A Social and Economic Analysis of Commercial Fisheries in North Carolina: Beaufort Inlet to The South Carolina State Line

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INTRODUCTION

North Carolina's coastal fishery resources are a source of economic and social importance to many coastal communities. The harvest of these resources could create a demand too difficult to maintain without harming the long-term viability of certain species if not properly controlled. In response to decreased fisheries resources, the North Carolina Marine Fisheries Commission (MFC), National Marine Fisheries Service (NMFS), the Atlantic States Marine Fisheries Commission (ASMFC), and the South Atlantic Fisheries Management Council (SAFMC) have recommended rules and placed restrictions on fishing activities to promote recovery of the resources. There are currently restrictions on blue crab (*Callinectes sapidus*), flounders (Paralichthys spp.), shrimp (Penaeid), mullet (Mugil spp.), oysters (*Crassostrea virginica)*, red drum (*Sciaenops ocellatus)*, snappers (Lutjanidae) and groupers (Epinephelus spp.), and striped bass (*Morone saxatilis)*, among other species. These restrictions are enforced primarily by the North Carolina Division of Marine Fisheries (NC DMF) throughout the coastal waters of North Carolina, including the study area.

Understanding the impacts of these restrictions on individual commercial fishermen, as well as on the commercial fishing industry as a whole, requires knowledge of the social and economic aspects of the fishing industry. This information is important for the development of state fishery management plans directed toward species, gears, water bodies, or any combination of species, gears, and water bodies under the North Carolina Fisheries Reform Act of 1997.

In August of 2002, the NC DMF began the fourth in a series of studies investigating the social and economic characteristics of North Carolina's commercial fisheries by interviewing fishermen and fish dealers. The previous three studies were similar analyses of the Albemarle Sound Management Area (Diaby, 2000), Pamlico Sound (Diaby, 2002), and Core Sound (Cheuvront, 2002).

Study Area

This study focused on the fishermen and fish dealers who work the estuarine waters from Beaufort Inlet southwest to the South Carolina state line (Figure 1.). The study area can be identified by NC Division of Marine Fisheries' trip ticket water body names. These water bodies include Newport River, Bogue Sound, White Oak River, Inland Waterway – Onslow County, New River, Stump Sound, Topsail Sound, Masonboro Sound, Cape Fear River, Lockwood Folly River, Shallotte River, and Inland Waterway – Brunswick County. The boundaries of these water bodies lie within Carteret, Onslow, Pender, New Hanover, and Brunswick counties. All of these rivers or sounds are behind barrier islands. While some fishermen and dealers in this study fish in the ocean, those activities generally are not reported here. In all, these water bodies comprise approximately 115,005 acres of water and about 1,147 linear miles of coastline from Beaufort Inlet to the South Carolina state line.

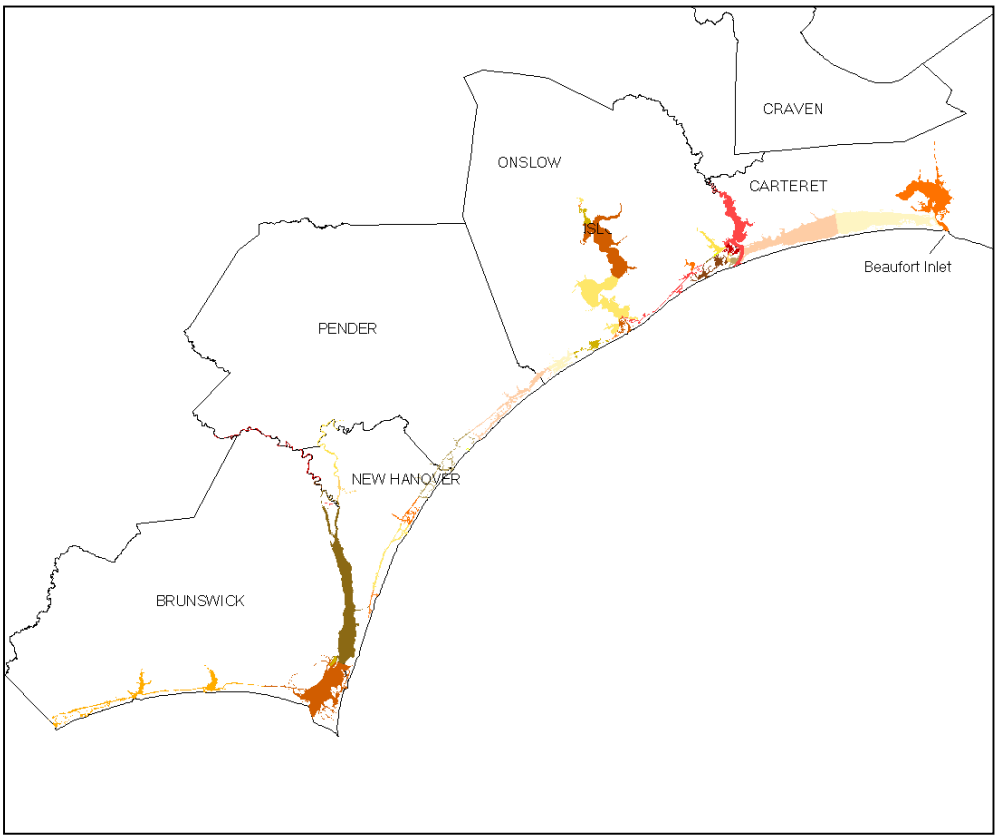

Figure 1. Map of study area (NC DMF GIS Program).

Study Objectives

The specific objectives of this study were:

1. To describe the socioeconomic aspects of commercial fisheries from Beaufort Inlet to the South Carolina state line. Descriptions include demographic characteristics of commercial fishermen, dependence on commercial fishing, fishing activities, and fish dealer businesses;
2. To collect costs and earnings information from commercial fishermen and fish dealers in order to develop estimates of the costs, earnings, and returns associated with commercial fishing; and
3. To assess commercial fishermen's perceptions of fishery regulations, conflict, and relevant issues including the future of the industry.

METHOD

Recruitment and Participation Rates

In the summer of 2002, a list of 907 commercial fishing license holders with contact information was obtained from the NC DMF license database. Each of the persons or businesses on the list reported at least $1,000 ex-vessel value in seafood landed from water bodies in the study area during calendar year 2001. Licenses included were the Standard Commercial Fishing License (SCFL), Retired Standard Commercial Fishing License (RSCFL), Land or Sell License, and the Shellfish License for North Carolina Residents without a SCFL. A sample of 400 was randomly selected from the list of 907 eligible fishermen. Also obtained was a list of 230 licensed fish dealers who purchased at least $1,000 of seafood caught in the study area during 2001.

All surveys for both the commercial fishermen and the fish dealers were conducted by a full-time interviewer hired specifically for the project.

Fishermen

The commercial fishing licensees were initially contacted by telephone between August 2002 and February 2003. It was discovered that one had transferred the license during the year and the new license owner was not fishing in the study area. Two of the licensees were deceased. Two were not included because they stated they did not land $1,000 worth of seafood from the study area in 2001. The second no longer fished his license, but instead transferred it to others to use.

A total of 82 license holders could not be reached at all to determine whether or not the fisherman wanted to participate. Reasons for not contacting included:

1) No response to messages repeatedly left at the residence.
2) The interviewer was told the fisherman was never home by someone else at the residence. Typically, this was because the fisherman was out of the area fishing.
3) The interviewer was given incorrect forwarding contact information by another person.
4) The interviewer was told not to call back by someone other than the fisherman.
5) The residential telephone line was disconnected and no other telephone number could be found.
6) The fisherman was in the hospital or a nursing home during the time of study.
7) The fisherman refused to come to the telephone.

An additional 21 fishermen were excluded from the study because they had participated in the Core Sound study (Cheuvront, 2002) the previous year. These fishermen were not included because it is likely these two data sets will be merged for future analyses. To avoid confounding the merged dataset, DMF did not want a single fisherman to be entered more than one time. The DMF attempts to avoid contacting the same fishermen too frequently because this might discourage participation. Many participate reluctantly and it is hoped this tactic will increase willing participation rates in future data collection efforts.

There were 292 fishermen who were contacted either by telephone or in person and were eligible to participate in the study. Of these, 13 (4.4%) refused to participate. Another 11 (3.8%) were classified as "passive refusers" because the fisherman never stated they did not want to participate, but for various reasons data were not collected from them. These reasons included:

1) Repeatedly telling the interviewer that he or she was "Too busy right now. Try back later."
2) Failure to keep appointments for a scheduled interview.
3) Refused to come to the telephone when the interviewer called at a previously arranged time.

Surveys were completed for 268 (91.8%) of the fishermen who were contacted and determined to be eligible to participate. This number of completed surveys resulted in a dataset with 95% confidence (±5%) in its ability to estimate values for the entire population of commercial fishermen in this part of North Carolina (Pearson NCS, 2003).

Fish dealers

The initial list of 230 fish dealers was scrutinized and it was determined that four dealers were listed more than once using more than one business name. This reduced the number of eligible dealers to 226. A comparison of the dealer list was made against the list of dealers who had participated in the earlier Core Sound study (Cheuvront, 2002). The 26 Core Sound dealer participants who were also on the dealer list for this study were removed in an effort to keep a business from being represented twice in any combined datasets. Once again, it is likely that the data from this study will be combined with the data from the earlier study. This further reduced the number of eligible dealers to 200.

In December 2002, surveys were mailed to each of the 200 licensed fish dealers. As of January 2003, 54 had been completed and returned by mail. The interviewer began to call those who had not returned the surveys. The dealers were asked to complete the survey over the telephone.

The DMF did not conduct interviews with 70 dealers, five of that number refused to participate when asked, and two were classified as passive refusals. Of the passive

refusals, one said he would fax the completed survey, but did not. The other said he lost the original survey and wanted a new one mailed, but did not return that survey either. The remaining 63 dealers were not contacted to reach a decision about participation. Reasons for not reaching the business included the business was closed at the time of the survey, change in business ownership, out of business, or the owner is now deceased. The DMF simply was unable to locate some dealers due to disconnected telephones, changed telephone numbers, or the study data collection period ended before they could be reached. Several attempts were made to reach each dealer by telephone prior to the end of the study. Time would not permit further follow up telephone calls.

As a result, 130 dealer surveys were completed. Of those, 76 surveys were completed by telephone, the rest were returned by mail. The survey completion rate was 95% for those dealers who were contacted by mail and telephone. This sample size resulted in a dataset with 95% confidence (±5.7%) in its ability to estimate values for the entire population of commercial fish dealers in this part of North Carolina (Pearson NCS, 2003).

Cost of Conducting The Surveys

It is important to know the costs associated with conducting surveys of this type for estimating time and money expenditures for future data collection efforts. Therefore, financial cost analyses were based on all expenditures associated with collecting and entering the data into a data entry program. The costs associated with conducting the study were divided by the number of completed surveys to arrive at the values associated with a cost per completed survey. This figure includes the values associated with reaching or attempting to reach those who did not participate.

Records were kept of the number of telephone calls made to each potential participant. We noted the number of days from the time the initial contact attempt was made until a participation status was determined or the survey was completed. Also recorded was the date when data entry for each survey was completed.

Principal investigator time and financial expenditures such as salary and fringe benefits for effort put into the study were not included, because this position is funded by non-research sources. Therefore, the costs did not impact the study's expenditures. The principal investigator wrote the data entry program therefore, the costs associated with the development of the program are not included here either.

Fishermen

The total cost for contacting and interviewing the fishermen was $12,564.70, including mail, telephone, and personnel costs. The total cost for the mailings to the 400 potential fishermen participants was $188. Telephone charges amounted to $836.16. Interviewer charges for this survey totaled $9,951.30. Data entry charges for the completed surveys were $1,589.24. Table 1 shows the detailed expenditures associated with conducting the fishermen survey.

Each potential participant was sent a letter describing the study prior to being contacted by an interviewer. The cost of postage was $0.37 per mailing. The cost of the envelope, paper, and printer toner per letter was $0.10 each.

It took an average of six phone calls for those participants who completed a survey (range: 1 – 29 calls, standard deviation: 5 calls). On average it took 13 days from the time of the first telephone call before a survey was completed (range: 0 – 69 days, standard deviation: 16 days). Of the 3,562 telephone calls made to fishermen, only 268 resulted in a completed survey. (Two of the surveys were completed in person at the request of the fisherman.) Telephone calls that did not result in a completed survey were estimated to last approximately 2 minutes each. Completed survey telephone calls lasted approximately 30 to 45 minutes each. The NC DMF places telephone calls within the state for $0.05 per minute regardless of whether the call is

Table 1. Fisherman survey expenditures.

	All Surveys	Per Completed Survey
Telephone	$ 836.16	$ 3.12
Postage/supplies	$ 188.00	$ 0.70
Personnel:	-	-
Data collection	$ 9,951.30	$ 37.13
Data entry	$ 1,589.24	$ 5.93
Total	$ 12,564.70	$ 46.88

local or long distance. Therefore, the estimated telephone charges per completed interview were $3.12.

Because the interviewer was a temporary employee, no fringe benefits were paid, only an additional 7.65% for the state's contribution to social security. The hourly rate for the interviewer was $11.02 plus the state's social security contribution. Interviewer costs were approximately $37.13 per completed interview. Additional personnel costs included ½ hour for data entry per completed interview ($5.93).

The total cost of the fisherman survey was $12,564.70, or $46.88 per completed survey, including averaging the costs associated with contacting those who did not participate into the costs of those who did.

Fish dealers

The total cost for contacting and interviewing the fish dealers was $1,722.10, including telephone, mail, and personnel costs. Telephone charges for this survey were $85.90. The total cost for the mailings to the 200 potential fishermen participants was $94. The total cost for interviewer wages were $771.10. An additional $771.10 was paid for survey data entry. Table 2 shows the detailed expenditures associated with conducting the fish dealer survey.

Each potential participant was sent a letter describing the study prior to being contacted by an interviewer. The cost of postage was $0.37 per mailing. The cost of the envelope, paper, and printer toner per letter was $0.10 each.

Table 2. Dealer survey expenditures.

	All Surveys	Per Completed Survey
Telephone	$ 85.90	$ 1.16
Postage/supplies	$ 94.00	$ 0.72
Personnel:	-	-
Data collection	$ 771.10	$ 5.93
Data entry	$ 771.10	$ 5.93
Total	$ 1,722.10	$ 13.75

Of the 193 telephone calls made only 74 resulted in a survey completed over the telephone. The telephone calls that did not result in a completed survey were estimated to last approximately 2 minutes each. Completed survey telephone calls lasted approximately 20 minutes each. The NC DMF places telephone calls within the state for $0.05 per minute regardless of whether the call is local or long distance. Therefore, the estimated telephone charges per completed interview was $1.16.

As the interviewer was a temporary employee, no fringe benefits were paid, only an additional 7.65% for the state's contribution to social security. The hourly rate for the interviewer was $11.02 plus the social security contribution. Interviewer costs were approximately $5.93 per completed interview. Interviewer costs included here are preparing the mailings, clerical work to track participants in the study, and making telephone calls. Additional personnel costs included ½ hour for data entry per completed interview ($5.93), for a total of $771.10. The total cost of the fish dealer survey was $13.75 per completed survey.

Survey Instruments

As was previously stated, this survey project was the fourth in a series of surveys covering North Carolina's inside waters. The goal in designing the surveys for this project was to make the data compatible with the data collected from the earlier projects, wherever possible.

Fishermen

A copy of the survey used to collect data from the fishermen is located in Appendix A. The fisherman survey used in this study was nearly identical to the one used in the Core Sound study (Cheuvront, 2002) with minor modifications to make the instrument relevant to the fisheries common in these waters. These surveys were filled out by the interviewer based on the respondents' answers given over the telephone. Two respondents did not want to be interviewed by telephone and were interviewed in person.

The data collected in the survey included information concerning:

(a) Individual socio-demographics

(b) Characteristics of the fishing business

(c) Fishing vessel characteristics and expenses

(d) Targeted species and gear combinations

(e) Income from fishing

(f) Financial costs of doing business

(g) Attitudes regarding fishery management

(h) User group conflicts

(i) Perceptions of the fishing industry

Fish dealers

A copy of the survey used to collect data from the fish dealers is located in Appendix B. This survey is nearly identical to the one used in the Core Sound study (Cheuvront, 2002). The minor differences were related to issues specific to the fisheries that occur in these waters. These surveys were either physically filled out by the respondents and returned by mail, or were filled out by the interviewer based on the respondents' answers given over the telephone.

The data collected in the survey included information concerning:

(a) Business characteristics

(b) Major species sold

(c) Operating expenses

(d) Markets

(e) Current issues important to seafood businesses

RESULTS

After collecting the data, the interviewer keyed the surveys into a Microsoft Access (2000) data entry program written by the author and designed to store and manage the data. The program checked for "out of range" responses, processed question skips where appropriate, and allowed the interviewer to record notes and

comments about the interview. A random sample of 50% of the questionnaires was double-keyed by other project personnel, except for the original interviewer's notes and comments. The data were analyzed using Statistical Package for the Social Sciences (SPSS release 12.0.0 [SPSS, 2003]). This version of SPSS has the ability to directly read Access files through open database connectivity (ODBC). Final data verification, assigning labels to variables and additional variable calculations were completed in SPSS along with all data analyses. The primary analyses in this report consist of frequency and simple univariate analyses. Further, in depth analyses on the entire dataset or subsets of the data may be available upon request from the author of this report.

Fishermen

Socio-demographics

The average fisherman who responded to the survey was a 48-year-old white male who has been fishing for about 24 years (see Table 3). The youngest fisherman interviewed was 17, and the oldest was 84 years old. Only 14 respondents were women (5.2%). Five respondents were African-American, two Native American, and one Hispanic. The remaining respondents were white (94.8%). Approximately, one third of the respondents live in Onslow County. Fewer than 30% of the fishermen interviewed live in New Hanover or Brunswick Counties. Carteret County accounted for nearly 23% of the respondents. Of the remaining respondents, nearly 5% lived in a county that did not border any of the water bodies covered in this study. On average, the respondents lived in their current community for over 35 years, but some had lived in their community for less than one year up to 81 years. The fishermen lived in households with a range of one to seven people; however, over 89% of the fishermen lived in households with two to four people. More than 70% of the fishermen were married at the time of the study and approximately 13% had never been married. The remaining participants were divorced, widowed, or separated from their spouses. Over 45% of the respondents were high school graduates and about 38% had less than a high school diploma. The remaining 17% had at least some college education.

Table 3. Sociodemographic variables.

	Frequency	Percent		Frequency	Percent
Gender			Annual Household Income		
Male	254	95%	Less than $15,000	44	18%
Female	14	5%	$15,001 - $30,000	122	50%
Racial/Ethnic Background			$30,001 - $50,000	48	20%
White	260	97%	$50,001 - $75,000	24	10%
African-American	5	2%	$75,001 - $100,000	4	2%
Native American	2	1%	More than $100,000	2	1%
Hispanic	1	0%	Refuse to Answer	24	9%
Education			County of Residence		
Less than High School	101	38%	Carteret	61	23%
High School Graduate	122	46%	Onslow	90	34%
Some College	25	9%	Pender	25	9%
College Graduate	20	8%	New Hanover	33	12%
Marital Status			Brunswick	46	17%
Married	189	71%	Other	13	5%
Divorced	25	9%	Age		
Widowed	14	5%	Average	48.27	
Separated	6	2%	Minimum	17	
Never Married	34	13%	Maximum	84	
# of People in Household			Years Fishing		
One	30	11%	Average	23.79	
Two	98	37%	Minimum	1	
Three	60	22%	Maximum	82	
Four	57	21%	Years in Community		
Five	19	7%	Average	35.41	
Six	2	1%	Minimum	0	
Seven	1	0%	Maximum	81	

Characteristics of Fishing Businesses

Slightly over half (51.5%) of the fishermen indicated year around fishing. Table 4 shows the number and percent of fishermen who fish in a given month, but not year-round. From May to November had the greatest percent of participation by fishermen who do not fish all year long. January and February had the least amount of participation.

Fishermen who fish the inside waters south of Beaufort Inlet to the South Carolina line fish about 75% of the time in these waters. Other water bodies listed by these fishermen, in order of preference were other North Carolina inside waters, in the ocean south of Cape Hatteras, and out-of-state waters. None of these fishermen

Table 4. Number and percentage of fishermen who fish in a given month, but do not fish year-round.

Month	Number (n=130)	Percent
January	39	30%
February	34	26%
March	43	33%
April	54	42%
May	75	58%
June	84	65%
July	91	70%
August	91	70%
September	89	68%
October	100	77%
November	85	65%
December	50	38%

reported fishing in the ocean north of Cape Hatteras. Twenty percent (55) of these fishermen also have a license to sell seafood.

The ownership of fishing businesses can generally be described by three categories: sole proprietorship, partnership, or corporation. A large majority of the fishermen work as sole proprietor businesses (97.4%). Nearly 2% work in partnerships and less than 1% could be classified as corporations.

Fishing Vessel Characteristics and Business Expenses

Approximately 11% of the fishermen interviewed did not use a vessel for fishing. These fishermen primarily landed oysters and clams. Most fishermen (64%) owned only one vessel. Another 18% owned two vessels. Five percent owned three vessels. The remaining 2% of the fishermen owned more than three vessels.

Vessels were classified according to size. Vessels less than 19 ft. in length were classified as being “small.” Vessels between 19 and 38 ft. in length were classified as being “medium.” Vessels over 38 ft. in length were classified as being large. Sixty-three percent of the vessels were classified as being small, 32% were medium, and 5% were large. Table 5 shows a summary of vessel characteristics based on vessel size.

Table 5. Summary characteristics by vessel size.

	Small (n=149)	Medium (n=75)	Large (n=12)
Length (in feet)	16.35	24.87	50.67
Crew Size	1.15	1.21	2.17
Years Owned	8.73	8.04	10.75
Value	$4,819	$13,961	$124,333
Average Trip Expenses:			
Fuel	$12.80	$35.61	$173.33
Bait	$3.16	$6.36	$0.00
Groceries	$4.43	$7.57	$26.17
Ice	$1.84	$2.74	$28.08
Other Expenses	$0.72	$1.70	$0.00
Total Average/Trip:	$22.95	$53.98	$227.58
Annual Expenses:			
Capt/Crew (not self)	$224	$1,326	$5,333
Pay to Relatives	$167	$671	$167
Insurance	$17	$37	$1,250
Licenses & Permits	$265	$331	$463
Startup (2001 only)	$0	$0	$0
Loan Payments	$203	$436	$1,917
New Gear	$1,264	$4,775	$3,050
Repairs	$845	$1,968	$4,729
Docking Fees	$110	$307	$240
Other Expenses	$223	$1,033	$71
Total Average/Annum:	$3,319	$10,884	$17,219

Fishermen who owned more than one vessel were asked to provide the information for the vessel used the most.

The average market value for small boats was $4,819, medium vessels average value was $13,961, and large vessels on average, were valued at $124,333. The market value of vessels varied greatly within each of the categories, however. Trip expenses varied according to size with larger boats incurring greater average trip expenditures. Average annual costs, not related to specific trips, increased as the vessel length increased. The average expenses of operating a smaller vessel were about $9,700. Operating expenses for medium-sized vessels averaged over $19,000, and nearly $30,000 for large vessels. Most of the medium and large vessels are ocean going and tend to incur the greatest expenses in salaries for captain or crew, new gear, and for repairs.

Fifty fishermen usually have a crew on the vessel used most. Of those, 26 (52%) utilize a share system for paying their crew. None of the fishermen mentioned bait being deducted prior to determining shares. Further investigation of the data showed that none of the vessels which used a share system were fishing operations that required bait. However, 84.6% said fuel, 34.6% said ice, and 57.7% said groceries were deducted prior to determining shares. Fewer deducted ice and groceries presumably due to the shorter duration of these fishing trips.

Targeted Species and Gear Combinations

Fishermen were asked about the species targeted and the gears used. Most fishermen in this area target more than one species. Some target only shellfish, while others target only crustacea. However, the majority of fishermen target a combination of shellfish, crustacea, and finfish. Table 6 shows the major species these fishermen target along with the proportion of the fishermen who target them. For those who target the species, the average amount of their total fishing effort is also shown along with the gears used to target them. Only major gears used to target a given species are shown. Likewise, some individual fishermen use more than one gear to target a species.

Shellfish are the predominant species taken by these fishermen. Clams were targeted by 57% and oysters were targeted by 38%. Most fishermen who targeted oysters were very likely to also target clams. However, many clam fishermen did not also target oysters. On average, people who clammed earned 59% of their fishing income from clams. People who targeted oysters earned about 30% of their fishing income from oysters. The most commonly used gears for targeting clams and oysters were rakes, tongs, and by hand. Mechanical methods were also mentioned for clams.

Scallops were targeted by only 5% of the fishermen and accounted for an average of 13% of their fishing income. The predominant gear used when targeting scallops is the scallop scoop. Some fishermen also reported using a rake for scallops.

Shrimp were the next most commonly targeted species. Thirty-five percent of the fishermen interviewed targeted shrimp. Those who did target shrimp earned an

Table 6. Targeted species and gear usage.

Species	Percent of Respondents who target	Average % of Fishing Income	Gears*	Percent Using Gear to Target
Clams	57%	59%		
			Rake	77%
			By Hand	54%
			Mechanical	7%
Oysters	38%	30%		
			By Hand	76%
			Tongs	39%
Scallops	5%	13%		
			Scoop	92%
			Rake	23%
Shrimp	35%	59%		
			Trawl	59%
			Skimmer Trawl	27%
			Channel Net	21%
Blue Crabs	16%	66%		
			Pots	95%
Flounders	21%	49%		
			Gill Net	82%
			Gig	32%
Spot	18%	25%		
			Gill Net	98%
Striped and White Mullet	17%	30%		
			Gill Net	96%
Atlantic Croaker	2%	8%		
			Gill Net	100%
Weakfish	2%	12%		
			Gill Net	100%

* Only major gears are listed here. In some cases, some fishermen use more than one gear to target the same species.

average of 59% of their fishing income from the species, primarily using shrimp trawls, skimmer trawls, and channel nets.

Blue crabs were targeted by 16% of the respondents. Those who targeted blue crabs earned an average of 66% of their fishing income from crabs. The predominant gear for targeting blue crabs was crab pots.

About one fifth (21%) of the respondents targeted flounder (southern, summer, and Gulf). Those who targeted flounder earned an average 49% of their total fishing income from flounder. The majority of fishermen targeted flounder using a gill net (82%) and about one third of the respondents used a gig to target flounder.

Spot (*Leiostomus xanthurus)* and striped/white mullet (*Mugil cephalus/Mugil curema*) were targeted by 18% and 17%, respectively. On average, fishermen who targeted spot or striped/white mullet earned 25 – 30% of their fishing income from the species. Gill nets were the overwhelmingly predominant gear mentioned for targeting spot and striped/white mullet.

Atlantic croaker (*Micropogonias undulates)* and weakfish (*Cynosicon* regalis) each were targeted only by 2% of the fishermen interviewed. Those who targeted Atlantic croaker earned 8% of their total fishing income from Atlantic croaker. Fishermen who targeted weakfish earned an average of 12% of their income from weakfish. Gill nets were the only gears mentioned by respondents for targeting Atlantic croaker and weakfish.

Income From Fishing

Fishing provides a large percentage of individual income for the majority of fishermen interviewed. Table 7 shows categories of self-reported individual income earned by the fishermen in the study in the year 2001. The most any fisherman stated as fishing earnings in 2001 was $60,000. The median fishing income for full-time fishermen was $10,000. According to the results, 98% of those surveyed made no more than $30,000 solely from fishing in 2001. The median individual income for all wage earners in the study area during this period was $22,000 - $28,000 (NC Dept. of Commerce, 2003).

Approximately, 2% (n=6) of the respondents refused to answer questions about how much money they made from fishing. Twelve percent of fishermen stated they either earned no money, or lost money from fishing in 2001. The greatest amount reported lost in 2001 by an individual was $8,000.

Further analysis was conducted on the responses given by those who had no profit or lost money on fishing in 2001. Slightly more than half (51.6%) of these fishermen targeted clams in 2001. Many fishermen who lost money targeted shrimp (29%). Twenty-three percent of the fishermen who lost money targeted flounder. Nineteen percent of those who lost money had targeted crabs and/or oysters.

Table 7. Individual income from fishing.

	Frequency	Percent
$0 or lost money	31	12%
$1 - $5,000	102	39%
$5,001 - $15,000	75	29%
$15,001 - $30,000	48	18%
> $30,000	6	2%
Total	262	100%
Refused	6	
Grand Total	268	

The majority of households with a commercial fisherman have additional sources of income. Table 8 shows total household income for commercial fishermen in the study. Nine percent of the respondents refused to answer the question about total annual household income. Of those who did answer, 18% lived in households with less than $15,000 total annual income and 13% lived in households with more than $50,000 in total income. The minimum household income given was $3,500 and the maximum was $200,000. The median household income in 2001 for this group of fishermen was approximately $22,500. The median income for all households in the study area during this time was $40,000 - $50,000 (NC Dept of Commerce, 2003).

Table 9 is a contingency table showing the relationship between income from fishing and total household income. Twenty-five fishermen did not answer both questions asking about income from fishing and total household income. Of the

Table 8. Total household income.

	Frequency	Percent
Less than $15,001	44	18%
$15.001 - $30,000	122	50%
$30,001 - $50,000	48	20%
$50,001 - $75,000	24	10%
$75,001 - $100,000	4	2%
More than $100,000	2	1%
Total	244	100%
Refused	24	9%
Grand Total	268	

Table 9. Contingency table showing relationship between fishing income and total household income.

Household Income / Income from fishing	<= $15,000	$15,001 - $30,000	$30,001 - $50,000	$50,001 - $75,000	$75,001 - $100,000	> $100,000	Total
$0 or lost money	7	11	5	3	2		28
$1 - $5,000	23	43	17	7	1		91
$5,001 - $15,000	14	42	11	1	1	2	71
$15,001 - $30,000		26	13	8			47
> $30,000			2	4			6
Total Respondents	44	122	48	23	4	2	243

remaining 243 respondents, seven either lost money or had no profit from fishing and had a total household income of less than $15,000. Only six respondents (2%) reported having a fishing income greater than $30,000. However, 77 (62%) reported total household incomes of at least $30,000, indicating that many fishermen live in households with additional sources of income such as a second job, or that other family members work and contribute to the household.

Two-thirds (66%) of the respondents stated that they had income separate from fishing activity. Table 10 shows the range of occupations listed as other sources of individual income received by these fishermen. The most frequently mentioned other source of income was retirement or disability. Approximately one fifth (22%) of the fishermen also earn income from the construction trades. Many fishermen have carpentry and electrical skills learned from repairing their own fishing boats. They also

Table 10. Other forms of employment.

Other Employment	Frequency	Percent
Retirement/Disability	56	30%
Construction	41	22%
Other Fishing	22	12%
Manual Labor	14	7%
Maintenance	8	4%
Other Maritime	6	3%
Retail	6	3%
Government	5	3%
Landscaping	5	3%
Agriculture	4	2%
Other	22	12%

live in areas experiencing population increases and can find opportunities to apply these skills in construction. Another 12% receive income from in other aspects of fishing such as net mending or working as a fish dealer. Three percent work in other maritime-related jobs such as ferry operators and building private docks or bulkheads. The "other" category includes occupations as diverse as clerical, food service, education, executive, real estate, minister, firefighter, police officer, movie set painter, and package delivery.

Important Issues Facing the Fishing Industry

Respondents were given a list of 21 items (Table 11) and asked to choose the seven that were the most important to them as fishermen. Once the seven issues were chosen they were asked to order them in terms of most to least important. The items listed in Table 11 are presented in the overall order of ranked importance.

Table 11. List of issues of concern to fishermen.

Rank	Issue
1	Too difficult to keep up with proclamations or changes in rules
2	Overfishing
3	Too many areas off limits to fishing
4	Too much local competition
5	Low prices for seafood
6	Imported seafood
7	The costs of doing business (business taxes, licenses, etc.)
8	Too many federal & state regulations, overall
9	Outside competition
10	Required record keeping or other paperwork
11	Too much environmental regulation
12	Gear Restrictions
13	Seasonal closures are too restrictive
14	Bag limits are too restrictive
15	Inability to predict the future for your fishing business
16	Quotas are too restrictive
17	Initial start up costs
18	Problems with your crew or other labor problems
19	Inability to obtain financing for repair/replacement of equipment
20	Respect for commercial fishermen
21	Weather

The issue named most often was keeping up with changes in rules and proclamations. Shellfish operations are frequently affected by proclamations enacting temporary closures due to weather events such as heavy rains. The shellfish fishermen frequently stated that they thought the state closed too many areas and for too long a period. Fishermen also felt that too many areas were permanently closed to harvesting.

Many fishermen, again predominantly shellfish harvesters, felt that some areas and species were over-harvested saying their targeted species were not available at the same level of abundance as they had been in previous years. Related to the over-harvesting issue, too much competition for the resources available was considered a serious issue. Many attributed lowered abundance to over-harvesting; others attributed the declines to other causes such as pollution, coastal development, and ineffective fisheries management.

Low prices paid to the fishermen and the presence of competing, imported seafood products were seen as serious issues. Recent years, in particular, have seen lower prices paid to fishermen participating in the shrimp and blue crab fisheries due to import pressures.

Fishermen were specifically asked to state how often they had negative experiences in the previous year with federal regulations and state rules. Table 12 shows a summary of their responses. The majority of respondents (88%) said they had no negative experiences with federal regulations. This is likely because most respondents do not participate in ocean fisheries beyond three miles of the shoreline that are managed at a federal level. At the state level, 43% of the fishermen said they had no negative experiences with state rules and proclamations. At the other extreme, 5% said they had daily negative experiences with federal regulations and 18% said they had daily negative experiences with state rules and proclamations.

Those fishermen who mentioned that they had negative experiences with federal regulations all cited issues related to the part of their fishing business that takes place in the ocean, namely complaints about using excluder devices, quotas, and difficulty obtaining permits. Negative experiences with state regulations and rules were mainly related to perceptions that the rules for fishing change too often and the fishermen have difficulty keeping up with them. Also, many expressed a desire that the Marine Patrol

Table 12. Frequency of negative experiences with federal regulations and state rules during 2001.

	Neg. Experiences with Federal Regulations		Neg. Experiences with State Rules	
	Frequency	Percent	Frequency	Percent
No Negative Experiences	230	88%	114	43%
1	2	1%	20	8%
2	2	1%	8	3%
3 - 5	1	0%	13	5%
6 - 20	2	1%	13	5%
21 50	3	1%	14	5%
51 -150	9	3%	16	6%
151 - 364	1	0%	18	7%
Negative Experiences Every Day	12	5%	49	18%
Total	262		265	
Missing	6	2%	3	1%
Grand Total	268		268	

be more lenient and issue warning tickets in the first day or so when a new rule or proclamation goes into effect. Some fishermen complained that the state has unnecessary regulations. They feel that these regulations hurt their ability to make a living, like the required use of excluder devices, or were wasteful, such as limits on red drum. Some fishermen complained that the state made competition for shellfish resources worse by issuing a $25 shellfish license available to all North Carolina residents.

User Group Conflicts

The fishermen were also given an opportunity to state the frequency with which they had negative experiences with other commercial fishermen and recreational anglers in the past year. The results are shown in Table 13.

The majority of respondents reported having no negative experiences with other commercial fishermen (66%) and no negative experiences with recreational anglers (59%). Very few complained of having negative experiences on a daily basis. Only 2% said they had negative experiences daily with other fishermen and 4% with recreational anglers.

Table 13. Frequency of negative experiences with other commercial fishermen and recreational anglers during 2001.

Number of Negative Experiences	Neg. Experiences with Commercial Fishermen		Neg. Experiences with Recreational Anglers	
	Frequency	Percent	Frequency	Percent
No Negative Experiences	176	66%	156	59%
1	10	4%	7	3%
2	23	9%	22	8%
3 - 5	20	8%	30	11%
6 - 20	14	5%	24	9%
21 - 364	16	6%	15	6%
Negative Experiences Every Day	6	2%	11	4%
Total	265		265	
Missing	3	1%	3	1%
Grand Total	268		268	

Conflicts with other commercial fishermen often were related to competition for resources, theft of gear, and other fishermen who purportedly disobey rules. For example, shrimp trawlers complained about channel netters setting too close to the center of the channel. They also complained about other shrimp trawlers cutting off others in the line and reported some trawlers cut through and tear up shellfish beds. Several complained of sabotaged or stolen gear and said others were fishing their leases, pots, and nets. The presence of too many other fishermen was listed as another complaint.

Conflicts with both recreational fishermen and boaters were cited. Many commercial fishermen reported receiving verbal abuse from recreational fishermen. They also reported having their gear destroyed or damaged by recreational boaters because “they don’t understand the meaning of the buoys.” Other negative experiences with recreational anglers revolved around inconsiderate or incompetent boat handling and speeding. Several complained that recreational anglers and Recreational Commercial Gear License (RCGL) holders catch and sell seafood in flagrant violation of the law. A few felt the presence of RCGL fishermen exacerbates the problem of too many fishermen targeting the same species in a given area.

Community Support

The 268 survey respondents live primarily in small towns. Notable exceptions are 21% of fishermen who live in the Wilmington, Jacksonville, and Morehead City areas. The remaining fishermen live in communities of just a few hundred to about 3,000 inhabitants.

All fishermen were asked to rate how important fishing was historically and economically to their community. They were also asked to rate "how much fishermen are respected in their community", and "how much their community supports commercial fishermen." All ratings were made on a scale of 1 to 10, with 1 being, "no support at all" to 10 being "extremely supportive."

On average, fishermen felt that fishing was very important historically (mean = 9.17) and economically (mean = 8.31) to their community. Ratings were less positive in terms of community respect for commercial fishermen (mean = 6.51) and community support for commercial fishing activities (mean = 6.91). When asked about the community support for commercial fishing activities, many mentioned the different seafood festivals held in their area, primarily in the fall. However, several said the recognition was not genuine because at some festivals promoters import seafood from other states or countries and do not purchase it directly from local fishermen.

Future Optimism

The fishermen were asked questions to assess their optimism about a future in commercial fishing. They were asked to use a 1 to 10 scale to rate how hard they work now to land the same amount of their targeted species compared to a few years ago. The average rating of 8.25 indicates that the majority fishermen feel it is more difficult to land the same number of their targeted species compared to a few years ago.

When asked directly how optimistic they were about their future as a commercial fisherman, the average was slightly pessimistic. The average rating was 4.43 on a 10-point scale, where 1 was "not at all optimistic", and 10 is "extremely optimistic".

The fishermen were asked whether they felt they would be fishing 10 years from now. The majority (59%) thought they would be. Those who thought they would not be fishing 10 years from now were asked why they believed this to be true. Many said they thought they would be retiring. Some said they would not be able to make enough money from commercial fishing to support their families because of falling seafood prices. Others said they would be "regulated out" of fishing or pushed out by recreational fishing interests.

Fish Dealers

Businesses in North Carolina that deal in seafood products traditionally are highly individualistic. They consist mostly of small family owned businesses long connected to the seafood industry, active fishermen, or members of fishermen's extended families. Most dockside buyers have a clientele of commercial fishermen with whom they do business. The relationship between fish houses and the fishermen themselves can be symbiotic. Fish houses depend on fishermen to bring them product. Fishermen may buy gas or ice from the fish house. In return for exclusive rights to the fisherman's landings, some fish dealers extend loans to fishermen who could not otherwise obtain them from other sources. Many of these smaller establishments are extremely flexible and may operate only seasonally in accordance with the fishermen's normal cycle of fishing activities.

Business Characteristics

Fish dealers were asked to describe the kinds of business activities in which they participate. Table 14 is a summary of these activities. The percentages do not add up to 100% because many fish dealers could be classified into more than one of the categories.

The majority of dealers were also fishermen (59%). Retail seafood markets made up the largest percent of the businesses (39%) followed by distributor/wholesalers (28%) and fish house/dockside buyers (22%). A few processors and restaurants (3%

Table 14. Fish dealer business activities (n=130).

Activity	Percent
Fish house/dockside buyer	22%
Fisherman with a dealer license	59%
Distributor/wholesaler	28%
Processor	3%
Importer/exporter	1%
Broker	0%
Restaurant	3%
Retail seafood market	39%
Supermarket	0%

each) were represented in the sample. No seafood brokers or supermarkets were included.

Survey respondents were asked to describe how their business was organized. Seventy-four percent said their businesses were sole proprietorships, 21% were owned by corporations and the remaining 5% were described as being partnerships.

Current owners of these businesses, on average, had been in business for over 16 years. The range was from one year to 60 years. Eighty percent of the businesses were under the ownership of the founder. Those businesses not currently owned by the founder had been in operation for an average of over 24 years prior to the current owner (range: 1 to 50 years of previous ownership).

Ten percent of the businesses had no fixed location aside from the home of the business owner. A large majority (86%) of the businesses had only one location. The most locations for any single business was three. None had locations outside of North Carolina. In fact, all business locations were in Carteret, Onslow, Pender, New Hanover, or Brunswick counties.

These businesses owned between 0 and 5 vessels, but on average, they owned only one vessel. Additionally, they had between 0 and 27 vessels under contract to fish for them. On average, they had one vessel under contract.

The average seafood business employed two full-time and two part-time workers. They averaged just over one unpaid employee such as a family member who did not work for a salary. On average, one of the business' employees served in a clerical/support position answering telephones, handling finances, or ran an office.

About 70% of the employees of these companies were male and 30% were female. Less than one percent of the employees were migrant labor. About 2% of the employees were Asian, 5% were African-American, 2% were Native Americans, and 1% was Latino. The remaining 90% of employees were non-Hispanic Caucasians.

Sales

The fish dealers were asked to indicate their total gross sales for 2001. Table 15 indicates that 57% of businesses had gross sales of less than $50,000. Many of these businesses are owned by commercial fishermen who also have a fish dealer's license and may only operate their seafood business part time. An additional 33% had gross sales between $50,000 and $500,000. Only 5% had sales in excess of $1 million. Gross sales were further investigated by type of business. The results of an Analysis of Variance (ANOVA) test determined that a significant difference exists between business types and the amount of gross sales ($F_{(2,24)} = 19.058$, $p < 0.001$). Further analysis using a Tukey HSD Post Hoc test determined that corporations have significantly higher gross sales than do sole proprietorships or partnerships. No significant differences between sole ownerships and partnerships in terms of gross sales in 2001.

Major Species Sold

Dealers were asked to estimate the percent of their total year 2001 sales by species and the results are summarized in Table 16. The total estimates do not sum to 100%

Table 15. Gross sales by study area fish dealers in 2001.

	Frequency	Percent
Less than $50,000	72	57%
$50,000 - $100,000	19	15%
$100,000 - $200,000	9	7%
$200,000 - $500,000	15	12%
$500,000 - $1 million	6	5%
More than $1 million	6	5%
Total	127	
Missing	3	2%
Grand Total	130	

Table 16. Estimated percent of sales by species by study area fish dealers, 2001.

	Minimum % of Sales	Maximum % of Sales	Mean % of Sales	Standard Deviation
Clams	0	100	8.87	20.39
Oysters	0	100	12.85	26.81
Scallops	0	30	0.51	3.19
Hard Crabs	0	100	10.39	25.45
Soft Crabs	0	100	3.28	13.61
Shrimp	0	100	31.14	35.41
Atlantic Menhaden	0	90	0.94	8.18
Flounders	0	100	7.20	17.67
Weakfish	0	25	0.87	3.10
Striped & White Mullet	0	50	1.99	6.87
Spotted Seatrout	0	10	0.19	1.09
Spot	0	100	6.41	17.65
Snappers/Groupers	0	90	3.63	11.27
Other Species	0	100	8.12	21.60

because all dealers typically do not deal in all of the species. The numbers in the table are best understood in terms of those that sell a particular species and the percent of the total sales contributed by this species. The category of “Other Species” included primarily other finfish species not included in the other categories such as tuna, dolphin, swordfish, Atlantic croaker, monkfish, and eels. Some retail outlets also sold seafood harvested from locations outside North Carolina, such as salmon. Four dealers interviewed sold only bait, primarily for the use of recreational anglers. Shrimp, oysters, and hard crabs were the species most commonly sold by dealers. Clams, flounder, and spot were the next most commonly sold species by these dealers.

Operating Expenses

Operating expenses for any given business varies based on the size and type of business. Regardless of whether a business is a sole proprietorship, partnership, or corporation, on average the largest percentage of a business’ expenses is for buying product (Table 17). This expense is closely followed by labor costs, equipment purchases, and utility payments. Many of the sole proprietorships and partnerships, like

Table 17. Business expenses as a percentage of total 2001 revenue by ownership type.

	Sole Proprietorships	Partnerships	Corporations
	Mean %	Mean %	Mean %
Product	24%	39%	32%
Labor	8%	19%	4%
Equipment	15%	6%	8%
Utilities	8%	7%	12%
Taxes	9%	4%	9%
Insurance	1%	2%	8%
Transportation	4%	3%	1%
Packing	2%	4%	2%
Loans	3%	1%	3%
Other	16%	3%	7%

most individual fishermen, do not have insurance. Other expenses could largely be described as maintenance of vessels, physical plants, or sales commissions.

Markets

Approximately 85% of all seafood products sold by dealers in the study area remain within the state of North Carolina. Almost all of the remaining 15% are sold within the United States outside North Carolina. Only one dealer interviewed also sold products to markets outside the US. For confidentiality reasons, no details of that exporting business can be explained as part of this report.

Table 18 shows the number of dealers (and the percent of the total number of survey respondents) who sold various seafood products in and out of state. The average number given for each product is the mean percent of product these dealers sold in state or out of state.

Finfish are sold by the largest percentage of dealers, both in state (59%) and out of state (18%). Of those dealers who sell finfish, on average 89% of the finfish are sold in state. Nearly as many dealers sell shrimp in state, but slightly fewer sell shrimp out of state. Approximately 91% of the shrimp sold by dealers was to in state buyers. Almost half of all the dealers who participated in the survey sell shellfish in state. Moreover, of

Table 18. Markets for various study area seafood products (%).

		In state	Out of state
Blue Crabs			
	Dealers	37 (37%)	14 (11%)
	Average	82%	18%
Shellfish			
	Dealers	62 (48%)	19 (15%)
	Average	84%	16%
Shrimp			
	Dealers	75 (58%)	18 (14%)
	Average	91%	9%
Finfish			
	Dealers	77 (59%)	23 (18%)
	Average	89%	11%

those dealers who do sell shellfish, about 84% of shellfish is sold in state. The smallest percentage of dealers in the state sold blue crabs with 37% of dealers selling in state and 11% of dealers selling out of state. However, blue crabs have the highest percentage of out of state sales (18%). Perhaps the reason for this is because few businesses in the study area will pick crabs. The number of crab picking businesses statewide has declined dramatically in recent decades.

Current Issues

Respondents were presented a list of business issues and asked to rate them on a scale of 1 to 10. A value of 1 means that the issue is “not at all important” to 10 meaning that the issue is “extremely important” to their business. Table 19 shows a summary of the issues and their average ratings.

Pollution and water quality was seen as the most important issue facing these fishermen with an average rating of 9.19. Many felt the overall reduction in the targeted species were due largely to increased pollution and degradation of estuarine water quality. This was followed by moderate ratings of importance for the issues of record

Table 19. Business issues important to study area fish dealers.

Issue	# who responded	Average rating
Pollution & water quality	130	9.19
Record keeping requirements	130	6.72
Supply of seafood	130	6.67
Illegal sales by non-licensed persons	130	6.57
Weather	130	6.45
Markets lost to imports	130	6.34
Government regulations	129	5.29
Business/property taxes	130	5.28
Keeping up with HACCP	130	4.58
Business financing issues	130	4.18
Competition from other dealers	130	4.11
Marketing products	130	3.84
Changing markets	130	3.08
Labor problems	130	2.53
Production problems	130	2.35
Transportation/delivery problems	130	2.33
Other problems	129	0.39

keeping requirements, maintaining a steady supply of seafood, illegal sales of seafood, weather (primarily closings of shellfish areas after rainfall), and markets lost to imports. Traditional business issues such as changing markets, labor, production, and transportation matters were not seen as being necessarily problematic.

In the spring of 2003, the NC DMF participated in providing approximately $4 million in economic relief to North Carolina's participants in the commercial shrimp industry. The primary motivation for this federally funded economic relief was to offset the impact of imports. Perception of imports as having greater importance was reflected in the rating by the 75 dealers who work in the shrimp industry. Illegal sales of seafood and maintaining a steady supply of product were also rated as having greater impact on these businesses than the general sample of all dealers.

DISCUSSION

Fishermen Demographics and Business Characteristics

Demographics of the fishermen who participated in this study are essentially the same as those who have participated in the other socioeconomic surveys conducted by NC DMF (Diaby, 2000, 2002; Cheuvront, 2002). Approximately the same percent of fishermen harvest full time, however, those fishermen who do not fish full time are less seasonal in their activities than are the Core Sound fishermen. While the trend seems to be similar, that is, more fishing activity occurring in the months of May to November, part-time fishermen in this study were more likely also to fish from December through April. This may be due to the nature of the fisheries occurring in the study areas and to weather differences.

Most of the fishermen in this study work alone. Few work in partnerships and fewer corporations were involved in commercial fishing activities. They are also less likely to employ a crew. More fishermen in this study did not use a vessel for their commercial fishing activities. Of those who did use a vessel, they were more likely than Core Sound fishermen to use only one vessel.

Vessels owned by the fishermen in this study were similar in size to the Core Sound fishermen; however, they had lower value. The fishermen in this study reported higher trip related expenses, but lower annual expenses. The largest differences in trip expenses were related to the increased price of fuel. Annual expenses were less in this study largely due to the lack of payments to family and crewmembers who work for the fishermen.

More fishermen in the current study reported that they did not make a profit or had lost money in their fishing operation compared to those in the Core Sound study. More than one in 10 fishermen said they did not make a profit from fishing. Most of them were part time fishermen. The species most often targeted by these fishermen was clams, along with a few who targeted shrimp. Clam fishermen stated that the primary reasons for not making a profit were areas that were overfished and areas that were temporarily closed due to pollution. Shrimp fishermen blamed their losses on

imports and regulations that forced them to fish using practices that limited the effectiveness of their operations such as trawl time limitations.

Only a third of the fishermen in this study earned their entire income from fishing compared to nearly half of the Core Sound fishermen. Part of the reason for this was that more of the fishermen in this study reported income from pensions and disability. In addition, there seemed to be a greater diversity of employment available to them. As in the Core Sound study, fishermen tend to live in smaller, rural communities. However, two relatively large population centers are included in this study area – Jacksonville (2001 pop. = 66,715) and Wilmington (2001 pop. = 75,838). The largest population centers near the Core Sound study area are considerably smaller, Havelock (2001 pop. = 22,442) and Morehead City (2001 pop. = 7,691) (NC Department of Commerce, 2003).

Previous research (Garrity-Blake, 1996) found that some NC fishermen are leaving the industry, but prefer not to make a clean break from fishing. Many fishermen describe their work on the water not just as a job, but as a way of life – one that is hard to abandon totally. Compared to the Core Sound study, just as many fishermen in this study fished part time; however, they tended to have higher overall individual income due their ability to find additional employment outside of fishing. Living near urban areas may make it easier for some fishermen to find other employment income, but still allow them to live the life they say they prefer, if only on a part time basis.

Fishermen Experiences, Attitudes and Opinions

In this study, as in the Core Sound study (Cheuvront, 2002), fishermen were more likely to report conflicts with state regulations than with federal regulations. This is primarily due to the study's focus on fishing activities that occur in state regulated waters. Even so, the largest group of participants (43%) reported not having any negative experiences with state regulations. The 25% or so of the respondents who reported having negative experiences more than 150 times per year were those who did not report specific instances, such as being stopped on occasion by a marine patrol officer. These participants largely disagreed with regulations that kept them from

pursuing desired fishing activities. Many are people who disagreed with closures of waters to shellfish harvesting due to weather events.

Many fishermen blamed conflicts with state regulations on the complexity and frequent changes of the rules and proclamations. Several said they had been cited by marine patrol officers based on proclamations that had been issued after they had started their current fishing trip. Several complained of having to dump a full day's work of harvested clams after being stopped by a marine patrol officer, because they did not know that the area they were fishing had been closed earlier in the day.

The inherent conflict that exists between DMF and fishermen is one of competing agendas. The Division's goal is to protect marine resources for future generations while allowing all user groups to pursue their desired activities as much as is practicable. Commercial fishermen see themselves as people who simply want to make a living off the bounty of the sea. They view DMF as a government agency trying to promote the interests of other groups at the commercial fishermen's expense. "After all", as one fisherman put it, "We've been out here a long time and now they're going to put us out of business."

Although fishermen would like simpler, and clearer rules and proclamations, they realize that regulation is necessary because so many people compete for the resources. However, they feel that commercial fishermen are scapegoated for causing the problem of lowered stocks. A few pointed out that other people are responsible for many of the problems, such as pollution caused by inland and coastal run off. They felt that the state should deal with those kinds of issues instead of taking away the livelihoods of commercial fishermen to make up for the losses.

Fishermen felt that low cost, imported seafood of inferior quality was hurting them. Many see this as a growing problem and blame the lower prices they receive as the final straw that may put them out of business. At least one fisherman even suggested using a government-operated price support system, not unlike those used for certain agricultural products.

In addition to protests about regulations, environmental issues, and imports, fishermen complained of conflicts with other commercial and recreational fishermen. Many reported activities such as stealing pots, cutting buoys, shellfish overfishing,

poaching from shellfish leases, and cutting each other off in the lineup of shrimp trawlers. A few complained of direct confrontations with recreational fishermen. Most of the complaints were related to verbal abuse and being cursed at for "taking all the fish." Several people interviewed complained specifically that many recreational users were inexperienced and sometimes created unsafe conditions for themselves and others on the water.

A number of shrimp trawler fishermen complained about the presence of some recreational commercial gear license (RCGL) users. This group of recreational fishermen is allowed to use limited amounts of some commercial gears. While they are allowed to use some of the same gears, they are not allowed to sell their catch. The commercial fishermen said they have seen some specific RCGL fishermen on the water so often that they suspected the RCGL fishermen might be selling their catch somewhere, probably inland or in South Carolina.

Fish Dealers

Most fish dealers in this study are small business people. In fact, the majority of them are fishermen themselves. Some fishermen also become dealers as a way to gain more control over how much money they make from their harvesting.

Most North Carolina seafood sold by dealers in this study is to buyers in North Carolina. Attempts to expand into other markets may not be an issue. Some feel they could sell even more seafood if they could get it, but have difficulty keeping steady supplies. Opening up other markets is not an issue when they do no have enough products to sell locally.

Fish dealers see pollution as the main issue causing reduced stocks. The main cause of aggravation for some fish dealers was said to be the amount of paperwork associated with running the business. Compounding these problems is what some dealers report as competition from illegal sales by unlicensed dealers.

Survey Methodology and Participation Rates

This study, along with the Core Sound study (Cheuvront, 2002), demonstrate that North Carolina's fishermen and fish dealers will participate at a high rate in an in-depth survey on a periodic basis. Furthermore, they will answer specific questions regarding fishing activity and give personal opinions. They will even give answers to sensitive, personal economic questions. This methodology is not seen as being overly intrusive by participants, especially when part of the recruitment procedure involves convincing study participants that their answers will help fisheries managers better understand fishermen's point of view.

The cost of conducting the interviews is not prohibitive, $46.88 per completed fisherman interview and $13.75 per completed dealer survey. These expenses are low when compared with the costs associated with maintaining a logbook program.

Using a periodic survey method such as the one employed in this study has some advantages over a logbook approach for obtaining socioeconomic data. Participation/compliance rates are much higher. Having a larger proportion of the population of interest providing data ensures that the estimates are more likely to be reflective of the true behavior, opinions, and economic realities of the entire group. Participants are more willing to participate because there is less of a burden on their part in time and effort. All data are obtained in a single session. Also, the periodic interview can be scheduled at the convenience of the participant and providing data at the end of every trip is not required. From the researcher's point of view, data entry, database maintenance, and data analysis are easier when using survey data compared to using a logbook approach.

That is not to say that collecting data using surveys is not without potential shortcomings when compared to logbook data collection. Logbooks provide a much greater level of detail than the survey method employed in this study. Logbooks provide trip level data. Surveys provide data based on the fisherman's recollection of expenditures associated with an average trip. A comparison needs to be done on the quality and completeness of logbook socioeconomic data and data collected from surveys. If aggregated data from logbooks is found to be comparable with surveys,

socioeconomic researchers may find that surveys are an easier way to compile pertinent data. Surveys are more flexible in acquiring a wider variety of data than is typically obtained from logbooks. Information gained from surveys has the potential to move more quickly into the hands of fisheries managers, so the data may be considered as required by the Magnuson-Stevens Act and the NC Fisheries Reform Act of 1997.

CONCLUSIONS

Commercial seafood harvesters and fish dealers in this study say they are under tremendous pressure. They see themselves as a dying breed of American men and women who are able to make their living from harvesting the sea's wealth. They feel they are the underdogs who are being pushed out by other interest groups with more political and financial influence – some environmentalists, recreational fishermen and boaters, developers and importers, to name a few.

Although problems surely exist, the picture is not entirely bleak for all commercial fishermen. Some say they have stayed successful because they are willing to adapt their fishing practices to stay ahead. Some fishermen who consider themselves to be successful are unsympathetic toward other fishermen who insist others are trying to put them out of business. "If a guy is willing to work hard and be flexible, you can make it as a commercial fisherman", said one fisherman. "It isn't easy, but you can do it."

North Carolina's commercial fishermen traditionally have been flexible in the species they target. Most fishermen target more than one species and move between the species as they come in and out of abundance. Fishermen who describe themselves as being the most successful seem to be those who move through the fisheries, adapt to changes, and abandon unprofitable practices for those that will keep them profitable.

It is interesting to note that the number of people participating in commercial fishing in North Carolina is getting smaller each year. Evidence for this is the decreasing number of standard and retired standard commercial fishing licenses sold and participants for whom commercial landings are reported. However, the number of shellfish licenses sold is up in recent years and the overall net difference from year to

year in total number of licenses sold is negligible. The majority of those who are now fishing commercially try to be optimistic about the future. They feel they will still be fishing in ten years.

Nonetheless, fewer young people may be choosing commercial fishing as a career. Most fishermen themselves report discouraging young people, especially their own children from going into the business. More than one fisherman reported not taking his children out fishing for fear they will fall in love with the lifestyle.

Commercial fishing in North Carolina is in a state of change. There are increased pressures on those in the industry – declining stocks, competition from imports, and increased regulations are the main factors. The long-term future of the industry in North Carolina is far from clear. Perhaps the fishermen who will remain years from now will be determined by their ability to adapt to the ongoing and inevitable changes, assuming of course that other, outside forces do not make commercial fishing entirely unprofitable.

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APPENDIX A – FISHERMAN SURVEY

1. How many years have you been a commercial fisherman? _____

2. Besides a commercial fishing license, do you also hold a dealer's license?
   □ No □ Yes

   (If *"Yes",* tell the fisherman that these initial questions only relate to the part of their business related to fishing.)

2(a) Do you own a shellfish lease? □ No □ Yes

3. Compare yourself to other fishermen using a scale of 1 to 10. With 1 being "not at all successful as a commercial fisherman" to 10 being "no one has more success than I do", how successful do you think you are? _____

4. What percentage of your total individual income do you earn from commercial fishing (*that is, sale of fish taken with commercial fishing gear)*?

   _____ % (range 0 – 100%)

If the answer above is anything other than 100%, ask the following question:

5. What other kinds of work do you do to earn income other than commercial fishing?

_____

6. In a typical year, what months do you fish?

   □ I fish all year long

   Or check all that are appropriate:

□ January	□ May	□ September
□ February	□ June	□ October
□ March	□ July	□ November
□ April	□ August	□ December

FISHERY PARTICIPATION

7. What is the ownership type that best describes your fishing operation?
   □ Sole Owner
   □ Partnership
   □ Corporation

8. How many vessels do you own that are registered for use in your fishing operation?

How many vessels? ____

Fill this out starting with the vessel used most often for commercial fishing.

	Years Owned	Market Value (incl. all gear)	Length	Crew Size*	Operator Status**
Vessel #1					1 2 3
Vessel #2					1 2 3
Vessel #3					1 2 3
Vessel #4					1 2 3

* Include the captain (Minimum crew size for every vessel is 1.)

** 1. Captain/Owner 2. Hired Captain 3. Other _____

9. What percent of your fishing activities occur in

	Vessel 1	Vessel 2	Vessel 3	Vessel 4
Inland waters west and south of Beaufort Inlet.	_____	_____	_____	_____
Other inland waters	_____	_____	_____	_____
Ocean waters south of Cape Hatteras	_____	_____	_____	_____
Ocean waters north of Cape Hatteras	_____	_____	_____	_____
Out-of-state waters	_____	_____	_____	_____
Total	100%	100%	100%	100%

OPERATING EXPENSES

10. Please provide the average operating expense for a **typical inside waters fishing trip in 2001** (for the vessel you use the most). Round off your answers to the nearest dollar.

Expense categories for vessel that is used the most
Fuel and oil
Ice
Groceries
Bait
Other _____

If the vessel used the most has a crew, ask Question 11. If not, skip to Question 12.

11. Do you use a share system to pay the crew and captain of the vessel you use the most?

□ No → How do you pay the captain and crew? _____
(Skip to Question 12)

□ Yes → Which of the following expenses were subtracted from your gross revenues before calculating the crew and captain's shares? *(Circle one number for each item below.)*

	Deducted	Not Deducted	N/A
Fuel and oil	1	2	99
Bait	1	2	99
Ice	1	2	99
Groceries	1	2	99
Other	1	2	99

Describe other _____

What percentage of the net share (gross total revenues minus the expenses indicated above) goes to

Boat share: _____ %

Captain's share: _____ %

Crew's share: _____ %

12. Please provide your total expenditures for 2001 for the vessel you use the most.

Expense Category	Vessel #1
Labor - Capt. & crew (not in your household)	
Payments to people in your household	
Licenses, Permits, Leases	
Start up (only 2001)	
Vessel loan payments	
Vessel/Gear Repairs	
Docking fees	
New Gear/Equipment	
Insurance	
Other Professional Expenditures/Fees	

COMMERCIAL FISHING

13. I'm going to read some numbers. When I reach a number **equal to or higher than** the amount you personally earned last year just from fishing, tell me to stop. Include only profit, that is, after you paid all expenses associated with your fishing business.

Read these numbers:		Mark here:	
	$0		1. $0 or lost money
	$5,000		2. $1 - $5,000
	$15,000		3. $5,001 - $15,000
	$30,000		4. $15,001 - $30,000
	$50,000		6. $30,001 - $50,000
	$75,000		7. $50,001 - $75,000
	$100,000		8. $75,001 - $100,000
	More than $100,000		9. > $100,000
			99. Refused

14. Which gears did you use in 2001 in the inland waters south and west of Beaufort Inlet.

15. What species did you target in 2001 in the inland waters south and west of Beaufort Inlet.

Gears	Targeted Species	Percent of total commercial fishing income in 2001
		%
		%
		%
		%
		%
		%
	Total	100 %

16. Do you ever sell finfish caught in the ocean south of Cape Hatteras in North Carolina waters? □ No □ Yes

If no, skip to question 25.

17. What species of finfish did you target in the ocean south of Cape Hatteras in 2001?
18. What gears did you use to target those species south of Cape Hatteras in 2001?

Gears	Targeted Species	Percent of total commercial fishing income in 2001
		%
		%
		%
		%
		%

19. Please provide the average operating expense for an **ocean fishing trip in 2001** (for the vessel you use the most). Round off your answers to the nearest dollar.

Expense categories for vessel that is used the most
Fuel and oil
Ice
Groceries
Bait
Other _____

If any of the ocean finfish species targeted are in the snapper/grouper complex, ask the following questions, else skip to question 25.

20. Do you land snappers and/or groupers based on the
    1. Recreational bag limit
    2. Federal 225-lb. nontransferable permit
    3. Federal transferable permit
    4. Crew member

21. Are you aware of the changes in fishing for snappers and groupers that will be contained in Amendment 12 of South Atlantic Snapper/Grouper Fishery Management Plan (FMP)?

    □ No → skip to question 24
    □ Yes

Use a scale of 1 to 10, with 1 being “extremely disagree” to 10 being “extremely agree” and tell me how much you agree or disagree with the following statement:

22. I agree with Amendment 12’s restriction of red porgy harvest.

    _____

    (Details: Closed season from Jan-Apr. Rest of the year: 50-lb. bycatch/trip limit.)

If the score given in question 22 is less than 5, ask question 23, else skip to 24.

23. What would you suggest be done to protect red porgy?_____

_____

24. Are you aware that the South Atlantic Marine Fisheries Council (SAMFC) is preparing Amendments 13 & 14 of the Snapper/Grouper FMP dealing with Marine Protected Areas (MPA's)? □ No □ Yes

Demographic Questions

25. How old are you? _____

(*Don't ask, just mark*) □ Male □ Female

26. What do you consider to be your ethnic background?

□ Hispanic/Latino (all races) □ Asian-Pacific Islander
□ White/Caucasian □ Native American
□ African-American/Black

27. What was the highest grade you completed in school?

□ Less than high school diploma □ Some college/technical school
□ High school diploma □ College diploma (or more)

28. What is your marital status?

□ Currently married □ Widowed □ Separated
□ Divorced □ Never married

29. How many people live in your household? (include respondent, people such as students away at school, someone in the hospital, or currently away on business or vacation, etc., but not someone whose main place of residence is somewhere else.)

_____

30. Of the people who live in your household, how many of them work at least part time in some aspect of the fishing industry? (Do not include the fisherman)

_____

31. What is the total income of everyone who lives in your household? _____

Read these numbers:		Mark here:	
	$15,000		1. ≤ $15,000
	$30,000		2. $15,001 - $30,000
	$50,000		3. $30,001 - $50,000
	$75,000		4. $50,001 - $75,000
	$100,000		5. $75,001 - $100,000
	More than $100,000		6. > $100,000
			99. Refused

32. What is the name of the community/town/city where you live? _____

33. Which county is that in? _____

34.How many years have you lived in this county? ____

EXPERIENCES & ATTITUDES ABOUT FISHERY MANAGEMENT

35. Do you think you will be a commercial fisherman 10 years from now?
□ Yes □ No (why?
_____)

Use a scale of 1 to 10, with 1 being “not at all” to 10 being “extremely” and tell me how much you agree or disagree with each of the following statements.

36. I am hopeful about my future ability to make a living in fishing.
_____

37. Commercial fishing is important economically in this area. _____

38. Commercial fishing has an important role in the history of this area. _____

39. Commercial fishermen are respected in this area. _____

40. This area actively supports commercial fishing with activities like seafood festivals, memorials to fishermen lost at sea, a “blessing of the fleet”, etc.
_____

Other community support activities _____

_____

41. I have to work harder now to land the same number of *my targeted species* than I did a few years ago. (If you think there is no difference, your answer should be 5.)
_____

In the last year, how many times have you had negative experiences:

42. with other commercial fishermen _____ (explain, _____)
x’s

43. with recreational fishermen _____ (explain, _____)
x’s

44. involving federal regulations _____ (explain, _____)
x’s

45. involving state regulations _____ (explain, _____)
x’s

Choose up to 7 of the following issues as the most important ones facing you as a commercial fisherman. Rank them in order of most importance from 1 to 7 with 1 being the most important.

46. _____ Overfishing
47. _____ Too much local competition
48. _____ Outside competition
49. _____ Too much environmental regulation
50. _____ Too difficult to keep up with proclamations or changes in rules
51. _____ Gear Restrictions
52. _____ Too many areas off limits to fishing
53. _____ Seasonal closures are too restrictive
54. _____ Bag limits are too restrictive
55. _____ Quotas are too restrictive
56. _____ Too many federal & state regulations, overall
57. _____ Low prices for seafood
58. _____ Imported seafood
59. _____ Initial start up costs
60. _____ Inability to obtain financing for repair/replacement of equipment
61. _____ The costs of doing business (business taxes, licenses, etc.)
62. _____ Required record keeping or other paperwork
63. _____ Problems with your crew or other labor problems
64. _____ Respect for commercial fishermen
65. _____ Weather
66. _____ Inability to predict the future for your fishing business

67. Once again, use a scale of 1 to 10. This time the scale ranges from 1 meaning “not at all likely” to 10 meaning “extremely likely”. If a young person came to you and said they were interested in becoming a commercial fisherman, how likely is it that you would recommend pursuing a career in fishing?

_____

APPENDIX B – DEALER SURVEY

Dear

The North Carolina Division of Marine Fisheries is conducting an economic survey of fish dealers. The purpose of the survey is to document the economic and social importance of North Carolina's seafood industry and to help determine fisheries management options.

All responses will be kept strictly confidential and will be reported only after they are combined with the responses of other fish dealers. After the data are combined there will be no way to identify information that came specifically from you.

The survey is voluntary, but we urge you to participate. We need your answers to provide a complete picture of the importance of your industry in North Carolina. Your business has a stake in the outcome of this survey. Federal and state laws require the consideration of available economic information when making fisheries management decisions. Please note that the person who fills out this survey does not have to be the owner. Any person employed by the business who is knowledgeable overall about the economic aspects of the business may fill it out.

Please return your completed survey within two weeks using the enclosed postage-paid envelope. Should you have any questions or comments, please contact Brian Cheuvront at 252-726-7021, ext. 603, or 1-800-682-2632 at the Division of Marine Fisheries in Morehead City.

Thank you again for participating.

FISH DEALER SURVEY

1. How would you describe this seafood business? (check all that are appropriate)
   - □ Fish house/dockside buyer
   - □ Fisherman with a dealer license
   - □ Distributor/Wholesaler (incl. packing & freezing)
   - □ Processor
   - □ Importer/Exporter
   - □ Broker
   - □ Restaurant
   - □ Retail seafood market
   - □ Supermarket

2. What is the ownership type that best describes this seafood business?
   □ Sole ownership □ Corporation □ Partnership

3. How many years have the present owners had this business? _____

4. How many years did this business exist prior to the present ownership? _____

5. How many separate locations does this business have? _____

6. Of those locations, how many are in Carteret, Onslow, Pender, New Hanover or Brunswick counties?

7. How many locations are outside NC? ____

8. How many fishing vessels are directly owned by this business? _____

9. How many fishing vessels work under contract exclusively for this business? _____

10. How many are support staff (manager, secretary, etc.) employees are there? _____

11. How many paid full time employees does this business have? _____ (not support staff)

12. How many paid part time employees does this business have? _____ (not support staff)

13. How many unpaid employees (e.g. family members) does this business have? ____

14. Of all of the people who work full or part time for this business in any capacity, what percent are in each of the following categories?

White or Caucasian	_____%	African-American	_____%
Asian/Pacific Islander	_____%	Native American	_____%
Hispanic/Latino	_____%		

15. What percentage of your employees are: Men ____% Women _____%

16. What percentage of your employees are migrant workers? _____%

17. Rate each of the following issues on a scale of 1 to 10 with 1 being not at all important to 10 being extremely important current issues for your seafood business:

___	Pollution and water quality	___	Financing issues
___	Government regulations	___	Supply of seafood
___	Record keeping requirements	___	Marketing
___	Keeping up with Hazard Analysis Critical Control Point (HACCP) requirements	___	Labor problems
___	Competition from other dealers	___	Production problems
___	Markets lost to imported seafood	___	Transportation/delivery problems
___	Weather	___	Changing markets
___	Illegal sales of seafood by persons without a seafood license	___	Business/property taxes

___ Other (Explain _____)

18. Please indicate the amount of your fish dealer business' gross total sales in 2000.

1. ☐ Under $50,000	5. ☐ $500,000 - $1 million
2. ☐ $50,000 - $100,000	6. ☐ $1 million - $2 million
3. ☐ $100,000 - $200,000	7. ☐ $2 million - $5 million
4. ☐ $200,000 - $500,000	8. ☐ More than $5 million

19. Indicate the percent of your total sales for each species group below:

Species	**% of 2000 total sales**
Hard Clams	%
Blue Crabs, Hard	%
Blue Crabs, Soft	%
Flounder	%
Gray trout/weakfish	%
Atlantic Menhaden	%
Mullet	%
Scallop, Bay	%
Spotted Seatrout	%
Shrimp	%
Spot	%
Oysters	%
Snappers/Groupers	%
Other species	%
Total	**100** %

20. Please indicate your primary markets by the percentage of your total sales in 2000:

1. In-state markets (restaurants, retail, stores, other dealers, etc.)	___%	
2. Out of state markets (US only)		___%
3. Export (Japan, Europe, etc.)	___%	
	Total	100%

21. Please provide some information about your annual operating expenses for the following items in 2000. Expenses should be provided as a percent of total revenues.

		Percent
1.	Raw products (fish, crabs, etc.)	_____%
2.	Labor (employee salaries/benefits)	_____%
3.	Utilities/Telephone	_____%
4.	Transportation/shipping	_____%
5.	Packing material	_____%
6.	Equipment	_____%
7.	Loan payments	_____%
8.	Insurance	_____%
9.	Taxes & License fees	_____%
10.	Other costs (_____)	_____%
	Total	100 %