



For-Hire Recreational Fishing in Georgia: Characteristics and Economic Impact

Prepared for Georgia Department of Natural Resources, Coastal Resources Division

by

Eugene Frimpong

Marine Extension and Georgia Sea Grant, University of Georgia

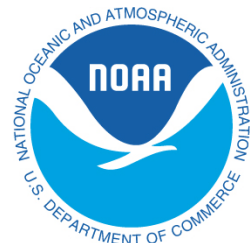


Marine Extension and
Georgia Sea Grant
UNIVERSITY OF GEORGIA



GEORGIA
DEPARTMENT OF NATURAL RESOURCES

COASTAL RESOURCES DIVISION



For-Hire Recreational Fishing in Georgia: Characteristics and Economic Impact

REPORT

2022

Eugene Frimpong

Marine Extension and Georgia Sea Grant, University of Georgia

Acknowledgements

Financial assistance is provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office for Coastal Management, National Oceanic and Atmospheric Administration and passed through the Coastal Management Program of the Department of Natural Resources. Views expressed here, however, do not reflect those of the Office for Coastal Management, National Oceanic and Atmospheric Administration, and Georgia Department of Natural Resources.

A special thanks goes to all for-hire recreational fishing operators who participated in this study. The findings reported here would not have been possible without their voluntary willingness to participate in this study. The author thanks Bryan Fluech, Ben Posadas, Kevin Decker, and Matthew Gostein for reviewing the survey instrument, and Domena Agyeman and one anonymous reviewer for guidance and comments on this research.

Executive Summary

Mail and online surveys were designed to collect background and sociodemographic information on for-hire recreational (charter) fishing captains/operators, information on characteristics of charter fishing operations, vessel characteristics, trip-level expenditure and revenue, and information on operators' level of satisfaction with and concerns about the charter fishing sector, as well as their opinions on potential actions. Survey data on expenditure and revenue were combined with Impact Analysis for Planning (IMPLAN) data to estimate the economic impact of the charter fishing sector on the state's economy.

Data collection lasted for 6 months, January 2022 through June 2022, and a total of 60 (out of 198) licensed charter fishing operators responded to the survey. Majority (67%) of the responses were through mail survey. As expected, overall, most (93%) responding charter fishing operators were Georgia residents, and a plurality (38%) of them operated from Chatham County.

Survey results show that the average responding charter fishing operator is 50 years old and has 12 years of charter fishing experience. A plurality (16) of operators opined that they engage in charter fishing business so people can enjoy fishing. Most of the operators reported a decrease in revenue and profit, perhaps due to increased cost of operating charter fishing vessels, during COVID-19 pandemic. Most (77%) captains operate charter fishing business as sole proprietors. These operators (82%) own the charter fishing vessels, operate on part-time basis (64%), do not typically hire full-time crew, and provide additional fishing services such as fish cleaning and photography. On average, charter fishing captains operate fishing vessels that are 23 feet long, has a carrying capacity of 6 passengers, and has one outboard motor that has a horsepower of about 255. Furthermore, survey results suggest that the average operator generates about \$125,705 (ranges from \$6,000 to \$1,125,200) per annum sales revenue, receives about \$7,891 (ranges from \$0 to \$60,300) per annum in tips, incurs about \$102,333 (ranges from \$7,432 to \$590,261) annual operating cost, and generates about \$30,000 annual net revenue.

Focusing on licensed resident charter fishing operators, economic impact metrics generated from IMPLAN's Input-Output model indicate that the charter fishing sector's 2021 gross output contribution to Georgia's economy is about \$53.3 (between \$36 and \$70.5) million. This value includes approximately \$24.7 (between \$16.2 and \$33.2) million in direct effect, \$14.7 (between \$11.8 and \$17.7) million in indirect effect, and \$13.6 (between \$7.8 and \$19.4) million in induced effect. The sector supports about 667 full time and part-time jobs. These estimates are slightly higher if licensed residents and non-resident charter fishing operators are combined. In terms of employment, the top five industries and services that directly rely on the charter fishing sector include the commercial fishing (bait) industry, retail sporting goods industry, repair and maintenance shops, retail miscellaneous stores, and sporting and athletic goods and manufacturing industries.

Generally, most (52%) responding charter fishing operators are satisfied with charter fishing business in Georgia. On the other hand, most (57%) are dissatisfied with Georgia's charter fishing regulations. Overall, majority of the concerns are related to fish limits.

TABLE OF CONTENTS

Executive Summary	i
TABLE OF CONTENTS	ii
LIST OF TABLES	iii
LIST OF FIGURES	v
I. INTRODUCTION	1
II. DATA COLLECTION ACTIVITIES	2
Survey Design	2
Population and Sample	2
Data Collection	3
III. DATA ANALYSIS	4
Estimating Earnings (Cash Flow), Expenditure (Cash Outflow), and Net Revenue	4
Economic Impact Analysis	4
<i>Regional Input-Output Model</i>	4
Monte Carlo Simulation	9
IV. RESULTS	9
Background Information	10
Business Ownership, Structure, and Operating Characteristics	12
Primary Vessel and Trip Characteristics	13
Earnings, Expenditures, and Net Revenue	15
Economic Impact Results	16
Satisfaction with the Charter Fishing Sector	18
Concerns about the Charter Fishing Sector	19
Charter Fishing Operators' Recommendations	20
V. SUMMARY AND CONCLUSIONS	22
REFERENCES	24
APPENDIX	26

LIST OF TABLES

Table 1. Number of respondents by county	3
Table 2. 12 months operating expenditures used to compute economic contribution/impact considering resident charter fishing operators	7
Table 3. 12 months operating expenditures used to compute economic contribution/impact considering resident and non-resident charter fishing operators	8
Table 4. Age and years of experience	10
Table 5. Typical annual sales before COVID-19.....	11
Table 6. Ownership and organization Characteristics	12
Table 7. Additional Services Offered	13
Table 8. Primary vessel and trip characteristics.....	14
Table 9. Summary of annual revenue	15
Table 10. Summary of annual operating cost	15
Table 11. Annual cash flow for the average charter fishing operator.....	16
Table 12. Economic impacts of charter fishing sector: using ABP approach: Considering only residents	17
Table 13. Economic impacts of charter fishing sector: using ABP approach: Considering residents and non-residents	18
Table 14. Charter fishing operators’ concerns about the sector.....	20
Table 15. Recommendations.....	21
Table A. Economic impacts of charter fishing sector using “Inbuilt-model” approach: Considering residents.....	26
Table B. Economic impacts of charter fishing sector using “Inbuilt-model” approach: Considering residents and non-residents	27
Table C. Economic impacts of charter fishing sector using “Inbuilt-model” approach and Monte Carlo simulated revenue data: Considering residents.....	29
Table D. Economic impacts of charter fishing sector using “Inbuilt-model” approach and Monte Carlo simulated revenue data: Considering residents and non-residents.....	30

Table E. 12 months operating expenditures used to compute economic impact considering resident charter fishing operators: Based on Monte Carlo simulated data	31
Table F. 12 months operating expenditures used to compute economic impact considering resident and non-resident charter fishing operators: Based on Monte Carlo simulated data.....	32
Table G. Economic impacts of charter fishing sector using APA approach and Monte Carlo simulated expenditure data: Considering residents.....	33
Table H. Economic impacts of for-hire fishing sector using APA approach and Monte Carlo simulated expenditure data: Considering residents and non-residents	34

LIST OF FIGURES

Figure 1. Reasons for entering/remaining in charter fishing business (n=47).....	10
Figure 2. Impact of COVID-19 on charter fishing businesses (n=50).....	11
Figure 3. Participation in extension education (n=50).....	12
Figure 4. Satisfaction with charter fishing business (n = 48)	19
Figure 5. Satisfaction with charter fishing regulations (n = 46)	19
Figure A. Distributions of sample and simulated data.....	28

I. INTRODUCTION

For-hire recreational fishing, popularly known as “charter fishing”, is increasingly becoming an important sector in US marine economy. Charter fishing operators offer anglers with boat access and fishing guide service for a fee, and thus provide anglers access to inshore and offshore marine resources, including highly migratory fisheries. Anglers’ expenditures on fishing trips, in US, generates billions of dollars of economic impact (Lovell, Hilger and Rollins, 2020; American Sports Fishing Association, 2022). And as demand for charter fishing services increase, a range of social, economic, and ecological impacts are expected. That is, to effectively manage recreational fisheries it is critical to understand the impacts of the various recreational fishing sectors, particularly the economic impact of the charter fishing sector which has been understudied.

This study aims to provide current socioeconomic information on charter fishing in the state of Georgia, where the number of charter fishing operators has grown increasingly over the last decade, and recreational fishing is one of the largest user groups of marine resources in the state. About a decade ago, a study suggested Georgia had only about 23 licensed charter fishing operators, and their activities contributed about \$1.6 million to the state economy (Holland *et al.*, 2012). By estimates, in 2021, about 184 licensed charter fishing operators in Georgia provided fishing guide services to nearly 53,000 passengers. The state’s charter fishing sector has unique attributes by the nature of services it provides and so requires periodic and timely information for local fisheries management decision making. This is especially true when weighing economic considerations against fisheries concerns.

Responding to the lack of economic information on Georgia’s charter fishing sector, in 2020, Georgia Department of Natural Resources (GA DNR) awarded Marine Extension and Georgia Sea Grant, University of Georgia, a Coastal Incentive Grant to gather socioeconomic information on the state’s recreational fishing industry and assess the economic impacts of the industry, including the charter fishing sector. To that end, four specific objectives were identified to help achieve this goal: (1) collect for-hire trip level economic data pertaining to last trip revenues, expenses, and operating characteristics, (2) estimate the average net operating revenues of for-hire fishing businesses from trip level economic data collected and subsequent sector level revenues generated, (3) create economic impact models for for-hire revenues and expenditures, and (4) publish findings and create educational outreach materials.

The rest of this report is as follows. The next section discusses survey design, target population and sample obtained, and data collection. This is followed by data analysis, results, conclusion, and reference sections. Other related information is provided in the appendix of this report.

II. DATA COLLECTION ACTIVITIES

Survey Design

To address study objectives, a mixed-mode mail and online surveys were designed in collaboration with charter operators and topic experts to make sure that survey questions resonate with charter operators. Inputs from these stakeholders were combined with information from prior related studies (Lichtkoppler 2002; Savolainen, Caffey, and Kazmierczak, 2012; Holland *et al.*, 2012; Steinback and Brinson 2013) to inform the final design of the survey.

A total of 58 survey questions were produced and organized under seven broad sections: questions regarding (1) background and sociodemographic, (2) ownership, organization, and operating characteristics of charter fishing business, (3) primary vessel characteristics, (4) last trip expenses, (5) last trip revenue, (6) satisfaction with and concerns about the charter fishing sector in Georgia, and (7) potential actions/recommendations. A deliberate decision was made to include questions that elicit operator's opinion about the impact of COVID-19 pandemic on their businesses, participation in extension education, level of satisfaction with charter fishing business and regulations, concerns about the charter fishing sector, and opinions on potential actions. This idea was not part of the original proposal but deemed important for fisheries management decisions. The introduction section of the survey provided participants with information on who to contact if they had questions about the survey, why the study is being conducted, and a confidentiality statement. Participation was voluntary. An electronic link was included in the mail surveys if participants instead preferred to complete the survey online. The online survey was designed such that it was compatible with mobile electronic devices, including mobile phones, tablets, etc. A draft of the questionnaire is included in the appendix of this report.

Population and Sample

A list of 198 licensed saltwater guides/captains/operators with unique identification numbers was obtained from GA DNR under a cooperative agreement between GA DNR and the board or regents of the University System of Georgia. A total of 184 captains (out of the 198), were Georgia residents. Because the population is only 198, rather than needing a representative sample, a census survey was utilized.

Typically, two types of operators are identified: head boat operators and charter boat operators (Holland *et al.*, 2012; Savolainen, Caffey, and Kazmierczak, 2012). By regulation, head boat operators operate vessels that carry more than six passengers while charter fishing operators operate vessels carrying six or fewer passengers per trip (Savolainen, Caffey, and Kazmierczak, 2012). The population frame received for this study, however, did not allow for decomposing licenses by vessel type. Discussions with some charter captains in Georgia, however, suggest that charter boat operations dominate in the state. This was confirmed in the survey responses and suggested in past study (Holland *et al.*, 2012).

Data Collection

Data collection procedures followed the best practices suggested by Dillman, Smyth, and Christian (2014). First, pre-survey notification letters were sent to the 198 licensed for-hire recreational fishing operators. The letters described the survey, when operators should expect survey packets, how the responses will be used, and how findings could be used to inform recreational fisheries management. The survey was launched on January 7, 2022, about two weeks after pre-survey notice letters were mailed out. After the launch, reminder notices were sent to participants at different times: February 10 and 28, March 29, April 21, and May 18, 2022. To encourage participation and appropriate responses, the survey was anonymous, and had no unique identification numbers. There is, however, a trade-off. That is, in striving for anonymity, I was unable to determine who has completed and returned the survey. As such, reminder notices were sent to all for-hire charter fishing operators in the population frame.

Data collection lasted for 6 months (January through June 2022)¹ and a total of 60 operators responded to the survey. However, responses from 55 operators were usable data bringing the response rate to 28%. A total of 37 (67%) responding operators returned the survey via mail while 18 (33%) used the online option (Qualtrics). A total of 4 out of the 60 responding operators were nonresidents. However, two of the nonresident operators suggested the home port of their primary vessel is in Georgia. Table 1 presents the breakdown of number of respondents by state and county (home port of primary vessel). About 21 (38%) of responding operators indicated that the home port for their primary vessel is at Chatham County. Fourteen (26%) indicated that the home port of their primary vessel is at Glynn County, 8 (15%) said home port for their primary vessel is at Camden County, 5 (9%) operators said home port for their primary vessel is at Bryan County and 3 (6%) captains' primary vessel home port is at McIntosh County. Two operators indicated their primary vessel home port is Liberty and Brantley (Table 1). Furthermore, two non-resident responding charter fishing operators indicated their primary vessel port is Nassau County in Florida.

Table 1. Number of respondents by county

County	Number of respondents	Proportion
Georgia		
Chatham	21	38%
Glynn	14	26%
Camden	8	15%
Bryan	5	9%
McIntosh	3	6%
Liberty	1	2%
Brantley	1	2%
Florida		
Nassau	2	4%

¹ Out of the 198 survey packets mailed, a total of 7 (3.5%) survey packets were not deliverable due to either wrong address information or change of address.

III. DATA ANALYSIS

Next, I discuss the data analysis. This comprises summary statistics of key variables, estimation of for-hire recreational fishing earnings, operating cost/expenditure, net revenue, and economic impact analysis. Survey data were entered into Microsoft Excel and organized and processed in R software. Except for economic impact analysis, all summary statistics are generated in either Microsoft Excel or R software. The economic impact analysis, however, was performed using IMPLAN Pro Software. Details on these are discussed below. Finally, results are presented in graphs and tables.

Estimating Earnings (Cash Flow), Expenditure (Cash Outflow), and Net Revenue

Earnings are the revenues accruing to charter fishing businesses through trip sales and tips. Survey information on number of monthly trips, trip fee, tip, and number of passengers per trip were used to compute total annual earnings for responding operators. Summary statistics including mean, minimum, maximum, median, and standard error were then derived.

Expenditures are the costs incurred while operating for-hire recreational fishing vessels. Here, operating expenditures for estimating annual cash outflow includes cost of vessel fuel, trip supply cost (bait, ice, food and drinks, and tackle), repair and maintenance, insurance, advertisement, local and federal fees, dockage fees, crew labor cost, and loan repayments. Like earnings, summary statistics are computed for the expenditure components.

Average net revenue to charter fishing operators is determined as the difference between mean annual cash flow and mean annual cash outflow.

Economic Impact Analysis

This subsection discusses the approach used to estimate the economic impact of the charter fishing sector. The economic impact of Georgia's for-hire fishing fleet goes beyond the direct employment, income, and revenues of the sector. That is, when for-hire fishing operators purchase goods and services to maintain and operate their vessels, they trigger further economic impacts. The companies/industries that supply the goods and services also source goods and services from secondary sources who in turn purchase goods and services from other suppliers. This process constitutes the indirect effect of the for-hire fishing sector spending. Furthermore, it is expected that incomes paid to employees of the secondary industries will be used to purchase goods and services from the economy, generating an induced effect. Thus, the flow of industry-to-industry demand and supply of goods and services continues until all the goods and services are sourced from outside Georgia. While the estimation of direct impact of the for-hire fishing sector is straightforward, determination of the indirect and induced effect requires further modelling.

Regional Input-Output Model

To measure the indirect and induced effects, I use IMPLAN's regional input-output (I-O) model as used in past related studies (Bota 2022; Holland *et al.*, 2012; Lichtkoppler 2002). The I-O model is a linear modeling technique which examines the economic cycle of production by

measuring the relative relationship between the flow of an industry’s inputs and resultant flow or destination of outputs in an economy (Grealis 2017). Mathematically, the I-O model can be derived as:

$$X = Z + Y \quad (1)$$

where X is gross output, Y is final demand, and Z is an inter-industry transaction table which shows intermediate sales between industries. The input requirement for each industry to produce a unit of output is computed as $a_{ij} = \frac{z_{ij}}{x_i}$ (Leontief 1986). Calculating the input requirement for each industry results in a matrix of technical coefficients, represented as $A = \frac{Z}{X}$. Substituting AX for Z in equation 1 and solving for X gives equation 2 which is the traditional Leontief input-output model.

$$X = (I - A)^{-1} \times Y \quad (2)$$

where I is the identity matrix², A is the technical coefficient or direct requirement matrix, and $(I - A)^{-1}$ is the Leontief inverse or the multiplier matrix. I-O models are driven by multipliers (IMPLAN Group 2022a). The multipliers are rates that describe how additional spending in an economy generates additional economic activity in the broader economy. As mentioned earlier, the direct effects are the initial values (e.g., sales/expenditure) to which the multipliers are applied and trigger the indirect and induced effects.

The IMPLAN system further breaks down the direct, indirect, and induced effects into employment impact (full-and part-time jobs supported or created), labor income, total value added (sum of labor income and proprietor income), and output/sales. Although five types of multipliers exist within the IMPLAN software, IMPLAN Group recommends the Type SAM Multiplier because it is consistent with reality. Type SAM multiplier is computed as the sum of direct, indirect, and induced effects divided by the direct effects (IMPLAN Group 2022a).

Two modelling techniques can be used within the IMPLAN software to determine the economic impact of a sector or industry. That is, the “Inbuilt-model” approach and “Analysis-By-Parts” (ABP) approach. The “Inbuilt-model” combines industry output/sales data with IMPLAN’s I-O data to estimate the economic impact. While this approach is the simplest and most attractive way of measuring economic impact/contribution of an industry change in IMPLAN (Bota 2022), estimates could be biased downward, especially because industry representatives may under-report revenues. The ABP, on the other hand, requires industry spending/expenditure patterns information derived from the industry’s production budget and surveys.

In this report I utilize the two different approaches to determine the economic impact of Georgia’s for-hire fishing sector. However, I elect to report and discuss results from the ABP in

² An identity matrix is a square matrix with ones on the principal diagonal and all other elements zeros.

the main text and relegate estimates from the “Inbuilt-model” to the appendix.³ That is, to accurately estimate the economic contribution/impact of Georgia’s for-hire fishing sector, first, for each expenditure type, I create a linear production function as the ratio of the expenditure and output (revenue) (IMPLAN Group, 2022b) and assign these ratios to the most appropriate IMPLAN commodity sector within IMPLAN software (see Tables 2 and 3). The ratios serve as the sector’s intermediate input spending coefficients within the IMPLAN software. License fees/taxes (payments to government institutions) are excluded from determining the indirect and induced contribution/impact analysis. The proportions of spending that occurs locally (local purchase percentages) are also adjusted for each commodity based on the Georgia SAM values to account for imports and leakages (IMPLAN Group, 2022b). Furthermore, for expenditures in the retail sector, including food and beverage stores (IMPLAN code #400), gasoline stations (IMPLAN code #402), ice (IMPLAN code #406), and sporting goods, hobby, book, and music stores (IMPLAN code #404), retail margins are applied (see Tables 2 and 3) to apportion values for manufacturing, transportations and wholesale distribution as recommended (IMPLAN Group, 2022c and Holland et al 2012). Retail margin values were obtained from IMPLAN Group and ranged between 0.2 to 0.5 (IMPLAN Group, 2022c). I then set the event year in the IMPLAN software to 2017 to correspond with the IMPLAN’s data year and used Type SAM multipliers. Because the for-hire fishing sector is only a subset of IMPLAN’s “other amusement and recreation (IMPLAN code #496)” industry, the final model was not constrained for economic contribution analysis (IMPLAN Group, 2022d). Finally, a single region analysis was processed within the IMPLAN software and results were generated and exported in excel format. All monetary values are reported in 2022-dollar values.

³ For the “Inbuilt-model” approach, I combine estimated total annual revenue of the sector with information on economic structure of the state of Georgia in 2017 (IMPLAN Software). Specifically, I assigned sales revenue to IMPLAN’s “other amusement and recreation (IMPLAN code #496)” industry of which “fishing guide service” is a sector. I set the event year to 2017 to match IMPLAN’s data year and opts for a Type SAM Multipliers.

Table 2. 12 months operating expenditures used to compute economic contribution/impact considering resident charter fishing operators

Item	IMPLAN [®] Sector Code	IMPLAN [®] Sector Description	Expense (\$1000)	Percent local	Expense Share
Boat Fuel (retail margin)	402	Retail-Gasoline stores	109.2 ±32	100%	0.004
Boat Fuel (production)	156	Petroleum refineries	2,165.3 ±634.5	94.3%	0.088
Repair and Maintenance	508	Personal and household goods repair and maintenance	667.10 ±165.9	100%	0.027
Bait	017	Commercial fishing (Bait)	4,935.18 ±863.8	100%	0.201
Ice (retail margin)	406	Retail-Miscellaneous store retailers	306.1 ±53.6	100%	0.013
Ice (production)	107	Ice (except dry ice) manufacturing	664.5 ±116.5	100%	0.027
Food/drinks (retail margin)	400	Retail-Food and beverage stores	164.6 ±28.8	100%	0.007
Food/drinks (production)	106	Beverages, soft drink, manufacturing	357.3 ±62.5	98%	0.015
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	860.6 ±150.6	100%	0.035
Tackle (production)	385	Fishing tackle and equipment manufacturing	1,868 ±326.9	99.5%	0.076
Insurance	437	Insurance carries, except direct life	334.6 ±35.4	100%	0.014
Advertisement	457	Advertising, public relations, and related services	275.9 ±59.7	100%	0.011
Dockage/Boat Launch	496	Other amusement and recreation industry	217.5 ±43.9	100%	0.009
Value added components					
Labor income		Employment compensation	7,465.3 ±1,668.8	100%	0.304
Proprietor income		Proprietor income	4,322.1 ±4,244	100%	0.176
License fees/Taxes		Taxes	71.1 ±10	100%	0.003
Total			24,784.2		1

Table 3. 12 months operating expenditures used to compute economic contribution/impact considering resident and non-resident charter fishing operators

Item	IMPLAN [®] Sector Code	IMPLAN [®] Sector Description	Expense (\$1000)	Percent local	Expense Share
Boat Fuel (retail margin)	402	Retail-Gasoline stores	117.5 ±34.4	90%	0.004
Boat Fuel (production)	156	Petroleum refineries	2,330.1 ±682.8	84.3%	0.088
Repair and Maintenance	508	Personal and household goods repair and maintenance	717.9 ±178.6	90%	0.027
Bait	017	Commercial fishing (Bait)	5,310.7 ±929.5	90%	0.201
Ice (retail margin)	406	Retail-Miscellaneous store retailers	329.4 ±57.7	90%	0.013
Ice (production)	107	Ice (except dry ice) manufacturing	715 ±125.1	90%	0.027
Food/drinks (retail margin)	400	Retail-Food and beverage stores	177.1 ±31	90%	0.007
Food/drinks (production)	106	Beverages, soft drink, manufacturing	384.5 ±67.3	88%	0.015
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	926 ±162.1	90%	0.035
Tackle (production)	385	Fishing tackle and equipment manufacturing	2,010.1 ±351.8	89.5%	0.076
Insurance	437	Insurance carries, except direct life	360 ±38.1	90%	0.014
Advertisement	457	Advertising, public relations, and related services	296.9 ±64.2	90%	0.011
Dockage fee/Boat Launch	496	Other amusement and recreation industry	234.1 ±47.3	90%	0.009
Value added components					
Labor income		Employment compensation	8,033.3 ±1,795.7	90%	0.304
Proprietor income		Proprietor income	4,651 ±4,566.9	90%	0.176
Licenses/Taxes		Taxes	76.5 ±10.4	90%	0.003
Total			26,669.9		1

Monte Carlo Simulation

So far economic contribution/impact values have been constructed assuming that the sample data is a representation of the population. To further assess uncertainty of the estimates, I perform Monte Carlo simulations⁴ to generate a sequence of independent random numbers based on the sample data distributions of the variables and their parameters (mean and standard deviation). I then derive the mean and standard errors from the simulated data, interpolate to the population totals and then combine this information with data from IMPLAN to compute lower and upper bound estimates of economic contribution/impact of for-hire fishing operations in Georgia. Monte Carlo simulation helps in reducing uncertainty in estimates, especially in small sample cases.

First, assessment of the variables' sample data suggests that except for proprietor income, all the variables of interest follow log normal distributions. For proprietor income I assume a normal distribution (Figure A). Also shown in Figure A are examples of log normal distributions of some variables. The distributions of all the expenditure variables are available on request.

For each variable of interest, using the sample mean and standard deviation as parameters and assuming a log normal distribution (except for proprietor income), I simulate 10,000 random numbers and then compute the means and standard errors for each variable of interest. Monte Carlo simulations and computations of mean and standard errors are performed in R software. Overall, except for the lower and upper bounds, economic impact estimates constructed using simulated data are parallel to estimates reported in the main text. Economic impact estimates from simulated data are reported in the appendix of the report, specifically in Tables C-H.

IV. RESULTS

The results of the charter fishing survey are presented and discussed below in five sections. The first section outlines background and sociodemographic information about charter fishing operators, including their perceptions of COVID-19 impact on the sector. The second section describes the business ownership style, structure, and operations of the charter fishing industry. The third section describes the primary vessel and trip characteristics of the sector. The fourth section presents summary results on earnings, cost/expenditure, and net revenue. Finally, results on economic impact estimates are presented.

⁴ Monte Carlo simulation is a statistical technique where a computer algorithm is used to generate a set of random numbers with the same data distribution as the original data and a statistical analysis used to compute outcomes such as means, standard errors (Bonate 2001; Raychaudhuri 2008).

Background Information

This section focuses on discussing background information including age, work experience, reasons why operators/captains entered or remained in the charter fishing business, perceptions of COVID-19 impact on for-hire fishing businesses, and participation in extension education. For age distribution of for-hire fishing captains, results presented in Table 4 suggest that on average, charter captains are in the mature working age group. The average age is about 50 years while the median age is 49 years. The youngest captain is 21 years while the oldest captain surveyed is 81 years. Also presented in the same table are results on captains' years of experience in the charter fishing sector. The results indicate that the average captain in the for-hire fishing sector has about 12 years of experience. The years of experience, however, range between 1 and 44 years. The median of experience is 9 years.

Table 4. Age and years of experience

	Observations	Mean	Minimum	Maximum	Median	Std. Dev.
Age	55	50.69	21	81	49	14.57
Years in business	55	12.29	1	44	9	11.53

Using a four-point scale (1=Highest through 4=Lowest) charter fishing operators were also asked to rank four reasons why they entered or remained in the charter fishing sector. The reasons included, *help people enjoy fishing*, *like the work*, *primary source of income*, and *secondary source of income*. For brevity, discussion focuses on the highest rank (in blue color). Results presented in Figure 1 shows that 16 operators entered charter fishing business mainly to help people enjoy fishing. About 15 operators indicated they entered the business mainly because they like it. In terms of income, 11 operators suggested they entered because it is the secondary source of income while 2 suggested charter fishing business is a primary source of income.

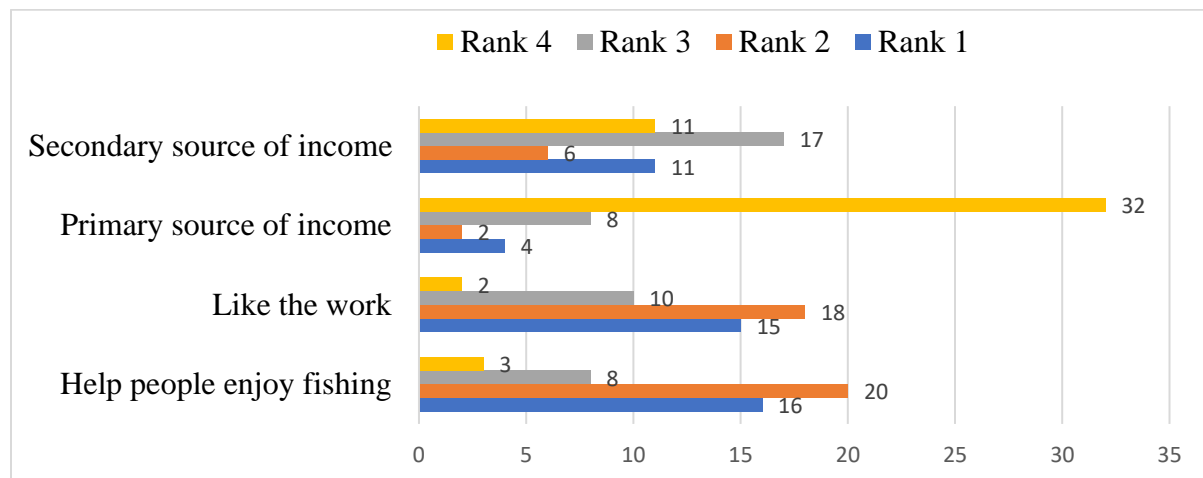


Figure 1. Reasons for entering/remaining in charter fishing business (n=47)

Figure 2 presents charter fishing operators' perceptions of COVID-19 impact on charter fishing businesses. Studies suggest that COVID-19 had adverse impact on various businesses

and industries (Apedo-Amah 2020; Meyer, Prescott, and Sheng 2022), including the tourism and recreation industry (Lee and Chen 2022; Abbas, Mubeen, and Raza 2021). Regarding the for-hire fishing sector in Georgia, survey results show that majority (about 54%) of respondents perceive that total cost of operating charter fishing vessel either increased or increased substantially during the COVID-19 pandemic. Furthermore, majority (about 60%) perceive a decline in revenue and profit. However, majority (about 51%) of the charter fishing operators also perceive that the pandemic did not affect the efficiency at which they operated their business.

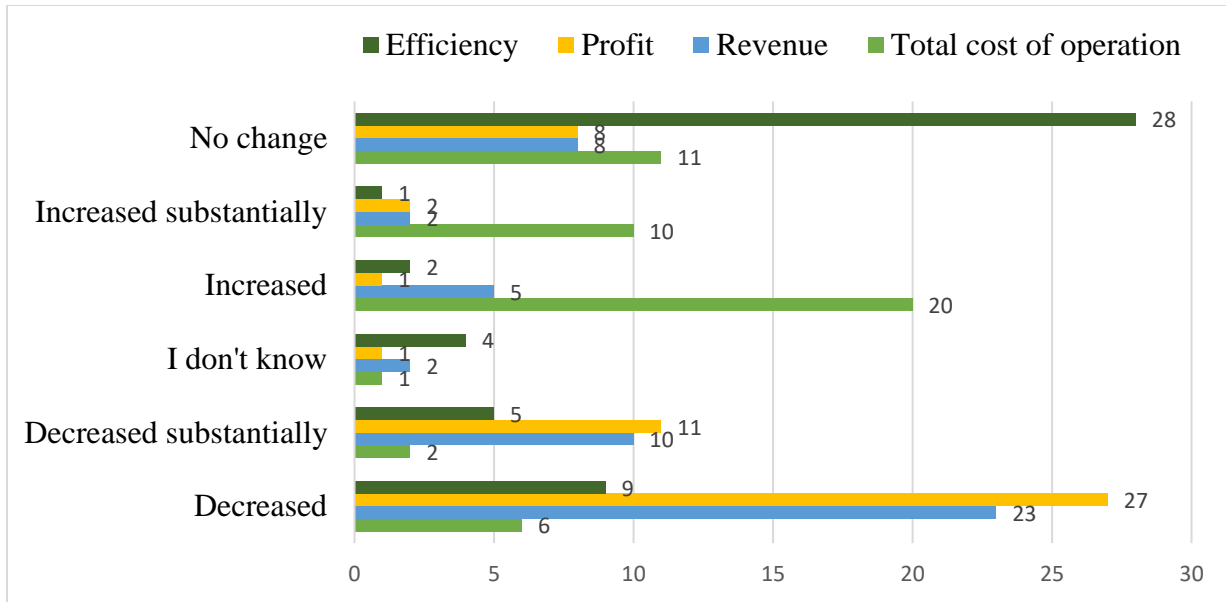


Figure 2. Impact of COVID-19 on charter fishing businesses (n=50)

In addition to these perceptions, for-hire fishing captains were asked to indicate their typical annual sales prior to COVID-19 pandemic. Survey results presented in Table 5 suggest that majority (60%) of the responding charter fishing operators made between \$10,001-\$100,000 in annual sales prior to COVID-19. About 23% of responding operators also made less than \$10,001 sales per annum pre-COVID-19 while very few (6%) operators made annual sales that exceeded \$100, 000.

Table 5. Typical annual sales before COVID-19

Annual sales	Number of respondents	Proportion
\$1-\$1000	4	7%
\$1,001-\$5,000	5	9%
\$5,001-\$10,000	3	6%
\$10,001-\$25,000	11	20%
\$25,001-\$50,000	9	16%
\$50,001-\$100,000	13	24%
\$100,001-\$250,000	2	4%
\$500,001-\$1,000,000	1	2%

Charter fishing operators were also asked if they had participated in any extension education in the past three years. Result from the survey, presented in Figure 3, shows that majority (86%) of responding operators have not participated in any extension education in the last three years. Only 1% responding operators have participated in extension education in the past three years. This information presents an opportunity to design extension education programs that focus on this group of people.

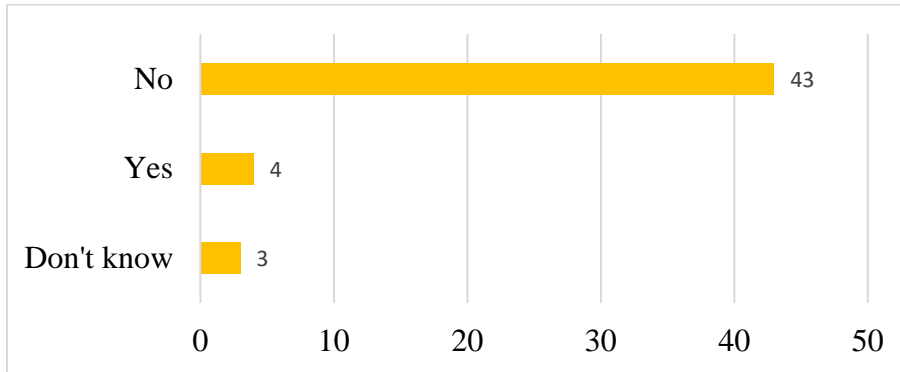


Figure 3. Participation in extension education (n=50)

Business Ownership, Structure, and Operating Characteristics

Turning to business ownership, structure, and operations, the survey results, as presented in Table 6, show that majority of charter fishing captains are sole proprietors (71%), own (87%) the boat/vessel they operate and operate the vessel on part-time basis (58%). The ownership style, sole proprietorship, indicates most for-hire fishing businesses are owned and run by one person where there is no legal distinction between the owner and the business entity. A few surveyed captains also mentioned they operate as either a limited liability cooperation (13%) or partnership (4%). Majority (58%) of charter fishing captains surveyed operate on part-time basis while 35% operate the boat/vessel full-time.

Table 6. Ownership and organization Characteristics

	Number of respondents	Proportion
Ownership type		
Sole proprietorship	39	71%
Corporation	7	13%
Partnership	4	7%
Organization structure		
Own the boat	48	87%
Leased/rented boat	1	2%
Salary employee	1	2%
Freelance hire per trip	1	2%
Boat operation		
Full-time	19	35%
Part-time	32	58%

Furthermore, Table 7 presents information on the additional services offered by charter fishing businesses. These services include the provision of ice, tackle, fishing license, bait, fish cleaning, food/bottled water, and photography. Specifically, in addition to the fishing guide service, majority (more than 50%) provide ice, tackle, licenses, bait, fish cleaning, food, and bottled water, and serve as photographers. These services are included in the passengers' fare. Only 2% of the respondents indicated that they provide lodging if requested.

Table 7. Additional Services Offered

Service item	Number of Respondents	Proportion
Ice	50	91%
Tackle	49	89%
Licenses	48	87%
Bait	47	85%
Fish cleaning	44	80%
Food/Bottled water	30	55%
Photos/videos	30	55%
Lodging	1	2%

Primary Vessel and Trip Characteristics

Presented in Table 8 are the summary of primary vessel and trip characteristics. The average primary vessel has a length of 23 feet, 1 engine with a horsepower of about 255 and carries about 6 passengers. The smallest boat in the for-hire fishing fleet is about 16 feet long has one engine with 1 outboard motor that has a horsepower of 60 while the largest vessel is 33 feet long has 3engines and a horsepower of 750. Survey results also suggest that the average for-hire fishing captain makes about 92 trips annually (3 a week and 11 a month), carries 3 passengers per trip with no additional crew, travels about 28miles for a trip, and burns about 103 gallons of boat fuel per trip. Majority (56%) of the captains undertake half day trips, mostly inshore (64%) and spend, on average, 5.8 hours during the trip. For the average for-hire fishing captain, about 81% of total trip hours are spent inshore where 22% of this trip hours are spent visiting inshore artificial reef sites. About 12% of the surveyed captains make trips to nearshore while 9% make trips to offshore. Furthermore, captains who make offshore trips spend about 35% of the total trip hours at offshore artificial reef sites.

Table 8. Primary vessel and trip characteristics

	Number of respondents	Proportion	Mean	Min.	Max.	Median	Std. D.
Boat characteristics							
Boat length (feet)	51		23.35	16	33	23	4.15
Number of engines	51		1	1	3	1	0.43
Horsepower	51		255.2	60	750	240	150.1
Carrying capacity	51		6.69	2	12	6	2.36
Additional crew							
Full time crew	16		0.38	0	1	0	0.5
Part time crew	19		0.68	0	3	1	0.82
Paid family crew	16		0.31	0	1	0	0.48
Unpaid family crew	14		0.14	0	1	0	0.36
Number of trips							
Week	32		3.31	0	12	2.5	2.88
Month	38		11.66	1	50	8	11.42
Year	47		92.68	4	280	95	74.06
Trip characteristics							
Full day trip	20	36%					
Half day trip	31	56%					
Trip duration	51		5.84	3	11	6	2.03
Inshore trip	35	64%					
Nearshore trip	7	13%					
Offshore trip	5	9 %					
% of total trip hours spent inshore	43		81	1	100	100	35.68
% of total trip hours spent nearshore	18		30.78	0	100	10	41.8
% of total trip hours spent offshore	11		32.73	0	100	10	41.97
% of total trip hours spent at inshore artificial reef	22		22	0	100	0	39.17
% of total trip hours spent at offshore artificial reef	21		35	0	100	0	47.18
Distance travelled (miles)	50		27.66	3	150	21.5	24.39
Boat fuel (gallons)	49		103.38	12	700	56	138.81
Number of passengers	48		3	1	6	3	1.23

Earnings, Expenditures, and Net Revenue

As expected, customer payments are the largest source of revenue to the charter fishing operator. As shown in Table 9, the average charter fishing operator’s annual revenue is about \$133,596. This, however, ranges from as low as \$7,812 and as high as \$1,197,000. Decomposing annual revenue into trip fee and tip, the average operator’s annual trip fee is \$125,705 (ranges between \$6000 and \$1,152,000) while annual tip is about \$7,891 (ranges between \$0 and \$60,300). Overall, the estimated revenue reflects self-reported annual sales prior to COVID-19 (Table 5).

Table 9. Summary of annual revenue

	Number of respondents	Mean (\$)	Min (\$)	Max (\$)	Median (\$)	Std. error (\$)
Revenue	49	133,596.61	7,812	1,197,000	66,636	28,313.69
Trip fee	49	125,705.5	6,000	1,152,000	64,800	27,464.43
Tip	49	7,891.10	0	60,300	4,848	1,773.89

Summarized in Table 10 are the cost associated with typical items required to operate and maintain for-hire fishing vessel. For the average charter fishing business, the largest annual operating expense are, trip supply (bait, ice, food/drinks, and tackle), labor income, fuel/oil, and repairs and maintenance respectively. While loan repayment is included in Table 10, it is not an operating cost (Lichtkoppler and Kuehn 2002) and so it is excluded from the annual average operating cost. Also, because few responding operators indicated they rent a boat to operate their business, boat rental cost is excluded from the annual average operating cost. The reported estimates, however, vary. For example, some operators purchase as low as \$240 of fuel/oil and as high as \$144,000 fuel/oil annually. Liability insurance, advertisement, and docking fee/boat launch are other significant operating cost associated with the for-hire fishing sector.

Table 10. Summary of annual operating cost

Item	Number of respondents	Mean (\$)	Min (\$)	Max (\$)	Median(\$)	Std. error (\$)
Fuel/oil	49	12,361.5	240	144,000	4,800	3,622.5
Labor income	49	40,572	1,932	309,120	19,320	9,069.4
Trip supply cost	49	49,761.8	1,200	244,800	19,296	8,709.3
Bait	49	26,821.6	646.81	131,947	10,400.5	4,594.3
Ice	49	5,274.8	127.2	25,948.8	2,045.4	923.2
Food/drinks	49	2,836.4	68.4	13,953.6	1,099.9	496.4
Tackle	49	14,829	357.61	72,950.4	5,750.2	2,595.4
<i>Boat rent cost</i>	10	620.3	300	1,501	300	527.1
Insurance	44	1,818.3	396	7500	1,320	192.4
Repair cost	48	3,625.5	0	30,000	1,200	901.8
License/fees	45	386.2	10	2,000	230	52.5
Docking fee	55	1,182.1	200	10,000	651	238.7
Advertisement	28	1,499.4	10	10,000	500	324.3
<i>Loan repayment</i>	15	1,168.3	93.8	3,020.8	701.14	253.3

Furthermore, presented in Table 11 is the annual net revenue for the average charter fishing operator. Results presented considers the case of loan repayment, boat rental, and without loan repayment or boat rental. This result, however, does not account for depreciation and purchasing cost of a charter fishing vessel/boat. Overall, on average, a charter fishing operator/business makes about \$30,000 net revenue per annum. Charter fishing operators with loan repayments or boat rental expense, however, are expected to have a little lower net revenue compared to operators without boat loan or rental expense.

Table 11. Annual cash flow for the average charter fishing operator

Revenue/Expense	Operators with boat loan repayments	Operators who rent boat	Operators without boat loan/rental payments	Number of respondents
Average Revenue (\$)	133,596.6	133,596.6	133,596.6	49
Cash Flow Needs (\$)				
Average operating costs	102,333.9	102,333.9	102,333.9	49
Average loan payments	1,168.3			15
Average boat rentals		620.3		10
Cash Needed (\$)	103,502.2	102,954.24		
Net Revenue (\$) to operator	30,094.3	30,642.4	31,262.7	

Economic Impact Results

Georgia’s for-hire fishing sector confers positive economic impacts/contributions. In this report, although economic impacts are estimated using the “Inbuilt-model” and ABP approach in IMPLAN, I only discuss results for the ABP approach and relegate results for the “Inbuilt-model” to the appendix (Table A1). Furthermore, results based on the Monte Carlo Simulations are reported in the appendix (Tables A3 and A5). The economic impacts are represented by employment, labor income, value-added and output. Employment represents the number of full time and part time jobs created by a sector. Labor income comprises all forms of employment income, including employee compensation and proprietor income. Value-added is the difference between a sector's total output and the cost of its intermediate inputs. Output is the total dollar value of production or service by a sector for a given period (Parajuli et al., 2018; Jolley et al., 2020). All economic impact estimates are reported in 2022-dollar values.

Table 12 reports the economic impact for only resident licensed for-hire fishing operators (184) and all (residents + non-residents) licensed for-hire fishing operators (198). Overall, estimates for only residents and all operators are similar. Although non-resident operators are licensed in Georgia, they could be purchasing goods and services out of state to operate their vessel. Lower and upper bounds are presented in parenthesis in the text. Lower and upper bound estimates are constructed based on estimated standard errors (see Tables 2 and 3).

First, focusing on residents, results displayed in Table 12 suggest that the for-hire fishing sector directly employs about 368 part-time and full-time workers and generates an output of approximately \$24.8 (between \$16.3 and \$33.3) million. This results in an estimated additional

indirect effect of 204 part-time and full-time workers and about \$14.8 (between \$11.8 and \$17.8) million in output, and an induced effect of 95 part-time and full-time workers and approximately \$13.7 (between \$7.9 and \$19.5) million in output in the broader Georgia economy. Thus, overall, these results equate to a total employment impact of 667 part-time and full-time workers and a total economic impact of about \$53.3 (between \$36 and \$70.5) million.

Turning attention to “all” licensed operators in Georgia, economic impact reported in Table 12 shows that direct purchases of goods and services of approximately about \$26.6 (between \$17.5 and \$35.8) million further generates an indirect output of about \$19.2 (between \$12.7 and \$19.1) million, and an induced impact of about \$15.8 (between \$8.4 and \$20.9) million in the broader Georgia economy. That is, the estimated overall economic output is \$61.7 (between \$38.7 and \$75.9) million. The sector directly employs 396 part-time and full-time workers. The direct spending of the for-hire fishing sector indirectly supports 253 workers. The induced employment impact is 110 part-time and full-time workers. This leads to a total employment impact of 759.

Table 12. Economic impacts of charter fishing sector: using ABP approach: Considering only residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	368	7.5	11.9	24.8
Indirect Effect	204	3.5	8.1	14.8
Induced Effect	95	4.4	8.1	13.7
Total Effect	667	15.4	28.0	53.3
Imputed Multiplier	0.8	1.1	1.4	1.1
Mean - 1 SE				
Direct Effect	368	5.8	5.9	16.3
Indirect Effect	167	2.8	6.5	11.8
Induced Effect	55	2.5	4.7	7.9
Total Effect	589	11.2	17.1	36.0
Imputed Multiplier	0.6	0.9	1.9	1.2
Mean + 1 SE				
Direct Effect	368	9.1	17.8	33.3
Indirect Effect	241	4.2	9.6	17.8
Induced Effect	135	6.2	11.5	19.5
Total Effect	745	19.6	38.9	70.5
Imputed Multiplier	1.0	1.1	1.2	1.1

Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.

Table 13. Economic impacts of charter fishing sector: using ABP approach: Considering residents and non-residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	396	8.0	12.8	26.7
Indirect Effect	253	5.1	10.7	19.2
Induced Effect	110	5.1	9.4	15.9
Total Effect	759	18.2	32.9	61.8
Imputed Multiplier	0.9	1.3	1.6	1.3
Mean - 1 SE				
Direct Effect	396	6.2	6.4	17.5
Indirect Effect	179	3.1	7.0	12.7
Induced Effect	59	2.7	5.0	8.5
Total Effect	634	12.0	18.4	38.7
Imputed Multiplier	0.6	0.9	1.9	1.2
Mean + 1 SE				
Direct Effect	396	9.8	19.1	35.8
Indirect Effect	260	4.5	10.3	19.1
Induced Effect	146	6.7	12.4	21.0
Total Effect	801	21.0	41.9	75.9
Imputed Multiplier	1.0	1.1	1.2	1.1

Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.

Satisfaction with the Charter Fishing Sector

Using a likert scale that ranges from extremely dissatisfied to extremely satisfied, charter fishing operators were asked to indicate their overall level of satisfaction with charter fishing operation/business and regulations in Georgia. Figure 4 presents responding operators' satisfaction levels with charter fishing business. A total of 17 out of 48 responding operators indicated they are neither satisfied nor dissatisfied with the charter fishing business. Thirteen (out of 48) are somewhat satisfied while 12 are extremely satisfied. Three operators indicated they are somewhat dissatisfied. Three additional operators indicated they are extremely dissatisfied with for-hire recreational fishing business in Georgia.

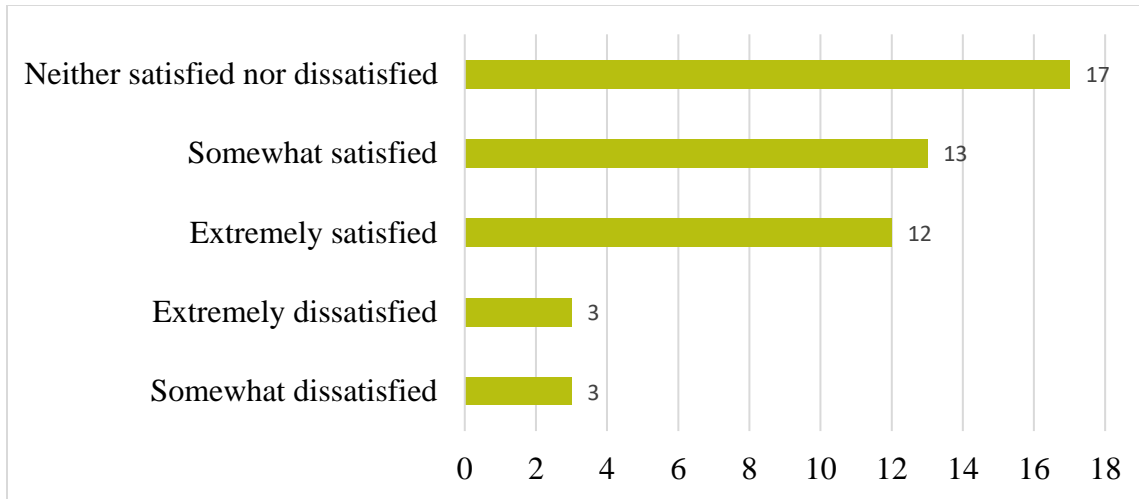


Figure 4. Satisfaction with charter fishing business (n = 48)

Regarding satisfaction with charter fishing regulations, Figure 5 indicates that generally, majority (23) of responding operators are dissatisfied with the regulation of the sector. A total of 18 responding operators are generally satisfied while 5 are neither satisfied nor dissatisfied.

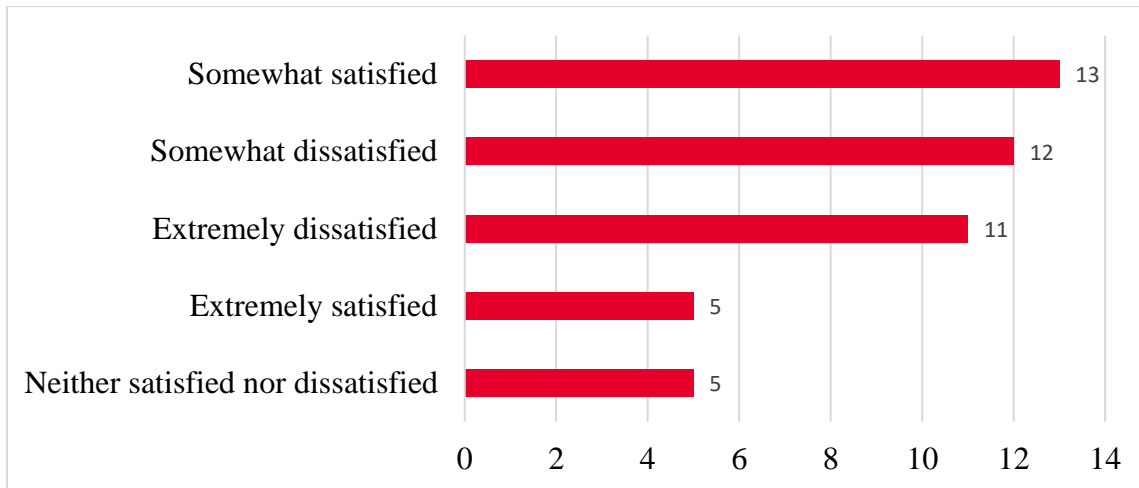


Figure 5. Satisfaction with charter fishing regulations (n = 46)

Concerns about the Charter Fishing Sector

A total of 40 responding charter operators provided various concerns about the sector. These concerns can be grouped under two headings: those related to fish limits and regulations as well as other concerns. To save space I present some selected concerns in Table 14. However, these concerns reflect those not presented here. Majority of the concerns are related to fish limits. Generally, operators want fish limits lowered to conserve fish stock. Other concerns include high fuel cost, unlicensed operators, and high cost of liability insurance.

Table 14. Charter fishing operators' concerns about the sector

Fish limits and regulations concerns
Biggest concern is current GA limits on game fish. Flounder limit is too short, and quantity is too high. Sea Trout and Red Drum quantities are also too high.
I believe GA should have lower limits and a smaller slot size for redfish. I would support a limit of 1 redfish per angler and a 17"-22" slot. I would support a trout limit of 5 fish per person with a minimum of 15" and a limit of one fish per boat over 20". I would support paying more in fees and taxes if the state would use those collected funds only for enforcement of harvesting regulations.
I have concerns that if we do not change our limits for the state of Ga, we will continue to hurt our fishery on the coast. Other states have made it clear with their regulations that bigger fish can be raised by moving the amount that can be kept to a lower number. Other states fisheries are way better than ours. I've fished several myself.
Georgia inshore limits have not changed in nearly 30 years. The limits that are in place no longer correlate appropriately with the number of anglers. I have seen a significant impact on the number of red drum on flats and in creeks. Specifically, within the last five years.
The DNR is tone deaf to charter captains reporting Redfish number diminishing and refuses to do anything constructive. The sum of the limits of redfish from Florida, South Carolina and North Carolina combined equal 4 fish, our limit is 5. Our fishery is suffering because the DNR refuses to listen to the guides who are seeing the population decline firsthand.
I am concerned with preservation of this industry and ecosystem. I believe current regulations on creel limits are outdated and ill managed. Why can't we adjust to match neighboring states? Add the question about money spent in neighboring states due to experienced decline in fish population in GA. Lower the limits on all in-shore species!
Other concerns
Charter fishing in GA is difficult due to the constantly changing weather conditions. It is unlikely that picking a date out will yield a good day to fish. It's more like you need customers who are ready to go with only hours' notice when conditions are "right".
Georgia does not protect the speckled trout or redfish like they should. I find a noticeable difference in fishing Florida waters versus Georgia waters in quality and quantity of fish.
Unlicensed charter operators. Many charters with no coast guard. Licensed operators
Federal government is regulating us out of business. Need fewer regulations plus better enforcement. Fuel costs will necessitate a price increase this season. This will result in fewer trips
I've about stopped chartering this year, spend money getting ready for trip, it gets canceled due to covid-19. Hard to find bait, cost of fuel, fish limits
Shrimpers' bycatch. No snapper seasons. Too many sharks. Over regulated.
High fuel prices

Charter Fishing Operators' Recommendations

Table 15 presents some proposals from responding operators. Like Table 14, proposals are grouped under two headings - fish limits and regulations and general proposals. Regarding fish limits and regulation, a common proposal is lowering fish limits. That is, charter fishing

operators recommend that authorities lower fish size limits and quantity. Operators opine that the current limits are causing decline in fish stock thereby threatening charter fishing businesses. Further, operators are in support of increasing recreational and charter fishing educational efforts, expansion of artificial reefs, fish stocking, increasing license period to annual basis, strict enforcement of regulations, and discounted group liability insurance for charter fishing operators.

Table 15. Recommendations

Fish limits and regulations
Stricter limits for small harvest amounts of all fish and more enforcement.
I would like to see Georgia match one of our neighbors: SC or FL. Why are we so far behind our neighboring states on limit changes and restrictions?
Speckled trout creel limit should be reduced to 10 pieces. Size limit raised to 15". Redfish creel should be reduced to 2 pieces. Slot limit moved to 16"-25".
Red fish boat limit of 15 fish. Redfish minimum size of 15. Red fish-allowed to keep one fish 23-27. Seatrout limit reduction to 10 per angler. Seatrout boat limit of 30 fish.
Spotted seatrout is 15 daily limits. Should be changed to 8 per person or 20 per boat. Trout are over fished. There should be more days to keep red snapper, they are plenty. The nearshore artificial reefs, within 20 miles need work most structure is sanded in. Reefs need new structure also.
To my understanding, red snapper regulations are based on old data and extremely influenced by the commercial fishing industry.
Revise creel limits for red drum, sea trout and flounder. Make tarpon catch and release only.
Reduce number of red drum limit from 5 per person to 2 per person.
Lower red fish limit. Raise minimum on red fish to at least 16-13.
Give us a real red snapper season!
General recommendations
Emphasis on conservation! Reduce the limits! Put more money in the science. Improve the environment - Artificial reefs inshore, education, etc. These surveys are excellent. I only hope that the data obtained can be put to good use.
The fishing industry in general needs assistance with stocking, updated bag/size limits. Both our neighboring states have utilized methods to greatly improve their inshore fishery and the fishing and charter industries have flourished. Unfortunately, Georgia still seems to be the "kill them All" State.
The change has to be Georgia. DNR has to do what it's supposed to be doing (protect Georgia natural resources) before it's too late. And here is a question everyone in Georgia want to hear, please ask ... why they are doing nothing to protect our fisheries.
Open dialogue between operators and law enforcement. Captains loose respect for DNR officers when they are engaged in fishing with customers and must stop fishing to allow DNR to do a safety check. Checking for illegal fish is appreciated and necessary. Captains are aware of the rules.
Living on the Stateline of FL/GA, it isn't fair that I have to pay out of state fees for my fishing license. It would also be nice if the license was good for a year. Instead of starting in April. Florida goes date to date for a year.

Table 15 Continued

Some type of discounted group insurance for captains of private operated vessels maybe subsidized by state DNR.
Fewer regulations, better enforcement, allow us to sell our catch more easily, and of course give us better weather.
Those captains running charters without license of any kind must be caught.
As far as regulations go, I think we are doing a good job.
FL and GA reciprocate their guide licensing.

V. SUMMARY AND CONCLUSIONS

The for-hire recreational (charter) fishing sector has become important in recreational fisheries management in Georgia. Yet detailed information, particularly economic impact information, about the sector is lacking. Occasional assessment of the economic impact and contribution of the charter fishing sector to the state's economy is critical for data-driven decision making. This study has four purposes. Three of the purposes focus on the collection of background information including operating characteristics, and economic data and estimation of net operating revenue as well as economic impact of charter fishing sector on Georgia's economy. The fourth purpose is to create educational materials including factsheet/infographic for public consumption.

Survey data suggest that the average responding charter fishing operator is 50 years old and has 12 years of charter fishing experience. A plurality (16) of operators opined that they engage in charter fishing business primarily so people can enjoy fishing. Most of the operators reported a decrease in revenue and profit, perhaps due to increased cost of operating charter fishing vessels, during the COVID-19 pandemic. Most (77%) captains operate charter fishing business as sole proprietors, and most of these operators own the charter fishing vessels (82%), operate on part-time basis (64%), do not typically hire full-time crew, and provide additional fishing services such as fish cleaning, and photography. On average, charter fishing captains operate fishing vessels that are 23 feet long, have a carrying capacity of 6 passengers, and have one outboard motor that has a horsepower of about 255. Furthermore, survey results suggest that the average operator generates about \$125,705 (ranges from \$6,000 to \$1,125,000) per annum sales revenue, about \$7,891 (ranges from \$0 to \$60,300) per annum in tips, incur about \$102,333 (ranges from \$7,432 to \$590,261) as annual operating cost, and generates about \$30,000 annual net revenue.

Economic impact metrics generated from IMPLAN's Input-Output model show that in 2021, the charter fishing sector contributed about \$53.3 (between \$36 and \$70.5) million in gross output to Georgia's economy. This value includes approximately \$24.7 (between \$16.2 and \$33.2) million in direct effect, \$14.7 (between \$11.8 and \$17.7) million in indirect effect, and \$13.6 (between \$7.8 and \$19.4) million in induced effect. The sector supports about 667 full time and part-time jobs. These estimates are slightly higher if I combine licensed residents and non-resident charter fishing operators. The charter fishing sector further supports other industries

and businesses. The top five industries and services, by employment, that directly rely on the for-hire fishing sector are the commercial fishing (bait) industry, retail sporting goods industry, repair and maintenance shops, retail miscellaneous stores, and sporting and athletic goods and manufacturing industries.

Survey results also show that generally, most (52%) responding charter fishing operators are satisfied with charter fishing business in Georgia. However, most operators (57%) are dissatisfied with Georgia's charter fishing regulations. Overall, operators recommend that authorities lower fish size and quantity limits. Operators opine that the current limits are causing decline in fish stock thereby threatening charter fishing businesses. Further, operators are in support of increasing recreational and charter fishing educational efforts, expansion of artificial reefs, fish stocking, increasing license period to annual basis, strict enforcement of regulations, and discounted group liability insurance for charter fishing operators. majority of the concerns are related to fish limits.

Overall, the findings in this report suggest that the charter fishing sector contributes substantially to Georgia's economy. To the extent that the sector depends on fish stock, a decline in fish stock, and hence decrease in demand for fishing guide services, could lead to significant economic losses. Thus, effective measures to sustain the charter fishing sector need to be implemented, including setting sustainable fish limits that would support charter fishing operations in the long run, while considering anglers' fishing needs. Authorities should design extension programs that would reach out to charter fishing operators and provide related educational information that will ultimately ensure sustainable use of the state's marine resources. Collaborations between authorities, charter fishing operators, resource managers, researchers, and stakeholders should be encouraged to identify charter fishing operators' needs and how to addresses those needs effectively. Charter fishing operators should be encouraged to represent the sector in advisory committees and decision-making processes.

REFERENCES

- American Sports Fishing Association. (2022). 2022 Special Report on Fishing. Available at <https://asafishing.org/2022-special-report-on-fishing/>
- Apedo-Amah, M. C., Avdiu, B., Cirera, X., Cruz, M., Davies, E., Grover, A., ... & Tran, T. T. (2020). Unmasking the Impact of COVID-19 on Businesses.
- Botta, R. (2022). *Enhancing the Usage of Regional Economic Analyses within Resource Management: Case Studies of Florida Aquatic Resources* (Doctoral dissertation, University of Florida).
- Bonate, P. L. (2001). A brief introduction to Monte Carlo simulation. *Clinical pharmacokinetics*, 40(1), 15-22.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. John Wiley & Sons.
- Grealis, E., Hynes, S., O'Donoghue, C., Vega, A., Van Osch, S., & Twomey, C. (2017). The economic impact of aquaculture expansion: An input-output approach. *Marine Policy*, 81, 29-36.
- Holland, S. M., Oh, C. O., Larkin, S. L., & Hodges, A. W. (2012). The operations and economics of the for-hire fishing fleets of the south Atlantic states and the Atlantic Coast of Florida. *University of Florida contract report prepared for the National Marine Fisheries Service. University of Florida, Gainesville, Florida*.
- Jolley, G. J., Khalaf, C., Michaud, G. L., & Belleville, D. (2020). The economic contribution of logging, forestry, pulp & paper mills, and paper products: A 50-state analysis. *Forest Policy and Economics*, 115, 102140.
- Meyer, B. H., Prescott, B., & Sheng, X. S. (2022). The impact of the COVID-19 pandemic on business expectations. *International Journal of Forecasting*, 38(2), 529-544.
- IMPLAN Group. 2022a. Multipliers. <https://blog.implan.com/understanding-implan-multipliers>
- IMPLAN Group. 2022b. A Practitioner's Guide to Conducting an Economic Impact Assessment of Regional Food Hubs using IMPLAN: a step-by-step approach.
- IMPLAN Group. 2022c. Margins & Deflators. <https://support.implan.com/hc/en-us/articles/115009506007-Margins-Deflators>.
- IMPLAN Group. 2022d. IMPLAN Pro: Considerations of Industry Contribution Analysis. <https://support.implan.com/hc/en-us/articles/115002801513-IMPLAN-Pro-Considerations-of-Industry-Contribution-Analysis#:~:text=The%20Impact%20Method%20is%20used,businesses%20in%20the%20local%20economy>.

Lee, C. C., & Chen, M. P. (2022). The impact of COVID-19 on the travel and leisure industry returns: Some international evidence. *Tourism Economics*, 28(2), 451-472.

Lovell, S. J., Hilger, J., Rollins, E., Olsen, N. A., & Steinback, S. (2020). *The economic contribution of marine angler expenditures on fishing trips in the United States, 2017*. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Leontief, W. (Ed.). (1986). *Input-output economics*. Oxford University Press.

Lichtkoppler, F. R. (2003). New York's Great Lakes charter fishing industry in 2002 (survey)

Parajuli, R., Henderson, J. E., Tanger, S., Joshi, O., & Dahal, R. (2018). Economic Contribution Analysis of the Forest-Product Industry: A Comparison of the Two Methods for Multisector Contribution Analysis Using IMPLAN. *Journal of Forestry*, 116(6), 513-519.

Pitcher, T. J. (1999). Evaluating the benefits of recreational fisheries.

Responsive Management (2017). Georgia saltwater anglers' and guides attitudes toward saltwater fishing issues

Raychaudhuri, S. (2008, December). Introduction to monte carlo simulation. In *2008 Winter simulation conference* (pp. 91-100). IEEE.

Savolainen, M. A., Caffey, R. H., & Kazmiercza Jr, R. F. (2012). The recreational for-hire sector in the US Gulf of Mexico: Structural and economic observations from the third decadal survey.

Steinback, S. R., & Brinson, A. A. (2013). The economics of the recreational for-hire fishing industry in the northeast United States.

APPENDIX

Table A. Economic impacts of charter fishing sector using “Inbuilt-model” approach:
Considering residents

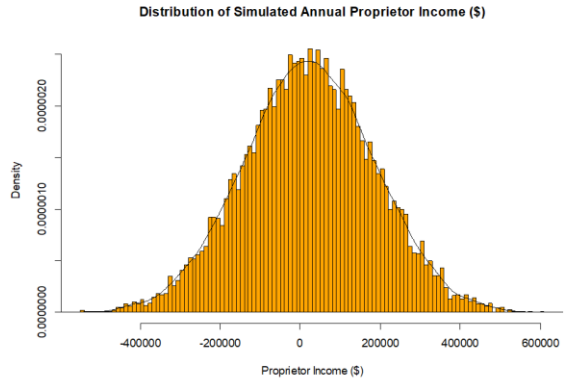
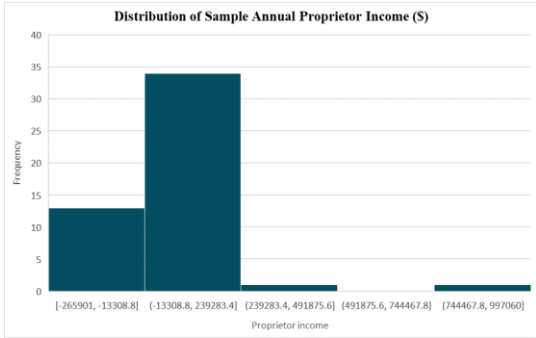
Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	349	12.3	18.5	25.8
Indirect Effect	65	3.3	6.2	10.4
Induced Effect	96	4.4	8.2	13.9
Total Effect	510	20.0	32.8	50.1
Mean-1 SE				
Direct Effect	275	6.1	11.0	20.4
Indirect Effect	51	2.6	4.9	8.2
Induced Effect	54	2.5	4.6	7.9
Total Effect	381	11.2	20.5	36.4
Mean + 1 SE				
Direct Effect	423	18.5	25.9	31.2
Indirect Effect	78	4.0	7.5	12.6
Induced Effect	138	6.3	11.8	19.9
Total Effect	639	28.8	45.1	63.7

Note: Except for employment, all values are in millions of dollars. SE is standard error.

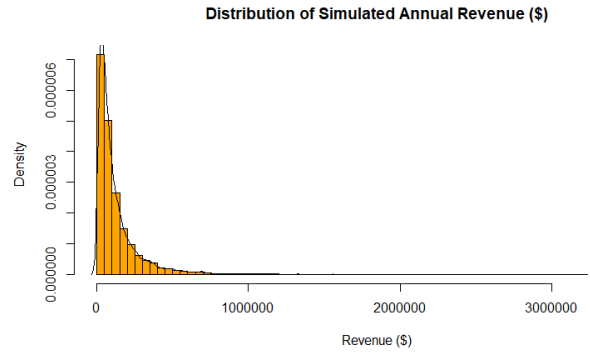
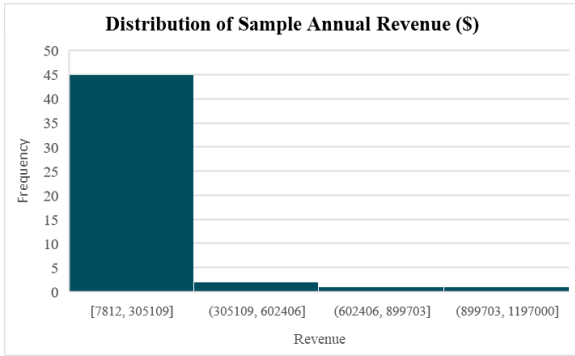
Table B. Economic impacts of charter fishing sector using “Inbuilt-model” approach:
Considering residents and non-residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	376	13.3	19.9	27.8
Indirect Effect	70	3.5	6.6	11.2
Induced Effect	103	4.8	8.8	14.9
Total Effect	549	21.5	35.3	53.9
Mean-1 SE				
Direct Effect	296	6.6	11.8	21.9
Indirect Effect	55	2.8	5.2	8.8
Induced Effect	58	2.7	5.0	8.5
Total Effect	410	12.1	22.0	39.2
Mean + 1 SE				
Direct Effect	455	21.2	29.2	33.6
Indirect Effect	84	4.3	8.0	13.6
Induced Effect	156	7.2	13.3	22.6
Total Effect	695	32.7	50.5	69.7

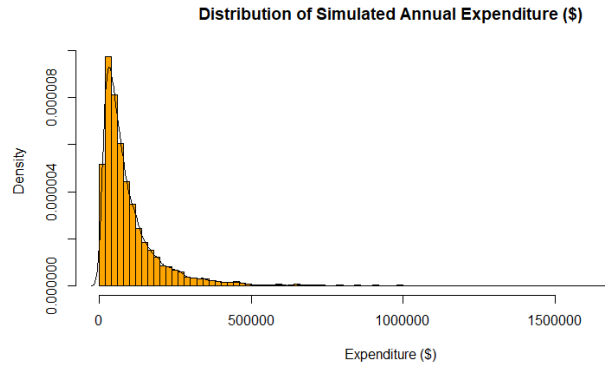
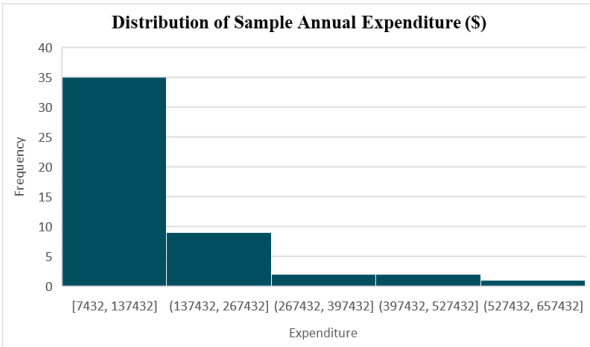
Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.



i



ii



iii

Figure A. Distributions of sample and simulated data

Table C. Economic impacts of charter fishing sector using “Inbuilt-model” approach and Monte Carlo simulated revenue data: Considering residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	347	3.5	9.6	25.6
Indirect Effect	64	3.3	6.1	10.3
Induced Effect	43	2.0	3.7	6.2
Total Effect	454	8.7	19.4	42.2
Mean - 1 SE				
Direct Effect	342	3.7	9.7	25.3
Indirect Effect	63	3.2	6.0	10.2
Induced Effect	44	2.0	3.8	6.4
Total Effect	449	8.9	19.5	41.9
Mean + 1 SE				
Direct Effect	352	7.4	13.6	26.0
Indirect Effect	65	3.3	6.2	10.5
Induced Effect	66	3.1	5.7	9.7
Total Effect	483	13.8	25.5	46.2

Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.

Table D. Economic impacts of charter fishing sector using “Inbuilt-model” approach and Monte Carlo simulated revenue data: Considering residents and non-residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	373	13.0	19.5	27.6
Indirect Effect	69	3.5	6.6	11.1
Induced Effect	101	4.7	8.7	14.6
Total Effect	543	21.1	34.8	53.4
Mean-1 SE				
Direct Effect	368	12.5	19.0	27.2
Indirect Effect	68	3.5	6.5	11.0
Induced Effect	98	4.5	8.4	14.2
Total Effect	534	20.5	33.8	52.4
Mean + 1 SE				
Direct Effect	379	13.4	20.1	28.0
Indirect Effect	70	3.6	6.7	11.3
Induced Effect	104	4.8	8.9	15.1
Total Effect	553	21.8	35.7	54.3

Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.

Table E. 12 months operating expenditures used to compute economic impact considering resident charter fishing operators: Based on Monte Carlo simulated data

Expenditure	IMPLAN [®] Sector	IMPLAN [®] Sector Description	Expense (\$1000)	Percent local	Expense Share
Boat Fuel (retail margin)	402	Retail-Gasoline stores	108.1 ±2	100%	0.004
Boat Fuel (production)	156	Petroleum refineries	2,143 ±39.4	94.3%	0.088
Repair and Maintenance	508	Personal and household goods repair and maintenance	662 ±10.6	100%	0.027
Bait	017	Commercial fishing (Bait)	4,914 ±57.9	100%	0.201
Ice (retail margin)	406	Retail-Miscellaneous store retailers	304.8 ±3.6	100%	0.013
Ice (production)	107	Ice (except dry ice) manufacturing	661.6 ±7.8	100%	0.027
Food/drinks (retail margin)	400	Retail-Food and beverage stores	163.9 ±1.9	100%	0.007
Food/drinks (production)	106	Beverages, soft drink, manufacturing	355.8 ±4.2	98%	0.015
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	856.9 ±10.1	100%	0.035
Tackle (production)	385	Fishing tackle and equipment manufacturing	1,8560 ±21.9	99.5%	0.076
Insurance	437	Insurance carries, except direct life	333.7 ±2.5	100%	0.014
Advertisement	457	Advertising, public relations, and related services	274.2 ±3.9	100%	0.011
Dockage/Boat Launch	496	Other amusement and recreation industry	216.3 ±2.9	100%	0.009
Value added components					
Labor income		Employment compensation	7,417.9 ±108.7	100%	0.304
Proprietor income		Proprietor income	4,094.9 ±299.5	100%	0.168
License fees/Taxes		Taxes	70.8 ±0.7	100%	0.003
Total			24,437.9		1

Table F. 12 months operating expenditures used to compute economic impact considering resident and non-resident charter fishing operators: Based on Monte Carlo simulated data

Item	IMPLAN [®] Sector code	IMPLAN [®] Sector Description	Expense (\$1000)	Percent local	Expense Share
Boat Fuel (retail margin)	402	Retail-Gasoline stores	116.3 ±2.1	90%	0.004
Boat Fuel (production)	156	Petroleum refineries	2,306.1 ±42.4	84.3%	0.088
Repair and Maintenance	508	Personal and household goods repair and maintenance	712.3 ±11.4	90%	0.027
Bait	017	Commercial fishing (Bait)	5,287.9 ±62.4	90%	0.201
Ice (retail margin)	406	Retail-Miscellaneous store retailers	328 ±3.9	90%	0.013
Ice (production)	107	Ice (except dry ice) manufacturing	711.9 ±8.4	90%	0.027
Food/drinks (retail margin)	400	Retail-Food and beverage stores	176.4 ±2.1	90%	0.007
Food/drinks (production)	106	Beverages, soft drink, manufacturing	382.8 ±4.5	88%	0.015
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	922.1 ±10.9	90%	0.035
Tackle (production)	385	Fishing tackle and equipment manufacturing	2,001.5 ±23.6	89.5%	0.076
Insurance	437	Insurance carries, except direct life	359.1 ±2.6	90%	0.014
Advertisement	457	Advertising, public relations, and related services	295.1 ±4.2	90%	0.011
Dockage fee/Boat Launch	496	Other amusement and recreation industry	232.8 ±3.1	90%	0.009
Value added components					
Labor income		Employment compensation	7,982.3 ±117	90%	0.304
Proprietor income		Proprietor income	4,406.5 ±322.3	90%	0.168
Licenses/Taxes		Taxes	76.2 ±0.7	90%	0.003
Total			26,297.3		1

Table G. Economic impacts of charter fishing sector using APA approach and Monte Carlo simulated expenditure data: Considering residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	368	7.4	11.6	24.4
Indirect Effect	210	3.7	8.4	15.6
Induced Effect	97	4.5	8.3	14.0
Total Effect	676	15.6	28.3	54.1
Imputed Multiplier	0.8	1.1	1.4	1.2
Mean - 1 SE				
Direct Effect	368	7.3	11.2	23.9
Indirect Effect	208	3.6	8.2	15.1
Induced Effect	94	4.3	8.0	13.6
Total Effect	670	15.2	27.4	52.6
Imputed Multiplier	0.8	1.1	1.5	1.2
Mean + 1 SE				
Direct Effect	368	7.5	12.0	25.0
Indirect Effect	213	3.7	8.5	15.8
Induced Effect	100	4.6	8.5	14.5
Total Effect	681	15.8	29.1	55.3
Imputed Multiplier	0.9	1.1	1.4	1.2

Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.

Table H. Economic impacts of for-hire fishing sector using APA approach and Monte Carlo simulated expenditure data: Considering residents and non-residents

Impact type	Employment	Labor Income	Value Added	Output
Mean				
Direct Effect	396	8.0	12.5	26.3
Indirect Effect	226	3.9	9.0	16.8
Induced Effect	105	4.8	8.9	15.1
Total Effect	727	16.7	30.4	58.2
Imputed Multiplier	0.8	1.1	1.4	1.2
Mean-1 SE				
Direct Effect	396	7.9	12.0	25.7
Indirect Effect	224	3.9	8.9	16.6
Induced Effect	102	4.7	8.7	14.7
Total Effect	721	16.4	29.6	56.9
Imputed Multiplier	0.8	1.1	1.5	1.2
Mean + 1 SE				
Direct Effect	396	8.1	12.9	26.9
Indirect Effect	224	3.7	9.0	16.3
Induced Effect	58	2.7	5.0	8.4
Total Effect	679	14.5	26.8	51.6
Imputed Multiplier	0.7	0.8	1.1	0.9

Note: Except for employment and imputed multiplier, values are in millions of dollars. SE is standard error.

Information Sheet for Participation in a Research Study

Principal Investigator: Dr. Eugene Frimpong

Title of Study: Estimating the Economic Impact of For-Hire Charter Business in Georgia

Dear Captain, you are invited to participate in a research study. This form includes information about the study and contact information if you have any questions.

WHY ARE WE DOING THIS RESEARCH?

The purpose of this research is to provide insight into the operational structure of the for-hire charter business and assess the extent to which for-hire charter businesses contribute to Georgia's Economy. Despite the important role for-hire charter businesses play in the recreational fishing and tourism industry, there is no current economic data to understand and estimate its impact on Georgia's economy. This survey will provide the information required to understand the operational characteristics and the contributions of the for-hire charter business in Georgia.

WHAT SHOULD I KNOW?

If you agree to participate in this study, you will be asked to complete a survey. The survey asks questions related to your business. Specifically, we will collect some background information, information on your business operating and boat characteristics, last trip expenses, last trip revenue, perceptions on the charter business in Georgia and recommendations. No personally identifiable information will be collected. The survey should take 15 minutes to complete. We do not anticipate any risk from completing this survey. You do not have to take part in this research, and you can stop at any time. The investigators may withdraw you from this research if circumstances arise which warrant doing so.

CONFIDENTIALITY

Any data we collect will be used solely for this research. No personally identifiable information will be collected, and the researchers will code the transcripts using numbers, not names. The information you provide will be uploaded to a secure password-protected computer at the researcher's office at University of Georgia.

WHO CAN I TALK TO?

If you would like to report a complaint or concern about this research study, contact Dr. Eugene Frimpong, at eugene.frimpong@uga.edu or call at 912-262-2379. You are not waiving any legal claims, rights, or remedies because of your participation in this research study.

Please print out a copy of this information sheet for your records

Consent: If you decide to participate in this study, continue with the survey by responding to the questions that follow next. *After you have completed the survey, put it in the return envelope (the return envelope is attached to the mail packet) and mail it to us at no cost at the nearest United States Postal Service (USPS) office. Alternatively, you may complete the survey online by typing https://ugeorgia.ca1.qualtrics.com/jfe/form/SV_cHBCpRjDu1H9ryC in your web browser.*

Background Information

Q1. What is your age (years)? _____

Q2. Which state do you consider to be your home state? *Check one:*

- Georgia
- Other (Please specify) _____

Q3. Which Georgia county do you consider to be the home port for the charter boat/vessel?
Check one:

- Effingham
- Chatham
- Bryan
- Liberty
- Long
- McIntosh
- Wayne
- Glynn
- Brantley
- Charlton
- Camden
- Other (Please specify) _____

Q4. How many years have you been in the charter business? _____

Q5. Why did you enter/remain in the charter business? *Rank from 1 through 4. 1 is the highest:*

Help people enjoy fishing	
Like the work	
Primary source of income	
Secondary source of income	

Q6. How has the coronavirus disease (COVID-19) impacted your business? *Check all that apply:*

	Increased substantially	Increased	Decreased	Decreased substantially	No change	I don't know
Total cost of operation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Revenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Profit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (Please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7. Please indicate the scale of your charter business by the typical annual sales before the effect of coronavirus disease (COVID-19). *Check one:*

- \$1-\$1000
- \$1,001-\$5,000
- \$5,001-\$10,000
- \$10,001-\$25,000
- \$ 25,001-\$50,000
- \$50,001-\$100,000
- \$100,001-\$250,000
- \$250,001-\$500,000
- \$500,001-\$1million
- Over \$1 million

Q8. Have you participated in any Extension education in the past 3 years? *Check one:*

- Yes
- No → (Skip to Question 10)
- I don't know

Q9. Who organized the meeting? *Check all that apply:*

- University of Georgia Marine Extension
- Georgia Department of Natural Resources
- Other (Please specify) _____

Q10. Have you contacted (through phone calls, emails, text messages, etc.) University of Georgia Marine Extension agent to make inquiries and other information requests about the charter business? *Check one:*

- Yes
- No
- I don't know

Information about the Ownership, Organization and Operation of Your Charter Business

Q11. Which one of the following best characterizes your charter business? *Check one:*

- Charter (6-pack) fishing
- Party boat
- Diving tours
- Dinner cruises
- Other (Please specify) _____

Q12. How would you describe the ownership structure of your charter business? *Check one:*

- Sole proprietorship
- Partnership
- Corporation
- Other (Please specify) _____

Q13. How would you describe your business organization structure? *Check one:*

- Own the boat(s)
- Leased/rented boat(s)
- Salary employee
- Freelance hire per trip
- Other (Please specify) _____

Q14. How would you describe the operation of your boat/ vessel? *Check one:*

- Part-time
- Full-time

Q15. In addition to the base charter service, which of the following services do you offer? *Check all items that apply:*

- Tackle
- Fish cleaning
- Bait
- Licenses
- Ice
- Photos/videos
- Lodging
- Food/bottled water
- Other (Please specify) _____

Q16. How many crew /employees do you have? *Please indicate the number of crew/employees in each category:*

Full time crew	
Part time crew	
Paid family crew	
Unpaid family crew	

Q17. How many charter trips do you undertake in a typical?

Week	
Month	
Year	

Information about your Primary Boat/Vessel

Q18. What is the length (in feet) of the boat/vessel used in your last trip? _____

Q19. What is the total horsepower of the boat/vessel used in your last trip? _____

Q20. How many engines does the boat/vessel have? _____

Q21. What is the passenger carrying capacity of your boat/vessel? _____

Q22. Which year did you purchase the boat/vessel? _____

Q23. What was the age (years) of the boat/vessel at the time of purchase? _____

Information about Last Trip and Expenditure/ Operating Cost

Q24. How long did your last trip last? *Check one:*

- Full day trip
- Half day trip
- overnight trip/ multiday trip

Q25. What was the duration (hours) of the last trip? _____

Q26. Where did you make the trip to? *Check all items that apply:*

- Inshore/coastal trip
- Nearshore trip
- Offshore trip

Q27. What percentage (%) of the total trip hours from your last trip was spent in

Inshore/coastal	
Nearshore	
Offshore	

Q28. What percentage (%) of the total trip hours from the last trip was spent at

Inshore artificial reef site	
Offshore artificial reef site	

Q29. What was the distance (in miles) travelled? _____

Q30. How many gallons of boat/vessel fuel was used in your last trip? _____

Q31. What is the approximate amount (\$) you paid for fuel for the last trip? _____

Q32. How many crews did you use on your last trip? *Please indicate the number of crew in each category:*

Full time crew	
Part time crew	
Paid family crew	
Unpaid family crew	

Q33. How much (\$) did you pay per crew labor for the last trip? *Please indicate the cost per crew in each category:*

Full time crew	
Part time crew	
Paid family crew	

Q34. Which range below contains the approximate amount you purchased the boat/vessel?
Check one:

- \$10,000-\$20,000
- \$20,001-\$30,000
- \$30,001-\$40,000
- \$40,001-\$50,000
- \$50,001-\$60,000
- \$60,001-\$70,000
- \$70,001-\$50,000
- \$80,001-\$150,000
- Over \$150,000

Q35. If you rented the boat/vessel, which range below contains the approximate amount per day you rent the boat/vessel? *Check one:*

- \$300-\$700
- \$701-\$1,100
- \$1,101-\$1,500
- \$1,501-\$1,900
- Over \$1,900

Q36. If you purchased the boat/vessel, is the boat/vessel financed through a bank? *Check one:*

- Yes
- No → (Skip to Question 39)
- Other (Please specify) _____

Q37. If the boat/vessel is financed through a bank, do you have an outstanding loan on the boat/vessel? *Check one:*

- Yes
- No

Q38. If you have an outstanding loan to pay for the boat/vessel, how much (\$) is the outstanding loan? _____

Q39. Do you have insurance coverage for the boat/vessel? *Check one:*

- Yes
- No → (Skip to Question 43)

Q40. How much do you pay (\$) monthly as insurance premium? _____

Q41. What is the amount (\$) of insurance coverage on your vessel? _____

Q42. If your boat/vessel is financed through a bank and you have insurance coverage for the boat/vessel, was insurance a requirement to obtain the loan for the boat/vessel? *Check one:*

- Yes
- No

Q43. Which range below contains the approximate amount (\$) you pay monthly for boat/vessel service and repairs? *Check one:*

- \$0-\$99
- \$100-\$499
- \$500-\$999
- \$1000-\$1,499
- \$1,500-\$1,999
- \$2000-\$2,499
- \$2,500-\$2,999
- \$3,000-\$3,499
- Over \$3,499

Q44. Were the service and repairs covered by insurance? *Check one:*

- Yes
- No

Q45. How much (\$) do you pay annually for federal and state vessel license? _____

Q46. Which range below contains the approximate amount (\$) you pay annually for docking?
Check one:

- \$200-\$500
- \$501-\$800
- \$801-\$1,100
- \$1,101-\$1,400
- Over \$1,400

Q47. Which range below contains the approximate amount (\$) you spend monthly on trip supplies including bait, tackle, food, bottled water, and ice? *Check one:*

- \$100-\$200
- \$201-\$300
- \$301-\$400
- \$401-\$500
- \$501-\$600
- Over \$600

Q48. Did you advertise the trip? *Check one:*

- Yes
- No → (Skip to Question 50)

Q49. How much (\$) did you spend on advertisement? _____

Q50. There are 5 coastal counties adjacent to the coastline in Georgia. The designers of this survey appreciate the time and effort you devote to completing our survey. We feel it is important to reward those who give this commitment by i) differentiating them from respondents who speed through surveys without properly reading the questions and ii) rewarding thoughtful, engaged respondents accordingly. To demonstrate that you have read this question carefully, please select the Glynn option below.

In which county is your business located? *Check one:*

- Chatham county
- Liberty county
- McIntosh county
- Glynn county
- Camden county

Information about Revenue

Q51. How much (\$) did you charge as trip fee per person on your last trip? _____

Q52. Does the trip fee include additional services such as tackle, fish cleaning, bait, licenses, ice, photo or video, food and bottled water, and lodging? *Check one:*

- Yes → (Skip to Question 54)
- No

Q53. If the trip fee does not cover additional services, how much (\$) did you charge per person?

Tackle	
Fish cleaning	
Bait	
Licenses	
Ice	
Photos/videos	
Lodging	
Food/bottled water	
Other (Please specify)	

Q54. How many passengers were on your last trip? _____

Q55. Which range below contains the approximate amount (\$) you received as tip? *Check one:*

- \$0-\$0.99
- \$1-\$50
- \$51-\$100
- \$101-\$150
- \$151-\$200
- \$201-\$250
- Over \$250

Satisfaction with and Concerns about the Charter Fishing Sector
--

Q56. Overall, what is your level of satisfaction with the

	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Extremely satisfied
charter fishing business in Georgia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
charter fishing regulations in Georgia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q57. What are your concerns about the charter fishing industry in Georgia?

Your Recommendations

Q58. What changes would you like to see in the charter fishing industry in Georgia?

We thank you for your time spent taking this survey.

Kindly put the completed survey in the return envelope (the return envelope is attached to the mail packet) and mail it to us at no cost at the nearest United States Postal Service (USPS) office.