

**Expenditure and Demographic Profiles of Anglers in the
Commonwealth of Puerto Rico with Special Attention on Coral Reef
Related Activities**



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Executive Summary

In 2004, 140,943 resident saltwater anglers took 1.0 million trips while 22,890 non-resident saltwater anglers took 32,273 trips. For residents, 61.8% of all trips were in the shore fishing mode, 37.8% were in the private boat mode and only 0.4% were in the charter mode. For non-residents, 54.9% of all trips were in the charter fishing mode, 29.8% were in the shore mode and 15.4% were in the private boat mode. Regionally, the majority of non-resident angler trips (17,892) occur in the north while the majority of resident trips (432,633) occur in the east of Puerto Rico.

All across Puerto Rico hook and line fishing predominates. The second most popular gear type is the yoyo used across as many as 11.9% of the trips in the west. The most popular target species vary by region with dolphin being the most popular for residents across all regions except the west where lane snapper is the most popular target. For non-residents, Atlantic tarpon is the most popular target in the east and the west while blue marlin is the favorite in the north and dolphin the favorite in the south. Overall, non-residents target fewer species of fish than residents.

Demographically, Puerto Ricans anglers are wealthier than average with the majority of resident and non-resident anglers making at least between \$15,600-\$31,199. Non-residents are slightly more affluent than residents. Overall the residents describe themselves as Puerto Rican (36.7%) while the majority of non-residents describe themselves as white (65.0%). This is also a highly educated group with 85% of residents holding a high school degree and 28% holding a bachelor's degree while 89.9% of non-residents hold high school degrees and 28.6% hold a bachelor's degree.

66.3% of residents list saltwater recreational fishing as their most important recreational activity while only 40.3% of non-residents feeling the same. Overall, the average age of anglers in this survey was 40.6 years. 27.1% own boats with an average length of 23.7 feet and 267.9 horsepower. As with other recreational survey efforts, 90.1% of the respondents were male and had 14.8 years of fishing experience.

Saltwater recreational fishing in PR is an important industry generating \$754.8 million in trip and durable good expenditures. The majority of that total, \$646.6 million, are from annual durable good purchases driven mainly by boat purchases. Regarding trip expenditures, resident anglers generate \$85.6 million (79.2%) in expenditures while tourist anglers generate \$22.5 million (20.8%) of that total. Resident expenditures are driven by shore mode food expenditures while tourist expenditures are driven by transportation expenditures. This suggests that tourist angling is also an important economic engine for PR.

Attempts were made to stratify expenditures by structure fished (coral reef, mangrove, man-made and unknown). However, because over 80% of intercepted anglers did not know what type of structure they fished, those estimates, while provided below, were deemed unreliable. Attempts were also made to stratify expenditures by Puerto Rican region, but due to low response rates, those estimates were also deemed unreliable.

In addition, the MRFSS add on survey revealed that 37% of the residents and 73% of the non-residents felt that coral reef were in excellent or good shape whereas 33% of the residents and 11% of the non-residents believed that the condition of the coral reefs was poor. Also, the add-on survey suggests that the entire population of recreational fishermen (both resident and non-resident combined) believed that 40% of the corals reefs in Puerto Rico were protected.

Introduction

In late 2003 the National Marine Fisheries Service (NMFS) conducted a series of economic surveys in Puerto Rico (PR). These surveys were conducted as add-on surveys to the Marine Recreational Fisheries Statistical Survey (MRFSS) in two month waves from November/December 2003 through September/October 2004. The MRFSS in Puerto Rico is conducted by PR Department of Natural and Environmental Resources personnel. The economic add-ons were designed to collect valuation and expenditure information from saltwater recreational anglers. The surveys began with the initial MRFSS intercept survey. The intercept survey gathers information on angler catch, effort and other trip characteristics. Participants in the intercept survey, upon completion of the base survey, were asked if they would participate in a short intercept add-on survey (Appendix 1). At the completion of the intercept add-on, participants were asked to provide a contact telephone number for a telephone follow-up survey (Appendix 2) used to collect detailed trip and annual expenditures along with demographic and attitude and opinion data. The telephone survey was conducted beginning in 2004. This report begins by describing the character of the recreational fishery in PR in 2004. Next the expenditure estimation routine is described and expenditure estimates for 2004 are detailed.

Recreational Fishery Background

Effort and Participation

Table 1 contains saltwater recreational fishing effort as estimated by the MRFSS survey and post stratified by the author using the proportion of resident and non-resident respondents responding to the base MRFSS data (NMFS 2009). Overall, 1.1 million recreational saltwater fishing trips were taken in PR in 2004. Residents took slightly over 1 million trips with the shore mode dominating effort by mode with 629,196 trips. Non-residents took 32,273 trips, mostly in the for-hire mode (17,710 trips). In 2004, the effort in Table 1 was generated by 140,943 resident recreational fishing participants and 22,890 non-resident participants (NMFS 2009). It is beyond the scope of this study to post-stratify participants beyond these estimates using the MRFSS intercept survey data as the intercept survey is designed to be a random sample of trips.

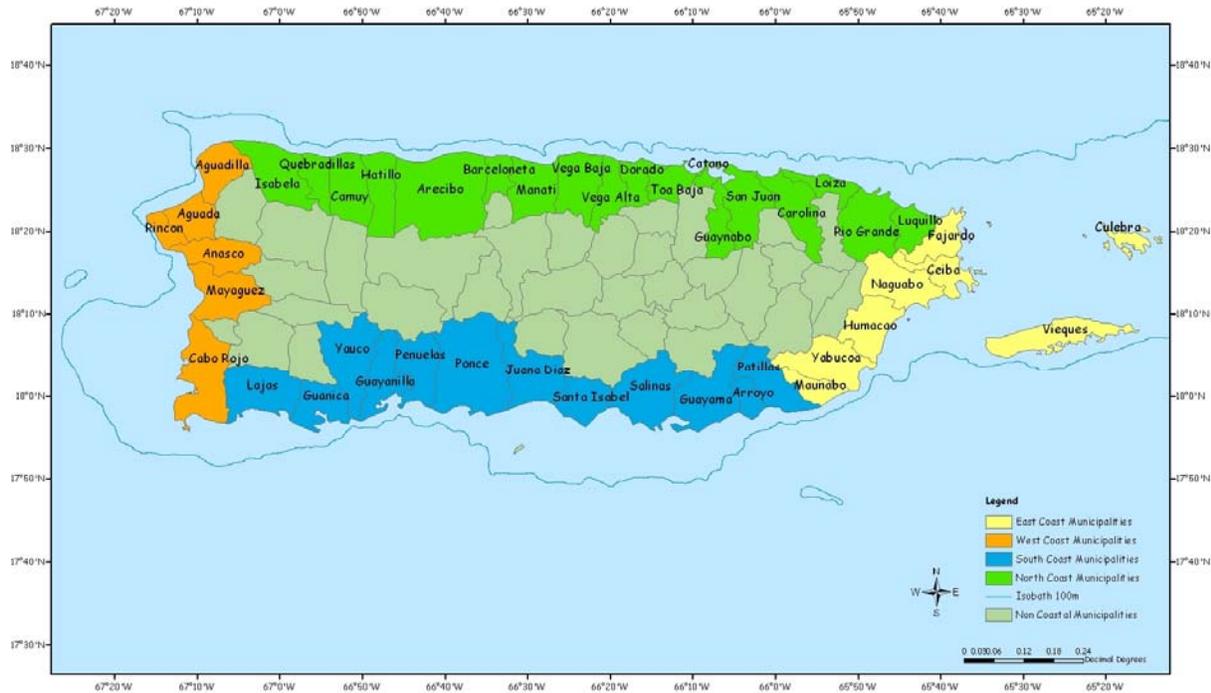
Table 1. Saltwater Recreational Fishing Effort by Resident Status

MODE	Resident		Non-Resident	
	Trips	Standard Error	Trips	Standard Error
Charter	4,318	1,256.56	17,710	5,153.59
Private Boat	384,512	39,989.20	4,957	515.57
Shore	629,196	96,266.98	9,606	1,469.72
Mode Total	1,018,026	137,512.74	32,273	7,138.89
Grand Total	1,050,299	144,651.63		

To further examine recreational fishing effort in PR, the MRFSS effort estimates were further post stratified using the region of trip origination. The regions used for this analysis were supplied by NMFS personnel and conform to regions used in commercial fishing data. Figure 1 displays the regions of PR used here. The segmentation used here includes: the north coast extending from the municipalities of Isabella to Luquillo; the east coast extending from the

municipalities of Fajardo to Maunabo, including the islands of Vieques and Culebra; the west coast extending from the municipalities of Cabo Rojo to Aguadilla; and the south coast extending from the municipalities of Patillas to Lajas. Region was assigned in the data using municipality of intercept.

Figure 1. Regions of Puerto Rico Used Here.



The intercept region proportions were used to stratify recreational saltwater fishing effort by region and resident status (Table 2). From Table 2, the most resident trips are taken in the east (432,633 trips) closely followed by the north with 408,493 trips. Non-residents take most of their trips in the north as well (17,892 trips). The unknown category is the result of the municipality of intercept variable being left blank. There were several non-resident observations in the telephone data that did not have a matching intercept record. The unknown trips are a result of these records.

Table 2. Saltwater Recreational Fishing Effort by Region and Resident Status.

MODE	Resident	Non-Resident
	Trips	Trips
East	432,633	9,458
North	408,493	17,892
South	34,701	1,268
West	142,199	2,730
Unknown	0	926
Mode Total	1,018,026	32,273
Grand Total	1,050,299	

Because the intercept add-on survey was designed primarily to examine use and valuation of coral reefs and other structures, the intercept survey asked what structure the angler fished during their fishing trip. Choices included coral reefs, man-made structure (piers, jetties, bridges, man-made reefs, etc.), mangroves, or unknown. The majority of anglers did not know what type of structure they fished over during their trip (83.3% for residents and 81.8% for non-residents). The responses to this question were used to post stratify resident effort in Table 3. Residents that fished over coral reefs took 115,042 fishing trips over coral reefs while non-residents took 3,461 trips utilizing coral reefs. Because of the degree of unknown responses, these estimates are likely gross underestimates of the actual fishing effort occurring over coral reefs. It is likely that these structure stratified effort estimates represent a lower bound on actual coral reef associated recreational fishing effort.

Table 3. Saltwater Recreational Fishing Effort by Structure Fished and Resident Status.

MODE	Resident	Non-Resident
	Trips	Trips
Coral	115,042	3,461
Man-Made	15,087	49
Mangrove	35,833	2,584
Unknown	852,064	26,179

Trip Characteristics

Table 4 contains the prevalence of gear type used by resident by region of trip origination. In all regions, hook and line fishing gear predominates (98.0% in the east to 82.2% in the west), but is lowest in the west at 82.2%. The second most popular gear type in the west is the yoyo. Yoyo gear involves a spring loaded reel that sets the hook automatically when a fish bites the hook. In fact, yoyo gear is the second most popular gear type in each region. Non-resident anglers only use the hook and line gear type.

Table 4. Resident Use of Gear Types by Region.

Gear	Region			
	East	North	South	West
	Percent	Percent	Percent	Percent
Hook & Line	97.99	97.14	92.39	82.23
Dip Net	0.17	n/a	n/a	n/a
Cast Net	0.44	n/a	n/a	1.59
Gill Net	n/a	n/a	n/a	n/a
Seine	0.35	n/a	n/a	2.65
Trawl	n/a	n/a	n/a	n/a
Trap	0.09	0.09	n/a	n/a
Spear	0.17	1.11	n/a	1.33
Hand	n/a	n/a	n/a	n/a
Other	n/a	n/a	n/a	n/a
Yoyo	0.70	1.66	7.61	11.94
Refused	0.09	n/a	n/a	0.27

The MRFSS survey characterizes area fished into three broad categories; inland (inside coastal bays and estuaries), ocean less than ten miles offshore and ocean more than 10 miles offshore. Table 5 contains the frequency of trips in each ocean zone by residents and non-residents. In all regions, residents most frequently go offshore but stay within 10 miles of land. Non-residents, on the other hand, predominately stay inshore less than 10 miles offshore in the east and north but predominately fish offshore greater than 10 miles in the south and the west. Non-residents also participate in more inland fishing than residents in the north and the west.

Table 5. Area Fished by Resident Status and Region.

Region	Fishing Area	Resident Percent	Non-Resident Percent
East	Ocean <= 10 miles	95.55	100.00
	Ocean > 10 miles	4.01	0.00
	Inland	0.44	0.00
North	Ocean <= 10 miles	64.54	78.20
	Ocean > 10 miles	27.98	10.63
	Inland	7.48	11.17
South	Ocean <= 10 miles	93.48	46.15
	Ocean > 10 miles	5.43	53.85
	Inland	1.09	0.00
West	Ocean <= 10 miles	75.86	25.00
	Ocean > 10 miles	19.63	46.43
	Inland	4.51	28.57
Unknown	Ocean <= 10 miles	0.00	0.00
	Ocean > 10 miles	0.00	0.00
	Inland	0.00	0.00

Table 6 details the targeting preferences for fish species in each region by resident status. In order to keep this table a manageable size, only the top ten most targeted species for each region and resident status are listed. In the east, residents target dolphin (18.3%), mutton snapper (13.3%) and tarpon (12.5%) while non-residents target tarpon (68.5%), mutton snapper (9.3%) and blackfin tuna (5.6%). In the north, residents target dolphin (42.5%), blue marlin (27.2%) and snook (6.1%) while the non-residents target blue marlin (45.6%), dolphin (35.4%) and tarpon (14.6%). In the south, residents target dolphin (20.0%), schoolmaster snapper (15.0%) and yellowtail snapper, while non-residents target only dolphin (72.2%) and wahoo (27.8%). In the west, residents target lane snapper (12.7%), snook (12.7%) and dolphin (10.7%) while non-residents target tarpon (48.8%), dolphin (19.5%) and wahoo (14.6%). Overall, non-residents target fewer species of fish and typically the top one or two positions explain most targeting behavior. Because non-resident trips are dominated by the charter fishing mode, much of the targeting choice for non-residents is driven by the captains of the charter vessels.

Table 6. Top Ten Targeted Species by Resident Status and Region.

Region	Resident		Non-Resident	
	Common Name	Percent	Common Name	Percent
East	DOLPHIN	18.33	ATLANTIC TARPON	68.52
	MUTTON SNAPPER	13.33	MUTTON SNAPPER	9.26
	ATLANTIC TARPON	12.50	BLACKFIN TUNA	5.56
	YELLOWFIN TUNA	11.67	BLUE MARLIN	2.78
	BLUE MARLIN	8.33	KING MACKEREL	2.78
	LITTLE TUNNY	5.83	SNAPPER FAMILY	2.78
	TUNA GENUS	5.83	KING MACKEREL (SMALL)	1.85
	ATLANTIC SAILFISH	5.00	LITTLE TUNNY	1.85
	BLACKFIN TUNA	5.00	ATLANTIC TARPON (YOUNG)	0.93
	KING MACKEREL	5.00	DOLPHIN	2.78
North	DOLPHIN	42.51	BLUE MARLIN	45.62
	BLUE MARLIN	27.19	DOLPHIN	35.40
	SNOOK	6.11	ATLANTIC TARPON	14.60
	CERO	5.39	WAHOO	1.82
	ATLANTIC TARPON	4.67	CERO	0.73
	JACK CREVALLE	2.04	ATLANTIC SAILFISH	0.36
	LANE SNAPPER	1.80	JACK CREVALLE	0.36
	SILK SNAPPER	1.80	KING MACKEREL (SMALL)	0.36
	DOG SNAPPER	1.20	SPOTFIN MOJARRA	0.36
	YELLOWTAIL			
	SNAPPER	1.08	WHITE MARLIN	0.36
South	DOLPHIN	20.00	DOLPHIN	72.22
	SCHOOLMASTER	15.00	WAHOO	27.78
	YELLOWTAIL			
	SNAPPER	15.00		
	BLUE MARLIN	10.00		
	LANE SNAPPER	10.00		
	MUTTON SNAPPER	10.00		
	CERO	5.00		
	SNOOK	5.00		
	SOUTHERN SENNET	5.00		
WAHOO	5.00			
West	LANE SNAPPER	12.69	ATLANTIC TARPON	48.78
	SNOOK	12.69	DOLPHIN	19.51
	DOLPHIN	10.66	WAHOO	14.63
	ATLANTIC TARPON	10.15	BLUE MARLIN	12.20
	WAHOO	10.15	BLACKFIN TUNA	2.44
	BLUE MARLIN	8.12	NORTHERN SENNET	2.44
	YELLOWTAIL			
	SNAPPER	6.09		
	RED HIND	4.57		
	SCHOOLMASTER	3.55		
CERO	3.05			

Description of MRFSS Add-on Results: Intercept and Telephone Surveys

Intercept Survey Questions

Table 7 details the sample sizes by resident status, fishing mode, and add-on survey. An important point to note here is that the telephone survey was plagued with a low response rate. While most intercept add-on participants agreed to a follow-up telephone survey, they either could not be contacted using the telephone number or refused the survey. While exact disposition of phone calls is not known, the survey contractor indicated they obtained a very high number of incorrect phone numbers. As a result, the sample sizes for items off the telephone survey are fairly small.

Table 7. Mode and Residency: Intercept and Telephone.

Resident Status	Fishing Mode	Intercept		Telephone Follow Up	
		Count	Percent	Count	Percent
Non-Resident	Charter	568	94.82	41	65.08
	Private Boat	13	2.17	3	15.87
	Shore	18	3.01	19	19.05
Resident	Charter	135	5.40	13	6.50
	Private Boat	1101	44.06	140	70.00
	Shore	1263	50.54	47	23.50

To examine potential biases that might arise, Table 8 breaks down the response to the structure fished question by the survey mode. The percentages between the two samples appear similar. This suggests, that at least for this one question, that the telephone sample is similar to the intercept sample.

Table 8. Structure Fished: Intercept and Telephone.

Structure	Intercept		Telephone Follow Up	
	Count	Percent	Count	Percent
Coral	347	11.20	29	11.03
Man-Made	36	1.16	5	1.90
Mangrove	134	4.33	14	5.32
Unknown	2581	83.31	215	81.75

Table 9 details the frequency counts of the response to the income question. The income question was asked on both the intercept survey and on the telephone survey. It is impossible to compare these two sample with regards to income due to the way the intercept survey was conducted. The intercept survey only asked income for those anglers that took time off work without pay to take their fishing trip. Very few anglers took time off work to take their trip. This protocol is followed because of the sensitivity of the income question. It was thought that asking everyone income would cause respondents to refuse to participate in the follow-up survey. Since income is only used by NMFS to calculate the opportunity cost of time for only those that took time off from work, the bare minimum data was collected. Mean PR income is

approximately \$17,000 per year.¹ From this table, one can see that fishermen have slightly higher incomes than average. Table 10 contains income by resident status. Non-residents have higher incomes than residents.

Table 9. Income: Intercept and Telephone Survey

Income	Intercept		Telephone Follow Up	
	Count	Percent	Count	Percent
\$0 - \$15,599	4	26.67	35	15.63
\$15,600 - \$31,199	5	33.33	54	24.11
\$31,200 - \$46,799	0	0	34	15.18
\$46,800 - \$62,399	1	6.67	36	16.07
\$62,400 - \$77,999	1	6.67	20	8.93
\$78,000 - \$93,599	2	13.33	9	4.02
\$93,600 - \$109,199	2	13.33	9	4.02
\$109,200 - \$124,799	0	0	7	3.13
\$124,800 - \$139,999	0	0	5	2.23
>\$140,000	0	0.00	15	6.70
Refused	3,083		39	

Table 10. Income by Resident Status.

Income Category	Resident		Non-Resident	
	Count	Percent	Count	Percent
\$0 - \$15,599	35	18.42	4	8.16
\$15,600 - \$31,199	55	28.95	4	8.16
\$31,200 - \$46,799	31	16.32	3	6.12
\$46,800 - \$62,399	25	13.16	12	24.49
\$62,400 - \$77,999	16	8.42	5	10.20
\$78,000 - \$93,599	8	4.21	3	6.12
\$93,600 - \$109,199	7	3.68	4	8.16
\$109,200 - \$124,799	3	1.58	4	8.16
\$124,800 - \$139,999	1	0.53	4	8.16
>\$140,000	9	4.74	6	12.24
Refused	2,509		613	

Telephone Survey Questions

Table 11 contains the responses to the ethnicity question which was only asked on the telephone survey, stratified by resident status. The majority of residents are Puerto Rican (36.7%) followed by other Hispanic (32.7%). The majority of non-residents are white (65%) followed by Puerto Rican (20.0%).

¹ http://www.newyorkfed.org/regional/profile_pr.html

Table 11. Ethnicity by Resident Status: Telephone Survey.

Ethnicity Category	Resident		Non-Resident	
	Count	Percent	Count	Percent
African American	2	1.01	1	1.67
Asian	1	0.50	1	1.67
Other Hispanic	65	32.66	7	11.67
Puerto Rican	73	36.68	12	20.00
White	58	29.15	39	65.00
Refused	1		3	

Table 12 contains respondent educational attainment by resident status. The majority of residents in this survey have obtained bachelor's degree (28.0%) and the same holds for the non-residents with 28.6% having obtained a bachelor's degree. Residents are slightly more educated.

Table 12. Educational Attainment by Resident Status: Telephone Survey.

Ethnicity Category	Resident		Non-Resident	
	Count	Percent	Count	Percent
Less than a high school degree	30	15.00	7	11.11
High school graduate	24	12.00	13	20.63
Some college no degree	33	16.50	9	14.29
Associates degree	25	12.50	4	6.35
Bachelors degree	56	28.00	18	28.57
Post-graduate	5	2.50	3	4.76
Post-graduate degree	26	13.00	6	9.52
Don't know	1	0.50	1	1.59
Refused	.	.	2	3.17

Table 13 contains the survey respondent's ranking of fishing compared to other recreational activities stratified by resident status. Most residents (66.3%) rate fishing as their most important recreational activity while the majority of non-residents rank fishing as one of many recreational activities they enjoy.

Table 13. Fishing's Importance as a Recreational Activity by Resident Status: Telephone Survey.

Rating of Fishing Compared to Other Recreational Activities	Resident		Non-Resident	
	Count	Percent	Count	Percent
Most Important	132	66.33	25	40.32
One of Many	35	17.59	31	50.00
Second Most Important	30	15.08	6	9.68
Don't Know	2	1.01	.	.

Table 14 contains respondent's rankings of relative coral reef health stratified by resident status. 32.9% of residents feel that coral reefs in PR are in poor shape. 30% of residents feel that coral reefs are in fair shape, while 31.8% feel that coral reefs are in good shape. Only 5.3% of

residents believe their coral reefs are in excellent shape. On the other hand, 56.8% of non-residents feel PR coral reefs are in good shape and only 10.8% believe them to be in poor shape. From Table 15, residents and non-residents feel that 40.4% of all coral reefs are protected. There is little difference between residents and non-residents with residents feeling that 39.5% and with non-residents feeling 44.7% of reefs are protected.

Table 14. Reef Health Rating by Resident Status: Telephone Survey.

Reef Health Rating	Resident		Non-Resident	
	Count	Percent	Count	Percent
Excellent Shape	9	5.29	6	16.22
Good Shape	54	31.76	21	56.76
Only Fair Shape	51	30.00	6	16.22
Poor Shape	56	32.94	4	10.81
Refused	30		26	

Table 15 contains the means of the continuous variable from the survey by intercept and telephone surveys. Not all variables in Table 15 were asked across both surveys. Confidence intervals in Table 15 are based on 95% confidence levels. The average age of the telephone survey respondent was 41 years old. On the intercept survey anglers fished for an average of 4.5 hours on their last trip while the telephone respondents fished for 4.8 hours. Less than one percent (0.7%) of intercept survey participants took time off work without pay to make their fishing trip while 2.1% of telephone survey respondents took time off work without pay. On average, intercept survey respondents work 42.2 hours per week while telephone respondents work 47.4 hours per week. 27.1% of intercept survey respondents own a boat while 50% of telephone survey respondents own a boat.

Regarding boat horsepower, anglers from the intercept survey that owned boats had a total horsepower of 267.9 while the telephone respondents had an average horsepower of 208.2. In terms of boat length, intercept participants own slightly longer boats with 23.6 foot boats compared to the 22.1 foot boats of the telephone respondents. Telephone survey participants were 90% male and had 14.8 years of saltwater fishing experience. Telephone survey participants also feel that 40.4% of coral reefs are protected. Means of the continuous variables by region are included in Appendix 3. Finally, Table 16 details the mode of public transportation used for those participants that had a non-zero public transportation expenditure. Only two resident participants listed a public transportation expenditure and one took the bus and the other took a taxi. It is believed that this question was misunderstood by respondents. By definition, a non-resident comes from somewhere outside PR and must travel by plane or boat to get to PR. Some respondents listed air travel, while others listed buses, taxis and other modes.

Table 15. Means of Continuous Variables: Intercept and Telephone Survey.

Variable	Intercept				Telephone			
	N	Mean	Lower Bound	Upper Bound	N	Mean	Lower Bound	Upper Bound
Age	n/a	n/a	n/a	n/a	263	40.64	39.01	42.27
Hours fished* (hrs)	3,093	4.46	4.40	4.52	244	4.75	4.52	4.98
Time off work without pay* (%)	2,712	0.66	0.36	0.97	244	2.05	0.26	3.84
Hours worked per week (hrs)	15	42.15	35.62	48.69	5	47.40	22.30	72.50
Boat ownership (%)	2,712	27.06	25.39	28.74	244	50.00	43.68	56.32
Boat horsepower (hp)	697	267.90	251.31	284.48	118	208.18	175.12	241.23
Boat length (feet)	722	23.69	23.02	24.36	122	22.07	20.79	23.34
Years saltwater recreational fishing (yrs)	n/a	n/a	n/a	n/a	261	14.82	13.23	16.41
Percent male	n/a	n/a	n/a	n/a	263	90.11	86.48	93.74
Percentage of reef protected**	n/a	n/a	n/a	n/a	144	40.35	34.66	46.05

*On most recent trip

**Question asked: What percentage of coral reefs around Puerto Rico do you think are fully protected—meaning there are no commercial or recreational activities allowed that could result in damaging or removing habitat, fish, coral, or other marine life on the reef?

Table 16. Public Transportation Mode for Respondents with a Positive Public Transportation Expenditure.

Public Transportation Mode	Resident		Non-Resident	
	Count	Percent	Count	Percent
Airplane	.	.	19	59.38
Bus	1	50.00	1	3.13
Taxi	1	50.00	7	21.88
Other, not specified	.	.	5	15.63

Expenditure Analysis

Average daily trip expenditures were estimated for each fishing mode (party/charter boat; private/rental boat; and shore) by resident type (resident or non-resident) using the same estimation techniques as Gentner, Steinback and Price (2001). Anglers reported making two types of trips: day trips and multi-day (overnight) trips. Overnight anglers were asked to report trip length, number of days fished, and total trip expenditure. Across this 2004 survey, 67.3% of non-resident anglers were on a single day trip and 32.5% were on a multi-day trip. As expected, only 4.0% of residents were on a multi-day trip.

Total daily average expenditures was derived by dividing total expenditures by either the number of days fished or trip length (nights away from residence). For those non-residents on a multi-day trip, they spent 6.7 nights in PR and 1.4 days fishing during the trip on average. For residents that were on a multi-day trip, they spend 4.9 nights away from their home and spent 2.7

days fishing. Average daily expenditures for expenditures directly related to fishing, such as boat fuel, guide or package fees, access and/or boat launching fees, equipment rental (boat, fishing or camping equipment), bait, ice, and public transportation were calculated by dividing the total amount spent by the number of days fished. For expenditures not directly associated with fishing (e.g., food/drink/refreshments and lodging at motels/cabins/lodges/campgrounds, etc.), average daily expenditures were derived by dividing total expenses on multi-day (overnight) trips by the length of these trips. This approach for estimating indirect average expenditures per day assumes constant daily food, beverage, and lodging expenditures for anglers on overnight trips.

To develop per person per day expenditures, the expenditures estimates were divided by the number of people sharing expenses. The phone survey asked the number of people sharing expenses in the party. It also asked, after every expenditure category if the expense was shared or not. If it was shared, the expenditure value given was divided by the number in the party sharing expenses. For non-residents, the average fishing party size was 3.5 people and for resident the fishing party averaged 3.0 people.

Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items used primarily for saltwater recreational fishing. Twelve month estimates of average angler expenditures for fishing equipment and semi-durable items were also calculated with data collected from the telephone follow-up survey. Annual estimates of expenditures of durable items were also derived.

Correcting for Avidity Bias

Because the intercept survey is a random sample of trips, it produces unbiased estimates of trip expenditures, but biased estimates of annual durable expenditures. In previous expenditures surveys (Gentner et al 2001), expenditure data was collected across a random sample of anglers and a random sample of trips. Estimates generated from the intercepted sample contain a higher proportion of responses from avid anglers. Because of the positive relationship between avidity and expenditures, annual durable good expenditures from the intercepted anglers contain an upward bias when compared to the random sample of anglers. To correct for the avidity bias, weighted durable expenditure means were calculated as described below.

Using a procedure adapted from Thomson (1991), estimates of means were computed as follows:

(1)

$$\hat{R} = \frac{\sum_s \frac{Y_k}{X_k}}{\sum_s \frac{1}{X_k}},$$

where \hat{R} is the weighted durable expenditure; Y_k is the expenditure of angler k; X_k is the avidity of angler k; and s represents the population sample. For this effort avidity is the number of days of saltwater fishing in the previous 12 months (7.3 days on average for non-residents and 65.8 days on average for residents). Equation (1) corrects for the unequal selection probabilities of intercepted anglers due to the avidity bias and produces consistent estimates of mean

expenditures with relatively high precision. Although \hat{R} is an unbiased estimator of R, equation 1 is not an unbiased estimate of the mean of R because it is a ratio estimator (Thomson 1991). However, as the sample size increases, the bias becomes negligible. The associated variance, $\hat{V}(\hat{R})$, developed by Thomson (1991), was estimated by

$$(2) \quad \hat{V}(\hat{R}) = \frac{\left[\sum_s \frac{Y_k}{X_k} \right]^2}{\left[\sum_s \frac{1}{X_k} \right]} \frac{1}{m} \left[\frac{S_{\frac{Y}{X}}^2}{\hat{R}^2} + \frac{S_{\frac{1}{X}}^2}{1} - \frac{2S_{\left(\frac{Y}{X}\right)\left(\frac{1}{X}\right)}}{\hat{R}} \right];$$

where

$$S_{\frac{Y}{X}}^2 = \frac{1}{m-1} \left[\sum_s \left(\frac{Y_k}{X_k} \right)^2 - m \left(\frac{\bar{Y}_k}{\bar{X}_k} \right)^2 \right],$$

$$S_{\frac{1}{X}}^2 = \frac{1}{m-1} \left[\sum_s \left(\frac{1}{X_k} \right)^2 - m \left(\frac{1}{\bar{X}_k} \right)^2 \right],$$

and

$$S_{\left(\frac{Y}{X}\right)\left(\frac{1}{X}\right)} = \frac{1}{m-1} \left[\sum_s \frac{Y_k}{X_k^2} - m \frac{\bar{Y}_k}{\bar{X}_k} \frac{1}{\bar{X}_k} \right].$$

m is the number of observations in the sample, $\frac{\bar{Y}_k}{\bar{X}_k}$ is the sample mean of Y_k

times the inverse of X_k , and is the sample mean of the inverse of avidity for each angler k.

Angler durable expenditure estimates were further adjusted to account for the amount spent in PR. In the telephone survey, anglers were asked to estimate the proportion of trip and equipment expenditures spent in PR and the proportion of durable and semi-durable expenditures spent outside PR. These proportions were used to adjust the expenditure estimates from the telephone follow-up survey prior to calculating weighted means for the annual items.

Total Expenditures

Arithmetic mean daily trip expenditures were multiplied by MRFSS estimates of total fishing effort (Table 1) to derive total trip expense estimates. Estimates were calculated by mode, and resident status. The variances of the total expenditure estimates were calculated according to Gray (1999) as follows:

$$(3) \quad \hat{V}(T\hat{r}) = T^2 \hat{V}(\hat{r}) + \hat{V}(T)\hat{r}^2 - \hat{V}(T)\hat{r},$$

where \hat{T} is the estimate of total trips and $\hat{V}(\hat{T})$ its associated variance, \hat{r} is the arithmetic mean of trip expenditures, and $\hat{V}(\hat{r})$ is the variance of trip expenditures.

Goodman (1960) showed that Equation (3) produces an unbiased variance estimate when \hat{r} and \hat{T} are independent random variables. Because trip-related items were collected randomly and estimates of r and T were calculated from different surveys, the variables were considered to be random and independent. Standard errors, derived from equation (3) are displayed in the expenditure estimate tables below.

Estimates of total annual fishing equipment and durable expenditures were calculated by multiplying the avidity weighted mean expenditures per participant by MRFSS estimates of annual total fishing participation. The resultant variance was calculated as follows:

(4)

$$V(RP) = P^2V(R) + V(P)R^2 - V(P)V(R),$$

where \hat{P} and $\hat{V}(\hat{P})$ are estimates of participation and its variance, \hat{R} is the weighted expenditure mean, and $\hat{V}(\hat{R})$ is the associated variance. The weighted mean expenditures and variances are estimated from equations (1) and (2). Standard errors were calculated from the resulting variance estimates for each expenditure item.

Estimates

Sample sizes for all expenditure estimates are generally smaller than desired. This is driven by the relatively small sample sizes used by the MRFSS in PR and the resultant high standard errors of MRFSS estimates of effort and participation. Additionally, because the survey contractor could not complete the telephone surveys mainly due to invalid numbers, sample sizes across the expenditure estimates were very small driving standard errors higher. Examining equation (3) indicates that two estimates multiplied together with high standard errors will produce high standard errors for the total expenditure estimates. In many cases the high standard errors of the expenditure means were driven by only one or two respondents reporting an expenditure at the resident status and fishing mode stratification level. To get a better idea of the underlying data, Appendix 2 includes estimates of the mean expenditures only across those individuals that had a non-zero expenditure (spenders) in that category.

During the trip expenditure portion of the telephone survey, if a respondent refused or did not know any individual expenditure amounts, they were asked if they could remember their total expenditures for the trip. This occurred 19 times in the data set. In previous analyses (Gentner et al 2001 is one example) NMFS produces a total trip expenditure estimate by summing the mean expenditures by category. The only way to incorporate these 19 observations would be to take a mean of the total expenditures, which would then not add up in the tables below. As a result, these 19 observations were dropped.

Table 17 contains the mean trip expenditure estimates stratified by resident status and fishing mode. For residents, the charter mode anglers had the highest total trip expenditures at \$338.85 per person per trip followed by the private boat mode at \$90.03/person/trip and the shore mode at \$37.62/person/trip. Resident charter expenditures are driven by charter fees of \$243.33/person/trip. Resident private boat expenditures are driven by boat fuel purchases of \$42.64/person/trip. Resident shore expenditures are driven by food expenditures of \$28.23/person/trip. For the non-residents, the charter mode anglers also had the highest expenditures at \$1,186.34/person/trip followed by the private boat mode at \$280.04/person/trip and the shore mode at \$12.44/person/trip. Non-resident charter mode expenditures are driven by charter expenditures of \$337.44/person/trip, but are closely followed by lodging and food expenditures. Non-resident private boat mode expenditures are driven by food expenditures of \$131.21/person/trip. Finally, non-resident shore mode expenditures are driven by food expenditures of \$7.65.

Table 17. Mean Trip Expenditures by Mode and Resident Status.

Expenditure Category	Fishing Mode	Resident Status					
		Resident			Non-Resident		
		N	Total Expenditure(\$)	Standard Error	N	Total Expenditure(\$)	Standard Error
Public Transportation	Party/Charter	11	0.00	0.00	32	433.63	81.42
	Private/Rental	132	0.44	0.33	10	91.60	89.84
	Shore	39	0.00	0.00	11	0.00	0.00
Food	Party/Charter	10	17.50	10.34	35	194.13	59.09
	Private/Rental	127	16.83	1.58	10	131.21	97.46
	Shore	38	28.23	19.56	11	7.65	2.49
Lodging	Party/Charter	11	13.64	13.64	32	204.43	32.59
	Private/Rental	132	0.92	0.77	10	0.00	0.00
	Shore	39	0.00	0.00	11	0.00	0.00
Boat Fuel	Party/Charter	9	15.89	13.20	32	7.97	5.54
	Private/Rental	127	42.64	4.83	10	29.73	7.38
	Shore	39	0.26	0.26	11	0.00	0.00
Boat & Equipment Rental	Party/Charter	7	23.21	14.99	31	3.55	2.48
	Private/Rental	133	0.08	0.08	10	3.33	3.33
	Shore	40	0.00	0.00	11	2.45	2.45
Charter Fees	Party/Charter	8	243.33	222.90	35	337.44	87.55
Access & Parking	Party/Charter	8	25.00	25.00	32	4.72	3.45
	Private/Rental	126	18.41	5.74	9	9.72	8.82
	Shore	40	0.00	0.00	11	0.00	0.00
Bait	Party/Charter	7	0.00	0.00	32	0.47	0.34
	Private/Rental	127	7.49	1.25	10	6.62	2.90
	Shore	40	4.37	0.64	11	1.73	0.90
Ice	Party/Charter	8	0.28	0.19	33	0.02	0.02
	Private/Rental	132	3.23	0.79	9	7.83	5.37
	Shore	40	4.75	3.73	11	0.61	0.30
Trip Total	Party/Charter		338.85	300.25		1186.34	272.46

	Private/Rental	90.03	15.36	280.04	215.11
	Shore	37.62	24.19	12.44	6.15

While the charter fee estimates seem low when compared to the market rates advertised by charter boat operators, one must remember that these estimates are per person per trip estimates. On the non-resident side, the average party size is 3.5 patrons per trip suggesting that the total charter fee was \$1,181.04 which is very much in line with current fees. Similarly for residents, if the average expenditures are expanded by the average number in the resident charter party (3.14), the total fare for the charter boat trip was \$764.06. While this seems a bit low, perhaps residents take more of the less expensive inshore charters or, because they are residents, may be able to obtain discounted fares.

Table 18 contains the mean durable good expenditures for residents and non-residents. Again, these estimates include only those purchases made in PR, except for magazine expenditures which include all magazine expenditures whether made in PR or elsewhere. If the respondent reported a non-zero expenditure for boats, boat accessories, fishing vehicles and second homes, they were asked if those items were purchased primarily for fishing use. If the respondent answered no, the observation was dropped. Residents spend \$4,521.28 every year, on average, on durable fishing equipment. This is driven by motorized boat purchases of \$2,241.58 and boat maintenance of \$1,634.78. This included both used and new purchases. Non-residents spend \$410.38 in PR each year on durable goods. This is driven by boat maintenance expenditures of \$349.92.

Table 18. Mean Durable Good Expenditures.

Expenditure Category	Resident Status					
	Resident			Non-Resident		
	N	Mean Expenditure (\$)	Standard Error	N	Mean Expenditure (\$)	Standard Error
Rods and reels	207	\$334.76	122.9411	47	\$44.36	36.8291
Tackle	207	\$85.03	24.8041	47	\$5.62	2.4691
Camping gear	214	\$42.55	19.6545	47	\$1.45	1.3627
Binnoculars	215	\$8.64	3.3921	47	\$0.00	0.0000
Clothing	213	\$17.71	5.7340	47	\$0.00	0.0000
Taxidermy	212	\$0.92	0.7740	47	\$0.82	0.8351
Magazines	212	\$3.71	1.3717	47	\$6.40	2.0927
Club dues	212	\$40.90	24.1558	47	\$0.00	0.0000
Miscellaneous	214	\$37.54	14.4307	47	\$0.05	0.0557
Motorize boat purchase	103	\$2,241.58	1,093.0997	15	\$0.10	0.1037
Boat maintenance	49	\$1,634.78	530.7903	7	\$349.92	276.7902
Non-motorized boat purchase	215	\$0.96	0.9054	47	\$0.00	0.0000
Boat accessories	214	\$23.60	8.8790	46	\$0.00	0.0000
Vehicle	215	\$47.08	37.9491	47	\$1.64	1.6338
Second home	214	\$1.72	1.2677	45	\$0.00	0.0000
Total Equipment		\$4,521.48	1,890.1494		\$410.38	322.1720

Table 19 contains the total trip expenditures and Table 20 contains the total durable expenditures. Across all modes and both residents and non-residents, saltwater recreational anglers spent \$754.8 million in PR on both trip and durable expenditures. Of that total, \$108.1 million were trip expenditures and \$646.7 million were durable equipment expenditures. Private rental mode resident trip expenditures dominate the trip total with \$43.9 million followed closely by resident shore mode expenditures of \$39.7 million. Non-resident charter mode expenditures generate the third highest total of \$21.0 million demonstrating the importance of tourist anglers in PR.

Table 19. Total Trip Expenditure Estimates.

Expenditure Category	Fishing Mode	Resident Status			
		Resident		Non-Resident	
		Total Expenditure (\$)	Standard Error	Total Expenditure (\$)	Standard Error
Public Transportation	Party/Charter	0	0.00	7,679,468	39,577
	Private/Rental	169,923	6,795.09	454,102	234
	Shore	0	0.00	0	0
Food	Party/Charter	97,157	94.95	3,437,958	17,718
	Private/Rental	7,526,822	258,706.76	650,458	335
	Shore	27,788,499	1,710,062.32	73,501	108
Lodging	Party/Charter	58,883	73.99	3,620,488	18,659
	Private/Rental	412,670	14,172.61	0	0
	Shore	0	0.00	0	0
Boat Fuel	Party/Charter	100,275	86.21	141,126	727
	Private/Rental	24,800,996	655,622.06	147,360	76
	Shore	5,464,683	15,530.97	0	0
Boat & Equipment Rental	Party/Charter	601,446	125.96	62,842	324
	Private/Rental	115,643	1,156.11	16,525	9
	Shore	308,878	0.00	23,578	35
Charter Fees	Party/Charter	1,050,731	1,320.31	5,975,976	30,798
Access & Parking	Party/Charter	107,952	135.65	83,569	431
	Private/Rental	6,462,439	283,017.67	48,197	25
	Shore	648,262	0.00	0	0
Bait	Party/Charter	0	0.00	8,302	43
	Private/Rental	2,666,805	115,179.06	32,802	17
	Shore	2,604,109	264,871.04	16,592	24
Ice	Party/Charter	4,318	1.53	268	1
	Private/Rental	1,725,447	49,721.27	38,833	20
	Shore	2,866,337	287,988.89	5,851	9
Trip Total	Party/Charter	2,020,761	1,839	21,009,996	108,277
	Private/Rental	43,880,744	1,384,371	1,388,276	716
	Shore	39,680,768	2,278,453	119,522	176
Total Trip Expenditures	All Modes	85,582,273	3,664,662	22,517,795	109,168
	Total	108,100,069	3,773,831		

Table 20. Total Durable Expenditures.

Expenditure Category	Resident Status			
	Resident		Non-Resident	
	Expenditure (\$)	Standard Error*	Expenditure (\$)	Standard Error*
Rods and reels	47,182,519	771.41	1,015,504	5.25
Tackle	11,984,379	195.94	128,752	0.67
Camping gear	5,996,996	98.05	33,283	0.17
Binoculars	1,218,415	19.92	0	0.00
Clothing	2,495,686	40.80	0	0.00
Taxidermy	129,882	2.12	18,769	0.10
Magazines	523,343	8.56	146,603	0.76
Club dues	5,764,747	94.25	0	0.00
Miscellaneous	5,290,778	86.50	1,251	0.01
Motorized boat purchase	315,934,697	5,165.34	2,226	0.01
Boat maintenance	230,410,609	3,767.07	8,009,651	41.44
Non-motorized boat purchase	134,911	2.21	0	0.00
Boat accessories	3,326,163	54.38	0	0.00
Vehicle	6,634,968	108.48	37,537	0.19
Second home	242,372	3.96	0	0.00
Total Equipment	637,270,467	10,418.98	9,393,577	48.59
Grand Total	646,664,044	10,467.58		

* In billions

Table 21 contains the trip expenditure means stratified by resident status and fishing region while Table 22 contains the total trip expenditures by resident status and region. Resident anglers in the east spend the most on each trip at \$98.92/person/trip averaged across all modes. This level of expenditure is driven by fuel expenditures. Non-resident anglers spend the most in the west with \$1,958.33/person/trip driven by charter fees. Because of the post-stratification technique employed for post-stratifying effort by region, standard errors could not be calculated for the regional totals. For residents, the east region generated the highest trip expenditures with 42.8 million. For non-residents, the north region also led the totals with \$18.2 million. Overall, recreational saltwater fishing in the north region generated \$57.2 million in trip expenditures, or 52.9% of all PR recreational saltwater trip expenditures.

Table 21. Mean Trip Expenditures by Resident Status and Region.

Expenditure Category	Fishing Region	Resident			Non-Resident		
		N	Expenditure (\$)	Standard Error	N	Expenditure (\$)	Standard Error
Public Transportation	North	117	0.00	0.00	19	282.74	71.45
	East	46	0.00	0.00	14	508.57	158.06
	South	2	0.00	0.00			
	West	17	3.43	2.48	3	433.33	260.34
	Unknown				17	58.82	58.82
Food	North	113	17.14	1.95	21	208.71	95.74
	East	44	30.26	16.80	15	122.47	36.83
	South	1	10.00				
	West	17	6.27	0.93	2	575.00	425.00
	Unknown				18	45.60	23.42
Lodging	North	117	2.14	1.53	20	220.00	48.12
	East	46	0.00	0.00	13	85.91	22.48
	South	2	0.00	0.00			
	West	17	1.27	1.17	2	150.00	150.00
	Unknown				18	40.28	28.52
Boat Fuel	North	113	32.07	3.74	17	4.41	3.21
	East	44	36.53	10.90	15	17.00	11.59
	South	1	20.00				
	West	17	18.65	11.54	3	0.00	0.00
	Unknown				18	12.35	5.07
Boat & Equipment Rental	North	115	1.50	1.00	17	5.49	3.93
	East	47	0.00	0.00	14	3.57	3.57
	South	1	0.00				
	West	17	0.00	0.00	3	0.00	0.00
	Unknown				18	1.50	1.50
Charter Fees	North	115	17.36	15.68	19	294.78	117.90
	East	47	2.55	2.16	16	132.47	36.26
	South	1	0.00				
	West	17	0.00	0.00	3	783.33	662.28
	Unknown				18	97.22	69.13
Access & Parking	North	111	14.90	5.23	16	0.00	0.00
	East	45	19.00	10.70	15	10.07	7.23
	South	1	0.00				
	West	17	0.59	0.59	3	0.00	0.00
	Unknown				18	4.86	4.44
Bait	North	111	7.60	1.36	17	1.08	0.74
	East	46	4.82	1.13	15	0.40	0.34
	South	1	0.00				
	West	16	3.79	1.56	3	0.00	0.00
	Unknown				18	4.21	1.74
Ice	North	116	2.82	0.89	18	0.19	0.19
	East	46	5.76	3.24	15	0.05	0.04
	South	1	1.25				
	West	17	1.55	0.39	3	16.67	16.67
	Unknown				17	1.39	0.61

Table 21 Continued							
Expenditure Category	Fishing Region	Resident			Non-Resident		
		N	Expenditure(\$)	Standard Error	N	Expenditure(\$)	Standard Error
Total Expenditure	North		95.53	31.38		1,017.39	341.26
	East		98.92	44.94		880.50	276.40
	South		31.25	0.00		0.00	0.00
	West		35.56	18.67		1,958.33	1,514.29
	Unknown		0.00	0.00		266.23	193.26

Table 22. Total Trip Expenditures by Resident Status and Region.

Expenditure Category	Fishing Region	Resident	Non-Resident
		Expenditure(\$)	Expenditure(\$)
Public Transportation	North	0.00	5,058,658.97
	East	0.00	4,809,950.67
	South	0.00	0.00
	West	487,938.44	1,183,033.55
	Unknown	0.00	54,486.84
Food	North	7,001,010.02	3,734,123.35
	East	13,089,866.95	1,158,310.13
	South	347,011.31	0.00
	West	892,230.29	1,569,794.51
	Unknown	0.00	42,235.62
Lodging	North	872,847.58	3,936,186.61
	East	0.00	812,527.95
	South	0.00	0.00
	West	181,234.28	409,511.61
	Unknown	0.00	37,308.35
Boat Fuel	North	13,099,781.44	78,934.22
	East	15,804,199.42	160,782.06
	South	694,022.63	0.00
	West	2,651,596.88	0.00
	Unknown	0.00	11,436.94
Boat & Equipment Rental	North	612,739.00	98,229.26
	East	0.00	33,777.74
	South	0.00	0.00
	West	0.00	0.00
	Unknown	0.00	1,389.41
Charter Fees	North	7,092,379.93	5,274,144.78
	East	1,104,593.83	1,252,825.89
	South	0.00	0.00
	West	0.00	2,138,560.64
	Unknown	0.00	90,054.64

Table 21 Continued

Expenditure Category	Fishing Region	Resident Expenditure(\$)	Non-Resident Expenditure(\$)
Access & Parking	North	6,087,522.10	0.00
	East	8,220,019.11	95,208.20
	South	0.00	0.00
	West	83,646.59	0.00
	Unknown	0.00	4,502.73
Bait	North	3,105,341.63	19,295.03
	East	2,085,571.21	3,783.11
	South	0.00	0.00
	West	539,171.97	0.00
	Unknown	0.00	3,902.37
Ice	North	1,150,763.75	3,313.29
	East	2,491,556.13	441.36
	South	43,376.41	0.00
	West	220,176.41	45,501.29
	Unknown	0.00	1,289.52
Trip Total (calculated)	North	39,022,385.45	18,202,885.51
	East	42,795,806.65	8,327,607.12
	South	1,084,410.36	0.00
	West	5,055,994.85	5,346,401.60
	Unknown	0.00	246,606.42

Table 23 details mean trip expenditures stratified by resident status and structure fished, while Table 24 details total trip expenditures by resident status and structure fished. Again, caution is warranted with these estimates as most respondents were unable to answer this question on the survey. As a result, it is likely that the total estimates are lower bounds on the true values. Across resident anglers, fishing mangrove structure produced the highest trip expenditures at \$90.14/person/trip. This expenditure amount was driven by access and parking fees. Across non-residents, fishing coral reef structure produced the highest trip expenditures of \$1,600.00/person/trip. Non-resident coral reef expenditures were driven by lodging expenditures. Caution is also warranted because this stratification produced cell counts with very low sample sizes in many cases. For both residents and non-residents, fishing over coral reef structure generated the most expenditure, at least across anglers that knew the structure they fished on the intercepted trip. In total, \$10.7 million was spent to fish over coral reefs, with residents spending \$5.1 million and non-residents spending \$5.5 million.

Table 23. Mean Trip Expenditures by Resident Status and Structure Fished.

Fishing Structure	Resident			Non-Resident		
	N	Expenditures(\$)	Standard Error	N	Expenditures(\$)	Standard Error
Coral	22	2.65	1.93	2	450.00	450.00
Mangrove	11	0.00	0.00	2	17.50	2.50
Man-Made	3	0.00	0.00			
Unknown	146	0.00	0.00	49	282.80	60.73
Coral	20	10.08	1.49	1	1,000.00	
Mangrove	11	6.05	1.71	1	20.00	
Man-Made	3	13.33	13.33			
Unknown	141	21.82	5.44	54	132.79	39.87
Coral	22	0.98	0.91	1	0.00	
Mangrove	11	0.00	0.00	2	150.00	0.00
Man-Made	3	0.00	0.00			
Unknown	146	1.71	1.23	50	124.84	25.29
Coral	20	15.10	3.11	2	0.00	0.00
Mangrove	9	27.44	21.74	1	0.00	
Man-Made	3	0.00	0.00			
Unknown	143	35.10	4.40	50	11.05	4.05
Coral	21	0.00	0.00	2	0.00	0.00
Mangrove	9	0.00	0.00	1	0.00	
Man-Made	3	0.00	0.00			
Unknown	147	1.17	0.78	49	3.48	1.77
Coral	21	4.76	4.76	2	125.00	125.00
Mangrove	9	13.89	13.89	1	150.00	
Man-Made	3	0.00	0.00			
Unknown	147	12.87	12.25	53	215.48	61.90
Coral	20	0.50	0.50	2	0.00	0.00
Mangrove	10	31.50	21.93	1	0.00	
Man-Made	3	0.00	0.00			
Unknown	141	15.56	5.10	49	4.87	2.75
Coral	20	8.32	5.00	2	0.00	0.00
Mangrove	9	1.37	0.80	1	0.00	
Man-Made	3	4.67	3.71			
Unknown	142	6.57	0.90	50	2.00	0.71
Coral	21	2.32	0.77	2	25.00	25.00
Mangrove	11	9.89	9.01	1	0.00	
Man-Made	3	1.00	1.00			
Unknown	145	3.16	1.05	50	0.55	0.23
Coral		44.72	18.47		1600.00	600.00
Mangrove		90.14	69.09		337.50	2.50
Man-Made		19.00	18.05		0.00	0.00
Unknown		97.97	31.16		777.85	197.29

Table 24. Total Trip Expenditures by Resident Status and Structure Fished.

Expenditure Category	Fishing Structure	Resident	Non-Resident
		Expenditures()	Expenditures()
Public Transportation	Coral	305,035	1,557,607
	Mangrove	0	45,217
	Man-Made	0	0
	Unknown	0	7,403,454
Food	Coral	1,160,005	3,461,348
	Mangrove	216,625	51,676
	Man-Made	201,166	0
	Unknown	18,590,968	3,476,375
Lodging	Coral	113,299	0
	Mangrove	0	387,573
	Man-Made	0	0
	Unknown	1,459,013	3,268,167
Boat Fuel	Coral	1,737,131	0
	Mangrove	983,408	0
	Man-Made	0	0
	Unknown	29,906,143	289,152
Boat & Equipment Rental	Coral	0	0
	Mangrove	0	0
	Man-Made	0	0
	Unknown	999,871	91,005
Charter Fees	Coral	547,818	432,669
	Mangrove	497,676	387,573
	Man-Made	0	0
	Unknown	10,964,765	5,641,077
Access & Parking	Coral	57,521	0
	Mangrove	1,128,730	0
	Man-Made	0	0
	Unknown	13,259,359	127,425
Bait	Coral	956,764	0
	Mangrove	49,104	0
	Man-Made	70,408	0
	Unknown	5,601,818	52,446
Ice	Coral	267,000	86,534
	Mangrove	354,526	0
	Man-Made	15,087	0
	Unknown	2,695,459	14,503
Trip Total	Coral	5,144,573	5,538,157
	Mangrove	3,230,070	872,040
	Man-Made	286,662	0
	Unknown	83,477,397	20,363,604

Discussion and Concluding Remarks

In 2004, 140,943 resident saltwater anglers took 1.0 million trips while 22,890 non-resident saltwater anglers took 32,273 trips. For residents, 61.8% of all trips were in the shore fishing mode, 37.8% were in the private boat mode and only 0.4% were in the charter mode. For non-residents, 54.9% of all trips were in the charter fishing mode, 29.8% were in the shore mode and 15.4% were in the private boat mode. Regionally, the majority of non-resident angler trips (17,892) occur in the north while the majority of resident trips (432,633) occur in the east of Puerto Rico.

All across Puerto Rico hook and line fishing predominates. The second most popular gear type is the yoyo used across as many as 11.9% of the trips in the west. The most popular target species vary by region with dolphin being the most popular for residents across all regions except the west where lane snapper is the most popular target. For non-residents, Atlantic tarpon is the most popular target in the east and the west while blue marlin is the favorite in the north and dolphin the favorite in the south.

Demographically, Puerto Ricans anglers are wealthier than average with the majority of resident and non-resident anglers making at least between \$15,600-\$31,199. Overall the residents consider themselves Puerto Rican (36.7%) while the majority of non-residents considered themselves white (65.0%). This is also a highly educated group with 85% of residents holding a high school degree and 28% holding a bachelor's degree while 89.9% of non-residents hold high school degrees and 28.6% hold a bachelor's degree.

66.3% of residents list saltwater recreational fishing as their most important recreational activity while only 40.3% of non-residents feeling the same. Overall, the average age of anglers in this survey was 40.6 years. 27.1% own boats with an average length of 23.7 feet and 267.9 horsepower. As with other recreational survey efforts, 90.1% of the respondents were male and had 14.8 years of fishing experience.

Saltwater recreational fishing in PR is an important industry generating \$754.8 million in trip and annual expenditures. The majority of that total, \$646.6 million, are from annual durable good purchases driven mainly by boat purchases. Regarding trip expenditures, resident anglers generate \$85.6 million (79.2%) in expenditures while tourist anglers generate \$22.5 million (20.8%) of that total. Resident expenditures are driven by shore mode food expenditures while tourist expenditures are driven by charter mode transportation expenditures. This suggests that tourist angling is also an important economic engine for PR.

The most robust trip expenditure estimates are for residents stratified by fishing mode. All other stratifications generate a high number of empty cells and high standard errors where non-zero expenditures were available. Much of the sample size problems were driven by lack of sampling success in the telephone follow-up survey. The survey contractor had a very difficult time reaching the correct person on the telephone suggesting that while respondents agreed to participate, they may have given a bad telephone number, the telephone number was entered incorrectly by the intercept interviewer or the respondents were screening their calls. The contractor mentioned a lot of disconnected numbers and talking to family members that described the respondent as only living at the given phone number occasionally. In the future, it

is recommended that a telephone survey not be used. Instead, NMFS has had great success moving the entire trip expenditure portion of the survey to the intercept. Since switching to an in-person survey, standard errors have gone down dramatically. The current NMFS methodology uses a mail survey to gather the durable good expenditures.

One additional note of caution surrounds non-response bias. Response rates to the intercept add-on were very high, but low response rates to the telephone follow-up call into question the representative nature of the estimates presented here. While a full analysis was not conducted, telephone survey participant responses to questions on the intercept survey were fairly similar to intercept participant responses. One exception was boat ownership. Telephone survey participants are twice as likely as intercept survey participants to own a boat. As a result, the expenditure estimates may be biased towards boat owners. This would have particular impact on durable good expenditures.

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Appendix 2: Telephone Follow-up Survey Instrument

Hello, may I please speak with [NAME]? This is [INTERVIEWER], calling from Macro International. You spoke with one of our field staff members on [TRIPDATE] during a day of fishing in [STATE] at [SITENAME].

If questflag=2, display: "I am calling to ask a few follow-up questions that could not be collected in the field."

If questflag=1, display "I am calling to verify some of the data that the interviewer recorded."

If questflag=3, display "I am calling to verify some of the data that the interviewer recorded and to ask a few follow-up questions that could not be collected in the field."

This study is being conducted in accordance with the privacy act of 1974. You are not required to answer any question that you consider to be an invasion of your privacy.}

{Note to programmer: If questflag=2, go to YEARSFISH}

{V1: Our records indicate that on TRIPDATE you spoke with one of our field staff members during a saltwater recreational fishing trip in STATE at SITENAME. Were you interviewed?

1 Yes, interviewed

(SKIPTO END1) 2 No, not interviewed

(SKIPTO END1) 8 Don't Know/Don't Remember

(SKIPTO END1) 9 Refused}

{V2: Did the interviewer conduct the interview in a courteous and professional manner?

(SKIPTO V4) 1 Yes

2 No

(SKIPTO V4) 8 Don't Know/Don't Remember

(SKIPTO V4) 9 Refused }

{V3: Please tell me why you think they were discourteous or unprofessional?

1 record response

8 Don't Know

9 Refused}

{V4: Did you catch any fish that were available for the interviewer to look at? By that I mean fish that you had not thrown back, already used for bait, or filleted.

1 Yes

(SKIPTO V12) 2 No

(SKIPTO V12) 8 Don't Know

(SKIPTO V12) 9 Refused }

{V5: The remaining questions refer only to the fish you kept that were not used for bait or filleted. Did the interviewer look at all of your fish, some of your fish, or none of your fish?

(SKIPTO V7) 1 All fish looked at

2 Some fish looked at

3 No fish looked at

{ASK V6 THEN SKIP TO V12}

(SKIPTO V7) 8 Don't Know

(SKIPTO V7) 9 Refused }

{V6: Why didn't the interviewer look at all of your fish?

1 Respondent didn't have time/didn't want to unpack, etc.

2 There were too many/more than 15 of one species

3 The interviewer didn't ask to see them

7 Other (Specify)

8 Don't Know

9 Refused }

{V7: Did the interviewer weigh all, some, or none of your fish?

(SKIPTO V9) 1 All fish weighed

2 Some fish weighed

3 No fish weighed

(SKIPTO V9) 8 Don't Know

(SKIPTO V9) 9 Refused }

{V8: Why didn't the interviewer weigh all of your fish?

1 Respondent didn't have time/didn't want to unpack, etc.

2 They were gutted

3 There were too many/more than 15 per species

4 They were too big

5 The interviewer didn't ask to weigh them

7 Other (Specify)

8 Don't Know

9 Refused }

{V9: Did the interviewer measure the length of all, some, or none of your fish?

(SKIPTO V11) 1 All fish measured

2 Some fish measured

3 No fish measured

{ASK V10 THEN SKIP TO V12}

(SKIPTO V12) 8 Don't Know

(SKIPTO V12) 9 Refused }

{V10: Why didn't the interviewer measure the length of all of your fish?

1 Respondent didn't have time/didn't want to unpack, etc.

2 There were too many/more than 15 per species

3 The interviewer didn't ask to measure them

7 Other (Specify)

8 Don't Know

9 Refused }

{V11: Did the interviewer use a measuring board or a tape measure to measure your fish?

1 Measuring board

2 Tape measure

3 Both measuring board and tape measure

8 Don't Know

9 Refused }

{V12: Approximately what time of day were you interviewed by our staff member?

1 6:00 a.m. - 8:59 a.m.

2 9:00 a.m. - 11:59 a.m.

3 12:00 Noon - 2:59 p.m.

4 3:00 p.m. - 5:59 p.m.

5 6:00 p.m. - 8:59 p.m.

6 9:00 p.m. - 11:59 p.m.

7 12:00 Midnight - 5:59 a.m.

8 Don't Know

9 Refused }

{YRSFISH:

How many years have you been saltwater recreational fishing?

001 record number of years

888 Don=t know

999 Refused}

{If modeflag=6 or 7 go to peop_pay} – PC

This survey is being conducted for the Puerto Rico Department of the Environment and Natural Resources in cooperation with the National Marine Fisheries Service to insure quality fishing in the future. By answering the following questions, you will help demonstrate the economic value of recreational fishing in Puerto Rico

{PEOP_PAY:

Now I would like to ask you about expenses you made for consumable items during the fishing trip you discussed with our field interviewer on [TRIPDATE]. I=m interested in expenditures for the whole trip, not just for the time spent fishing.

How many people, including yourself, contributed to expenses for the trip?

01 Record number of people (If 1, set indiv=1)

98 Don=t Know

99 Refused}

{TRIP_01:

About how much did you individually spend for the following items?

Display if indiv=0: If you can=t recall how much you spent individually for each question, please tell me how much was spent by the group of people who went on the trip with you.

Food, drink and refreshments?

00 Zero/Nothing (Skip to TRIP_02)

01 Record amount

98 Don=t Know (Skip to TRIP_02)

99 Refused (Skip to TRIP_02)}

[If this expense was part of a package deal, enter 88888]

{TRIP_01BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_02:

Lodging at motels, cabins, lodges or campgrounds?

00 Zero/Nothing (Skip to TRIP_03)

01 Record amount

98 Don=t Know (Skip to TRIP_03)

99 Refused (Skip to TRIP_03)}

[If this expense was part of a package deal, enter 88888]

{TRIP_02BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_03:

Transportation other than your own car, such as plane, train, bus or car rental?

00 Zero/Nothing (Skip to TRIP_04)

01 Record amount

98 Don=t Know (Skip to TRIP_04)

99 Refused (Skip to TRIP_04)}

[If this expense was part of a package deal, enter 88888]

{PUB_MODE: ASK ONLY IF TRIP_03 > 0

What mode of transportation did you use?

01 Ferry

02 Air

03 Bus

04 Cruise-ship

05 Other (specify): _____

98 Don=t Know

99 Refused}

{TRIP_03BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_04

Boat fuel?

00 Zero/Nothing (Skip to TRIP_05)

01 Record amount

98 Don=t Know (Skip to TRIP_05)

99 Refused (Skip to TRIP_05)}

{TRIP_04BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_05:

Guide or package fees for charter boats?

00 Zero/Nothing (Skip to TRIP_06)

01 Record amount

98 Don=t Know (Skip to TRIP_06)

99 Refused (Skip to TRIP_06)}

{TRIP_05BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_06:

Access and/or boat launching fees for access to pier, park, launch?

00 Zero/Nothing (Skip to TRIP_07)

01 Record amount

98 Don=t Know (Skip to TRIP_07)

99 Refused (Skip to TRIP_07)}

{TRIP_06BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_07:

Equipment rental for boat, fishing or camping equipment?

00 Zero/Nothing (Skip to TRIP_08)

01 Record amount

98 Don=t Know (Skip to TRIP_08)

99 Refused (Skip to TRIP_08)}

{TRIP_07BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual

02 Group}

{TRIP_08:

Live, cut or prepared bait?

00 Zero/Nothing (Skip to TRIP_09)

01 Record amount

98 Don=t Know (Skip to TRIP_09)

99 Refused (Skip to TRIP_09)}

{TRIP_08BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual
02 Group}

{TRIP_09:

Ice?

00 Zero/Nothing (Skip to TRIP_11)
01 Record amount
98 Don=t Know (Skip to TRIP_11)
99 Refused (Skip to TRIP_11)}

{TRIP_09BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual
02 Group}

{TRIP_11BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual
02 Group}

{TRIP_10:

Ask if TRIP_01 through TRIP_09 and **TRIP_11** are all 98 or 99

Could you estimate the **total** amount that was spent for the trip?

00 Zero/Nothing (Skip to BOATEXP)
01 Record amount
98 Don=t Know (Skip to BOATEXP)
99 Refused (Skip to BOATEXP)}

{TRIP_10BY: Ask if indiv=0

And was that your individual expenses or the group=s expenses?

01 Individual
02 Group}

{BOATEXP: Ask if boatown = 1 off intercept add-on survey

On an annual basis, how much do you usually spend on mooring, storage, maintenance, and insurance for your fishing boat? [If the respondent owns more than one boat that is used for saltwater fishing, ask about the boat that is used the most.]

00 Zero/Nothing
01 Record amount
98 Don=t Know
99 Refused}

{EQUIP_01:

For the next several questions, I=d like you to think about fishing equipment which was purchased during the last 12 months. For purchases during the last 12 months, how much did you spend on rods, poles, reels, and lines?

00 Zero/Nothing skip to EQUIP_02
01 Record amount
98 Don=t Know
99 Refused}

ASK ONLY IF EQUIP_01 IS NON-ZERO: What percentage of the fishing equipment you just described was purchased in:

**IF [STATE OF RESIDENCE] = PR THEN ASK
{ERES_01A:**

In Puerto Rico ? ENTER % ($\geq 0, \leq 100$)
Don't know 998
Refused 999}

{ERES_01B: IF (ERES_01A = 100), SKIP TO EQUIP_02.
Outside Puerto Rico but inside United States?
ENTER % ($=100 - \text{ERES_01A} - \text{ERES_01B}$)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ENON_01A: In Puerto Rico? ENTER % ($\geq 0, \leq 100$)
Don't know 998
Refused 999}

{ENON_01B: (ENON_01A = 100), SKIP TO EQUIP_02.
In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % ($\leq 100 - \text{ENON_01A}$)
Don't know 998
Refused 999}

{ENON_01C: IF (ENON_01A + ENON_01B = 100), SKIP TO EQUIP_02.
Outside [STATE OF RESIDENCE] but inside United States?
ENTER % ($=100 - \text{ENON_01A} - \text{ENON_01B}$)
Don't know 998
Refused 999}

{EQUIP_02:

Tackle and gear (lures, hooks, leaders, sinkers, flies, and fly-tying supplies/tackle boxes, landing nets, bait containers, minnow seines, knives?

00 Zero/Nothing
01 Record amount
98 Don't Know
99 Refused}

ASK ONLY IF EQUIP_02 IS NON-ZERO: What percentage of the fishing equipment you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ERES_02A:
In Puerto Rico ? ENTER % ($\geq 0, \leq 100$)
Don't know 998
Refused 999}

{ERES_02B: IF (ERES_02A = 100), SKIP TO EQUIP_03.
Outside Puerto Rico but inside United States?
ENTER % ($=100 - \text{ERES_02A} - \text{ERES_02B}$)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ENON_02A: In Puerto Rico? ENTER % ($\geq 0, \leq 100$)
Don't know 998
Refused 999}

{ENON_02B: (ENON_02A = 100), SKIP TO EQUIP_03.
In [STATE OF RESIDENCE] but outside of Puerto Rico?

ENTER % (<=100-ENON_01A)
Don't know 998
Refused 999}

{ENON_02C: IF (ENON_02A + ENON_02B = 100), SKIP TO EQUIP_03.
Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ENON_02A-ENON_02B)
Don't know 998
Refused 999}

{EQUIP_03:

Ask if EQUIP_01 and EQUIP_02 are 98 or 99

Could you tell me the total amount that was spent for fishing equipment purchases during :\MONTH?

00 Zero/Nothing

01 Record amount

98 Don't Know

99 Refused}

ASK ONLY IF EQUIP_03 IS NON-ZERO: What percentage of the fishing equipment you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ERES_03A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ERES_03B: IF (ERES_03A = 100), SKIP TO OTHIT_01.

Outside Puerto Rico but inside United States?
ENTER % (=100-ERES_03A-ERES_03B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ENON_03A: In Puerto Rico? ENTER % (>=0,<=100)
Don't know 998
Refused 999}

{ENON_03B: (ENON_03A = 100), SKIP TO OTHIT_01.

In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-ENON_01A)
Don't know 998
Refused 999}

{ENON_03C: IF (ENON_03A + ENON_03B = 100), SKIP TO OTHIT_01

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ENON_03A-ENON_03B)
Don't know 998
Refused 999}

{OTHIT_01:

We're also interested in spending on other items purchased between :\MONTHS. Please include all items purchased PRIMARILY for saltwater recreational fishing, even if you use them for other things. During the past 2 months,

how much did you spend on camping equipment (such as sleeping bags, packs, tents) primarily used for saltwater recreational fishing.

- 00 Zero/Nothing
- 01 Record amount
- 98 Don't Know
- 99 Refused}

ASK ONLY IF OTHIT_01 IS NON-ZERO: What percentage of the camping equipment you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_01A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ORES_01B: IF (ORES_01A = 100), SKIP TO OTHIT_02.

Outside Puerto Rico but inside United States?
ENTER % (=100-ORES_03A-ORES_03B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_01A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998
Refused 999}

{ONON_01B: (ONON_01A = 100), SKIP TO OTHIT_02.

In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-ONON_01A)
Don't know 998
Refused 999}

{ONON_01C: IF (ONON_01A + ONON_01B = 100), SKIP TO OTHIT_02

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ONON_01A-ONON_01B)
Don't know 998
Refused 999}

{OTHIT_02:

Binoculars, field glasses, or similar equipment.

- 00 Zero/Nothing
- 01 Record amount
- 98 Don't Know
- 99 Refused}

ASK ONLY IF OTHIT_02 IS NON-ZERO: What percentage of the other equipment you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_02A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ORES_02B: IF (ORES_02A = 100), SKIP TO OTHIT_03.

Outside Puerto Rico but inside United States?

ENTER % (=100-ORES_02A-ORES_02B)

Don't know 998

Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_02A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998

Refused 999}

{ONON_02B: (ONON_02A = 100), SKIP TO OTHIT_03.

In [STATE OF RESIDENCE] but outside of Puerto Rico?

ENTER % (<=100-ONON_02A)

Don't know 998

Refused 999}

{ONON_02C: IF (ONON_02A + ONON_02B = 100), SKIP TO OTHIT_03

Outside [STATE OF RESIDENCE] but inside United States?

ENTER % (=100-ONON_02A-ONON_02B)

Don't know 998

Refused 999}

{OTHIT_03:

Special fishing clothing such as foul weather gear, boots, and waders.

00 Zero/Nothing

01 Record amount

98 Don=t Know

99 Refused}

ASK ONLY IF OTHIT_03 IS NON-ZERO: [What percentage of the foul weather gear you just described was purchased in:](#)

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_03A:

In Puerto Rico ? **ENTER % (>=0,<=100)**

Don't know 998

Refused 999}

{ORES_03B: IF (ORES_03A = 100), SKIP TO OTHIT_04.

Outside Puerto Rico but inside United States?

ENTER % (=100-ORES_03A-ORES_03B)

Don't know 998

Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_03A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998

Refused 999}

{ONON_03B: (ONON_03A = 100), SKIP TO OTHIT_04.

In [STATE OF RESIDENCE] but outside of Puerto Rico?

ENTER % (<=100-ONON_03A)

Don't know 998

Refused 999}

{ONON_03C: IF (ONON_03A + ONON_03B = 100), SKIP TO OTHIT_04

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ONON_03A-ONON_03B)
Don't know 998
Refused 999}

{OTHIT_04:

Taxidermy fees.
00 Zero/Nothing
01 Record amount
98 Don=t Know
99 Refused}

ASK ONLY IF OTHIT_04 IS NON-ZERO: What percentage of the taxidermy fees that you just described were made in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_04A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ORES_04B: IF (ORES_04A = 100), SKIP TO OTHIT_05.

Outside Puerto Rico but inside United States?
ENTER % (=100-ORES_04A-ORES_04B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_04A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998
Refused 999}

{ONON_04B: (ONON_04A = 100), SKIP TO OTHIT_05.

In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-ONON_04A)
Don't know 998
Refused 999}

{ONON_04C: IF (ONON_04A + ONON_04B = 100), SKIP TO OTHIT_05

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ONON_04A-ONON_04B)
Don't know 998
Refused 999}

{OTHIT_05:

Subscriptions to magazines devoted to recreational fishing.
00 Zero/Nothing
01 Record amount
98 Don=t Know
99 Refused}

{OTHIT_06:

Dues or contributions to national, state or local recreational fishing clubs or organizations.
00 Zero/Nothing

01 Record amount
98 Don't Know
99 Refused}

ASK ONLY IF OTHIT_06 IS NON-ZERO: What percentage of the fishing equipment you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_06A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ORES_06B: IF (ORES_06A = 100), SKIP TO OTHIT_07.

Outside Puerto Rico but inside United States?
ENTER % (=100-ORES_06A-ORES_06B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_06A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998
Refused 999}

{ONON_06B: (ONON_06A = 100), SKIP TO OTHIT_07.

In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-ONON_06A)
Don't know 998
Refused 999}

{ONON_06C: IF (ONON_06A + ONON_06B = 100), SKIP TO OTHIT_07

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ONON_06A-ONON_06B)
Don't know 998
Refused 999}

{OTHIT_07:

Any other miscellaneous expenses for items which you primarily use for saltwater recreational fishing that were not listed elsewhere?

00 Zero/Nothing
01 Record amount
98 Don't Know
99 Refused}

ASK ONLY IF OTHIT_07 IS NON-ZERO: What percentage of the miscellaneous equipment you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_07A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ORES_07B: IF (ORES_07A = 100), SKIP TO OTHIT_08.

Outside Puerto Rico but inside United States?
ENTER % (=100-ORES_07A-ORES_07B)
Don't know 998

Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_07A: In Puerto Rico? ENTER % (>=0,<=100)
Don't know 998
Refused 999}

{ONON_07B: (ONON_07A = 100), SKIP TO OTHIT_08.
In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-ONON_07A)
Don't know 998
Refused 999}

{ONON_07C: IF (ONON_07A + ONON_07B = 100), SKIP TO OTHIT_08
Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-ONON_07A-ONON_07B)
Don't know 998
Refused 999}

{OTHIT_08:

Ask if OTHIT_01 through OTHIT_07 and OTHIT_09 are all 98 or 99

Could you tell me the total amount that was spent for these types of items during the last 12 months, where the items were purchased **primarily** for saltwater recreational fishing?

00 Zero/Nothing

01 Record amount

98 Don't Know

99 Refused}

ASK ONLY IF OTHIT_08 IS NON-ZERO: [What percentage of the fishing equipment you just described was purchased in:](#)

IF [STATE OF RESIDENCE] = PR THEN ASK

{ORES_08A:
In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{ORES_08B: IF (ORES_08A = 100), SKIP TO OTHIT_09.
Outside Puerto Rico but inside United States?
ENTER % (=100-ORES_08A-ORES_08B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{ONON_08A: In Puerto Rico? ENTER % (>=0,<=100)
Don't know 998
Refused 999}

{ONON_08B: (ONON_08A = 100), SKIP TO OTHIT_09.
In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-ONON_08A)
Don't know 998
Refused 999}

{ONON_08C: IF (ONON_08A + ONON_08B = 100), SKIP TO OTHIT_09
Outside [STATE OF RESIDENCE] but inside United States?

ENTER % (=100-ONON_08A-ONON_08B)

Don't know 998

Refused 999}

{DURAB_01:

This next set of questions concerns new boats and durable equipment purchased primarily for saltwater recreational fishing during the last 12 months. Again, please include all items purchased PRIMARILY for saltwater recreational fishing, even if you use them for other things. How much did you spend on new motor boats or motor boat accessories, including hull, motor and accessories?

00 Zero/Nothing

01 Record amount

98 Don't Know

99 Refused}

ASK ONLY IF DURAB_01 IS NON-ZERO:

{PRIME_01:

Would you have purchased this new motor boat or motor boat accessory if you weren't going to use it for fishing?

1 Yes

2 No

8 Don't know

9 Refused

What percentage of the new motor boat or motor boat accessories you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{DRES_01A:

In Puerto Rico ? **ENTER % (>=0,<=100)**

Don't know 998

Refused 999}

{DRES_01B: IF (DRES_01A = 100), SKIP TO DURAB_02.

Outside Puerto Rico but inside United States?

ENTER % (=100-DRES_01A-DRES_01B)

Don't know 998

Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{DNON_08A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998

Refused 999}

{DNON_01B: (DNON_01A = 100), SKIP TO DURAB_02.

In [STATE OF RESIDENCE] but outside of Puerto Rico?

ENTER % (<=100-DNON_01A)

Don't know 998

Refused 999}

{DNON_08C: IF (DNON_01A + DNON_01B = 100), SKIP TO DURAB_02

Outside [STATE OF RESIDENCE] but inside United States?

ENTER % (=100-DNON_01A-DNON_01B)

Don't know 998

Refused 999}

{DURAB_02:

Kayak or other non-motor boat?

00 Zero/Nothing

01 Record amount

98 Don't Know
99 Refused}

ASK ONLY IF DURAB_02 IS NON-ZERO:

{PRIME_02:

Would you have purchased this kayak or other non-motor boat if you weren't going to use it for fishing?

- 1 Yes
- 2 No
- 8 Don't know
- 9 Refused

What percentage of the kayak or other non-motor boats you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{DRES_02A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{DRES_02B: IF (DRES_02A = 100), SKIP TO DURAB_03.

Outside Puerto Rico but inside United States?
ENTER % (=100-DRES_02A-DRES_02B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{DNON_02A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998
Refused 999}

{DNON_02B: (DNON_02A = 100), SKIP TO DURAB_03.

In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-DNON_02A)
Don't know 998
Refused 999}

{DNON_02C: IF (DNON_02A + DNON_02B = 100), SKIP TO DURAB_03

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-DNON_02A-DNON_02B)
Don't know 998
Refused 999}

{DURAB_03:

Depth/fish finder or other electronic fishing devices?

- 00 Zero/Nothing
- 01 Record amount
- 98 Don't Know
- 99 Refused}

ASK ONLY IF DURAB_03 IS NON-ZERO:

What percentage of the kayak or other non-motor boats you just described was purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{DRES_03A:

In Puerto Rico ? **ENTER % (>=0,<=100)**

Don't know 998
Refused 999}

{DRES_03B: IF (DRES_03A = 100), SKIP TO DURAB_04.

Outside Puerto Rico but inside United States?
ENTER % (=100-DRES_03A-DRES_03B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{DNON_03A: In Puerto Rico? ENTER % (>=0,<=100)
Don't know 998
Refused 999}

{DNON_03B: (DNON_03A = 100), SKIP TO DURAB_04.
In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-DNON_03A)
Don't know 998
Refused 999}

{DNON_03C: IF (DNON_03A + DNON_03B = 100), SKIP TO DURAB_04
Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-DNON_03A-DNON_03B)
Don't know 998
Refused 999}

{DURAB_04:

Vehicles (such as pickup, camper, RV, motor home, or trailer/hitch) used primarily for saltwater recreational fishing?

00 Zero/Nothing
01 Record amount
98 Don't Know
99 Refused}

ASK ONLY IF DURAB_04 IS NON-ZERO:

{PRIME_04:

Would you have purchased this vehicle if you weren't going to use it for fishing?

1 Yes
2 No
8 Don't know
9 Refused

What percentage of the vehicle expenditures you just described were purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{DRES_04A:
In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{DRES_04B: IF (DRES_04A = 100), SKIP TO DURAB_05.
Outside Puerto Rico but inside United States?
ENTER % (=100-DRES_04A-DRES_04B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{DNON_04A: In Puerto Rico? ENTER % (>=0,<=100)
Don't know 998
Refused 999}

{DNON_04B: (DNON_04A = 100), SKIP TO DURAB_05.
In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-DNON_04A)
Don't know 998
Refused 999}

{DNON_04C: IF (DNON_04A + DNON_04B = 100), SKIP TO DURAB_05
Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-DNON_04A-DNON_04B)
Don't know 998
Refused 999}

{DURAB_05:

Second home used primarily for saltwater recreational fishing?

00 Zero/Nothing
01 Record amount
98 Don't Know
99 Refused}

ASK ONLY IF DURAB_05 IS NON-ZERO:

{PRIME_05:

Would you have purchased this second home if you weren't going to use it for fishing?

1 Yes
2 No
8 Don't know
9 Refused

IF [STATE OF RESIDENCE] ne PR THEN ASK

{DNON_05A: In Puerto Rico? ENTER % (>=0,<=100)
Don't know 998
Refused 999}

{DNON_05B: (DNON_05A = 100), SKIP TO DURAB_06.
In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-DNON_05A)
Don't know 998
Refused 999}

{DNON_05C: IF (DNON_05A + DNON_05B = 100), SKIP TO DURAB_06
Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-DNON_05A-DNON_05B)
Don't know 998
Refused 999}

{DURAB_06:

Ask if DURAB_01 through DURAB_05 are DK or Ref

Could you tell me the total amount that was spent for durable fishing equipment purchases such as these during the last twelve months?

- 00 Zero/Nothing
- 01 Record amount
- 98 Don't Know
- 99 Refused}

ASK ONLY IF DURAB_06 IS NON-ZERO:

What percentage of the vehicle expenditures you just described were purchased in:

IF [STATE OF RESIDENCE] = PR THEN ASK

{DRES_06A:

In Puerto Rico ? **ENTER % (>=0,<=100)**
Don't know 998
Refused 999}

{DRES_06B: IF (DRES_06A = 100), SKIP TO FISHRATE.

Outside Puerto Rico but inside United States?
ENTER % (=100-DRES_06A-DRES_06B)
Don't know 998
Refused 999}

IF [STATE OF RESIDENCE] ne PR THEN ASK

{DNON_06A: In Puerto Rico? ENTER % (>=0,<=100)

Don't know 998
Refused 999}

{DNON_06B: (DNON_06A = 100), SKIP TO FISHRATE.

In [STATE OF RESIDENCE] but outside of Puerto Rico?
ENTER % (<=100-DNON_06A)
Don't know 998
Refused 999}

{DNON_06C: IF (DNON_06A + DNON_06B = 100), SKIP TO FISHRATE

Outside [STATE OF RESIDENCE] but inside United States?
ENTER % (=100-DNON_06A-DNON_06B)
Don't know 998
Refused 999}

{FISHRATE:

Compared to your other recreational activities, would you rate fishing as... [Read list]
[By other recreational activities I mean things such as golfing, hiking, hunting and tennis.]

- 01 Your most important recreational activity
- 02 Your second most important recreational activity
- 03 Only one of many recreational activities
- 98 DK
- 99 Refused}

{REEFRATE:

As far as you know, how would you rate the health of coral reefs around Puerto Rico? [Read list]

- 01 Excellent shape
- 02 Good shape
- 03 Only fair shape

- 04 Poor shape
- 98 Not sure/Don't know
- 99 Refused

{REEFPRO:

What percentage of coral reefs around Puerto Rico do you think are fully protected—meaning there are no commercial or recreational activities allowed that could result in damaging or removing habitat, fish, coral, or other marine life on the reef?

	RECORD PERCENTAGE
998	Don't Know
999	Refused

Demographics: This last set of questions will help us to know more about anglers. The information you provide will remain strictly confidential, and you will not be identified with your answers.

{AGE:

How old were you on your last birthday? (If respondent hesitates, quickly go to AGE_GRP)

ENTER NUMBER	GO TO GENDER
Don't Know	8
Refused	9 GO TO GENDER}

{AGE_GRP:

That is, in which of the following age groups do you belong?

15 to 24	1	25 to 34	2
35 to 44	3	45 to 54	4
55 to 64	5	65 and over	6
Don't Know	8	Refused	9}

{GENDER:

Code Gender:	Male	1
	Female	2 IF UNCERTAIN, SIMPLY ASK WHAT IS YOUR GENDER?}

{ETHNIC1:

In which of the following ethnic groups do you belong?

White	01
Black or African American	20
Trigueno	10
Hispanic or Latino (of any race)	50
Mexican	51
Puerto Rican	52
Cuban	53
Other Hispanic	54
American Indian	30
Asian	40
Asian Indian	41
Chinese	42
Filipino	43
Japanese	44
Korean	45
Vietnamese	46
Other Asian or Pacific Islander	47
Other Specify	60
Don't Know	88
Refuse	99}

{EDUC:

What was the last grade of formal education which you have completed?

(IF RESPONDENT HESITATES, READ LISTED ALTERNATIVES)

Less than a high school degree	1
--------------------------------	---

High school graduate	2
Associates Degree	3
Some college no degree	4
Bachelors Degree	5
Post-graduate/professional no degree	6
Post-graduate/professional degree	7
Don't know	8
Refused	9}

{INCOME:

Is your total annual household income before taxes over or under 46,800?

And is it over or under 62,399?

And is it over or under 31,199?

IF OVER And is it over or under 77,999?

IF UNDER And is it over or under 15,599?

IF OVER And is it over or under 93,599?

IF OVER And is it over or under 109,199?

IF OVER And is it over or under 124,799?

IF OVER And is it over or under 139,999?

Less than 15,599	01
15,600 to 31,199	02
31,200 to 46,799	03
46,800 to 62,399	04
62,400 to 77,999	05
78,000 to 93,599	06
93,600 to 109,199	07
109,200 to 124,799	08
124,800 to 139,999	09
Greater than 140,000	10
Don't Know	98
Refused	99

{END1: That=s all the questions I have for you. Thank you very much for your time and assistance.}

Appendix 3: Means of Continuous Variables by Resident Status and Region.

Region	Variable	Resident			Non-Resident		
		N	Mean	Standard Error	N	Mean	Standard Error
East	Age	49	37.18	1.87	17	43.18	2.25
	Hours fished	1080	4.30	0.05	194	3.88	0.08
	Time off work without pay	991	0.01	0.00	167	0.01	0.01
	Hours worked per week	6	50.83	3.75	1	60.00	
	Boat ownership	991	0.16	0.01	167	0.20	0.03
	Propulsion (HP)	138	326.70	22.21	30	225.53	26.08
	Boat length (feet)	144	26.48	0.65	33	21.00	0.94
	Years saltwater recreational fishing experience	49	14.86	1.94	17	14.06	4.12
	Percent male	1082	0.04	0.01	194	0.07	0.02
	Percentage of reef protected	26	37.62	7.39	6	42.17	13.49
North	Age	128	43.19	1.19	24	36.25	2.71
	Hours fished	1081	5.24	0.06	366	3.88	0.04
	Time off work without pay	955	0.00	0.00	301	0.00	0.00
	Hours worked per week	3	30.67	9.33	1	60.00	
	Boat ownership	955	0.49	0.02	301	0.20	0.02
	Propulsion (HP)	460	266.12	9.49	56	275.55	34.49
	Boat length (feet)	469	22.96	0.29	62	26.19	2.11
	Years saltwater recreational fishing experience	127	15.35	1.12	24	12.00	2.66
	Percent male	1083	0.11	0.01	367	0.05	0.01
	Percentage of reef protected	81	41.30	3.78	4	63.75	21.93
South	Age	2	20.50	1.50	0		
	Hours fished	92	3.84	0.16	26	5.10	0.26
	Time off work without pay	89	0.00	0.00	24	0.00	0.00
	Hours worked per week	0			0		
	Boat ownership	89	0.21	0.04	24	0.13	0.07
	Propulsion (HP)	18	98.83	19.22	3	93.33	28.33
	Boat length (feet)	19	17.79	0.99	3	18.00	3.00
	Years saltwater recreational fishing experience	2	14.50	0.50	0		
	Percent male	92	0.01	0.01	26	0.00	0.00
	Percentage of reef protected	1	10.00		0		
West	Age	21	36.81	3.08	3	56.67	0.88
	Hours fished	377	3.88	0.08	56	5.04	0.21
	Time off work without pay	329	0.02	0.01	50	0.00	0.00
	Hours worked per week	7	38.29	3.91	0		
	Boat ownership	329	0.34	0.03	50	0.04	0.03
	Propulsion (HP)	105	168.08	18.49	2	400.00	0.00
	Boat length (feet)	109	21.38	1.21	2	44.00	16.00
	Years saltwater recreational fishing experience	21	14.71	1.89	3	33.00	9.07
	Percent male	377	0.05	0.01	56	0.05	0.03
	Percentage of reef protected	12	33.83	8.38	1	99.00	

Appendix 4: Spender Tables

Table A4.1. Spender Mean Trip Expenditures by Mode and Resident Status.

Expenditure Category	Fishing Mode	Resident Status			
		Resident		Non-Resident	
		Total Expenditure()	Standard Error	Total Expenditure()	Standard Error
Public Transportation	Party/Charter			513.93	88.20
	Private/Rental	29.17	9.17	458.00	442.00
	Shore				
Food	Party/Charter	29.17	15.89	242.66	71.13
	Private/Rental	17.96	1.64	131.21	97.46
	Shore	38.32	26.40	8.42	2.62
Lodging	Party/Charter	150.00		251.61	33.85
	Private/Rental	40.56	30.19		
	Shore				
Boat Fuel	Party/Charter	47.67	36.50	85.00	42.52
	Private/Rental	47.09	5.16	33.03	7.38
	Shore	10.00			
Boat & Equipment Rental	Party/Charter	81.25	2.08	55.00	5.00
	Private/Rental	10.00		33.33	
	Shore			27.00	
Charter Fees	Party/Charter	648.89	576.33	437.42	106.35
Access & Parking	Party/Charter	200.00		50.33	28.58
	Private/Rental	136.42	30.03	43.75	36.25
	Shore				
Bait	Party/Charter			7.50	2.50
	Private/Rental	13.79	2.02	9.45	3.68
	Shore	5.64	0.67	3.80	1.59
Ice	Party/Charter	1.13	0.13	0.50	
	Private/Rental	3.81	0.92	10.07	6.76
	Shore	8.27	6.45	1.34	0.52
Trip Total	Party/Charter	1,158.10	630.93	1,643.94	378.13
	Private/Rental	298.79	79.11	718.84	593.54
	Shore	62.23	33.53	40.56	4.72

Table A4.2. Spender Mean Durable Good Expenditures.

Expenditure Category	Resident Status			
	Resident		Non-Resident	
	Mean Expenditure(\$)	Standard Error	Mean Expenditure(\$)	Standard Error
Rods and reels	375.08	154.7880	90.20	47.1828
Tackle	80.92	26.0159	32.72	19.5611
Camping gear	44.06	24.3066	11.89	7.6357
Binnoculars	8.64	3.6387	2.52	2.5151
Clothing	15.39	4.7381	7.46	5.9039
Taxidermy	0.20	0.1950	1.58	1.1529
Magazines	4.66	1.7508	4.68	1.5304
Club dues	52.77	30.9804	0.02	0.0193
Miscellaneous	43.78	18.2993	4.69	2.7946
Motorize boat purchase	2,241.58	1,093.0997	0.10	0.1037
Boat maintenance	1,634.78	530.7903	349.92	276.7902
Non-motorized boat purchase	1.20	1.1682	0.04	0.0387
Boat accessories	26.57	10.8158	5.93	4.3744
Vehicle	60.68	48.7424	1.16	1.1608
Second home	2.22	1.6373	0.00	0.0000
Total Equipment	4,592.52	1,950.9664	512.90	370.7634