An Economic Analysis of Commercial Fisheries in the Albemarle Sound Management Area, North Carolina

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1. INTRODUCTION

The fishery resources of the Albemarle Sound and its tributaries are extremely important to the state of North Carolina, as well as to the region. This estuarine system is not only an important habitat for the production of many species along the entire Atlantic coast but also a major fishing area.

Commercial and recreational fishermen in the area use a wide variety of gears and methods to harvest many economically important species. Some of these species are spot, Atlantic croaker, spotted seatrout, weakfish, striped bass, American shad, hickory shad, river herring, red drum, blue crabs, and flounders. There are currently restrictions on harvest of some of these species put in place by the North Carolina Marine Fisheries Commission (MFC) under fishery management plans of the Atlantic States Marine Fisheries Commission (ASMFC) and enforced primarily by the North Carolina Division of Marine Fisheries (DMF) in the subject area. The North Carolina Wildlife Resources Commission (WRC) also promulgates and enforces rules affecting the recreational harvest of some of these species.

To fully understand the impacts of these fishery regulations, there is a need for economic information on commercial fishing operations in the Albemarle Sound Management Area[1]. Such information is vital for the development of state fishery management plans that can address species, gears, areas, or any combination of species, gears, and areas under the North Carolina Fisheries Reform Act of 1997. This information is not currently available.

The goal of this research was to collect economic information about commercial fisheries in the Albemarle Sound Management Area. Specific objectives were:

1. To describe the socioeconomic aspects of commercial fisheries. Descriptions include demographic characteristics of commercial fishermen, dependence on commercial fishing, employment opportunities, fishing activities, wholesaling/processing activities, and other fishing related businesses;
2. To collect costs and earnings information from commercial fishermen and seafood dealers and develop estimates of the costs, earnings, and returns associated with commercial fishing; and
3. To assess fishermen's perceptions of fisheries management practices.

[1] The term "Albemarle Sound Management Area" refers to Albemarle Sound and its Coastal, Joint and Inland water tributaries; Currituck Sound; Roanoke Sound and Croatan Sounds and all their Coastal, Joint and Inland water tributaries, including Oregon Inlet, north of a line from Roanoke Marshes Point

2. STUDY AREA

The study area is comprised of part of eleven counties surrounding the Albemarle Sound and its tributaries: Bertie, Camden, Chowan, Currituck, Dare, Hertford, Martin, Pasquotank, Perquimans, Tyrrell, and Washington (Figure 1). These counties collectively accounted for 31% of North Carolina's total commercial fisheries landings and 37% of its total values in 1998.

3. METHODS

The population of commercial fishermen for the Albemarle Sound Management Area was generated from the DMF trip ticket and licenses data files according to three criteria. First, individual fishermen must have held both a commercial vessel license and an endorsement-to-sell (ETS) in 1998. Second, the commercial vessel must be based in the Albemarle Sound Management Area. And, third, the vessel must have had an annual landed value of at least $1,000 in 1998. Application of these criteria resulted in identification of 744 ETS-vessel licenses operating within the Albemarle Sound Management Area in 1998 (Table 1).

Because of the variability in the vessel size and harvesting patterns, vessels were divided into three strata: small (vessels under 19 ft in length); medium (vessels in 19-38 ft in length); and large (vessels longer than 38 ft).

Table 1. Survey sample sizes and number of interviews, by vessel size, 1998.

Vessel size	Total Number	Sample	Interviews completed
Small	262	39	34 (87%)
Medium	465	70	68 (97%)
Large	17	17	12 (71%)
Total	744	126	114 (90%)

Source: NCDMF License & Statistics.

Training of interviewers and pretest of the survey instrument were completed in late August 1999. A survey consisting of 26 questions was used to collect information from 126 randomly selected vessel owners during September-December 1999. The survey focused primarily on fisherman demographics, vessel operations, and preferences for regulatory methods (Appendix A). The survey instrument was completed during in-person interviews and the completion rate was about 90%.

(35° 48' 12"N-75° 43' 06"W), running 122° (M) across the north point of Eagles Nest Bay (35° 44' 12"N-75° 31' 09"W).

Landings, revenues, and selected characteristics of vessels were extracted from the license and trip ticket databases.

In addition, a list of 129 active seafood dealers from the study area was compiled from the trip ticket database. Dealers were mailed a two-page survey along with a self-addressed, stamped return envelope in September 1999 (Appendix B). The response rate to the mail survey was 41%.

4. RESULTS

4.1 Socioeconomic characteristics of commercial fishermen

Assessing the profile of people engaged in commercial fishing gives some insight into their expectations and attitudes toward the industry. For example, people who fish part-time may have a different attitude toward assessing risk, adopting new technology, and maximizing revenues compared to those who fish full-time.

Sole proprietorships made up the largest share (95%) of the vessel ownership by survey respondents in 1998. Four percent were classified as partnerships, and the rest were organized as corporations. Nearly all vessels were owner-operated (87%), compared to 13% managed by hired captains. Sixty-six percent of vessel owners fished full-time during 1998.

Table 2 presents the socioeconomic characteristics of the survey respondents. Commercial fishermen in the Albemarle Sound Management Area tended to be similar to the typical North Carolina worker in 1998. They averaged about 43 years of age, and ranged from 24 to 73, compared with the overall work force average in North Carolina of 44 years old. About 6% of commercial fishermen were 65 years and older, compared to 12% of all workers in North Carolina.

The experience data indicate that, on average, Albemarle Sound Management Area fishermen had engaged in commercial fisheries for 13 years. Eighty-seven percent of fishermen had less than 20 years of experience.

The majority of commercial fishermen were male. Sixty-six percent of the respondents were married, and of these, about 27% of their wives work in commercial fishing.

According to the North Carolina Office of State Planning (Table 2), minorities accounted for about 27% of North Carolina population in 1998. However, the vast majority (93%) of the Albemarle Sound Management Area commercial fishermen were white. Asian-Americans (i.e.,

Vietnamese) accounted for 7% of commercial fishermen, compared with 1.2% of the statewide population. In contrast, African-Americans and Hispanics accounted for 22.2% and 1.6% of the statewide population compared with none of the study area commercial fishermen respondents.

Table 2. Socioeconomic profile of survey respondents, 1998.

Characteristics	**Fishermen**	**State population**[1]
Fisherman status		
Full-time	66.4%	
Part-time	33.6%	
Age		
Under 20		27.5%
20-34	27.7%	23.1%
35-44	29.4%	15.3%
45-54	24.4%	13.7%
55-64	12.6%	8.5%
65 and over	5.9%	12.0%
Years of experience in commercial fishing		N/A
Less than 1		
1-5	13.4%	
5-10	31.1%	
10-20	42.9%	
20-30	9.2%	
30-40	3.4%	
40 and over		
Gender		
Male	97.5%	49.7%
Female	2.5%	50.3%
Marital status (Married)	65.5%	45.0%
Ethnicity		
Caucasian	93.3%	73.4%
African-American		22.2%
Native American		1.6%
Asian or Asian-American	6.7%	1.2%
Latino or Hispanic-American		1.6%
Education		
Less than high school	0.8%	38.9%
High school graduate	52.1%	25.8%
Some college	30.3%	19.2%
College graduate	13.4%	11.8%
Graduate school or Professional degree	3.4%	4.4%
Household income		
Under $15,000	10.2%	12.4%
$15,000-29,999	28.7%	23.0%
$30,000-49,999	34.3%	24.3%
$50,000-74,999	13.9%	20.5%
$75,000-99,999	12.0%	10.4%
$100,000 and over	1.9%	9.6%
Average percent of household income from commercial fishing	66.6%	N/A

[1] Current Population Survey 1998, March Supplement, Office of State Planning, Office of the Governor.

The surveyed Albemarle Sound Management Area commercial fishermen had a high school (52%) or at least some college (47%) level of education.

Household incomes ranged from less than $15,000 to more than $100,000, with 73% citing household incomes under $50,000 in 1998. About 14% of the respondents reported household incomes over $75,000. Commercial fishermen with less than a high school education had the lowest household incomes of all fishermen grouped by educational attainment. In contrast, college-educated commercial fishermen had the highest household incomes.

Albemarle Sound Management Area commercial fishermen earned, on average, 67% of their household income from fishing. However, full-time commercial fishermen derived greater proportions of household income from fishing than did part-time fishermen (82.5% vs. 35.4%).

When asked to rate their perception about income-earning potential from commercial fishing, using a 1-10 scale with 1 being "poor outlook" and 10 being "excellent outlook", 69% the fishermen responded with a rating of 5 and less.

Overall, commercial fishermen from the Albemarle Sound Management were generally more educated and had lower household incomes compared to the statewide population.

4.2 Commercial fishing operations

4.2.1 Characteristics of vessels

The numbers of commercial fishing vessels and ETS-vessel licenses based in the study area have remained stable between 1995 and 1998, mostly as a result of the 1994 moratorium (Figure 2). In 1995 there were 2,493 vessels and 1,256 ETS-vessel licenses, whereas in 1998 there were 2,327 vessels and 1,533 ETS-vessels.

Table 3. Selected average vessel characteristics, by vessel size, 1998.

	Small	Medium	Large
Length of vessel (ft.)	16.2	23.7	44.5
Age of vessel (yr.)	17.6	14.3	15.9
Horsepower	47.7	159.9	374.8
Number of trips	66.6	94.3	88.6
Crew size	1.2	1.4	2.3
Market value ($)	$17,647.1	$25,647.1	40,058.3

The typical small vessel averaged 16.5 feet in length, approximately 18 years old, and

was equipped with a 50 horsepower engine (Table 3). In contrast, medium and large vessels were about, on average, 4 and 2 years newer than small vessels, respectively.

Estimated average market value of vessels in the Albemarle Sound Management Area ranged from about $17,600 to $40,000 in 1998, while crew size was one or two (Table 3).

4.2.2 Fishing activities

The seasonal characteristics of North Carolina's fisheries follow closely the natural fluctuations of the stocks throughout the year. Commercial fishermen use various combinations of these seasonal fisheries to fill out their annual round of fishing activities. They switch among a variety of gears and species on a seasonal basis and from year to year. This behavior has profound implications for the proper management of fisheries, gears, and areas.

A comparison of total revenues among major North Carolina water bodies indicates that the share of total revenues from the Albemarle Sound Management Area exceeded all other water bodies for small and medium vessels. In contrast, total revenues for large vessels were derived primarily from fishing in other waters (Figure 3).

In terms of species as main sources of revenues from all fishing areas, blue crabs represented the largest share of vessels' total revenues, followed by flounders, Atlantic croaker, and other species (Figure 4). Blue crabs provided 83% of total revenues for medium vessels in 1998, ranging from 38% for large vessels to 44% for small vessels. In contrast, flounders accounted for 12% of total revenues for all vessels, but were more important to small (30%) and large vessels (16%) than to medium vessels. The anadromous species such as striped bass, river herring, American shad were primarily landed by small vessels during the fall and winter seasons, while blue crabs were fished from April to October. Overall, blue crabs and flounders collectively contributed a larger share of total revenues for small (74%) and large (54%) vessels.

Annual vessel rounds of activities were examined in terms of participation in three fisheries: blue crab fishery using crab pot/trawl; flounder fishery using gill/pound nets; and multi-species fisheries using different gears (Figure 5). Of the 744 vessels based in the Albemarle Sound Management Area, more than two-thirds participated in multi-species fisheries, compared with 18% targeting only blue crabs and 14% targeting only flounders. Within the group fishing for mixed species, 169 were small vessels, 325 were medium vessels, and 16 were large vessels.

Vessels targeting only blue crabs depended on the species for nearly 100% of total revenues, while flounders accounted for about 72%, on average, of total revenues of vessels fishing only for flounders (Figure 6). In contrast, blue crabs, flounders, and Atlantic croaker represented the largest share of total revenues for multi-species fishing vessels.

This switching behavior among a variety of gears and species by commercial fishermen within seasons and from year to year is influenced by many factors. These factors include availability of targeted species, price received, regulations, environment, and others (Johnson and Orbach 1990; Johnson 1986).

4.2.3 Economic Analysis

The overall economic performance of vessels based in the Albemarle Sound Management Area was analyzed by total revenues, routine trip costs, net operating revenues, total variable costs, income above total variable costs, fixed costs, and income above total costs. Total revenue represents the gross receipts received per vessel for 1998 sales of all species from all waters. Routine trip costs are those costs that vary with the number of trips taken such as fuel, oil, ice, bait, groceries, and other miscellaneous costs, while net operating revenues are the residual revenues after deducting total routine trip costs. Positive net operating revenues indicate revenues that can be used to pay labor (crew and captain) and fixed costs. Negative operating revenues suggest that vessels may not be able to cover their trip costs. Variable costs are the sum of total routine trip costs and payments to captain and crew. Fixed costs consist of maintenance of vessel, fishing gear repair, permits, dockage, insurance, association fees, professional services, loan payment, and miscellaneous costs. Income above total costs is calculated by subtracting total revenues from total costs, which are the sum of variable costs and fixed costs.

4.2.3.1 Analysis by vessel sizes

In terms of total revenues, large vessels were the highest revenue group in 1998. Average total revenues ranged from $13,500 for small vessels to more than $82,500 for large vessels (Table 4). There was considerable variation in vessel revenues and net operating revenues due primarily to differences in the year-round activities and targeted species. Small vessels realized the lowest average net operating revenues. Although the average vessel had a

positive net operating revenue for all sizes, small and medium vessels, on average, had negative returns from commercial fishing. By engaging in commercial fishing, these small and medium vessels were able to generate some gross revenues over total annual variable costs to cover some fixed costs and to reduce losses. Because a vessel operation cannot survive negative revenue, many small and medium vessel operators may rely on non-fishing employment to sustain the business as well as provide adequate income for the household.

Table 4. Estimated annual commercial fishing average costs and returns, by vessel size, 1998.

	Small	Medium	Large
Total gross revenues, all species	$13,507.0	$37,857.0	$82,529.0
Annual routine trip costs	5,222.0	7,976.0	9,941.0
Net operating revenues	8,285.0	29,881.0	72,588.0
Labor payments	6,213.0	22,452.0	44,333.0
Total annual variable costs	11,435.0	30,428.0	54,274.0
Income above total variable costs	2,072.0	7,429.0	28,255.0
Total annual fixed costs	6,455.0	8,102.0	11,423.0
Total costs	17,890.0	38,530.0	65,697.0
Income above total costs	-4,383.0	-673.0	16,832.0

Of the 744 vessels included in this analysis, 8% did not cover their routine trip costs and about 22% had incomes greater than $10,000 above total costs (Figure 7). Approximately 79% of small vessels, 64% of medium vessels, and 59% of large vessels did not have income above total variable costs in their commercial fishing operations during 1998. This result shows that the level of profitability for vessels based in the Albemarle Sound Management Area varied substantially among vessels, and only large vessels were profitable in 1998. Thus, the main problem facing commercial fishermen was high operating costs. Operating costs have been rising over the years and continue to rise, in part because of increases in fuel prices and new regulations. These problems may become more severe when fish stocks are poor and regulations are implemented.

4.2.3.2 Analysis by fishery

A wide dispersion in economic performance was observed for vessels engaged in three targeted fisheries during 1998. In general, multi-species vessels had higher revenues, trip costs, and net operating revenues than did blue crab or flounder vessels (Appendix A).

On average, multi-species vessels took 94 trips and earned $34,800 in revenues. Although small and medium multi-species vessels had a large number of trips and high costs,

they did cover their fixed costs. Overall, commercial fishing was more profitable operation for multi-species large vessels in 1998 than for other types of vessels.

The average net operating revenues were similar between small blue crab vessels ($5,140) and small flounder vessels ($5,065). In contrast, medium blue crab vessels averaged $28,569 in net operating revenues compared with an average of $9,978 for medium flounder vessels. Most of these differences were due to more trips by blue crab vessels, which led to greater fuel and bait expenses. Within the blue crab fisheries, medium vessels took fewer trips than medium multi-species vessels but had less revenues and net operating revenues. Similarly, small blue crab vessels took fewer trips (about half the number of trips by small multi-species vessels) and earned about half the net operating revenues.

Flounder vessels took many trips but earned little revenue during 1998. This poor performance was probably linked to poor catches, low prices, and other economies of scale. Overall, large vessels outperformed medium vessels, which outperformed small vessels, regardless of the target species.

4.3 Preferences for fishing regulation methods

The survey solicited respondents' opinions regarding a variety of regulatory methods, which could be used to manage the Albemarle Sound Management Area fisheries. Each regulatory method was rated based on a 5 point rating scale where 1=strongly oppose and 5=strongly support. Fishermen' opinions are essential, not only for reasons of political and administrative feasibility, but also to assess the socioeconomic impacts of commercial fishing regulations.

Nearly 59% of the commercial fishermen surveyed supported or strongly supported individual transferable quotas (ITQ) as a management system for the river herring and striped bass fisheries (Table 5). In contrast, at least 84% of the respondents opposed or strongly opposed size and seasonal limits for catfishes, white perch, and yellow perch. These findings suggest that fishermen may not support attempts to implement additional restrictions on these species, or to create more seasonal closures.

There are currently many regulations on commercial fisheries in the Albemarle Sound Management Area. These include regulations such as a quota of 300,000 pounds for river herring, and seasons, sizes, and harvest limits for striped bass. One of the questions fishermen

were asked: 'If you fish for flounder, have you seen a decrease in the abundance of medium and/or large flounders?' There were 99 respondents to this question, with 97 answering no. Some fishermen felt that flounder were abundant in larger sizes recently.

Table 5. Commercial fishermen's ratings of regulation methods.

Statement	1	2	3	4	5
ITQ management for river herring fishery	12.9%	11.2%	17.2%	23.3%	35.3%
ITQ management for striped bass fishery	12.9%	10.3%	17.2%	25.4%	34.5%
Limit size on catfish	47.4%	37.1%	14.7%	0.0%	
Limit size on white perch	49.1%	40.5%	9.5%	0.9%	
Limit size and/or season on yellow perch	49.1%	37.9%	12.1%	0.0%	
If you fish for flounder, have you seen a decrease in the abundance of medium and/or large flounder?	YES=2% NO=98%				
Do you favor flexible season opening and closing dates for the striped bass fishery?	YES=70% NO=30%				

1=Strongly oppose; 2=Oppose; 3=Neutral; 4=Support; 5=Strongly support.

An existing regulation allows a striped bass season between October 1 and April 30. Fishermen were also asked, "Do you favor flexible season opening and closing dates?" A survey of fishermen found strong support (70%) for this alternative management option.

The typical responses for supporting this alternative scheme are listed below:

a. The opening dates suggested were January (77.4%) and December (19%).

b. The closing dates were April (54%) and May (29%).

c. The striped bass population is abundant enough to sustain a longer season or year-round fishing.

d. Control the striped bass population to prevent harming other species.

e. Increase the quota or/and daily catch at the end of March.

4.4 Characteristics of seafood dealer businesses

The wholesaling and processing of fishery products in North Carolina is a highly individualistic and fragmented industry composed of many small firms owned by families long-connected to the seafood industry, active fishermen or members of their extended families. Each seafood dealer has a clientele of commercial fishermen with whom he usually does business. These seafood establishments are extremely flexible, and may operate seasonally in accordance with fishermen's annual round of activities.

Table 6 presents the characteristics of these businesses from the Albemarle Sound

Management Area during 1998. The classification of these businesses was primarily fishermen with dealer licenses, followed by distributors/wholesalers, and dockside buyers. The increase in the number of fishermen acting as fish dealers is indicative of a trend toward small operations in recent years. By marketing their own catches, these small operators can increase their share of the seafood dollar.

The survey results allowed the seafood businesses to be classified into three groups: sole proprietorships (54.9%), corporations (27.5%), and partnerships (17.6%). For the group of sole proprietorship, nearly all businesses were owner-operated. Most of these businesses were fairly new, indicating they have been in business no more than 10 years.

Reported total sales ranged from less than $50,000 to more than $5 million, with over 44% of respondents citing total sales under $100,000 for 1998. Just over a quarter (27%) of these seafood businesses had total sales of over $1 million.

Regionally, hard blue crabs were the most important species in terms of total sales, followed by flounders, river herring, and soft blue crabs. Although hard blue crabs accounted for almost one-third (32%) of total sales in 1998, they generated 25% to 100% of revenue for some seafood dealers. Similarly, flounders contributed about 17% in terms of total sales, on average, and ranged from 5% to 90% for some dealers.

The majority of these fish dealers reported that most (74%) of their customers were located in North Carolina. Out-of-state sales accounted for 24% of the total sales, while exports represented only 2%.

Employment by seafood dealers is entirely dependent on the volume and seasonality of the catches; therefore, it is quite variable within the industry and during the year. The average employment per establishment was estimated at 7.5 for full-time and 9 for seasonal. Management support staff was 2.8 on average. Approximately 39% of the labor force were female. Only seven seafood businesses employed migrant workers, who accounted for 10-90% of their total employment in 1998.

The sales value of fishery products at the seafood dealer level includes the cost of raw products plus the costs of the services performed such as labor, transportation, and packaging. Information received from the survey respondents showed that raw products accounted for 66% of the total costs, followed by wages and salaries (12%), transportation (6%), utilities (4%), packaging (3%) and other costs (9%). However, value added for each species can not be

determined because of the numerous products handled and a lack of data.

Table 6. Characteristics of Albemarle Sound Management Area seafood dealer business, 1998.

CHARACTERISTICS	PERCENT
Business classification	
Fishhouse/dockside buyer	37.7%
Distributor/wholesaler	24.5%
Processor	15.1%
Importer	5.7%
Exporter	3.8%
Broker	1.9%
Fisherman with dealer license	52.8%
Others (restaurant, retail, charterboat, etc.)	30.2%
Ownership type	
Sole proprietorship	54.9%
Corporation	27.5%
Partnership	17.6%
Operation type	
Owner-operator	86.5%
Manager	13.5%
Years in business	
0-5 years	34.0%
6-10 years	17.0%
11-15 years	5.6%
16-20 years	17.0%
20 years and more	26.4%
Years of present ownership	
0-5 years	32.1%
6-10 years	22.6%
11-15 years	13.2%
16-20 years	13.2%
20 years and more	18.9%
Sales	
Under $50,000	28.8%
$50,000 – 100,000	15.4%
$100,000 – 200,000	9.6%
$200,000 – 500,000	7.7%
$500,000 - 1,000,000	11.5%
$1,000,000 – 2,000,000	15.4%
$2,000,000 – 5,000,000	7.7%
$5,000,000 and more	3.8%
Sales by species	
Catfish	1%
Bluefish	1%
Atlantic croaker	2%
Spot	2%
Striped bass	2%
Weakfish	3%
White perch	3%
River herring	9%
Soft blue crabs	7%
Flounders	17%
Other species	22%
Hard blue crabs	32%
Customers by location	
In-state	74%
Out-of-state	24%
Export	2%

5. SUMMARY

This study was conducted to provide baseline economic information concerning commercial fisheries in the Albemarle Sound Management Area. The specific objectives of the study were to (1) describe the socioeconomic aspects of commercial fisheries; (2) collect costs and earnings of commercial fisheries; and (3) assess fishermen's perceptions of fisheries management practices.

Commercial fishermen from the Albemarle Sound Management had demographic characteristics similar to those of North Carolina workers as a whole. The average age was 43 years, with about 6% age 65 years or older. They averaged 13 years in commercial fishing, which accounted for about 67% of their total household income in 1998.

Seafood dealers from the Albemarle Sound Management Area engaged in a range of seafood marketing activities over the species they handled. Most of these seafood establishments were owner-operated, and just more than half had been in business less than 10 years. Average employment was 7.5 for full-time and 9 for seasonal.

Vessels were classified into three sizes based upon the length. Productivity analysis of vessels indicated that the level of profitability was significantly related to the size of the vessel and the type of fishery. In general, large vessels outperformed small and medium vessels regardless of the target species.

Overall, hard blue crabs were, by far, the most important species in the study area, accounting for at least 40% of gross revenues for vessel owners and 32% of total sales for seafood dealers. Additional efforts to regulate the blue crab fisheries would affect many fishermen and seafood dealers in the Albemarle Sound Management Area**.**

6. LITERATURE CITED

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APPENDIX A
Detailed Economic Information

Albemarle Sound Management Area vessels, 1998 averages

ALL SPECIES	Small	Medium	Large
Number of trips	66.6	94.3	88.6
Total gross revenues, all species	$13,507.0	$37,857.0	$82,529.0
Annual routine trip costs	5,222.0	7,976.0	9,941.0
Net operating revenues	8,285.0	29,881.0	72,588.0
Labor payments[a]	6,213.0	22,452.0	44,333.0
Total annual variable costs	11,435.0	30,428.0	54,274.0
Income above total variable costs	2,072.0	7,429.0	28,255.0
Fixed costs			
Maintenance	3,504.0	4,694.0	6,300.0
Fishing and other gears	2,167.0	2,683.0	3,650.0
Insurance and dockage	463.0	430.0	855.0
Permits	145.0	141.0	175.0
Services[b]	176.0	154.0	443.0
Total annual fixed costs	6,455.0	8,102.0	11,423.0
Income above total costs	-4,383.0	-673.0	16,832.0

[a] Include payments to captain and crew based on share system.
[b] Include accounting, legal, and fishing association fees.

Albemarle Sound Management Area blue crab vessels, 1998 averages

BLUE CRABS ONLY	Small	Medium	Large*
Number of trips	36.6	85.8	
Total gross revenues, all species	$8,251.0	$36,680.0	
Percent of revenues by target species	100.0	100.0	
Annual routine trip costs	3,111.0	8,111.0	
Net operating revenues	5,140.0	28,569.0	
Labor payments[a]	4,009.0	26,001.0	
Total variable costs	7,120.0	34,1121.0	
Income above total variable costs	1,131.0	2,568.0	
Fixed costs			
Maintenance	3,229.0	3,129.0	
Fishing and other gears	3,214.0	3,077.0	
Insurance and dockage	337.0	443.0	
Permits	139.0	135.0	
Services	131.0	169.0	
Total annual fixed costs	7,050.0	6,953.0	
Income above total costs	-5,919.0	-4,385.0	

* Confidential data because there was only 1 respondent.
[a] Include payments to captain and crew based on share system.

Albemarle Sound Management Area flounder vessels, 1998 averages

FLOUNDERS ONLY	Small	Medium	Large*
Number of trips	48.7	47.2	
Total gross revenues, all species	$6,656.0	$11,329.0	
Percent of revenues by target species	66.0	77.0	
Annual routine trip costs	1,591.0	1,351.0	
Net operating revenues	5,065.0	9,978.0	
Labor payments[a]	4,304.0	8,682.0	
Total annual trip costs	5,895.0	10,033.0	
Income above total variable costs	761.0	1,296.0	
Fixed costs			
Maintenance	2,667.0	5,163.0	
Fishing and other gears	2,667.0	3,250.0	
Insurance and dockage	463.0	660.0	
Permits	158.0	166.0	
Services	212.0	211.0	
Total annual fixed costs	6,167.0	9,450.0	
Income above total	-5,406.0	-8,154.0	

[a] Include payments to captain and crew based on share system.
* No data available.

Albemarle Sound Management Area multi-species vessels, 1998 averages

MULTI-SPECIES FISHERIES	Small	Medium	Large
Number of trips	78.6	102.5	93.8
Total gross revenues, all species	$16,994.0	$41,406.0	$87,607.0
Annual routine trip costs	6,584.0	9,353.0	10,506.0
Net operating revenues	10,410.0	32,053.0	77,101.0
Labor payments[a]	7,597.0	24,036.0	45,560.0
Total variable costs	14,181.0	33,389.0	56,066.0
Income above total variable costs	2,813.0	8,017.0	31,541.0
Fixed costs			
Maintenance	3,765.0	5,313.0	6,938.0
Fishing and other gears	1,647.0	2,250.0	3,625.0
Insurance and dockage	514.0	371.0	863.0
Permits	146.0	136.0	188.0
Services[b]	188.0	139.0	455.0
Total annual fixed costs	6,260.0	8,209.0	12,069.0
Income above total costs	-3,447.0	-192.0	19,472.0

[a] Include payments to captain and crew based on share system.
[b] Include accounting, legal, and fishing association fees.

APPENDIX B
Survey Instruments

North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries
Commercial Fishermen Survey

Attempt No.	Date	Time	Discon.	No answer	Busy	Refused	Succ. Cont.
1							
2							
3							
4							
5							

Hello. My name is _____. I am conducting an economic survey on the behalf of the North Carolina Division of Marine Fisheries.

This survey is being conducted to provide information concerning commercial fisheries in the Albemarle Sound area. Your input will help to identify potential economic and social effects of fishery management actions that might be proposed by the North Carolina Marine Fisheries Commission and the National Marine Fisheries Service.

Your vessel with endorsement P-XXXXX was randomly selected from a list of vessel-ETS holders who fished commercially in the Albemarle Sound area. Your responses will be kept strictly confidential and will be combined with the responses of other commercial fishermen. When the data are presented, they will be in the form of summary statistics, so there will be no way of tracing responses back to you.

The survey is voluntary, but we urge you to participate. We need your answers. Fishermen like yourself, who have a vital stake in the management decisions being made, can provide the information necessary to evaluate the economic effects of different options on commercial fishermen.

The interview can take about 30-40 minutes. The purpose of this call is to set up an appointment with you at your convenience to meet with you in person to conduct this interview. It may be helpful to you to have your 1998 (January-December) fishing records available in case you need to refer back to them for revenue and cost data relating to your operation.

Should you have any questions and/or comments or wish to discuss your response, please contact Solo Diaby at 1-800-682-2632 Ext. 603 at the Division of Marine Fisheries, Morehead City.

Date:_____ Starting Time:_____ Ending Time:_____

A. DEMOGRAPHIC INFROMATION

1. Do you consider yourself to be primarily a?
   1.□ Full-time commercial fisherman 2.□ Part-time commercial fisherman
2. How many years of experience do you have fishing commercially? _____ years
3. Do you have other occupations besides commercial fishing?
   1.□ YES 2.□ NO
4. Please indicate years of experience in your non-fishing employment. _____ years
5. Are you? 1.□ Male 2.□ Female

6. How old are you? ____ Years
7. What is your ethnic background?
   1.□ African American or Black
   2.□ Caucasian
   3.□ American Indian
   4.□ Asian or Asian American
   5.□ Hispanic

8. What was the last grade of school you completed?
   1.□ Less than a high school degree
   2.□ High school graduate
   3.□ Some college
   4.□ College graduate
   5.□ Post-graduate or professional degree

9. Are you married? 1.□YES 2.□NO
   9A. Is your spouse involved in any aspect of the fishing industry? 1.□YES 2.□NO
   9B. What fishing-related work does your spouse do? _____
10. Excluding yourself, how many family members, relatives, and other individuals depend upon your income from fishing? [Count only those individuals you directly support] _____ # individuals
11. Please indicate the amount that represents your total household income from all sources in 1998.
   1.□UNDER $15,000
   2.□$15,000- $29,999
   3.□$30,000- $49,999
   4.□$50,000- $74,999
   5.□$75,000- $99,999
   6.□$100,000 and over
12. What percent of your household's annual income comes from commercial fishing? _____%
13. On average, how many hours per week do you work in total? _____
14. In a typical week, what percentages of your time are spent fishing and in non-fishing employment activities? 1. □Fishing: _____ % 2.□Non-fishing: _____%
15. Think about your income from fishing since 1989. Over these ten years, in how many years was your income:
   1.□ 10% more than your 1998 income? _____
   2.□ More than 25% less than your 1998 income? _____
16. On a scale of 1 to 10 (where 1=poor outlook and 10=excellent outlook) rate your perception about the income-earning potential from your commercial fishing activities.
   1 2 3 4 5 6 7 8 9 10

B. VESSEL CHARACTERISTICS

1. Please indicate the ownership type of this vessel during 1998.
   1.□Sole owner 2.□Partnership 3.□Corporation
2. Please indicate the harvesting operation of this vessel during 1998.
   1.□Owner/operator 2.□Hired captain 3.□Other
3. Please give the following characteristics of this vessel
   Vessel length _____ feet
   Market value including all equipment $_____
   Average crew size including captain _____
4. How many vessels do you own that were used for commercial fishing in 1998? #___ Vessel(s)

C. OVERHEAD AND OPERATING COSTS OF VESSEL

1. How much did you spend for overhead costs for 1998 related to your vessel fishing activity?
   Overhead costs represent those costs that incur regardless of whether or not the vessel is away from the dock.

	Dollar amount spent in 1998
1) Maintenance and repair of vessel	$_____
2) Fishing gear	$_____
3) Fishing permits/licenses	$_____
4) Mooring, dockage fees	$_____
5) Insurance (hull, protection, property)	$_____
6) Association(s) fees	$_____
7) Professional fees (accounting, bookkeeping, lawyer, etc.)	$_____
8) Loan payment	$_____
9) Other overhead costs	$_____

2. Please indicate species targeted during 1998 (Please check only one):
   1) Blue crabs only _____

2) Flounders only _____
3) Mixed species _____
4) Varies by trip or season _____
5) Catch whatever you can _____
6) Others _____

3.Based on your answer to question #2 (above), please indicate the operating expenses for your typical fishing trip in 1998?

	Amount spent per trip during 1998
1) Fuel	$_____
2) Oil	$_____
3) Ice	$_____
4) Bait	$_____
5) Groceries	$_____
6) Other trip costs	$_____

4.On a typical trip, what were the captain's share, the boat share, and the crew share of the net revenues after deductions?

Captain share: ____%
Boat share: ____%
Crew share: ____%

D. FISHERY MANAGEMENT

The following is a list of possible regulations to better manage the Albemarle Sound Management Area fisheries.

1. Please indicate below whether you support or oppose these regulations.
ITQ (Individual Transferable Quota) is a particular amount of a total catch assigned to individuals.

	Strongly oppose	Oppose	Neutral	Support	Strongly Support
ITQ management for river herring fishery					
ITQ management for striped bass fishery					
Limit size on catfish					
Limit size on white perch					
Limit size and/or season on yellow perch					

2. If you fish for flounder, have you seen a decrease in the abundance of medium and/or large flounders?

1. □YES 2. □NO

Comments:_____
_____

3. Do you favor flexible season opening and closing dates for the striped bass fishery?

1. □YES 2. □NO

If YES, please specify: Begin season:_____ End season:_____

Comments:_____
_____

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION

North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries
Seafood Dealer survey

Dear North Carolina's Licensed Fish Dealer:

The North Carolina Division of Marine Fisheries is conducting an economic survey of fish dealers in the Albemarle Sound area. The purpose of the survey is to document the economic and social importance of North Carolina's seafood industry and to provide information to industry about economic and social impacts of fisheries management options.

Your completed survey is one important source of information for documenting the economic importance of your industry. All responses will be kept strictly confidential and will be combined with the responses of other fish dealers. Once information has been compiled, your individual survey form will be destroyed and there will be no way to identify your firm.

The survey is voluntary, but we urge you to participate. We need your answers. Fish dealers like yourself, who have a vital stake in the management decisions being made, can provide the information necessary to evaluate the economic effects of different options on the commercial fishing industry.

Please return your completed survey in the enclosed postage-paid envelope. Should you have any questions and/or comments or wish to discuss your response, please contact Solo Diaby at 1-800-682-2632 Ext. 603 at the Division of Marine Fisheries, Morehead City.

A. BUSINESS CHARACTERISTICS

1. County of your fish business location: _____
2. Do you own or operate your fish business from more than one location?
   1.□ YES 2. □ NO
   If YES, please give the total number of locations: _____
3. Please indicate the type of your fish business ownership:
   1. □ Sole proprietorship 3. □ Partnership
   2. □ Corporation 4. □ Other (specify) _____
4. Operator status? 1.□ Owner/operator 2.□ Manager
5. How long have the present owner(s) owned the fish business? _____ Years
6. How long has this fish business existed, whether or not under the present ownership? ____ Years
7. Does the fish business own any fishing vessels directly or through subsidiaries?
   1.□ YES 2.□ NO
8. How would you best describe your firm's fish marketing activities? (Please check more than one if appropriate)
   1.□ Fish house/dockside buyer
   2.□ Distributor/wholesaler (including packing & freezing)
   3.□ Processor
   4.□ Importer
   5.□ Exporter
   6.□ Broker
   7.□ Others, specify by circling

A. Fisherman with a dealer license
B. Restaurant
C. Retail
D. Supermarket
E. Fishing pier
F. Charterboat
G. Marina

9. How many people are employed by your fish business at this location?
   A. Total number of:
      1. Full-time year-round employees _____
      2. Seasonal employees _____
   B. Total number of support staff (i.e., secretaries, manager, etc.): _____
10. Please give your employees characteristics
   A. Gender: Female____% Male____%
   B. What percentage of your total employees is a migrant worker? _____%

B. BUSINESS OPERATIONS

1. Please indicate the range of your fish business' gross total sales in 1998.
   1. Under $50,000
   2. $50,000 - $100,000
   3. $100,000 - $200,000
   4. $200,000 - $500,000
   5. $500,000- $1 million
   6. $1 million- $2 million
   7. $2 million- $5 million
   8. $5 million and above

2. Please check primary species/products handled by indicating the percent of your total sales each group represented in 1998?

Species/Products	% of total sales in 1998
River herring	%
Striped bass	%
Croaker	%
White perch	%
Catfish	%
Bluefish	%
Hard crabs	%
Soft crabs	%
Weakfish	%
Spot	%
Flounders	%
Others	%
TOTAL	100%

3. Please indicate your primary markets by the percentage of your total sales in 1998:
   1. In-state markets (restaurants, institutions, retail, stores, other dealers, etc.) _____%
   2. Out-of-state markets (U.S dealers) _____%
   3. Export (Japan, Europe, etc.) _____%

   100%

4. Please provide your annual operating expenses for the following items in 1998. Expenses can be provided in either dollars or a percent of total revenues (sales).

	Dollars	Percent of sales
1. Raw products costs (fish, crabs, etc.)	$_____ or	_____%
2. Labor (employees' salaries)	$_____	_____%
3. Utilities/Telephone	$_____	_____%
4. Transportation (shipping)	$_____	_____%
5. Packaging material	$_____	_____%

6. Other costs (ice, additives, etc.) $_____ _____%

YOUR CONTRIBUTION TO THIS EFFORT IS GREATLY APPRECIATED. PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED PRE-ADDRESSED ENVELOPE AS SOON AS POSSIBLE.