For continuous variables, two types of tests were conducted. Test 1 was for differences in means between summer and winter season visitors and used a T-test. Tests for equality of variances (Folded F-test) were also performed to determine the appropriate T-test; pooled for cases of equality of variances and Satterthwaite for unequal variances. Tests were done using SAS PROC T-test. Test 2 was for the difference in distributions. Non-parametric tests were used. The Kolmogorov-Smirnov (KS) and Kuiper (K) two-sample tests were used for differences in the empirical distribution function.

The results of the T-tests are in Table 7.1. Only two statistically significant differences were found between summer and winter season reef-using visitors. Winter season visitors were significantly older than summer season visitors and had higher household incomes (before taxes). The same was true for the distributions using the KS and K tests (Table 7.2).

**Categorical Variables.** For categorical variables, Chi-square tests were performed using SAS PROC Freq. Sex, Race, and Ethnicity (Hispanic or non-Hispanic were for the survey respondent only. For Race, the data was obtained for each category separately since people could be categorized in multiple categories, so each is treated as a dummy variable coded 1 or 0. Household income (Before Taxes) was obtained in categories and was treated above as a continuous variable by setting the value equal to the median of the interval with those over \$150,000 se to \$200,000. Here we tested for the difference in distributions using the categories.

As with the coding of household income (before taxes) as a continuous variable, winter season visitors had higher incomes. A significantly higher proportion of summer season visitors were Hispanic and Black or African American. A higher proportion of winter season reef-using visitors were White, Asian or Native Hawaiian or Pacific Islander In addition, a higher proportion of summer season visitor's primary purpose of their trip was fro "recreation or vacation" or "visiting family and friends" (Table 7.3).

## For Selected Continuous Variables – Differences in Means<sup>1</sup>

Table 7.1 Statistical Tests for Differences between Summer and Winter Reef Using Visitors

Variable	Summer Mean	Winter Mean	T-value	T-value Significance	Statistically Significant Difference <sup>3</sup>
Number of Annual Trips	1.3407	1.3593	0.36	0.7173	No
Number of Annual Days	10.8352	9.6016	-1.86	0.0629	No
Length of Interview Trip	8.4505	8.8565	0.79	0.4278	No
Number of Nights Interview Trip	7.7775	7.7812	0.01	0.9939	No
Age of Respondent	35.1983	42.4576	11.11	<0.0001	Yes
Party Size	3.2857	3.4002	0.68	0.4965	No
Household Income (Before Taxes) <sup>2</sup>	\$77,716	\$99,771	6.70	<0.0001	Yes

**1. T-test for differences in means. Folded F-test used to test equality of variances. All tests concluded all variables had equal variances, so pooled T-test was used.**

**2. Household Income was obtained in intervals (See Table 7.3). For continuous variable, household income was set to the median of each interval with the highest category, \$150,000 or more set to \$200,000.**

**3. Significance of 0.05 or lower or the 95 percent confidence level used to judge statistically significant differences.**

## Selected Continuous Variables – Differences in Distributions<sup>1</sup>

Table 7.2 Statistical Tests for Differences between Summer and Winter Reef Using Visitors

Variable	KS	KS Significance	K	K Significance	Statistically Significant Difference <sup>3</sup>
Number of Annual Trips	0.36	0.9994	0.504 9 1.394	1.0000	No
Number of Annual Days	1.29	0.0714	9 0.773	0.2769	No
Length of Interview Trip	0.555 7	0.9169	2 1.074	0.9861	No
Number of Nights Interview Trip	0.919 7	0.3662	7 3.799	0.7221	No
Age of Respondent	7 0.706	<0.0001	7 0.888	<0.0001	Yes
Party Size	0 2.564	0.7013	0 2.564	0.9323	No
Household Income (Before Taxes) <sup>2</sup>	4	<0.0001	4	<0.0001	Yes

1. Kolmogorov-Smirnov (KS) and Kuiper (K) Two-sample tests for differences in empirical distribution function.
2. Household Income was obtained in intervals (See Table 7.3). For continuous variable, household income was set to the median of each interval with the highest category, \$150,000 or more set to \$200,000.
3. Significance of 0.05 or lower or the 95 percent confidence level used to judge statistically significant differences.

## For Selected Categorical Variables – Differences in Distributions<sup>1</sup>

**Table 7.3 Statistical Tests for Differences between Summer and Winter Reef Using Visitors**

Variable	Summer	Winter	Chi-square	Chi-Square Significance	Statistically Significant Difference
<b>Sex of Respondent</b>			2.1876	0.1391	No
Male	43.45	47.11			
Female	56.55	52.89			
<b>Ethnicity (Hispanic)</b>			29.8446	<0.0001	Yes
Yes	42.31	29.13			
<b>Race of Respondent (% Yes)</b>					
White	49.18	68.35	60.4807	<0.0001	Yes
Black or African American	17.86	10.55	16.3587	<0.0001	Yes
American Indian or Native Alaskan	1.65	0.96	1.3281	0.2491	No
Asian	2.75	5.30	7.975	0.0047	Yes
Native Hawaiian or Pacific Islander	0.27	0.96	4.1662	0.0412	Yes
<b>Primary Purpose of Trip</b>			30.1799	<0.0001	Yes
Recreation or Vacation	77.12	74.44			
Visit Family or Friends	19.21	15.99			
Business Trip	2.82	8.12			
Other	0.85	1.45			
<b>Household Income (Before Taxes)</b>			97.5908	<0.0001	Yes
Less than \$5,000	3.85	2.47			
\$5,000 to \$9,999	7.14	3.86			
\$10,000 to \$14,999	1.65	0.42			
\$15,000 to \$19,999	2.75	1.15			
\$20,000 to \$24,999	1.65	1.08			
\$25,000 to \$29,999	3.02	1.27			
\$30,000 to \$34,999	3.02	1.75			
\$35,000 to \$39,999	4.12	4.76			
\$40,000 to \$44,999	2.47	1.93			
\$45,000 to \$49,999	5.22	3.19			
\$50,000 to \$59,999	9.34	6.09			
\$60,000 to \$74,999	9.34	8.38			
\$75,000 to \$99,999	14.84	12.90			
\$100,000 to \$149,999	12.09	16.03			
\$150,000 or more	11.81	18.87			
Did not Answer	7.70	15.85			

1. Chi-square test. Level of significance of 0.05 or less or 95% confidence level used for significance.



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## **Exhibit 1: Questionnaires and Supporting Materials**

### **Airport Survey**

1. Tally Sheet
2. On-site Questionnaire (short form)
3. Reef Activities List (Blue Card)
4. Respondent Card (Green Card)
5. Full Activities List (White Card)
6. Region Maps (one overall showing all five regions and one for each of the five regions)
7. Satisfaction Mailback Questionnaire
8. Expenditure Mailback Questionnaire
9. Mailback Center GREEN PAGE with Postage Paid and Return Address (Side 1)
10. Mailback Center GREEN PAGE with instructions to respondent (Side 2)
11. Post Card Reminder for Mailbacks
12. Brochure for Sweepstakes/Lottery

### **CUSTOMER Survey (Example: One Version for Days and Dives)**

13. On-site Questionnaire (Example: One Version for Days and Dives Estimation)
14. Respondent Green Card (same as Airport Survey)
15. Reef Activities List – Blue Card (same as Airport Survey)
16. Region Maps (same as for Airport)
17. Brochure for Sweepstakes/Lottery (same as for Airport Survey)

### Airport Survey

On-site Survey Number: \_\_\_\_\_

Screening Criteria: 1) NOT a resident of Puerto Rico  
(See Tally Sheet) 2) Visiting PR and did reef recreation/tourist activity \_\_\_\_\_

Airport: \_\_\_\_\_  
Month Day Time

Number of People in Party: \_\_\_\_\_ (# of people)

- (a) How many people in your party are ages 16 or older? \_\_\_\_\_ (# of People)  
(b) How many people in your party are under 16? \_\_\_\_\_ (# of People)

2. Where is your primary residence?

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

Country: \_\_\_\_\_

- |   |   |                                    |
|---|---|------------------------------------|
| <input type="radio"/> U.S.A                 | <input type="radio"/> Australia/Oceania | <input type="radio"/> Other Europe |
| <input type="radio"/> Canada                | <input type="radio"/> Japan             | <input type="radio"/> Middle East  |
| <input type="radio"/> Mexico                | <input type="radio"/> Other Far East    | <input type="radio"/> Africa       |
| <input type="radio"/> Central Am./South Am. | <input type="radio"/> United Kingdom    | <input type="radio"/> 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

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



## Airport Survey

### Hand respondent Green Card

10. 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      C Business trip      E Other (specify)  
B Visit family or friends      D Business/pleasure

---

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

11. In what year were you born? (Code last two digits) \_\_\_\_ \_\_\_\_

12. Sex    male       female

13. Are you Spanish, Hispanic, or Latino?       Yes       No

13b. 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 Alaska Native  
D Asian  
E Native Hawaiian or Pacific Islander

14. 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  
 don't know

15. Do you own a second home or time share in the Puerto Rico?

Yes       No

16. On this trip, are you paying your own expenses, sharing expenses, or is someone else paying your expenses?

- own expenses \_\_\_\_\_ ↳ Beside your own expenses, how many other people are you paying for on this trip? \_\_\_\_\_
- shared expenses \_\_\_\_\_ ↳ \_\_\_\_\_
- someone else paying expenses \_\_\_\_\_ ↳ With how many people are you sharing expenses? \_\_\_\_\_

## Airport Survey

We would like to collect some additional information on your visit to Puerto Rico during your trip. We have two mailback questionnaires that are self-addressed and postage is paid. The information gained from these questionnaires is very important to both managers of the coral reefs and business and governments providing services on your trip enjoyment. As an incentive for completing panel questions, a sweepstakes has been organized by the local business community. Hand brochure describing sweepstakes By completing the mailbacks, we enter you in the sweepstakes each time you complete a module.

E-mail: \_\_\_\_\_ Phone: \_\_\_\_\_

Reminder: Your name and address and all personal information collected in the project are protected. After the survey is completed and the sweepstakes prizes awarded, all name and address information will be destroyed. No one will be allowed to use this information for contacting you about any promotions. This concludes our interview. Thank you for your time. In Appreciation for your participation, we would like to offer you this gift.

19. Will you complete these questionnaires?

Yes (Go to Satisfaction and Expenditure suggestions and questions 20 and 21)

No → This concludes our interview. Thank you for your time. In appreciation for your participation we would like to offer you this gift.

### Satisfaction

We suggest completing the satisfaction questionnaire on your way home while your thoughts about your trip to the Puerto Rico are fresh.

### Expenditure

The expenditure survey should be completed after your trip is over and you have returned home.

Interviewer: Code on-site survey number and location on mailback

Show example of mailback questionnaire, where to start, the types of questions that are asked, and how to seal it to mail it back

20. Please give us your name and address. In the event that we do not receive the take home questionnaire we will send you another.

Satisfaction name and address

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

21. If someone other than yourself paid for all your expenses on this trip to Puerto Rico, we would like that person to answer the questionnaire. Will you please give us the name and address of that person?

Expenditure name and address

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

This concludes our interview. Thank you for your time. In appreciation for your participation, we would like to offer you this gift.

**REEF ACTIVITIES LIST**

<u>Number</u>	<u>Water-based Activities</u>
	<b>Snorkeling</b>
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
	<b>Scuba Diving</b>
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
	<b>Special Activities while Snorkeling or Scuba Diving</b>
300	Diving for lobsters
301	Underwater photography
303	Spear fishing
	<b>Fishing – Inshore or Light Tackle Fishing</b>
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
	<b>Other Fishing</b>
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)
	<b>Viewing Nature and Wildlife</b>
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
	<b>Other Activities on the Reefs</b>
13A	Surfing
15A	Swimming
18A	Paddle boarding, wind surfing or kite boarding

## RESPONDENT CARD

### CONFIDENTIALITY 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

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

**ACTIVITIES LIST**

<u>Number</u>	<u>Water-based Activities</u>
	<b>Snorkeling</b>
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
	<b>Scuba Diving</b>
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
	<b>Special Activities while Snorkeling or Scuba Diving</b>
300	Diving for lobsters
301	Underwater photography
302	Wreck diving or other artificial reefs
303	Spear fishing
304	Cave diving
305	Diving to capture ornamental fish for aquariums (not to sell)
	<b>Fishing – Offshore</b>
400A	Fishing from charter boat (pay operation, usually six persons or less) - offshore
402A	Fishing from a rental boat – off shore
403A	Fishing from a private boat (your boat or friend or relative's boat) – offshore
	<b>Fishing – Inshore or Light Tackle Fishing</b>
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
	<b>Other Fishing</b>
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)
411	Freshwater fishing
	<b>Viewing Nature and Wildlife</b>
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
506	Manatee watching
	<b>Personal Watercraft (jet skis, wave runners, etc.)</b>
600A	Personal watercraft – rental
601A	Personal watercraft – Private (your boat or friend or relative's watercraft)
	<b>Sailing</b>
700A	Sailing charter/party boat (pay operation)
701A	Sailing rental boat
702A	Sailing private boat (your boat or friend or relative's boat)

Number	<b>Other Water-Based Activities</b>
--------	-------------------------------------

---

**Beach Activities – Sunbathing**

- |     |   |
|-----|---|
| 12A | Sunbathing                                      |
| 13A | Surfing   |
| 14  | Collecting shells and sea glass                 |
| 15A | Swimming  |
| 18A | Paddle boarding, wind surfing, or kite boarding |
- Other Activities NOT MENTIONED ABOVE** (parasailing, hang gliding, water-skiing, sunset cruises)
- |      |   |
|------|---|
| 800A | Other activities from a charter/party boat (pay operation)                    |
| 801A | Other activities from a rental boat   |
| 802A | Other activities from a private boat (your boat or friend or relative’s boat) |

Number	<b>Land-Based Activities</b>
--------	------------------------------

---

**Nature Study – Wildlife Observation – Photography**

- |     |   |
|-----|---|
| 19A | Wildlife observation or wildlife photography                      |
| 20A | Other nature study and observation                                |
| 21  | Photography – Natural landscapes/scenery (not including wildlife) |

**Camping – Backpacking – Hiking – Picnicking**

- |    |  |
|----|--|
| 22 | Backpacking  |
| 23 | Camping in developed campgrounds   |
| 24 | Camping in primitive campgrounds   |
| 25 | Day Hiking   |
| 26 | Attending guided walk (by park rangers, private companies or non-government organizations) |
| 27 | Self-guided nature or historic trail   |
| 28 | Picnicking   |

**Cultural, Historic and Tourist Attractions**

- |     |   |
|-----|---|
| 29A | Visiting historic areas, sites, buildings or memorials  |
| 30  | Attending special events (fairs, festivals, ceremonies, etc.)   |
| 31  | Attending outdoor concerts, plays, or other outdoor performances  |
| 32  | Attending indoor concerts, plays, performances, or events   |
| 33  | Sight-seeing tours and tourist attractions (paid)   |
| 34  | Sight-seeing (not paid tours)   |
| 35  | Reading roadside exhibits or markers  |
| 36A | Visiting a museum, education facility, or information center  |
| 37  | Attending outdoor sports events (sailing or boat races; spectator at fishing tournament, surfing or other competitions like baseball, horse racing, or cock fighting) |
| 38  | Attending indoor sporting events (basketball, boxing or other indoor sporting events)   |
| 39  | Agricultural tourism (visiting coffee plantations, farms, wineries)   |
| 40  | Visiting Forest and Nature Reserves (El Yunque, Guánica Dry Forest, Mona Island Nature Reserve)   |
| 41  | Visiting caves (Rio Camuy Cave Park or other caves)   |
| 42  | Visiting Special Coral Reef Areas (Guánica, Cabo Rojo, Northeastern Reserves, Culebra)  |

**Outdoor Sports**

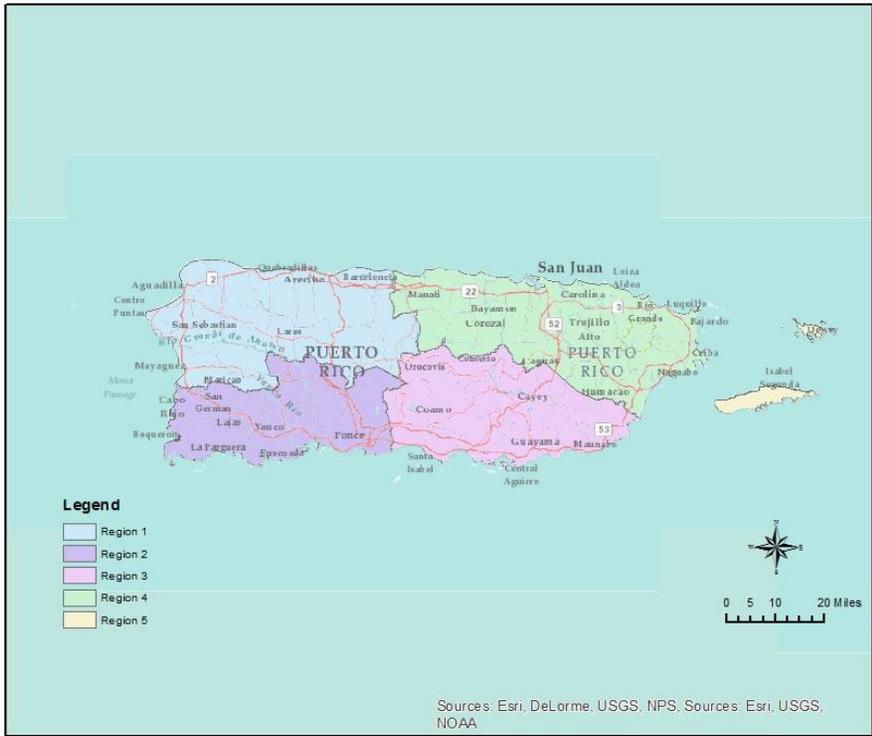
- |    |   |
|----|---|
| 43 | Golf  |
| 44 | Tennis  |
| 45 | Zip Lining                                      |
| 46 | Mountain climbing, rock climbing or rappelling  |
| 47 | Participation in other outdoor sports and games |

**Bicycling – Horseback Riding – Driving for Pleasure**

- |    |  |
|----|--|
| 48 | Bicycling                                  |
| 49 | Horseback riding                           |
| 50 | Driving for Pleasure (mopeds, motorcycles) |

**Other**

- |    |                  |
|----|------------------|
| 51 | Attended Wedding |
| 52 | Visited Casino   |









**Legend**

 Region 3



0 5 10 20 Miles  


Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA



**Legend**

 Region 4



0 5 10 20 Miles



Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA



## THANK YOU!

for  
participating in this  
Recreation Survey

Dear Visitor,

During your recent trip to Puerto Rico you indicated that you would be willing to complete this questionnaire. It is self-explanatory and should take about 20 minutes to complete. **Please** record your answers accurately and legibly. Your answers represent many other people not included in this survey effort so it is **very important** that you return your questionnaire.

Your answers are voluntary. Your name will never be released to anyone unless otherwise required by law. After the completion of the project all materials identifying you as an individual will be destroyed.

When you complete the questionnaire, please reverse-fold it so that our return address on the GREEN PAGE in the inside is folded to the outside. Please staple or tape to seal the questionnaire and mail it back to us. No postage is needed. Your cooperation in this effort is greatly appreciated.

Sincerely,

Ms. Glenis Padilla Plaza (Project Lead)  
University of Puerto Rico - Mayaguez Campus  
Telephone: (787) 508-2475  
[gpadillaplaza@gmail.com](mailto:gpadillaplaza@gmail.com)

Dr. Ruperto Chaparro (Project Co-lead)  
Puerto Rico Sea Grant Program  
Extension Leader  
University of Puerto Rico  
P.O. Box 5000  
Mayaguez, PR 00681  
Telephone: (787) 832-8045  
[Ruperto.chaparro@upr.edu](mailto:Ruperto.chaparro@upr.edu)

Please note: It is very important that the same person who participated in the on-site interview also complete this questionnaire.

In this section we are interested in identifying the recreation site information which is important to you, the visitor.

IMPORTANCE  
(in the ideal recreational setting for activities)

1a Please read each statement and rate the importance of each item as it contributes to an ideal recreation/tourism setting for the activities you did in Puerto Rico. If an item does not apply, indicate by circling n/a (not applicable). Likewise, if you don't know, circle (dk).

	Not Applicable	Don't Know	1	2	3	4	5
			Not Important	Somewhat Important	Very Important	Extremely Important	
1) Clear water (high visibility)	n/a	dk	1	2	3	4	5
2) Clean water for swimming and other water-based activities.	n/a	dk	1	2	3	4	5
3) Amount of living corals on the reefs.	n/a	dk	1	2	3	4	5
4) Many different kinds of fishes and sea life to view	n/a	dk	1	2	3	4	5
5) Many different kinds of fishes and sea life to catch	n/a	dk	1	2	3	4	5
6) Control of invasive species (lionfish)	n/a	dk	1	2	3	4	5
7) Enforcement of environmental laws and regulations.	n/a	dk	1	2	3	4	5
8) Artificial reefs (sunken ships, reef balls)	n/a	dk	1	2	3	4	5
9) Easy, abundant and quality beach and shoreline access.	n/a	dk	1	2	3	4	5
10) Marina facilities, boat ramps/launching facilities	n/a	dk	1	2	3	4	5
11) Mooring buoys and navigational markers	n/a	dk	1	2	3	4	5
12) Value of lodging (cost vs amenities: clean rooms & linens, working ac, hot showers).	n/a	dk	1	2	3	4	5
13) Resorts with focus on Ecotourism/green initiatives: low energy use, recycling.	n/a	dk	1	2	3	4	5
14) Availability of public restrooms	n/a	dk	1	2	3	4	5
15) Cleanliness of streets and sidewalks	n/a	dk	1	2	3	4	5
16) Well maintained roads and bridges	n/a	dk	1	2	3	4	5
17) Public transportation	n/a	dk	1	2	3	4	5
18) Parking	n/a	dk	1	2	3	4	5
19) Historic preservation (historic landmarks, houses, etc.)	n/a	dk	1	2	3	4	5
20) Educational posters, signs, brochures	n/a	dk	1	2	3	4	5
21) Availability of tour guides	n/a	dk	1	2	3	4	5
22) Availability of lifeguards for beach safety	n/a	dk	1	2	3	4	5
23) Customer service and friendliness of people	n/a	dk	1	2	3	4	5
24) Public safety (areas with low crime rates)	n/a	dk	1	2	3	4	5
25) Good maps and signage for road navigation	n/a	dk	1	2	3	4	5

lb. On the previous page you indicated the importance of a list of items to your recreational/tourist experiences. Now please read each of the items on this list and rate how satisfied you were with each at the places you did your activities in Puerto Rico. If an item does not apply, indicate by circling n/a (not applicable). Likewise, if you don't know, circle (dk).

SATISFACTION  
(with each of these items where you did activities in Puerto Rico)

	Not Applicable	Don't Know	Terrible	Unhappy/Miserable	Satisfied	Very Satisfied
1) Clear water (high visibility)	n/a	dk	1	2	3	4 5
2) Clean water for swimming and other water-based activities.	n/a	dk	1	2	3	4 5
3) Amount of living corals on the reefs.	n/a	dk	1	2	3	4 5
4) Many different kinds of fishes and sea life to view	n/a	dk	1	2	3	4 5
5) Many different kinds of fishes and sea life to catch	n/a	dk	1	2	3	4 5
6) Control of invasive species (lionfish)	n/a	dk	1	2	3	4 5
7) Enforcement of environmental laws and regulations.	n/a	dk	1	2	3	4 5
8) Artificial reefs (sunken ships, reef balls)	n/a	dk	1	2	3	4 5
9) Easy, abundant and quality beach and shoreline access.	n/a	dk	1	2	3	4 5
10) Marina facilities, boat ramps/launching facilities	n/a	dk	1	2	3	4 5
11) Mooring buoys and navigational markers	n/a	dk	1	2	3	4 5
12) Value of lodging (cost vs amenities: clean rooms & linens, working ac, hot shower)	n/a	dk	1	2	3	4 5
13) Resorts with focus on Ecotourism/green initiatives: low energy use, recycling	n/a	dk	1	2	3	4 5
14) Availability of public restrooms	n/a	dk	1	2	3	4 5
15) Cleanliness of streets and sidewalks	n/a	dk	1	2	3	4 5
16) Well maintained roads and bridges	n/a	dk	1	2	3	4 5
17) Public transportation	n/a	dk	1	2	3	4 5
18) Parking	n/a	dk	1	2	3	4 5
19) Historic preservation (historic landmarks, houses, etc.)	n/a	dk	1	2	3	4 5
20) Educational posters, signs, brochures	n/a	dk	1	2	3	4 5
21) Availability of tour guides	n/a	dk	1	2	3	4 5
22) Availability of lifeguards for beach safety	n/a	dk	1	2	3	4 5
23) Customer service and friendliness of people	n/a	dk	1	2	3	4 5
24) Public safety (areas with low crime rates)	n/a	dk	1	2	3	4 5
25) Good maps and signage for road navigation	n/a	dk	1	2	3	4 5

SATISFACTION  
(with each of these items five  
years ago in Puerto Rico)

Ic. Had you visited Puerto Rico more than five years ago?

- If "yes" answer question Id.
- If "no" skip to question IIa on page 4.

Id. Now please read each of the items on this list and rate how satisfied you were with each five years ago or more in Puerto Rico. If an item does not apply, indicate by circling n/a (not applicable). Likewise, if you don't know, circle (dk).

		Not Applicable, Don't know	1	2	3	4	5	
1)	Clear water (high visibility) . . . . .	n/a	dk	1	2	3	4	5
2)	Clean water for swimming and other water-based activities. . . . .	n/a	dk	1	2	3	4	5
3)	Amount of living corals on the reefs. . . . .	n/a	dk	1	2	3	4	5
4)	Many different kinds of fishes and sea life to view . . . . .	n/a	dk	1	2	3	4	5
5)	Many different kinds of fishes and sea life to catch . . . . .	n/a	dk	1	2	3	4	5
6)	Control of invasive species (lionfish) . . . . .	n/a	dk	1	2	3	4	5
7)	Enforcement of environmental laws and regulations. . . . .	n/a	dk	1	2	3	4	5
8)	Artificial reefs (sunken ships, reef balls) . . . . .	n/a	dk	1	2	3	4	5
9)	Easy, abundant and quality beach and shoreline access. . . . .	n/a	dk	1	2	3	4	5
10)	Marina facilities, boat ramps/launching facilities . . . . .	n/a	dk	1	2	3	4	5
11)	Mooring buoys and navigational markers . . . . .	n/a	dk	1	2	3	4	5
12)	Value of lodging (cost vs amenities: clean rooms & linens, working ac, hot shower) . . . . .	n/a	dk	1	2	3	4	5
13)	Resorts with focus on Ecotourism/green initiatives: low energy use, recycling . . . . .	n/a	dk	1	2	3	4	5
14)	Availability of public restrooms . . . . .	n/a	dk	1	2	3	4	5
15)	Cleanliness of streets and sidewalks . . . . .	n/a	dk	1	2	3	4	5
16)	Well maintained roads and bridges . . . . .	n/a	dk	1	2	3	4	5
17)	Public transportation . . . . .	n/a	dk	1	2	3	4	5
18)	Parking . . . . .	n/a	dk	1	2	3	4	5
19)	Historic preservation (historic landmarks, houses, etc.) . . . . .	n/a	dk	1	2	3	4	5
20)	Educational posters, signs, brochures . . . . .	n/a	dk	1	2	3	4	5
21)	Availability of tour guides . . . . .	n/a	dk	1	2	3	4	5
22)	Availability of lifeguards for beach safety . . . . .	n/a	dk	1	2	3	4	5
23)	Customer service and friendliness of people . . . . .	n/a	dk	1	2	3	4	5
24)	Public safety (areas with low crime rates) . . . . .	n/a	dk	1	2	3	4	5
25)	Good maps and signage for road navigation . . . . .	n/a	dk	1	2	3	4	5

Ila. Now please read each of the items on the list below and rate **your** expectations for each of the following in Puerto Rico. If an item does not apply, indicate by circling not applicable (n/a). Likewise, if you don't know, circle (dk).

EXPECTATION  
(with each of these items  
in Puerto Rico)

		Not Applicable	Don't Know	Did not expect	Small expectation	Moderate expectation	Large expectation	
1)	Marina facilities . . . . .	n/a	dk	1	2	3	4	5
2)	Availability of public restrooms. . . . .	n/a	dk	1	2	3	4	5
3)	Public transportation. . . . .	n/a	dk	1	2	3	4	5
4)	Parking . . . . .	n/a	dk	1	2	3	4	5
5)	Cleanliness of streets and sidewalks . . . . .	n/a	dk	1	2	3	4	5
6)	Boat ramps/launching facilities. . . . .	n/a	dk	1	2	3	4	5
7)	Well maintained roads and bridges. . . . .	n/a	dk	1	2	3	4	5
8)	Value of lodging (cost vs amenities: clean rooms & linens, working ac, hot showers) . . . . .	n/a	dk	1	2	3	4	5
9)	Mooring buoys and navigational aids. . . . .	n/a	dk	1	2	3	4	5
10)	Good maps and signage for road navigation . . . . .	n/a	dk	1	2	3	4	5
11)	Resorts with focus on Ecotourism/green initiatives: low energy use, recycling . . . . .	n/a	dk	1	2	3	4	5
12)	Educational posters, signs, brochures. . . . .	n/a	dk	1	2	3	4	5
13)	Availability of lifeguards for beach safety . . . . .	n/a	dk	1	2	3	4	5
14)	Easy, abundant, and quality beach & shoreline access . . . . .	n/a	dk	1	2	3	4	5
15)	Enforcement of environmental laws & regulations . . . . .	n/a	dk	1	2	3	4	5
16)	Public safety (area has low crime rates) . . . . .	n/a	dk	1	2	3	4	5
17)	Customer service and friendliness of people . . . . .	n/a	dk	1	2	3	4	5
18)	Availability of tour guides . . . . .	n/a	dk	1	2	3	4	5
19)	Historic preservation (historic landmarks, houses, etc.) . . . . .	n/a	dk	1	2	3	4	5
20)	Artificial reefs (sunken ships, reef balls) . . . . .	n/a	dk	1	2	3	4	5
21)	Quality restaurants . . . . .	n/a	dk	1	2	3	4	5
22)	Clear water (high visibility). . . . .	n/a	dk	1	2	3	4	5
23)	Clean water for swimming and other water-based activities. . . . .	n/a	dk	1	2	3	4	5
24)	Amount of living coral on the reefs. . . . .	n/a	dk	1	2	3	4	5
25)	Many kinds of fish and sealife to view. . . . .	n/a	dk	1	2	3	4	5

11b. Now please read each of the items on the list below and rate how they **met** your expectations for each of the following in Puerto Rico. If an item does not apply, indicate by circling not applicable (n/a). Likewise, if you don't know, circle (dk).

ACCOMPLISHMENT  
(with each of these items  
in Puerto Rico)

		Not Applicable	DK	1	2	3	4	5
		Completely did not meet expectation	Slightly did not meet expectation	Met expectation	Slightly exceeded expectation	Completely exceeded expectation		
1)	Marina facilities . . . . .	n/a	dk	1	2	3	4	5
2)	Availability of public restrooms. . . . .	n/a	dk	1	2	3	4	5
3)	Public transportation. . . . .	n/a	dk	1	2	3	4	5
4)	Parking . . . . .	n/a	dk	1	2	3	4	5
5)	Cleanliness of streets and sidewalks . . . . .	n/a	dk	1	2	3	4	5
6)	Boat ramps/launching facilities. . . . .	n/a	dk	1	2	3	4	5
7)	Well maintained roads and bridges. . . . .	n/a	dk	1	2	3	4	5
8)	Value of lodging (cost vs amenities: clean rooms & linens, working ac, hot showers) . . . . .	n/a	dk	1	2	3	4	5
9)	Mooring buoys and navigational aids. . . . .	n/a	dk	1	2	3	4	5
10)	Good maps and signage for road navigation . . . . .	n/a	dk	1	2	3	4	5
11)	Resorts with focus on Ecotourism/green initiatives: low energy use, recycling . . . . .	n/a	dk	1	2	3	4	5
12)	Educational posters, signs, brochures. . . . .	n/a	dk	1	2	3	4	5
13)	Availability of lifeguards for beach safety . . . . .	n/a	dk	1	2	3	4	5
14)	Easy, abundant, and quality beach & shoreline access . . . . .	n/a	dk	1	2	3	4	5
15)	Enforcement of environmental laws & regulations . . . . .	n/a	dk	1	2	3	4	5
16)	Public safety (area has low crime rates) . . . . .	n/a	dk	1	2	3	4	5
17)	Customer service and friendliness of people . . . . .	n/a	dk	1	2	3	4	5
18)	Availability of tour guides . . . . .	n/a	dk	1	2	3	4	5
19)	Historic preservation (historic landmarks, houses, etc.) . . . . .	n/a	dk	1	2	3	4	5
20)	Artificial reefs (sunken ships, reef balls) . . . . .	n/a	dk	1	2	3	4	5
21)	Quality restaurants . . . . .	n/a	dk	1	2	3	4	5
22)	Clear water (high visibility). . . . .	n/a	dk	1	2	3	4	5
23)	Clean water for swimming and other water-based activities. . . . .	n/a	dk	1	2	3	4	5
24)	Amount of living coral on the reefs. . . . .	n/a	dk	1	2	3	4	5
25)	Many kinds of fish and sealife to view. . . . .	n/a	dk	1	2	3	4	5

In this section we have a few special issues questions we would like to ask you.

IIIa. Do you own a boat in Puerto Rico?

- Yes (Continue)
- No (Go to Question IIId)

IIIb. What is the length of your boat?

\_\_\_\_\_ (Feet)

IIIc. Do you trailer your boat or do you store it at a dock or marina?

- Trailer
- Store at a dock or marina

III d. Do you own or rent a vacation home on the coast with access to the water?

- Yes
- No

IIIe. How important were Puerto Rico's beaches to your decision to visit Puerto Rico?

Not  
 1 Important  
 2 Somewhat  
 3 Important  
 4 Very  
 5 Important  
 Extremely  
 Important

III f. Was this trip your first visit to Puerto Rico for recreation activities?

- Yes (Go to Question IVa)
- No (Continue)

III g. How many years have you been coming to Puerto Rico for recreation activities?

\_\_\_\_\_ (Years)

IVa. How likely is it that you will recommend Puerto Rico to a friend or family member for their next vacation?  
(Circle the appropriate answer)

Don't  
 dk Know  
 1 Will Not  
 2 Recommend  
 3 somewhat  
 4 Likely  
 5 Very  
 Recommend  
 end

IVb. How likely is it that you will return to Puerto Rico for a visit?  
(Circle the appropriate answer)

Don't  
 dk Know  
 1 Will  
 2 Return  
 3 somewhat  
 4 Likely  
 5 Very  
 Likely  
 Return

<If you circle "Don't Know" or "Will Not Return" above, go to Question V>

IVc. How soon might you return to Puerto Rico?

- Don't Know
- In less than 3 months
- 3 to 6 months
- 6 to 12 months
- Greater than one year

Va. On your first visit ever to Puerto Rico, was your visit on a cruise ship stopover?

- Yes       No (Skip to Section VI)

Vb. Did your stopover experience in Puerto Rico result in you choosing Puerto Rico as a destination for a non cruise ship visit?

- Yes       No

Vc. If this cruise ship visit was your first visit, did your experience lead you to think about planning a future non cruise ship visit to Puerto Rico?

- Yes       No

Vla. Islands like Puerto Rico face competing demands for development. When choosing a destination for your vacation and/or recreation activities what is your preference? (Check one answer only)

- Low development, small town atmosphere along the coast
- Dense development, large town with high-rise hotels and casinos, many restaurant and shopping opportunities
- Mix of low development and dense development places
- No preference

Vlb. Some people may be okay with staying in dense developed areas, but when doing certain recreation activities like visiting beaches, fishing, SCUBA diving, snorkeling, boating, surfing, wind surfing, paddle boarding, viewing wildlife, photography and hiking trails prefer to have views unobstructed by development (e.g. big hotels, offshore oil and gas platforms, wind turbines etc.).

How important to you is it to have areas with natural views protected? (Check one answer only)

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

VII. In this section, we want to ask you about several issues of importance to managing Puerto Rico's natural resources that support recreation activities, or protect the resources by preservation methods

For the following statements, please indicate if you 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, or dk = don't know. (Please circle one number for each statement)

		1	2	3	4	5
1) I support the creation of marine protected areas that allow activities as long as they don't harm the resource . . . . .						
2) I support the creation of marine reserves that prohibit all activities that take things like fishing and ornamental trade for aquariums. . . . .		1	2	3	4	5
3) I support the creation of research only areas that only allow scientific and educational activities . . . . .		1	2	3	4	5
3) I support increased protection of threatened and endangered species like turtles and elk and staghorn corals . . . . .		1	2	3	4	5
5) I support increased enforcement of environmental laws and regulations . . . . .		1	2	3	4	5
6) I support increased education and outreach for violators of environmental laws and regulations. . . . .		1	2	3	4	5
7) I support a balanced approach to using education and outreach and enforcement on violators of environmental laws and regulations . . . . .		1	2	3	4	5

*Strongly Disagree*  
*Disagree*  
*Neutral*  
*Agree*  
*Strongly Agree*

OMB Approval #:

Expiration Date:

That's All!! If you would like to be entered into a sweepstakes to win a free Vacation to Puerto Rico, fill out your name, address and phone number below. All prizes will be awarded TBD.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Prizes will be announced in December 2016. The Prizes to be awarded are:

GRAND PRIZE – in Vieques

- \* Lodging ( a room for two for 3 nights) – provided by Esperanza Inn
- \* Dive tour for 2 – provided by Isla Nena Scuba
- \* 1/2 Day fishing trip – provided by Vieques Sport Fishing (Capt. J. Ferguson)
- \* Coffee table book (*Beneath the Waves*) – provided by PR Sea Grant
- \* Reuseable Gore Tex shopping bag – provided by the Surfrider Foundation Rincon
- \* Children's Book (*Adventures of Pelican*) – provided by Jobos Bay National Estuarine Reserve
- \* Puerto Rico T-shirt – provided by Puerto Rico Tourism Company

FIRST PRIZE

- \* Dive trip for 2 certified divers from Fajardo reefs – provided by Sea Ventures Inc.
- 1/2 Day deep sea fishing trip (1/2 price) from Fajardo – provided by Light Tackle Paradise (Capt. Marcos Hanke)
- \* Coffee table book (*Beneath the Waves*) – provided by PR Sea Grant
- \* Reuseable Gore Tex shopping bag – provided by Surfrider Foundation Rincon
- \* Children's Book (*Adventures of Pelican*) – provided by Jobos Bay National Estuarine Reserve

SECOND PRIZE

- \* 1/2 Day fishing trip (in-shore) in Cabo Rojo – provided by Light Tackle Adventures (Capt. Pochy Rosario)
- \* Coffee table book (*Beneath the Waves*) – provided by PR Sea Grant
- \* Reuseable Gore Tex shopping bag – provided by the Surfrider Foundation Rincon
- \* Children's Book (*Adventures of Pelican*) – provided by Jobos Bay National Estuarine Reserve
- \* Puerto Rico T-shirt – provided by Puerto Rico Tourism Company

Consolation Prizes

- \* Reuseable Gore Tex shopping bag – provided by Surfrider Foundation Rincon
- \* Puerto Rico T-shirt – provided by Puerto Rico Tourism Company
- \* National Geographic Society logo shopping bag – provided by the National Geographic Society
- \* Book (On Assignment) – provided by National Geographic Society

This is a cooperative research project of the University of Puerto Rico-Mayaguez, Puerto Rico Sea Grant, the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration. Public reporting burden for this collection of information is estimated to average 10 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.

Your participation in this  
recreation expenditure survey is

***GREATLY APPRECIATED***

Dear Visitor,

During your recent trip to Puerto Rico you indicated that you would be willing to complete this questionnaire. It is self-explanatory and should about 20 minutes to complete. Please record your answers accurately and legibly. Your answers represent many other people not included in this survey effort so it is very important that you return your questionnaire.

Your answers are voluntary. Your name will never be released to anyone unless otherwise required by law. After the completion of the project all materials identifying you as an individual will be destroyed.

Before you mail back the questionnaire, please reverse-fold it so that our return address is on the outside. Please staple or tape to seal the questionnaire and mail it back to us. No postage is needed. Your cooperation in this effort is greatly appreciated.

Sincerely,

Ms. Glenis M. Padilla Plaza (Project Lead)  
University of Puerto Rico - Mayaguez Campus  
Telephone: (787) 508-2475  
[gpadillaplaza@gmail.com](mailto:gpadillaplaza@gmail.com)

Dr. Ruperto Chaparro (Project Co-lead)  
Puerto Rico Sea Grant Program  
Extension Leader  
University of Puerto Rico  
P.O. Box 5000  
Mayaguez, PR 00681  
Telephone: (787) 832-8045  
[Ruperto.chaparro@upr.edu](mailto:Ruperto.chaparro@upr.edu)

Please note: It is very important that the same person who participated in the on-site interview also complete this questionnaire.

**PART A: YOUR EXPENDITURES FOR THIS TRIP**

We would like to ask you about the expenses related to your recent trip to Puerto Rico. Please complete one of the questions below, indicating for how many people you paid expenses.

1) If you paid your own expenses or if you shared expenses with someone else, please check this box   
 On the following pages, report only those trip expenses you personally paid for.

2) If you were paying all the expenses for yourself and for one or more others, please check this box   
 and record in the box below the number of persons you paid expenses for, including yourself.  
 Report the total amount of expenses you paid for on the following pages.

Number of people you were paying expenses for, including yourself

Please report your expenditures for each of the items listed to the nearest whole dollar. In Column A, put the total amount of money you spent on that item, regardless of where you were when you spent it. In Column B, report only the amount you spent while you were in Puerto Rico.

EXAMPLE: Joe and Jane Smith purchased round-trip tickets to Puerto Rico online at \$400 each, or a total of \$800. Their total amount spent for the trip was \$800 (Column A). The amount spent in Puerto Rico was \$0 (Column B).

Item	Column A: Total amount spent for this trip	Column B: Of the amount in column A, how much did you spend in Puerto Rico?
TRANSPORTATION Airline Fare		
a) Package tour	_____	_____
b) Any other airline fare	800	0



Item	Column A: Total amount spent for this trip	Column B: Of the amount in Column A, how much did you spend in Puerto Rico?
<b>BOATING</b> Boat, jet ski, and wave runner rental Boat fuel and oil Boat repairs Boat launch fees Boat slip fees or marina fees (this trip only) Sailing charters or sunset cruises	 <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<b>FISHING</b> Cut bait Live bait Daily or special fishing permits  Fishing lines, fly lines, fish nets, and minnow traps Charter/party boat, guide service	 <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<b>SCUBA DIVING/SNORKELING</b> Rental fee for equipment Charter/party boat, guide service	 <hr/> <hr/>	 <hr/> <hr/>
<b>SIGHTSEEING</b> Sightseeing tours Glass bottom boat rides Excursions, kayak tours Park entrance fees Admission to tourist, amusement, festivals and other commercial attractions Food and drinks on sightseeing tours	 <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	 <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>



**PART B: ANNUAL VACATION EXPENDITURES AND EQUIPMENT PURCHASES**

This section asks about money people spent on recreational equipment, boat storage, time-share and condo fees and related purchases for items you own over the past 12 months. Do not include rentals, they were included in Part A. For each of the items listed, indicate in Column A the total amount of money you spent on that equipment in the past 12 months. In Column B, report the total amount of purchases you made just in the county where you live. In Column C, report the total amount of purchases you made in Puerto Rico.

First, please answer these questions regarding your boating recreation.

- During the past 12 months, how many times did you take a trip away from home for a boating-related activity (sailing, waterskiing, canoeing, fishing from a boat, motor boating, SCUBA diving, jet skiing, etc.)? \_\_\_\_\_
- Of these trips, how many were to some place outside Puerto Rico? \_\_\_\_\_

Example: Joe and Jane Smith purchased a boat for \$17,000 from a dealer at their home in New York last summer. They also purchased a jet ski for \$12,000 from a dealer in Puerto Rico. Here is how they would report these expenditures.

Item	Column A: Total Purchases in Past 12 Months	Column B: Purchases in Your Home County	Column C: Purchases in Puerto Rico
BOATING EQUIPMENT New motorized boats or jet skis	29,000	17,000	12,000

Item	Column A: Total Purchases in Past 12 Months	Column B: Purchases in Your Home County	Column C: Purchases in Puerto Rico
<b>MAJOR RECREATIONAL EQUIPMENT (not rentals)</b> Diving or snorkeling equipment _____ Fishing rods and reels _____ Cameras and other photo gear _____ Binoculars and other viewing equipment _____ Miscellaneous (boats, guns, surfboard, vehicles, any other major equipment), specify _____			
<b>BOATING EQUIPMENT AND FEES (not rentals)</b> New motorized boats or jet skis _____ New nonmotorized boats (sailboats, row boats, canoes, kayaks, etc.) _____ New boat engines _____  New boat accessories _____ New sails or rigging _____ New boat trailer _____ Boat storage and marina fees _____ Other boating expenses (not rentals) Describe: _____			
<b>ANNUAL LODGING-RELATED FEES (not rentals)</b> Condo and time-share fees _____ RV or trailer park fees _____			

Number: \_\_\_\_\_

That's All!! If you would like to be entered into a sweepstakes to win a free Vacation to Puerto Rico, fill out your name, address and phone number below. All prizes will be awarded in TBD.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Prizes will be announced in December 2016. The Prizes to be awarded are:

GRAND PRIZE – in Vieques

- \* Lodging ( a room for two for 3 nights) – provided by Esperanza Inn
- \* Dive tour for 2 – provided by Isla Nena Scuba
- \* 1/2 Day fishing trip – provided by Vieques Sport Fishing (Capt. J. Ferguson)
- \* Coffee table book (*Beneath the Waves*) – provided by PR Sea Grant
- \* Reuseable Gore Tex shopping bag – provided by the Surfrider Foundation Rincon
- \* Children's Book (*Adventures of Pelican*) – provided by Jobos Bay National Estuarine Reserve
- \* Puerto Rico T-shirt – provided by Puerto Rico Tourism Company

FIRST PRIZE

- \* Dive trip for 2 certified divers from Fajardo reefs – provided by Sea Ventures Inc.  
1/2 Day deep sea fishing trip (1/2 price) from Fajardo – provided by Light Tackle Paradise (Capt. Marcos Hanke)
- \* Coffee table book (*Beneath the Waves*) – provided by PR Sea Grant
- \* Reuseable Gore Tex shopping bag – provided by Surfrider Foundation Rincon
- \* Children's Book (*Adventures of Pelican*) – provided by Jobos Bay National Estuarine Reserve

SECOND PRIZE

- \* 1/2 Day fishing trip (in-shore) in Cabo Rojo – provided by Light Tackle Adventures (Capt. Pochy Rosario)
- \* Coffee table book (*Beneath the Waves*) – provided by PR Sea Grant
- \* Reuseable Gore Tex shopping bag – provided by the Surfrider Foundation Rincon
- \* Children's Book (*Adventures of Pelican*) – provided by Jobos Bay National Estuarine Reserve
- \* Puerto Rico T-shirt – provided by Puerto Rico Tourism Company

Consolation Prizes

- \* Reuseable Gore Tex shopping bag – provided by Surfrider Foundation Rincon
- \* Puerto Rico T-shirt – provided by Puerto Rico Tourism Company
- \* National Geographic Society logo shopping bag – provided by the National Geographic Society
- \* Book (On Assignment) – provided by National Geographic Society

This is a cooperative research project of the University of Puerto Rico-Mayaguez, Puerto Rico Sea Grant, the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration. Public reporting burden for this collection of information is estimated to average 10 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.

NO POSTAGE  
NECESSARY IF  
MAILED IN THE  
UNITED STATES

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**BUSINESS REPLY MAIL**  
FIRST CLASS MAIL PERMIT NO. X MAYAGUEZ, PR

Ms. Glenis Padilla Plaza  
Sea Grant College Program  
UPR-RUM Call Box 9000  
Mayaguez, PR 00681-9000

**Please begin this questionnaire on Page 1**

**If you have already mailed us a questionnaire, thank you for your cooperation. You do not need to send us a second questionnaire.**

**Please turn page for more questions.**

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED  
STATES



*Respondent's Name*

*Respondents' Street Address*

*Respondents's City, State/Territory/Country, Zip Code (US)*

## Post Card Reminder

You completed a survey at the airport in Puerto Rico on a recent trip.  
We handed you two mailback questionnaires.

If you have already mailed us the questionnaires, thank you for your cooperation. You do not need to send us a second questionnaire. You will be entered into the sweepstakes/lottery for each survey questionnaire you completed.

If you have not completed the questionnaires, please complete them and put them in the mail. Postage is already paid.

If you lost your copies, you will receive another copy in the mail in a couple of weeks.

Thanks You, Glenis Padilla Plaza, Project Leader, University of Puerto Rico –  
Mayaguez 787-508-2475



# Economic Valuation of Puerto Rico's Coral Reef- Associated Tourism and Recreation

## Sweepstakes Lottery Gifts for Visitors

### Grand Prize—in Vieques

- Lodging (a room for two for 3 nights) - provided by Esperanza Inn
- Dive tour for 2 - provided by Isla Nena Scuba
- ½ day fishing trip - provided by Vieques Sport Fishing (Capt. J. Ferguson)
- Coffee table book (*Beneath the Waves*) - provided by PR Sea Grant
- Reusable Gore Tex shopping bag - provided by Surfrider Foundation Rincón
- Children's Book (*Adventures of Pelican*) - provided by Jobos Bay National Estuarine Reserve
- Puerto Rico T-shirt - provided by Puerto Rico Tourism Company

### First Prize

- Dive trip for 2 certified divers from Fajardo reefs - provided by Sea Ventures Inc.
- 1/2 day deep sea fishing trip (1/2 price) - from Fajardo - provided by Light Tackle Paradise (Capt. Marcos Hanke)
- Coffee table book (*Beneath the Waves*) - provided by PR Sea Grant
- Reusable Gore Tex shopping bag - provided by Surfrider Foundation Rincón
- Children's Book (*Adventures of Pelican*) - provided by Jobos Bay National Estuarine Reserve



## Second Prize

- 1/2 day fishing trip (in-shore) in Cabo Rojo - provided by Light Tackle Adventures (Capt. Pochy Rosario)
- Coffee table book (*Beneath the Waves*) - provided by PR Sea Grant
- Reusable Gore Tex shopping bag - provided by Surfrider Foundation Rincón
- Children's Book (*Adventures of Pelican*) - provided by Jobos Bay National Estuarine Reserve
- Puerto Rico T-shirt - provided by Puerto Rico Tourism Company

## Consolation Prizes

- Reusable Gore Tex shopping bag - provided by Surfrider Foundation Rincón
- Puerto Rico T-shirt - provided by Puerto Rico Tourism Company
- National Geographic Society logo shopping bag - provided by National Geographic Society
- Book (*On Assignment*) - provided by National Geographic Society

**Sweepstakes Lottery is being conducted by Ridge to Reefs, Inc.**



**For Further information, contact:**

Glenis Padilla Plaza (Project Lead) University of Puerto Rico – Mayagüez Campus  
Telephone: (787) 508-2475  
gpadillaplaza@gmail.com



**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: \_\_\_\_\_

- |   |   |                                    |
|---|---|------------------------------------|
| <input type="radio"/> U.S.A                 | <input type="radio"/> Australia/Oceania | <input type="radio"/> Other Europe |
| <input type="radio"/> Canada                | <input type="radio"/> Japan             | <input type="radio"/> Middle East  |
| <input type="radio"/> Mexico                | <input type="radio"/> Other Far East    | <input type="radio"/> Africa       |
| <input type="radio"/> Central Am./South Am. | <input type="radio"/> United Kingdom    | <input type="radio"/> 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

Interviewer: Make sure if answer to Q.4. is greater than one, that answer to Q.6. is 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)

No Reef Use

Region 1

B1	B2	B3	B4	B5
Activity	Resp.	# Others	Respondent # of days	Respondent # of dives
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____

No Reef Use

Region 2

B1	B2	B3	B4	B5
Activity	Resp.	# Others	Respondent # of days	Respondent # of dives
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____

No Reef Use

Region 3

B1	B2	B3	B4	B5
Activity	Resp.	# Others	Respondent # of days	Respondent # of dives
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____
_____	<input type="radio"/>	_____	_____	_____

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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found it difficult to select an option of reef conditions I preferred.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was concerned that the Puerto Rico government cannot effectively Manage coral reefs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I should not have to pay more to protect or restore coral reefs in Puerto Rico.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understood the different alternatives presented in each choice question.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The illustrations of coral reef conditions helped me distinguish the low, medium and high conditions for all reef attributes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The pictures of different levels of crowding helped me distinguish low, medium and high crowding conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The government should use incentives to businesses and households to pay for environmental protections instead of	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.**

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**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  | C Business trip     | E Other (specify) |
| B Visit family or friends | D Business/pleasure |                   |

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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.

<sup>a</sup>  <sup>b</sup>  <sup>c</sup>  <sup>d</sup>  <sup>e</sup>  <sup>f</sup>  <sup>g</sup>  <sup>h</sup>  <sup>i</sup>  <sup>j</sup>  <sup>k</sup>  <sup>l</sup>  <sup>m</sup>  <sup>n</sup>  <sup>o</sup>  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: Air Enplanement Data

Air Enplanement Data: Total Airport Passengers Summer and Winter Seasons

Summer	Passengers	Winter	Passengers
May 2016	382,497	November 2016	339,011
June 2016	425,766	December 2016	415,432
July 2016	485,012	January 2016	409,254
August 2016	386,073	February 2016	389,824
September 2016	272,436	March 2016	411,263
October 2016	292,751	April 2016	409,423
<b>Total</b>	<b>2,244,535</b>	<b>Total</b>	<b>2,374,207</b>

Source: Aerostar and Puerto Rico Tourism Company