



Socioeconomic Survey of Recreational Saltwater Anglers in North Carolina
2016
by
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INTRODUCTION

In 2009, the North Carolina Division of Marine Fisheries (DMF) conducted the first socioeconomic survey of licensed recreational saltwater fishermen. The information for this study has been made available by the implementation of the Coastal Recreational Fishing License (CRFL) on January 1, 2007. The CRFL provided the database of licensees for sampling.

There are exemptions to purchasing a CRFL for certain anglers: minors under the age of 16, anyone fishing from a fishing pier or a charter boat with a blanket license, and resident members of the Armed Forces on leave in North Carolina. Additionally, the Fourth of July is a free fishing day. A CRFL is not required to harvest shellfish or crabs, only finfish. Exempted individuals are not included in this study but a limited socioeconomic survey is conducted by the Marine Recreational Information Program which surveys anglers at piers, the shoreline, and boat ramps throughout coastal NC.

The goal of this study was to conduct a representative survey of those individuals who purchased a license to fish in coastal areas in 2016 as an update to the original 2009 study. Conducting socioeconomic surveys of recreational fishermen will aid in the development of fishery management plans (FMPs) and other regulations by providing information on how coastal anglers, and their expenditures, are impacted by changes in harvest rules.

STUDY OBJECTIVES

The specific objectives of this study are:

1. To describe the demographic aspects of recreational coastal fishermen in North Carolina;
2. To collect expenditure information from these fishermen to develop estimates of the economics associated with their fishing activities; and
3. To assess their perceptions of fishery regulations, conflict, and relevant issues including the future of the fisheries.

METHODS

Recruitment and Participation Rates

By the Division's estimates, there were 948,541 individuals eligible to fish under a CRFL in 2016 (NCDMF 2017). Individuals who possess a Lifetime Sportsman License who are eligible to hunt and to fish both freshwater and saltwater bodies may or may not fish in coastal waters. These individuals were included in this survey and may have received the survey but their results are not included if they indicated they did not fish in coastal waters.

In January 2016, a pool of 4,000 CRFL holders was obtained from the NC Wildlife Resource Commission database. The pool was a stratified random sample across the different types of licenses holders in direct proportion to their representation in the CRFL sales database, with the exception of Infant and Youth Lifetime License Holders who were under the age of 18 in 2016. Lifetime Sportsman holders over the age of 85 were also excluded, primarily to reduce the likelihood of surveying deceased

individuals. The pool included residents of states other than North Carolina. The purpose of drawing the original stratified sample was to provide a sufficiently large list of probable fishermen who could be contacted without running out of names. A goal of 600 completed surveys was considered to be an economically feasible target that balanced out the need for an adequate sample size with the exponential increases in completions that are necessary for reducing the confidence intervals.

666 surveys were returned by anglers for a raw response rate of 17%. Surveys that were returned largely incomplete, or were deemed ineligible because anglers did not take coastal fishing trips were not used in the final analysis. Of the 666 returned surveys, 625 were deemed complete and usable. This sample provides confidence intervals of +/- 3% at a 95% confidence level when making comparisons to the 900,000+ licensees statewide. Interviewers were instructed to continue to send out letters and make calls until at least 600 surveys were completed.

Survey Instrument

The Division has traditionally surveyed commercial fishermen via telephone, partly because the surveys involve many questions about their business of commercial fishing. Recreational fishermen do not need to be interviewed on this topic, greatly reducing the length of the survey. Because this survey was intended to be as cost-effective as possible an internet/mail survey methodology was employed using the following approach:

- 1) Staggered draws of 500 random anglers were pulled from the pool.
- 2) Anglers were sent a letter with a unique code and instructions to go to a website where they could fill out survey information at their discretion and a paper survey that could be filled out by mail and returned in a pre-paid envelope.
- 3) Interviewers regularly checked the completion lists on the website and called individuals who had not yet responded. Interviewers used the same internet entry as the fishermen would have used had they entered the data themselves, eliminating the need to later merge separate databases.

Responses from anglers via the internet portal (SurveyMonkey.com) were positive. Most of the anglers would complete the survey online within a week of an email being sent, with further responses tailing off rapidly as the days progressed until another reminder email was sent. Of the 666 completed surveys, 201 (30%) were completed through SurveyMonkey, and the remaining 465 (70%) were completed by paper surveys through the mail.

The data collected in the survey (see Appendix 1) includes information concerning:

- Individual socio-demographics
- Targeted species and other fishing behavior
- Fishing trip expenses and vessel ownership
- Attitudes regarding fishery management
- User group conflicts

The anglers were surveyed in the summer and fall of 2017. Results were stored in an Excel spreadsheet by the SurveyMonkey website. The data were analyzed using Excel and R. Final data verification, assigning labels to variables, and additional variable calculations were completed in R along with all data analyses. The primary analyses in this report consist of frequency and simple univariate analyses.

RESULTS

The following results are presented for both active and inactive recreational anglers. The first question of the survey instrument asks if the respondent has taken a fishing trip in North Carolina within the past 12 months of the mail date. This question was designed to isolate anglers that may not have actively fished in North Carolina in 2016 and therefore may not have the most recent expenditure information. Out of the 625 total completed surveys received, 509 were actively fishing in NC in 2016 while 116 were inactive.

Demographics: Active Respondents (N=509)

Demographic information was collected for each respondent (Table 1). Fishermen interviewed were mostly white (90%) respondents who have fished, on average, for 28 years. Fifty percent (50%) were college graduates, and most (79%) were married.

Table 1. Demographic information of active respondents. (N=509)

Demographics	Frequency	Percent
<u>Racial/Ethnic Background</u>		
White/Caucasian	459	90%
Hispanic/Latino	6	1%
African-American/Black	14	3%
Asian/Pacific-Islander	5	1%
Native American	6	1%
Prefer not to answer	19	4%
<u>Highest Education</u>		
Some Highschool	18	4%
High School/GED	89	17%
Some College	124	24%
Associates	65	13%
Bachelors	129	25%
Graduate/PhD.	60	12%
Preferred not to answer	24	5%
<u>Marital Status</u>		
Never Married	35	7%
Married	404	79%
Divorced	38	7%
Widowed	11	2%
Separated	8	2%
Prefer not to answer	13	3%
<u>Household Size</u>		
One	37	7%
Two	275	54%
Three	71	14%
Four	88	17%
Five	16	3%
Six	8	1%
Seven	1	0%
Prefer not to answer	13	3%

Twenty-nine percent (29%) of the respondents reported household incomes over \$50,000/year, and 17% had incomes of \$100,000 or more (Figure 1). Over half of all respondents, however, preferred not to state their household incomes. The median family income in North Carolina for 2016 was 53,764. ¹

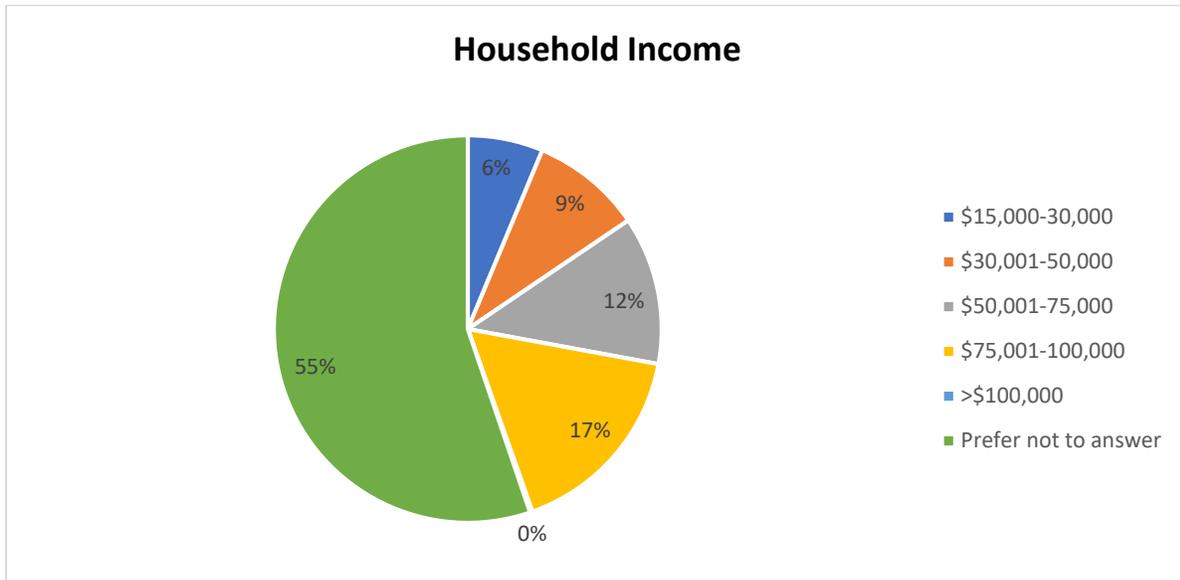


Figure 1. Household income of active respondents.

¹ U.S. Bureau of the Census, Median Household Income in North Carolina [MEHOINUSNCA646N]

Fishing Activity (N=509)

April through October were the months of highest fishing participation with over three-quarters spending some time on the water, and winter was the slowest time (Figure 2).

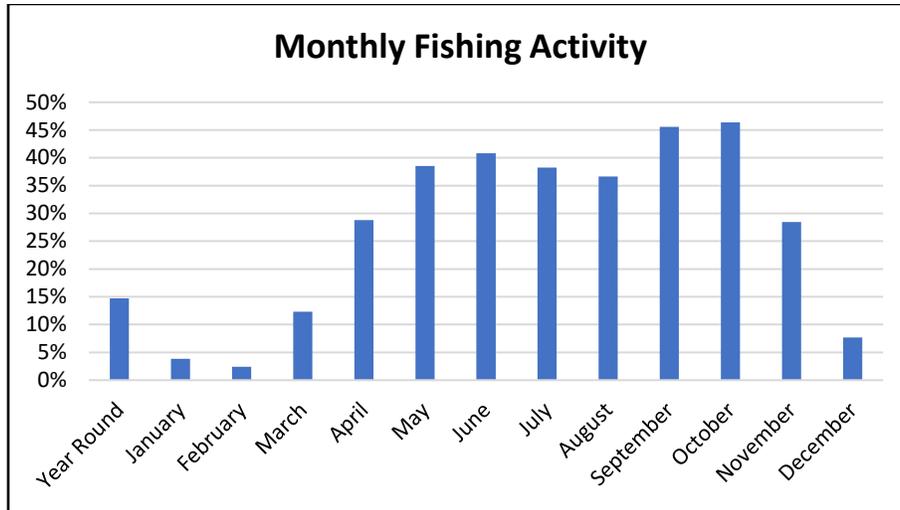


Figure 2. Monthly fishing activity of active respondents.

Targeted Species

Saltwater species regulated in the waters in and near North Carolina fit in two general categories, inshore (within state jurisdiction) and offshore (in federal waters greater than three miles from the coast). The percentage of inshore and offshore species most commonly targeted by the respondents was calculated (Table 2). Fishermen were also asked about other saltwater fishing activities they participate in besides angling and their responses recorded (Table 3).

Table 2. Primary inshore and offshore species targeted by active respondents.

Inshore Species	% who target	Offshore Species	% who target
Flounder	47%	Dolphin/Mahi	12%
Red drum	40%	Tuna	10%
Spotted sea trout/Speck	37%	King mackerel	9%
Black Drum	29%	Wahoo	8%
Weakfish/Grey Trout	26%	Other	8%
Spot	25%	Black sea bass	6%
Bluefish	25%	Gag/black grouper	5%
Spanish Mackerel	24%	Marlin	5%
Croakers	23%	Red snapper	4%
Sea mullet/whiting	20%	Amberjack	3%
Striped Bass	19%	Red porgy/pink snapper	3%
Other	18%	Grunts	3%
Sheepshead	15%	Vermillion snapper/beeliners	3%
Pompano	15%	Triggerfish	3%
Cobia	13%	Sailfish	3%

Table 3. Non-angling activities of active respondents.

Activity	% who
Cast net for bait	36%
None	28%
Harvest crabs	16%
Cast net for shrimp	14%
Gig for flounder	13%
Harvest clams	9%
Other	9%
Harvest oysters	6%
Dive/spearfish	2%

Perceptions (N=509)

Respondents were asked a variety of questions designed to elicit their opinions on the issues that affect their saltwater fishing activities, particularly regarding the challenges fishermen face today. Every fisherman ranked a variety of different issues on a ten-point scale by "how important [he or she] considers each of these issues are to [his or her] fishing business" (Table 4). The presented order of the issues was randomly shuffled by the computer for each survey to prevent bias.

Table 4. Listed issues of concern of active respondents.

Rank	Issue
1	Keeping up with rules and regulations
2	Water quality and pollution
3	Bag limits/size limits
4	Finding enough time in my life to fish
5	Overfishing
6	Weather
7	Access issues
8	Fuel prices
9	Loss of fishing piers
10	Competition from commercial fishermen
11	Competition from other recreational fishermen/crowding

User Group Conflicts (N=509)

The fishermen were also asked about conflicts with enforcement officers and with other user groups. The most common indicated conflict with other user groups was with recreational and other commercial fishermen (Figure 3).

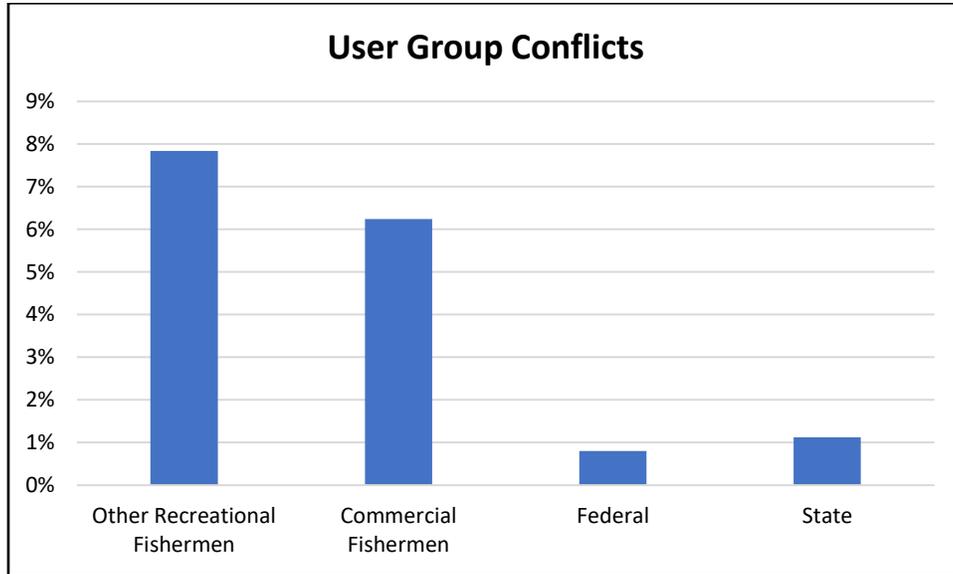


Figure 3. Percentage of active respondents reporting conflicts with enforcement officers or other user groups.

Fishing Vessels and Expenses (N=509)

Less than half of the fishermen (36%) owned boats used for coastal angling, with less than a percent reporting owning two boats. Vessel characteristics were collected for each boat including length and value (Table 5). Value also includes gear used on that boat. The mean boat length was 20 feet and the median boat length was 19 feet, with a minimum reported length of 10 feet and a maximum of 58 feet. The highest self-reported value was \$1,000,000.

Table 5. Average vessel characteristics of active respondents.

Vessel Characteristic	Average
Length (in feet)	20
Average Value	\$27,399

Respondents were asked to estimate their per-trip expenditures for several different categories of coastal fishing they might participate in: inshore, offshore, chartered, and pier. Table 6 illustrates the estimated per-trip and annual inshore and offshore operating expenses incurred by North Carolina saltwater anglers. Estimates include both the average and the median (that of the "middle" fishermen). Note that the average inshore per-trip expenditure is almost double the median, indicating that much of the money spent fishing is spent by a few fishermen. The median cost of an inshore trip was \$79 for 2016, and the median number

of trips taken was 12. The differences in average and median values for offshore expenditures per-trip are nearly identical, as an even small percentage of saltwater anglers venture out of state waters. The median cost of an offshore trip was \$167 for 2016, and the median number of trips taken was 4.

Table 6. Average estimated inshore and offshore trip expenditures of active respondents.

Trip Expenses	Inshore Average	Median	Offshore Average	Median
Ice	\$7	\$5	\$13	\$7
Bait	\$17	\$10	\$27	\$20
Tackle	\$21	\$14	\$39	\$20
Boat Fuel & Oil	\$31	\$10	\$158	\$75
Truck/Car Fuel	\$39	\$20	\$50	\$20
Grocery	\$35	\$20	\$48	\$25
Total/Trip	\$150	\$79	\$335	\$167
Trips/Year	23	12	10	4
Estimated annual spending/angler	\$3,450	\$948	\$3,350	\$668

Respondents were asked if they took any chartered or guided fishing trips. Thirteen percent (13%) of respondents took an inshore charter or guide, 13% also reported taking an offshore charter, and 16% reported taking a headboat trip. The average spent on an inshore charter or guide was \$414, on an offshore charter was \$1,172, on a headboat trip was \$83. Over a quarter (26%) responded that they have pier fished and the average spent on a fishing pier fee was \$19.

Demographics: Inactive Respondents (N=116)

Demographic information was collected for each inactive respondent (Table 7). Fishermen interviewed were mostly white (88%) respondents who have fished, on average, for 22 years. Thirty-nine percent (39%) were college graduates, and most (75%) were married. Forty-three (43%) of the respondents reported household incomes over \$50,000/year, and 3% of those had incomes of \$100,000 or more (Figure 4).

Table 7. Demographic information of inactive respondents.

Demographics	Frequency	Percent
<u>Racial/Ethnic Background</u>		
White/Caucasian	102	88%
Hispanic/Latino	1	1%
African-American/Black	9	8%
Asian/Pacific-Islander	1	1%
Native American	1	1%
Prefer not to answer	2	2%
<u>Highest Education</u>		
Some Highschool	3	3%
High School/GED	23	20%
Some College	29	25%
Associates	13	11%
Bachelors	27	23%
Graduate/PhD.	6	5%
Preferred not to answer	15	13%
<u>Marital Status</u>		
Never Married	9	8%
Married	87	75%
Divorced	12	10%
Widowed	5	4%
Separated	1	1%
Prefer not to answer	2	2%
<u>Household Size</u>		
One	14	12%
Two	69	59%
Three	16	14%
Four	9	8%
Five	4	3%
Six	1	1%
Seven	1	1%
Prefer not to answer	2	2%

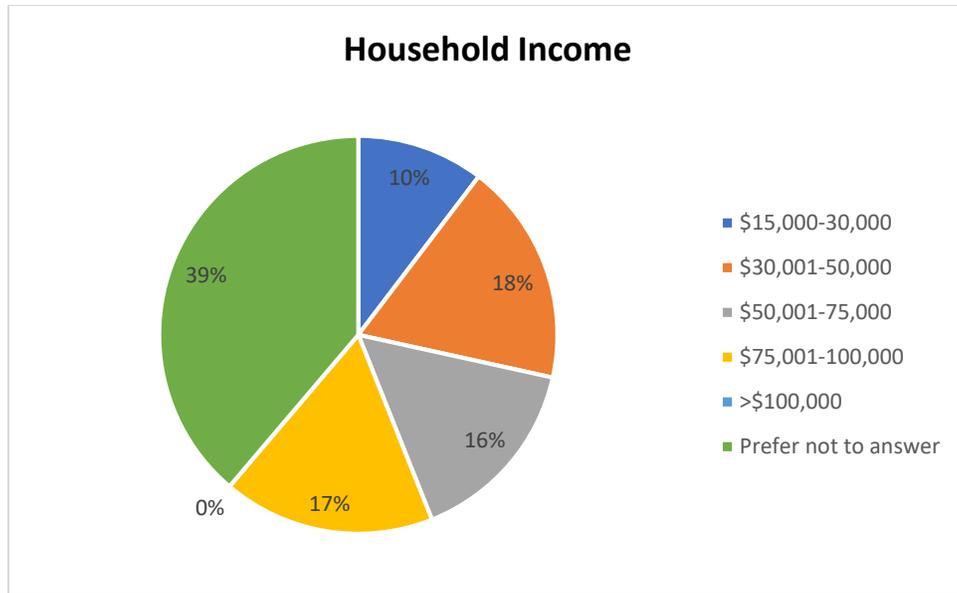


Figure 4. Household income of inactive respondents.

Targeted Species

Saltwater species regulated in the waters in and near North Carolina fit in two general categories, inshore (within state jurisdiction) and offshore (in federal ocean waters greater than three miles from the coast). The percentage of inshore and offshore species most commonly targeted by the respondents was calculated (Table 8). Fishermen were also asked about other saltwater fishing activities they participate in besides angling and their responses recorded (Table 9).

Table 8. Primary inshore and offshore species targeted by inactive respondents.

Inshore Species	% who target	Offshore Species	% who target
Flounder	7%	Tuna	1%
Spot	5%	Dolphin/Mahi	1%
Spotted sea trout/Speck	4%	Wahoo	1%
Striped Bass	4%	Other	1%
Croakers	4%	King mackerel	0%
Black Drum	4%	Red snapper	0%
Red drum	4%	Amberjack	0%
Bluefish	4%	Red porgy/pink snapper	0%
Weakfish/Grey Trout	3%	Gag/black grouper	0%
Sea mullet/whiting	3%	Grunts	0%
Sheepshead	3%	Vermillion snapper/beeliners	0%
Pompano	3%	Black sea bass	0%
Spanish Mackerel	3%	Triggerfish	0%
Other	3%	Marlin	0%
Cobia	2%	Sailfish	0%

Table 9. Non-angling activities of inactive respondents.

Activity	% who
None	9%
Cast net for bait	4%
Harvest crabs	3%
Cast net for shrimp	2%
Gig for flounder	2%
Other	2%
Harvest clams.	1%
Harvest oysters	0%
Dive/spearfish	0%

Perceptions

Respondents were asked a variety of questions designed to elicit their opinions on the issues that affect their saltwater fishing activities, particularly regarding the challenges fishermen face today. Every fisherman ranked a variety of different issues on a ten-point scale by "how important [he or she] considers each of these issues are to [his or her] fishing business" (Table 10). The presented order of the issues was randomly shuffled by the computer for each survey to prevent bias.

Table 10. Listed issues of concern of inactive respondents.

Rank	Issue
1	Keeping up with rules and regulations
2	Water quality and pollution
3	Weather
4	Bag limits/size limits
5	Finding enough time in my life to fish
6	Overfishing
7	Access issues
8	Fuel prices
9	Loss of fishing piers
10	Competition from other recreational fishermen/crowding
11	Competition from commercial fishermen

User Group Conflicts

The fishermen were also asked about conflicts with enforcement officers and with other user groups. The most common indicated conflict with other user groups was with recreational and other commercial fishermen (Figure 5).

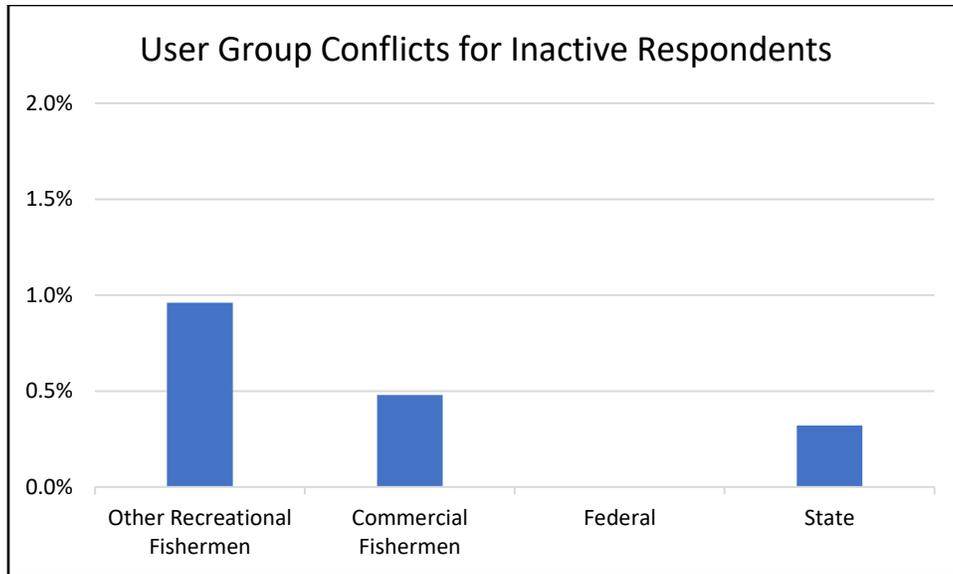


Figure 5. Percentage of inactive respondents reporting conflicts with enforcement officers or other user groups.

Fishing Vessels and Expenses

Of the inactive respondents 4% owned boats used for coastal angling. Vessel characteristics were collected for each boat including length and value (Table 11). Value also includes gear used on that boat. The mean boat length was 18 feet and the median boat length was 17 feet, with a minimum reported length of 10 feet and a maximum of 26 feet. The highest self-reported value was \$50,000.

Table 11. Average vessel characteristics of inactive respondents.

Vessel Characteristic	Average
Length (in feet)	18
Average Value	\$10,690

ECONOMIC IMPACT

The impact of saltwater fishing trips on North Carolina's economy for 2016 is shown in Table 12. The DMF collects data about recreational fishing in conjunction with the federal government's Marine Recreational Information Program (MRIP).² Multiplying the trip count estimates³ for various fishing modes from 2016 with the average estimated expenditures (see Table 6) for each of those modes, and the mean reported costs of charter and pier fees, the total expenditures are estimated at \$1,036,438,915 for 5,411,329 trips.⁴

These numbers are significantly higher than the most recent economic impact estimates from the National Marine Fisheries Service's published document, *The Fisheries Economics of the United States 2015* (NMFS 2017). That report estimated the total sales impact of trip related expenses in North Carolina at \$473,483,000 for 4,646,000 trips. In this report, we estimated a total sales impact of \$454,786,976 for 5,411,329 trips.

In 2015....

Lovell et al. (2013) estimated average expenditures at \$98.17 per trip.⁵ Expenditure estimates for the current study are at \$190.97 trip. Average trip expenditures and overall impact estimates likely differed due the significant time difference in periods which the two surveys were conducted.

An input-output model based on the direct effects which are those effects that represent the initial change in the industry, was generated using IMPLAN Version 3. The economic sectors most affected by trip expenditures in the recreational fishery are retail sport stores, hotels, charter services, retail food stores, and gas stations. These sectors create indirect effects, defined as changes in inter-industry transactions as supplying industries respond to increased demands from the directly affected industries. These sectors also create induced effects which reflect changes in local spending that result from income changes in the directly and indirectly affected industry sectors. Using these data, the total economic effects (output) from recreational angling in North Carolina are estimated at over \$800 million dollars (Table 12).

Table 12. Estimated economic impact of saltwater angling.

Impact Type	Output	Employment	Labor Income	Value Added
Direct Effect	\$454,786,976	4,845	\$172,472,288	\$229,371,800
Indirect Effect	\$161,546,704	1,062	\$53,496,412	\$91,927,090
Induced Effect	\$186,124,928	1,418	\$59,612,572	\$109,778,600
Total Effect	\$802,458,624	7,324	\$285,581,280	\$431,077,500

² The MRIP consists of two complementary surveys: 1) a telephone survey of households in coastal counties to get trip information and 2) an intercept survey of anglers at shore side access sites to obtain catch rates and species composition. The data from the two surveys are combined to provide estimates of the total number of fish caught, released, and harvested; the weight of the harvest; the total number of trips; and the number of people participating in marine recreational fishing.

³ See Table III.2 of the License and Statistics Annual Report (NCDMF 2017)

⁴ The following assumptions were made:

- 1) Charter trips were assigned the same travel expenditures (automotive fuel, lodging, and food) as offshore trips in addition to the charter fee & tips.
- 2) Pier trips were assigned the same travel and bait expenses as inshore man-made trips in addition to the pier fee.
- 3) Beach trips were assigned the same travel and bait expenses as man-made inshore trips.

⁵ Lovell et al. (2013) estimates adjusted for inflation

DISCUSSION

The combination of using an online survey with a telephone follow-up for non-respondents yielded positive results. The online option proved popular with many fishermen, and greatly lowered survey costs for the Division. Staff costs were hence minimal. This online/telephone format should be utilized future surveys when possible.

The estimated \$802 million economic impact attributed to recreational fishing trip expenditures is a significant contribution to the coastal economy, particularly during a time when other economic engines have declined. Expenditures and impact values determined in this survey are significantly higher those of federal surveys (Lovell et al. 2013), however, the most recent federal publications are several years behind. MRIP has conducted a new socioeconomic add-on survey in 2016; however, the data are still preliminary and being analyzed. Once that data collection is complete, the studies should be compared to one another for consistency.

The economic expenditure information was very strictly defined and based only on expenditures associated with individual fishing trips. The sale of durable goods, such as boats, tackle, and beach homes, were not included. Durable expenditures were estimated by Lovell et al. (2013) and found to total \$1.09 billion in North Carolina in 2014. Most durable expenditures have multiple uses beyond recreational angling which makes it more difficult to assess their actual impact. Additionally, durable goods such as boats are hard to estimate value on a per trip basis or even a yearly basis, as the usable lifespan of such goods varies greatly according to product quality and intensity of use. Further refinement of these data in North Carolina may be of importance for future studies assessing the total value of recreational saltwater fishing to the state.

ACKNOWLEDGEMENTS

I wish to thank all of the recreational fishermen who took the time to answer this long survey. Chris Wilson provided the original stratified sample from the WRC database.

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13: How many days per year do you go fishing **INSHORE**? _____

14: Including yourself, how many people are usually on those **INSHORE** trips? _____

OFFSHORE TRIPS (if none check here and go to Question 24)

Please provide your daily operating expenses for your typical **OFFSHORE** fishing trip, rounded to the nearest dollar. Offshore includes ocean waters greater than 3 miles from shore. Enter "0" if you had none.

Please do not leave Blanks.

15: **Ice** expense: \$ _ _ _ .00

16: **Bait** (live, dead, or artificial) expense: \$ _ _ _ .00

17: **Tackle** (lures, hooks, line, weights, etc.) expense: \$ _ _ _ .00

18: **Boat Fuel & Oil** expense: \$ _ _ _ .00

19: **Truck/Car Fuel** expense: \$ _ _ _ .00

20: **Grocery** expense: \$ _ _ _ .00

21: What is your primary target species when fishing **OFFSHORE**? _____

22: How many days per year do you go fishing **OFFSHORE**? _____

23: Including yourself, how many people are usually on those **OFFSHORE** trips? _____

24: What forms of Recreational Coastal Fishing activities do you participate in along and off the North Carolina coast. (circle those that apply and/or list any other)

Harvest crabs

Harvest clams

Harvest oysters

Cast net for shrimp

Cast net for bait

Gig for flounder

Dive/Spearfish

Fishing Vessel and For-Hire Information

25: Do you own a boat primarily used for recreational fishing?

- Yes **—————>** Length _____ feet
- No

26: If you answered yes to Q:25, please estimate the market value of your vessel (with all gear).

\$ _ _ , _ _ _ , _ _ _ .00

27: Did you take a for-hire fishing trip in NC last year? (check which apply)

- None
- Inshore Charter or Guide **—————>** average fee \$ _ _ _ _ .00
- Offshore Charter **—————>** average fee \$ _ _ _ _ .00
- Headboat **—————>** average fee \$ _ _ _ _ .00

28: Did you fish from an ocean pier in NC last year?

- Yes **—————>** average fee \$ _ _ _ _ .00
- No

Angler Information

29: What would you consider your ethnic background?

- White/Caucasian Hispanic/Latino African-American/Black
- Asian/Pacific-Islander Native American Other _____

30: What is the highest level of education you have completed?

- Some High School High School/GED Some College
- Associates Bachelors Graduate/ PhD.

31: What is your marital status?

- Never Married Married Divorced Widowed Separated

32: How many people live in your household? _____

33: What is the total income of everyone who lives in your household?

- <\$15,000 \$15,000 to \$30,000 \$30,001 to \$50,000 \$50,001 to \$75,000
- \$75,001 to \$100,000 >\$100,000 Prefer not to answer

34. Do you belong to any saltwater fishing organizations, if yes please list them.

Fisheries Management Issues

35: In the last year have you had any negative experiences with: (check those that apply)

- Other recreational fishermen?
- Commercial fishermen?
- Federal Officers (Coast Guard or NOAA Enforcement)?
- State officers (Marine Patrol or Wildlife Enforcement)?

36: Using a scale of 1 to 10, how important do you consider each of these issues to fishing in coastal waters overall and to you personally? (1) meaning “it’s not important or doesn’t affect me” and (10) meaning “it’s extremely important or it affects me a great deal.”

- Keeping up with rules and regulations _____
- Finding enough time in my life to fish _____
- Weather _____
- Water quality/pollution _____
- Bag limits/size limits _____
- Competition from other recreational fishermen/crowding _____
- Competition from commercial fishermen _____
- Overfishing _____
- Fuel prices _____
- Loss of fishing piers _____
- Access issues (lack of boat ramps, parking at the beach, etc.) _____
- Other _____

**Please add any additional comments you have on the structure or substance of this survey.
Thank you for your participation!**