ECONOMIC ANALYSIS OF THE 1991 SOUTH CAROLINA

SHRIMP BAITING FISHERY

by

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I. INTRODUCTION

Background and Objectives of the Study

The use of bait to attract shrimp for capture has become an extremely popular activity in coastal waters of South Carolina in recent years (Liao, 1988 and Theiling, 1988). The rapid growth of shrimp baiting resulted in pressure on the General Assembly to pass the Shrimp Baiting Act in 1988. The Act established a 60-day season, limited the number of poles used to mark bait, set a 48-quart catch limit per boat per day, and required one baiting permit per boat. Since 1983, state law has outlawed the sale of shrimp taken over bait.

Increased participation in shrimp baiting in South Carolina has created issues and problems for fisheries managers. Commercial shrimp fishermen have claimed that unfair access by shrimp baiters to shrimp in estuaries has a negative impact on the catch of commercial shrimp trawlers. Thus, one of the major problems is a controversy over how the shrimp stock should be allocated among competing commercial and recreational shrimping fishermen. The development of an appropriate shrimp management program requires both economic and biological data on the fishery.

The purpose of this study was to develop some basic economic information concerning the shrimp baiting fishery. More specifically the study focused on the following objectives:

1. to determine the socio-economic characteristics of licensed recreational shrimpers,
2. to analyze factors affecting recreational shrimping trips,
3. to estimate the economic values of shrimp baiting trips by the direct questioning method.

Research Methods

All permit holders for the 1991 shrimp baiting season constituted the "population" for the survey. There were 12,005 permit holders in 1991. The sample size was 25 percent of permit holders. Thus, the sampling method designated every fourth permit holder in each county's listing sample. A total of 2,980 permit holders was selected from the sampling frame for the survey (Low, 1992).

A questionnaire (Appendix 1) was mailed to selected permit holders. As can be seen in Table 1, overall return rate to the

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mail survey was 43.7 percent. A total of 1,172 respondents were active permit holders who engaged in one or more shrimp baiting trips during the 1991 season.

The survey data of active permit holders were grouped according to the county categories (Table 1). Statistical techniques were then used to analyze demographic characteristics. The data from the mail survey were also used in conducting the empirical model estimation by the statistical procedures of least-squares regression. This analysis permitted the examination of several factors that appear related to the number of shrimp trips taken by the permit holders.

Shrimpers estimation of their trip values and costs were then analyzed. Net economic value of trips was estimated as gross economic value less trip costs. Comparisons of the estimated values with ex-vessel prices were also made to explore some issues regarding shrimp resource management.

II. CHARACTERISTICS OF RECREATIONAL SHRIMPERS

Demographic Characteristics

An analysis of the survey data indicates that the population of South Carolina recreational shrimpers is quite diverse. This diversity is shown by describing the age, household size, household income and shrimp baiting experience of the active permit holders. This description provides a demographic profile of the South Carolina recreational shrimp fishermen.

Responding recreational shrimpers in South Carolina were determined to have an average age of 44 years (Table 2). The sample permit holders were asked to check off one of seven age intervals. To calculate average age, midpoint of the age interval was used for each respondent. The bulk of the recreational shrimpers ranged between the ages 30 to 49, which represented 67 percent of the total number of those shrimpers who responded to the questionnaire (Table 2a). This age distribution is very similar to those results obtained in a 1986 survey (Liao, 1988).

Of the 1,126 shrimpers reporting data on household size, slightly more than one-third (35.9%) of the household consisted of 1-2 individuals (Table 2b). Slightly more than one-half (52.7%) of the households consisted of 3-4 individuals while only 11.4% had 5 or more individuals at home. This did not change from those of a 1989 survey (Low, 1990).

The household income question asked respondents to check off one of eight income classes. About 1,082 shrimpers provided income information. Their responses were converted to midpoints of the income classes in the mean calculation. The average annual household income of shrimpers was approximately $41,834 (Table 2). About 13.9% of respondents reported annual household income of less than $20,000 (Table 2c).

Approximately two-third of shrimpers (67.6%) had annual household of less than $50,000. The income distribution of recreational shrimpers closely parallels the income distribution of shrimp baiters in the 1989 season (Low, 1990) and private boat anglers in South Carolina (Liao and Cupka, 1979). It is interesting to note that 10 percent of permit holders who did not participate in shrimp baiting also provided their income information. The average household income for these inactive permit holders in 1991 was $46,111 which was higher than the average household income of active permit holders.

Information concerning the number of years of shrimp baiting experience was provided by 1,133 shrimpers (Table 2d). The average shrimper in South Carolina had about 3 years of shrimp baiting experience. About 38% of shrimpers had engaged in shrimp baiting for 3 to 4 years and 17% had 5 years or more. Nearly 45% had two years or less experience.

Trip Characteristics

This section describes characteristics of shrimping activities of active permit holders in terms of distance traveled, number of assistants, trip costs, and catch rate. The use of cast nets and fish meal as bait in recreational shrimping at night was described by Theiling (1988).

The one-way distance traveled by the average shrimping residents in South Carolina was 44.9 miles (Table 3). It was observed that the average shrimpers from Charleston County traveled 9.4 miles while participants from Aiken Group estimated that their average one-way distance was 102.5 miles.

The average number of assistants per permit holder is given in Table 3. The permit holders in South Carolina usually had two assistants on their shrimping trips. Thus, the average recreational shrimping party size was three persons. It was observed that there was no variation about the average number of assistants per permit holder according to area of residence.

The total amount spent by South Carolina recreational shrimpers on their trip averaged $24.84 in 1991. The trip costs consisted of those expenditures incurred while traveling to and from the shrimping site and those expenses incurred at the site. As shown in Table 3, the typical cost per trip was lowest in Charleston County and highest in the Aiken Group and other counties where long-distance traveled resulted in increased costs.

The estimates of shrimp caught per trip show that non-coastal participants are likely to have higher catch rates than coastal county residents. Differences in catch rates are caused by many factors in addition to the availability of shrimp. A higher catch rate by non-coastal recreational shrimpers could be due in part to their having more incentive to go to the productive areas and shrimp more hours because they spend more money and travel farther than coastal recreational shrimpers.

III. FACTORS AFFECTING RECREATIONAL SHRIMPING TRIPS

Estimation of Shrimping Trips

Table 4 presents estimates of shrimping trip statistics for the 1991 season by area of residence. The estimate of total trips is the product of the average number of trips per active permit holder and total active permit holders. The average number of trips per permit holder in Charleston County was 6.99. Total active permit holders for Charleston County was 3,135. Thus, total number of shrimping trips for Charleston County was estimated at 21,914. Based on the results estimated, total shrimping trips for South Carolina amounted to 69,433. The same procedure was used to estimate total catch which is the product of total trips and the average catch per trip. Estimated total catch for all recreational shrimp baiting by South Carolina residents was approximately 1,464,995 quarts of heads-on shrimp (Table 5). This estimate equals 2.17 million pounds of heads-on shrimp.

Estimation of Recreational Shrimping Model

This section presents an economic methodology for estimation of a recreational shrimping model. Factors which were hypothesized to be important in influencing the number of trips taken by shrimpers included trip costs, distance traveled, catch rate, number of assistants, household size, household income, age, and shrimping experience. Thus, an empirical model for recreational shrimping trips is specified as follows:

$$Trips = EXP (B_0 + B_1 \, Catch + B_2 \, Miles + B_3 \, Costs + B_4 \, Assistants + B_5 \, Household \, size + B_6 \, Age + B_7 \, Income + B_8 \, Experience + e)$$

Where:
- Trips = number of trips taken by shrimpers;
- Catch = shrimp catch per trip;
- Miles = one-way distance traveled;
- Costs = the trip costs;
- Assistants = the number of assistants on the trip;
- Household size = the number of individuals at home;
- Age = the age of permit holder;
- Income = the estimated annual household income;
- Experience = the number of years of recreational shrimping experience;
- e = the random error term;
- B_0, B_1, B_2, B_3, B_4, B_5, B_6, B_7, B_8 are regression parameters.

Relationship of the above model more nearly approximates an exponential than a linear function because it includes recreational quality (i.e. catch rate) as an independent variable. Thus, the model was estimated as an exponential function. When converted to logarithms, the function is linear in the parameters and can be estimated with conventional multiple regression techniques. Based on the survey data, the above model was estimated by using ordinary least-squares method. The regression results for the function (t-values in parentheses):

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$$\text{Log Trips} = 0.62385 + 0.00236 \text{ Catch} - 0.00114 \text{ Miles}$$
$$(10.16) \quad (3.17) \quad\quad (-4.19)$$
$$- 0.00242 \text{ Costs} + 0.08015 \text{ Assistants}$$
$$(-3.23) \quad\quad (13.24)$$
$$+ 0.01069 \text{ Household Size} - 0.00161 \text{ Age}$$
$$(1.26) \quad\quad\quad (-1.84)$$
$$-0.000002 \text{ Income} + 0.0209 \text{ Experience}$$
$$(-4.24) \quad\quad (5.13)$$

$$R^2 = 0.27 \quad\quad\quad F = 40.7 \quad\quad\quad N = 895$$

The calculated F ratio is 40.7, indicating that the equation is overall significant at the 0.01 level. The R^2 value is small. In any case, we are much concerned with estimates of the structural parameters. The regression model indicates that only age and household size variables in the equation were not statistically significant at the 1%. Thus, age and household size failed to exert a significant influence on the dependent variable. The most striking character of this model is the negative sign on the income coefficient. This indicates that increases in household income have virtually negative effect on recreational shrimping trip demand. The coefficient of trip costs was negative and statistically significant. This implies that there is an inverse relationship between number of trips taken by shrimpers and costs per trip. Catch rate exerted its usual positive impact upon additional shrimping trips. Thus, shrimpers are responsive to changes in shrimping success and catch is an important determinate of shrimping trips. Number of assistants exerted a positive influence upon shrimping trips taken while distance traveled had a negative influence on the dependent variable. Years of shrimping experience has the expected positive sign. It had a positive influence on the number of shrimping trips.

IV. ECONOMIC VALUE OF THE SHRIMP BAITING FISHERY

Estimation of Gross Economic Value

One of the objectives of this study was to develop numerical estimates of economic values of the South Carolina shrimp baiting fishery by the direct questioning method. For this study, "gross economic value" is defined in terms of the maximum amount that the shrimp baiter is willing to pay for shrimping rather than do without. Thus, shrimpers were asked to provide an estimate of the maximum amount that he is willing to pay for his typical shrimping trip rather than give up the shrimp baiting trip. Average gross economic values per trip and total gross values were estimated by area of residence (Table 6). Total gross economic value of shrimp baiting trips in South Carolina during 1991 was estimated at $1,868,143. This estimate was then divided by total trips to find the average gross economic value per trip which was about $26.91.

The average gross economic value per pound of shrimp was calculated using total gross economic value divided by total catch of shrimp in 1991. The average gross economic value per pound of white shrimp was $0.86. This value may be overstated because attributing all economic value of recreational shrimping to only shrimp caught can overestimate the value of shrimp because other factors including being outdoor and spending time with friends are also valued aspects of a shrimping trip.

Estimation of Net Economic Value

The net economic value to a recreational shrimper is equal to the maximum amount that he would be willing to pay for the use of a resource, over and above the actual costs that he must incur in order to participate in the recreational shrimping activity. Thus, net economic value is the margin between gross economic value and trip costs. Net economic value estimates for each of seven residential groups of South Carolina are presented in Table 7, along with trip costs. By multiplying the average net economic value per trip by the total trips in each county category, the total net economic value was estimated (Table 8). For the state, total net economic value was $236,246 for all shrimping trips in 1991. The average net economic value per trip was $3.40 while the average net economic value per pound of whole shrimp was only $0.11.

Comparisons of Economic Values and Harvests between Commercial and Recreational Shrimping

Estimates of gross economic value of shrimp baiting make it possible to compare gross economic value per pound of shrimp between recreational and commercial fishermen. Ex-vessel prices represent a good approximation of gross economic value to commercial shrimp fishermen. During 1991, average ex-vessel prices per pound of whole white shrimp was $2.01 (Table 9). This value is about $1.15 higher than estimated average gross economic value per pound from recreational shrimping trips.

Table 10 presents comparisons of commercial shrimp landings and recreational shrimp harvest in South Carolina, 1987-1991. Five years of harvest data were used to estimate the commercial and recreational shrimping relationships. The equation which was estimated with five years data was:

$$Y_1 = 3.0823 + 0.4270X$$
$$(2.5966) \quad (0.4756)$$
$$R^2 = 0.07$$

Where Y_1 = Commercial landings of shrimp
in million pounds in the fall season,
X = Recreational shrimping
harvest in million pounds.

Figures in parenthesis are t-values. The regression coefficient of X was not significantly different from zero. This

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indicates that recreational shrimping harvest were not significantly related to commerical landings of shrimp in the fall season.

It was also desirable to estimate the commercial and recreational shrimping relationships on commercial shrimping over time period longer than fall season. The equation which estimated from the annual data was:

$$Y_2 = 5,0441 + 0.8093X$$
$$(2.3857)(0.5060)$$
$$R^2 = 0.08$$

Where Y_2 = total annual commercial landings in million pounds of shrimp,
  X = recreational shrimping harvest in million pounds.

The above equation was quite similar to the previous equation. The regression coefficients of recreational shrimping were again not significantly different from zero. Based on these two equations, it appears that the commercial shrimp landings were independent of the level of state-wide recreational shrimping harvest. Therefore, the coexistence of two user groups can occur for achieving optimal management of shrimp resources even if the gross economic value per pound of shrimp was higher from commercial landings.

V. SUMMARY AND CONCLUSIONS

Research Findings and Implications

Recreational shrimpers in South Carolina were determined to have an average of 3 years of shrimp baiting experience and an average annual household income of $41,834. Most recreational shrimpers were between thirty to forty-nine years of age (67%). The mean age was 44. The average one-way distance shrimpers traveled to make a trip was 44.9 miles. Shrimping party size per trip averaged 3 persons. Shrimpers' expenses were estimated to be $24.84 per trip and an average catch per trip was 21.44 quarts of whole shrimp.

Estimated total shrimping trips taken by South Carolina residents were 69,433. An empirical model for recreational shrimping trips was specified and estimated. The results indicate that catch rate, years of baiting experience, and number of assistants on trips have a positive and strong influence on number of shrimping trips taken by shrimp baiters. Trip costs, distance traveled, and income have a negative impact upon additional shrimping trips.

Total gross economic values of shrimping trips in 1991 were estimated at $1,868,143, while total net economic values were only $236,246. The average gross economic value per pound of shrimp was $0.86 and the net economic value was only $0.11 per pound of whole shrimp caught by recreational shrimpers. Based on

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ex-vessel prices, the average gross economic value of commercially caught shrimp was estimated to be $2.01 per pound, which as higher than that of the recreational shrimp baiting harvest.

Total catch by recreational shrimpers in 1991 was about 2.17 million pounds of heads-on shrimp which represented 23 percent of commercial shrimp landings. The analysis of commercial and recreational shrimping relationships indicated that the commercial shrimp landings were independent of the level of recreational shrimping harvest. Therefore, commercial and recreational shrimping activities can coexist even if the gross economic value per pound was lower from recreational shrimping.

Limitations and Needed Further Research

This study is a first attempt to estimate economic values based on shrimpers' willingness to pay for recreational shrimping by the direct questioning method. This preliminary approach may be inaccurate because the questionnaire may be difficult to answer by some respondents. Although preliminary estimated economic values appear useful, alternative approaches are needed to asses the magnitude of the economic values of the shrimp baiting fishery and provide estimates for comparison.

The analysis of commercial and recreational shrimping relationships was based on only 5 years of data. Validity of analyses depends crucially upon the underlying data used for the analyses. Better and longer time series data on catch and effort are needed for both the commercial and recreational shrimping sectors.

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Table 1. Distribution of Permit Holders and Responses in the Mail Survey by Area of Residence.

Residential Category	Population of Permit Holders	Sample Size of Permit Holders	Total Responses of Permit Holders	Percent of Responses	Total Responses of Active Permit Holders***	Percent of Active Permit Holders
Charleston County	3,562	890	383	43.0	337	88
Beaufort/Jasper Hampton/Colleton Counties	2,794	696	295	42.4	262	89
Berkeley/Dorchester Counties	2,139	534	221	41.4	200	90
Georgetown/Horry Counties	681	169	62	36.7	57	92
Aiken Group*	1,809	481	239	49.7	223	93
Other Counties**	1,020	210	103	49.0	93	.90
Total Statewide	12,005	2,980	1,303	43.7	1,172	90

*Includes Aiken, Allendale, Bamberg, Barnwell, Orangeburg, Lexington, and Richland Counties.
**Includes thirty counties which are not included in the above categories.
***Engaged in one or more shrimp baiting trips during the 1991 season.

Table 2. Average Characteristics of Recreational Shrimpers by Area Of Residence.

Residential Category	Age of Permit Holders	Household Size	Household Income	Shrimp Baiting Experience
Charleston County	42.1 (12.1)*	3.07 (1.28)	44,721 (18,957)	3.12 (1.99)
Beaufort/Jasper/ Hampton/Colleton Counties	43.7 (12.6)	3.13 (1.18)	36,271 (17,668)	3.09 (2.59)
Berkeley/Dorchester Counties	43.6 (11.2)	3.31 (1.26)	40,135 (16,879)	3.21 (2.59)
Georgetown/Horry Counties	44.0 (10.12)	3.35 (1.17)	39,554 (18,715)	2.37 (1.59)
Aiken Group	44.4 (11.7)	3.08 (1.14)	45,074 (18,150)	3.17 (1.59)
Other Counties	46.5 (12.7)	3.07 (1.17)	44,773 (18,630)	2.50 (3.51)
Total Statewide	43.6 (11.9)	3.14 (1.22)	41,834 (18,443)	3.05 (2.54)

*Standard derivation in parentheses.

Table 2a. Percent of South Carolina Recreation Shrimpers in Each Age Group.

Age(year)	No. of Responses	Precent (%)
Less than 21	11	1.0
21 - 29	106	9.4
30 - 39	383	33.8
40 - 49	316	33.8
50 - 59	183	16.0
60 - 69	113	10.0
Over 70	21	1.9
Total	1,133	100.0

Average Age - 43.6 Year

Table 2b. Percent of South Carolina Recreational Shrimpers by Household Size.

Household Size	No. of Responses	Percent (%)
1-2	404	35.9
3-4	593	52.7
5-6	122	10.8
Greater than 6	7	0.6
Total	1,126	100.0

Average Household Size 3.14

Table 2c.   Percent of South Carolina Recreational Shrimpers in
            Each Gross Household Income Class.

Gross Household Income Class	No. of Responses	Percent (%)
Less than $10,000	27	2.5
$10,000 - $19,999	123	11.4
$20,000 - $29,999	181	16.7
$30,000 - $39,999	202	18.7
$40,000 - $49,999	176	16.3
$50,000 - $59,999	136	12.6
$60,000 - $69,999	87	8.0
More than $70,000	150	13.8
Total	1,082	100.0

Average Household Income - $41,834

Table 2d.   Percent of South Carolina Recreational Shrimpers in
            Each Shrimp Baiting Experience Group.

Years of Experience	No. of Responses	Percent (%)
0	7	0.6
1-2	505	44.5
3-4	430	38.0
5-6	138	12.2
more than 6	53	4.7
Total	1,133	100.0

Average Experience - 3.05 years

Table 3. Average Characteristics of Shrimping Trips by Area of Residence.

Residential Categories	No. of Assistants	Miles Traveled	Trip Costs ($)	Catch Rate* (Quarts)
Charleston County	2.15 (1.36)**	9.4 (9.8)	18.21 (11.32)	17.03 (11.63)
Beaufort/Jasper/ Hampton/Collenton Counties	2.25 (1.51)	23.1 (22.0)	19.09 (11.34)	24.05 (14.40)
Berkeley/Dorchester Counties	2.53 (2.13)	32.6 (17.7)	22.03 (11.11)	20.08 (13.29)
Georgetown/Horry Counties	1.97 (1.34)	27.8 (16.9)	20.23 (9.63)	18.54 (13.97)
Aiken Group	2.17 (1.55)	102.5 (37.9)	41.38 (18.35)	24.81 (13.79)
Other Counties	2.57 (3.45)	137.5 (67.8)	43.81 (21.97)	26.78 (17.31)
Total Statewide	2.26 (1.82)	44.9 (51.4)	24.84 (16.65)	21.44 (14.00)

*Quarts whole shrimp per trip.
**Standard derivation in parentheses.

Table 4. Estimates of Recreational Shrimping Trips by Area of Residence.

Residential Category	Trips Per Active Permit Holders	X	Total Active Permit Holders	=	Total Trips
Charleston County	6.99		3,135		21,914
Beaufort/Jasper Hampton/Colleton Counties	7.73		2,482		19,186
Berkeley/Dorchester Counties	6.65		1,936		12,874
Georgetown/Horry Counties	5.04		626		3,155
Aiken Group	4.85		1,688		8,187
Other Counties	4.47		921		4,117
Total Statewide	6.35		10,788		69,433

Table 5. Estimates of Recreational Shrimping Catch by Area of
          Residence.

Residential Category	Average Catch Per Trip (Quarts)	X	Total Trips	=	Total Catch (Quarts)
Charleston County	17.03		21,914		373,195
Beaufort/Jasper Hampton/Colleton Counties	24.05		19,186		461,423
Berkeley/Dorchester Counties	20.08		12,874		258,510
Georgetown/Horry Counties	18.54		3,155		58,494
Aiken Group	24.81		8,187		203,120
Other Counties	26.78		4,117		110,253
Total Statewide					1,464,995

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Table 6. Estimated Gross Values of Recreational Shrimping by Area of Residence.

Residential Category	Average Gross Values Per Trip ($)	X	Total Trips	=	Total Gross Values ($)
Charleston County	21.53		21,914		471,808
Beaufort/Jasper Hampton/Colleton Counties	24.08		19,186		461,999
Berkeley/Dorchester Counties	24.58		12,874		316,443
Georgetown/Horry Counties	26.33		3,155		83,071
Aiken Group	41.55		8,187		340,170
Other Counties	47.28		4,117		194,652
Total Statewide					1,868,143

Table 7. Estimated Average Net Value Per Trip of Recreational Shrimping by Area of Residence.

Residential Category	Gross Value Per Trip – ($)	Cost Per Trip = ($)	Net Value Per Trip ($)
Charleston County	21.53	18.21	3.32
Beaufort/Jasper Hampton/Colleton Counties	24.08	19.09	4.99
Berkeley/Dorchester Counties	24.58	22.03	2.55
Georgetown/Horry Counties	26.33	20.23	6.10
Aiken Group	41.55	41.38	0.17
Other Counties	47.28	43.81	3.47

Table 8.   Estimated Total Net Value of Recreational Shrimping by Area
           of Residence.

Residential Category	Total Gross Value ($)	Total Cost ($)	Total Net Value ($)
Charleston County	471,808	399,053	72,755
Beaufort/Jasper Hampton/Colleton Counties	461,999	366,261	95,738
Berkeley/Dorchester Counties	316,443	283,614	32,829
Georgetown/Horry Counties	83,071	63,825	19,246
Aiken Group	340,170	338,778	1,392
Other Counties	194,652	180,366	14,286
Total Statewide	1,868,143	1,631,897	236,246

Table 9. Average Ex-vessel Price of S.C. White Shrimp by
          Count Size, 1991.

Count Size	Price Per Pound (Heads-on)
15/20	3.46
21/25	3.01
26/30	2.26
31/35	1.95
36/40	1.85
41/45	1.71
46/50	1.66
51/55	1.56
56/60	1.42
61/70	1.27
71+	1.11
Average	2.01

Source: Office of Fisheries Management

Table 10. Comparisons of Commercial Shrimp Landings and Recreational Shrimp Harvest in South Carolina, 1987-1991.

Year	Commercial Shrimp Landings (million lbs.)	Recreational Shrimp Harvest (million lbs.)	Commercial Shrimp Fall Landing (million lbs.)	Recreational Shrimp Harvest	
				% of Total Harvest	% of Fall Harvest
1987	5.81	1.80	4.41	24	29
1938	4.25	1.16	2.47	21	32
1939	7.36	1.25	3.96	15	24
1990	5.88	2.75	3.23	33	46
1991	9.31	2.17	5.24	19	29
5 Yr. Ave.	6.52	1.82	3.86	22	32

Heads-on weight
Source: Office of Fisheries Management

APPENDIX 1. The 1991 survey questionnaire.

South Carolina
Wildlife & Marine
Resources Department

EQUAL OPPORTUNITY AGENCY

James A. Timmerman, Jr., Ph.D
Executive Director
Paul A. Sandifer, Ph.D
Director o
Marine Resources Division

ATTENTION SHRIMP BAITING PERMIT HOLDERS

Because of the increasing popularity of recreational shrimp baiting, the Marine Resources Division must have accurate and unbiased data to manage the shrimp fishery fairly and effectively. Please answer the following questions honestly with your best estimates. Base your responses only on shrimping you did with your permit, tags, and poles. The return envelope requires no postage. Please complete and return this form even if you did no shrimping. Thank you for your cooperation.

1. What county do you live in? _____ Zip Code _____

2. How many trips did you make this season using your permit and gear?

   ___September ___October ___November ___All season ___Didn't go

3. Please indicate the number of trips you made in <u>each</u> of the following areas.

   ___BEAUFORT (incl. Calibogue & Pt. Royal Sds., Broad R.)

   ___CHARLESTON (incl. harbor, Wondo Cooper, Ashley, Folly, Stono, and Kiawah R.)

   ___ST. HELENA SD. (incl. Coosaw, Combahee, Morgan, Ashepoo R.)

   ___BULLS BAY (incl. McClellan-ville)

   ___WADMALAW/EDISTO ID. (incl. N. & S. Edisto R.)

   ___GEORGETOWN (incl. Santee & Winyah Bays & Horry County waters)

4. How many <u>different</u> people assisted you on your trips? _____

5. What was your average catch per trip? (quarts whole shrimp)_____

6. What was your total catch for the whole season? (quarts whole shrimp)_____

7. What mesh size did you use most often?
    ___3/8 in. ___1/2 in. ___larger

8. What length net did you use most often?
    ___4 ft. ___5 ft. ___6 ft. ___7 ft. ___8 ft.

9. How many miles (one-way) did you travel from home to landing on an average trip? _____

10. How much did you spend directly on an average trip (for gas, bait, ice, food, travel, and related expenses)?_____

11. How many people shared the cost of an average trip?_____

12. What is the maximum you would be willing to pay for your average trip in total costs rather than give up the shrimp baiting trip? _____

13. How many people live in your household (including yourself)?____

14. Please check the most appropriate blank describing your gross household income in 1990.

    __less than $10,000   __$30,000 to $39,999   __$60,000 to $69,999
    __$10,000 to $19,999   __$40,000 to $49,999   __$70,000 or more
    __$20,000 to $29,999   __$50,000 to $59,999

15. Please check your appropriate age category.

    ___less than 21   ___30-39   ___50-59   ___70 or over
    ___21-29   ___40-49   ___60-69

16. How many years have you engaged in shrimp baiting?_____

17. What problems or conflicts did you experience this season?

    _____

    _____

    _____

18. How would you rate your overall shrimp baiting experience this season?

    ___Poor   ___Fair   ___Satisfactory   ___Good   ___Excellent

19. Do you intend to obtain a shrimp baiting permit next year?

    ____YES   ____NO

20. Do you currently have any of the following licenses?

    __Trawler Captain   __Land and Sell   __Primary Wholesale Dealer

21. What Comments, criticisms, suggestions, etc. do you have
    regarding this fishery and its management?

_____

_____

_____