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EXPENDITURE AND WILLINGNESS-TO-PAY SURVEY OF CARIBBEAN BILLFISH ANGLERS: SUMMARY REPORT



EXPENDITURE AND WILLINGNESS-TO-PAY SURVEY OF CARIBBEAN BILLFISH ANGLERS: SUMMARY REPORT

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PREPARATION OF THIS DOCUMENT

This circular is part of a series of desk and field studies carried out under the Ocean Partnership Program (OPP) belonging to the Areas Beyond National Jurisdictions (ABNJ) program. The program is funded by the Global Environmental Facility (GEF) and the World Bank and executed by various agencies, including the Western Central Atlantic Fishery Commission (WECAFC) of the Food and Agriculture Organization of the United Nations (FAO) based at the FAO Subregional Office in Bridgetown, Barbados. The preparation of this circular was financed by the Caribbean Billfish Project (GCP/SLC/001/WBK) and supported by the International Game Fish Association (IGFA).

This study was commissioned to develop Caribbean region specific estimates of the willingness-to-pay for billfish conservation and the economic activity generated by billfish angling based on primary data. Additionally, the survey conducted for this study in 2017 explored the willingness-to-pay for various conservation financing methods and explored attitudes and opinions towards current management and potential interventions available to better conserve billfish stocks in the Caribbean.

The study team was composed of Mr Brad Gentner (Gentner Consulting Group, USA), and Mr John Whitehead (Appalachian State University, USA). The information presented in this circular was reviewed by the members of the Consortium on Billfish Management and Conservation (CBMC) in March 2018.

Mr Raymon van Anrooy, WECAFC Secretary, and Mr Roy Bealey, Caribbean Billfish project coordinator, supported the finalization and publication of this circular.

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ABSTRACT

This circular summarizes the methods and results of a survey designed to estimate angler expenditures and willingness-to-pay (WTP) for billfish recreational fishing in the Caribbean. The survey conducted in 2017 found that the value of billfish recreational fishing and expenditures by recreational fishers are very high in the region. The results demonstrate that there is the potential to raise conservation funds from this resource user group. This study estimated that one more billfish caught in the Caribbean, regardless of the disposition of that catch, was worth USD 761, with USD 1 494 for an additional trophy fish caught. The survey also examined WTP for conservation funds that could provide longer term financing of fisheries interventions aimed at securing the sustainability of overfished billfish stocks. A stamp for billfish fishing, or a license for billfish fishing, is a seemingly appealing way of converting some of the WTP for increased stocks into a fund that can be used to enhance billfish conservation. On average, anglers that had not taken a trip in the last 12 months were willing to pay USD 280 for a government administered stamp or an endorsement that would allow them to target billfish for a year. Avid anglers are willing to pay somewhat more for such an endorsement, at USD 439/year for a government administered fund. Total daily expenditures by non-resident private boaters participating in this survey were USD 2 767/day and USD 1 036/day for residents. On the charter angler side, total non-resident expenditures were USD 2 971/day and resident anglers expenditures were USD 820/day the survey revealed. Overall, angler expenditures for billfish angling in the Caribbean could be as high as USD 3.5 billion and the total that could be raised from a billfish stamp could be USD 79.1 million for a government administered fund.

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Roy Bealey, Caribbean Billfish Project Coordinator, Food and Agricultural Organization (FAO), for providing insight into billfish angler behavior and verifying Caribbean specific items in the survey.

Freddy Arocha, Fishery Biologist, Oceanographic Institute of Venezuela, for translating the survey instrument into Spanish and providing insight in Hispanic angler behavior.

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Club Nautico for distributing the survey link to their members in the Dominican Republic.

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Kary Gomez, Marina Manager, Marina Cap Cana in the Dominican Republic, for distributing the survey link to marina clients.

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INTRODUCTION

The Ocean Partnership for Sustainable Fisheries and Biodiversity Conservation Models for Innovation and Reform Project (OPP) aims to design and prepare business plans that attract investment into a series of fisheries improvement pilots that mainstream the sustainable management of shared highly migratory stocks (such as tuna, billfish and sharks) spanning areas within and beyond national jurisdiction. The idea is to reclaim values lost to overfishing, habitat destruction and pollution, through targeted investments and improving fisheries governance. These issues are symptoms of fisheries management institutional failures. The Caribbean Billfish Project, which is executed by the Secretariat of the Western Central Atlantic Fishery Commission (WECAFC), is financed by the OPP and is focusing on billfish resources and fisheries in particular. The goal of the project is to address the open access, commons nature of the billfish fishery and increase the value of the billfish stock in the Caribbean region to improve triple bottom line outcomes. At this project's initiation, a desk study was carried out to assess the regional value and economic activity associated with billfish recreational and commercial fishing in the region (Gentner 2016).

That desk study established the region wide value proposition for conserving billfish resources to: 1) demonstrate the benefits of improving billfish stocks; 2) establish the amount of potential compensation available to enhance the transition to new management regimes; and 3) develop tools to help the Consortium on Billfish Management and Conservation (CMBC) select nations with the best value proposition for use in the Project's ultimate business cases.

This study was commissioned to develop Caribbean region specific estimates of the willingness-to-pay for billfish conservation and the economic activity generated by billfish angling based on primary data. Additionally, the survey explored the willingness-to-pay for various conservation financing methods and explored attitudes and opinions towards current management and potential interventions available to better conserve billfish stocks in the Caribbean.

Billfish resources in the Caribbean are ecologically and economically important. In some Caribbean islands, the fisheries for billfish contribute to food security. It is important when trying to attract investment funds for conservation that an accurate picture can be painted of the benefits and costs of conservation. Additionally, it is important to identify both the winners and the losers of changes in regulations and management focus to identify the best potential funding mechanisms and compensation pathways. This study focuses on the economic activity generated by billfish recreational trips and the willingness of anglers to pay for enhanced conservation. The results of this study will be used to build cash flow models of the commercial and recreational fishing industries in the Caribbean Billfish Project pilot countries of Grenada and the Dominican Republic. These models will be used to develop business cases for billfish conservation beyond the Project's current timeline.

This circular details the basics of the survey design, survey implementation, estimation methodology and estimates of economic activity and willingness-to-pay for enhanced billfish catch rates and different funding instruments.

SURVEY METHODS

Generally, there is a lack of recreational fisheries data throughout the Caribbean. No nation in the region, besides the United States, has a universe of anglers targeting pelagic species, nor does any nation besides the USA collect data on saltwater recreational fishing participation, effort or catch. As a result, there is no frame of saltwater recreational anglers available to use for statistical sampling purposes, nor is there a universe of participants at either the region or in any individual country available to establish total participation and therefore total recreational fishing effort in the region or at national level.

One way to address the lack of a universe of recreational anglers is to conduct a telephone or mail screening survey that reaches out to local residents to develop a sample frame and to establish a participation rate to develop resident participation estimates by country. For tourist anglers, in-person exit interviews at airports can be used to screen visitors, establish a participation rate and recruit participants for a more detailed follow-up survey. However, due to time and budget constraints none of these options were available.

Instead, this survey used a sample of convenience to contact recreational billfish anglers through an online survey using Survey Monkey. The International Game Fish Association (IGFA), a collaborator on this study, volunteered the use of their email list and made various posts on their social media pages. Marlin Magazine offered to feature the survey in their November 2017 conservation column and posted the survey on their web site and social media sites. Additionally, the owner of a large Caribbean tournament series volunteered the use of their tournament registration lists from last year. Recreational angler associations in both Caribbean Billfish Project pilot countries, Grenada and the Dominican Republic, also provided their membership lists. Finally, two popular marinas in the Dominican Republic agreed to send the survey link around to boat owners that had rented boat slips.

The survey was designed by the authors, who have many years of experience developing expenditure surveys and stated preference valuation surveys. Unfortunately, there was no time or budget for neither focus group testing nor a formal pre-test of the survey. Informal pre-tests were conducted by the authors and colleagues in the field were enlisted to test the online survey. The larger collaborator team, which included IGFA, FAO-WECAFC and Conservation International, also gave input and feedback on the survey. Through this process, it was realized that all of the sample sources may include charter boat captains and/or owners in addition to private anglers, so a charter boat cost and earnings module was developed. The survey, including the charter cost and earnings questions, contained 108 questions presented over 82 internet pages, with most anglers facing far fewer questions than that, on average, due to skip patterns. The average time to complete the survey was 13 minutes and 24 seconds.

All email lists were sent a link to the survey instrument and the source of the sample was tracked. All email lists were reminded to participate three times over about a 30 day period. Incentives were offered to encourage participation. The incentive was an entry to win one of 10 Yeti Ramblers (metal tumblers) engraved with the IGFA logo. The survey went live on October 4th 2017 and the drawing was held December 1st. All winners were notified immediately and their prizes shipped within the week. The survey instrument was made available in English and Spanish languages. The Spanish translation was done by a native Spanish speaker, Dr. Freddy Arocha, who is a billfish stock expert in the Caribbean and very familiar with the idiomatic nature of Spanish relating to recreational fishing. Overall, 1 101 anglers visited the survey link, with 56 percent completing the survey once they initiated the survey. Table 1 contains the survey respondent statistics by sample source.

Table 1. Survey initiation by sample source.

Sample source	Language	COUNT	PERCENT (of total initiations)
IGFA	English	859	73.04%
IGFA	Spanish	11	0.94%
Email list	English	249	21.17%
Email list	Spanish	34	2.89%
Marlin Magazine	English	23	1.96%

The IGFA mailing went out to 61 000 emails. The email indicated the survey was for anglers that participated in Caribbean billfish fisheries. There was no good way to screen this worldwide list in advance, so the invitation was sent to everyone. The IGFA list generated the most visits to the survey at 859, which was 73 percent of all survey initiations. Their completion rate was also the highest at 68 percent. Eleven IGFA members chose to take the Spanish version of the survey. The email lists, which contained regional tournament participants and fishing club members, contained 1 442 email addresses. 1 235 of those emails came from billfish tournament registration lists and 191 people responded to either the initial invitation or one of three follow-up emails. This sub-group had a 50.8 percent survey completion rate. The second group of emails came from the Grenada Game Fishing Association who supplied 207 email addresses. Unfortunately, considering that Grenada is a pilot nation for the project, only 21 anglers responded to this invitation.

This same web link was sent to a Dominican Republic sportfishing organization, Club Nautico, and the marina managers at Casa de Campo and Punta Cana. As displayed in Table 1, 34 of those respondents in the Dominican Republic chose to respond to the Spanish version of the survey. Finally, while Marlin Magazine went above and beyond to help this survey effort, very little response came from the mention in the magazine, from subsequent posting of the column online or through cross posting on social media pages.¹ This result was surprising to the research team, who collectively expected this avenue to yield a greater response. While it is understood that few respondents will take the time to type in the URL to a survey found on a post card or a magazine page, it was hoped that the web version of the article or the social media posts would have driven more traffic to the online survey.

For the purposes of the stated preference (SP) analysis below, the sample was split into respondents that had taken a Caribbean billfishing trip in the last 12 months and those that had not. In total, 467 respondents responded to the SP questions in the survey, with 239 of those respondents having taken a trip where they targeted billfish in the Caribbean in the previous 12 months.

The demographics of these two samples are presented in Table 2. Somewhat surprisingly, demographics of these two samples are very similar, although no tests for statistical difference were conducted. The average years of fishing experience is 35 for both samples. The average age of the respondents is in the mid-50s. Eighty-seven percent of those who did not target billfish in the Caribbean in the last 12 months are white/Caucasian, while 72 percent of the respondents who had taken a Caribbean billfishing trip in the previous 12 months are white/Caucasian. The average household size is three and males represented 86-88 percent in both samples. The average years schooling is between 15 and 16 for both samples. The average household income (in US) is USD 161 000 for those who did not target billfish in the Caribbean in the last 12 months and USD 241 000 for those who did target billfish in this period.

¹ <https://www.marlinmag.com/caribbean-billfish-project-conservation-plan>

Table 2. Sample summary.

Variable	0 days for billfish in past 12 months					1+ days for billfish in past 12 months				
	n	Avg	SD	Min	Max	n	Avg	StdDev	Min	Max
Experience	222	34.55	17.08	1	71	230	34.80	16.00	2	70
Age	217	55.19	13.46	20	80	227	53.29	13.76	18	83
White	228	0.87	0.34	0	1	239	0.72	0.45	0	1
House	218	2.61	1.27	1	8	229	2.74	1.30	1	7
Male	228	0.86	0.34	0	1	239	0.88	0.33	0	1
School	219	15.38	2.17	10	18	227	15.63	2.18	10	18
Income (USD 1000)	180	161.25	135.89	0.05	800	198	241.19	372.25	0.05	3,000

Table 3 contains the results of the ethnicity question expanded to include all ethnicity categories included in the survey. These results are not necessarily indicative of overall participation in recreational fishing in the region because most of the sample came from United States (US) residents. Again, it is a predominantly white/Caucasian sample. In both samples, the second most represented ethnicity represented was Hispanic at 5 and 12 percent for the anglers with no fishing of billfish in the last 12-months and those that did fish for billfish in the last 12-months, respectively.

Table 3. Ethnicity expanded.

Race	0 days for billfish in past 12 months		1+ days for billfish in past 12 months	
	Frequency	Percent	Frequency	Percent
Multiple	3	1.36%	12	5.53%
American Indian or Alaskan Native	1	0.45%	1	0.46%
Asian/Pacific Islander	6	2.73%	3	1.38%
Black or African American	1	0.45%	3	1.38%
Hispanic	11	5.00%	26	11.98%
White/Caucasian	198	87.00%	172	72.00%

For those who targeted billfish during the 12 months prior to the survey, we asked questions about their billfishing avidity (Table 4). Respondents took an average of nine billfishing trips and fished an average of 16 days across all of these trips, fishing, on average, two days during every trip. Thirteen of these days were typically spent on a private boat, while three days were typically on a charter boat.

Table 4. Billfishing avidity.

Variable	1+ days for billfish in past 12 months				
	n	Avg	StdDev	Min	Max
Trips	239	8.67	14.27	1	100
Days	239	16.44	19.66	1	100
Private	239	13.18	17.70	0	99
Charter	239	2.62	7.02	0	60

TRIP EXPENDITURES ESTIMATES

Expenditure estimates were calculated as simple average as detailed in Gentner and Steinback (2008). If a respondent completed any expenditure category in the expenditure table, then all missing responses were re-coded as zeros. The survey collected information on fishing mode, either in the private boat mode or the charter boat mode, of their last Caribbean fishing trip and the country of their last trip. The country of their last trip was compared to their country of residence to define whether the respondent was a resident of the country where they took their last trip. Resident status and fishing mode were used to post stratify the expenditure average. Initial averages were calculated on those strata and outliers were eliminated by strata and expenditure category. Outliers were removed by calculating the percent standard error (PSE) for each average. Any average with higher than a 20 percent PSE had the upper 5 percent of its distribution truncated at the 95 percent value as a high PSE is often an indicator of an outlier (Gentner and Steinback 2008). Fishing days were collected in the survey and total trip expenditures were calculated and then divided by total fishing days to derive an estimate of expenditure per fishing day.

Appendix 1 contains the full aggregate expenditure means tables with outliers removed. Figures 1 and 2 are based on those tables. With outliers removed, the total spending by private boat anglers was USD 1 583 for residents and USD 7 055 for non-residents. Recreational anglers fishing in the charter mode spent USD 1 863 and USD 6 807 for residents and non-residents, respectively. It is interesting to note that residents and non-residents, whether they are fishing on private boats or charter boats, spend nearly the same amount per fishing trip in total and per fishing day. As is typical for angler surveys, the single biggest expenditure items for non-residents in either mode are charter fees, airfare and lodging (Figure 1 and 2). For resident anglers, the single biggest expenditure items are fuel for private boat anglers and charter fees for the charter angler (Figure 1 and 2).

Figure 1. Allocation of private boat angler expenditures by resident status.

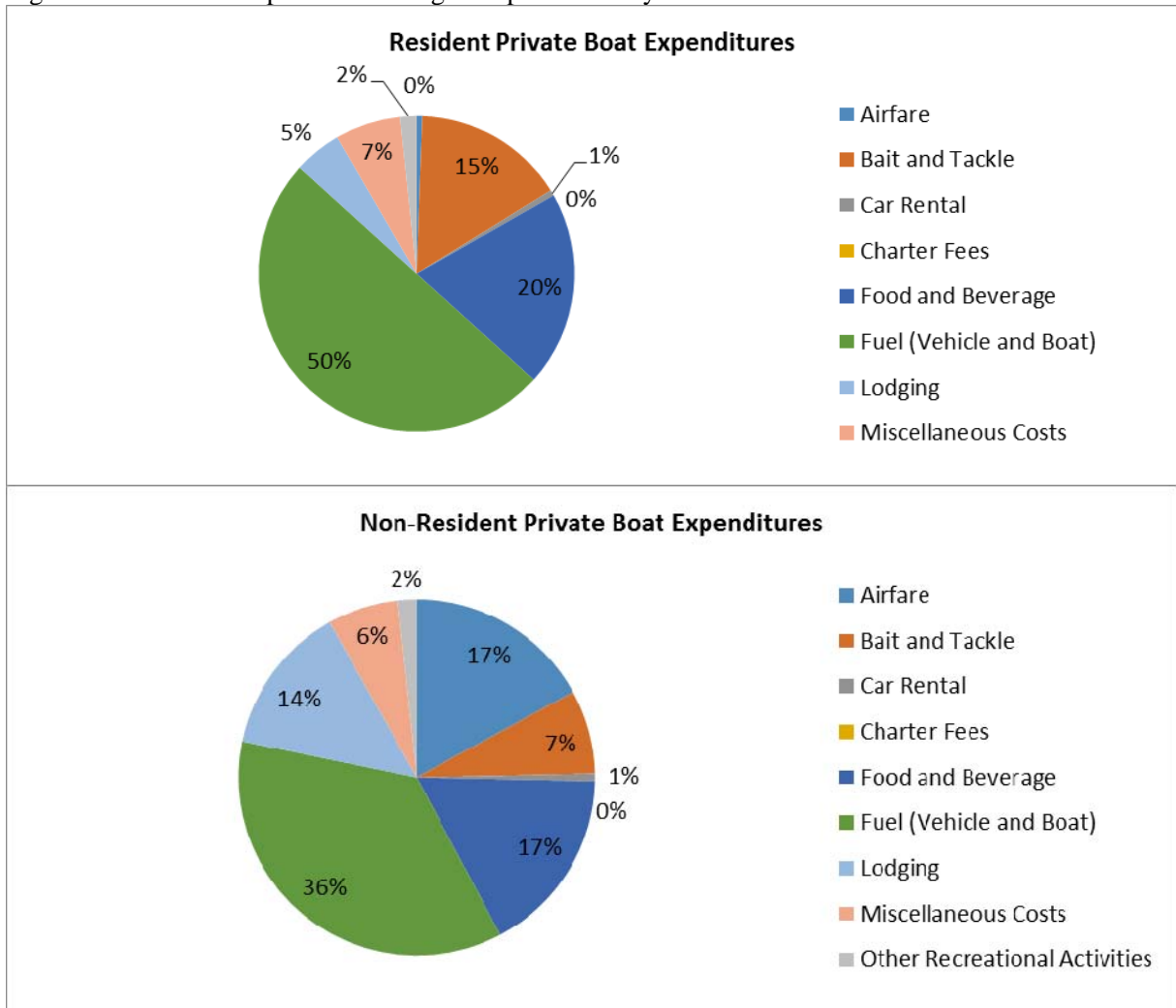
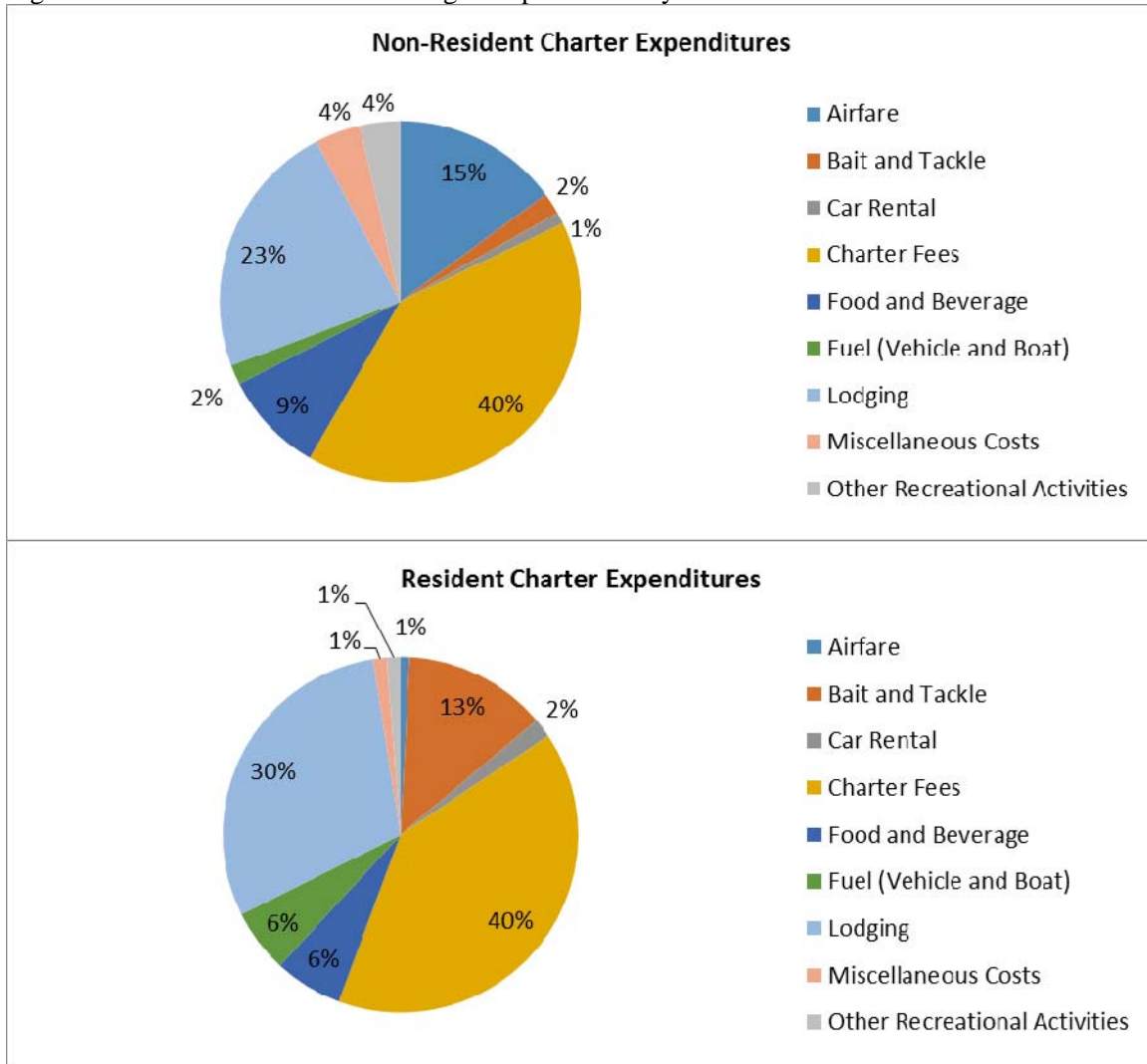


Figure 2. Allocation of charter boat angler expenditures by resident status.



All attempts were made to stratify the angler expenditure estimates by Caribbean country. Most Caribbean countries did not contain enough response to report estimates. Appendix 2 contains the expenditure estimates that could be stratified for this study. Figure 5 details the allocations of total expenditures for the Dominican Republic (DR), one of the Caribbean Billfish Project pilot countries, by resident status. Even though GCG obtained a Grenada specific email list with over 200 email addresses of recreational anglers, only four responses were filled with missing values from this second pilot country. Therefore Grenada figures are not individually reported as a result of insufficient data. If a country had more than three complete responses in any strata, their expenditure estimates are presented in Appendix 2. Nine additional countries and overseas territories were stratified in the estimates presented in Appendix 2. These countries and overseas territories are: Aruba, The Bahamas, Belize, British Virgin Islands, Costa Rica, Guatemala, Mexico, Puerto Rico, and Trinidad and Tobago. If a Caribbean country or overseas territory is not presented in Appendix 1, no strata had three or more complete responses for that country or overseas territory. The regional average presented above are however generally representative of expenditures across the range of countries for which survey responses were obtained. This is particularly

true for countries with higher sample sizes like the Bahamas and the Dominican Republic, which had the highest and second highest country sample sizes respectively. For instance, Bahamas non-resident charter boat anglers spent USD 7 217 per trip (Appendix 2), Dominican Republic non-resident charter boat anglers spent USD 7 426/trip (Table 9) and the aggregate spending for the entire region for the non-resident charter boat anglers was USD 6 807/trip (Table 8).

Referring to the Dominican Republic expenditures estimates in Appendix 2, nineteen non-resident charter mode anglers, 24 non-resident private boat anglers, one resident charter angler and 10 resident private boat anglers responded to the survey. Non-resident charter anglers spent the most on charter fees (USD 3 251) and non-resident private boat anglers spent the most on fuel (USD 3 683). Resident private boat anglers spent the most on fuel (USD 1 325) and resident charter anglers spent the most on lodging (USD 1 367). However, resident charter angler estimates should be considered with caution as they are based on a single observation that did not indicate any charter fee expenditures. Overall, charter boat angler expenditures in the Dominican Republic are very similar to those presented in Tables 5 and 6 with the charter boat angler expenditures in the Dominican Republic being slightly higher. For anglers on private boats, the resident expenditures are nearly identical but the non-resident expenditures are nearly USD 4 000 less.

When examining expenditures for economic development opportunities, it is important to note what expenditures will stay local and what expenditures will leave the country and not contributed to the economic well-being of that country. Airfare is a perfect example of an expenditure that never even makes it to the local country, unless that airfare is for a locally based airline who's profits are kept in a local bank. Similarly for lodging; staying in a global chain leaves very little of that expenditure locally. Staying in an AirBnB, a rental house or a private lodge keeps most of that money local. Most, if not all, of the countries in the Caribbean import all of their fuel, so those expenditures leave the country with only a small mark-up remaining in country. Charter fees are a perfect example of a "good" expenditure from an economic development perspective. While some of those funds go towards gear, fuel and food, which are likely imported across most of the Caribbean, the bulk of those expenditures go to local captains and mates as labor payments and have a large and direct impact on the local economy. As with any other economic development in locations that rely heavily on imports, coupling import substitution activities into tourism development can help keep more money locally. For instance, developing local agriculture in concert with lodges keeps more of the food expenditures in the local economy.

CHARTER COSTS AND EARNINGS

While the focus of this survey was on anglers and not charter boat businesses, the research realized early in the survey development that all of the sample sources would reach charter boat captains and charter boat owners. Instead of screening those individuals out of the survey, the research team developed a charter module. Early in the survey participants were asked if they owned a boat, and, if yes, the survey asked if they ever chartered that boat. If their answer to that question was yes, they were administered the charter module. Once that module was complete, their survey was complete.

Tables 5 and 6 display the basic sample characteristics of the charter captains in this sample. From Table 6 it is clear that country level stratification will be impossible except for Barbados, the Dominican Republic and Puerto Rico for both sample size reasons and confidentiality reasons. Take for instance, Grenada, where there are really only two full time charter captains and perhaps another two part time charter captains. It would not be ethical to present confidential business information that could be easily deduced presenting estimates from those two vessels.

Table 5. Charter characteristics (average).

Detail	N	Average	Standard Error	95% Lower Bound	95% Upper Bound
Boat Length	52	37.70	1.86	33.97	41.43
Fuel Capacity	48	551.21	74.86	400.61	701.80
Total HP	49	984.14	125.01	732.79	1,235.50
Boat Value (USD)	46	556,775	165,498	223,445	890,105

Overall, charters in the Caribbean use “Sportfisher” type boats that average 37.7 feet long with full cabins (60 percent) and have an average 551 gallons of fuel capacity, followed by center console boats at 35 percent. The majority of those boats are diesel-operated with 984 total horsepower on average. Average current, fair market value of the vessels used for chartering is just over a USD 500 thousand. Only 43 percent of respondents keep their boat year round in the Caribbean. During Fishery Performance Indicator studies in the Dominican Republic in 2017 it was found that many of the charters are owned by boat owners that may or may not have a permanent residence in the Caribbean, but move their boats to follow the fish around the Caribbean (Gentner et al 2018).

For most charter boat captains only a portion of their trips are charter trips. Forty-six percent of the charter boat captains report taking 25 percent or less of their trips for-hire and, on the other side of that coin, only 6 percent report taking all of their trips as for-hire trips. This is borne out by the question about the type of for-hire business they are, with 22 percent responding that they are full time charters, and 31 percent self-identifying as part-time charters. Sixteen percent of the respondents identified as cost recovery charters and 31 percent indicated “other” as their type operation. The remaining respondents seemed to have misunderstood the question, indicating they were a “fun” charter or some variation of a cost recovery charter.

Thirty-nine percent of the charter boat captains responded that they sell fish and, of those, the majority do not sell fish every trip. Sixty-one percent of the captains responded that they do not sell fish on 75–99 percent of their trips. The fish sales question was asked of all survey respondents and it was found also that 8 percent of the private anglers sold their fish.

Table 6. Charter characteristics (frequencies)

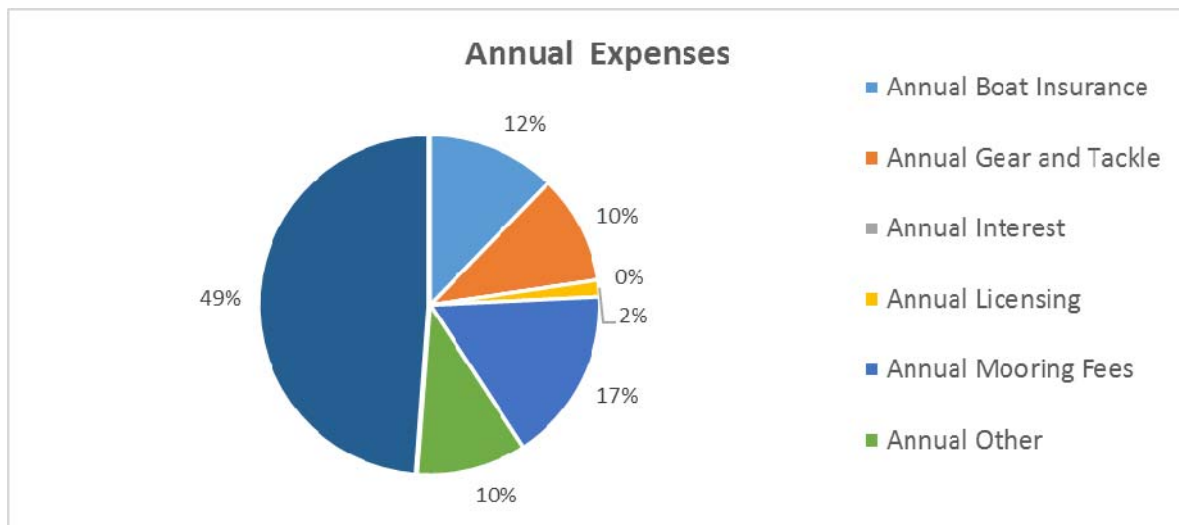
Detail	Response	Frequency Count	Percent Frequency
Charter Country	Bahamas	1	4.76%
	Barbados	4	19.05%
	Dominican Republic	4	19.05%
	Grenada	2	9.52%
	Mexico (Caribbean coast)	2	9.52%
	Puerto Rico	4	19.05%
	Trinidad and Tobago	3	14.29%
	Venezuela (Bolivarian Republic of)	1	4.76%
Boat Type	Center console	18	34.62%
	Cuddy cabin	3	5.77%
	Sportfisher	31	59.62%
Fuel Type	Diesel	30	60.00%
	Gasoline	20	40.00%
Keep a Boat in the Caribbean?	No	29	56.86%
	Yes	22	43.14%
Percent For-Hire Trips	0% (none)	8	16.00%
	100% (all of them)	3	6.00%
	Between 1% and 25%	23	46.00%
	Between 25% and 50%	11	22.00%
	Between 75% and 99%	5	10.00%
Type of Charter	Cost recovery	5	15.63%
	Full-time charter	7	21.88%
	Other (please specify)	10	31.25%
	Part-time charter	10	31.25%
Do You Ever Sell Fish	No	20	60.61%
	Yes	13	39.39%
Percent Trips with No Fish Sales	0% (none)	1	3.57%
	Between 1% and 25%	7	25.00%
	Between 25% and 50%	3	10.71%
	Between 75% and 99%	17	60.71%

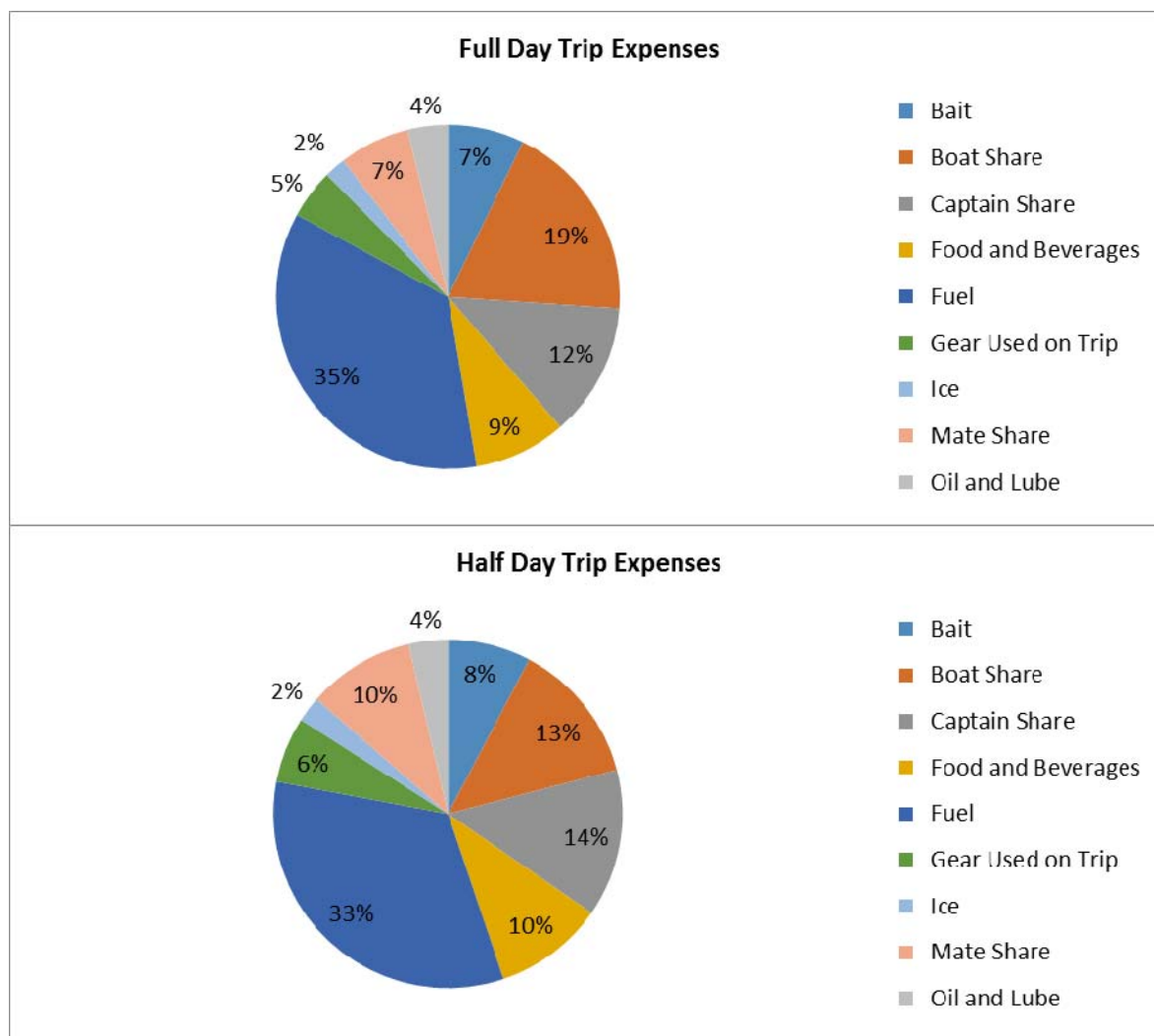
Appendix 3 contains the results for the charter cost and earnings questions, aggregated across responses received from charter captains. Averages were calculated as above with the outliers removed using the same previously described outlier rule. Total revenue appears to be quite low at USD 21 796 per year. Fortunately, the survey asked half and full day prices and the total number of half and full day trips. While not estimated here, total revenue calculated from their reported prices and days fished will be used in future profitability analysis for developing the pilot project business. On average, these businesses seem to lose money as total annual costs are higher than revenues. That is to be expected if the majority of these boats are part-time charters or cost recovery charters.

Figure 3 contains the cost allocations for the charter boat operators. The highest annual cost was annual repair and maintenance at USD 12 459 (49 percent). The second highest was annual boat insurance at USD 3 123 per year (12 percent). While only 39 percent responded they sold fish, average annual fish sales were USD 2 623. In total, their average half day trip costs are USD 492/trip and full day trip costs are USD 761/trip. With half day prices averaging USD 578 and half day tips averaging USD 81, margins are therefore very tight for the half day trips. On the other hand, with full day prices averaging USD 1 344/trip and tips averaging USD 181, margins are much better on full day trips. On average, each vessel captain that responded to the survey is taking 22 half day trips and 19 full day trips, which is indicative of a part-time charter. It is however not unusual, for a charter captain in a warm weather location, to average over 200 trips a year.

The allocations between full day costs and half day costs are very similar in percentage terms. Fuel is their largest expense at 35 percent and 33 percent for full and half days respectively. Interestingly, the mate share is higher on half day trips, 10 percent versus 7 percent, and the boat share is significantly less on the half day trips, 19 percent versus 13 percent. Oddly, ice and food and beverage costs are virtually the same across both trip types. As with angler expenditures, the expenditures that stay local contribute the most to livelihoods locally. For instance, the fuel expenditures are mostly leaving the country but the returns to labor and the vessel generally stay local if the boat is registered locally. For foreign vessels operating charters, those returns to labor and capital may or may not be staying in the local economy.

Figure 3. Charter boat cost allocations.





ATTITUDES AND OPINIONS

Much of the end of the survey was dedicated to exploring management issues in the Caribbean. For one of the Caribbean Billfish Project pilot countries, the Dominican Republic, fish aggregating devices (FADs) are a source of conflict between commercial and recreational sectors and are a growing concern Caribbean wide (Table 7). In our sample, 71 percent of all respondents have never encountered a FAD while fishing. If the answer to that question was “no” the remaining attitudes and opinions questions were skipped. Of anglers that do encounter FADs, 93 percent fish them and 72 percent keep GPS locations for those FADs. Only 34 percent of the respondents stated they know the owner of the FADs they fish. Despite rising conflicts related to fishing rights around FADs between sectors in some locations, 65 percent of the respondents do favor the deployment of additional FADs.

The sample was nearly equally split on the question of paying for exclusive rights to fish FADs, with 41 percent opposing paying commercial fishermen to fish FADs, 34 percent in support of paying to use FADs and 24.5 percent undecided on the issue. Sixty-eight percent of the recreational fishers in this survey feel that FADs are a good thing for recreational fishing and 47 percent feel FADs are good for pelagic fish stocks. Interestingly, 33 percent of respondents were undecided regarding the impact of FADs on pelagic fish stocks, suggesting there is significant uncertainty regarding the impact of FADs on stocks.

This may indicate a need for more outreach and education regarding the impact of FADs on pelagic fish stocks, pelagic fish abundance and pelagic fish migration patterns.

Table 7. Use and opinions about FADs.

Question	Response	Frequency	Percent
Do you ever encounter Fish Aggregating Devices (FADs) during your fishing in the Caribbean?	No	571	71.11
	Yes	232	28.89
Do you fish around them?	Yes	213	93.42
	No	9	3.95
	I Do Not Know	6	2.63
Do you keep GPS positions for FADs?	Yes	165	72.37
	No	45	19.74
	I Do Not Know	18	7.89
Do you generally know who owns or deployed each FAD?	Yes	78	34.06
	No	127	55.46
	I Do Not Know	24	10.48
Should further FAD deployments be encouraged in the Caribbean?	Yes	148	64.63
	No	32	13.97
	I Do Not Know	49	21.40
If you could pay someone for exclusive rights to fish a FAD for a day would you?	Yes	80	34.93
	No	93	40.61
	I Do Not Know	56	24.45
Do you think FADs are a good thing or a bad thing for recreational fishing?	Good	156	68.42
	Bad	31	13.60
	Neither Good nor Bad	41	17.98
	Bad	41	17.98
Do you consider FADs to be good or bad for pelagic fish stocks overall?	Good	106	46.49
	Bad	47	20.61
	Neither Good nor Bad	75	32.89
	Bad	75	32.89

Table 8 contains a series of statements about governance as it relates to recreational fisheries in the Caribbean, with an emphasis on billfish conservation and management. Anglers seem undecided regarding their trust of local governments to spend license fees to benefit recreational anglers. The majority disagree with that statement but followed very closely, with the neutral response and not far behind with agreement with that statement. They are more strongly in disagreement about local governments listening to their management concerns, with the majority of respondents (52 percent) either disagreeing or strongly disagreeing that governments listen to their concerns. Not surprisingly, as many respondents were from the US where there is a successful recreational fisheries licensing regime, the vast majority believe that a fishing license is a great funding tool, with 84 percent either strongly agreeing or agreeing with the institution of a fishing license. However, this is only the case if those funds can be successfully earmarked for conservation. Similarly, but not as strongly, 65 percent of respondents strongly agree or agree that fishing licenses can improve data collection for management purposes. In line with these opinions, anglers believe that they need to help pay for fishery management, with 66 percent strongly agreeing or agreeing with that statement. Anglers also agree that it is important to collect data on overall participation, with nearly 80percent strongly agreeing or agreeing with that statement. Generally, this battery of questions supports the notion that most saltwater anglers support paying for management and collecting data on recreational fishing. Figure 4 demonstrates however that most anglers (61 percent)

feel that governments are doing too little to manage billfish fisheries and another 30 percent don't know if enough is being done.

Table 8. Governance attitudes and opinions.

Statement	Response	Frequency	Percent
I trust local governments to spend license fees to benefit recreational fisheries.	Strongly Agree	71	9.44
	Agree	159	21.14
	Neither Agree nor Disagree	207	27.53
	Disagree	213	28.32
	Strongly Disagree	102	13.56
The government listens to the concerns of recreational fishermen.	Strongly Agree	24	3.18
	Agree	128	16.98
	Neither Agree nor Disagree	211	27.98
	Disagree	261	34.62
	Strongly Disagree	130	17.24
A saltwater fishing license is a good idea if the funds were used for conservation.	Strongly Agree	337	44.69
	Agree	296	39.26
	Neither Agree nor Disagree	70	9.28
	Disagree	30	3.98
	Strongly Disagree	21	2.79
A saltwater fishing license would provide better information for fisheries managers.	Strongly Agree	199	26.36
	Agree	294	38.94
	Neither Agree nor Disagree	161	21.32
	Disagree	67	8.87
	Strongly Disagree	34	4.50
Recreational fishermen need to pay to help manage the fishery.	Strongly Agree	170	22.52
	Agree	331	43.84
	Neither Agree nor Disagree	140	18.54
	Disagree	76	10.07
	Strongly Disagree	38	5.03
It is important to keep track of how many people fish in salt water.	Strongly Agree	234	31.03
	Agree	367	48.67
	Neither Agree nor Disagree	113	14.99
	Disagree	23	3.05
	Strongly Disagree	17	2.25

Figure 4. Government action.

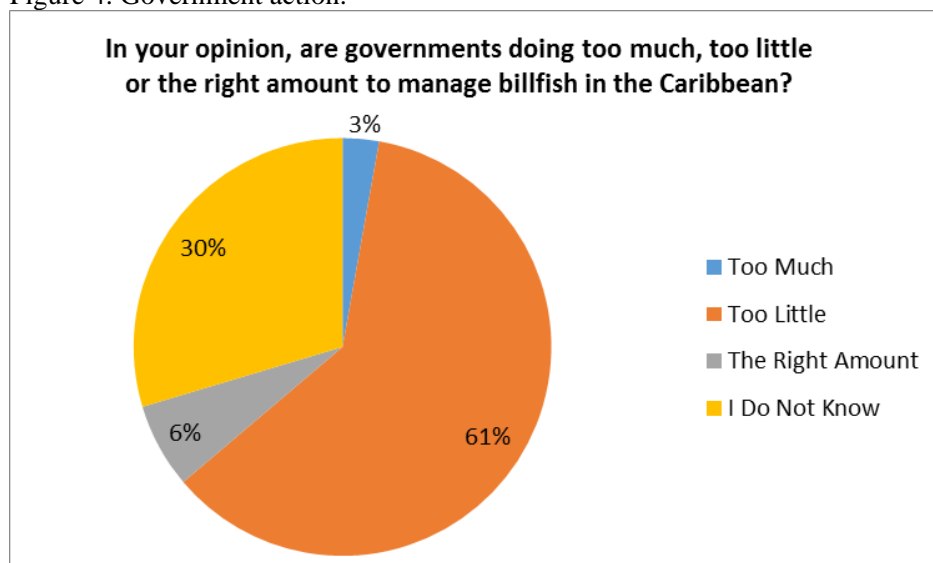


Table 9 covers attitudes and opinions about various potential management strategies. Overall, anglers support circle hook requirements for pitch, live or dead baits, with 80 percent strongly agreeing or agreeing with that strategy. Similarly, 80 percent of the respondents also strongly agree or agree with the mandatory use of circle hooks for commercial fishermen, something that has been very successful in reducing billfish mortality in US waters. In addition, 84 percent of the respondents strongly agree or agree with time/area closures for commercial fishermen. Only 48 percent of the respondents agree or strongly agree with limiting the total number of FADs, with 40 percent neutral on the topic, suggesting that support could be generated with the right communications. Overall, 84 percent of respondents strongly agree or agree with limiting commercial fleet sizes. Only 46 percent believe commercial fishermen should be compensated for releasing billfish but, again, 32 percent of the anglers were neutral to this concept suggesting that with the right communication this strategy could be acceptable. Finally, 82 percent of the respondents believe the commercial sale and exportation of billfish should be banned. This policy had the largest percentage responding with strong agreement at 59 percent of the sample.

Table 9. Attitudes and opinions regarding potential billfish management policies.

Statement	Response	Frequency	Percent
Circle hooks should be required for recreational fishing when using pitch, dead or live baits.	Strongly Agree	353	47.96
	Agree	236	32.07
	Neither Agree nor		
	Disagree	104	14.13
	Disagree	31	4.21
	Strongly Disagree	12	1.63
Circle hooks and mandatory release should be required for commercial vessels.	Strongly Agree	400	54.20
	Agree	194	26.29
	Neither Agree nor		
	Disagree	107	14.50
	Disagree	31	4.20
	Strongly Disagree	6	0.81
Commercial fishermen should be limited to when and where they can fish.	Strongly Agree	372	50.41
	Agree	245	33.20
	Neither Agree nor		
	Disagree	81	10.98
	Disagree	29	3.93
	Strongly Disagree	11	1.49
The total number of FADs must be limited.	Strongly Agree	139	18.91
	Agree	210	28.57
	Neither Agree nor		
	Disagree	293	39.86
	Disagree	71	9.66
	Strongly Disagree	22	2.99
Commercial fleet sizes should be limited.	Strongly Agree	385	52.24
	Agree	237	32.16
	Neither Agree nor		
	Disagree	95	12.89
	Disagree	16	2.17
	Strongly Disagree	4	0.54
Local fishermen should be compensated for verifiably releasing billfish.	Strongly Agree	100	13.51
	Agree	241	32.57
	Neither Agree nor		
	Disagree	234	31.62
	Disagree	128	17.30
	Strongly Disagree	37	5.00
The commercial landing, sale or exportation of billfish should be banned.	Strongly Agree	431	58.48
	Agree	173	23.47
	Neither Agree nor		
	Disagree	86	11.67
	Disagree	42	5.70
	Strongly Disagree	5	0.68

Table 10 contains the results of statements presented to anglers regarding billfish management in general. Results show that 79 percent of the respondents to the survey strongly agree or agree that monitoring and enforcement should be increased. In addition, 84 percent either strongly agree or agree that circle hooks reduce release mortality for billfish, but only 58 percent strongly agree or agree that circle hooks improve hooking success. Interestingly, this result suggests that anglers are willing to trade hooking success for lower release mortality. Along those same lines, 64 percent believe that the use of J-hooks increases post release mortality, while 87 percent strongly agree or agree that more needs to be done for billfish conservation in the Caribbean. A slim majority (51 percent) strongly disagrees or disagrees that local governments can effectively protect billfish stocks.

Table 10. Attitudes and opinions regarding potential billfish management policies continued.

Statement	Response	Frequency	Percent
Monitoring and enforcement should be increased	Strongly Agree	261	35.95
	Agree	309	42.56
	Neither Agree nor Disagree	130	17.91
	Disagree	23	3.17
	Strongly Disagree	3	0.41
Circle hooks reduce release mortality for billfish	Strongly Agree	338	46.56
	Agree	268	36.91
	Neither Agree nor Disagree	104	14.33
	Disagree	14	1.93
	Strongly Disagree	2	0.28
Circle hooks improve hooking success	Strongly Agree	169	23.28
	Agree	251	34.57
	Neither Agree nor Disagree	253	34.85
	Disagree	44	6.06
	Strongly Disagree	9	1.24
J-hooks increase post release mortality	Strongly Agree	207	28.43
	Agree	258	35.44
	Neither Agree nor Disagree	221	30.36
	Disagree	35	4.81
	Strongly Disagree	7	0.96
More needs to be done to protect billfish stocks in the Caribbean	Strongly Agree	344	47.25
	Agree	292	40.11
	Neither Agree nor Disagree	81	11.13
	Disagree	10	1.37
	Strongly Disagree	1	0.14
I have confidence and trust in the willingness and ability of governments in the Caribbean to effectively protect billfish.	Strongly Agree	28	3.86
	Agree	97	13.38
	Neither Agree nor Disagree	229	31.59
	Disagree	250	34.48
	Strongly Disagree	121	16.69

Table 11 provides insight in the viewpoints of recreational fishers regarding management financing options for billfish conservation. With 51 percent of respondents indicating support of contributing to a private fund for billfish conservation, this option will be examined more quantitatively in the next chapter. Sixty-five percent of the respondents support a saltwater fishing license. Twenty-two percent

support paying to lease rights to fish FADs and 35 percent oppose this action. Fifty-four percent of the recreational fishers support the creation of a special billfish stamp in addition to a fishing license. Finally, a majority of recreational fishers (62 percent) support instituting a commercial landings tax on billfish to contribute to management and conservation funds for billfish.

Table 11. Attitudes and opinions regarding management financing options.

Potential management financing Options	Response	Frequency	Percent
Contributing to a special private fund to enhance billfish conservation	Oppose	42	5.81
	Neither Support nor Oppose	252	34.85
	Support	371	51.31
	I Do Not Know	58	8.02
Instituting a saltwater fishing license	Oppose	91	12.62
	Neither Support nor Oppose	138	19.14
	Support	470	65.19
	I Do Not Know	22	3.05
Paying to lease exclusive rights to fish FADs	Oppose	252	35.15
	Neither Support nor Oppose	231	32.22
	Support	155	21.62
	I Do Not Know	79	11.02
Creating a special billfish stamp for fishing licenses	Oppose	119	16.50
	Neither Support nor Oppose	174	24.13
	Support	390	54.09
	I Do Not Know	38	5.27
Instituting a landings tax on commercial billfish landings	Oppose	88	12.17
	Neither Support nor Oppose	134	18.53
	Support	450	62.24
	I Do Not Know	51	7.05

Table 12 explores attitudes of recreational fishers towards catch and release behavior in billfish angling. Interestingly, 75 percent of the respondents strongly agree or agree that all recreationally caught billfish should be released, but 36 percent believe that they should still be able to harvest a trophy-sized fish. Along the same lines, only 12 percent believe that most billfish die when released, suggesting a confidence among fishers that catch-and-release is a sustainable and useful practice for the billfish stocks. Additionally, most anglers (76 percent) think it is more important to release large fish because they are likely breeding females. Forty-seven percent of the respondents believe that billfish should only be kept if they look like they will not survive release, while 67 percent strongly agree or agree that recreational sales of any finfish should be illegal, even from charter vessels; an opinion which is in line with the Technical Guidelines for Recreational Fisheries (FAO, 2012). A large majority (76 percent) of the recreational fishers that responded to the survey strongly agreed or agreed with the statement that they do not consume billfish because the fish is far more valuable as a recreational target species.

Table 12. Attitudes towards catch and release of billfish.

Statement	Response	Frequency	Percent
Anglers should release all billfish	Strongly Agree	342	48.93
	Agree	182	26.04
	Neither Agree nor		
	Disagree	107	15.31
	Disagree	59	8.44
	Strongly Disagree	9	1.29
Anglers should be able to keep trophy sized billfish	Strongly Agree	71	10.22
	Agree	176	25.32
	Neither Agree nor		
	Disagree	147	21.15
	Disagree	181	26.04
	Strongly Disagree	120	17.27
A high proportion of billfish caught will die if released	Strongly Agree	22	3.17
	Agree	62	8.92
	Neither Agree nor		
	Disagree	214	30.79
	Disagree	312	44.89
	Strongly Disagree	85	12.23
Billfish should be kept only if they look like they are going to die if released	Strongly Agree	79	11.38
	Agree	246	35.45
	Neither Agree nor		
	Disagree	193	27.81
	Disagree	138	19.88
	Strongly Disagree	38	5.48
It should be illegal to sell recreationally harvested fish, even from charter vessels	Strongly Agree	279	40.09
	Agree	185	26.58
	Neither Agree nor		
	Disagree	112	16.09
	Disagree	85	12.21
	Strongly Disagree	35	5.03
Anglers should release large billfish because they are breeding females	Strongly Agree	293	42.22
	Agree	235	33.86
	Neither Agree nor		
	Disagree	139	20.03
	Disagree	21	3.03
	Strongly Disagree	6	0.86
I don't consume billfish because I think they are worth more as a recreational target	Strongly Agree	371	53.23
	Agree	160	22.96
	Neither Agree nor		
	Disagree	115	16.50
	Disagree	35	5.02
	Strongly Disagree	16	2.30

WILLINGNESS-TO-PAY FOR BILLFISH

Expenditures describe economic activity whereas economic value is derived from a consumer's willingness-to-pay for a good above and beyond the current expenditures on that good. Expenditures are a positive metric while economic value is a normative metric. A positive metric is simply a measure of a state of nature; like looking at an outdoor temperature gauge. A measurement of 10 degrees Celsius conveys no information about whether that is a good temperature or a bad temperature. On the other hand, a normative metric, like economic value, conveys just that sort of information. An increase in economic value is always better off for society whereas an increase in expenditures is not necessarily better for society. A good example is a hurricane. Post hurricane, expenditures go up dramatically, but society agrees that all hurricanes are bad.

Normally economic value for consumer goods can be captured by looking at market transactions for that good. Unfortunately, recreational fishing is composed of many parts and none of those parts are traded in the market place. Recreational fishing is what is termed a "non-market" good. To measure economic value from recreational fishing non-market valuation techniques must be used to measure willingness-to-pay for fishing trip attributes. One type of non-market valuation is stated preference valuation. This type of valuation technique is often used when there is no behavioral data on recreational fishing; which is certainly the case in the Caribbean. Instead of being able to observe behavior, economists construct either stated preference choice experiments or contingent valuation questions to estimate values. This effort will use both types of stated preference techniques.

Stated preference choice experiments present anglers with a set of hypothetical trip scenarios where trip attributes are varied. By comparing responses to the variables, willingness-to-pay can be estimated. Contingent valuation questions ask what anglers would be willing-to-pay for a particular scenario directly.

Two hundred and thirty nine recreational fishers provided information on their most recent fishing trip, which is presented in Table 13. The average number of billfish caught on the most recent trip was 2.58, with 0.80 of these being trophy- sized. The number of tuna, dolphin and other fish caught on the most recent trip was 1.83, 3.12 and 2.93, respectively. The average length of the most recent trip of the respondents was average 2.83 days. Fifty nine percent of the respondents were very satisfied with their most recent fishing trip.

Table 13. Most recent trip.

Variable	n	Average	StdDev	Min	Max
billfish	239	2.58	2.07	0	6
trophy	239	0.80	1.51	0	6
tuna	226	1.83	2.16	0	6
dolphin	239	3.12	2.35	0	6
other	239	2.93	2.44	0	6
days	226	2.83	2.16	1	7
satisfied	239	0.59	0.49	0	1

Anglers were presented a stated preference choice experiment consisting of a series of four stated preference questions that varied cost and catch quality levels. Appendix 4 contains the complete state preference choice experiment question, including the experimental design proportions. In each of the four trip questions, respondents face one of 36 different survey versions. Respondents were asked to "suppose for some reason" that they expect the total costs (C) of the trip to be USD C higher compared to their

most recent trip. The additional cost was randomly assigned and could take on one of six versions: USDC = 100, 250, 500, 750, 1 000 or 1 500. Respondents were then presented with one of three different catch versions where they expect to catch 1, 2 or 3 more billfish. The catch is further varied so that one of these additional billfish is trophy-sized. In all, there were six different catch versions. Respondents were then asked if they think they would take this billfishing trip under these conditions. In summary, 79 percent, 74 percent, 66 percent and 65 percent of the respondents would take the billfishing trip offered in the four scenarios.

After the fourth trip question, respondents who had responded that they would not take the trip or did not know if they would take the trip (n=96, which is 41 percent of the respondents) were asked about what they think they would do instead of fishing for billfish. Only 7 percent reported they would stay at home, 9 percent would take a billfish fishing trip at a different time when costs were lower, 40 percent would take a lower cost trip to a different location, 21 percent would take a non-billfish fishing trip, 6 percent would take a shorter trip to the same location, 9 percent would take some other non-fishing trip and 6 percent stated some other alternative plans.

The determinants of trip taking behavior were estimated using a conditional logit model with clustered standard errors (Table 14) (Haab and McConnell, 2002). The model finds that as trip cost increases respondents are less likely to take the trip, while as the number of additional billfish caught increases, respondents are more likely to take the trip. If one of these additional billfish is trophy-sized, then respondents are more likely to take the trip. Each of the coefficient estimates are statistically significant at the $p < 0.01$ level. The billfish and trophy coefficients are also statistically different from each other at the $p < 0.05$ level. The reader is referred to Haab and McConnell (2002) for an explanation of conditional logit modeling and the model fit parameters found in Table 18. Because this publication is aimed at fishery managers, it was decided to leave the formal econometric equations and explanation of limited dependent variable modeling to the more advanced readers.

Table 14. Conditional logit trip demand model dependent variable is Yes (would take the trip)

Variable	Coefficient	Clustered SE	z
COST	-0.0007	0.00015	-4.67
FISH	0.53	0.0675	7.88
TROPHY	1.045	0.141	7.43
LL	-561.184		
AIC	1128.4		
Sample size	239		
Time periods	4		

The willingness to pay to catch an additional billfish and additional trophy-sized billfish is presented in Table 15. The average willingness-to-pay for an additional billfish (smaller than trophy-sized) is USD 761. The average willingness-to-pay for an additional trophy-sized billfish is USD 1 494. Both of these estimates are statistically different from zero. However, the willingness-to-pay estimates are not statistically different from each other, suggesting that respondents value trophy and non-trophy billfish equally. This is due to the imprecision of the willingness-to-pay estimates since they are estimated as the ratio of the fish/trip and cost coefficients.

Table 15. Willingness-to-pay.

Attribute	Average WTP (USD)	SE	z
FISH	760.77	135.35	5.62
TROPHY	1,493.51	289.36	5.16

Respondents were presented with a contingent valuation method scenario for the purchase of a billfish stamp, or a license needed to fish for billfish. Before the willingness-to-pay question, they were presented with information about ICCAT's 2011 blue marlin and 2012 white marlin stock assessments. Then respondents received information about a proposed Caribbean Billfish Conservation Fund (CBCF) that would invest in conservation activities that would reduce billfish harvest. The goal of the fund would be to limit blue and white marlin catch to avoid overfishing. This information was presented to the respondents in two versions that were randomly assigned. The first version stated that the CBCF would be administered by the government. The second version stated that the CBCF would be administered privately. Respondents were then asked about how likely they think it is that the CBCF could achieve the catch level goals. While 11 percent of the respondents believe that it is very likely that the catch goals could be achieved, 66 percent believe it is somewhat likely and 23 percent thinks that this would not be likely at all. There were no differences in these answers if the CBCF would be government or privately operated.

Next, respondents were told that a Caribbean Billfish Stamp would be introduced to raise money for the CBCF. The stamp would be required to catch billfish in the Caribbean and a cost of A USD, where A takes on one of six randomly assigned values: USD 25, USD 50, USD 100, USD 150, USD 200, and USD 250. The stamp revenue could be invested in conservation activities or enforcement of the stamp. Respondents were then assigned one of three versions describing how the revenue would be used. The three versions were a 75/25 split in revenue between conservation and enforcement, a 50/50 split and a 25/75 split.

While 59 percent of respondents who did not target billfish in the previous 12 months in the Caribbean are willing to pay the CBCF cost, 63 percent of those who targeted billfish in the most recent 12 months are willing to pay the CBCF cost (Table 16). For those who did not target billfish, the percentage of yes (willing to pay the cost) responses declines from 76 to 39 percent as the cost rises from USD 25 to USD 250. The difference in frequencies is statistically significant at the $p < 0.01$ level (chi-squared, χ^2 , test statistic). For those who did target billfish in the last 12 months, the percentage of yes responses declines from 71 to 55 percent as the cost rises from USD 25 to USD 250. The difference in frequencies is statistically significant at the $p < 0.11$ level. Table 16. CBCF Stamp Purchase.

Cost	0 days for billfish in past 12 months				1+ days for billfish in past 12 months			
	No	Yes	%Yes	Total	No	Yes	%Yes	Total
25	9	29	76%	38	10	25	71%	35
50	12	29	71%	41	7	28	80%	35
100	13	24	65%	37	17	24	59%	41
150	15	17	53%	32	22	24	52%	46
200	21	21	50%	42	15	27	64%	42
250	23	15	39%	38	18	22	55%	40
Total	93	135	59%	228	89	150	63%	239
χ^2	15.44				9.17			

The determinants of a CBCF stamp purchase were analyzed using the logit model (Table 17) (Haab and McConnell 2002). The independent variables are the stamp cost, a dummy variable equal to one if the CBCF would be administered by the government (else = 0), a dummy equal to one if respondents believe that the CBCF is not likely to be effective (else = 0) and the percentage of the CBCF that would be used for enforcement activities. In both models the coefficient on the cost variable is negative and statistically different from zero. This is the expected result for any demand equation; as costs rise, the consumer wants less and less of the good generating a negative sign on cost. Those respondents who targeted billfish in

the last 12 months are twice as likely to purchase the stamp if the CBCF is government administered, however the coefficient on the government run fund is not significant for the part of the sample that did not fish in the Caribbean in the last 12 months. Respondents who think it is not likely that the catch goals can be reached with the CBCF are less likely to be willing to purchase the stamp, which is also consistent with theory. The percentage of funding devoted to enforcement activities has no effect on stamp purchase for either group. This suggests that anglers do not have strong preferences regarding how the money is spent, whether more is spent on enforcement versus other more direct conservation activities, also suggesting a willingness to be flexible with the spending priorities with the CBCF.

Table 17. Contingent valuation logit model dependent variable is Yes (willing to pay the cost).

Variable	0 days for billfish in past 12 months			1+ days for billfish in past 12 months		
	Coefficient	SE	z	Coefficient	SE	z
Constant	2.20	0.56	3.95	1.060	0.51	2.09
COST	-0.008	0.0018	-4.28	-0.0042	0.0019	-2.28
GOVT	0.043	0.29	0.15	0.79	0.28	2.79
NOTLIKELY	-1.058	0.35	-2.99	-1.021	0.32	-3.21
ENFORCE	-0.011	0.0072	-1.47	-0.0019	0.0070	-0.27
χ^2	25.86			21.93		
Sample size	228			239		

The willingness-to-pay estimates are presented in Table 18. Setting all the independent variables equal to zero, the willingness-to-pay for the billfish stamp estimates are USD 275 and USD 251 for those who did not target billfish and those who did target billfish, respectively. These represent the willingness-to-pay when the CBCF is administered privately and when respondents think it is at least somewhat likely that the conservation goals set by the International Commission for the Conservation of Atlantic Tunas (ICCAT), can be achieved. Those respondents who did not target billfish in the last 12 months and who think it is not likely that the catch goals can be reached with the CBCF are willing to pay USD 132 less for the stamp. Combining these two estimates, willingness-to-pay for the stamp is USD 142 (SE = 56.70) for those who do not think it is likely that the catch goals can be achieved. To put it another way, those that did not fish in the Caribbean in the last 12 months would be willing to pay 275 for a stamp in a privately run fund, but that amount decreases by 132 to a total of 143 if they lack confidence in the potential success of the fund. Because the coefficient on government in the regression was statistically insignificant, there would be no change in WTP for this group regardless of who ran the fund.

For those who target billfish in the last 12 month their willingness-to-pay is USD 187 greater if the government administers the CBCF. Their total willingness-to-pay for the billfish stamp is USD 439 (SE = 154) for a government administered CBCF. Those who think it is not likely that the catch goals can be reached with the CBCF are willing to pay USD 242 less for the same stamp. Willingness-to-pay for the stamp is not statistically different from zero for those who targeted billfish and do not think the CBCF is likely be effective. Combining these two alternative estimates, government run fund increase of USD 188 on top of the base USD 251 WTP, the willingness-to-pay for a stamp is 196 (SE = 109).

Table 18. Willingness-to-pay estimates for license.

Attribute	0 days for billfish in past 12 months			1+ days for billfish in past 12 months		
	WTP (USD)	SE	z	WTP (USD)	SE	z
STAMP	274.91	58.56	4.69	251.15	105.70	2.38
GOVT=1	5.34	36.30	0.15	187.49	100.16	1.87
NOTLIKELY=1	-132.16	47.59	-2.78	-242.08	124.32	-1.95

The final type of stated preference question asked of respondents involves future billfish fishing trips (Table 19). Three questions were asked. The first question asked about their plans to take fishing trips in the next 12 months under the current conditions (Trips1). The average number of billfish fishing trips that respondents who did not target billfish during the past 12 months said that they would take during the next 12 months is two. For those who targeted billfish in the past 12 months the number of trips planned for in the next 12 months is 8. This is slightly lower than the number of trips these respondents took in the past 12 months from Table 4, which were nearly 9 trips. Respondents were asked a similar future trip question after the last discrete choice experiment trip question. In this case, respondents were asked to assume that their typical trip would be similar to the cost and catch conditions in the discrete choice experiment question (Trip2). Under this set of trip characteristics, anglers that had taken billfishing trips in the previous 12 months would take slightly more than 8 trips while those that had not taken a trip would take slightly more than 2 trips. Finally, respondents were also asked for the number of billfish fishing trips they would take with implementation of the CBCF (Trip3). The WTP for both groups drop a small amount, however, there is not a statistically significant difference in the number of trips in the second (Trip2) and third (Trip3) hypothetical scenarios.

Table 19. Future billfish fishing trips.

Variable	0 days for billfish in past 12 months					1+ days for billfish in past 12 months				
	n	Average	StdDev	Min	Max	n	Average	StdDev	Min	Max
Trips1	228	2.09	6.93	1	100	239	7.93	14.44	1	100
Trips2	228	2.27	7.17	0	100	239	8.34	14.76	0	100
Trips3	228	2.01	6.98	0	100	239	7.19	13.04	0	100

GENERATING TOTALS

As discussed in the introduction, there is no universe of anglers in the Caribbean. The lack of such data prevents the direct estimate of total billfish angling participants or the total effort in the fishery. In this section the authors apply a very crude benefits transfer approach to explore what total participation in billfish angling and total billfish effort could be in an effort to put bounds on the total amount a billfish stamp could raise and how much economic activity is being generated in the region from billfish angling.

Cisneros-Montemayor and Sumaila (2010) published a recreational fishing participation rate for all the regions in the world. Using a “benefits transfer” type approach that is not discussed in detail. They developed a recreational fishing participation rate of 23 percent for the Caribbean. Applying that percentage to the total Caribbean population in 2017 of 43 883 319 yields 10 001 008 Caribbean residents that fish recreationally for all species.² In order to estimate how many of those anglers participate in the recreational billfish fishery, the ratio of US highly migratory species (HMS) permit holders to regular resident saltwater fishing participants was estimated. The data on recreational HMS permits was taken from the species stock assessment and fishery evaluation report (NMFS 2018) and the data on total angler participation in saltwater fishing from the Marine Recreational Information Program Online Queries (MRIP 2018). This ratio for 2017 was 0.33 percent of all anglers hold a HMS recreational permit. When applied to the rough estimate of total Caribbean recreational fishermen the total number of Caribbean residents that could purchase a billfish license or stamp would be 32 864. Table 20 contains all the estimates described in this section. Resident effort was estimated by using the number of trips taken per year, 16.44 as estimated in this survey, and multiplying it by the participation number of 32 864 resident billfish anglers. That total effort was split into fishing modes by using the fishing modes proportions from the Large Pelagic Survey of US anglers (MRIP 2018). Table 20 shows that resident private boat effort would be estimated at 450 696 trips and charter trips would be 89 592 under these assumptions and using data transferred from multiple sources.

Generating non-resident participation and effort estimates is a little more difficult. During the Fishery Performance Indicator mission, it was found that Grenada asks visitors leaving via the airport what activities they participated in during their visit. Nearly five percent indicated they had gone fishing. Assuming the Caribbean wide fishing participation estimate is similar to Grenada and applying the total number of tourist visits to the Caribbean in 2017 of 26 089 000, yields 1 278 361 total trips to the Caribbean to fish by individual tourists.³ Again using the MRIP queries for US HMS fishermen, 83 percent of US trips targeting HMS species are from private boats and 17 percent are from charter boats (MRIP 2018). Assuming Caribbean visitors are similar to all US anglers and assuming all trips are billfish or HMS trips, non-residents could have taken 1 066 380 private boat trips and 211 981 charter trips Caribbean wide.

This assumption likely produces an upper bound estimate on actual billfish effort for a number of reasons. One, the ratio of private trips to charter trips is likely very different for tourists than it is for residents. The Large Pelagic Survey of US anglers does not differentiate between resident and non-resident angler trips (MRIP 2018). Two, this is likely an overestimate as there are all sorts of fishing opportunities in the Caribbean, including significant inshore fisheries for species like bonefish. To estimate a potential lower bound, the US proportion of HMS effort to total saltwater recreational effort was calculated and applied to the upper bound estimate. In the US, the proportion of HMS trips to all saltwater trips is very low at 0.54 percent for private trips and 1.36 percent for charter trips (MRIP 2018). Applying these proportions, non-resident billfish effort in the Caribbean could be as low as 5 777 private trips and 2 891 charter trips.

² <http://www.worldometers.info/world-population/caribbean-population/>

³ <https://www.wttc.org/-/media/files/reports/economic-impact-research/regions-2017/caribbean2017.pdf>

Dividing the two effort estimates, the upper bound and the lower bound, through by the number of trips taken (i.e. 8.67), from this survey generates participation estimates in the range between 1 000 participants and 147 446 non-resident participants.

In summary, using rough, benefit transfer type estimates to derive participation and effort, billfish fishing is a significant economic engine in the region. Trip expenditures in the charter mode range from USD 9,6 million to USD 630.8 million. Trip expenditures in the private boat mode range from USD 18.5 million to USD 3 billion. Across both modes, trip expenditures likely fall within the range of USD 28.1 million to USD 3.5 billion. The lower end of that number is likely too low as the upper is also likely too high. However, anywhere in that range proves billfish angling is a significant economic driver. When looking at potential stamp revenues the number is similarly striking. Under a privately administered fund, the maximum that could be raised is between USD 8.5 million and USD 45.3 million. Under a government administered fund, the potential revenue is between USD 14.9 million and USD 79.1 million.

Table 20. Total effort, participation, expenditures and stamp revenue estimates.

Estimate type	Resident status	Estimates			
		Upper bound	Lower bound		
Participation	Resident	32 864			
	Non-resident	147 446	1 000		
Total		180 311	33 864		
Estimate type	Resident status	Private fund		Government fund	
		Upper bound	Lower bound	Upper bound	Lower bound
Stamp revenues	Resident	8 253 854		14 415 571	
	Non-resident	37 031 184	251 108	64 675 925	438 566
Total		45 285 038	8 504 962	79 091 496	14 854 137
Estimate type	Resident status	Private boat		Charter boat	
		Upper bound	Lower bound	Upper bound	Lower bound
Effort	Resident	450 696		89 592	
	Non-resident	1 066 380	5 777	211 981	2 891
Total		1 517 076	456 473	301 573	92 484
Trip expenditures (USD)	Resident	2 530 859		1 002 021	
	Non-resident	2 951 045 639	15 987 109	629 ,752 167	8 590 028
Total		2 953 576 498	18 517 969	630 754 187	9 592 048

DISCUSSION

Gentner (2016) summarized the existing studies on billfish WTP values from other regions. Whitehead et al. (2013) conducted a similar study for North Carolina, USA. In that study, they found anglers were willing to pay US 2 113 to harvest an additional billfish and the willingness to pay per single angler trip to target billfish was USD 717 per person per trip. Duffield et al. (2012) found that Hawaiian anglers were willing to pay USD 423 for an additional caught and released marlin across all anglers in their sample. Ditton's (1998) publication summarized a number of his billfish studies. His publication contained the only known study of Caribbean fishermen as one of the studies profiled was conducted in Puerto Rico. That Puerto Rican study found anglers were willing to pay USD 439/angler to maintain current billfish stock sizes, USD 554/angler for a 25% increase in billfish stock size and the entire trip had an access value of 859/trip. Access value is simply the value of taking the trip regardless of the catch or harvest from that trip.

None of these metrics exactly line up with the metrics calculated in this region-wide study and that was a main motivating factor in conducting a Caribbean specific valuation study to establish the value of conserving billfish stocks in our regional value proposition. This study estimated that one more billfish caught, regardless of disposition of that catch, was worth USD 761, with USD 1 494 for an additional trophy fish.

The analysis shows that the avid respondents would take no additional trips with stock conservation but would be willing to pay more for them through the purchase of a billfish stamp or license. While not explored in the survey, anecdotally from the Fishery Performance Indicator studies conducted in the region (Gentner et al. 2018), many avid anglers from the US keep their boats in the Caribbean through the peak season and seem to fish as often as their budgets and schedules will allow. It is possible that they are greatly anchored to the Caribbean region and that their behavior will not change much regardless of stock conditions. That is, they are currently taking as many trips as they can given status quo conditions. Nonetheless, if stocks improve they would obtain more value per trip.

Additionally, much of the current Caribbean recreational fisheries attention is focused in the Dominican Republic, which is reflected in the number of responses to this survey from that country. The Dominican Republic is currently rated as one of the top billfish recreational fisheries destinations in the world and the blue marlin release record was broken December 11, 2016, with 23 blue marlin released in a single day.⁴ Also, the 2016 Billfish Report ranked Cap Cana the #2 Billfishery of the Year worldwide for 2016.⁵ Much of this increased attention and recreational fishing in the Dominican Republic has been attributed to the heavy use of anchored FADs, which are also increasing the availability of billfish to commercial harvester ultimately driving more conflict between the commercial and recreational fishing sectors.

Often in WTP studies for catch rates, a single fish increase in the catch rate is very much a non-marginal change and that is particularly true for most billfish fisheries, as billfish are generally regarded as "rare event" species. For instance, in Grenada, the daily catch rate for blue marlin generally average less than one fish, but those fish are often trophy or nearly trophy size. A one fish increase in catch is very much a non-marginal change in that case. However, in the DR during peak season, double digit catch rates are not at all unusual. Unfortunately, based on sample size limitations and modeling complexity, we were unable to estimate country specific valuation estimates at this time. It would be necessary to combine the revealed preference data with the stated preference data using a much more complicated model that is

⁴ <http://www.marlinmag.com/atlantic-blue-marlin-release-record-broken-by-blue-bird-in-cap-cana-dominican-republic>

⁵ <http://billfishreport.com/2017/billfish-report/2016-billfisheries-of-the-year-2-punta-cana/>

beyond the scope of this study. Given the relatively wide confidence intervals in the WTP estimates, it is unlikely that modeling country specific estimates would generate statistically different estimates across countries. From a policy standpoint, however, it is very difficult to estimate how recreational catch rates will change without a complex bioeconomic model that includes both the stock and the angler behavior. Suffice it to say, however, there is a strong WTP for improvements in billfish catches in the region and those estimates are in line with other regions where billfish catch value has been estimated.

More importantly, are the estimates on conservation financing vehicles and the WTP for those vehicles. A stamp for billfish fishing, or a license for billfish fishing, is a seemingly appealing way of converting some of the additional willingness to pay for increased stocks into a fund that could be used to enhance billfish conservation and management. On average, anglers that had not taken a trip in the last 12 months were willing to pay USD 275 for a privately administered stamp or an endorsement that would allow them to target billfish for a year. That value would decrease USD 132 if the respondent did not have faith that the program could change billfish stocks. If they had little faith in the management interventions succeeding, they would be willing to pay USD 143/year to target billfish (USD 275 – USD 132). Avid anglers are willing to pay less for such an endorsement, at USD 251/year for a privately run fund, but if that fund were run by the government, their WTP increases to USD 439/year. However, avid anglers are only willing to pay USD 9/year if they have low confidence in success and if the fund is administered privately. If the same fund is administered by the government, they are still willing to pay USD 196/year for a billfish stamp even if they feel the conservation goals cannot be met using the fund.

Looking at the angler expenditure estimates, Table 21 pulls in the estimates presented in Gentner 2017 from outside the Caribbean region for billfish or highly migratory species (HMS) targeting trips for comparison. From above, total daily expenditures for non-resident private boaters from this survey were USD 2 767/day and USD 1 036/day for residents with a private boat. Recreational fishers taking charter trips spent on average USD 2 971/day and USD 820/day for non-residents and residents respectively. These estimates are significantly higher than the estimates in Table 24, none of which were stratified by resident status.

Table 21. Per day trip expenditures and economic impact estimates from the literature (Taken from Gentner 2017).

Region	Species Target	Expenditures per Day Trip	Source
Atlantic Coast US	Billfish Mostly	900.25	Hutt et al. 2014
Panama	HMS Mostly	216.55	Southwick et al. 2013
Costa Rica	HMS	549.33	Jimenez et al. 2010
Cabo San Lucas, Mexico	Mostly HMS	331.42	Southwick et al. 2008

CONCLUSIONS AND RECOMMENDATIONS

Even using rough effort and participation estimates transferring estimators from the US HMS program, the economic footprint of billfish angling in the region may be over USD 3,5 billion in the entire Caribbean. Even if the footprint is as small as the lower bound estimate of USD 28,1 million, it is a significant industry that deserves more recognition and better management. And speaking of better management, if a region-wide billfish license/stamp was instituted, it could raise as much as USD 79 million to improve data collection, conservation and enforcement in the region.

To put the survey results in context, overall anglers feel that not enough is being done to conserve billfish stocks. Additionally, anglers appear to be willing to contribute to the conservation of billfishes and are willing to be licensed or pay for a stamp. They are also willing to contribute to a private fund for conservation, but are more willing to contribute to a government controlled fund. Anglers also support increased data collection to facilitate management and conservation work, a target already being pursued through the Caribbean Billfish Project.

Currently, the major marinas in the Dominican Republic are collecting catch and effort estimates for their own marketing use and it would be a simple matter to formalize that data collection process and feed that data into a regional database. This database is planned to be maintained by the Western Central Atlantic Fishery Commission (WECAFC) at its Secretariat in Barbados. The regional database is one of the main measures proposed in the Caribbean Billfish Management and Conservation Plan. Data would be assessed on a regional scale to track billfish stocks management intervention successes. The same database could also provide much sought after data to improve accuracy and overall confidence in Atlantic wide billfish stock assessment of the ICCAT, which holds the overall mandate for sustainably managing Atlantic billfish species.

Anglers with experience fishing FADs generally like them and want more anchored FADs to be deployed. Anglers have mixed feelings about paying for access to FADs and seem, in general, to dislike the concept of directly compensating commercial fishermen for reduced harvest or leasing FAD rights. From Gentner et al. (2017) it is known that the recreational fishing fleet in the Dominican Republic is already collecting substantial sums of money to maintain FADs and compensate commercial fishermen for FAD access, but that program has mixed support and seems to suffer from transparency concerns following the disbursement of collected FAD funds to the linked communities. Finally, anglers strongly support 100 percent catch and release for billfish and bans on the sales of recreationally caught fish of any species. They also support the use of circle hooks for live and dead baits for the recreational sector and also for the commercial sector. ICCAT supports the use of circle hook in all commercial longline fisheries.

The results of this study will be used to develop cash flow models of the recreational sector for both pilot countries of the Caribbean Billfish Project. The models will be combined with cash flow models of the commercial fisheries sectors to examine the benefits and costs and potential funding mechanisms for policy interventions to increase billfish conservation in the region. This study highlights that the value and expenditures for billfish recreational fishing are very high in the Caribbean region and that there is the potential to raise conservation funds from the recreational user group.

In order to impact the allocation of resources in the Caribbean to improve livelihoods and conserve billfish, the results of this study should be disseminated to fishery managers and stakeholders alike. The results support the Caribbean Billfish Management and Conservation Plan and the individual pilot projects in the pilot countries. In many Caribbean countries, the economic footprint of recreational fishing is not well understood and therefore not incorporated into tourism development plans. This document demonstrates the footprint of recreational billfish angling is substantial. These results also demonstrate the

power of licensing to generate revenue that can be used to invest in conservation and monitoring, control and surveillance.

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APPENDIX 1: AGGREGATE EXPENDITURE TABLES

Private Boat Angler Expenditures by Resident Status (with Outliers Removed).

Private Boat		Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
Expenditure Category	Resident Status					
Airfare	non-resident	1,202.83	112	276.73	654.48	1,751.18
	resident	9.30	43	6.50	(3.81)	22.42
Bait and Tackle	non-resident	537.03	112	80.73	377.06	697.00
	resident	246.42	43	59.35	126.64	366.20
Car Rental	non-resident	48.79	112	12.02	24.97	72.62
	resident	9.30	43	6.50	(3.81)	22.42
Charter Fees	non-resident	0.00	112	0.00	0.00	0.00
	resident	0.00	43	0.00	0.00	0.00
Food and Beverage	non-resident	1,191.77	112	238.76	718.64	1,664.89
	resident	316.05	43	63.75	187.39	444.71
Fuel (Vehicle and Boat)	non-resident	2,540.58	112	329.66	1,887.33	3,193.83
	resident	792.00	43	151.38	486.51	1,097.49
Lodging	non-resident	960.54	112	183.16	597.59	1,323.50
	resident	77.33	43	33.22	10.28	144.37
Miscellaneous Costs	non-resident	455.09	112	88.86	279.00	631.17
	resident	106.05	43	24.40	56.81	155.28
Other Recreational Activities	non-resident	119.21	112	25.96	67.78	170.65
	resident	26.74	43	11.57	3.40	50.09
Total Daily Expenditures	non-resident	2,767.35	112	570.66	1,636.56	3,898.14
	resident	1,036.55	43	206.40	620.03	1,453.07
Total Trip Expenditures	non-resident	7,055.85	112	930.17	5,212.65	8,899.05
	resident	1,583.19	43	247.46	1,083.79	2,082.58

Charter Angler Expenditures by Resident Status (with Outliers Removed).

Charter		Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
Expenditure Category	Resident Status					
Airfare	non-resident	999.00	105	103.94	792.89	1,205.11
	resident	25.00	8	25.00	(34.12)	84.12
Bait and Tackle	non-resident	140.33	105	29.31	82.21	198.46
	resident	271.25	8	181.97	(159.04)	701.54
Car Rental	non-resident	68.48	105	11.83	45.03	91.93
	resident	46.88	8	26.07	(14.76)	108.51
Charter Fees	non-resident	2,811.52	105	268.68	2,278.72	3,344.32
	resident	706.25	8	113.56	437.72	974.78
Food and Beverage	non-resident	644.86	105	71.36	503.35	786.37
	resident	188.13	8	40.84	91.56	284.69
Fuel (Vehicle and Boat)	non-resident	230.00	105	85.52	60.41	399.59
	resident	175.00	8	121.74	(112.88)	462.88
Lodging	non-resident	1,404.00	105	149.96	1,106.62	1,701.38
	resident	375.00	8	154.69	9.22	740.78
Miscellaneous Costs	non-resident	298.04	105	50.80	197.30	398.78
	resident	37.50	8	24.55	(20.55)	95.55
Other Recreational Activities	non-resident	210.89	105	31.56	148.31	273.47
	resident	37.50	8	24.55	(20.55)	95.55
Total Daily Expenditures	non-resident	2,970.79	105	231.77	2,511.19	3,430.40
	resident	819.94	8	152.89	458.40	1,181.48
Total Trip Expenditures	non-resident	6,807.11	105	452.06	5,910.66	7,703.56
	resident	1,862.50	8	395.36	927.62	2,797.38

APPENDIX 2: COUNTRY EXPENDITURE TABLES

Aruba			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode	1,356.25	4	389.76	115.85	2,596.65
Airfare	non-resident	Charter					
		Private Boat	400.00	2	150.00	(1,505.93)	2,305.93
Bait and Tackle	non-resident	Charter	50.00	4	50.00	(109.12)	209.12
		Private Boat	0.00	2	0.00	0.00	0.00
Car Rental	non-resident	Charter	125.00	4	75.00	(113.68)	363.68
		Private Boat	0.00	2	0.00	0.00	0.00
Charter Fees	non-resident	Charter	3,000.00	4	1,285.17	(1,089.99)	7,089.99
		Private Boat	0.00	2	0.00	0.00	0.00
Food and Beverage	non-resident	Charter	375.00	4	72.17	145.33	604.67
		Private Boat	300.00	2	100.00	(970.62)	1,570.62
Fuel (Vehicle and Boat)	non-resident	Charter	37.50	4	23.94	(38.67)	113.67
		Private Boat	0.00	2	0.00	0.00	0.00
Lodging	non-resident	Charter	1,025.00	4	375.00	(168.42)	2,218.42
		Private Boat	425.00	2	275.00	(3,069.21)	3,919.21
Miscellaneous Costs	non-resident	Charter	50.00	4	50.00	(109.12)	209.12
		Private Boat	0.00	2	0.00	0.00	0.00
Other Recreational Activities	non-resident	Charter	125.75	4	74.59	(111.62)	363.12
		Private	150.00	2	150.00	(1,755.93)	2,055.93

Aruba			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Boat					
Total Daily Expenditures	non-resident	Charter	2,882.00	4	848.41	182.00	5,582.00
		Private Boat	343.75	2	143.75	(1,482.77)	2,170.27
Total Trip Expenditures	non-resident	Charter	6,144.50	4	1,457.48	1,506.14	10,782.86
		Private Boat	1,275.00	2	675.00	(7,301.69)	9,851.69

Bahamas			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode	828.95	19	237.78	329.39	1,328.51
Airfare	non-resident	Charter					
		Private Boat	1,256.43	42	498.78	249.12	2,263.74
Bait and Tackle	non-resident	Charter	186.84	19	72.33	34.88	338.80
		Private Boat	615.43	42	137.40	337.94	892.92
Car Rental	non-resident	Charter	72.11	19	27.15	15.06	129.15
		Private Boat	24.40	42	12.06	0.04	48.77
Charter Fees	non-resident	Charter	3,373.68	19	788.32	1,717.48	5,029.89
		Private Boat	0.00	42	0.00	0.00	0.00
Food and Beverage	non-resident	Charter	760.53	19	174.11	394.73	1,126.33
		Private Boat	1,412.74	42	368.34	668.87	2,156.61
Fuel (Vehicle and Boat)	non-resident	Charter	260.53	19	150.27	(55.18)	576.24

Bahamas			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Private Boat	3,026.19	42	560.29	1,894.67	4,157.72
Lodging	non-resident	Charter	1,100.00	19	182.57	716.43	1,483.57
		Private Boat	930.95	42	270.59	384.48	1,477.42
Miscellaneous Costs	non-resident	Charter	471.05	19	133.51	190.55	751.56
		Private Boat	350.24	42	86.88	174.77	525.70
Other Recreational Activities	non-resident	Charter	163.16	19	76.55	2.33	323.99
		Private Boat	101.24	42	41.82	16.78	185.70
Total Daily Expenditures	non-resident	Charter	2,653.94	19	449.34	1,709.91	3,597.97
		Private Boat	2,661.56	42	594.70	1,460.54	3,862.58
Total Trip Expenditures	non-resident	Charter	7,216.84	19	885.29	5,356.93	9,076.76
		Private Boat	7,717.62	42	1,582.16	4,522.37	10,912.87

Belize			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode	1,130.00	5	217.72	525.53	1,734.47
Airfare	non-resident	Charter					
	resident	Charter	0.00	1	.	.	.
		Private Boat	0.00	2	0.00	0.00	0.00
Bait and Tackle	non-resident	Charter	494.00	5	376.69	(551.87)	1,539.87
	resident	Charter	0.00	1	.	.	.

Belize			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Private Boat	525.00	2	475.00	(5,510.45)	6,560.45
Car Rental	non-resident	Charter	50.00	5	50.00	(88.82)	188.82
	resident	Charter	0.00	1	.	.	.
		Private Boat	0.00	2	0.00	0.00	0.00
Charter Fees	non-resident	Charter	1,730.00	5	496.39	351.81	3,108.19
	resident	Charter	950.00	1	.	.	.
		Private Boat	0.00	2	0.00	0.00	0.00
Food and Beverage	non-resident	Charter	1,300.00	5	931.80	(1,287.09)	3,887.09
	resident	Charter	300.00	1	.	.	.
		Private Boat	300.00	2	0.00	300.00	300.00
Fuel (Vehicle and Boat)	non-resident	Charter	920.00	5	895.21	(1,565.50)	3,405.50
	resident	Charter	0.00	1	.	.	.
		Private Boat	762.50	2	62.50	(31.64)	1,556.64
Lodging	non-resident	Charter	1,930.00	5	1,157.32	(1,283.25)	5,143.25
	resident	Charter	550.00	1	.	.	.
		Private Boat	462.50	2	137.50	(1,284.60)	2,209.60
Miscellaneous Costs	non-resident	Charter	210.00	5	95.39	(54.86)	474.86
	resident	Charter	150.00	1	.	.	.
		Private Boat	100.00	2	100.00	(1,170.62)	1,370.62
Other Recreational Activities	non-resident	Charter	100.00	5	68.92	(91.35)	291.35
	resident	Charter	0.00	1	.	.	.
		Private	0.00	2	0.00	0.00	0.00

Belize			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Boat					
Total Daily Expenditures	non-resident	Charter	1,731.94	5	420.85	563.49	2,900.40
	resident	Charter	650.00	1	.	.	.
		Private Boat	1,075.00	2	250.00	(2,101.55)	4,251.55
Total Trip Expenditures	non-resident	Charter	7,864.00	5	3,800.86	(2,688.88)	18,416.88
	resident	Charter	1,950.00	1	.	.	.
		Private Boat	2,150.00	2	500.00	(4,203.10)	8,503.10

British Virgin Islands (BVI)			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode	1,083.33	6	414.26	18.44	2,148.22
Airfare	non-resident	Charter					
		Private Boat	720.00	10	180.00	312.81	1,127.19
	resident	Private Boat	0.00	1	.	.	.
Bait and Tackle	non-resident	Charter	16.67	6	16.67	(26.18)	59.51
		Private Boat	315.00	10	140.64	(3.16)	633.16
	resident	Private Boat	300.00	1	.	.	.
Car Rental	non-resident	Charter	0.00	6	0.00	0.00	0.00
		Private Boat	50.00	10	50.00	(63.11)	163.11
	resident	Private	0.00	1	.	.	.

British Virgin Islands (BVI)			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Boat					
Charter Fees	non-resident	Charter	1,966.67	6	321.11	1,141.23	2,792.10
		Private Boat	0.00	10	0.00	0.00	0.00
	resident	Private Boat	0.00	1	.	.	.
Food and Beverage	non-resident	Charter	500.00	6	177.01	44.98	955.02
		Private Boat	602.00	10	189.16	174.09	1,029.91
	resident	Private Boat	600.00	1	.	.	.
Fuel (Vehicle and Boat)	non-resident	Charter	91.67	6	82.07	(119.31)	302.64
		Private Boat	1,245.00	10	457.44	210.21	2,279.79
	resident	Private Boat	1,500.00	1	.	.	.
Lodging	non-resident	Charter	1,716.67	6	793.90	(324.12)	3,757.45
		Private Boat	100.00	10	66.67	(50.81)	250.81
	resident	Private Boat	0.00	1	.	.	.
Miscellaneous Costs	non-resident	Charter	83.33	6	83.33	(130.88)	297.55
		Private Boat	500.00	10	204.80	36.70	963.30
	resident	Private Boat	250.00	1	.	.	.
Other Recreational Activities	non-resident	Charter	83.33	6	83.33	(130.88)	297.55
		Private Boat	120.00	10	99.78	(105.71)	345.71
	resident	Private	250.00	1	.	.	.

British Virgin Islands (BVI)			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Boat					
Total Daily Expenditures	non-resident	Charter	4,925.00	6	1,656.29	667.37	9,182.63
		Private Boat	1,664.26	10	268.95	1,055.86	2,272.66
	resident	Private Boat	1,450.00	1	.	.	.
Total Trip Expenditures	non-resident	Charter	5,541.67	6	1,537.88	1,588.42	9,494.91
		Private Boat	3,652.00	10	911.57	1,589.89	5,714.11
	resident	Private Boat	2,900.00	1	.	.	.

Costa Rica			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode	722.73	11	148.38	392.12	1,053.34
Airfare	non-resident	Charter					
		Private Boat	337.50	4	114.34	(26.37)	701.37
Bait and Tackle	non-resident	Charter	104.55	11	46.93	(0.02)	209.11
		Private Boat	187.50	4	82.60	(75.37)	450.37
Car Rental	non-resident	Charter	118.18	11	42.79	22.85	213.51
		Private Boat	72.50	4	59.91	(118.17)	263.17
Charter Fees	non-resident	Charter	2,681.82	11	776.22	952.30	4,411.34
		Private Boat	0.00	4	0.00	0.00	0.00

Costa Rica			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Food and Beverage	non-resident	Charter	360.91	11	44.12	262.61	459.21
		Private Boat	512.50	4	234.85	(234.91)	1,259.91
Fuel (Vehicle and Boat)	non-resident	Charter	336.36	11	191.30	(89.88)	762.60
		Private Boat	1,325.00	4	906.80	(1,560.85)	4,210.85
Lodging	non-resident	Charter	1,980.00	11	701.32	417.37	3,542.63
		Private Boat	637.50	4	235.74	(112.73)	1,387.73
Miscellaneous Costs	non-resident	Charter	253.64	11	114.99	(2.57)	509.85
		Private Boat	437.50	4	359.04	(705.11)	1,580.11
Other Recreational Activities	non-resident	Charter	143.18	11	89.32	(55.84)	342.20
		Private Boat	250.00	4	250.00	(545.61)	1,045.61
Total Daily Expenditures	non-resident	Charter	2,837.98	11	1,112.24	359.75	5,316.21
		Private Boat	2,761.67	4	2,179.78	(4,175.35)	9,698.69
Total Trip Expenditures	non-resident	Charter	6,701.36	11	1,456.81	3,455.40	9,947.33
		Private Boat	3,760.00	4	1,848.38	(2,122.38)	9,642.38

Dominican Republic			Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
Expenditure Category	Resident Status	Fishing Mode					
Airfare	non-resident	Charter	1,604.21	19	403.77	755.92	2,452.50
		Private Boat	1,354.00	24	382.34	563.06	2,144.94

Dominican Republic			Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
Expenditure Category	Resident Status	Fishing Mode					
			1,604.21	19	403.77	755.92	2,452.50
	resident	Charter	0.00	1	.	.	.
		Private Boat	20.00	10	20.00	(25.24)	65.24
Bait and Tackle	non-resident	Charter	69.21	19	33.67	(1.53)	139.95
		Private Boat	893.75	24	231.38	415.11	1,372.39
	resident	Charter	1,500.00	1	.	.	.
		Private Boat	176.10	10	72.36	12.41	339.79
Car Rental	non-resident	Charter	55.26	19	23.85	5.16	105.36
		Private Boat	82.29	24	34.82	10.26	154.33
	resident	Charter	200.00	1	.	.	.
		Private Boat	40.00	10	26.67	(20.32)	100.32
Charter Fees	non-resident	Charter	3,251.05	19	672.10	1,839.02	4,663.09
		Private Boat	0.00	24	0.00	0.00	0.00
	resident	Charter	1,000.00	1	.	.	.
		Private Boat	0.00	10	0.00	0.00	0.00
Food and Beverage	non-resident	Charter	652.63	19	186.71	260.37	1,044.90
		Private Boat	1,847.08	24	825.15	140.13	3,554.03
	resident	Charter	275.00	1	.	.	.
		Private Boat	385.00	10	141.63	64.62	705.38
Fuel (Vehicle and Boat)	non-resident	Charter	42.11	19	39.42	(40.70)	124.91
		Private Boat	3,683.33	24	882.80	1,857.12	5,509.54
	resident	Charter	0.00	1	.	.	.
		Private Boat	1,325.00	10	546.97	87.66	2,562.34
Lodging	non-resident	Charter	1,367.11	19	260.43	819.97	1,914.24
		Private Boat	1,765.63	24	519.84	690.26	2,840.99
	resident	Charter	1,000.00	1	.	.	.
		Private Boat	125.00	10	100.35	(102.00)	352.00

Dominican Republic			Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
Expenditure Category	Resident Status	Fishing Mode					
			1,604.21	19	403.77	755.92	2,452.50
Miscellaneous Costs	non-resident	Charter	61.84	19	32.58	(6.60)	130.28
		Private Boat	677.08	24	296.20	64.34	1,289.82
	resident	Charter	0.00	1	.	.	.
		Private Boat	215.00	10	59.18	81.12	348.88
Other Recreational Activities	non-resident	Charter	332.63	19	96.00	130.93	534.33
		Private Boat	106.25	24	50.03	2.76	209.74
	resident	Charter	0.00	1	.	.	.
		Private Boat	65.00	10	34.20	(12.36)	142.36
Total Daily Expenditures	non-resident	Charter	3,486.22	19	608.33	2,208.17	4,764.28
		Private Boat	5,311.99	24	2,363.41	422.90	10,201.07
	resident	Charter	567.86	1	.	.	.
		Private Boat	2,018.30	10	686.42	465.50	3,571.10
Total Trip Expenditures	non-resident	Charter	7,436.05	19	971.78	5,394.41	9,477.70
		Private Boat	10,409.42	24	2,675.59	4,874.54	15,944.29
	resident	Charter	3,975.00	1	.	.	.
		Private Boat	2,351.10	10	643.56	895.26	3,806.94

Guatemala			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode					
Airfare	non-resident	Charter	1,196.25	4	439.05	(201.00)	2,593.50
		Private Boat	900.00	2	200.00	(1,641.24)	3,441.24

Guatemala			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
	resident	Charter	0.00	1	.	.	.
Bait and Tackle	non-resident	Charter	300.00	4	300.00	(654.73)	1,254.73
		Private Boat	500.00	2	500.00	(5,853.10)	6,853.10
	resident	Charter	20.00	1	.	.	.
Car Rental	non-resident	Charter	0.00	4	0.00	0.00	0.00
		Private Boat	0.00	2	0.00	0.00	0.00
	resident	Charter	0.00	1	.	.	.
Charter Fees	non-resident	Charter	2,375.00	4	746.52	(0.76)	4,750.76
		Private Boat	0.00	2	0.00	0.00	0.00
	resident	Charter	500.00	1	.	.	.
Food and Beverage	non-resident	Charter	550.00	4	263.00	(286.97)	1,386.97
		Private Boat	300.00	2	200.00	(2,241.24)	2,841.24
	resident	Charter	100.00	1	.	.	.
Fuel (Vehicle and Boat)	non-resident	Charter	0.00	4	0.00	0.00	0.00
		Private Boat	1,500.00	2	1,500.00	(17,559.31)	20,559.31
	resident	Charter	1,000.00	1	.	.	.
Lodging	non-resident	Charter	3,250.00	4	1,010.36	34.57	6,465.43
		Private Boat	1,400.00	2	1,400.00	(16,388.69)	19,188.69
	resident	Charter	50.00	1	.	.	.
Miscellaneous Costs	non-resident	Charter	1,300.00	4	472.58	(203.97)	2,803.97
		Private Boat	250.00	2	250.00	(2,926.55)	3,426.55
	resident	Charter	0.00	1	.	.	.

Guatemala			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Other Recreational Activities	non-resident	Charter	300.00	4	238.05	(457.57)	1,057.57
		Private Boat	225.00	2	25.00	(92.66)	542.66
	resident	Charter	0.00	1	.	.	.
Total Daily Expenditures	non-resident	Charter	2,971.98	4	432.02	1,597.09	4,346.87
		Private Boat	1,691.67	2	425.00	(3,708.47)	7,091.80
	resident	Charter	1,670.00	1	.	.	.
Total Trip Expenditures	non-resident	Charter	9,271.25	4	1,246.89	5,303.08	13,239.42
		Private Boat	5,075.00	2	1,275.00	(11,125.41)	21,275.41
	resident	Charter	1,670.00	1	.	.	.

Mexico			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode					
Airfare	non-resident	Charter	610.00	15	112.57	368.57	851.43
		Private Boat	300.00	6	143.76	(69.54)	669.54
Bait and Tackle	non-resident	Charter	46.67	15	26.93	(11.10)	104.43
		Private Boat	745.00	6	466.29	(453.63)	1,943.63
Car Rental	non-resident	Charter	31.67	15	28.29	(29.01)	92.35
		Private Boat	70.83	6	70.83	(111.25)	252.92

Mexico			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Charter Fees	non-resident	Charter	2,566.67	15	699.57	1,066.24	4,067.09
		Private Boat	0.00	6	0.00	0.00	0.00
Food and Beverage	non-resident	Charter	533.33	15	107.20	303.41	763.26
		Private Boat	1,591.67	6	1,282.47	(1,705.03)	4,888.37
Fuel (Vehicle and Boat)	non-resident	Charter	10.00	15	10.00	(11.45)	31.45
		Private Boat	3,133.33	6	1,820.56	(1,546.57)	7,813.24
Lodging	non-resident	Charter	824.00	15	188.20	420.35	1,227.65
		Private Boat	133.33	6	133.33	(209.41)	476.08
Miscellaneous Costs	non-resident	Charter	285.67	15	139.04	(12.54)	583.87
		Private Boat	483.33	6	312.43	(319.79)	1,286.45
Other Recreational Activities	non-resident	Charter	260.00	15	90.26	66.40	453.60
		Private Boat	183.33	6	164.15	(238.62)	605.29
Total Daily Expenditures	non-resident	Charter	2,541.83	15	397.08	1,690.17	3,393.50
		Private Boat	1,508.61	6	618.87	(82.24)	3,099.46
Total Trip Expenditures	non-resident	Charter	5,168.00	15	1,140.68	2,721.49	7,614.51
		Private Boat	6,640.83	6	3,476.34	(2,295.37)	15,577.04

Puerto Rico			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode					
Airfare	non-resident	Charter	1,125.00	4	515.39	(515.20)	2,765.20
		Private Boat	1,750.00	2	1,750.00	(20,485.86)	23,985.86
	resident	Charter	100.00	2	100.00	(1,170.62)	1,370.62
		Private Boat	22.22	9	22.22	(29.02)	73.47
Bait and Tackle	non-resident	Charter	0.00	4	0.00	0.00	0.00
		Private Boat	260.00	2	240.00	(2,789.49)	3,309.49
	resident	Charter	200.00	2	200.00	(2,341.24)	2,741.24
		Private Boat	104.44	9	51.33	(13.91)	222.80
Car Rental	non-resident	Charter	172.50	4	102.09	(152.40)	497.40
		Private Boat	212.50	2	212.50	(2,487.57)	2,912.57
	resident	Charter	87.50	2	12.50	(71.33)	246.33
		Private Boat	0.00	9	0.00	0.00	0.00
Charter Fees	non-resident	Charter	1,950.00	4	956.99	(1,095.58)	4,995.58
		Private Boat	0.00	2	0.00	0.00	0.00
	resident	Charter	300.00	2	100.00	(970.62)	1,570.62
		Private Boat	0.00	9	0.00	0.00	0.00
Food and Beverage	non-resident	Charter	900.00	4	420.32	(437.64)	2,237.64
		Private Boat	550.00	2	450.00	(5,167.79)	6,267.79
	resident	Charter	200.00	2	100.00	(1,070.62)	1,470.62

Puerto Rico			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Private Boat	73.89	9	21.57	24.16	123.62
Fuel (Vehicle and Boat)	non-resident	Charter	12.50	4	12.50	(27.28)	52.28
		Private Boat	725.00	2	475.00	(5,310.45)	6,760.45
	resident	Charter	125.00	2	125.00	(1,463.28)	1,713.28
		Private Boat	283.33	9	90.14	75.47	491.19
Lodging	non-resident	Charter	2,837.50	4	1,761.08	(2,767.05)	8,442.05
		Private Boat	600.00	2	600.00	(7,023.72)	8,223.72
	resident	Charter	500.00	2	500.00	(5,853.10)	6,853.10
		Private Boat	0.00	9	0.00	0.00	0.00
Miscellaneous Costs	non-resident	Charter	625.00	4	473.24	(881.07)	2,131.07
		Private Boat	75.00	2	75.00	(877.97)	1,027.97
	resident	Charter	0.00	2	0.00	0.00	0.00
		Private Boat	16.67	9	11.79	(10.51)	43.84
Other Recreational Activities	non-resident	Charter	250.00	4	144.34	(209.35)	709.35
		Private Boat	0.00	2	0.00	0.00	0.00
	resident	Charter	75.00	2	75.00	(877.97)	1,027.97
		Private Boat	0.00	9	0.00	0.00	0.00
Total Daily Expenditures	non-resident	Charter	4,211.25	4	1,220.40	327.39	8,095.11
		Private Boat	1,564.17	2	1,044.17	(11,703.23)	14,831.56
	resident	Charter	937.50	2	362.50	(3,668.50)	5,543.50

Puerto Rico			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
		Private Boat	484.44	9	161.98	110.93	857.96
Total Trip Expenditures	non-resident	Charter	7,872.50	4	2,781.17	(978.43)	16,723.43
		Private Boat	4,172.50	2	3,652.50	(42,236.91)	50,581.91
	resident	Charter	1,587.50	2	1,012.50	(11,277.53)	14,452.53
		Private Boat	500.56	9	158.52	135.01	866.10

Trinidad and Tobago			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Expenditure Category	Resident Status	Fishing Mode					
Airfare	non-resident	Private Boat	0.00	2	0.00	0.00	0.00
	resident	Private Boat	0.00	6	0.00	0.00	0.00
Bait and Tackle	non-resident	Private Boat	250.00	2	50.00	(385.31)	885.31
	resident	Private Boat	433.33	6	183.79	(39.11)	905.77
Car Rental	non-resident	Private Boat	0.00	2	0.00	0.00	0.00
	resident	Private Boat	0.00	6	0.00	0.00	0.00
Charter Fees	non-resident	Private Boat	0.00	2	0.00	0.00	0.00
	resident	Private Boat	0.00	6	0.00	0.00	0.00

Trinidad and Tobago			Average Expenditure (USD)	N	Standard Error	95% Lower Bound	95% Upper Bound
Food and Beverage	non-resident	Private Boat	350.00	2	150.00	(1,555.93)	2,255.93
	resident	Private Boat	720.00	6	285.42	(13.70)	1,453.70
Fuel (Vehicle and Boat)	non-resident	Private Boat	2,650.00	2	2,350.00	(27,209.58)	32,509.58
	resident	Private Boat	1,333.33	6	166.67	904.90	1,761.76
Lodging	non-resident	Private Boat	0.00	2	0.00	0.00	0.00
	resident	Private Boat	0.00	6	0.00	0.00	0.00
Miscellaneous Costs	non-resident	Private Boat	200.00	2	100.00	(1,070.62)	1,470.62
	resident	Private Boat	166.67	6	84.33	(50.10)	383.44
Other Recreational Activities	non-resident	Private Boat	0.00	2	0.00	0.00	0.00
	resident	Private Boat	41.67	6	41.67	(65.44)	148.77
Total Daily Expenditures	non-resident	Private Boat	1,416.67	2	616.67	(6,418.83)	9,252.16
	resident	Private Boat	838.33	6	213.09	290.57	1,386.10
Total Trip Expenditures	non-resident	Private Boat	3,450.00	2	2,650.00	(30,221.44)	37,121.44
	resident	Private Boat	2,695.00	6	613.70	1,117.44	4,272.56

APPENDIX 3: AGGREGATE CHARTER BOAT COSTS AND EARNINGS.

Estimate Type	Expenditure Category	Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
Annual Estimates	Annual Boat Insurance	3,123.29	28	624.02	1,842.91	4,403.66
	Annual Gear and Tackle	2,657.21	28	591.89	1,442.75	3,871.67
	Annual Interest	0.16	25	0.11	(0.07)	0.39
	Annual Licensing	403.46	28	92.16	214.37	592.55
	Annual Mooring Fees	4,225.07	28	1,083.86	2,001.17	6,448.97
	Annual Other	2,653.78	27	772.64	1,065.59	4,241.96
	Annual Repair and Maintenance	12,459.00	28	2,877.53	6,554.80	18,363.20
	Fish Sale Revenue	2,622.71	24	585.84	1,410.80	3,834.62
	Total Annual Cost	25,427.18	28	4,870.19	15,434.37	35,419.98
	Total Revenue	21,796.19	36	4,542.62	12,574.19	31,018.20
Full Day Trip Estimates	Full Day Bait Cost	54.78	27	10.20	33.82	75.74
	Full Day Boat Share	143.67	27	40.09	61.26	226.07
	Full Day Captain Share	95.70	27	26.28	41.69	149.72
	Full Day Food and Beverages	66.07	27	12.40	40.58	91.57
	Full Day Fuel	270.93	27	52.71	162.59	379.26
	Full Day Gear Used on Trip	35.30	27	6.91	21.10	49.50
	Full Day Ice	15.37	27	2.77	9.67	21.07
	Full Day Mate Share	50.70	27	12.71	24.59	76.82
	Full Day Oil and Lube	28.70	27	6.24	15.88	41.53
	Full Day Price	1,343.84	38	160.62	1,018.39	1,669.30
	Full Day Tips	180.60	35	30.45	118.72	242.48
	Total Full Day Cost per Trip	761.22	27	113.57	527.77	994.67
	Total Full Day Trips (# of trips)	19.28	47	3.46	12.31	26.24
Half Day Trip Estimates	Half Day Bait	39.97	29	7.13	25.37	54.56
	Half Day Boat Share	68.44	27	18.06	31.33	105.56
	Half Day Captain Share	70.85	27	18.08	33.70	108.01

Estimate Type	Expenditure Category	Average Expenditure (USD)	N	Standard Error (USD)	95% Lower Bound (USD)	95% Upper Bound (USD)
	Half Day Food and Beverages	52.86	29	9.31	33.79	71.93
	Half Day Fuel	171.47	30	31.10	107.85	235.08
	Half Day Gear Used on Trip	31.61	28	5.59	20.14	43.07
	Half Day Ice	12.28	29	1.75	8.69	15.87
	Half Day Mate Share	51.41	27	11.57	27.62	75.19
	Half Day Oil and Lube	18.79	28	3.28	12.05	25.52
	Half Day Price	577.94	31	91.92	390.21	765.66
	Half Day Tips	81.53	30	15.98	48.86	114.21
	Total Half Day Cost per Trip	491.73	30	68.79	351.04	632.42
	Total Half Day Trips (# of trips)	21.74	27	6.38	8.63	34.85

APPENDIX 4: STATE PREFERENCE CHOICE EXPERIMENT QUESTION.

Now we are going to ask you a few hypothetical questions about your next billfish fishing trip in {{ Q49 }}. Please answer these questions thinking about your most recent billfish fishing trip in the Caribbean.

Assume that:

-- you expect to fish for {{ Q39 }} days.

-- you expect that the total cost of the trip (including transportation, lodging, airfare, car rental, food and beverage, bait and tackle, charter fees, fuel and all other costs) is equal to the total cost of your most recent trip.

-- you expect to catch {{ Q34 }} billfish ({{ Q35 }} trophy sized), {{ Q36 }} tuna, {{ Q37 }} dolphin and {{ Q38 }} other fish.

Now, suppose that for some reason:

A 16.65% -- you expect that the total costs of your trip will be US\$ 100 higher compared to your most recent trip.

B 16.67% -- you expect that the total costs of your trip will be US\$ 250 higher compared to your most recent trip.

C 16.67% -- you expect that the total costs of your trip will be US\$ 500 higher compared to your most recent trip.

D 16.67% -- you expect that the total costs of your trip will be US\$ 750 higher compared to your most recent trip.

E 16.67% -- you expect that the total costs of your trip will be US\$ 1000 higher compared to your most recent trip.

F 16.67% -- you expect that the total costs of your trip will be US\$ 1500 higher compared to your most recent trip.

A 16.65% -- you expect to catch 1 more billfish compared to your most recent trip (this billfish is not trophy sized).

B 16.67% -- you expect to catch 1 more billfish compared to your most recent trip (this billfish is trophy sized).

C 16.67% -- you expect to catch 2 more billfish compared to your most recent trip (neither of these billfish are trophy sized).

D 16.67% -- you expect to catch 2 more billfish compared to your most recent trip (1 of these billfish is trophy sized).

E 16.67% -- you expect to catch 3 more billfish compared to your most recent trip (none of these billfish are trophy sized).

F 16.67% -- you expect to catch 3 more billfish compared to your most recent trip (1 of these billfish is trophy sized).

This circular summarizes the methods and results of a survey designed to estimate angler expenditures and willingness-to-pay (WTP) for billfish recreational fishing in the Caribbean. The survey conducted in 2017 found that the value of billfish recreational fishing and expenditures by recreational fishers are very high in the region. The results demonstrate that there is the potential to raise conservation funds from this resource user group. This study estimated that one more billfish caught in the Caribbean, regardless of the disposition of that catch, was worth USD 761, with USD 1 494 for an additional trophy fish caught. The survey also examined WTP for conservation funds that could provide longer term financing of fisheries interventions aimed at securing the sustainability of overfished billfish stocks. A stamp for billfish fishing, or a license for billfish fishing, is a seemingly appealing way of converting some of the WTP for increased stocks into a fund that can be used to enhance billfish conservation. On average, anglers that had not taken a trip in the last 12 months were willing to pay USD 280 for a government administered stamp or an endorsement that would allow them to target billfish for a year. Avid anglers are willing to pay somewhat more for such an endorsement, at USD 439/year for a government administered fund. Total daily expenditures by non-resident private boaters participating in this survey were USD 2 767/day and USD 1 036/day for residents. On the charter angler side, total non-resident expenditures were USD 2 971/day and resident anglers expenditures were USD 820/day the survey revealed. Overall, angler expenditures for billfish angling in the Caribbean could be as high as USD 3.5 billion and the total that could be raised from a billfish stamp could be USD 79.1 million for a government administered fund.



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