

North Carolina Saltwater Angler Education Needs and Information Delivery Preferences: Results of a 2017 Statewide Mail Survey



UNC-SG-18-14

December 21, 2018

M. Scott Baker, Jr.
North Carolina Sea Grant
University of North Carolina Wilmington Center for Marine Science
5600 Marvin Moss Lane, Wilmington, NC, 28409, United States
Telephone: +1 910-962-2492; Fax: +1 910-962-2410, E-mail: msbaker@ncsu.edu

Sara E. Mirabilio
North Carolina Sea Grant
P.O. Box 699, Manteo, NC, 27954, United States
Telephone: +1 252-475-5488, Fax: +1 252-475-3545, E-mail: semirabi@ncsu.edu



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Executive Summary

North Carolina has a long tradition of saltwater angling — and it is a popular sport. In 2016, the N.C. Division of Marine Fisheries (NCDMF) issued more than 780,000 licenses to North Carolina residents for saltwater angling. That is roughly 1 out of 13 people in the state. One of our duties as fisheries specialists with North Carolina Sea Grant is to share relevant scientific discoveries with individuals who work, play and live along the coast — including anglers. We also listen to ideas from all fishermen and share their observations and thoughts with the research and management community.

In 2017, we conducted a statewide, stratified-random mail survey of the North Carolina resident Coastal Recreational Fishing License (CRFL) population to better understand angler education needs and information delivery preferences. Using a modified version of Dillman’s Tailored Design Survey Method, we requested feedback from 1,000 anglers on the topics of boating and angling practices, conservation and habitat enhancement, and fisheries science and management. In addition, we asked when, where and how anglers would like to receive educational information about fishing-related subjects. To better understand angler motivation to complete such surveys, half of survey recipients received an upfront, token, non-cash incentive.

We contacted 1,000 anglers and received 275 completed surveys from 861 valid addresses. Completed surveys represented 221 zip codes, 81 North Carolina counties, and four CRFL categories (10-day CRFL, n=14; Annual CRFL, n=109; Grandfathered Lifetime CRFL, n=52; Lifetime CRFL, n=100). The Grandfathered Lifetime CRFL was issued in 2007 prior to the implementation of other categories of CRFL (10-day, Annual and Lifetime). Additional analyses were conducted to document how our survey respondents were similar to, or different from, other anglers selected based on age, location and license type. Given the population size of North Carolina resident CRFL holders, the results of this survey are accurate at the 95% confidence level plus or minus 6 percentage points. The experimental incentive increased the response as expected relative to control (+10%), but the incentive purchase and associated additional mailing costs make it impractical for regular use.

We received great feedback on 22 topics across the broad topical areas of boating and angling practices, conservation and habitat enhancement, and fisheries science and management. Anglers were asked to rate each topic from “Of No Use” or “1” to “Very Useful” or “5,” which allowed for statistical ranking of individual topics and combined topical areas. Respondents scored interest in learning about Fisheries Science and Management significantly lower than both the Boating and Angling Practices or Conservation and Habitat Enhancement topical areas.

Respondents weighed in on three specific educational projects; this will help North Carolina Sea Grant consider how to refine these efforts for broader appeal.

Based on angler preferences, the most effective mode of education and information delivery appears to be a combination of online and in-person activities. Respondents also provided thoughts on generic education events at which Sea Grant could have a presence at (E.g., boat and tackle shows, fishing magazines, web sites, etc.), as well as offered suggestions on 37 different partner opportunities.

As a science-based, nonadvocacy, nonregulatory university-based program, North Carolina Sea Grant has low name recognition with saltwater anglers. This was not unexpected but further suggests that we consider strong partnerships to assist with the development and delivery of educational programs for anglers. The response to this survey clearly suggests that anglers are interested in educational programming opportunities related to saltwater fishing.

Quick Facts

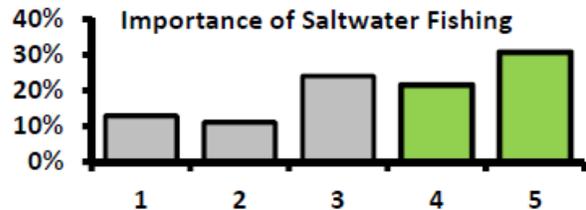
From the 2017 Mail Survey of N.C. Saltwater Angler Information Preferences

About The Survey

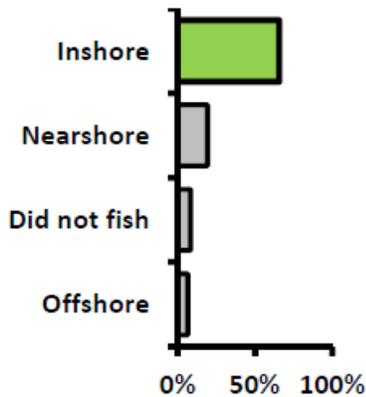
- Purpose: to understand N.C. angler education needs.
- Sample size: mailed to 1,000 anglers; 275 anglers completed surveys.
- Results: accurate at the 95% confidence level \pm 6%.

About Anglers

52% of anglers ranked the importance of saltwater fishing in their life as a 4 or 5.



Where They Fish



How They Fish

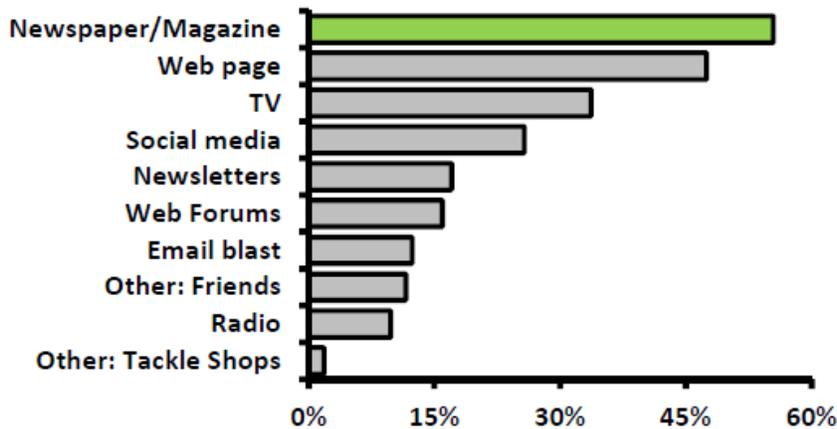


Who They Are

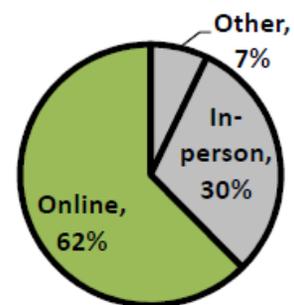
- Ages represented: 19-65+
- Hailing from 81 N.C. counties and 221 zip codes
- Years spent fishing in N.C.: 26% < 11 years; 43% > 30 years
- Days fished last 12 months: 57% < 11 days; 8% > 40 days
- 47% own a fishing boat(s)

Angler Information Sources and Methods

The ranking of how anglers find or receive non-regulatory fishing and other marine-related information (a "select all" question)



The *one preferred* method of receiving fisheries education / training if anglers had to choose



Quick Facts

From the 2017 Mail Survey of N.C. Saltwater Angler Information Preferences

What We Learned

- Anglers have broad educational interests and appreciated the opportunity to voice their opinions.
- The survey results inspired the creation of *Hook, Line & Science* – a new blog. Visit: HookLineScience.com.

Topics Anglers Find Useful

Topics rated for usefulness in rank order. Topics with a ✓ had higher scores.

1. FISHERIES SCIENCE & MANAGEMENT

- ✓ Protected Species Management
- ✓ Status of North Carolina Fish Stocks
- ✓ Law Enforcement: Who does what?
- ✓ Updates on Saltwater Fisheries Research
- ✓ Seafood Sustainability and Eco-labels

Fisheries Science Basics

N.C. Fisheries Management Overview

Advanced Topics in Fisheries Science

Advanced Topics in Fishery Management

Federal Fisheries Management Overview

N.C. Commercial Fishing Gear and Methods

2. BOATING & ANGLING PRACTICES

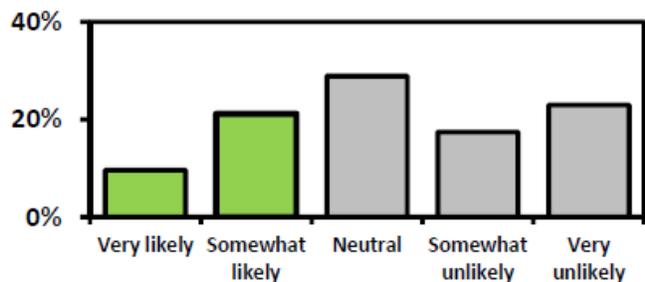
- ✓ Marine Weather
- ✓ Boater Safety
- ✓ Safe Seafood Handling and Consumption
- ✓ Release Techniques to Reduce Fish Mortality
- Basic Guide for the "Beginning Angler"
- Boat Fuel Economy

3. CONSERVATION & HABITAT ENHANCEMENT

- ✓ Reserves, Protected Areas and Sanctuaries
- ✓ Invasive Species Control and Management
- ✓ Overview of N.C. Artificial Reefs
- ✓ Climate Impacts on Fisheries / Habitat
- ✓ Aquaculture for Stock Enhancement

Potential For In-Depth Learning

- 31% of anglers we surveyed were very likely or somewhat likely to consider participating in a free, in-depth, multi-day workshop to learn about the basics of fisheries science and N.C. management.



Angler Outreach Suggestions



37 Number of unique events or partnership ideas for N.C. Sea Grant to pursue



Anglers ranked boat & tackle shows first as venues for outreach.

Thank you, N.C. saltwater anglers!

For more info on this project: msbaker@ncsu.edu



Introduction

North Carolina has a long tradition of saltwater angling — and it is a popular sport. In 2016, 1.9 million anglers, resident and non-resident combined, were licensed to saltwater fish in North Carolina. That year, North Carolina led all other states along the East Coast of the United States in terms of saltwater angler participation (Pers. comm. from the National Marine Fisheries Service (NMFS), Fisheries Statistics Division (FSD), September 6, 2018). Further, these 1.9 million North Carolina saltwater anglers in 2016 spent an estimated \$1.8 billion on expenditures (sales) related to fishing, which generated 15,609 jobs, \$621,019 in income impacts, and \$1.6 billion output impacts (NCDMF 2017). In a national ranking of 22 states by saltwater angler expenditures, North Carolina ranked seventh, trailing only Florida and New Jersey on the East Coast of the United States (Lovell et al. 2016). Clearly, saltwater fishing is important to North Carolina.

In 2016, the N.C. Division of Marine Fisheries (NCDMF) issued more than 780,000 licenses to North Carolina residents for saltwater angling (NCDMF 2017). That is roughly 1 out of 13 people in the state. To our knowledge, no recent efforts have been undertaken to better understand education needs of this vast – and growing - user group of North Carolina’s marine fisheries. In the late 1980’s, Perdue and Betz (1991) conducted an extensive survey with North Carolina saltwater anglers to document information-seeking behavior, fishing knowledge and diffusion of fishing innovations among other fishermen. In 2013, NMFS conducted a first-ever national survey of saltwater anglers’ opinions and attitudes (Brinson and Wallmo 2013). That study provided insights into anglers’ motivations, characteristics of successful trips, and preferred management objectives but did not ask for opinions about educational topics related to fishing or the preferred information delivery mechanisms for such information.

North Carolina Sea Grant sought to better understand the needs and wants of anglers who reside in North Carolina and use our state’s estuarine and ocean waters. Better informed anglers may behave more conservation-minded, act as more responsible stewards of fisheries resources and share similar information with fellow anglers. Our long-term objective is to develop future educational content and programs based in part to the responses collected from this survey.

Methods

Survey Design

In 2017, we conducted a statewide, stratified-random mail survey of the North Carolina resident license frame to better understand saltwater angler education needs and information delivery preferences. Prior to implementing the survey, we obtained Internal Review Board (IRB) approval of the survey instrument and proposed delivery methods from the University of North Carolina Wilmington (UNCW) Sponsored Programs and Research Center Offices. We worked with the NCDMF Licensing and Statistics Section to randomly select 1,000 licensed anglers from the state's four (CRFL) categories: 10-day CRFL, Annual CRFL, Grandfathered Lifetime CRFL, and Lifetime CRFL. At no point did we have access to the confidential information associated with the CRFL database including those license holders selected for the survey. Of this total of 780,000 CRFL holders, we excluded license holders under 18 and over 85 years of age in accordance with our IRB protocols and standard NCDMF survey methods. The NCDMF staff used a computer program to draw the random sample of 1,000 license holders from the remaining CRFL population of 645,742 persons. The number of surveys selected per license type was proportional to the actual number of licenses present in the population (Table 1).

Table 1. Number of North Carolina resident Coastal Resident Fishing License (CRFL) holders in 2016 in both the population and survey sample. People under age 18 and over age 85 were excluded.

License Type	Population	Percent	Sample	Percent
10-Day CRFL	33,293	5.2	56	5.6
Annual CRFL	322,440	49.9	481	48.1
Grandfathered Lifetime CRFL	140,558	21.8	217	21.7
Lifetime CRFL	149,451	23.1	246	24.6
Total	645,742	100	1,000	100

Survey Distribution

Design and delivery of the survey followed a modified version of the Tailored Design Survey Method (Dillman et al. 2014). The voluntary survey was composed of questions related to the topics of boating and angling practices, conservation and habitat enhancement, and fisheries science and management. In addition, we asked when, where and how anglers would like to receive educational and non-regulatory information about fishing-related subjects. We

attempted to contact each respondent up to five times via the U.S. Postal Service. First, each respondent received a personally signed warm-up letter that described the purpose of the study and served as notice for the forthcoming survey. Approximately one week later, respondents received a survey packet (Appendix A), and then a few days after that, a reminder/thank-you postcard (depending on whether they had completed the survey or not). A pre-addressed envelope affixed with a first-class stamp was provided in each survey packet. Approximately three weeks after the first survey packet was mailed, a replacement survey packet was mailed to non-respondents, followed again by a final reminder/thank-you postcard, correspondingly, a few days later.

In order to determine whether a token incentive might increase survey response rates, half of all survey recipients, by license type, received a package of Berkeley Gulp!® bait delivered with their survey (Figure 1). These anglers also were notified in the warm-up letter that they would be receiving an unspecified token incentive with their survey package. The incentive only was provided in the original survey packet (not the replacement).



Figure 1. Picture of the actual Berkley Gulp!® saltwater bait product used as incentive in one-half of survey mailings.

Responses were recorded as they were received in an attempt to exclude respondents from further mailings. Completed surveys were deemed usable for analyses if respondents attempted to complete most questions. Incomplete survey returns, deceased license holders, and those responding as not being a saltwater angler were not included in the completed survey tally. Microsoft Excel served as the software for data input, but data was analyzed using standard survey statistical analyses described below. No attempt was made to analyze

responses by license type, only responses in total. The number of completed surveys relative to the sample of drawn CRFL holders with valid addresses was used to calculate a margin of error for survey responses at the industry standard 95% confidence level. Chi-square (χ^2) tests of independence were used to compare the number of respondents with respect to location, license type and age to that of the total population of drawn CRFL holders. The five-point Likert criteria selections used in this survey were converted to numbers, with “Most Useful” receiving the highest score of “5” and “Of No Use” receiving the lowest score of “1.” This transformation allowed for statistical means testing using Analysis of Variance (ANOVA) and Tukey-Kramer ranking (SAS, vers. 9.4, SAS Inst., Inc., Cary, NC). Open-ended responses were summarized when possible to better understand trends.

Results and Discussion

Overall Response

A total of 1,000 surveys were mailed of which 139 (13.9%) were undeliverable (as classified by the U.S. Postal Service) (Table 2). A total of 315 responses were received from the surveys sent to valid addresses (n=861). These included usable, completed surveys (n=275), responses from family indicating license holders were deceased (n=19), and phone or email contacts from survey recipients but no incomplete surveys (n=21). It is important to note that not all surveys deemed complete for our analyses (n=275) had responses to all questions. In those instances, the number of responses will be provided for reference.

Table 2. Number of mailings, undeliverable, deceased, responses and useable surveys by license type.

License Type	Mailings	Undeliverable	Deceased	Response*	Useable Surveys
10-Day CRFL	56	3	0	14	14
Annual CRFL	481	76	2	117	109
Grandfathered Lifetime CRFL	217	35	6	67	52
Lifetime CRFL	246	25	11	117	100
Total	1,000	139	19	315	275

*Includes any contact with research team initiated by survey recipient.

While the rate of undeliverable mail and deceased CRFL holders seem high, they are similar to the 15% undeliverable rate and the 2.8% deceased rate observed with a recent, large-scale

(50,000) survey led by NCDMF of the Grandfathered Lifetime CRFL holders (Pers. comm. from NCDMF, January 20, 2017). Our total response rate was 36.6% (315/861), and our rate of completed surveys returned was 31.9% (275/861). Given the population size of 645,742 CRFL holders and the 275 completed surveys, the results of this survey are accurate at the 95% confidence level plus or minus 6 percentage points.

We had anticipated a completed survey response rate of between 15-30% based on the results of a 2012 Sea Grant-led mail survey with federal commercial fishing license holders in the South Atlantic region (Baker and Von Harten 2013). Compared to the 2013 study, this study incorporated more contacts per person, a warm-up letter, and an incentive for one-half of recipients.

Survey Sample vs. Population of License Holders

Three comparative tests based on angler location, license type and age were used to compare the demographics of those who completed surveys to those that received surveys. First, all surveyed CRFL holders were identified by county of residence with the 20 North Carolina coastal counties considered as one location (coast) and all other counties (n=80) considered as a second location (inland). A Chi-square test of independence revealed that anglers from both locations responded at rates that were not significantly different from all anglers receiving surveys ($\chi^2 = 0.04$, d.f. = 1, $P = 0.836$). Actual locations of survey recipients and survey respondents based on zip code can be seen in Figure 2.

Second, all surveyed CRFL holders were identified by their license type. A Chi-square test of independence revealed that anglers by license type responded at rates that were significantly different from the proportions of anglers by license type that received surveys ($\chi^2 = 16.37$, d.f. = 3, $P = 0.0009$) (Figure 3). Specifically, those with an Annual CRFL reported at lower rates than expected; those with a Grandfathered Lifetime CRFL reported at rates higher than expected.

Finally, all license holders were sorted by their age bin (19-34, 35-50, 51-64, and ≥ 65 years). A Chi-square test of independence revealed that anglers by age bin responded at rates that were significantly different from the proportions of anglers by age bin that received surveys ($\chi^2 = 43.232$, d.f. = 3, $P < 0.0001$) (Figure 4). This difference was driven by the significantly lower response rate of anglers aged 19-34 years old relative to responses from all other age bins.

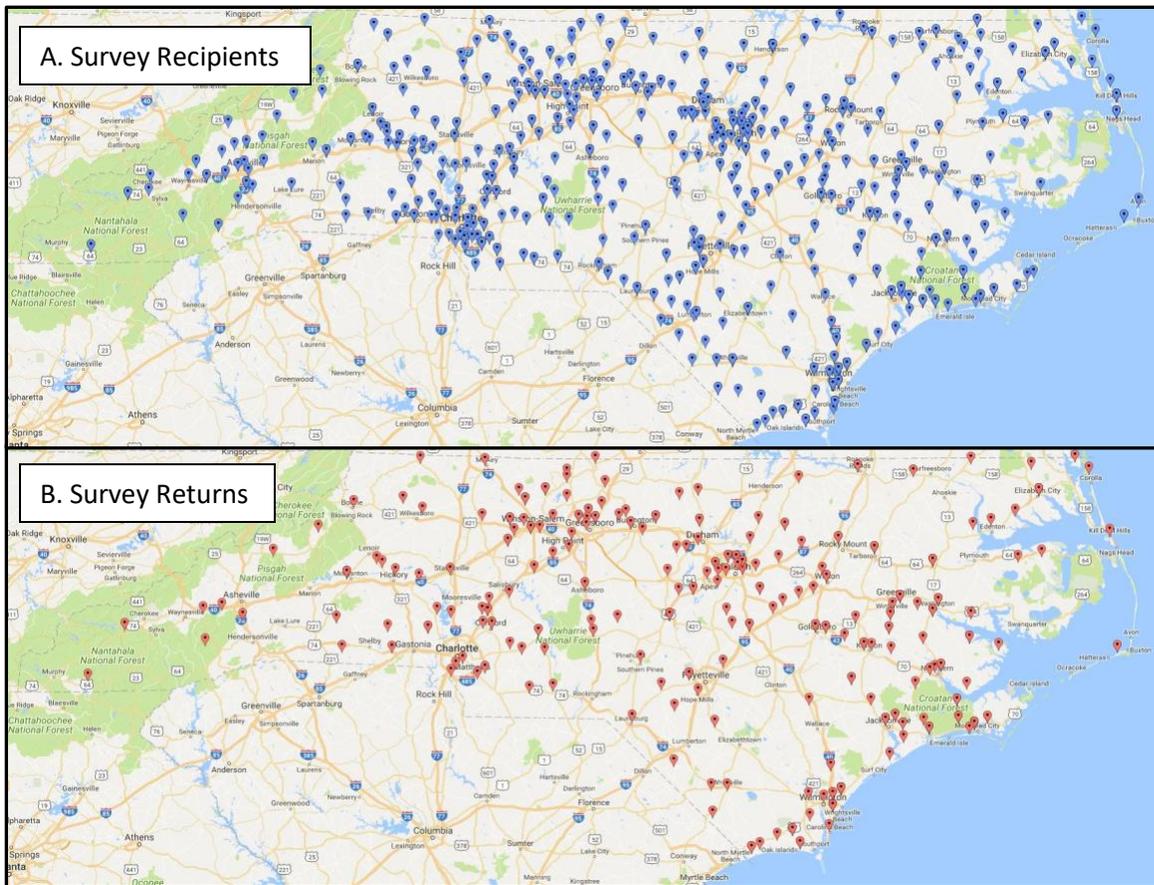


Figure 2. Locations of zip codes associated with each survey recipient (A) and completed survey return (B). Each marker may represent multiple recipients.

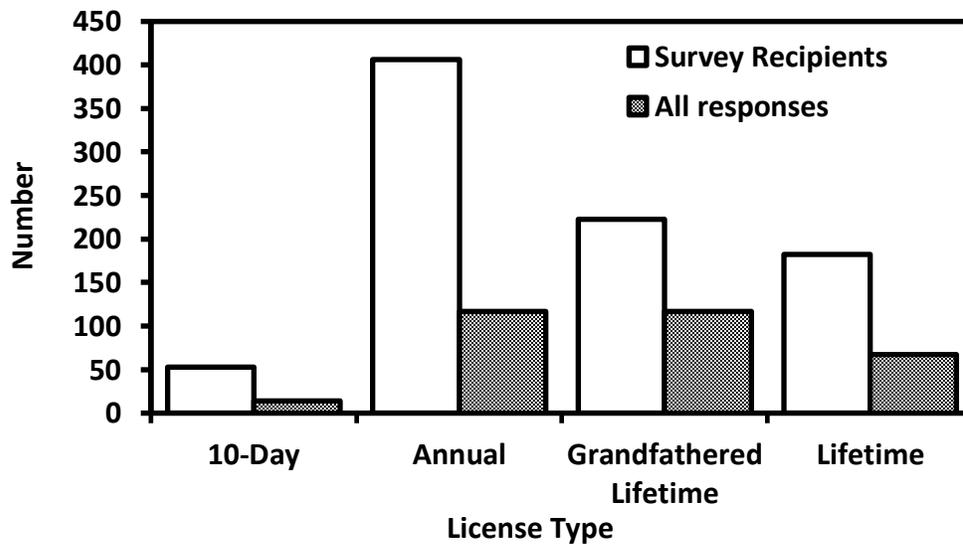


Figure 3. Number of all survey responses received by CRFL type compared to number of CRFL holders by type that received surveys.

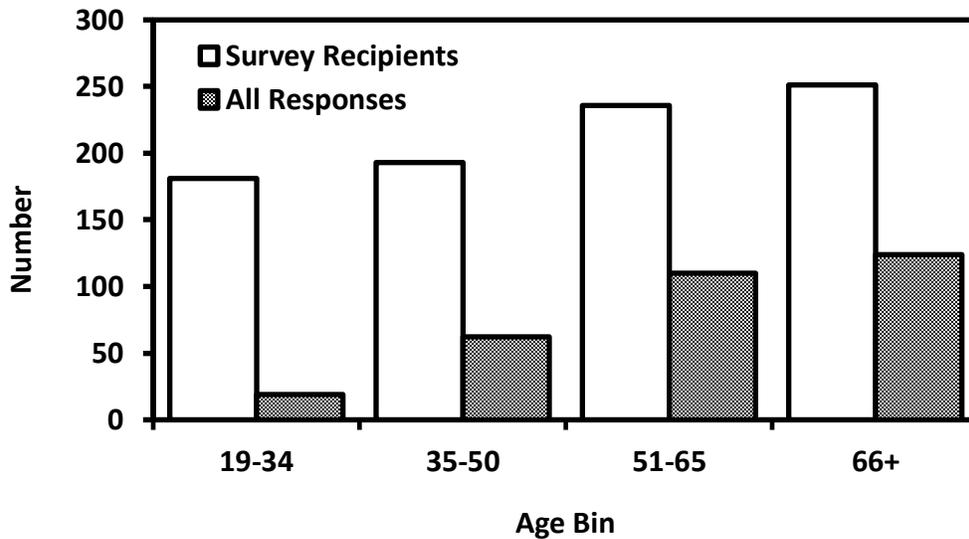


Figure 4. Number of all survey responses, by age bin, compared to number of CRFL holders that received surveys. License holders less than 18 and greater than 85 years of age were not surveyed.

The increase in response by older anglers is likely an artifact of the mail survey format. This is a response observed in similar studies (Dillman et al. 2014). We speculate that the Grandfathered Lifetime and Lifetime CRFL holders responded at higher rates than expected, because these individuals are more invested in fishing, holding a longer-term and (generally) more expensive license type. By having a better understanding of the survey responses by location, license type and age, we can further speculate how these differences may have affected our results.

Effect of the Incentive on Survey Response

Excluding for undeliverable addresses, a total of 436 surveys with incentives and 428 surveys without incentives (control) were delivered to CRFL holders (Table 3). The overall response rate, controlling for sample size within each license type, was 41% for surveys with incentives and 31% for control surveys. In all but the 10-Day CRFL category, incentive-based response rates bested control rates. The 9% increase in response is similar to that predicted (8%) for mail surveys that incorporate a token incentive, according to meta-analysis of survey literature (Singer and Ye 2013). We anticipated that a token incentive specific to fishing would have created a higher response. Our preference was to utilize a \$2 cash incentive, because this method typically yields a 19% higher response than control and does not have increased mailing costs for survey delivery (Church 1983). However, university protocol prohibited the use of cash incentive. Given the cost of the artificial bait incentive (even at discount, as obtained

Table 3. Number of valid addresses, responses and response rates by CRFL type.

License Type	Valid Addresses		Responses*		Response Rate	
	Incentive	Control	Incentive	Control	Incentive	Control
10-Day CRFL	26	27	5	9	0.19	0.33
Annual CRFL	205	200	74	43	0.36	0.22
Grandfathered Lifetime CRFL	91	91	38	29	0.42	0.32
Lifetime CRFL	113	108	62	55	0.55	0.51
Total	435	426	179	136	0.41	0.32

*Includes any contact with research team initiated by survey recipient.

through this study) and the increased delivery cost of a bulky item, future mail surveys with CRFL holders should simply increase the number of mailed control surveys to obtain the desired response rate.

Characteristics of Anglers Surveyed

We received 275 responses representing 221 five-digit U.S. postal zip codes and 81 of North Carolina’s 100 counties, as visualized in a word cloud (Figure 5). Wake County had the highest number of survey recipients (n=78) and respondents (n=17) of any county. Anglers aged 65 or older and 51-65 years old comprised the largest percentage of responses at 39.4 % and 34.9%, respectively. Anglers aged 19-34 years comprised only 6% of all responses. When anglers were asked to rank saltwater fishing in personal importance from 1 to 5, with “5” being of highest importance, 52% of respondents scored the question a “4” (21%) or “5” (31%) (Figure 6). Only 24% of anglers scored the question a “2” (11%) or “1” (13%). The mean score was 3.5 ± 1.5 (n=275). Based on the response to this question alone, we consider that CRFL holders seem open to participating in educational programming opportunities. When asked how long they (CRFL holder) had been saltwater angling in North Carolina (specifically), 26% of respondents indicated ten years or less with 27% indicating greater than 40 years (Figure 7). The high percentage of years fished is not surprising considering the over-response by older anglers in the survey and the fact that fishing is of moderate to high importance for most CRFL holders surveyed.

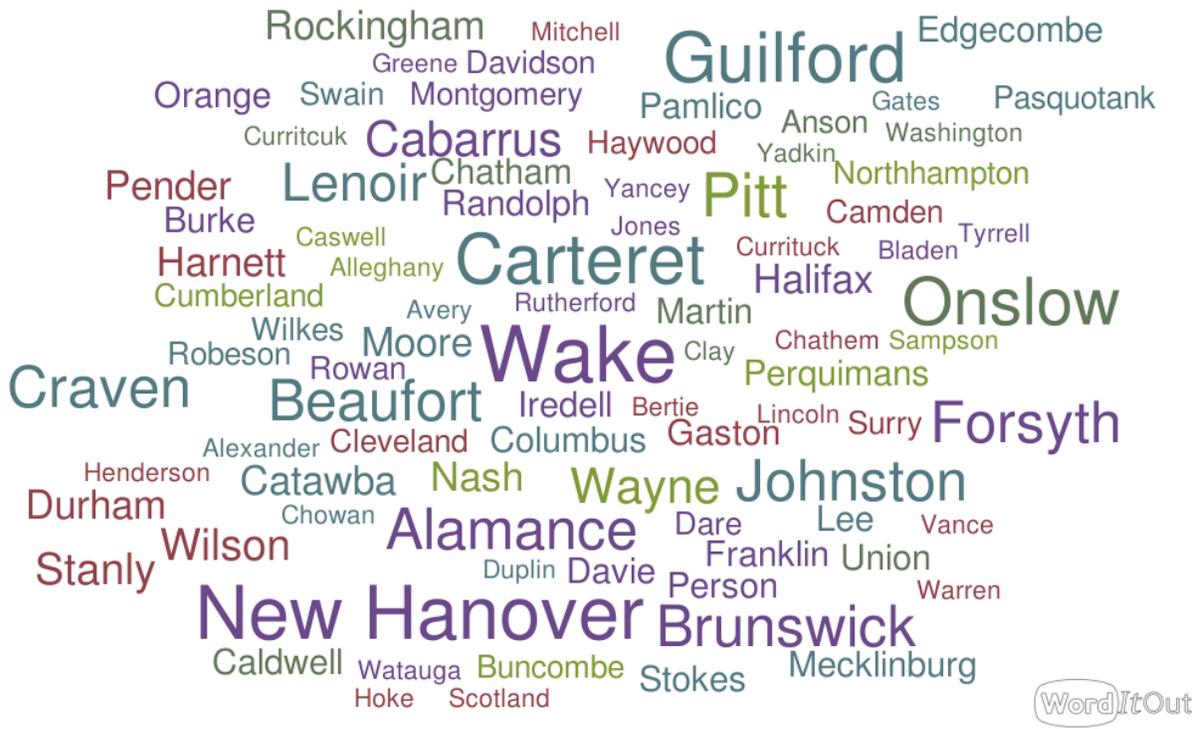


Figure 5. Word cloud depicting the North Carolina counties from which survey returns came. The larger the font, the greater the number of surveys received from that location.

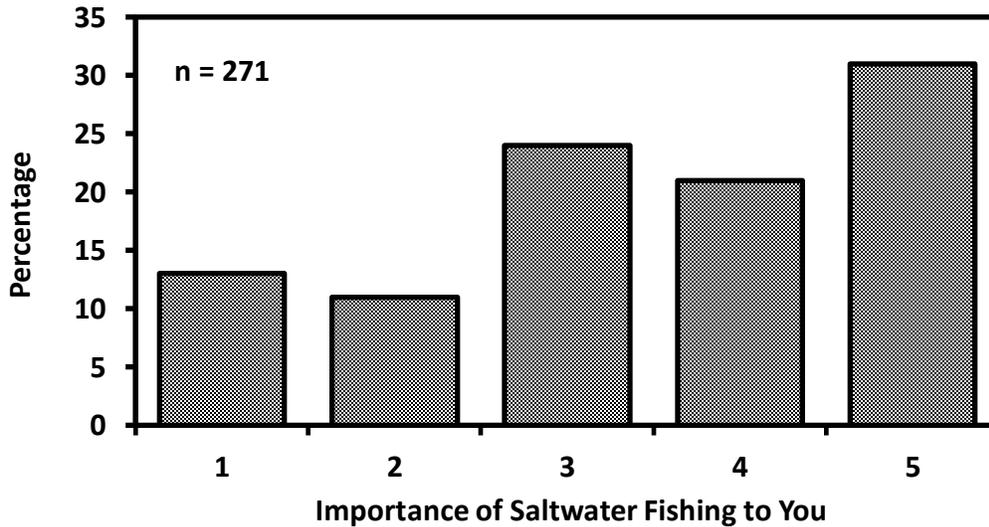


Figure 6. Ranking of importance of saltwater fishing in their life by respondents with “1” indicating lowest Importance versus “5” indicating highest importance.

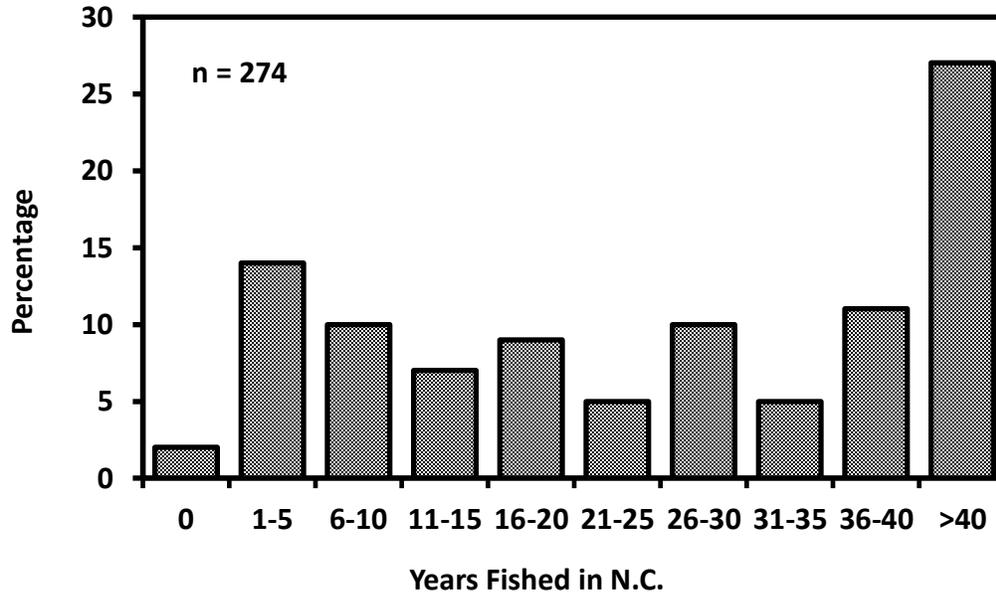


Figure 7. Number of years spent fishing in North Carolina as reported by survey respondents.

When asked about the general locations of where fishing primarily occurred during the 12-month period preceding the survey, 66% of respondents fished inshore (not beyond the inlets), 19% fished nearshore (inlets out to three miles), 7% fished offshore and 8% did not fish during this period (Figure 8). These findings are similar to effort data reported through the NMFS Marine Recreational Information Program (MRIP).

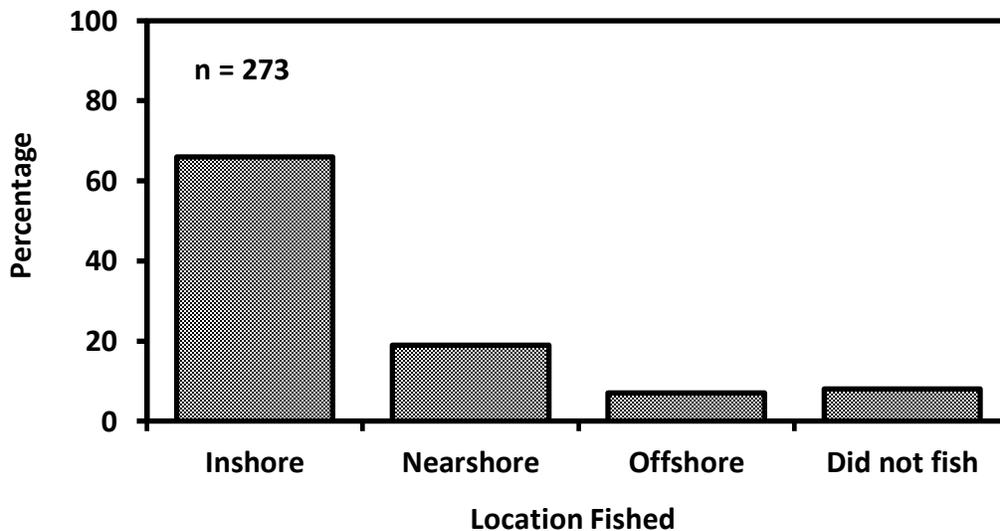


Figure 8. Primary location fished by survey respondents during the previous 12 months.

During the preceding 12-month period to the survey, respondents indicated that most of their fishing trips were from shore (48%), followed closely by private boat (39%) (Figure 9). Only 4% of respondents fished primarily with for-hire guides (charters) and 9% did not fish at all. During the same time period (2016), NMFS MRIP estimated that 76% of 21.1 million trips in North Carolina occurred from shore and 23 percent of trips involved rental or private boats (Pers. comm. from NMFS, FSD, September 6, 2018). Approximately one-half (47%) of the 251 CRFL holders responding to the question indicated that they owned one or more fishing boats at the time of this survey. Response to this question supports the finding of the previous question (primary mode of fishing) and suggests educational programming relating to boating may be of first interest to CRFL holders and an initial target for extension activities.



Figure 9. Primary mode fished by survey respondents during the previous 12 months.

Interests and Opinions of Respondents

Respondents were asked to rate the usefulness of 22 topics across the categories of Boating and Angling Practices (n=6), Conservation and Habitat Enhancement (n=5), and Fisheries Science and Management (n=11). Note that full titles of topics, along with specific examples of each, can be found in the actual survey instrument (Appendix A).

Under the section entitled Boating and Angling Practices, mean scores of the six topics ranged from a high of 4.2 (Marine Weather or MarWea) to a low of 3.4 (Boat Fuel Economy or FuelEco) (Figure 10). Rating scores increased with usefulness from 1 (Of No Use) to 5 (Very Useful). Two distinct groupings emerged when mean scores were compared statistically (One-way ANOVA,

$F_{5,1550} = 11.28, P < 0.0001$, Tukey-Kramer, $P > 0.5$). The topics of Marine Weather (MarWea), Boater Safety (BoaSaf), Safe Seafood Handling and Consumption (SafSea), and Release Techniques to Reduce Fish Mortality (ReaTec) were in the highest scoring group (A). A second, and significantly lower scoring group (B), was comprised of Basic Guide for the Beginning Angler (BegAng) and Boat Fuel Economy (FueEco). For this analysis, we can say that topics in the “A” grouping scored statistically higher than those in the “B” grouping. We anticipated that Boat Fuel Economy (FueEco) would score higher than we observed, but in light of the responses related to boat ownership, primary mode fished, and primary location fished, the low ranking is understandable. The Basic Guide for the Beginning Angler (BegAng) topic likely scored low due to the fact that 55% of the respondents held Lifetime or Grandfathered Lifetime CRFLs, and therefore, were not beginning anglers.

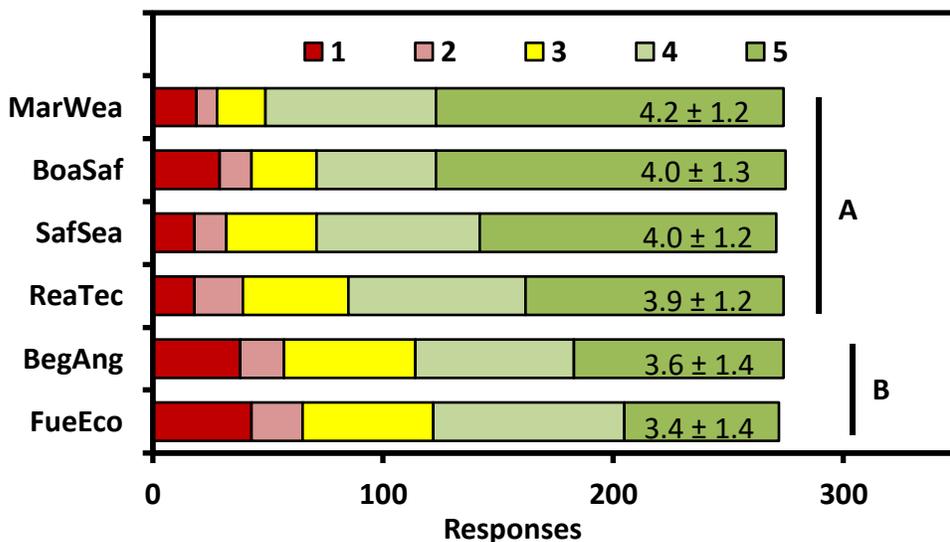


Figure 10. Rank by survey respondents regarding usefulness of each potential education topic within the Boating and Angling Practices section. Rating scores increased with usefulness, ranging from 1 (Of No Use) to 5 (Very Useful). Means scores for each topic are shown. Topics that are associated with the same letter have mean scores that are not significantly different from each other.

Under the section entitled Conservation and Habitat Enhancement, mean scores of the five topics ranged from a high of 4.0 (Marine Reserves, Protected Areas and Sanctuaries or MPAs) to a low of 3.7 (Aquaculture for Stock Enhancement or AquSto) (Figure 11). When scores from all five topics were compared statistically, no significant differences were observed (One-way ANOVA, $F_{4,1364} = 2.77, P = 0.0259$, Tukey-Kramer, $P > 0.5$). For this section, we can say that respondents did not score any one topic or topics of more interest over another.

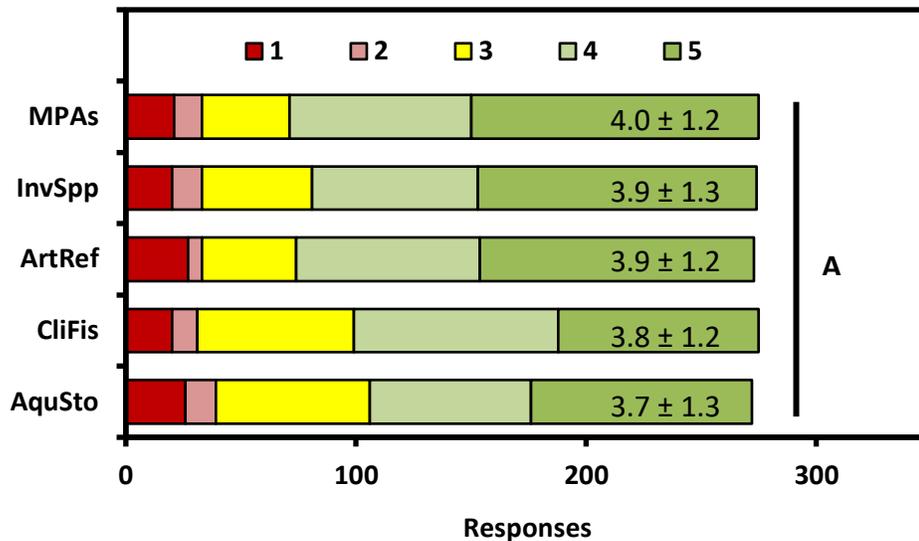


Figure 11. Rank by survey respondents regarding usefulness of each potential education topic within the Conservation and Habitat Enhancement section. Rating scores increased with usefulness, ranging from 1 (Of No Use) to 5 (Very Useful). Means scores for each topic are shown. Topics that are associated with the same letter have mean scores that are not significantly different from each other.

Eleven topics were put forth to surveyed CRFL holders under the section entitled Fisheries Science and Management. Mean scores ranged from a high of 4.0 (Protected Species Management or ProSpe) to a low of 3.3 (North Carolina Commercial Fishing Gear and Methods or ComFis) (Figure 12). An ANOVA revealed that the topics could be segmented into four distinct groups (A-D), with overlap among all but the highest scoring group “A” and the lowest scoring group “D” (One-way ANOVA, $F_{10, 2987} = 10.98$, $P < 0.0001$, Tukey-Kramer, $P > 0.5$). Groups A and D contained all 11 topics. Group A was comprised of Protected Species Management (ProSpe), Status of North Carolina Fish Stocks (NCStoc), Maritime Law Enforcement: Who does what? (LawEnf), Updates on Saltwater Fisheries Research (FisRes), and Seafood Sustainability and Eco-labels (EcoLa). Group D was comprised of Fisheries Science Basics (FSBas), North Carolina Fisheries Management Overview (FMOver), Advanced Topics in Fisheries Science (AdvTop), Advanced Topics in Fishery Management (AdvMgt), Federal Fisheries Management Overview (FedMgt), and North Carolina Commercial Fishing Gear and Methods (ComFis).

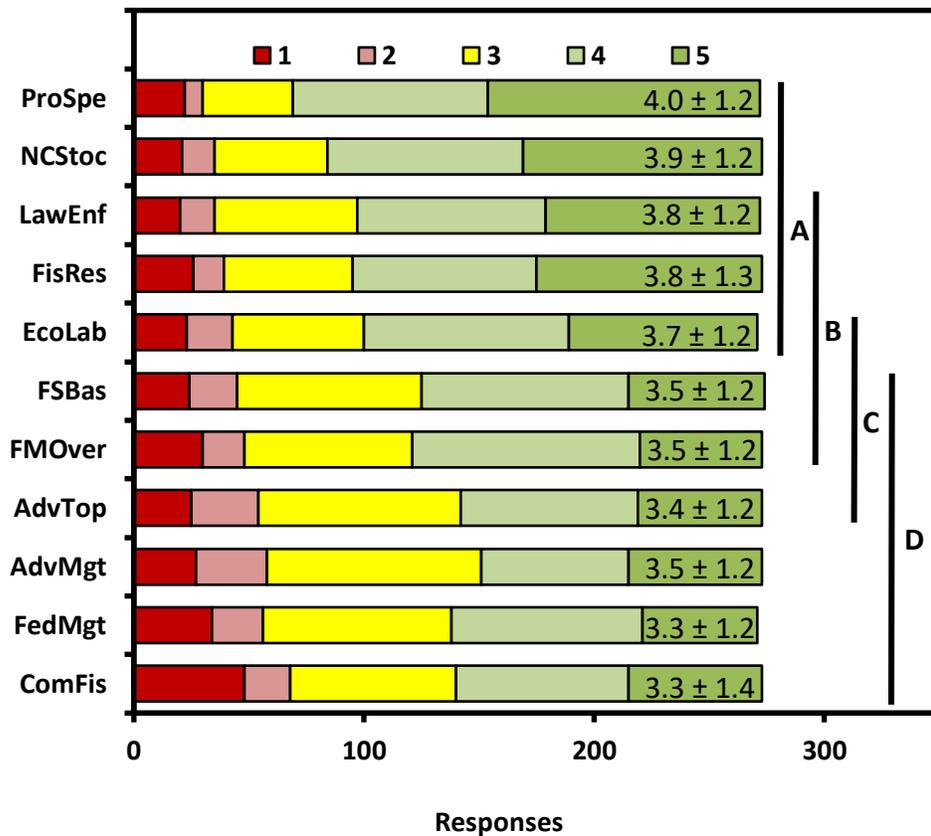


Figure 12. Rank by survey respondents regarding usefulness of each potential education topic within the Fisheries Science and Management section. Rating scores increased with usefulness, ranging from 1 (Of No Use) to 5 (Very Useful). Means scores for each topic are shown. Topics that are associated with the same letter have mean scores that are not significantly different from each other.

The reasoning behind angler’s preference for topics in this broad section can only be speculated. The topic Protected Species Management (ProSpe) perhaps relates more to conservation than science and management, as respondents did not disproportionately rank Conservation and Habitat Enhancement topics in the previous question. The Status of North Carolina Fish Stocks (NCStoc) topic likely scored well because most respondents have extensive fishing experience in North Carolina and are familiar with at least some of the stock status changes and fluctuations through time. The fact that Saltwater Fisheries Research (FisRes) ranked in the top (A) grouping is encouraging to Sea Grant, considering that broad dissemination of coastal research results to stakeholders is a strength of the program but one that could be improved by adding more content specific to CRFL holder needs and interests.

While it is difficult to determine the reasoning behind the low scoring of generic fisheries science and management topics (specifically within group D, Figure 12), it is possible that a better understanding of science and management topics may not necessarily lead to better or more enjoyable fishing opportunities or success. Given that most CRFL holders are not likely involved in fisheries science and management activities, the desire for education on these topics may be secondary to topics that may increase fishing opportunities or success, particularly Boating and Angling Practices.

Next, scores for the 22 topics were aggregated and compared at the broad, section level (Boating and Angling Practices, Conservation and Habitat Enhancement, and Fisheries Science and Management) (Figure 13). The purpose of this analysis was to determine the relative importance of any one section when compared to the others. An ANOVA revealed that respondents scored the Fisheries Science and Management section significantly lower than both the Boating and Angling Practices or Conservation and Habitat Enhancement sections. However, there was no significant difference in mean scores for these two sections (One-way ANOVA, $F_{10, 2987} = 10.98$, $P < 0.0001$, Tukey-Kramer, $P > 0.5$). This result is not surprising considering the low scores associated with the generic fisheries science and management topics (Group D, Figure 12). Educators should be aware that these differences exist when creating and delivering programming in these areas, as different approaches may be involved relative to program design and delivery.

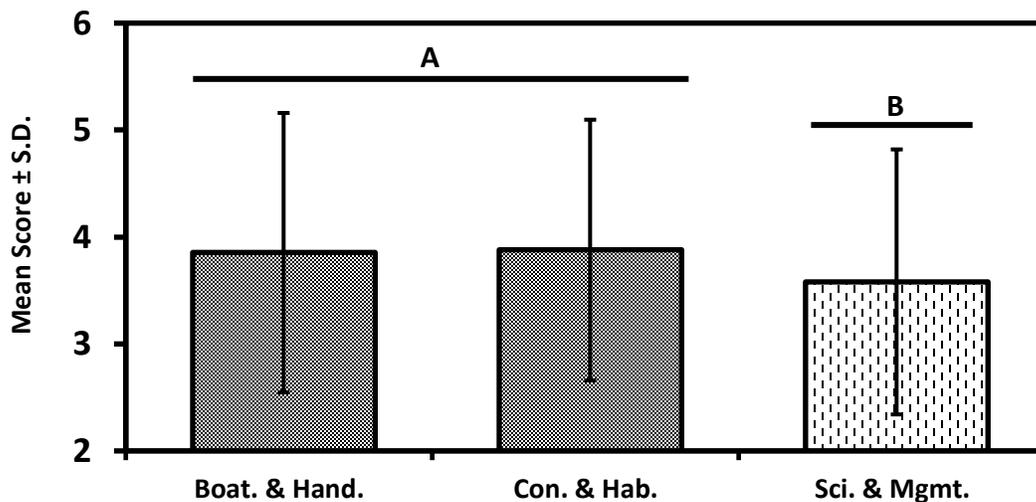


Figure 13. Mean score comparison by topical sections. Rating scores increased with usefulness from 1 (Of No Use) to 5 (Very Useful). Topics that are associated with the same letter have mean scores that are not significantly different from each other.

Information Sources

When given the opportunity to select any of the nine sources listed (including a catch-all “Other” category) for receiving non-regulatory information about fishing and other marine-related activities and issues, 275 respondents made 637 selections (2.3 sources per respondent) (Figure 14). Fifty-five percent of respondents chose Newspaper/Magazine, followed by Web Page (47%), Television (34%) and Social Media (26%). Combined, these four sources accounted for 70% (448 of 637) of the total selections made. Of the original nine sources provided, Radio (10%) received the fewest votes. The catch-all “Other” category was selected 37 times. For the report, we further grouped these 37 responses into two broad categories: Friends (12%) and Tackle Shops (2%).

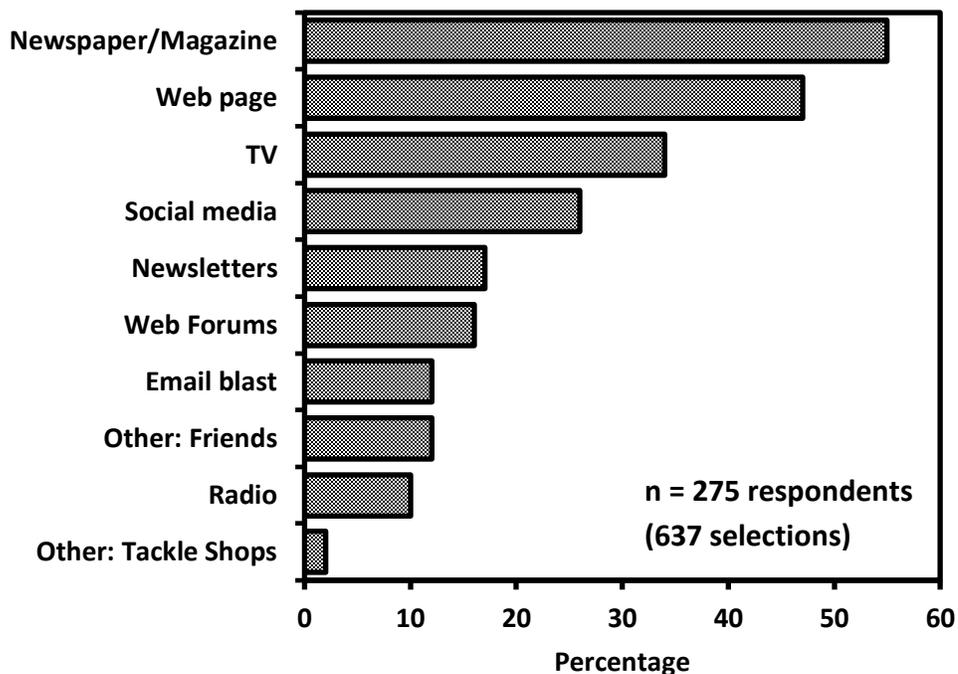


Figure 14. Popularity of non-regulatory information sources related to saltwater angling as indicated by survey respondents. Respondents were allowed to choose any and all options.

The surveyed CRFL holders were next asked how likely or unlikely they would be to utilize a smartphone app, should one be developed by NCDMF. The question stated that the purpose of the app would be to help communicate rules, regulations and other fisheries information, and that it would be free or very inexpensive (Figure 15). Two-thirds of respondents indicated that they would be “Very Likely” (42%) or “Somewhat Likely” (24%) to use the app if created.

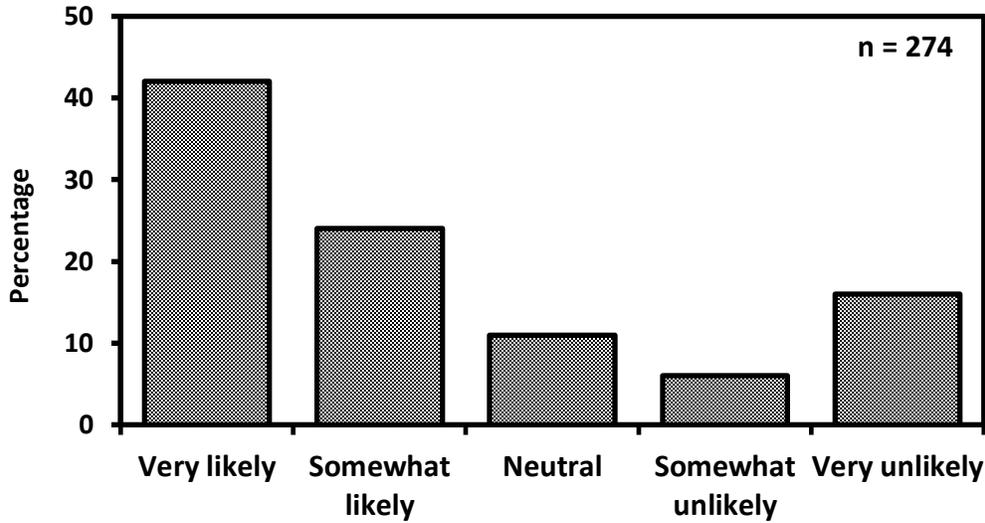


Figure 15. Percentage of survey respondents likely or unlikely to use a smartphone app created by the N.C. Division of Marine Fisheries to communicate management information.

Close to 25% of respondents indicated that they would be “Somewhat Unlikely” (6%) or “Very Unlikely” (16%) to use the app, with the remainder being “Neutral” (11%). Approximately 3 out of 10 respondents (84 of 271) indicated that they attended at least one webinar in the past. In the survey, we defined a webinar as a seminar or meeting held over the internet where attendees listen to, and may also watch, a speaker and/or presentation live. When respondents were asked whether they had ever attended an in-person seminar where they received training and expert guidance relating to recreational angling, 24% (65 of 269) replied “Yes” (Figure 16).

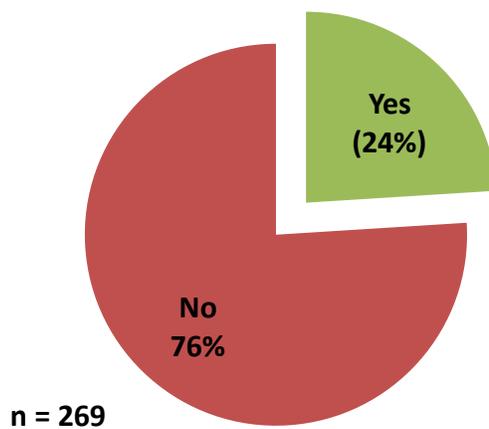


Figure 16. Percentage of survey respondents who have attended at least one fishing seminar.

We asked anglers to select their one preferred method of receiving education and training, given the choices “In-person,” “Webinar,” “Online” and “Other” (write in). We defined a webinar as “live, over the internet, so as to interact with the presenter” and online as “information posted to a website for viewing at leisure” (Figure 17). By a margin of more than 2 to 1, respondents selected “Online” (62%) in lieu of “In-person” (30%), with 266 people responding to the question. “Webinar” and “Other” were each selected as preferred less than 5% of the time.

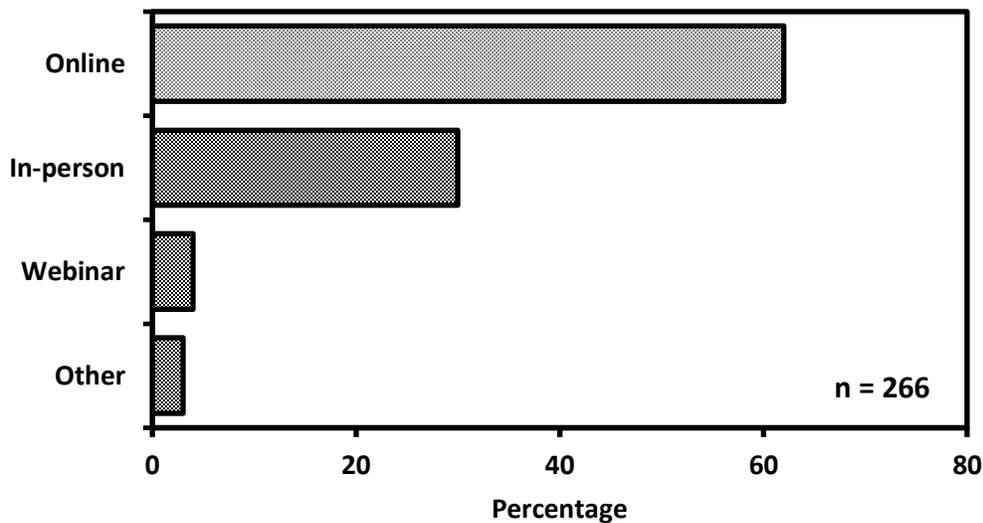


Figure 17. Survey respondents indicated a preference for a single, preferred method of receiving education and training related to fisheries – online.

In an attempt to utilize the preferences and experience of surveyed CRFL holders, we asked each respondent to provide a list of existing events popular with saltwater anglers that Sea Grant might partner with to provide in-person education and training opportunities. Boat and tackle shows (n=11), websites (n=6) and fishing magazines (n=6) were mentioned most often with regard to generic event types (Table 4). Respondents provided suggestions for 37 specific events or partnerships for Sea Grant to pursue for educational programs.

Overall, we can infer that saltwater anglers prefer educational content related to fisheries and marine resources delivered in a range of online and in-person formats, with online delivery the preferred method when asked to choose a single approach. However, this appears to be in contrast to the way that non-regulatory information about fisheries and marine resources is currently obtained by CRFL holders. For example, newspapers and magazines, followed closely by web pages, appear to be the most popular platforms currently used for information delivery.

Table 4. Suggestions for existing events, communication products and partners popular with saltwater anglers that Sea Grant could associate with to provide in-person education and training opportunities.

Generic events:	Specific partners/events (continued):
Boat and tackle shows (11)	Big Rock Fishing Tournament
Websites (6)	Boy and Girl Scouts
Fishing magazines (6)	Cabela’s
Fishing schools (4)	Carolina Outdoor Journal (TV)
Tournaments (4)	Carteret News Times
Fairs and festivals (4)	Fish Brain (app)
Community colleges (2)	Fisherman’s Post (magazine)
Tackle shops (2)	International Game Fish Assn. events
Local angler meetings	Lions Club
Fishing guides	Moose Lodge
Fishing piers	N.C. Angler (magazine)
High schools	N.C. Aquariums
Mail	N.C. Division of Marine Fisheries
Marinas	N.C. Maritime Museum
Surf shops	N.C. Sportsman (magazine)
TV	National Rifle Association events
Vacation rentals	Neuse Sports Shop
	Oscher Lifelong Learning Institute
	Riverwatch
	Rum Runners Dive Shop
	Saltwatercentral.com
	Sea Tow / Boat U.S. events
	Southeastern Community College
	Sterling Marine
	The Hull Truth (online forum)
	UNCW
	Wounded Warrior
	YouTube series
Specific partners/events:	
Bass Pro events (2)	
Coastal Conservation Assn-N.C. (2)	
N.C. Decoy Festival (2)	
N.C. Seafood Festival (2)	
Raleigh Boat Show (2)	
UNC-TV (2)	
Wildlife in N.C. (magazine) (2)	
N.C. Science Festival	
Autumn with Topsail (event)	

This discrepancy in current information sources and desired (future) information delivery likely relates to over-response of older CRFL holders in our returns and the shift in increasingly more educational materials being made available online. Clearly, a mix of online and in-person delivery of content is desired based on the general responses in this section, as well as the number of potential partnerships and events offered for consideration.

Availability of Anglers

Two hundred and fifty-nine surveyed CRFL holders responded to the question: “What time of year would be best to conduct in-person educational programming with saltwater anglers?” Almost half of respondents chose Winter (48%), followed by Spring (28%), Summer (15%) and Fall (9%).

Further, those surveyed were asked, “What time of day would be best to conduct ‘live’ (via webinar over the internet) educational programming with saltwater anglers?” Almost two-thirds of the 254 respondents chose “Evening” (64%), while “Morning” and “Afternoon” each garnered 15% and 14% of responses, respectively. The least preferred time of day for educational programming is “Lunch” (7% of respondents).

Overall, availability of saltwater anglers to participate in educational programs appears to be as we expected. Anglers are most available during the winter and spring with preference for educational programs to be offered in the evening. This finding is consistent with the availability of commercial fishermen for educational programming in North Carolina.

Referendum on Sea Grant Ideas

In the next section of the survey, we asked for feedback on specific educational project ideas under consideration for development with saltwater anglers. For each question, we anticipated that 10% or less of respondents would score an idea as “Very Likely” when considering the random sample of CRFL holders who would comprise a variety of interests as it relates to fishing.

First, we asked surveyed CRFL holders how likely or unlikely would they be to participate in a time-limited (for example, Fridays from noon-1 p.m.) Sea Grant staff-moderated web forum, where the results of research related to North Carolina saltwater fisheries would be the subject of facilitated discussion (Figure 18). Of the 270 responses collected, approximately 33% of respondents indicated that they would be “Very Likely” (11%) or “Somewhat Likely” (26%) to use the forum if created. However, approximately one-third of respondents indicated that they would be “Somewhat Unlikely” (17%) or “Very Unlikely” (19%) to use the forum, with the remainder being “Neutral” (27%). The interest in this idea was not overwhelming, but higher than expected. The web forum subject matter focuses on a topic of interest (FisRes, Group A, Figure 12) and incorporates preferred communication methods (E.g., online) as opposed to the most popular way that similar information is consumed (E.g., newspapers/magazines).

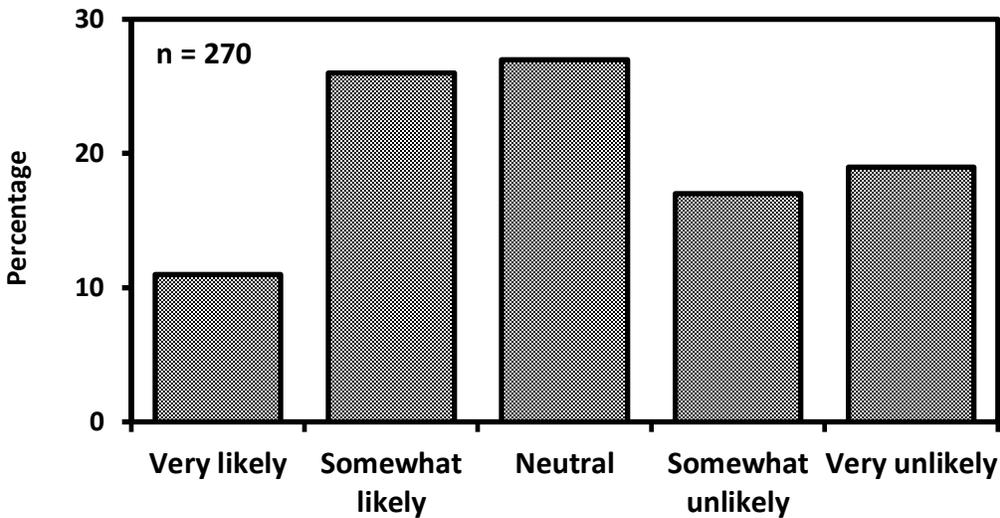


Figure 18. Percentage of respondents likely and unlikely to consider participating in a Sea Grant staff moderated web forum, where the results of research related to North Carolina saltwater fisheries would be the subject of facilitated discussion.

Second, we wanted to know how likely or unlikely those surveyed would be to take part in a citizen science program, considering that the NCDMF currently was compiling a list of research questions for this specific purpose. As part of the question, we defined citizen science as “where data collection is done by the general public, typically as part of collaborative research alongside professional scientists” (Figure 19). Of the 270 responses received, more than one-third of respondents indicated that they would be “Very Likely” (16%) or “Somewhat Likely” (23%) to assist with citizen science. Approximately one-third of respondents indicated that they would be “Somewhat Unlikely” (14%) or “Very Unlikely” (18%) to assist with citizen science, with the remainder being “Neutral” (29%). Response to this question was higher than expected and encouraging considering that few details about such a yet-to-be developed program are known. The mention of NCDMF within the body of this question, however, could have caused a response bias, as CRFL holders may like or dislike NCDMF as a management entity.

To conclude this section of the survey, we asked a two-part question about interest in the development and delivery of a multi-day education program where a diverse group of stakeholders (recreational and commercial fishermen, managers, scientists, etc.) would collaboratively learn about science and management behind North Carolina fisheries policies. We stated that the program would be modelled after the successful Marine Resource Education Program or MREP – a program “designed by fishermen – for fishermen.” First, we asked how likely or unlikely respondents would be to consider applying to participate in such a program,

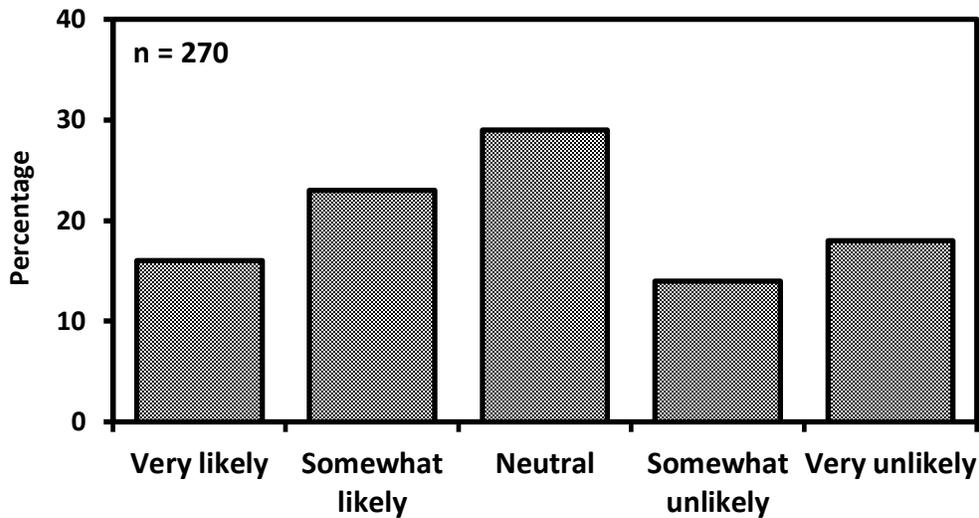


Figure 19. Percentage of respondents likely and unlikely to participate in a citizen science program.

assuming it was free (Figure 20). Of the 270 responses received, about one-third of respondents indicated that they would be “Very Likely” (10%) or “Somewhat Likely” (21%) to consider applying to such a program. More than one-third of respondents were not interested in the program indicating their choice as “Somewhat Unlikely” (17%) or “Very Unlikely” (23%). Twenty-nine percent of respondents were “Neutral” on the topic.

We were surprised by the level of interest in this potential project considering the program would be an in-person, multi-day event and focus on science and management topics, which ranked lower overall in comparison to Boating and Handling, and Conservation and Habitat Enhancement topics. The program (MREP) by which we would consider emulating has been extremely popular with anglers, and many feel that the success of the program is predicated on the fact materials are presented to attendees in layman terms and the fact that the in-person, multi-day format allows for “hands-on” sharing of viewpoints.

One drawback to the MREP-style event is that there is a substantial cost to delivering such a program. To determine if cost might decrease enthusiasm for the event, we asked a follow-up question to those respondents that answered “Very Likely” or “Somewhat Likely” (31%) related to maintained interest in a fee-based program. Specifically, we asked whether their response would remain the same if this course required attendees to pay a fee to cover expenses. We described the estimated fee as “\$200 per person which would include all meals, lodging and

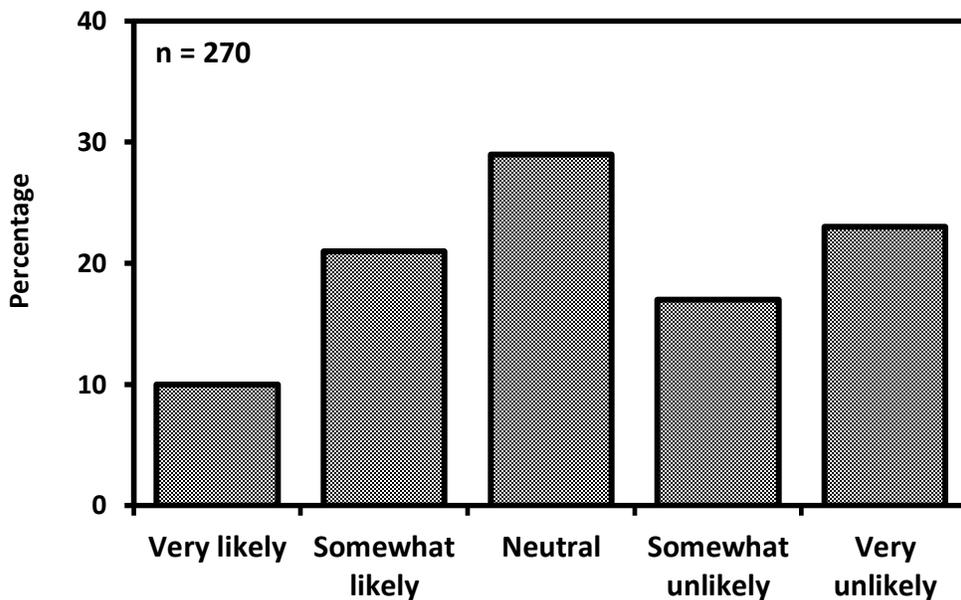


Figure 20. Percentage of respondents likely and unlikely to participate in an intensive marine education program related to North Carolina fishery science and management.

handouts for 3 days / 2 nights” (Figure 21). Of the 77 responses received, more than one-half (57%) of CRFL-holders still held an interest in such a program even if it was fee-based. The fact that many respondents retained interest in such a program even if costs were incurred implies that more, and perhaps unique, types of educational opportunities related to fisheries science and management should be offered, or at least attempted to satisfy the interests of this segment of CRFL holders.

Finally, we asked CRFL holders if they had ever heard of North Carolina Sea Grant prior to the mailing of this survey. Of the 269 responses received, only a small percentage (13%) had ever heard of the program before. Respondents selecting “Yes” were asked to describe how they came to know about the program, and in their own words, describe the primary function(s) of the program. Few responses accurately described the primary function of the program and several respondents seemed to confuse the Sea Grant program with that of UNCW, where the Sea Grant program Wilmington field office administering the survey resides.

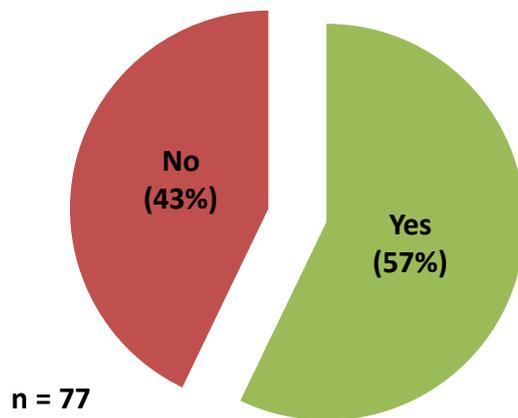


Figure 21. Percentage of survey respondents initially indicating “Very Likely” and “Somewhat Likely” to participate in an intensive marine education program who maintained interest even if attendance required a fee of up to \$200 to cover costs.

To conclude, survey recipients were invited to provide any additional comments or suggestions. Numerous respondents provided personal anecdotes or specific comments related to their responses within the survey. We incorporated these comments, when possible, in qualitative findings throughout the report. Fourteen respondents provided negative comments about commercial fishing in general. Twelve respondents thanked us for conducting the survey.

Conclusions

We are quite pleased with the 275 completed responses to the survey and the quality of comments and suggestions received. We solicited and received responses from across the state and from a broad range of (fishing) interests, ages, and CRFL license types. We received great feedback on 22 topics across the broad topical areas of boating and angling practices, conservation and habitat enhancement, and fisheries science and management. The feedback provided on 3 specific educational projects will help to determine whether or not to move forward with those projects and how to better design each. The experimental incentive increased the response as expected, but the purchase and mailing costs make it impractical for regular use. As a science-based, nonadvocacy, nonregulatory university-based program, North Carolina Sea Grant has low name recognition with recreational saltwater anglers. This was not unexpected, but further suggests that we consider strong partnerships to assist with the development and delivery of educational programs for anglers. Based on angler preferences,

the most effective mode of education and information delivery will likely be a combination of online and in-person activities.

Acknowledgements

We wish to thank all CRFL holders that took the time to participate in this survey. The NCDMF allowed us supervised access to the CRFL database from which we drew our survey sample. Finally, we would also like to acknowledge an anonymous North Carolina for-hire captain and a local tackle shop who assisted us in securing Berkley Gulp!® baits to be used as our experimental incentive for this project. Funding for this project was provided by the North Carolina Sea Grant.

References

- Baker, Jr., M. S. and A.V. Harten. (2013). Snapper grouper permit holder's attitude and perceptions regarding cooperative research in the U.S. South Atlantic: Results of a May 2012 Survey. UNC-SG-13-02. 64 pp.
- Brinson, A. A. and K. Wallmo. (2013). Attitudes and Preferences of Saltwater Recreational Anglers: Report from the 2013 National Saltwater Angler Survey, Volume I. U.S. Dept. of Commer., NOAA Technical Memorandum, NMFS-F/SPO-135, 45 p.
- Church, A.H. (1983). Estimating the effect of incentives on mail survey response rates: A meta-analysis. *Public Opinion Quarterly*, 57, 62-79.
- Dillman, D. A., J.D. Smyth and L.M. Christian. (2014). *Internet, Phone, Mail and Mixed-Mode Surveys*. Hoboken, New Jersey. John Wiley and Sons, Inc. 509 pp.
- Lovell, S.A., J. Hilger, S. Steinback, and C. Hutt. (2016). The Economic Contribution of Marine Angler Expenditures on Durable Goods in the United States, 2014. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-165, 72 p.
- North Carolina Division of Marine Fisheries (NCDMF). (2017). License Statistics Annual Summary Report. Available: <http://portal.ncdenr.org/web/mf/commercial-fishing-annual-reports>. 395 pp.

Perdue, R. R. and C.J. Betz. (1991). Communication networks in marine recreational fishing: Information-seeking behaviors, fishing knowledge, and diffusion of fishing innovations among marine recreational fishermen in North Carolina. UNC-SG-92-05. 80 pp.

Singer, E. and C. Ye. (2013). The use and effectiveness of incentives in surveys. *Annals of the American Academy of Political and Social Science*, 645 (1), 112-141.

Thank you!

One final question before you go, prior to receiving mailings related to this research project, had you ever heard of North Carolina Sea Grant?



YES NO

If "yes," in the box below please describe how you came to know about the program, and in your own words, what you believe the primary function(s) of the program are.

If you have any additional comments or suggestions, please write them here.

Thank you for your time spent answering this questionnaire!

Once more, in early summer a summary report of findings will be made available on Sea Grant's website www.ncseagrant.org. For additional information and questions, please contact one of North Carolina Sea Grant's two fisheries extension specialists.

Scott Baker, bakers@uncw.edu, (910) 962-2492
 Sara Mirabilio, saram@csi.northcarolina.edu, (252) 475-5488

Please return your questionnaire in the enclosed envelope. Or, mail to Scott Baker, UNCW Center for Marine Science, 5600 Marvin K. Moss Lane, Wilmington, NC 28409

Survey No.

FOLD ALONG DOTTED LINE

FOLD ALONG DOTTED LINE



Understanding Saltwater Angler Education Needs:

A Questionnaire to Improve Engagement with the Marine Recreational Fishing Community

This research project will help the university-based North Carolina Sea Grant Program better understand saltwater anglers. Your answers to the following questions will help guide Sea Grant's development of future fisheries education, communication and cooperative research efforts, and ensure that these activities are highly relevant to anglers like yourself.

For the purposes of this study, *marine* and *saltwater* both refer to open ocean or any portion of a bay, sound or river that is salt or brackish water.

The questions in this survey are about YOU and YOUR saltwater fishing opinions and interests. Please do not include any information from other household members or fishing partners. Clearly print answers in comment boxes.

Participation in this survey is voluntary, and answers to all questions will remain anonymous. A survey number is printed on the back of the survey to assist in reducing unnecessary reminder mailings.



The survey only should take between 10-15 minutes to complete.

Thank You!



About You

To get started, we will ask about you, your recreational fishing experience, and your fishing style.

1. What is the five-digit zip code of your primary residence?
2. Please select your age range. (SELECT ONE)
 - 19-34 years
 - 35-50 years
 - 51-65 years
 - 66+ years
3. How would you rank saltwater fishing in importance to you, from 1-5, with "5" being of highest importance. Enter number 1-5 here. >>>>
4. How long have you been saltwater recreationally fishing in North Carolina?
 - Enter number of years; round up or down to nearest whole year.
5. During the past 12 months, how many days did you spend saltwater recreational fishing?
 - Enter number of days; count partial days as full.
 - If unsure, check this box.
6. During the past 12 months, where did most of your fishing occur? (PICK ONE)
 - Inshore (not beyond inlets)
 - Nearshore (inlets out to three miles)
 - Offshore (more than three miles from shore)
7. During the past 12 months, most of my fishing trips were on... (PICK ONE)
 - Shore (beach, pier, bridge, etc.).
 - For-hire boats (charter, party or head boat).
 - Private boats (motor boat, kayak, canoe, etc.).
8. Do you own a fishing boat(s)? YES NO

Thoughts on Our Ideas?

Below are some ideas under consideration for educational programs with saltwater anglers. *It is very important to us to hear your feedback on these proposals.*

20. The N.C. Division of Marine Fisheries is compiling a list of research questions that could be addressed by "Citizen Science" – where data collection is done by the general public, typically as part of collaborative research alongside professional scientists. How likely or unlikely are you to assist with such a program, if offered?
 - Very likely
 - Somewhat likely
 - Neutral
 - Somewhat unlikely
 - Very Unlikely
21. The Marine Resource Education Program, or "MREP," is a successful, multi-day education program "designed by fishermen— for fishermen" where a diverse group of stakeholders (recreational and commercial fishermen, managers, scientists, etc.) collaboratively learn about the "science" and "management" behind federal fisheries policies. If a program were developed at the state level, how likely or unlikely are you to *consider applying* to participate in such a program, assuming it was free?
 - Very likely
 - Somewhat likely
 - Neutral
 - Somewhat unlikely
 - Very Unlikely

If answering "very likely" or "somewhat likely," would your answer remain the same if this education required you to pay a fee to cover expenses for the multi-day program? (Estimated fee = \$200 per person which would include all meals, lodging and handouts for 3 days / 2 nights).

YES NO

Continue to back cover. 

Your Info Sources

Below, we continue to ask you about how you prefer to receive marine resource-related information, and how you learn best.

16. In the box below, please list any existing events or communication products popular with saltwater anglers that Sea Grant could partner with to provide in-person education and training opportunities?

17. What time of year is best to conduct in-person educational programming with saltwater anglers? (Think, when are you most available?) (PICK ONE)

- Winter Spring Summer Fall

18. What time of day would be best to conduct "live" (via webinar over the internet) educational programming with saltwater anglers? (PICK ONE)

- Morning Lunch Afternoon Evening

19. Much research relating to saltwater fisheries occurs within North Carolina universities and agencies. There is no good clearinghouse for these research results. If North Carolina Sea Grant were to moderate an online forum one day a week for a short amount of time (for example, Friday's from noon– 1 p.m.), how likely or unlikely would you be to participate and/or post questions, as time allows?

- Very likely
 Somewhat likely
 Neutral
 Somewhat unlikely
 Very Unlikely

Interests & Opinions

Here we ask you about your interest in different topics.

9. Please rate the usefulness, from "Very Useful" to "Of No Use," of the following potential education topics relating to saltwater recreational fishing.

Very Useful
 Somewhat Useful
 Neutral
 Not Very Useful
 Of No Use

	Very Useful	Somewhat Useful	Neutral	Not Very Useful	Of No Use
BOATING & ANGLING PRACTICES					
Basic Guide for the "Beginning Angler" (E.g., ethical angling; navigating DMF website)	<input type="radio"/>				
Release Techniques to Reduce Fish Mortality (E.g., descending devices; circle hook use)	<input type="radio"/>				
Safe Seafood Handling and Consumption (E.g., proper chilling and freezing; contaminants)	<input type="radio"/>				
Boater Safety (E.g., "rules of the road;" inspections)	<input type="radio"/>				
Boat Fuel Economy (E.g., props, tops and trim; ethanol)	<input type="radio"/>				
Marine Weather (E.g., info sources; impacts on fish and fishing)	<input type="radio"/>				
CONSERVATION & HABITAT ENHANCEMENT					
Overview of N.C. Artificial Reefs (E.g., locations; do's and don'ts)	<input type="radio"/>				
Marine Reserves, Protected Areas and Sanctuaries) (E.g., differences; locations -state and federal)	<input type="radio"/>				
Aquaculture for Stock Enhancement (E.g., candidate species; examples nationwide)	<input type="radio"/>				
Invasive Species Control and Management (E.g., lionfish; blue catfish; hydrilla)	<input type="radio"/>				
Climate Impacts on Fisheries and Fisheries Habitat (E.g., shifts in abundance; range expansion)	<input type="radio"/>				

Interests & Opinions

Here we ask you about your interest in different topics.

10. Please rate the usefulness, from “Very Useful” to “Of No Use,” of the following potential education topics relating to saltwater recreational fishing.

Very Useful
Somewhat Useful
Neutral
Not Very Useful
Of No Use

FISHERIES SCIENCE & MANAGEMENT	Very Useful	Somewhat Useful	Neutral	Not Very Useful	Of No Use
Fisheries Science Basics (E.g., life history; data collection methods)	<input type="radio"/>				
Advanced Topics in Fisheries Science (E.g., stock assessments; ecosystem approaches)	<input type="radio"/>				
N.C. Fisheries Management Overview (E.g., Marine Fisheries Commission; DMF)	<input type="radio"/>				
Federal Fisheries Management Overview (E.g., Fishery Management Councils; NMFS)	<input type="radio"/>				
Advanced Topics in Fishery Management (E.g., sector allocation; permitting; data)	<input type="radio"/>				
Status of North Carolina Fish Stocks (E.g., definitions; determinations)	<input type="radio"/>				
Seafood Sustainability and Eco-labels (E.g., types of certification; NOAA FishWatch)	<input type="radio"/>				
N.C. Commercial Fishing Gear and Methods (E.g., mobile vs. fixed; regional differences)	<input type="radio"/>				
Maritime Law Enforcement: Who does what? (E.g., USCG; N.C. Marine Patrol; NMFS)	<input type="radio"/>				
Protected Species Management (E.g., observer programs; sea turtles; birds)	<input type="radio"/>				
Updates on Saltwater Fisheries Research (E.g., saltwater license grant program)	<input type="radio"/>				

4

Your Info Sources

In this section, we will ask you about how you prefer to receive marine resource-related information, and how you learn best.

11. Where do you get non-regulatory information about fishing and other marine-related activities and issues? (Think fishing tips, gear suggestions, where to fish, etc.) (SELECT ALL THAT APPLY)

- newspaper/magazine
- email blast
- social media
- web page
- television
- radio
- web forum
- newsletter
- other: _____

12. If the N.C. Division of Marine Fisheries developed a smartphone app for anglers to help communicate rules, regulations and other fisheries information, how likely or unlikely are you to utilize such an app, assuming it was free or very inexpensive?

- Very likely
- Somewhat likely
- Neutral
- Somewhat unlikely
- Very Unlikely

13. Have you ever attended a webinar? (A seminar or meeting held over the internet where attendees listen to, and may also watch, a speaker and/or presentation live). YES NO

14. Have you ever attended an in-person seminar where you received training and expert guidance relating to saltwater angling? YES NO

15. Please select your one preferred method of receiving education and/or training.

- In-person
- Webinar (“live,” over the internet, so as to interact with presenter)
- Online (information posted to a website for viewing at leisure)
- Other: _____

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