

SURVEY OF COMMERCIAL FISHING LICENSE HOLDERS FOR PERSONAL CONSUMPTION OF SEAFOOD CAUGHT WITH COMMERCIAL GEAR

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INTRODUCTION

Commercial harvest is currently recorded via the North Carolina Division of Marine Fisheries (NCDMF) Trip Ticket Program. Under record keeping requirements outlined in G.S. 113-168.2 (h), all seafood landed and sold in North Carolina must be recorded on a trip ticket by a licensed seafood dealer. Fish or shellfish caught by commercial gear or in commercial quantities by a commercial fishing license holder can be kept for personal consumption or donation but do not fall under the trip ticket reporting requirements. As such, this harvest can go un-recorded and there are no sampling protocols in place, making the extent and make-up of this harvest unknown. At times, this unknown harvest has come to the forefront of discussion at the Marine Fisheries Commission with recent issues over defining a commercial fisherman, unsold target species when harvesting red drum as a bycatch species, and oyster harvest in the southern region of the state.

In response, the NCDMF carried out a mail-based pilot survey of commercial fishing license holders in early 2015 as part of an effort to gather information on fish and shellfish that are landed with commercial fishing gear or harvested in commercial quantities, but kept for personal consumption or donation. Being a pilot survey to gauge if more effort is needed to investigate the extent of unsold catch, the survey was designed to be brief and low cost. The survey contained five questions on fishing behavior as well as the final disposition (sold or not sold) of fish and shellfish harvested with commercial gear or in commercial quantities.

METHODOLOGY

In December 2014, a list of 7,903 North Carolina commercial fishing license holders was obtained from the NCDMF license database for individuals that owned a commercial fishing license in fiscal year 2014. The list included all individuals that owned a Standard Commercial Fishing License (SCFL), Retired Standard Commercial Fishing License (RSCFL), or a commercial Shellfish License for North Carolina Residents. No distinction was made as to license holders' landings, license type, or entity type (person or business). Each license holder in the database has a personal identification number (PID) which was used to track individuals' commercial license types, landings, and survey responses. Additionally, each individual was assigned a survey number ranging from 1 to 7,903. This number was used to select participants for each mailing of the survey.

There were two separate mailings of the survey in early January 2015 and in early February 2015. For each mailing, 1,000 individuals were randomly chosen from the described database according to their assigned study number. Each license holder was mailed a copy of the survey on a pre-paid postage card along with a letter introducing and describing the survey. For the purpose of this survey, commercial gears listed were crab pot, gig, trawl, gillnet, rod and reel, by hand/rake/tong, and other. A copy the survey instrument can be found in Appendix 1. A database was created encompassing survey responses combined with NCDMF license and Trip Ticket Program information detailing individuals' licenses types, number of licenses, and landings, where applicable, by both shellfish and finfish.

RESULTS

Respondents were asked to answer a series of five general questions regarding their main reason for owning a commercial fishing license, whether they fished with commercial gears or harvested commercial quantities of shellfish or finfish in 2014, what kind of gears were used, typical use of catch, and estimated harvest of seafood caught by commercial gears but kept for personal consumption or donation. Some respondents did not answer all questions on the survey, so responses do not add up to the total surveyed population. Conversely, respondents often provided multiple answers to a single question; therefore percentages may be above 100% in a respective question if they were to be summed.

Out of the 2,000 surveys that were mailed, the division received 657 responses, making for an overall response rate of 33%. There were 55 additional surveys returned due to invalid mailing addresses. Of the respondents, 262 (40%) had recorded landings on trip tickets in 2014 and 395 (60%) did not have any recorded commercial landings. These license holders held 477 SCFLs, 164 RSCFLs, and 75 commercial shellfish licenses. There were 49 respondents that owned more than one commercial license and nine respondents owned more than one type of commercial license.

Responses to the survey questions were tabulated and summarized (Table 1). The first question inquired about a license holder's main purpose for owning a commercial license. This question did not have pre-selected answers, leading to a wide variety of responses. An effort was made to characterize responses into five separate categories, with a sixth category of "other". Most respondents (93%) provided answers to this question, with many respondents providing answers that fell into multiple categories. Not surprisingly, the most common purpose of owning a commercial fishing license was related to current or past income (57%). Additionally 13% of respondents indicated owning a commercial license for future income prospects. This often included either a backup income should loss of current employment occur or for supplemental income after retirement. The second most common response included some sort of personal consumption or donation aspect (28%). While some respondents listed personal consumption or donation as the main reason for owning a commercial license, this response was often associated with an income reason as well. A few responses indicated that a commercial license allowed sale of excess catch (2%), which was often associated with the ability to help cover trip expenses. Some responses also indicated that the commercial license allowed license holders to fish under commercial requirements or in commercial quantities instead of recreational. This response was often associated with harvesting above recreational shellfish or finfish limits, utilizing more than 100 yards of gill net, or not being required to adhere to some attendance requirements. Finally, many responses (13%) did not fall into any of the previous categories and were listed as "other".

The majority of respondents indicated that they had fished with commercial gear in 2014 (60%). The most commonly cited commercial gear used was gill net (53%), followed by hand/rake/tong (34%), crab pot (34%), rod and reel (32%), trawl (23%), gig (21%), and "other" (13%). "Other" gears included dredge, fish pot, pound net, channel net, trotline, longline, cast net, greenstick, long haul, peeler pot, spear, bandit rig, and hoop net. Approximately two thirds of respondents provided information on what they typically did with their harvest when using commercial gears or harvesting in commercial quantities. The most common response was to sell part of the catch and keep the other portion for personal consumption or donation (45%). This was closely followed by "sell all of catch" (44%) and "do not sell catch" (20%).

Overall, 342 respondents did not indicate having unsold seafood caught with commercial gear. There were 315 respondents that provided an estimate of unsold catch. The most commonly cited category was finfish (79%) followed by bushels of shellfish (46%), crabs (35%), shrimp (34%), and numbers of shellfish (7%). The corresponding number of responses, average, median and, where appropriate, mode values for each category can be seen in Table 1. The presence of some relatively high estimates of harvest skewed summarized data upwards. This is reflected in standard deviations that are larger than the average and average values that tend to be much larger than corresponding median values. As such, median values may be a better descriptive statistic to more accurately represent the central tendencies of responses for this question.

Table 1. Answers from survey respondents. (N=657)

Q1: Main purpose for owning a commercial fishing license		Responses	% of Total Response			
Current or Past Income		348	57%			
Future Income		80	13%			
Personal Consumption or Donation		170	28%			
Sell Excess Catch		10	2%			
Fish Under Commercial Requirements Instead of Recreational		20	3%			
Other		79	13%			
<i>Total Responses</i>		608	-			
<i>No Response</i>		49	-			
Q2: Used commercial gear or harvested in commercial quantities		Responses	% of Total Response			
Yes		383	60%			
No		266	40%			
<i>Total Responses</i>		649	-			
<i>No Response</i>		8	-			
Q3: Commercial Gears Used		Responses	% of Total Response			
Crab Pot		145	34%			
Gig		91	21%			
Trawl		98	23%			
Gill Net		227	53%			
Rod and Reel		136	32%			
By Hand/Rake/Tong		147	34%			
Other		55	13%			
<i>Total Responses</i>		428	-			
<i>No Response</i>		229	-			
Q4: Typical use of catch		Responses	% of Total Response			
Sell All of Catch		180	44%			
Sell Part and Keep Other Portion for Personal Consumption or Donation		187	45%			
Do Not Sell Catch		81	20%			
<i>Total Responses</i>		412	-			
<i>No Response</i>		245	-			
Q5: Estimated harvest kept but not sold	Responses	% of Total Responses	Average	Std. Dev.	Median	Mode
Finfish (pounds)	249	79%	217.1	454.8	100	100
Shellfish (bushels)	144	46%	11.4	19.8	5	10
Shellfish (numbers)	22	7%	512	840.9	300	100
Crabs (bushels)	111	35%	12.6	32	3	1
Shrimp (pounds)	108	34%	166.3	253.2	100	50
<i>Total Responses</i>	315	-	-	-	-	-
<i>No Positive Response</i>	342	-	-	-	-	-

Comparing Respondents With and Without Recorded Commercial Landings

Results of the survey responses were further distinguished by those that had recorded sales of seafood via trip tickets in 2014 (Table 2) and those that had no recorded commercial seafood landings (Table 3). Those that did record sales of seafood had average commercial landings of 13,627 pounds of shellfish, 12,857 pounds of finfish, and 26,485 total pounds of seafood in 2014. Median values for each category were much lower, at 254 pounds of shellfish, 412 pounds of finfish, and 2,354 total pounds of seafood. Shellfish landings included crabs and shrimp; however individual shellfish species were further broken out in the survey.

Not surprisingly, the respondents that had recorded landings of seafood often indicated that they held a commercial license for current or past income purposes (91%). Less common were responses that fell into the personal consumption or donation category (17%) followed by “other” (8%), future income (4%), sell excess catch (1%), and ability to fish under commercial requirements instead of recreational (<1%). In contrast, the license holders that had no recorded seafood sales most commonly indicated a personal consumption or donation response (36%). Current or past income (32%) was a common response as well for this group, with future income (20%) also often appearing. There were some respondents in this category that mentioned not being able to fish commercially in the past year due to health issues, but had previously relied on commercial fishing for income. Responses that fell into “other” (16%), fishing under commercial requirements instead of recreational (5%), and selling excess catch (2%) were less common.

The vast majority of survey participants that had recorded commercial landings of seafood in 2014 indicated using commercial gear (90%) to do so. In contrast, the majority of those that did not have recorded commercial landings in 2014 indicated not using major commercial gears to harvest fish or shellfish in commercial quantities (62%). The most commonly used commercial gears for both groups were gill nets (55% for those reporting landings, 50% for those not reporting landings). For those reporting commercial landings, this was followed by crab pot (35%), by hand/rake/tong (31%), rod and reel (26%), trawl (26%), “other” (19%), and gig (18%). For those without commercial landings, gill nets were followed by rod and reel (39%), hand/rake/tong (39%), crab pot (32%), gig (25%), trawl (19%), and “other” (4%).

The majority of respondents that recorded sales of seafood in 2014 typically sold all of their catch (63%), with fewer selling part of their catch and keeping the other part for donation or personal consumption (43%). Few respondents in this category did not typically sell any of their catch (3%). The responses for those that did not record sales of seafood in 2014 were somewhat similar for selling part of their catch and keeping the other part for donation or personal consumption (49%), but more respondents did not typically sell their catch when fishing with commercial gear (43%) and few typically sold all of their catch (18%).

The average quantities of unsold catch were lower in all categories for survey respondents that recorded commercial sales of seafood. Median quantities were lower for these respondents as well for finfish bushels of shellfish and crabs. The median quantities were the same for shrimp, and higher for numbers of shellfish. The most commonly indicated quantity of unsold harvest for respondents that had recorded commercial landings was 50 pounds of finfish, 2 bushels of shellfish, 1,000 individual shellfish, 1 bushel of crabs and 100 pounds of shrimp. In contrast, the most commonly cited quantity of unsold catch for license holders that did not record commercial landings of seafood was 100 pounds of finfish, 10 bushels of shellfish, 100 shellfish, 2 bushels of crabs, and 50 pounds of shrimp.

Table 2. Answers from survey respondents that had recorded commercial seafood landings in 2014. (N=262)

Q1: Main purpose for owning a commercial fishing license		Responses	% of Total Response			
Current or Past Income		234	91%			
Future Income		9	4%			
Personal Consumption or Donation		43	17%			
Sell Excess Catch		2	1%			
Fish Under Commercial Requirements Instead of Recreational		1	<1%			
Other		21	8%			
<i>Total Responses</i>		256	-			
<i>No Response</i>		6	-			
Q2: Used commercial gear or harvested in commercial quantities		Responses	% of Total Response			
Yes		236	90%			
No		25	10%			
<i>Total Responses</i>		261	-			
<i>No Response</i>		1	-			
Q3: Commercial Gears Used		Responses	% of Total Response			
Crab Pot		86	35%			
Gig		44	18%			
Trawl		62	26%			
Gill Net		134	55%			
Rod and Reel		63	26%			
By Hand/Rake/Tong		75	31%			
Other		47	19%			
<i>Total Responses</i>		243	-			
<i>No Response</i>		19	-			
Q4: Typical use of catch		Responses	% of Total Response			
Sell All of Catch		149	63%			
Sell Part and Keep Other Portion for Personal Consumption or Donation		102	43%			
Do Not Sell Catch		7	3%			
<i>Total Responses</i>		238	-			
<i>No Response</i>		24	-			
Q5: Estimated harvest kept but not sold	Responses	% of Total Responses	Average	Std. Dev.	Median	Mode
Finfish (pounds)	128	75%	139.2	250.8	50	50
Shellfish (bushels)	75	44%	10.1	22.5	4	2
Shellfish (numbers)	15	9%	404	361.6	300	1,000
Crabs (bushels)	70	41%	8.1	19.9	2	1
Shrimp (pounds)	64	38%	149.7	200.8	100	100
<i>Total Responses</i>	170	-	-	-	-	-
<i>No Positive Response</i>	92	-	-	-	-	-

Table 3. Answers from survey respondents that did not have recorded commercial seafood landings in 2014. (N=395)

Q1: Main purpose for owning a commercial fishing license		Responses	% of Total Response			
Current or Past Income		114	32%			
Future Income		71	20%			
Personal Consumption or Donation		127	36%			
Sell Excess Catch		8	2%			
Fish Under Commercial Requirements Instead of Recreational		19	5%			
Other		58	16%			
<i>Total Responses</i>		352	-			
<i>No Response</i>		43	-			
Q2: Used commercial gear or harvested in commercial quantities		Responses	% of Total Response			
Yes		147	38%			
No		241	62%			
<i>Total Responses</i>		388	-			
<i>No Response</i>		7	-			
Q3: Commercial Gears Used		Responses	% of Total Response			
Crab Pot		59	32%			
Gig		47	25%			
Trawl		36	19%			
Gill Net		93	50%			
Rod and Reel		73	39%			
By Hand/Rake/Tong		72	39%			
Other		8	4%			
<i>Total Responses</i>		185	-			
<i>No Response</i>		210	-			
Q4: Typical use of catch		Responses	% of Total Response			
Sell All of Catch		31	18%			
Sell Part and Keep Other Portion for Personal Consumption or Donation		85	49%			
Do Not Sell Catch		74	43%			
<i>Total Responses</i>		174	-			
<i>No Response</i>		221	-			
Q5: Estimated harvest kept but not sold	Responses	% of Total Responses	Average	Std. Dev.	Median	Mode
Finfish (pounds)	121	83%	299.5	598.6	100	100
Shellfish (bushels)	69	48%	12.8	16.4	10	10
Shellfish (numbers)	7	5%	742.9	1,441.8	150	100
Crabs (bushels)	41	28%	20.5	45.1	5	2
Shrimp (pounds)	44	30%	190.5	315.3	100	50
<i>Total Responses</i>	145	-	-	-	-	-
<i>No Positive Response</i>	250	-	-	-	-	-

DISCUSSION

The results of this survey provide information from commercial fishing license holders that is often not collected on trip tickets or in other sampling programs. Results indicate some interesting differences between commercial fishing license holders that did and did not report commercial landings of seafood. The sample size of this survey is statistically valid to represent the total population of commercial fishing license holders in 2014 at a 95 percent confidence level and a ± 5 percent sampling error. This survey was randomly administered and the percent of respondents that had commercial landings (40%) in 2014 compared to those that did not (60%) matches up well with the ratio of total licenses with selling privileges used (42%) with those that were not used (58%) in fiscal year 2014.

Nevertheless, there are some causes for concern in the study's application and computation of results. Due to the "pilot nature" and limited budget for this survey, there were no efforts to follow up with license holders selected to participate in the survey. This could have led to some level of non-response bias among the surveyed population. Also, there may have been some response bias where survey participants may have purposely inflated or deflated estimates of harvest or provided inaccurate responses due to apprehension over how study results may be used. Additionally, there was likely recall bias involved in the provided harvest estimates, as participants were asked to estimate 12 months of fishing activity. Some participants likely were not able to accurately remember all harvest due to the time lapse between being questioned and when the harvest took place.

Only positive values were used in computing the unsold harvest estimates, as there was extreme inconsistency in how the survey was filled out. Respondents often did not include any values (leaving spaces blank) despite indicating keeping some catch for personal consumption or donation or indicated that they could not quantify their unsold harvest. Another common issue was that respondents filled out some categories but left others completely blank. This made it unclear if the question was skipped, if they could not quantify harvest, or if they did not have unsold harvest in that category. In future efforts, the estimated harvest component of the survey could be improved if respondents were asked to state whether or not they had harvest in each category, specific species kept, and the common uses of unsold harvest such as donation to others, consumed personally or within the respondent's family, or used for other purposes such as bait.

Caution should be used when applying the results of this survey to the licensed population. Results can be used in a more qualitative manner, such as typical reasons for owning a commercial license, common gears utilized, general use of seafood harvested with commercial gear and the make-up of unsold harvest (e.g. certain groups of species are likely kept more for personal consumption or donation than others). Quantitative application of survey results to estimate total unsold harvest should be met with less confidence, as there are several causes for concern with the survey, as previously described.

Despite the inability of this survey to quantify the amount of unsold harvest, the results do highlight some potential issues with the use of the commercial fishing license outside of the intended purpose of selling seafood for income. The license is often held for income purposes (current and future), especially by those that report sales of seafood. Nevertheless, the license is also used for unintended purposes in some circumstances, such as for personal consumption or circumventing certain regulations or bag limits. The unsold harvest is thought to be largely unreported via the trip ticket program and is not captured by the Marine Recreational Information Program or other NCDMF harvest sampling programs. These issues have come to

the forefront of discussion by the North Carolina Marine Fisheries Commission several times in recent years with concerns over unsold catch when commercially harvesting red drum as a bycatch species, regional impacts of unrecorded harvest on certain species such as oysters, and how to define a commercial fisherman in relation to the large portion of commercial licenses that do not have recorded sales of seafood. Whether or not this unrecorded catch measurably impacts fishery resources and needs to be addressed is debatable and unclear. Should further information be desired and adequate funding made available, efforts could be made to gather additional data and increase confidence in survey results by taking measures to improve the survey instrument and implementing more rigorous sampling methods.

APPENDIX 1: Survey instrument

1) What is your main purpose for owning a commercial fishing license? PID:#####

2) Did you fish with commercial gear or harvest fish/shellfish in commercial quantities in 2014?

- Yes (If "yes" please continue with the survey)
 No (if "no" please disregard the following questions and mail this survey back to NCDMF)

3) Which commercial gear(s) did you use in 2014? (Please check all that apply)

Crab Pot Gig Trawl Gill Net Rod and Reel By Hand/Rake/Tong Other: _____

4) When fishing with commercial gear, what do you usually do with your harvest?

- Sell all of your catch Yes No
- Do not sell any of your catch Yes No
- Sell part of your catch and keep the other portion for personal consumption or for donation Yes No

5) When fishing with commercial gear please estimate how many pounds of the following seafood categories that you kept this year and did not sell?

<u>Category</u>		<u>Please circle correct measure</u>
Finfish (flounder, spot, jumping mullet, etc.)	_____	pounds
Shellfish (oysters, clams, bay scallops, etc.)	_____	bushels / numbers
Crabs	_____	bushels
Shrimp	_____	pounds

Thank you for participating in this survey! Please drop this survey card in the most convenient U.S. Postal Service mailbox for return to NCDMF. (Please note that no postage is necessary)