Economic Impact of Saltwater Recreational Fishing in Georgia

A report prepared for Georgia Department of Natural Resources, Coastal Resources Division

by

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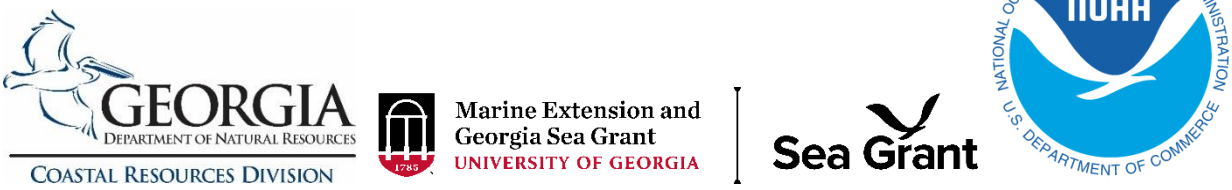
Marine Extension and Georgia Sea Grant, University of Georgia



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Report

2023

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EXECUTIVE SUMMARY

1. The Coastal Resources Division of the Georgia Department of Natural Resources sought socioeconomic data to gain insights into the economic significance of the saltwater recreational fishing in Georgia.

2. University of Georgia Marine Extension and Georgia Sea Grant received funding from the Georgia Department of Natural Resources Coastal Resources Division to gather socioeconomic information on Georgia's saltwater recreational fishing sector and assess the economic contributions of the sector to Georgia's economy.

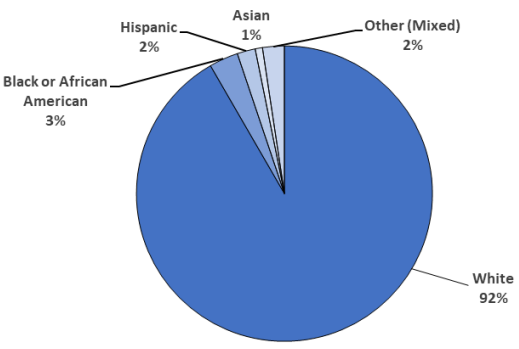
3. A survey was developed in consultation with the staff of the Georgia Department of Natural Resources Coastal Resources Division and disseminated to randomly sampled anglers to collect demographic data and saltwater fishing-related expenditures. This report summarizes the method and results from the survey.

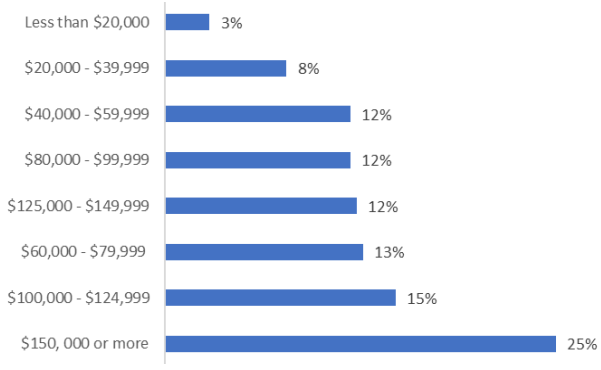
4. **Economic contributions: saltwater recreational fishing trips in Georgia supported 3,217 full or part-time jobs, contributed $310.6 million in sales, $74.4 million in labor income, and $155.1 million in gross domestic product (GDP) to Georgi's economy in 2022.**
    - Georgia residents: saltwater recreational fishing trips supported 3,039 full or part-time jobs, contributed $292.90 million in sales, $71.3 million in labor income, and $148.3 million in gross domestic product (GDP) to Georgi's economy.
    - Non-residents: supported 214 full or part-time jobs, contributed $17 million in sales, $5.1 million in labor income, and $9.2 million in gross domestic product (GDP) to Georgi's economy.

5. Expenditure: saltwater recreational anglers spent an average of $594.8 per trip on trip-related costs in 2022, with a median expenditure of $187. The top five expenditure categories by average values were as follows: lodging, with an average of $194.80 (median of $0), restaurant meals at $100.90 (median of $5), auto fuel at $96.14 (median of $47.5), tackle at $66.30 (median of $15), and boat fuel at $63.90 (median of $0).

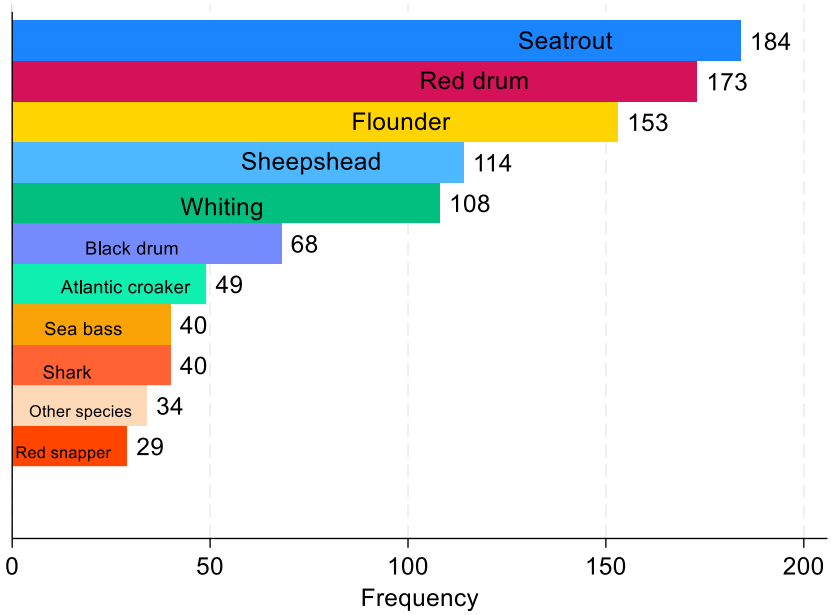
- Georgia resident saltwater anglers had an average expenditure of $565.1 per trip on trip-related expenses, with a median expenditure of $250.
    - Coastal resident saltwater anglers had an average expenditure of $273.8 on trip-related expenses, with a median expenditure of $170.
- Non-resident saltwater anglers had an average expenditure of $1,138per trip on trip-related costs, with a median expenditure of $523.5.
- Private boat fishing
    - Resident anglers spent on average $474.8 (median is $210) per trip.
        - ✓ Coastal resident anglers spent on average $312.5 (median is $ 181) per trip.
    - Non-resident anglers spent on average $908.21 (median is $245) per trip.
- Shore fishing
    - Residents spent an average of $622.1 (median is $116).
        - ✓ Coastal resident anglers spent an average of $174.9 (median is $120) per trip.
    - Non-resident anglers spent an average of $1,267.62 ($234).

6. The data revealed that the average saltwater angler is about 54 years old. Plurality of the anglers are white (92%), male (89%), married (85%), live in a family household (93%), have a bachelor's degree (32%), and have annual household income of $80, 0000 or more (64%).

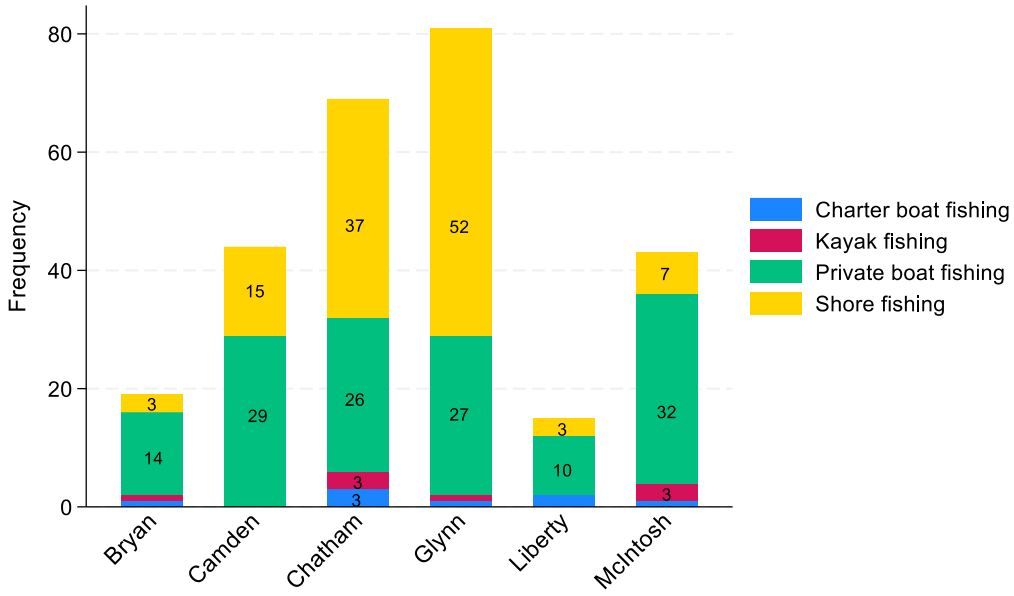




7. Top three fish species sought after are seatrout, red drum, and flounder.



8. Top three fishing destinations are Glynn County, Chatham County, and Camden County



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 saltwater anglers who participated in this study. The findings reported here would not have been possible without their voluntary willingness to participate in this study.

I would like to thank Bryan Fluech for assisting me with the survey design and review process.

Thank you to the staff of the Department of Natural Resources' Coastal Resources Division for guidance and comments on the design of the survey.

I take full responsibility for any errors or deficiencies.

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INTRODUCTION

Saltwater recreational fishing, often referred to as angling, is a popular leisure activity that involves fishing in estuarine and marine environments, such as coastal rivers, sounds, oceans, seas, and other saltwater bodies. Anglers have the option to either release, retain, or share their catches among their social circle (Pawson et al 2008). The allure of saltwater recreational fishing goes beyond the thrill of the catch; it entails a significant economic component. Anglers spend on fishing equipment, such as fishing rods, reels, bait, and tackle, while also incurring additional expenses related to transportation, lodging, and food. In the United States, the annual expenditure on marine recreational fishing is estimated to exceed 10 billion dollars (Lovel et al. 2020), thus, solidifying its position as a financially robust sector within the tourism and recreation industry.

In the pursuit of gaining insight into the multifaceted dimensions of saltwater recreational fishing in the state of Georgia, the Coastal Resources Division of the Georgia Department of Natural Resources embarked on a quest for socio-economic data. This endeavor sought to unravel the economic significance of the recreational fishing industry in the state, and ultimately contribute to enhanced management practices to ensure the long-term well-being of both the economic and ecological aspects of saltwater recreational fishing. Between September 2020 and September 2023, the Georgia Department of Natural Resources' Coastal Resources Division allocated funding to the Marine Extension and Georgia Sea Grant as part of the Coastal Incentive Grant Program for two primary purposes: (1) the collection of expenditure data from recreational anglers and the estimation of economic impacts resulting from their fishing activities, and (2) the analysis of demographic characteristics pertaining to saltwater anglers in Georgia. A noteworthy precursor to this report is the study conducted by Lovel et al. (2020), which provided valuable economic insights into saltwater recreational fishing in Georgia. Their research, based on data collected in 2017 shows that anglers spent an average of about $266 per angler day on for-hire trips, $40 on private or rental boat trips, and $51on shore trips. Furthermore, they found that in 2017, the sector supported 2,788 full or part-time jobs, and contributed $231 million in sales, $76 million in income, and $144 million in gross domestic product (GDP) to Georgia’s economy.

This report endeavors to provide the most current socio-economic data on Georgia's saltwater recreational fishing sector. As per regulations in Georgia, saltwater fishing is permitted in the expansive waters extending from the coastline to specific demarcation points, including

the crossings of several rivers and tributaries (GA Code § 27-4-1 (2022)). That is, typically, saltwater fishing transpires within the six coastal counties along the Atlantic Ocean in Georgia: Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden. These coastal regions are renowned for their natural beauty, featuring barrier islands, sandy beaches, salt marshes, dunes, and estuaries, all of which remain largely untouched and protected. Additionally, the region's temperate climate makes coastal Georgia a year-round destination for outdoor enthusiasts, including saltwater anglers.

DATA

Survey design

This report relies on a survey conducted with saltwater anglers, both Georgia residents and non-residents. Online and mail surveys were designed in consultation with stakeholders and staff of the Georgia Department of Natural Resources Coastal Resources Division. The surveys were similar in terms of content with slight modifications to account for the different modes.

The survey began with a consent letter followed by a set of screening questions that target anglers who are18 years of age or older and have participated in saltwater recreational fishing in Georgia in the previous 12 months. A section of the survey was dedicated to collecting data on anglers' fishing experience, including the mode of fishing used in the last saltwater fishing trip and the number of trips taken in a week, month, and or year. Another section of the survey was devoted to collecting information on expenditure incurred during their last saltwater fishing trip. Anglers were also asked to indicate the locations where they fished or departed in a vessel to go fishing. To this end, they were provided with maps, as shown in the survey instrument in the appendix, on which specific areas were demarcated and labeled with letters. Anglers only saw the map associated with a selected coastal county. Questions on targeted species, factors affecting choice of fishing site, and demographics were also asked. Overall, the survey contained 30 questions. The survey was designed to guarantee anonymity and encourage participants to respond to survey questions.

Sampling

The sampling frame was obtained from a database maintained by the License and Boat Registration unit of the Georgia Department of Natural Resources. This confidential list contained 387,423 anglers with valid saltwater information permit. After removing incomplete

emails and or addresses, our sampling frame consisted of 266, 570 saltwater anglers. To best represent the population, anglers were grouped as residents and non-residents. The Resident angler sample frame consisted of 242,120 (90.8%) while nonresident sample frame was 24,450 (9.2%). A random sampling technique was then applied to each group. To determine the sample size for each group, I assumed an error margin (*e*) of 5% and sample sizes generated using the formula below. The letter *z* is z-score (1.96), *s* is standard deviation (0.5), and *N* is population size. This approach resulted in a sample size of 384 for resident anglers and 378 for non-resident anglers. However, a total of 1, 500 sample sizes were used.

$$Sample\ size = \frac{\frac{z^2 \times s(1-s)}{e^2}}{1 + \left(\frac{z^2 \times s(1-s)}{e^2 N}\right)}$$

Data Collection

The data gathering process followed a tailored Dillman approach, where, if a participant had a valid email address on record, they were initially contacted via email with an invitation to access an online survey. Otherwise, a self-reported survey questionnaire that included a link to the web-based survey was mailed to anglers who did not have email addresses or had invalid email addresses. In the initial email, respondents were also given the option to request a survey packet. The packet enclosed both the survey questionnaire and a prepaid return envelope.

Given the objective of gaining insights into the fishing locations of saltwater anglers, in-person sampling was not feasible. One week after sending the initial email invitations, reminder messages were dispatched to encourage participation. The data collection phase spanned approximately five months, specifically from February 28th to July 28th. It is worth noting that, due to the survey's design prioritizing anonymity, it was impossible to ascertain who had completed and returned the survey. The survey elicited responses from a total of 626 anglers, resulting in a response rate of 41.7%. From the information provided by respondents regarding their residency or zip code, 172 were identified as Georgia residents, while 84 were from outside the state. That is, approximately half of the respondents (371) did not furnish details about their residency or zip code. Consequently, item-nonresponse to survey questions was relatively high.

ANALYSIS APPROACH

This entails describing survey variables by utilizing summary statistics generated Stata and/ or Microsoft Excel, which are then presented in tables and as graphs. Using saltwater fishing trip expenditure data from the survey, I then estimate the "economic impact" of saltwater recreational fishing in Georgia.[1] The money spent on saltwater recreational fishing circulates through the economy, leading to a multiplier effect where one dollar spent can have a more significant impact as it passes through various sectors. To capture these effects, I utilized IMPLAN's regional input-output (I-O) model (IMPLAN Group 2022a). For more information regarding IMPLAN's Input-Output (I-O) model, I recommend readers to consult the report on for-hire recreational fishing in Georgia (Frimpong 2022). The economic impact results derived from IMPLAN are presented in terms of employment, labor income, value added, and output. Employment impact quantifies the overall number of both full-time and part-time positions directly or indirectly sustained by purchases of goods and services linked to saltwater recreational fishing. Labor income encompasses both employee compensation, such as wages and salaries, and proprietor income, which includes income derived from self-employment. Value added reflects the contribution to the regional gross domestic product (GDP), particularly within the geographical context of Georgia, while output impact measures the aggregate gross sales or total output arising from saltwater recreational fishing activities within the region.

Furthermore, these impacts can be categorized into four distinct types: direct, indirect, induced, and total effects. **Direct effects** pertain to the expenditures integrated into the input-output multipliers for an impact assessment. In this context, it signifies the changes in production within the sector resulting from additional saltwater fishing trips. These production adjustments, when integrated into the IMPLAN multipliers, offer insights into the regional economic response to these changes. **Indirect effects** encompass the inter-business transactions occurring within the regional supply chain, originating from the initial sector purchases. **Induced effects** represent the

[1] Ideally this type of analysis will be referred to as "economic contribution". Nevertheless, in this report, we use the terms "impact" and "contribution" interchangeably. The key distinction lies in the fact that 'contributions' pertain to the existing state of activity, while 'impacts' typically denote alterations in the existing state.

outcomes stemming from increased household expenditures, driven by labor income. These induced effects manifest as workers in the recreational sector supply chain utilize their earnings to acquire everyday consumer goods like gasoline, groceries, utility payments, and various other commodities. The summation of the direct, indirect, and induced multiplier effects yields the total economic impacts or contributions attributed to expenditures related to saltwater recreational fishing in Georgia.

To estimate the economic impact or contribution of saltwater recreational fishing in Georgia, the IMPLAN Pro Software employs industry changes. If industry data, differentiating labor, benefits, proprietor income, and wages, were available from the survey, "analysis by parts," could also be employed. The “analysis by parts” approach involves utilizing a customized spending pattern specific to the industry to estimate the economic impact in IMPLAN (IMPLAN Group 2022b). To execute the industry change approach, total expenditures for various expenditure categories were derived using median values, as depicted in Figure 1. Subsequently, these varied expenditures were matched to IMPLAN sectors, as illustrated in Tables 1 through 7. These expenditures serve as industry sales impacts or output impacts.

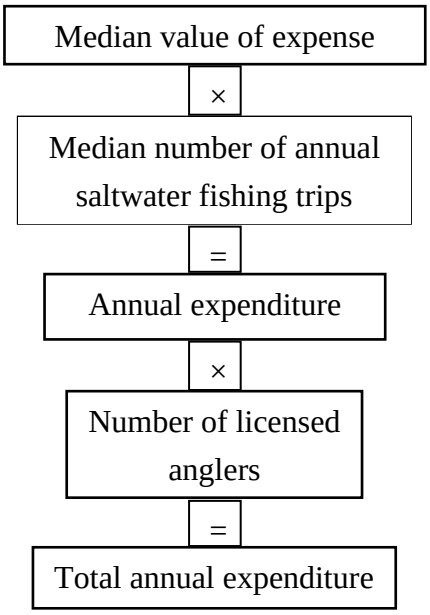

Figure 1. Estimating total annual expenditures

To allocate expenses within the retail sector, which includes gasoline stores (IMPLAN code #402), alcohol beverages, food and beverage stores, snacks (IMPLAN code #400), ice

(IMPLAN code #406), and sporting goods, hobby, book, and music stores (IMPLAN code #404), we applied retail margins, as indicated in Tables 1 through 5. These margin values were sourced from IMPLAN Group and ranged from 0.2 to 0.5 (IMPLAN Group, 2022c), following recommendations by Holland et al. (2012). I adjusted the proportions of local spending (local purchase percentages) to account for imports and leakages. Subsequently, I conducted a single-region analysis using IMPLAN's Type SAM multipliers and exported the results in Excel format. All monetary values are presented in 2023-dollar values.

Table 1. 12 months trip level expenditures used to compute economic contribution/impact considering resident and non-resident saltwater anglers.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (retail margin)	402	Retail-Gasoline stores	20.58	90%	0.09
Car Fuel (production)	156	Petroleum refineries	71.44	85%	0.32
Restaurant	501	Full-service restaurant	9.69	100%	0.04
Alcohol bev. (*retail margin*)	400	Retail-Food and beverage stores	6.46	90%	0.03
Alcohol beverage (*production*)	108	Breweries (Beer, ale, …)	12.92	63%	0.06
Bottled water (retail margin)	400	Retail-Food and beverage stores	3.23	90%	0.01
Bottled water (production)	106	Bottled and canned soft drinks & water	6.46	59.50%	0.03
Snacks (retail margin)	400	Retail-Food and beverage stores	3.23	90%	0.01
Snacks (production)	096	Cookies and Cracker manufacturing	6.46	25%	0.03
Ice (*retail margin*)	406	Retail-Miscellaneous store retailers	4.89	100%	0.02
Ice (production)	107	Ice (except dry ice)	10.61	100%	0.05
Fish bait	017	Commercial fishing (Bait)	38.74	90%	0.17
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	13.75	90%	0.06
Tackle (production)	385	Fishing tackle and equipment manufacturing	15.31	14%	0.07
Total			223.74		1

Table 2. 12 months trip level expenditures used to compute economic contribution/impact considering resident saltwater anglers.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (retail margin)	402	Retail-Gasoline stores	18.86	100%	0.09
Car Fuel (production)	156	Petroleum refineries	65.47	85%	0.32
Alcohol beverage (*retail margin*)	400	Retail-Food and beverage stores	4.73	100%	0.02
Alcohol bev. (*production*)	108	Breweries (Beer, ale, …)	9.47	63%	0.05
Bottled water (retail margin)	400	Retail-Food and beverage stores	5.92	100%	0.01
Bottled water (production)	106	Bottled and canned soft drinks & water	6.46	59.50%	0.03
Snacks (retail margin)	400	Retail-Food and beverage stores	2.96	100%	0.01
Snacks (production)	096	Cookies and Cracker manufacturing	5.92	25%	0.03
Ice (*retail margin*)	406	Retail-Miscellaneous store retailers	5.60	100%	0.03
Ice (production)	107	Ice (except dry ice)	12.15	100%	0.06
Fish bait	017	Commercial fishing (Bait)	35.51	100%	0.17
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	16.80	100%	0.08
Tackle (production)	385	Fishing tackle and equipment manufacturing	18.71	14%	0.09
Total			205.05		1

Table 3. 12 months trip level expenditures used to compute economic contribution/impact considering non-resident saltwater anglers.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (retail margin)	402	Retail-Gasoline stores	1.09	50%	0.08
Car Fuel (production)	156	Petroleum refineries	3.77	45%	0.28
Restaurant meals	501	Full-service restaurants	3.88	100%	0.29
Alcohol bev. (*retail margin*)	400	Retail-Food and beverage stores	0.32	80%	0.02
Alcohol beverage (*production*)	108	Breweries (Beer, ale, …)	0.65	32%	0.05
Bottled water (retail margin)	400	Retail-Food and beverage stores	0.06	90%	0.005
Bottled water (production)	106	Bottled and canned soft drinks & water	0.13	59.50%	0.01
Snacks (retail margin)	400	Retail-Food and beverage stores	0.10	90%	0.01
Snacks (production)	096	Cookies and Cracker manufacturing	0.19	25%	0.01
Ice (*retail margin*)	406	Retail-Miscellaneous store retailers	0.15	100%	0.01
Ice (production)	107	Ice (except dry ice)	0.33	100%	0.02
Fish bait	017	Commercial fishing (Bait)	1.94	90%	0.14
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	0.46	90%	0.03
Tackle (production)	385	Fishing tackle and equipment manufacturing	0.51	14%	0.04
Total			13.59		1

Table 4. 12 months private boat fishing trip expenditures used to compute economic contribution/impact for resident.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (*retail margin*)	402	Retail-Gasoline stores	2.61	100%	0.02
Car Fuel (*production*)	156	Petroleum refineries	9.05	85%	0.07
Boat Fuel (*retail margin*)	402	Retail-Gasoline stores	6.51	100%	0.05
Boat Fuel (*production*)	156	Petroleum refineries	22.62	85%	0.18
Repair and Maintenance	508	Personal and household goods repair and maintenance	19.39	100%	0.16
Insurance	437	Insurance carries, except direct life	19.42	100%	0.16
Alcohol bev. (*retail margin*)	400	Retail-Food and beverage stores	2.16	100%	0.02
Alcohol beverage (*production*)	108	Breweries (Beer, ale, …)	4.32	63%	0.03
Bottled water (*retail margin*)	400	Retail-Food and beverage stores	1.29	100%	0.01
Bottled water (*production*)	106	Bottled and canned soft drinks & water	2.59	59.50%	0.02
Snacks (*retail margin*)	400	Retail-Food and beverage stores	1.08	100%	0.01
Snacks (*production*)	096	Cookies and Cracker manufacturing	2.16	25%	0.02
Ice (*retail margin*)	406	Retail-Miscellaneous store retailers	2.04	100%	0.02
Ice (*production*)	107	Ice (except dry ice) manufacturing	4.43	100%	0.04
Fish bait	017	Commercial fishing (Bait)	12.95	100%	0.10
Tackle (*retail margin*)	404	Retail-Sporting goods, hobby, musical instruments	4.59	100%	0.04
Tackle (*production*)	385	Fishing tackle and equipment manufacturing	5.12	14%	0.04
Total			122.32		1

Table 5. 12 months private boat fishing trip expenditures used to compute economic contribution/impact for non-resident.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (*retail margin*)	402	Retail-Gasoline stores	0.02	50%	0.02
Car Fuel (*production*)	156	Petroleum refineries	0.07	45%	0.06
Boat Fuel (*retail margin*)	402	Retail-Gasoline stores	0.03	50%	0.03
Boat Fuel (*production*)	156	Petroleum refineries	0.11	45%	0.10
Repair and Maintenance	508	Personal and household goods repair and maintenance	0.53	40%	0.46
Insurance	437	Insurance carries, except direct life	0.21	50%	0.18
Alcohol bev. (*retail margin*)	400	Retail-Food and beverage stores	0.01	80%	0.01
Alcohol beverage (*production*)	108	Breweries (Beer, ale, …)	0.02	32%	0.02
Bottled water (*retail margin*)	400	Retail-Food and beverage stores	0.005	90%	0.004
Bottled water (*production*)	106	Bottled and canned soft drinks & water	0.01	59.50%	0.01
Snacks (*retail margin*)	400	Retail-Food and beverage stores	0.005	90%	0.004
Snacks (*production*)	096	Cookies and Cracker manufacturing	0.01	25%	0.01
Ice (*retail margin*)	406	Retail-Miscellaneous store retailers	0.004	100%	0.004
Ice (*production*)	107	Ice (except dry ice) manufacturing	0.01	100%	0.01
Fish bait	017	Commercial fishing (Bait)	0.06	90%	0.05
Tackle (*retail margin*)	404	Retail-Sporting goods, hobby, musical instruments	0.01	90%	0.01
Tackle (*production*)	385	Fishing tackle and equipment manufacturing	0.01	14%	0.01
Total			1.14		1

Table 6. 12 months shore fishing trip-level expenditures used to compute economic contribution/impact for resident anglers.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (retail margin)	402	Retail-Gasoline stores	16.23	100%	0.10
Car Fuel (production)	156	Petroleum refineries	56.35	85%	0.34
Alcohol beverage (*retail margin*)	400	Retail-Food and beverage stores	2.90	100%	0.02
Alcohol beverage (*production*)	108	Breweries (Beer, ale, …)	5.81	63%	0.04
Bottled water (retail margin)	400	Retail-Food and beverage stores	2.42	100%	0.01
Bottled water (production)	106	Bottled and canned soft drinks & water	4.84	59.50%	0.03
Snacks (retail margin)	400	Retail-Food and beverage stores	4.84	100%	0.03
Snacks (production)	096	Cookies and Cracker manufacturing	9.68	25%	0.06
Ice (*retail margin*)	406	Retail-Miscellaneous store retailers	2.29	100%	0.01
Ice (production)	107	Ice (except dry ice)	4.97	100%	0.03
Fish bait	017	Commercial fishing (Bait)	29.03	100%	0.17
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	13.73	100%	0.08
Tackle (production)	385	Fishing tackle and equipment manufacturing	15.30	14%	0.09
Total			168.39		1

Table 7. 12 months shore fishing trip-level expenditures used to compute economic contribution/impact for non-resident anglers.

Item	IMPLAN© Sector Code	IMPLAN© Sector Description	Expense ($million)	Percent local	Expense Share
Car Fuel (retail margin)	402	Retail-Gasoline stores	1.70	50%	0.08
Car Fuel (production)	156	Petroleum refineries	5.90	45%	0.27
Restaurant meals	501	Full-service restaurants	9.50	100%	0.43
Alcohol beverage (*retail margin*)	400	Retail-Food and beverage stores	0.32	80%	0.01
Alcohol beverage (*production*)	108	Breweries (Beer, ale, …)	0.63	32%	0.03
Snacks (retail margin)	400	Retail-Food and beverage stores	0.13	90%	0.01
Snacks (production)	96	Cookies and Cracker manufacturing	0.25	25%	0.01
Fish bait	017	Commercial fishing (Bait)	1.90	90%	0.09
Tackle (retail margin)	404	Retail-Sporting goods, hobby, musical instruments	0.90	90%	0.04
Tackle (production)	385	Fishing tackle and equipment manufacturing	1.00	14%	0.05
Total			22.23		1

RESULTS

Demographics

Presented in Table 8 are summary statistics on age, race, sex, marital status, household type, education, and income. The survey data shows that the average saltwater angler is about 54 years old (median is 55). Plurality of the anglers are white (91.7%), male (88.6%), married (85%), live in a family household (92.9%), have a bachelor's degree (31.5%), and have annual household income of $150, 0000 or more (25.2%). These results exhibit a degree of similarity to those reported by Knowlton in 2018, where most (87%) saltwater anglers in Georgia were of Caucasian ethnicity. In contrast, African Americans constituted only 5%, and Hispanics/Latinos represented 3%. Knowlton's study also highlighted that most anglers, 26%, held bachelor's degrees, and 24% had incomes of $120,000 or higher. Additionally, the median age of anglers in her research was reported to be 49 years old.

Table 8. Summary statistics on demographics

Variable	Obs.	%	Mean	Median
Age	254		54.32	55
Race				
White	231	91.67		
Black or African American	8	3.17		
Hispanic	5	1.98		
Asian	2	0.79		
Other (Mixed)	6	2.38		
Sex				
Male	225	88.58		
Female	29	11.42		
Marital Status				
Married	216	85.04		
Divorced	18	7.09		
Never married	15	5.91		
Widowed	3	1.18		
Separated	2	0.79		
Household type				
Family household	235	92.89		
Non-family household	18	7.11		
Education				
Bachelor's degree	79	31.47		
High school diploma	75	29.88		
Associate degree	36	14.34		
Master's degree	29	11.55		
PhD/ Doctorate degree	14	5.59		
Professional degree	13	5.18		
No High school diploma	5	1.99		
Income				
$150, 000 or more	61	25.21		
$100,000 - $124,999	36	14.88		
$60,000 - $79,999	31	12.81		
$125,000 - $149,999	30	12.40		
$80,000 - $99,999	29	11.98		
$40,000 - $59,999	29	11.98		
$20,000 - $39,999	19	7.85		
Less than $20,000	7	2.89		

Background on saltwater recreational fishing

This includes the method of fishing used in the last saltwater fishing trip, the marine zone where the fishing activity occurred, the county where respondents either fished from or set out in boats for fishing, the fish species targeted, the number of fish that respondents need to catch to feel the

trip was successful, respondents source of fishing-related information, and number of saltwater fishing trips taken within a year.

Figure 2 depicts the fishing method used in the last fishing trip. The top three fishing methods are private boat fishing (50%), shore fishing (42%), and charter boat fishing (5.3%).

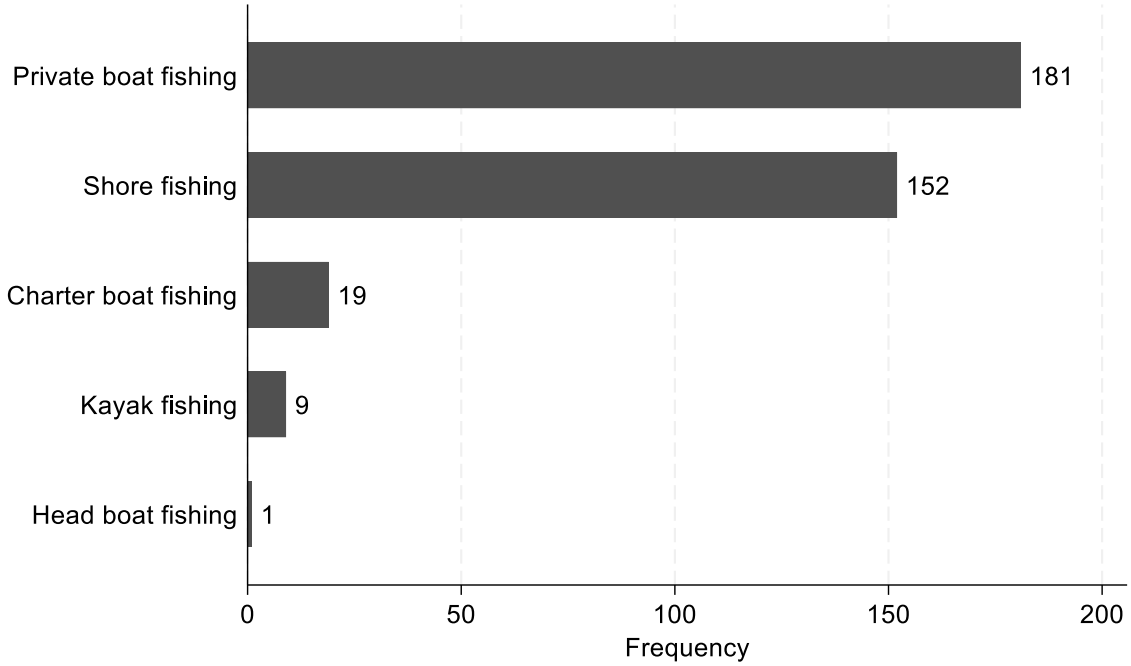

Figure 2. Fishing method used in the last saltwater fishing trip.

Displayed in Figure 3 is the marine zone where anglers indicated they fished. A plurality (73.7%) of responding anglers indicated they fished inshore during their last saltwater fishing trip while 20% fished nearshore. Only 6.3% fished offshore. By regulation inshore is up to about 2.5 nautical miles from the shoreline. This is within state waters, which is about 3 nautical miles from the shoreline. Nearshore is between 2.5 and 15 nautical miles, and offshore is beyond 15 nautical miles. This finding aligns with those of Responsive Management (2022). They note that 86% of Georgia saltwater anglers fish inshore, 57% fish in nearshore waters, and 26% in offshore waters.

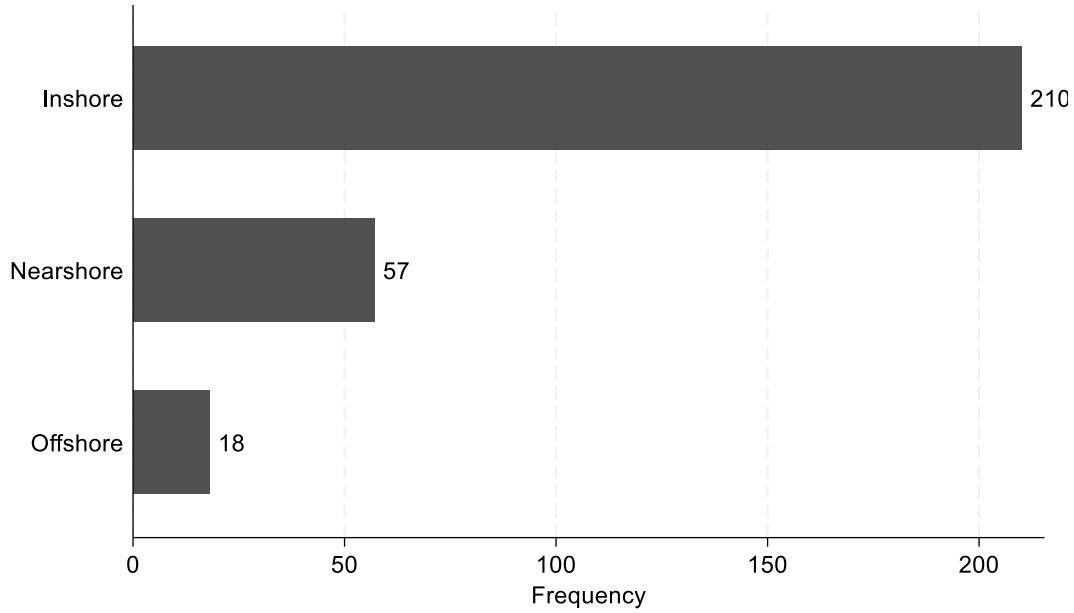

Figure 3. Marine zone where anglers fished from during the last saltwater fishing trip

In terms of the counties where anglers either fished from or set out in vessels for fishing, Figure 4 illustrates that the leading three counties were Glynn County (29.9%), Chatham County (25.5%), and Camden County (16.2%).

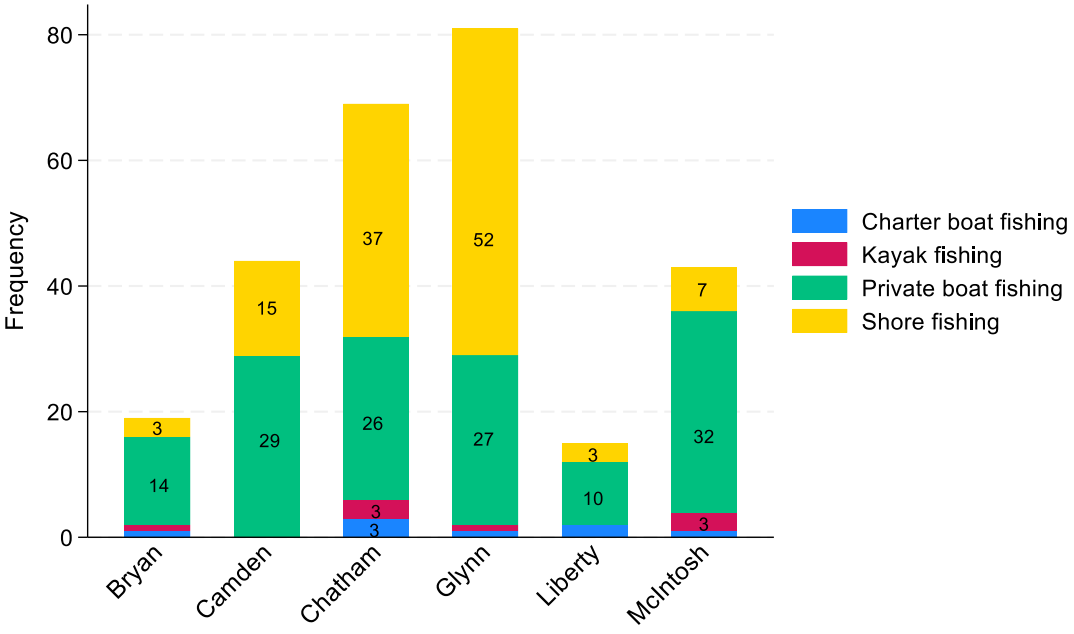

Figure 4. County where anglers chose to fish or departed in vessels to go fishing.

Furthermore, upon examining the data on anglers' fishing methods and their choice of county, it becomes apparent that most (52) of the surveyed anglers who fished in Glynn County engaged in shore fishing (see Figure 4). Conversely, most of the respondents (32) who selected private boat fishing did so in McIntosh County. It's worth noting that Chatham County stood out as a prominent destination for charter boat fishing.

When inquired about their preferences for the counties to engage in fishing or embark on a boat trip for their next saltwater fishing trip, Glynn, Chatham, and Camden County continued to be the foremost choices (Figure 5). Responsive Management (2022) also finds that Glynn and Chatham Counties are the top tier saltwater fishing sites in Georgia.

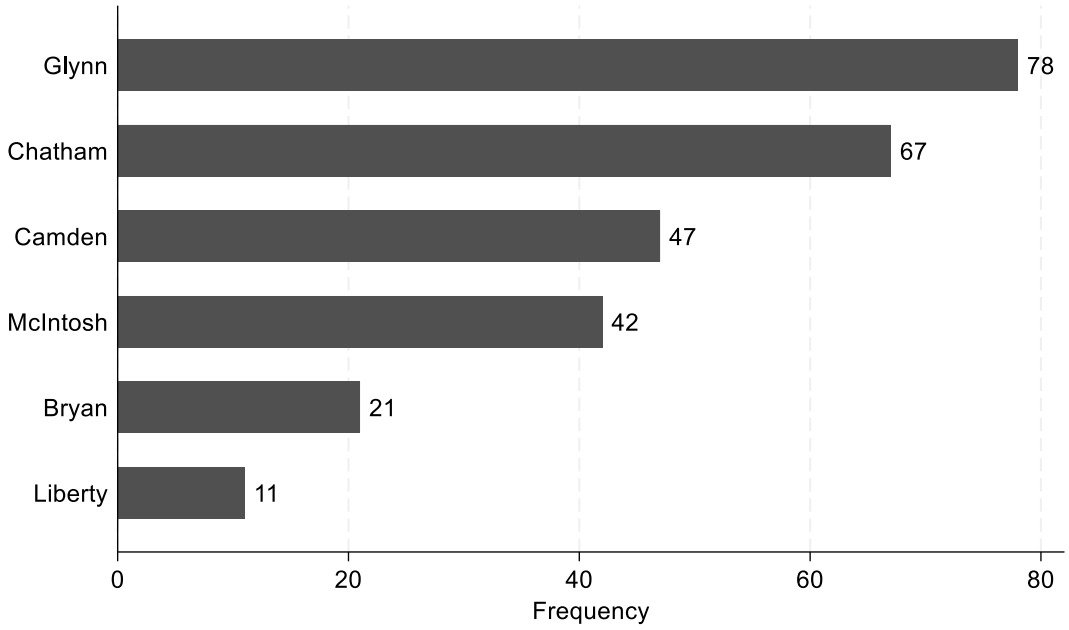

Figure 5. County where anglers plan to fish from or departed in a boat to go fishing during their next trip.

When asked about the elements influencing saltwater anglers' selection of fishing locations, the foremost considerations that surfaced were weather conditions, prior fishing achievements at the site, and the quality of the water (refer to Figure 6). This largely holds true irrespective of the method employed by anglers for saltwater fishing. These results underscore the potential ramifications of climate change on outdoor leisure activities and the tourism industry in Georgia.

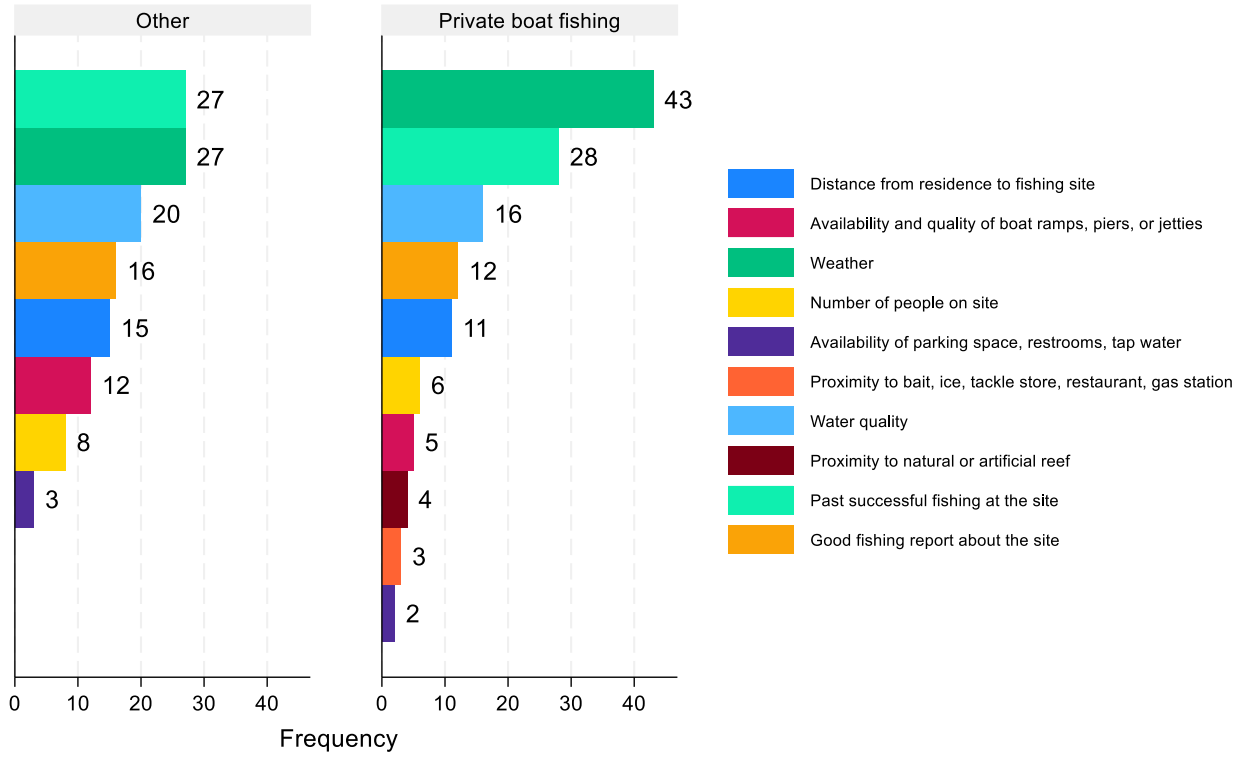

Figure 6. Factors affecting choice of fishing site

Figure 7 presents anglers' targeted fish species. The survey data suggest that seatrout, red drum, flounder, sheepshead, and whiting are the top five fish species targeted by saltwater recreational anglers in Georgia. Black drum, Atlantic croaker, sea bass, shark, and red snapper are other popular targeted species. “Other species” include, blue crab, shrimp, oyster, etc. Responsive Management (2022) also note that seatrout, red drum, flounder, and sheepshead are typically sought-after saltwater fish species by anglers in Georgia.

Respondents were also asked about the quantity of fish species they must catch to consider their trip a success. As depicted in Table 9, the responses generally fall within the daily and possession limits. For instance, for seatrout, the average number reported was approximately 6, with a median of 5. By regulations the daily and possession limit for seatrout is 15 (DNR CRD 2023).

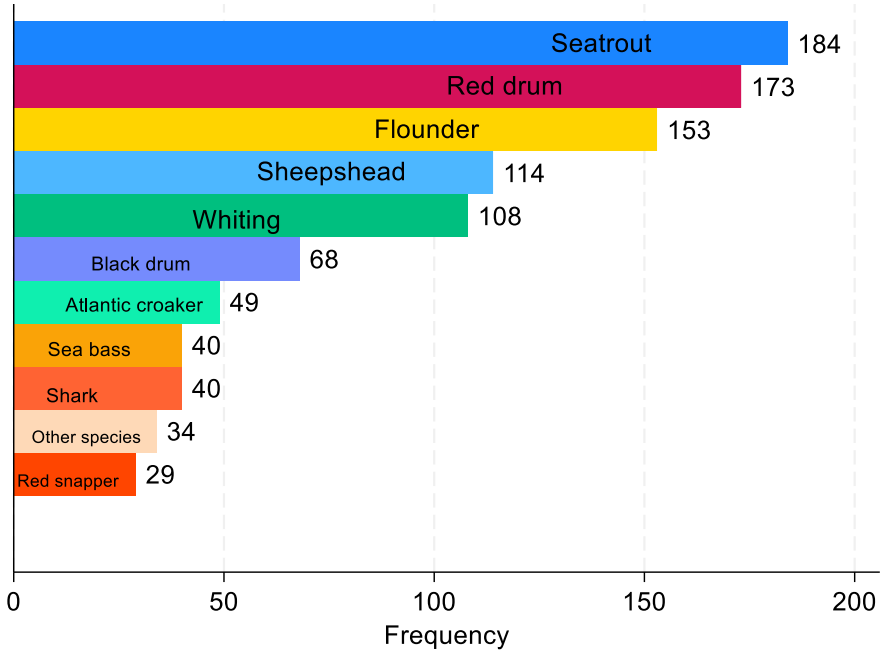

Figure 7. Target fish species

Table 9. Quantity of fish to catch to feel fishing trip was successful

Fish species	Obs	Mean	Median	Min	Max.
Seatrout	179	6.25	5	0	50
Red drum	169	3.31	2	0	25
Whiting	105	10.16	7	0	50
Flounder	152	3.32	2	0	40
Red snapper	26	2.92	2	0	10
Sheepshead	38	1.97	1	0	10
Tarpon	110	4.42	3	0	20
Atlantic croaker	49	10.94	8	0	100
Black sea bass	37	7.32	5	0	28
Black drum	65	3.09	2	0	25

Regarding source of fishing-related information, Figure 8 shows that plurality of anglers (46.3%) rely on the internet for fishing-related information. Friends and family (32%), Tackle shopes (10%) and Marinas (7%) are alternative sources of saltwater recreational fishing-related information. Georgia Department of Natural Resources, guides, personal experience, magzines were other sources mentioned.

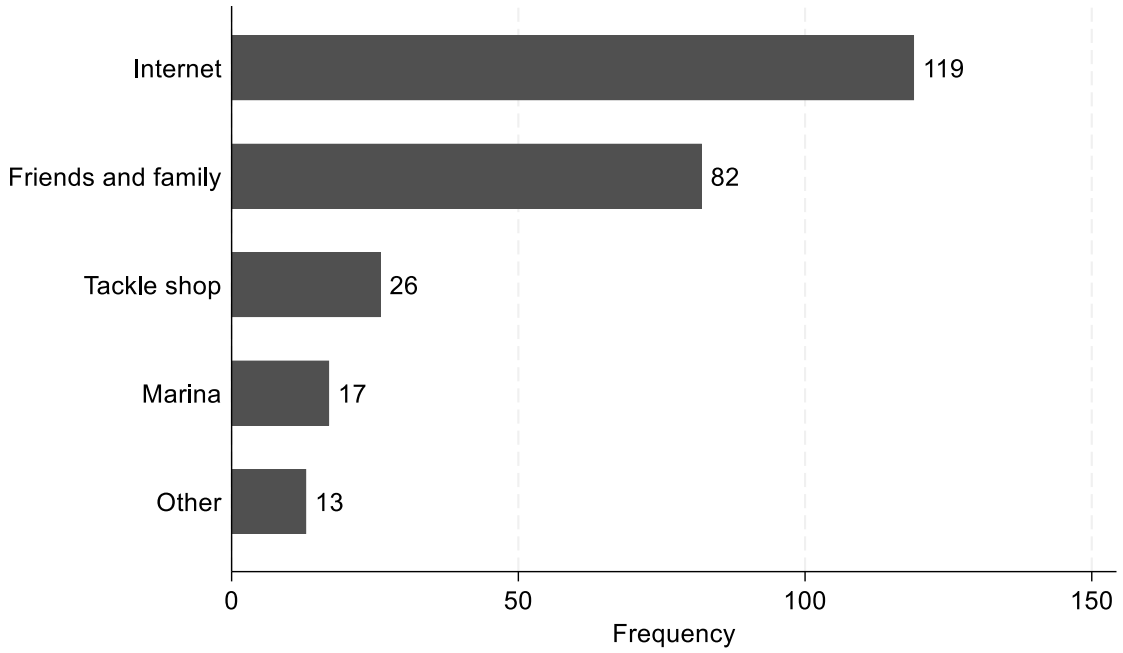

Figure 8. Source of fishing-related information

Table 10 provides a summary of annual saltwater recreational fishing trips categorized by fishing method and resident status. When it comes to Georgia residents, the typical saltwater angler who engages in shore fishing embarks on approximately 23 fishing trips each year. For those who prefer private boat fishing, the average is around 20 trips, while charter boat fishing sees about 4 outings per year. Head boat fishing averages 7 trips annually, kayak fishing stands at 27 trips in a year. In contrast, non-resident saltwater anglers have somewhat different patterns. A typical non-resident saltwater angler participating in shore fishing embarks on approximately 17 fishing trips annually. For those who opt for private boat fishing, the average is approximately 12 trips, while charter boat fishing comprises around 2 outings per year. Kayak fishing averages 24 trips annually.

Table 10. Annual saltwater recreational fishing trips by fishing method and resident type**.**

	Obs.	Mean	Median	Min.	Max.
Georgia residents					
Shore fishing	86	23.48	5	1	240
Private boat fishing	88	19.84	10	1	120
Charter boat fishing	22	3.55	1	1	48
Head boat fishing	4	7.25	4	1	20
Kayak fishing	17	27.35	7	1	288
Non-residents					
Shore fishing	43	17.16	3	1	240
Private boat fishing	36	12.44	4	1	80
Charter boat fishing	10	2.1	1	1	6
Head boat fishing	0	0	0	0	0
Kayak fishing	6	24.33	9.5	1	72

Saltwater recreational fishing expenditure

The initial focus is on all anglers sampled, encompassing both residents and non-residents. Subsequently, the expenses are divided into categories for residents and non-residents, and further stratified by private boat and shore fishing, considering both resident and non-resident anglers. Charter and head boat fishing expenditures are combined for analysis.

When considering both residents and non-residents, saltwater recreational anglers spent an average of $594.82 per trip on trip-related costs in 2022, with a median expenditure of $187. This estimate closely resembles the 2016 national estimate of $739, as reported by the US Fish and Wildlife Service in 2016. The top five expenditure categories as shown in Table 11 were as follows: lodging, with an average of $194.80 (median of $0), restaurant meals at $100.90 (median of $5), car fuel at $96.14 (median of $47.5), tackle at $66.30 (median of $15), and boat fuel at $63.90 (median of $0).

Table 11. Trip-level expenditures.

Item	Obs.	Mean ($)	Median ($)	Min. ($)	Max. ($)	Std. dev. ($)
Car fuel	288	96.14	47.5	0	3800	258.14
Car rental	287	12.49	0	0	1200	84.68
Boat fuel	287	63.89	0	0	3000	255.51
Boat rental	287	0.42	0	0	120	7.08
Airplane ticket	287	11.76	0	0	650	73.16
Train ticket	287	0	0	0	0	0
Taxi service	287	0	0	0	0	0
Bus ticket	287	0.32	0	0	90	5.313
Lodging	287	194.77	0	0	4500	537.64
Campgrounds	287	30.44	0	0	3600	222.80
Restaurant	287	100.90	5	0	1500	178.07
Alcohol and Soda	287	27.89	10	0	500	51.49
Bottled water	287	12.12	5	0	500	33.23
Snacks	287	8.53	5	0	100	15.39
Ice	287	16.87	8	0	200	27.51
Charter fishing fee	287	44.20	0	0	1400	164.12
Head boat fishing fee	287	11.23	0	0	1200	97.74
Fishing tournament fee	287	4.28	0	0	999	59.77
Fish bait	287	37.29	20	0	1500	106.00
Tackle	287	66.30	15	0	1500	184.27
Gift/Souvenirs	287	9.29	0	0	400	38.28
Other	287	4.95	0	0	750	48.85

Narrowing our attention to Georgia residents exclusively, in 2022, Georgia resident saltwater recreational anglers had an average expenditure of $565.1 per trip on trip-related expenses, with a median expenditure of $250.[2] Table 12 reveals that the primary categories of expenditure included lodging, which averaged $127.98 (with a median of $0), followed by restaurant meals at $77.20 (with a median of $0), car fuel at $68.05 (with a median of $47.5), tackle at $67.33 (with a median of $20), and boat fuel at $50.88 (with a median of $0).

[2] Saltwater anglers living in the coastal areas of Georgia, specifically in the 11 designated coastal counties (Effingham, Chatham, Bryan, Liberty, Long, McIntosh, Wayne, Glynn, Brantley, Camden, and Charlton), had an average spending of $273.8 on expenses related their fishing trips, with a median expenditure of $170.

Table 12. Georgia residents' trip-level expenditures.

Item	Mean ($)	Median ($)	Min. ($)	Max. ($)	Std. dev. ($)
Car fuel	68.05	47.5	0	600	94.13
Car rental	3.10	0	0	100	14.38
Boat fuel	50.88	0	0	1000	129.1
Boat rental	0	0	0	0	0
Airplane ticket	2.39	0	0	400	30.95
Train ticket	0	0	0	0	0
Taxi service	0	0	0	0	0
Bus ticket	0.01	0	0	1	0
Lodging	127.98	0	0	2000	325.85
Campgrounds	13.16	0	0	400	54.92
Restaurant	77.20	0	0	800	139.47
Alcohol and Soda	28.12	8	0	500	57.45
Bottled water	11.132	5	0	100	14.22
Snacks	8.88	5	0	100	25.2
Ice	17.14	10	0	200	14.44
Charter fishing fee	35.62	0	0	1400	150.68
Head boat fishing fee	16.21	0	0	1200	78.1
Fishing tournament fee	6.84	0	0	999	122.09
Fish bait	29.16	20	0	200	33.81
Tackle	67.33	20	0	1500	175.44
Gift/Souvenirs	9.91	0	0	400	45.99
Other	3.10	0	0	250	24.91

Note: Number of observations for each item is 168.

Shifting our focus to non-resident anglers, in 2022, non-resident saltwater recreational anglers had an average expenditure of $1,133.77 per angler day on trip-related costs, with a median expenditure of $540. Table 13 shows that the top five categories of expenses included lodging, averaging $362.05 (with a median of $0), followed by car fuel at $165.54 (with a median of $50), restaurant meals at $161.43 (with a median of $40), boat fuel at $69.19 (with a median of $0), and tackle at $67.42 (with a median of $10).

Table 13. Non-residents' day trip-level expenditures.

Item	Obs.	Mean	Median	Min.	Max.	Std. dev.
Car fuel	83	165.54	50	0	3,800	450.58
Car rental	83	14.64	0	0	500	75.34
Boat fuel	83	69.19	0	0	2,600	292.66
Boat rental	83	1.45	0	0	120	13.09
Airplane ticket	83	27.11	0	0	650	113.13
Train ticket	83	0	0	0	0	0
Taxi service	83	0	0	0	0	0
Bus ticket	83	0	0	0	0	0
Lodging	83	362.05	0	0	4,500	840.13
Campgrounds	83	67.65	0	0	3,600	400
Restaurant	83	161.43	40	0	1,500	246.2
Alcohol and Soda	83	30.15	10	0	250	46.11
Bottled water	83	16.28	2	0	500	57.79
Snacks	83	9.06	3	0	100	34.12
Ice	83	17.57	5	0	200	19.35
Charter fishing fee	83	64.76	0	0	1,200	204.15
Head boat fee	83	6.02	0	0	500	54.56
Fishing tournament fee	83	0	0	0	0	0
Fish bait	83	54.45	20	0	1,500	185.78
Tackle	83	67.42	10	0	1,500	207.02
Gift/Souvenirs	83	6.08	0	0	100	20.33
Other	83	10.84	0	0	750	83.26

Note: Number of observations for each item is 83.

When examining private boat trips among resident saltwater recreational anglers, the survey data suggests that these anglers spent an average of $474.79 per angler day on trip-related expenses in 2022, with a median expenditure of $210.[3] It's worth noting that this estimate surpasses the figure reported by Lovel et al. in 2020, which was based on both residents and non-residents and amounted to $40.58. Table 14 illustrates that the five primary categories of trip-level expenditures for private boat anglers in 2023 were boat fuel at $95.37 (with a median of $45), tackle at $72.71 (with a median of $15), restaurant meals at $59.06 (with a median of $0), lodging at $58.33 (with a median of $0), and car fuel at $57.53 (with a median of $30). In

[3] Anglers residing in Georgia coastal counties, who utilized private boats for their fishing trips, had an average expenditure of $312.5 per fishing trip (with a median spending of $181).

contrast, Lovel et al. (2020) identified boat fuel ($13.21), auto fuel ($9.30), and groceries ($6.43) as the top three expenses associated with boat trips in 2017. Additional expenditures for private boat anglers in 2022 included monthly boat insurance at $43.19 (with a median of $25), monthly boat storage at $65.63 (with a median of $0), annual boat repairs at $782.83 (with a median of $299.50), and annual boat registration at $54.86 (with a median of $36.50).

Table 14. Private boat expenditures for Georgia residents

Item	Obs.	Mean	Median	Min.	Max.	Std. dev.
Trip-level expenditures						
Car fuel	87	57.53	30	0	500	72.94
Car rental	87	1.03	0	0	65	7.44
Boat fuel	87	95.37	45	0	1,000	165.32
Boat rental	87	0	0	0	0	0
Airplane ticket	87	0	0	0	0	0
Train ticket	87	0	0	0	0	0
Taxi service	87	0	0	0	0	0
Bus ticket	87	0	0	0	0	0
Lodging	87	58.33	0	0	1,500	192.57
Campgrounds	87	5.98	0	0	300	38.47
Restaurant	87	59.06	0	0	800	130.42
Alcohol and Soda	87	18.74	10	0	200	31.37
Bottled water	87	11.15	6	0	50	12.59
Snacks	87	8.05	5	0	100	12.57
Ice	87	16.46	10	0	200	27.19
Fishing tournament fee	87	19.83	0	0	1,200	131.47
Fish bait	87	30.38	20	0	200	34.44
Tackle	87	72.71	15	0	1,500	208.61
Gift/Souvenirs	87	4.71	0	0	300	33.79
Other	87	0.23	0	0	20	2.14
Other expenditures						
Boat insurance (monthly)	78	43.19	25	0	300	59.08
Boat storage (monthly)	85	65.63	0	0	951	173.90
Boat repairs (annually)	66	782.83	299.50	299.50	2,749.50	691.28
Boat registration (annually)	80	54.86	36.50	0	300	52.33

Table 15 reveals that non-resident private boat anglers spent an average of $908.21 per angler day on trip-related costs in 2022, with a median expenditure of $245.The primary categories of trip-level expenditures for non-resident private boat anglers in 2022 included car fuel at $154.21 (with a median of $30), boat fuel at $147.26 (with a median of $50), restaurant

meals at $141.41 (with a median of $0), campground fees at $101.28 (with a median of $0), and lodging at $71.79 (with a median of $0). In addition, other relevant expenses encompassed monthly boat insurance at $43.94 (with a median of $25), monthly boat storage at $98.74 (with a median of $0), annual boat repairs at $864.88 (with a median of $749.50), and annual boat registration at $68 (with a median of $34).

Table 15. Private boat expenditures for non-residents

Item	Obs.	Mean	Median	Min.	Max.	Std. dev.
Car fuel	39	154.21	30	0	3,800	603.08
Car rental	39	0	0	0	0	0
Boat fuel	39	147.26	50	0	2,600	418.51
Boat rental	39	3.08	0	0	120	19.22
Airplane ticket	39	42.31	0	0	650	149.80
Train ticket	39	0	0	0	0	0
Taxi service	39	0	0	0	0	0
Bus ticket	39	0	0	0	0	0
Lodging	39	71.79	0	0	1,800	299.96
Campgrounds	39	101.28	0	0	3,600	576.11
Restaurant	39	141.41	0	0	1,500	296.40
Alcohol and Soda	39	21.82	10	0	100	28
Bottled water	39	23.67	5	0	500	80.43
Snacks	39	8.00	5	0	100	16.41
Ice	39	18.03	5	0	200	39.20
Fishing tournament fee	39	12.82	0	0	500	80.06
Fish bait	39	71.74	20	0	1,500	240.02
Tackle	39	62.59	10	0	1,500	242.01
Gift/Souvenirs	39	3.21	0	0	100	16.40
Other	39	3.85	0	0	150	24.02
Other expenditures						
Boat insurance (monthly)	33	43.94	25.00	0	$300	63.13
Boat storage (monthly)	38	98.74	0	0	$800.50	187.11
Boat repairs (annually)	26	864.88	749.50	299.50	$2,749.50	597.62
Boat registration (annually)	32	68	34	0	$450	105.34

Focusing on shore fishing method, which includes fishing from the shoreline/bank, beach, bridge, dock, pier, jetties, etc., in 2022, Georgia residents who engaged in saltwater fishing through shore fishing spent an average of $622.08 per day per angler. The median

expenditure stood at $116.[4] Table 16 shows that the primary expenditure categories for residents engaging in shore fishing in 2023 included accommodations, where the average cost was $211.63 (with a median of $0), followed by restaurant meals at an average of $97.62 (with a median of $0), car fuel at $82.93 (with a median of $50), tackle expenses at $58.89 (with a median of $20), and finally, expenditures on alcohol and soda at an average of $40.20 (with a median of $6).

Table 16. Shore fishing trip expenditures for Georgi residents

Item	Mean ($)	Median ($)	Min. ($)	Max. ($)	Std. dev. ($)
Car fuel	82.93	50	0	60	116.74
Car rental	6.06	0	0	100	20.18
Boat fuel	3.52	0	0	250	29.67
Boat rental	0	0	0	0	0
Airplane ticket	5.65	0	0	400	47.47
Train ticket	0	0	0	0	0
Taxi service	0	0	0	0	0
Bus ticket	0	0	0	0	0
Lodging	211.63	0	0	2,000	418.30
Campgrounds	23.82	0	0	400	71.64
Restaurant	97.62	0	0	600	146.25
Alcohol and Soda	40.20	6	0	500	78.35
Bottled water	11.03	5	0	100	16.29
Snacks	17.66	10	0	100	23.75
Ice	10.32	5	0	100	17.13
Charter fishing fee	0	0	0	0	0
Head boat fishing fee	0	0	0	0	0
Fishing tournament fee	0	0	0	0	0
Fish bait	28.04	20	0	200	31.11
Tackle	58.89	20	0	1,000	134.24
Gift/Souvenirs	17.68	0	0	400	59.20
Other	7.04	0	0	250	37.92

Note: Number of observations for each item is 71.

[4] Anglers residing in Georgia coastal counties, who utilized shore fishing method, had an average expenditure of $172.67 per trip (median is $117).

The average expenditure for nonresident anglers who chose shore fishing amounted to $1,267.62, and the median expenditure was $234. As indicated in Table 17, the top five categories of expenses for these nonresident anglers encompass lodging, car fuel, restaurant meals, tackle, and fish bait. Specifically, the expenses for lodging averaged $600 (with a median of $0), car fuel stood at an average of $166.30 (with a median of $80), restaurant meals averaged $162 (with a median of $100), tackle expenses came in at an average of $84.46 (with a median of $20), and fish bait costs were around $47.59 (with a median of $20).

Table 17. Shore fishing trip expenditures for non-residents

Item	Mean ($)	Median ($)	Min. ($)	Max. ($)	Std. dev. ($)
Car fuel	166.30	80	0	1,200	263.67
Car rental	32.84	0	0	500	111.66
Boat fuel	0	0	0	0	0
Boat rental	0	0	0	0	0
Airplane ticket	16.22	0	0	400	72.70
Train ticket	0	0	0	0	0
Taxi service	0	0	0	0	0
Bus ticket	0	0	0	0	0
Lodging	600	0	0	4,500	1,126.94
Campgrounds	45	0	0	500	125.30
Restaurant	162	100	0	500	178.96
Alcohol and Soda	36.92	10	0	200	49.74
Bottled water	12.59	0	0	150	27.32
Snacks	21.62	4	0	100	31.62
Ice	11.95	0	0	100	23.55
Charter fishing fee	0	0	0	0	0
Head boat fishing fee	0	0	0	0	0
Fishing tournament fee	0	0	0	0	0
Fish bait	47.59	20	0	800	133.39
Tackle	84.46	20	0	1,000	188.45
Gift/Souvenirs	9.86	0	0	100	25.21
Other	20.27	0	0	750	123.30

Note: Number of observations for each item is 37.

Economic impact results

As mentioned previously, money spent on saltwater recreational fishing circulates through Georgia's economy, leading to a multiplier effect where one dollar spent can have a more

significant impact as it passes through various sectors. 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). The discussions will focus on the total effects. All economic impact estimates are reported in 2023-dollar values.

Table 18 reports the economic impact for both resident and non-resident saltwater recreational fishing in Georgia. The results show that saltwater recreational fishing trips in Georgia supported 3,217 full or part-time jobs, contributed $310.6 million in sales, $74.4 million in labor income, and $155.1 million in gross domestic product (GDP) to Georgi's economy. The current estimates are slightly higher than what Lovel et al. (2020) found in 20217. They estimated that in 2017 saltwater recreational fishing trips in Georgia supported 2,788 full or part-time jobs, contributed $230.52 million in sales, $75.6 million in labor income, and $144.4 million in gross domestic product (GDP).

Table 18. Economic impacts of saltwater recreational fishing

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	2,566	39.12	93.17	197.74
Indirect Effect	348	20.77	34.41	66.92
Induced Effect	302	14.47	27.48	45.91
Total Effect	3,217	74.37	155.07	310.57
Imputed Multiplier	1.3	1.9	1.7	1.6

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

Table 19 shows that Georgia resident saltwater recreational fishing trips supported 3,039 full or part-time jobs, contributed $292.90 million in sales, $71.3 million in labor income, and $148.3 million in gross domestic product (GDP) to Georgi's economy. These estimates are higher than what Lovel et al. (2020) found in 20217. They estimated that in 2017 saltwater recreational fishing trips in Georgia supported 2,788 full or part-time jobs, contributed $230.5 million in sales, $75.6 million in labor income, and $144.4 million in gross domestic product (GDP).

Table 19. Residents' saltwater recreational fishing economic impacts

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	2,419	37.78	89.27	185.83
Indirect Effect	331	19.62	32.67	63.08
Induced Effect	290	13.87	26.34	43.99
Total Effect	3,039	71.27	148.28	292.90
Imputed Multiplier	1.3	1.9	1.7	1.6

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

Table 20 indicates that non-resident saltwater recreational fishing trips supported 214 full or part-time jobs, contributed $17 million in sales, $5.1 million in labor income, and $9.2 million in gross domestic product (GDP) to Georgi's economy.

Table 20. Non-residents' economic impacts of saltwater recreational fishing

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	175	3.0	5.5	10.3
Indirect Effect	18	1.1	1.9	3.5
Induced Effect	21	1.0	1.9	3.2
Total Effect	214	5.1	9.2	17.0
Imputed Multiplier	1.2	1.7	1.7	1.6

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

Table 21 indicates that resident private boat trips supported 1,672 full or part-time jobs, contributed $198.9 million in sales, $53.6 million in labor income, and $101.8 million in gross domestic product (GDP) to Georgi's economy. Lovel et al. (2020) estimated that in 2017 private boat trips in Georgia supported 769 full or part-time jobs, contributed $56.7 million in sales, $18.2 million in labor income, and $37.4 million in gross domestic product (GDP). Estimates by Lovel et al. (2020) might have combined resident and non-resident private boat anglers.

Table 21. Economic impacts of saltwater recreational fishing using private boat; residents

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	1,209	27.7	57.4	119.3
Indirect Effect	246	15.5	24.6	46.6
Induced Effect	217	10.4	19.8	33.0
Total Effect	1,672	53.6	101.8	198.9
Imputed Multiplier	1.4	1.9	1.8	1.7

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

Table 22 suggests that in 2022 non-resident private boat trips supported 9 full or part-time jobs, contributed $1 million in sales, $0.3 million in labor income, and $0.5 million in gross domestic product (GDP) to Georgi's economy.

Table 22. Economic impacts of saltwater recreational fishing using private boat; for non-residents

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	6	0.2	0.3	0.6
Indirect Effect	1	0.1	0.1	0.2
Induced Effect	1	0.1	0.1	0.2
Total Effect	9	0.3	0.5	1.0
Imputed Multiplier	1.4	1.9	1.8	1.7

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

Table 23 indicates that in 2022, Georgia resident shore fishing outings played a role in sustaining 2,340.7 jobs, generating $232.6 million in sales, providing $53.4 million in labor income, and contributing $116.6 million to Georgia's gross domestic product (GDP).

Table 23. Economic impacts of saltwater recreational fishing using shore fishing method; residents

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	1,865	27.6	72.2	150.6
Indirect Effect	259	15.4	24.7	49.1
Induced Effect	217	10.4	19.7	33.0
Total Effect	2,341	53.4	116.6	232.6
Imputed Multiplier	1.3	1.9	1.6	1.5

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

Table 24 indicates that non-resident shore fishing trips contributed to the sustenance of 362 full or part-time jobs, injected $29.8 million into sales, provided $9.7 million in labor income, and added $15.9 million to Georgia's gross domestic product (GDP).

Table 24. Economic impacts of saltwater recreational fishing using shore fishing method; non-residents

Impact type	Employment	Labor Income	Value Added	Output
Direct Effect	290	5.8	8.9	17.6
Indirect Effect	32.	2.0	3.4	6.2
Induced Effect	40	1.9	3.6	6.0
Total Effect	362	9.7	15.9	29.8
Imputed Multiplier	1.2	1.7	1.8	1.7

Note: Except for employment and imputed multiplier, values are in millions ($1000,000) of dollars.

DISCUSSION AND CONCLUSION

This project documents the demographics and economic significance of saltwater recreational fishing in Georgia, shedding light on key findings derived from surveys conducted among both residents and nonresident saltwater anglers.

The result of the survey suggests saltwater recreational fishing is dominated by middle-aged white men with at least bachelor's degree and a household annual income exceeding $80, 000. The survey also reveals that saltwater recreational fishing is somewhat expensive, with an average expenditure of $594.82 (median is $187) per trip per angler. This estimate closely aligns with the national average reported in 2016 by the US Fish and Wildlife Service, which was $739. The top expenditure categories encompass lodging, restaurant expenses, auto fuel, tackle, and boat fuel. However, the expenditure patterns vary depending on whether the angler is a resident or nonresident, reside in a Georgia coastal county, as well as their chosen method of fishing. In terms residence, Georgia resident saltwater anglers spend an average of $564.88 (median is $247.5) per trip while nonresidents spend $1, 133.8 (median is $540) per trip. In contrast, saltwater anglers residing in Coastal Georgia tend to have lower expenditures. The average spending for this group of residents amounts to $273.8, and the median expenditure is $170. These differences can be attributed to various factors, including travel expenses incurred by nonresidents coming from distant locations. Furthermore, the method of fishing also plays a pivotal role in expenditure. For example, anglers who use private boats tend to have additional costs like boat fuel and insurance, contributing to the disparity in spending.

The economic contributions of angler expenditure are substantial. Saltwater recreational fishing trips supported 3,039 full or part-time jobs, contributed $292.90 million in sales, $71.3 million in labor income, and $148.3 million in gross domestic product (GDP) to Georgi's

economy. As expected, these estimates, to a large extent, are higher than what Lovel et al. (2020) found in 20217. They estimated that in 2017 saltwater recreational fishing trips in Georgia supported 2,788 full or part-time jobs, contributed $230.5 million in sales, $75.6 million in labor income, and $144.4 million in gross domestic product (GDP).

The research also unveiled that well-frequented locations for saltwater recreational fishing include Glynn County, Chatham County, and Camden County. This revelation is not unexpected, as these counties are renowned tourist destinations along Georgia's coastline, offering various amenities that enhance the appeal of saltwater recreational fishing. The survey results indicated that most respondents consider several factors when choosing their fishing destination. These factors encompass the proximity of the destination to their residence, past fishing success at the site, the availability of amenities such as parking, restroom facilities, tap water, proximity to bait, ice, tackle stores, restaurants, gas stations, weather conditions, and water quality. Additionally, the top three fish species sought after by anglers are seatrout, red drum, and flounder.

In summary, the economic significance of saltwater recreational fishing in Georgia cannot be overstated. The findings of this study demonstrate its substantial contributions to the state's economy, including job creation, sales revenue, labor income, and GDP. Compared to previous estimates in 2017, the sector has shown growth, supporting more jobs and contributing more to the state's economic well-being. Variations in economic contributions are to be expected, given the diverse nature of saltwater recreational fishing. Different resident types and fishing methods naturally lead to differences in spending patterns. The selection of weather conditions and water quality as primary factors affecting saltwater anglers' choice of fishing locations highlights the potential ramifications of climate change on outdoor leisure activities and the tourism industry in Georgia. Popular fishing destinations in Glynn County, Chatham County, and Camden County provide valuable insights for marketing and infrastructure development.

Georgia’s saltwater recreational fishing sector intertwines with various industries, from retail and manufacturing to hospitality and tourism. It generates government revenue through taxes and fees while also contributing to conservation efforts. The intricate web of economic and ecological interdependencies underscores the importance of sustainable practices and effective management to ensure the continued prosperity of saltwater recreational fishing in Georgia.

The limitations of this report should be considered when interpreting its findings. Firstly, the study relied on self-reported data, which introduces the potential for response bias and inaccuracies in participants' recollections. Self-reported data can be influenced by subjective perceptions and may not always reflect objective reality. Additionally, the primary mode of data collection via the internet might have introduced a form of self-selection bias, as individuals with greater technological proficiency were more inclined to participate in the survey, potentially influencing the outcomes. Moreover, the study's limited survey completion rate poses a constraint on the ability to extend the findings to a wider population of saltwater anglers. Subsequent research endeavors should aim for a larger and more diverse sample size that encompasses various saltwater recreational fishing practices, possibly implementing incentives to enhance survey participation rates.

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APPENDIX

Survey Instrument

Screening questions

Q1. Are you 18 years or older?

- ○ Yes
- ○ No

Q2. Have you participated in saltwater recreational fishing in Georgia in the previous 12 months?

- ○ Yes
- ○ No

Saltwater recreational fishing experience

Q3. Which of the following best characterizes your last saltwater fishing trip? *Check one:*

- ○ Shore fishing (shoreline/bank, beach, bridge, dock, pier, jetties, etc.)
- ○ Private boat fishing
- ○ Charter boat fishing
- ○ Head boat fishing
- ○ Kayak fishing
- ○ Other (Please specify) _____

Q4. Of the fishing experiences provided below, indicate how many saltwater fishing trips you take in a week, month, and year in Georgia. *Example, if you typically participate in shore fishing once a week, or three times in a month or perhaps 100 times in a year, then for shore fishing experience indicate 1 under Week, 3 under Month, and 100 under the Year column. Do the same for other fishing experiences that apply to you. Indicate 0 if not applicable.*

	Week	**Month**	**Year**
Shore fishing (shoreline/bank, beach, bridge, dock, pier, jetties, etc.)			
Private boat fishing			
Charter boat fishing			
Head boat fishing			
Kayak fishing			
Other (Please specify)			

In this section of the survey, we will collect information on the costs of participating in saltwater recreational fishing. For each item that applies to your saltwater fishing trip, please do your best to provide an accurate dollar amount that you spent. Indicate 0 for items that are not associated with your trip.

Q5. Considering your last saltwater fishing trip, how much money ($) did you spend on

Item	**Cost ($)**
Auto, truck, or RV fuel (*if you did not purchase fuel on your last saltwater fishing trip because you already had fuel, please estimate the cost of fuel used*)	
Auto, truck, or RV rental	
Boat fuel (*if you did not purchase boat fuel on your last saltwater fishing trip because you already had boat fuel, please estimate the cost of boat fuel used*)	
Boat rental (*if you rented the boat for a period (example, for a week) please estimate the cost of boat rental for your last saltwater fishing trip by dividing the total rental cost by 7 days*)	
Airplane ticket	
Train ticket	
Taxi service	
Bus ticket	
Lodging	
Campgrounds	
Restaurant meals	
Alcoholic beverages and soda	
Bottled water	
Ice	
Snacks	
Charter fishing fee	
Head boat fishing fee	
Fishing tournament fees	
Bait	
Tackle	
Gifts or souvenirs	
Other (Please specify)	

Respond to questions Q6-Q9 if you own and used a private boat for saltwater recreational fishing in the past 12 months.

Q6. How much money ($) do you pay monthly as boat insurance premium? _____

Q7. Which range below contains the approximate amount of money ($) you pay monthly for docking/boat storage? *Check one:*

- ○ $0
- ○ $200-$350
- ○ $351-$450
- ○ $451-$550
- ○ $551-$650
- ○ $651-$750
- ○ $751-$850
- ○ $851-$950
- ○ Over $950

Q8. Which range below contains the approximate amount of money ($) you pay annually for boat repairs and services? *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

Q9. How much money ($) do you pay annually for boater registration fee? _____

Q10. What percentage of all the expenses you just described were spent in Georgia? _____

Q11. Was your last saltwater fishing trip part of a longer trip in which you spent at least one night away from your permanent or seasonal residence, or was it a one-day fishing trip?

- ○ Longer trip
- ○ One day trip

**** Respond to questions Q12, Q13, and Q14 if you selected "longer trip" in question Q11.***

Q12. How many nights were you away from your primary residence on this trip? _____

Q13. How many days of this trip did you go saltwater fishing? _____

Q14 What was the primary purpose of this entire trip away from home?

- ○ Saltwater fishing
- ○ Vacation or other personal trip
- ○ Business
- ○ Don't know

Q15. On average, how many miles roundtrip did you travel from your primary residence to the location of your last saltwater fishing trip? _____

Q16. What was the total duration (hours) of your last saltwater fishing trip? _____

****Respond to question 17 and 18 if you selected "private boat fishing" in question Q3.***

Q17. If your fishing experience was private boat fishing, what was the total distance (in miles) travelled in the boat, based on your last saltwater fishing trip? _____

Q18. How many gallons of boat fuel was used in your last saltwater fishing trip? _____

Saltwater fishing area and fishing boat departure location

Q19. Based on your last saltwater fishing trip, select the area of water in which you spent most of your time actively fishing.

- ○ Inshore (saltwater bays and estuaries)
- ○ Nearshore (from the shoreline to 12 nautical miles out)
- ○ Offshore (greater than 12 nautical miles from shoreline)

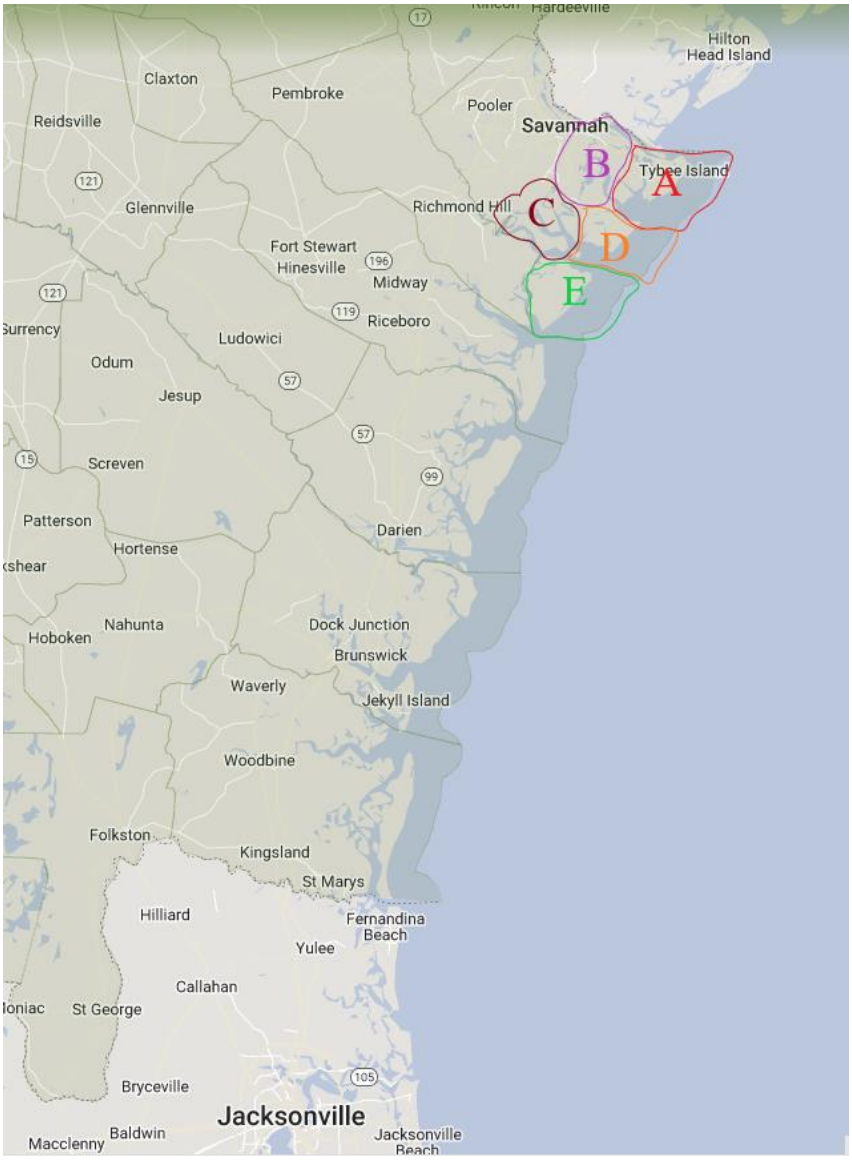
Q20. Based on your last saltwater fishing trip, from which Georgia coastal county did you spend most of your fishing time (shore fishing trip) or depart from in the boat (private, charter boat, and head boat fishing) to go fish? *Check one*.

- ○ Chatham County
- ○ Bryan County
- ○ Liberty County
- ○ McIntosh County
- ○ Glynn County
- ○ Camden County

Respond to question Q21a if you selected "Chatham County" or "Bryan County" in Q20.

Q21a. Based on the map provided, which of the following letters best represent the site you spent most of your fishing time (shore fishing trip) or departed from in a boat (private, charter boat, and head boat fishing) based on your last saltwater fishing trip? *Check one*.

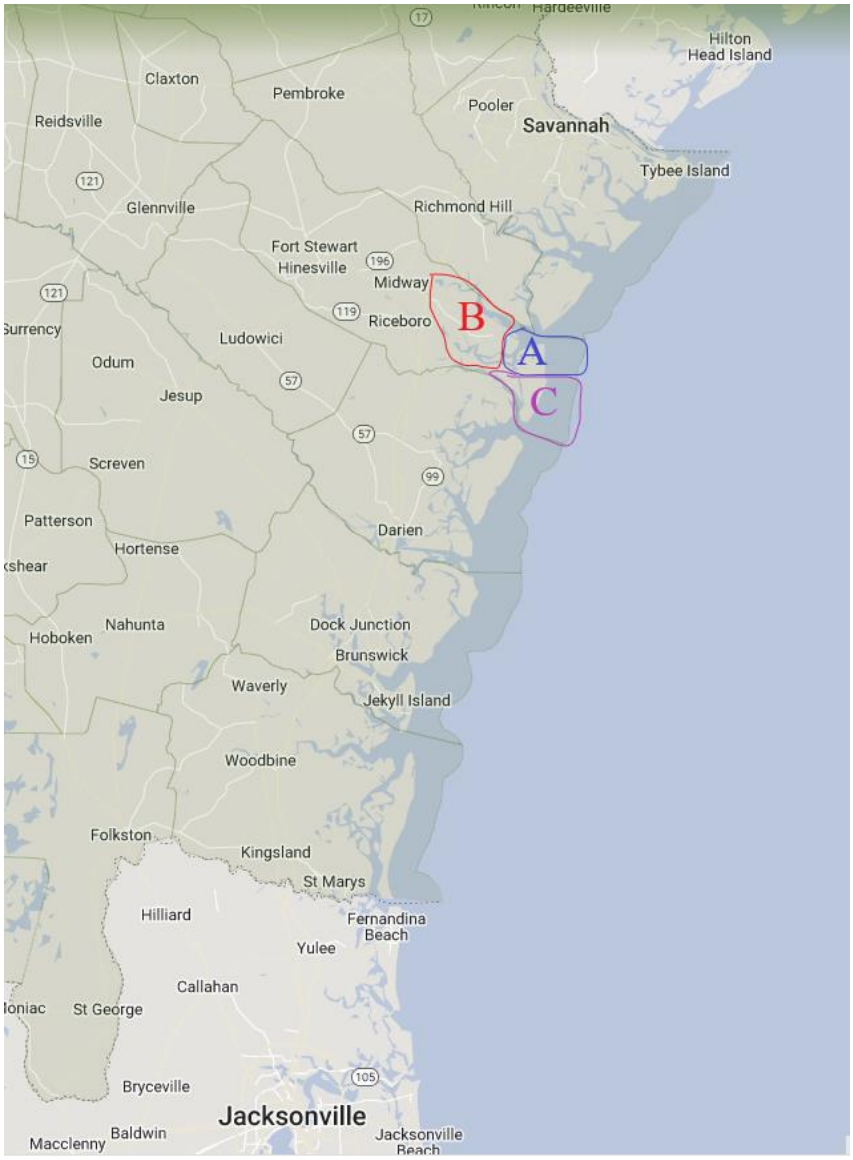
- ○ A
- ○ B
- ○ C
- ○ D
- ○ E



Respond to question Q21b if you selected "Liberty County" in Q20.

Q21b. Based on the map provided, which of the following letters best represent the site you spent most of your fishing time (shore fishing trip) or departed from in a boat (private, charter boat, and head boat fishing) based on your last saltwater fishing trip? *Check one*.

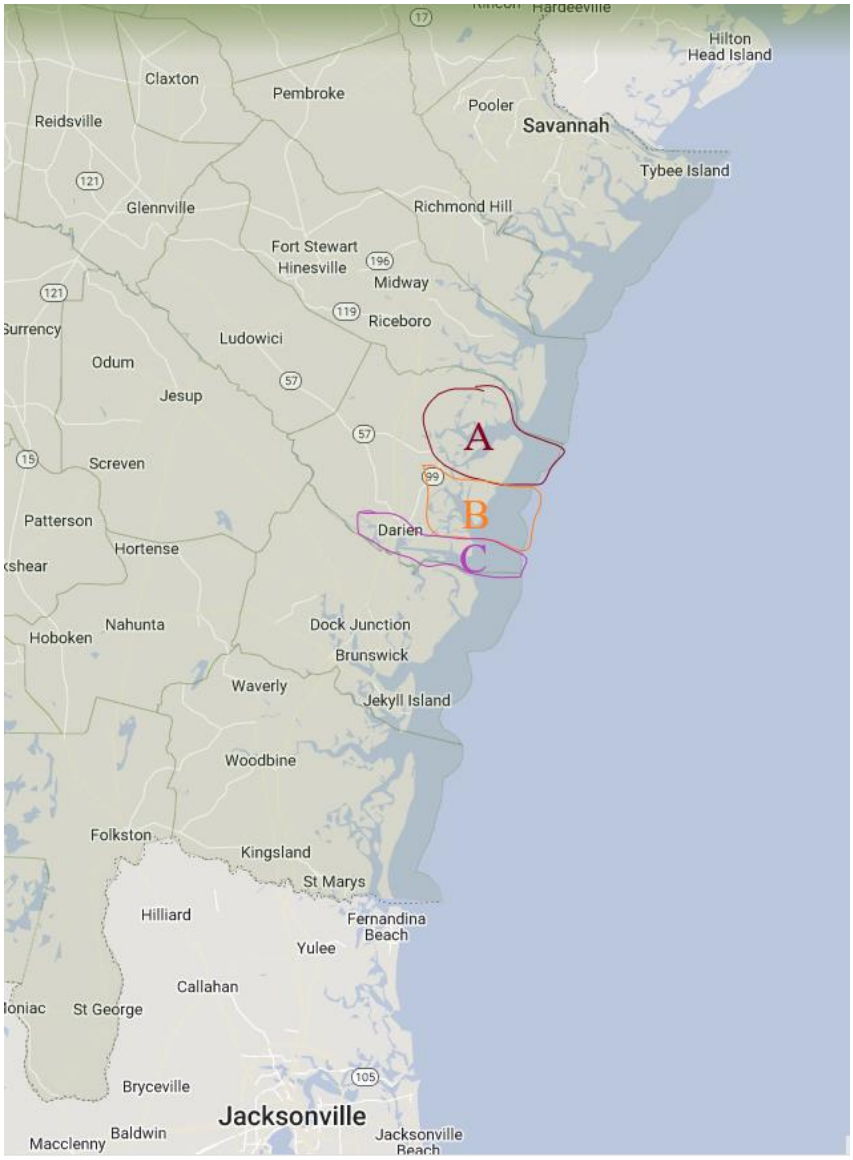
- ○ A
- ○ B
- ○ C



***Respond to question Q21c if you selected "McIntosh County" in Q20**.*

Q21c. Based on the map provided, which of the following letters best represent the site you spent most of your fishing time (shore fishing trip) or departed from in a boat (private, charter boat, and head boat fishing) based on your last saltwater fishing trip? *Check one*.

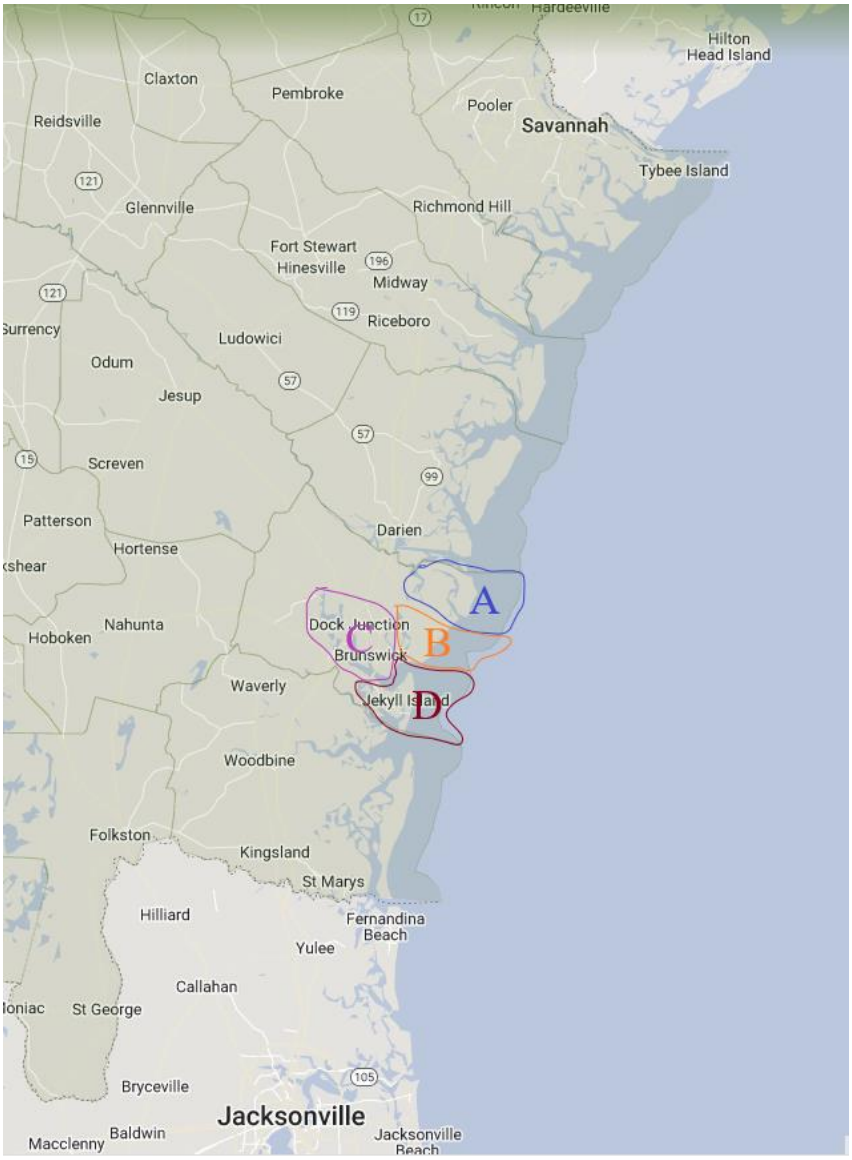
- ○ A
- ○ B
- ○ C



Respond to question Q21d if you selected "Glynn County" in Q20.

Q21d. Based on the map provided, which of the following letters best represent the site you spent most of your fishing time (shore fishing trip) or departed from in a boat (private, charter boat, and head boat fishing) based on your last saltwater fishing trip? *Check one*.

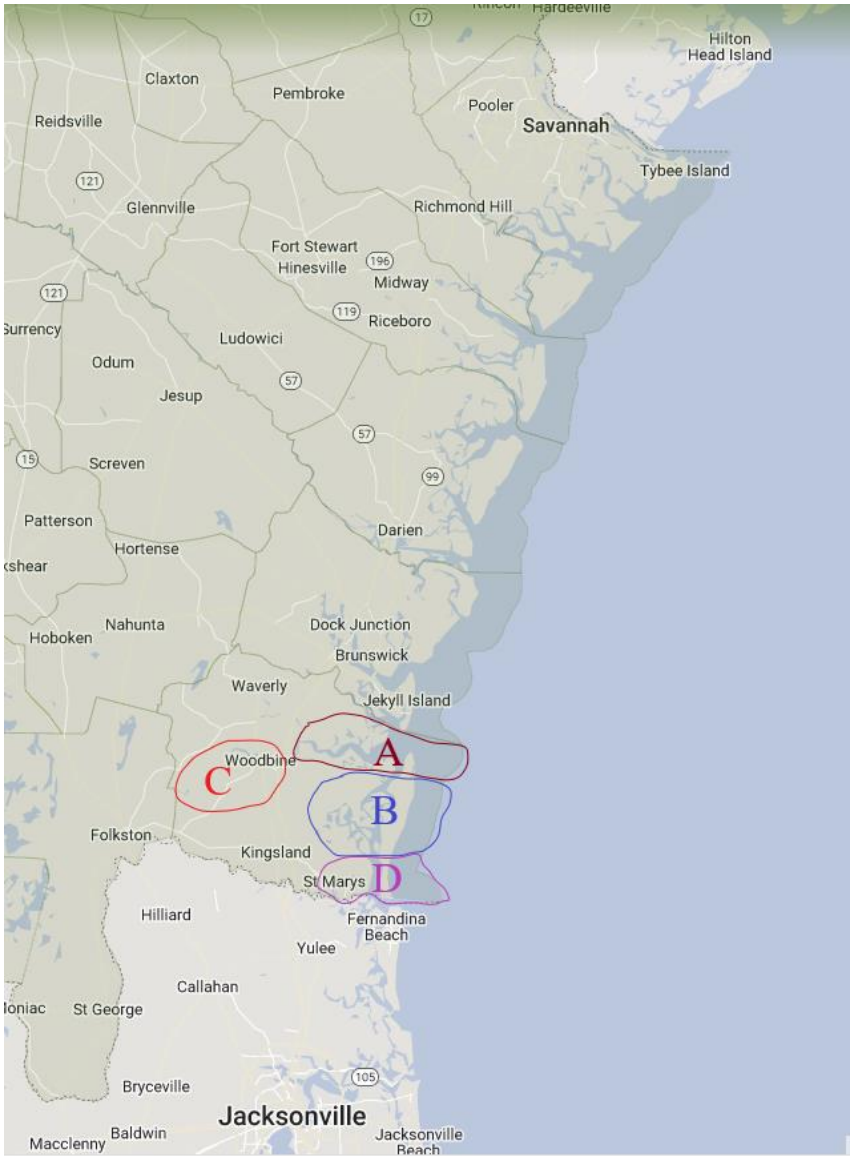
- ○ A
- ○ B
- ○ C
- ○ D



Respond to question Q21e if you selected "Camden County" in Q20.

Q21e. Based on the map provided, which of the following letters best represent the site you spent most of your fishing time (shore fishing trip) or departed from in a boat (private, charter boat, and head boat fishing) based on your last saltwater fishing trip? *Check one*.

- ○ A
- ○ B
- ○ C
- ○ D



Q22. How many saltwater fishing trips do you typically take in a week, month, and year to the location of your last saltwater fishing trip?

	Number of saltwater fishing trips
Week	
Month	
Year	

Q23. For your next saltwater fishing trip, from which Georgia coastal county do you plan to spend most of your fishing time (shore fishing trip) or depart from in a boat (private, charter boat, and head boat fishing) to go fish? *Check one*.

- ○ Chatham County
- ○ Bryan County
- ○ Liberty County
- ○ McIntosh County
- ○ Glynn County
- ○ Camden County

Targeted species

Q24. What fish species do you typically target? *Check all items that apply*.

- ○ Spotted Seatrout
- ○ Red Drum
- ○ Whiting
- ○ Flounder
- ○ Red Snapper
- ○ Shark
- ○ Sheepshead
- ○ Tarpon
- ○ Atlantic Croaker
- ○ Black Sea Bass
- ○ Black Drum
- ○ Other (please specify) _____

Q25. Of the fish species you typically target, how many do you need to catch (released and harvested) to feel like it was a successful fishing trip? **Based on the fish species selected in Q24.*

Fish species	**Number to catch to feel like a successful fishing trip**
Spotted Seatrout	
Red Drum	
Whiting	
Flounder	
Red Snapper	
Shark	
Sheepshead	
Tarpon	
Atlantic Croaker	
Black Sea Bass	
Black Drum	
Other (Please specify)	

Factors affecting choice of fishing site

Q26. What do you consider when choosing your saltwater fishing site? Rank each factor listed below from 1 through 10. 1 is the most important. For example, if you consider *water quality* to be most important and *number of people on site* to be least important when selecting saltwater fishing site, then assign 1 to *water quality* and 10 to *number of people on site. *For internet version: to rank the factors, click and hold a factor, then drag up or down to rearrange to your preferred position.*

Factors	Rank
Distance from my residence to fishing site	
Availability and quality of boat ramps, piers, or jetties	
Weather (wind, humidity, temperature, water temperature, degrees of sunshine, etc.)	
Number of people on site (crowding)	
Availability of parking space, restrooms, tap water, etc.	
Proximity to natural or artificial reef	
Proximity to bait, ice, tackle store, restaurant, gas station	
Water quality	
Past successful fishing at the site	
Good fishing report about the site (heard the bite is good)	

Q27. Which of the following is your best source for Georgia saltwater recreational fishing information? *Check one*.

- ○ Internet
- ○ Tackle shop
- ○ Marina
- ○ Friends and family
- ○ Other (Please specify) _____

Q28. The designers of this survey appreciate the time and effort you devote to completing our survey. It is important to differentiate between respondents who speed through surveys without properly reading the questions and other respondents who are thoughtful and engaged

accordingly. To demonstrate that you have read this question carefully, please select the flounder option below.

Which fish species did you catch on your last trip? *Check one:*

- ○ Seatrout
- ○ Red fish
- ○ Sheepshead
- ○ Tarpon
- ○ Flounder
- ○ Red snapper

Demographic information

This is the last and equally important section of the survey. In this section we seek to understand the socio-demographic profile of anglers. The information you provide will be combined with those from other anglers. No personally identifiable information will be collected.

Q29. Which state do you consider to be your primary residence? *Check one*:

- ○ Georgia
- ○ Other (Please specify) _____

Q30. What is your residential zip code? _____

Q31. What is your age (years)? _____

Q32. What is your sex? *Check one:*

- ○ Male
- ○ Female

Q33. Which best describes your race? *Check one:*

- ○ American Indian or Alaskan Native
- ○ Native Hawaiian and Other Pacific Islander
- ○ Asian

- ○ Black or African American
- ○ Hispanic
- ○ White or Caucasian
- ○ Other (Please specify) _____

Q34. What is your marital status? *Check one:*

- ○ Married
- ○ Widowed
- ○ Divorced
- ○ Separated
- ○ Never married

Q35. Which of these describe your household? *Check one:*

- ○ Family household
- ○ Nonfamily household

Q36. What is the highest education you have completed? *Check one:*

- ○ Did not complete high school
- ○ High school diploma
- ○ Associate's/ two-year degree
- ○ Bachelor's/four-year degree
- ○ Master's degree
- ○ Professional degree
- ○ PhD/Doctorate degree

Q37. Which Category best describes your annual household income? *Check one:*

- ○ Less than $20,000
- ○ $20,000-$39,999
- ○ $40,000-$59,999
- ○ $60,000-$79,999
- ○ $80,000-$99,999
- ○ $100,000-$124,999
- ○ $125,000-$149,999
- ○ $150,000 or more

We thank you for your time spent taking this survey