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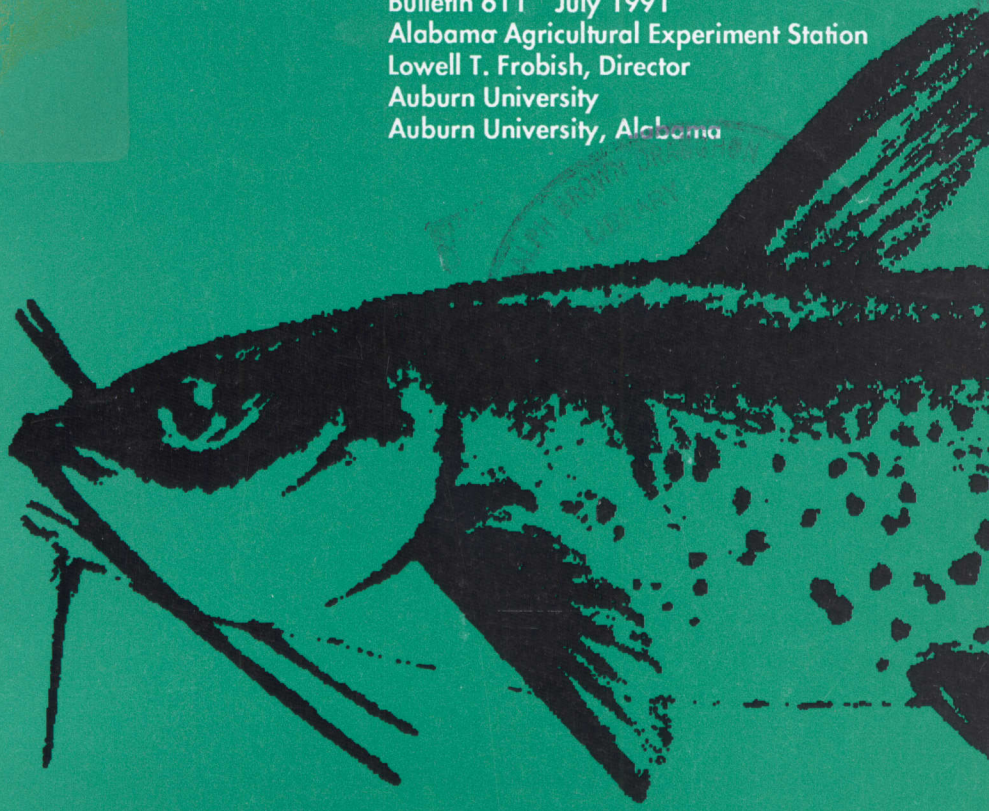

Retail Grocery Markets for Catfish

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RETAIL GROCERY MARKETS FOR CATFISH

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INTRODUCTION

DEMAND FOR AQUACULTURAL products is increasing as a result of a relatively constant supply from capture fisheries, perceived health benefits associated with fish consumption, and increases in income and population. Aquaculture's ability to supply a consistent, high quality product throughout the year is a major comparative advantage relative to capture fisheries. This advantage has the potential of allowing aquacultural products to break the temporal and geographical bounds that have limited the traditional consumption markets of capture fisheries.

There has been little research published that specifically addresses consumer and product characteristics for new and existing cultured fish species. Fish and seafood markets as a component of total household food expenditures have been investigated by Blaylock and Smallwood *(2)* and Hu *(9)*. Cheng and Capps *(4)* recently completed a study analyzing demand for selected fish and seafood species that focused on explaining variation in expenditures. Kinnucan et al. *(11)* and Zidack and Hatch *(15)* analyzed demand for catfish at the processor level.

Raulerson and Trotter in 1973 analyzed retail grocery demand for catfish *(13)*. Boleware and Dillard *(3)* conducted consumer acceptance surveys for catfish in Mississippi and found the product attractive to consumers. This body of research, however, did not address specific product characteris-

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tics and their importance with regard to consumer perception of cultured fish species.

More recently, three studies of local markets for cultured fish species have begun to provide insights into emerging markets for these new products *(5,7,8)*. The Dixon et al. *(7)* study, conducted in Mississippi in 1981, found that catfish was available at 24 percent of retail groceries and that average sales per week were 61 pounds. Results of the Cremer et al. study in Kentucky in 1982 *(5)* indicated that approximately 60 percent of retail groceries sell catfish but only about 20 percent of restaurants have the product on the menu. The Engle et al. study *(8)* was conducted in east-central Alabama and west-central Georgia. Marketing channels investigated included: retail groceries, seafood markets, restaurants, fish-out ponds, and seafood wholesalers. Catfish and shrimp were the only species found in the top five sellers in each of the channels.

Marketing research commissioned by the Southern Regional Aquaculture Center and completed by a cooperative university research group focused on existing and potential markets for catfish and crawfish in the United States. This marketing study was undertaken to extend catfish marketing information beyond local marketing studies *(5,7,8)* to provide a more comprehensive picture of national and regional product and consumer characteristics. Consumers, retail grocery managers, and restaurant managers were surveyed. This report will focus on the results from the retail grocery survey and contains four sections: Survey Procedures, Survey Results, Logit Analysis of Potential New Markets, and Summary and Recommendations. The Procedures section describes the surveys and outlines the flow of questions in the grocery survey. The Survey Results discussion focuses on responses of stores in each region concerning whether they sell catfish or were likely to add the product within the next year. Quantity sold, years the product has been available, product form, reasons for not selling, supply and quality problems, advertising, and promotion and sales leaders were analyzed.

SURVEY PROCEDURES

A national telephone survey of 3,600 consumers, 1,800 retail grocery managers, and 1,800 restaurant managers was

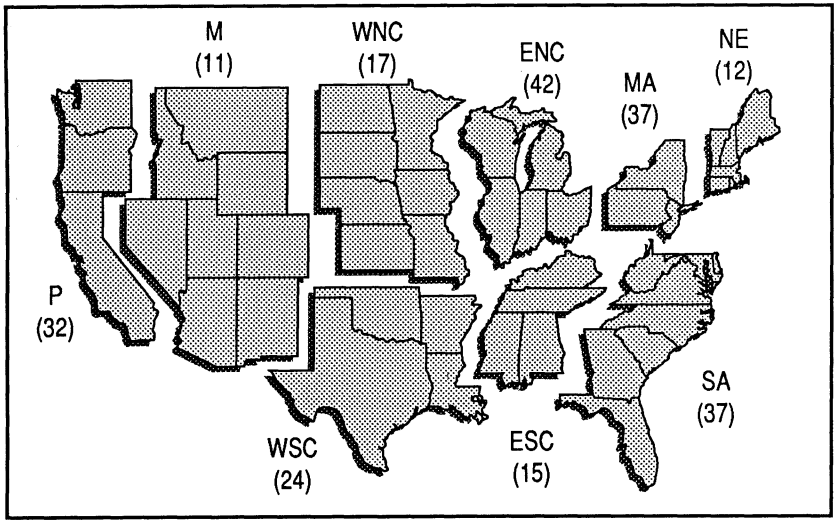

FIG. 1. Census regions of the United States with 1980 populations for each region (given as millions, in parentheses).

conducted from April to June 1988. The primary data for this analysis were obtained from the retail grocery survey. Each of the nine census regions—New England (NE), Middle Atlantic (MA), East North Central (ENC), West North Central (WNC), South Atlantic (SA), East South Central (ESC), West South Central (WCS), Mountain (M), and Pacific (P)—were equally represented in the survey (200 completed surveys from each census region), figure 1.

Appendix A contains the actual survey questions, accompanied by the respective response rate as a percentage of the total respondents replying to the given question. The survey consisted of three primary sections, with one section defined by questions pertaining to catfish, a second with questions about crawfish, and the third pertaining to demographic characteristics of the stores. In both the catfish and crawfish sections, a similar question format was pursued. The grocers were first asked whether or not they sold catfish (crawfish). If they did not sell catfish (crawfish), they were asked to give reasons why they did not sell the product and the likelihood of adding catfish (crawfish) to their product line in the next year. Grocers selling catfish (crawfish) were asked questions relating to time of product introduction, supply problems,

quality problems, product form, level of sales, price, and promotion of catfish (crawfish). In addition, stores that sold catfish were asked if the national advertising campaign for catfish resulted in their decision to add catfish to the stores' product line. The third, and final section, dealt with the socio-economic characteristics of the stores surveyed. Socio-economic characteristics addressed included: weekly sales volume, store size, location (location included rural, urban, suburban, and census region information), income and race of the clientele, membership in a retail grocery chain, present or future availability of a specialized fish section, and top selling fish and seafood products.

Results from the questions involving catfish are the focus of this analysis. No distinction was made between farm-raised and wild-caught catfish due to the expected low number of full-service stores that might sell wild-caught catfish. Appendix B contains a summary of socio-economic characteristics of survey respondents by region. Appendix C presents a summary of survey data for stores selling catfish by selected store classifications. Socio-economic characteristics cross-tabulated by selected store classifications are provided in Appendix D.

SURVEY RESULTS

Forty-five percent of all stores in the survey sold catfish, table 1. The traditional catfish consumption regions (ESC and WSC) had the highest percentage of retail groceries selling catfish, as expected, with 54 percent and 59 percent, respectively. Penetration of other areas was indicated by relatively high percentages in the ENC (47 percent), WNC (49 percent), and P (46 percent) regions. The east coast regions (NE, MA, SA) and the mountain region (M) had the lowest percentages. Sixty-one percent of stores selling catfish were members of a chain, relative to 41 percent chain stores for the entire sample. Thirty-seven percent of stores selling catfish had a specialized fish market section, compared to 23 percent of the entire sample. Thirty-nine percent of stores selling catfish had total store sales over $100,000, as opposed to 26 percent for the entire sample.

Twenty-one percent of respondents who did not sell catfish said they were likely to add it in the next year, table 1.

TABLE 1. EXISTING AND POTENTIAL MARKETS FOR CATFISH, FROM NATIONAL AND REGIONAL RETAIL GROCERY SURVEY, 1988

Question	U.S. weighted total	Response, by region[1]							
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
1. Does your store sell catfish?[2]										
Yes	45	27	27	47	49	40	54	59	41	46
1b. Within the next year, what is the likelihood of your store beginning to sell catfish?[3]										
Very or somewhat likely	21	15	12	23	13	25	26	26	19	23
11. Did the National Advertising Campaign for catfish result in the addition of catfish to your product line?[4]										
All sellers	18	19	20	16	12	24	19	18	12	18
2 yr. or less	21	17	19	13	14	29	22	14	21	38

[1]Regional abbreviations used in this and following text tables are as follows: NE = New England; MA = Middle Atlantic; ENC = East North Central; WNC = West North Central; SA = South Atlantic; ESC = East South Central; WSC = West South Central; M = Mountain; and P = Pacific.

[2]Percentage of stores selling catfish.

[3]Values were computed by adding the first two responses to each question and dividing the total number of valid responses for each respective question. Valid responses were those responses not recorded as "other," "don't know," or no response.

[4]Percentage of stores reporting that advertising did influence their decision to add catfish to their product line.

Stores outside the traditional consumption region (ESC and WSC) that were likely to add catfish were led by the SA (25 percent), ENC (23 percent), and P (23 percent) regions. Quantitative analysis of factors influencing the decision to add catfish to a retail grocery store's product line is presented in a later section.

Eighteen percent of respondents who sold catfish replied that the national advertising campaign had resulted in a decision to add the product, table 1. The MA (20 percent) and SA (24 percent) regions reported the highest relative adoption of catfish as a result of the ad campaign. For stores that added catfish in the previous 2 years, the years of The Catfish Institute (TCI) generic advertising campaign, P (38 percent) and SA (29 percent) reported the highest adoption *(14)*. Store promotion methods most frequently used included newspaper advertisements and store signs.

Twenty-nine percent of retail groceries sold over 50 pounds of catfish per week, table 2. Stores selling over 50 pounds per week were more likely to be in the traditional consumption area, ESC (47 percent) and WSC (41 percent). The non-traditional consumption areas were led by WNC (35 percent) and

TABLE 2. WEEKLY SALES AND TIME OF INTRODUCTION FOR CATFISH, FROM NATIONAL AND REGIONAL RETAIL GROCERY SURVEY, 1988[1]

Question	U.S. weighted total	Response, by region							
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
6. How many pounds of catfish/crawfish, on the average, do you sell weekly?										
a. <50 lb.	71	84	78	76	66	80	54	59	82	88
b. 51-99 lb.	16	13	15	15	21	14	22	19	12	9
c. 100-199 lb.	8	2	2	6	10	3	16	13	4	4
d. >200 lb.	5	0	5	4	4	3	9	9	1	0
2. How many years has your store been selling catfish?										
a. <6 mo.	6	20	6	11	2	9	2	3	6	2
b. 6 mo.-1 yr.	7	24	18	7	7	7	6	4	8	9
c. 1-2 yr.	12	26	16	16	10	14	10	10	14	5
d. >2 & <5 yr.	23	20	24	25	22	22	11	22	22	41
e. >5 yr.	52	10	35	41	59	49	70	61	49	43

[1]Percentages reported in this table were computed relative to the total number of "valid responses" for the question. Valid responses excluded "don't know," no response, and "it varies" replies from the data set.

ENC (25 percent), followed by the MA (22 percent) and SA (20 percent) regions. Forty-four percent of stores selling more than 50 pounds of catfish per week had a specialized fish section, relative to 23 percent for the entire sample. Sixty-eight percent of stores with catfish sales exceeding 50 pounds per week were chain stores, whereas 41 percent of the entire sample were chain stores. Fifty-four percent of stores selling over 50 pounds of catfish per week had a weekly sales volume exceeding $100,000, compared to 26 percent for the entire sample.

Table 2 also presents information on length of time stores have been selling catfish. Twenty-five percent of all respondents selling catfish had added the product in the last 2 years and 48 percent had added in the last 5 years. Seventy percent of stores selling catfish in New England had been selling it only 2 years or less. As expected, the traditional consumption area had a majority (over 80 percent) of its stores that had been selling the product for more than 2 years but, unexpectedly, the P (84 percent) and M (71 percent) regions also had a high level of stores that had been selling catfish more than 2 years. Stores selling for over 5 years were led by the ESC, WSC, and WNC regions. The Pacific region added the product at a rather rapid rate several years prior to the survey, but appeared to be slowing

down at the time of the survey. The WNC had been selling the product for a long time, but was not increasing at a particularly fast pace at the time of the survey relative to the traditional regions. NE and MA were adding the product at a rather rapid pace at the time of the survey; however, the relatively large percentages for these two regions reflect the small base of stores that had been selling for a long period. ENC and SA are the regions that seem to have both a reasonable base of stores that have been selling for a long time and above average rates of new stores adding catfish in the last 2 years.

TABLE 3. CATFISH PRODUCT FORM AVAILABILITY, SALES VOLUME, AND PRICES, FROM NATIONAL AND REGIONAL RETAIL GROCERY SURVEY, 1988[1]

Product form[2]	U.S. weighted total	Response, by region								
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P
FRESH WHOLE DRESSED										
Sell, pct.[3]	64	40	43	60	61	75	63	63	60	76
Top seller, pct.[4]	37	16	18	42	33	50	31	27	46	52
Top seller price, dol.[5]	2.93									
FRESH FILLETS										
Sell, pct.	63	83	81	66	46	72	50	62	66	60
Top seller, pct.	33	68	51	31	16	31	28	38	27	32
Top seller price, dol.	3.87									
FROZEN WHOLE DRESSED										
Sell, pct.	26	18	14	22	44	22	22	31	36	24
Top seller, pct.	5	6	4	5	18	1	6	4	8	3
Top seller price, dol.	2.64									
FROZEN FILLETS										
Sell, pct.	38	16	31	35	38	33	44	52	44	19
Top seller, pct.	14	4	12	12	22	9	25	14	14	7
Top seller price, dol.	3.00									
INDIVIDUALLY FROZEN FILLETS										
Sell, pct.	13	0	15	11	12	16	10	17	11	3
Top seller, pct.	1	0	6	0	1	1	0	1	0	0
Top seller price, dol.	3.67									
BREADED/PROCESSED										
Sell, pct.	25	24	29	25	23	24	22	33	17	13
Top seller, pct.	2	4	4	1	5	4	1	1	1	1
Top seller price, dol.	3.25									

[1]Percentages reported were computed relative to the total number of "valid responses" for the question. Valid responses excluded "don't know" and no response from the data set.

[2]Other product forms represented approximately 13 and 7 percent of the "sell" and "top sellers," respectively.

[3]Survey question 4.

[4]Survey question 7.

[5]Survey question 8.

Fresh catfish dominated product form availability and sales volume, table 3. In terms of availability, fresh whole dressed (64 percent) and fresh fillets (63 percent) were followed by frozen fillets (38 percent), frozen whole dressed catfish (26 percent), breaded/processed catfish (25 percent), and individually frozen fillets (13 percent). The top selling product forms were fresh whole dressed (37 percent), fresh fillets (33 percent), frozen fillets (14 percent), frozen whole dressed (5 percent), breaded/processed (2 percent), and individually frozen fillets (1 percent). The average prices per pound for product forms reported as "top selling" were: fresh fillets ($3.87), individually frozen fillets ($3.67), breaded/processed ($3.25), frozen fillets ($3.00), fresh whole dressed ($2.93), and frozen whole dressed ($2.64). Fresh whole dressed was the top seller in all regions except NE, MA, and WSC, where fresh fillets were the top sellers. Frozen whole dressed was the third preferred product form in the WNC, but this form was not highly rated in any other region. Frozen fillets were the third rank preference in all regions except NE (where breaded/processed was third) and the WNC. Individually frozen fillets were generally not carried by stores in NE and P regions, but some popularity for them was indicated in the MA region.

For stores that did not sell catfish on a nationwide basis, negative consumer attitudes (21 percent) and low demand (17 percent) were the primary reasons given for not selling catfish products, Appendix A. The third most common reason given was storage problems (11 percent), followed by lack of availability at certain times of the year (8 percent). Two percent each of respondents reported wholesale price being too high and lack of product freshness were significant problems.

Table 4 presents the reasons cited for not selling catfish (survey question 1a) by regions and by type of problem mentioned. Cross-tabulation by problem responses revealed some interesting patterns. The largest frequency of grocers who had not heard of catfish occurred in the NE region (36 percent). Stores not selling catfish in the MA (18 percent), P (16 percent), and SA (10 percent) regions also cited not having heard of catfish as a reason for not selling catfish. As expected, stores not selling catfish in the traditional consumption regions did not cite non-awareness as a factor in deciding not to sell catfish products. Negative consumer attitudes

TABLE 4. REASONS FOR NOT SELLING CATFISH, FROM NATIONAL AND REGIONAL RETAIL GROCERY SURVEY, 1988

Question[1]	U.S. weighted total	Response, by region									
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P	Total[2]
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
1. Does your store sell catfish?											
No	57	73	73	54	51	61	47	41	60	55	
1a. What are the reasons your store does not sell catfish? (by problem)											
a. Have not heard of it		36	18	4	6	10	2	0	8	16	100
b. Negative consumer attitudes		14	15	12	11	8	6	6	15	14	100
c. Unreliable supply		8	15	8	8	9	11	9	18	14	100
d. Storage problem		11	12	8	9	13	13	15	8	11	100
e. Wholesale price too high		7	15	15	7	4	26	4	11	11	100
f. Not fresh		18	6	12	6	12	0	12	12	24	100
g. Seasonal supply		13	9	13	9	12	13	7	12	10	100
h. Other		14	16	12	10	12	8	8	11	9	100
1a. What are the reasons your store does not sell catfish? (by region)											
a. Have not heard of it	4	12	6	2	3	4	1	0	3	7	
b. Negative consumer attitudes	21	22	24	24	25	16	16	17	28	29	
c. Unreliable supply	6	3	7	4	5	5	7	7	10	8	
d. Storage problem	13	9	10	8	11	14	17	23	8	11	
e. Wholesale price too high	2	1	3	3	2	1	7	1	2	3	
f. Not fresh	2	2	1	2	1	2	0	2	2	3	
g. Seasonal supply	8	8	5	10	8	10	13	7	9	8	
h. Other	43	42	46	47	44	47	38	41	38	33	
Total[2]	100	100	100	100	100	100	100	100	100	100	

[1]Question 1a allowed for two responses. Both responses were combined into one data set for the purpose of computing the percentages.
[2]Total may not add to 100 due to rounding.

tended to increase as a reason why stores did not sell catfish as one moved from the two south central regions. Unreliable supply was given as a reason for not selling catfish in the M (18 percent), MA (15 percent), and P (14 percent) regions more often than in the other six census regions. Storage problems were more frequently reported in the WSC (15 percent) and ESC (13 percent) regions. Grocers in the ESC (26 percent) region responded that high wholesale price was an important factor in the decision not to sell catfish products. The response rate was substantially higher for the ESC (26 percent) region regarding the issue of wholesale price being too high relative to the next highest regions, the MA (15 percent) and ENC (15 percent). Less than acceptable product freshness was cited more frequently in the P (24 percent) and NE (18 percent) regions.

Generally, cross-tabulation of the reasons given by grocers for not selling catfish products by region were, with few exceptions, consistent with the response pattern observed for the aggregated U.S. sample, table 4. Responses in the unspecified "other" category were cited across the nine census regions as the most important factor in grocers deciding not to carry catfish products. The "other" response was separated into six categories after the survey was administered, Appendix A. "Low demand" represented almost 40 percent of the "other" category.

Negative consumer attitudes were generally reported as the most important specific reason for not selling catfish. However, for the ESC and WSC regions, storage problems were slightly more a factor than negative consumer attitudes. Seasonality of supply and storage problems generally tended to be the most important problems following negative consumer attitudes for the other seven census regions. The major exception to this observation was found in the NE region, which reported that non-awareness was more important in deciding not to sell catfish than were seasonality of supply and storage problems.

Analysis of the cross-tabulation of survey question 1a by problem and by region provided insights into important market obstacles. First, the survey results suggest that if technical, logistical, and market pricing problems could be rectified, some of the stores not currently selling catfish may decide to carry catfish products. Specific problems that need

to be addressed, according to the survey results, include product storage, seasonality of supply, and grocery managers' perceptions of wholesale pricing practices in some areas. The latter observation appears to be more of a factor in the traditional catfish consuming regions (ESC and WSC). The second major market challenge in persuading grocers to sell catfish products is to change the perceptions concerning negative consumer attitudes in non-traditional consumption regions. Recent empirical evidence suggests the advertising campaign implemented by The Catfish Institute may be addressing this obstacle to market expansion *(10,14,15)*.

Store managers selling catfish were asked if they had any problems with the consistency of catfish product supply (survey question 3a). Eleven percent of the stores selling catfish responded that they had experienced supply problems on a nationwide basis, table 5. Seasonality of supply (31 percent) and insufficient quantities (27 percent) were reported to be the most significant supply problems. Unavailability of some product forms (11 percent), unspecified (16 percent), and unreliable quality (10 percent) constituted the next most frequently cited group of supply problems. Size of wholesale lots (6 percent) was reported as the least significant supply factor by the grocers.

A summary of results for question 3a by problem and by region is presented in table 5. Cross-tabulation by supply problem yielded differences in regional rankings. Insufficient quantity was cited as a supply problem by grocers in the SA (25 percent), WSC (20 percent), and P (20 percent) regions more often than in other regions. Catfish availability was not frequently reported as a problem in the ENC (5 percent), WNC (5 percent), ESC (0 percent), and M (0 percent) regions. Seasonality of supply was reported by grocers selling catfish as a problem most frequently in P (20 percent), followed by WSC (16 percent), SA (16 percent), and WNC (12 percent) regions. Restrictions on the availability of some product forms for catfish were found to be a problem in the MA (18 percent), ENC (18 percent), ESC (18 percent), and P (18 percent) regions. Product form availability was not reported by grocers to be a problem in the SA (0 percent) and M (0 percent) regions. "Unreliable quality" was most frequently cited by grocers in the WNC (30 percent) region. Grocers in the ENC (20 percent) and M (20 percent) regions cited unre-

TABLE 5. CATFISH SUPPLY PROBLEMS, FROM NATIONAL AND REGIONAL RETAIL GROCERY SURVEY, 1988

Question[1]	U.S. weighted total	Response, by region									
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P	Total[2]
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
3. Has your catfish supply been consistent?											
No	11	13	11	9	12	13	6	11	6	17	
3a. What supply problems have you had? (by problem)											
a. Insufficient quantity		15	10	5	5	25	0	20	0	20	100
b. Seasonality		8	8	4	12	16	8	16	8	20	100
c. Some product forms not available		9	18	18	9	0	18	9	0	18	100
d. Unreliable quality		0	0	20	30	10	10	0	20	10	100
e. Lot sizes		0	0	0	25	25	0	25	0	25	100
f. Other		8	23	15	8	0	8	23	0	15	100
3a. What supply problems have you had? (by region)											
a. Insufficient quantity	27	43	22	13	10	45	0	31	0	27	
b. Seasonality	31	29	22	13	30	36	33	31	50	33	
c. Some product forms not available	11	14	22	25	10	0	33	8	0	13	
d. Unreliable quality	10	0	0	25	30	9	17	0	50	7	
e. Lot sizes	6	0	0	0	10	9	0	8	0	7	
f. Other	16	14	33	25	10	0	17	23	0	13	
Total[2]	100	100	100	100	100	100	100	100	100	100	

[1]Question 3a allowed for two responses. Both responses were combined into one data set for the purpose of computing the percentages reported above.

[2]Total may not add to 100 due to rounding.

liable quality as an issue somewhat less frequently. Though lot size was ranked as a relatively minor supply problem for the entire national sample, the WNC (25 percent), SA (25 percent), WSC (25 percent), and P (25 percent) regions reported lot size as a supply problem.

Perceived quality problems (survey questions 9 and 9a) can be used in conjunction with the previous discussion of results on supply problems to gain insight into problems experienced by stores that sell catfish. On a nationwide basis, only 9 percent of the grocers selling catfish indicated they were having quality problems, table 6. The national response rate regarding quality of catfish products was similar to the rate previously noted for catfish supply problems (11 percent) reported in table 5. The ENC (16 percent), P (12 percent), and WSC (10 percent) regions reported the largest percentages of quality problems. Nationally, freshness (42 percent) ranked as the highest quality concern, followed by off-flavor (27 percent). Of lesser importance was "other" (18 percent), packaging (11 percent), and product form (2 percent).

Cross-tabulation by problem and by region was performed for survey question 9a, table 6. The majority of the grocers citing off-flavor as a problem were located in the ENC (33 percent) and WSC (33 percent) regions. "Freshness" was cited most frequently in the ENC, ESC, WSC, and P regions (16 percent each). Grocery store managers in the WNC (43 percent), P (43 percent), and M (14 percent) regions were the only respondents citing quality problems stemming from packaging. Of the store managers reporting product form as a quality issue, half were in the NE region and the other half in the P region.

Grocers generally viewed freshness as a primary concern; however, two regions (MA and WNC) were exceptions. Grocery managers in the MA region reported "unspecified" (67 percent) and off-flavor (33 percent) as the most important quality issues. Quality issues concerning product packaging were reported to be the most important quality issues faced by grocers in the WNC (50 percent) region.

Fish and seafood preferences were elicited to obtain a better picture of the competitive position of catfish in national and regional markets. The survey contained the questions:

TABLE 6. CATFISH QUALITY PROBLEMS FROM NATIONAL AND REGIONAL RETAIL GROCERY SURVEY, 1988

Question[1]	U.S. weighted total	Response, by region									
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P	Total[2]
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
9. Have you had any problems with the quality of catfish products?											
Yes	9	7	6	16	6	6	8	10	6	12	
9a. What catfish quality problems have you had? (by problem)											
a. Off-flavor		0	11	33	0	11	0	33	0	11	100
b. Freshness		11	0	16	11	5	16	16	11	16	100
c. Packaging		0	0	0	43	0	0	0	14	43	100
d. Product form		50	0	0	0	0	0	0	0	50	100
e. Other		0	25	0	13	13	0	13	0	38	100
9a. What catfish quality problems have you had? (by region)											
a. Off-flavor	27	0	33	50	0	33	0	43	0	9	
b. Freshness	42	67	0	50	33	33	100	43	67	27	
c. Packaging	11	0	0	0	50	0	0	0	33	27	
d. Product form	2	33	0	0	0	0	0	0	0	9	
e. Other	18	0	67	0	17	33	0	14	0	27	
Total[2]	100	100	100	100	100	100	100	100	100	100	

[1]Question 9a allowed for two responses. Both responses were combined into one data set for the purpose of computing the percentages reported above.
[2]Total may not add to 100 due to rounding.

1. What are the top five fish and seafood products in terms of sales? (survey question 26)
2. What are the three fish and seafood items with fastest growth in the last year? (survey question 27)

Results from the two questions, presented in detail in Appendix A, are similar and this discussion will focus on results from survey question 26. Shrimp dominated preferences at the national level, with catfish and cod tied for second place in terms of sales, as shown below:

Species	*Percent*
Shrimp	9
Catfish	7
Cod	7
Perch	4
Orange roughy	4
Red snapper	3
Flounder	3
Haddock	3
Sole	3
Salmon	3
Halibut	3

Regional disaggregation of preferences provided useful information in specific markets. Shrimp was the preferred fish and seafood item in the MA, M, and P regions, figure 2. Catfish was the top seller in the WSC, ESC, and WNC regions and ranked third in the SA region. Cod, flounder, and perch were the leaders in the NE, SA, and ENC regions, respectively. Cod was among the top sellers in the NE, MA, ENC, WNC, and M regions and shrimp was among the top sellers in all regions except the north central regions (ENC and WNC). Orange roughy was on the preferred list in several regions (WNC, ENC, and WSC).

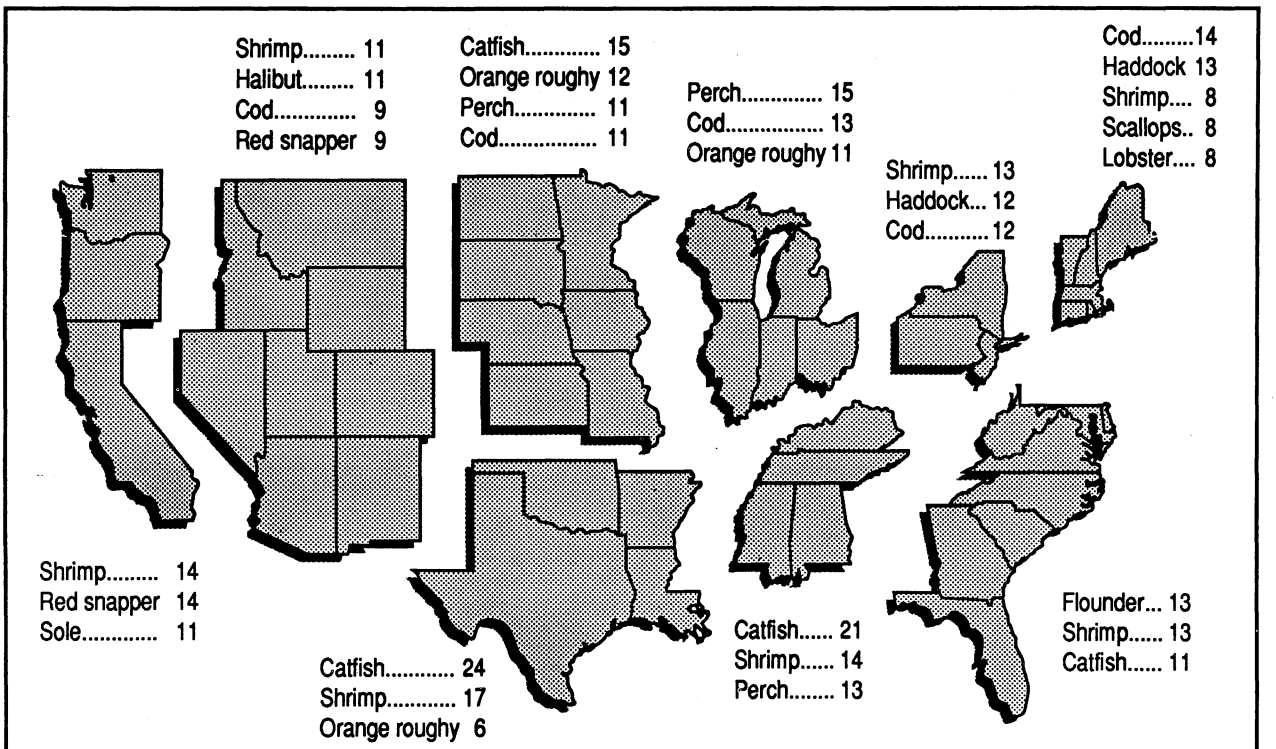

FIG. 2. Top selling fish and seafood products, by region in 1988. Numbers following species name represent percentage of retail grocery managers citing that species in response to survey question 26, "What are the top five fish and seafood in terms of sales?"

LOGIT ANALYSIS OF POTENTIAL NEW MARKETS

Assessment of potential markets for catfish will assist industry planners in determining market areas upon which to concentrate marketing or advertising efforts. The previous sections have focused on descriptive statistics for existing markets. This section provides a quantitative estimate of regional rankings that might be helpful in indicating relative market potential. The survey results reflect how various socioeconomic and demographic factors individually affect the sales of catfish in the grocery stores. A logit model was used to quantify the interactive effects of these variables on the likelihood of a store selling catfish. Logit analysis has well understood statistical and estimating properties *(12)* and has been used in related studies involving qualitative decisions *(1,6)*.

The logit model was used to analyze the effect of sales volume, race, income, and other demographic factors on the store manager's decision to add catfish. Grocery store managers were asked if they sell catfish (survey question 1). If they answered "no," they were then asked to express their position regarding the possibility of adding catfish within the next year (survey question 1b). Stores defined as "likely to add catfish" were those with store managers selecting responses one or two for question 1a. Respondents selecting choices three or four constituted the "unlikely to add catfish" group. "Don't knows" were not included in the analysis. A binary choice (logit) model was developed with the qualitative dependent variables being the likelihood of a store to add catfish to its product line. The stores likely to add catfish were assigned a value of one and those that are unlikely to add catfish were assigned a value of zero.

The specific logit model estimated was:

$$(1)\quad \log\left(P_i / (1 - P_i)\right) = \beta_0 + \beta_1 \cdot SALESVOL + \beta_2 \cdot URBAN + \beta_3 \cdot RURAL + \beta_4 \cdot IRACE + \beta_5 \cdot CHAIN + \beta_6 \cdot NE + \beta_7 + MA + \beta_8 \cdot ENC + \beta_9 \cdot WNC + \beta_{10} \cdot SA + \beta_{11} \cdot WSC + \beta_{12} \cdot M + \beta_{13} \cdot P + V_i$$

where,

P_i	=	probability that a store manager will add catfish,
SALESVOL	=	dollar amount of sales per week,
URBAN	=	1 if store is located in an urban area, 0 otherwise,
RURAL	=	1 if store is located in a rural area, 0 otherwise,

IRACE	=	an interaction variable between income and race, 1 if clientele is middle or high income white, 0 otherwise,
CHAIN	=	1 if store is a member of a chain, 0 otherwise,
NE	=	1 if store located in New England Region, 0 otherwise,
MA	=	1 if store located in Middle Atlantic Region, 0 otherwise,
ENC	=	1 if store located in East North Central Region, 0 otherwise,
WNC	=	1 if store located in West North Central Region, 0 otherwise,
SA	=	1 if store located in South Atlantic Region, 0 otherwise,
WSC	=	1 if store located in West South Central Region, 0 otherwise,
M	=	1 if store located in Mountain Region, 0 otherwise,
P	=	1 if store located in Pacific Region, 0 otherwise, and
V_i	=	random error term.

Increases in sales volume (SALESVOL) were hypothesized to be positively associated with the decision to sell catfish. This is plausible since stores with large sales volume tend to diversify and carry larger inventories. This is supported by the survey results which showed that 39 percent of stores selling catfish had total store sales over $100,000, compared to 26 percent for the entire sample.

Due to historical and traditional factors, stores in the rural area were hypothesized to be able to sell more catfish compared to those in suburban areas. This may be due to the fact that people in the rural areas are traditionally more exposed to catfish consumption through fishing for leisure, and in some cases for subsistence. Based on survey results, stores in the urban areas are expected to be less likely to sell catfish than stores in suburban areas.

The interaction term (IRACE) captures the effect of both income and race on the decision to add catfish to a store's product line. Stores with clientele comprised of primarily middle or high income white clientele were hypothesized to be less likely to add catfish. In the past, the largest per capita consumption of catfish was thought to be among low income earners, especially low income blacks in the South. However, the survey results tend to suggest that the high income black and low income white clientele stores added the product several years ago and have slowed their relative rate of addition recently, whereas the high income white clientele stores have recently increased their speed of acceptance. The

public image of catfish being perceived as a low-income food commodity may be changing. This may be due to several factors, including the purported benefits of fish consumption and the "upscale" advertising approach taken by the catfish industry. Thus, while the sign of IRACE is expected to be negative, the magnitude and statistical significance of the parameter estimate is likely to be relatively small.

Store membership in a chain was hypothesized to be positively associated with the decision to sell catfish. In fact, the survey results showed that 61 percent of stores selling catfish were members of a chain, as opposed to 41 percent chain stores for the entire sample.

East South Central was selected as the base region since it is the census region that is most representative of the traditional catfish consumption area that includes much of the lower Mississippi River. Fifty-four percent of the retail groceries in ESC were selling catfish at the time of the survey. In other words, it is not clear from the survey that the remaining stores currently not selling catfish in the ESC region are more or less likely to add catfish relative to stores in other regions of the country. *A priori* sign expectations are not obvious for the various regional variables.

Results

The maximum likelihood estimates of the logit model and their asymptotic ratios are presented in table 7. The maximum likelihood estimation procedure has the properties of producing consistent as well as asymptotically efficient parameter estimates, especially for large samples. Also, all parameter estimates are known to be distributed asymptotically normal. In this instance, a test using the chi-square distribution replaces the usual F-test as a means of testing the significance of the entire logit model. The test statistic, $-2 \log \lambda = -2(\text{Log}(L_0) - \text{Log}(L_{max}))$, asymptotically follows a chi-square distribution with K degrees of freedom, where K is the number of parameters in the equation (excepting the constant), L_o equals the value of likelihood function L when all independent variables are constrained to be equal to zero, and L_{max} equals the unconstrained likelihood function evaluated at its maximum *(12)*.

TABLE 7. MAXIMUM LIKELIHOOD ESTIMATES OF THE LOGIT MODEL PARAMETERS FOR THE LIKELIHOOD OF GROCERY STORES TO ADD CATFISH

Explanatory variables	Expected signs	Coefficients	Asymptotic t-ratio
SALESVOL	+	0.74379	3.9295[1]
URBAN	-	0.12942	0.3395
RURAL	+	0.42149	1.3699
IRACE	-	-0.33684	-1.1784
CHAIN	+	0.30486	1.0004
NE		-1.2473	-2.1670[1]
MA		-1.3750	-2.4377[1]
ENC		-0.32847	-0.61536
WNC		-1.4229	-2.4342[1]
SA		0.04458	0.08763
WSC		0.28568	0.54216
M		-0.97376	-1.8330[2]
P		-0.05452	-0.10903
CONSTANT		-1.8475	-3.4966[1]

N = 395
LIKELIHOOD RATIO TEST = 45.9485 WITH 13 D.F.

$\hat{R}^2 = 0.116$

Pct. of right predictions = 76.709

[1]Significant at 5 percent level.
[2]Significant at 10 percent level.

The significance of all logit coefficients was evaluated at $P < 0.05$ and $P < 0.10$ probability levels of rejection. The likelihood ratio test statistic, 45.9485 with 13 degrees of freedom, was significant at the 0.05 probability level of rejection. A measure of goodness of fit analogous to R^2 was computed for the model, $\hat{R}^2 = 0.116$, which explains the variation in the dependent variable explained by the variation in the explanatory variables *(12)*. The logit coefficient associated with SALESVOL was positive and significant at .05 probability level of rejection, indicating that the probability of a grocery store selling catfish increases with an increase in the total dollar sales volume of the store. As mentioned earlier, stores with large sales volume tend to diversify and carry larger inventories. The sign associated with the coefficient of the URBAN variable was negative but insignificant ($P < 0.10$), indicating that the probability of selling catfish decreases if the store is located in an urban area, but the probability is insignificantly different from that of a store located in a suburban area. Though the sign associated with the coefficient of the RURAL variable was positive, as expected, it was also statistically insignificant ($P < 0.10$). This

lends support to the fact that catfish consumption is spreading from the historical rural base to both urban and suburban areas.

The sign associated with the income and race interaction term (IRACE) came out as expected, but was statistically insignificant ($P < 0.10$). The negative sign associated with IRACE variable indicates that the probability of a store manager with high and middle income white clientele choosing to sell catfish may be slightly lower, but not statistically significant from stores with clientele comprised of low income whites and non-whites of all income groups. This may be due to increased acceptance of catfish consumption across all ethnic groups and various income levels.

The sign of the coefficient associated with the CHAIN variable was positive as expected, but statistically insignificant ($P < 0.10$). However, when the size of the stores in square feet was substituted for dollar amount of sales, the coefficient associated with the CHAIN variable became statistically significant.[2] A possible reason for this result may be the slight collinearity between dollar sales and the chain variables. This makes economic sense, since the chain stores are likely to be more cost efficient due to distributional marketing network and to economies of scale. All these factors together may result in more diverse inventories and larger sales, implying a more positive influence on the probability of selling catfish. In fact, the correlation coefficient between the SALESVOL and CHAIN variables was 0.43221, which shows slight positive correlation between the two variables. The correlation coefficient between the SIZE and CHAIN variable was -0.27183.

The signs of the logit coefficients associated with NE, MA, and WNC were all negative and significant ($P < 0.05$), while the sign associated with the logit coefficient of P was negative and slightly less significant ($P < 0.10$). This suggests that the probability of selling catfish is lower in the NE, MA, WNC, and P regions compared to the traditional catfish region (ESC). The remaining regions did not have coefficients that were statistically different from that of the ESC region.

Table 8 presents the estimated probabilities for different

[2]A separate regression was performed by substituting a store size (square feet) variable for the store sales volume variable.

TABLE 8. ESTIMATED PROBABILITIES OF U.S. RETAIL GROCERY STORES ADDING CATFISH TO THEIR PRODUCT LINE[1]

Sales volume, thousands of dollars	Estimated probabilities, by region								
	NE	MA	ENC	WNC	SA	ESC	WSC	M	P
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
URBAN									
<40	10	9	21	8	28	27	33	12	26
40-99	18	16	36	16	45	44	51	23	42
>100	32	29	54	28	63	62	68	38	61
RURAL									
<40	12	11	26	11	34	33	40	16	32
40-99	23	21	43	20	52	51	57	28	50
>100	39	36	61	34	70	69	74	45	67

[1]Estimated probabilities are based on the assumption that the store characteristics consist of a chain with middle and high income white clientele.

levels of sales volumes across the various census regions. A chain store with primarily middle or high income white clientele was assumed. The probabilities were calculated by substituting the estimated values into equation 1. For example, the estimated probability of a store located in an urban area of NE region with a SALESVOL of less than $40,000 adding catfish, table 8, is

$$(2)\quad P_i = \frac{1}{1+e^{Z_i}} = \frac{e^{Z_i}}{1+e^{Z_i}} = \frac{e^{-2.24997}}{1+e^{-2.24997}} = \frac{0.1054}{1.1054} \simeq 0.10$$

The probabilities estimated for regions ENC, SA, ESC, WSC, and P are similar to one another in magnitude with slight variations. This confirms the results of the logit model where the coefficients associated with these regions (ENC, SA, WSC, and P) are not significantly different from the base region (ESC). The estimated probabilities in table 8 also reflect increases in the likelihood to add catfish for all regions as the sales volume increases. In addition, the probabilities of product adoption associated with rural areas are slightly higher than those associated with the urban area.

Market Potential

Quantitative assessment of regional market potential is an important consideration in expanding the market for a new product. By ranking regional market potential, industry plan-

ners can target advertising and marketing efforts in a manner that maximizes the returns to these efforts.

Regional market potential was analyzed using information generated by the survey and quantified by the logit model. In an effort to simplify the computation, a representative store type is assumed for all regions. The representative base store was assumed to be a member of a chain located in an urban area with middle and high income white clientele and sales less than $40,000. Probabilities by region for the selected base store to add catfish to the product line, given that it currently does not sell catfish, are presented in the first row of table 8. Furthermore, it was assumed that there is a proportional relationship between population and quantity of base stores that remains constant for all nine census regions.

As a quantitative measure of market potential, the following market potential index (MI) was proposed:

$$(3) \quad MI_i = (POP_i - SELL_i \cdot POP_i) \cdot PROB_i$$

where

i = index of the nine census regions,
MI_i = market index for the i^{th} region,
POP_i = regional population (1980 census), in millions,
$SELL_i$ = proportion of stores currently selling catfish in the i^{th} region (survey question 1), and
$PROB_i$ = predicted probability from logit model of base store adding catfish to the store product line given that it does not currently sell catfish.

Alternatively stated, MI is defined as simply the portion of the population in a given region who are associated with stores not currently selling catfish multiplied by the estimated probability that these stores will add catfish to their product line. MI is then an empirical measure of market potential. The larger the MI is for a particular region, the greater is the number of stores likely to add catfish to their product line.

Ranking of the computed index values suggests that the top three regions in terms of new market development, in decreasing order of potential, are SA, ENC, and P regions, table 9. Results from the time path of adoption reported in the survey results section support SA and ENC as the two regions with both a good base of stores that have been sell-

TABLE 9. ESTIMATED REGIONAL RETAIL GROCERY MARKET POTENTIAL FOR CATFISH BASED ON SURVEY DATA AND LOGIT PROBABILITIES, 1988

Region	Population	Sell	Probability	Market index	Rank
	Mil.	*Pct.*	*Pct.*		
New England	12.3	28	10	0.9	7
Middle Atlantic	36.8	27	9	2.4	5
East North Central	41.7	46	21	4.7	2
West North Central	17.2	49	8	.7	9
South Atlantic	36.9	40	28	6.2	1
East South Central	14.7	53	27	1.9	6
West South Central	23.7	59	35	3.4	4
Mountain	11.4	41	12	.8	8
Pacific	31.8	46	26	4.5	3

ing the product for several years and a greater proportion of stores that are likely to add, relative to the other census regions.

Sensitivity analysis was performed by changing the store clientele among various ethnic and income groups. This was done to test the robustness of the computed probabilities and the consequent effect on the ranking of the regions based on the computed market index. These rankings retained the earlier assumption of stores located in rural areas with sales less than $40,000. The ranking remained consistent for the regions with the six highest market indexes (MI). Thus, the regional rankings appear to be robust for the regions with the greatest potential for catfish market expansion.

SUMMARY AND RECOMMENDATIONS

A market survey of 1,800 retail grocery managers was commissioned by the Southern Regional Aquaculture Center in an effort to gather information on existing and potential markets for catfish and crawfish in the United States. Two hundred retail grocers from each of the nine census regions were asked if they sold catfish (crawfish). Those not selling catfish (crawfish) were asked to give reasons why they did not sell the product, and the likelihood of adding the product. Stores selling catfish (crawfish) were asked questions concerning quality and supply problems, influence and use of advertising, time of product introduction, product form, level of sales, and product price. All survey respondents were also

asked several questions regarding socio-economic characteristics of the store. Analysis in this report focused on catfish.

Forty-five percent of all stores surveyed sold catfish. Stores in the traditional catfish consumption regions, comprised of the ESC and WSC regions, reported percentages above the national mean, while the east coast (NE, MA, and SA) and mountain (M) regions were below the national mean. Generally, store characteristics associated with an increased likelihood of selling catfish included: (1) members of a chain; (2) a specialized fish market section; and 3) total monthly store sales over $100,000.

Eighteen percent of the store managers reported that the national advertising campaign for catfish influenced their decision to add catfish to their product line. Regional impact of the national advertising campaign on catfish product adoption was greatest in the SA and MA regions. Stores in the P and SA regions reported the largest rate of catfish product adoption for the 2-year period prior to the time of the survey (a period overlapping The Catfish Institute's generic advertising campaign).

Twenty-five percent of all respondents selling catfish had added the product in the last 2 years and 48 percent had added in the last 5 years. A general pattern of earlier adoption in the ESC and the WSC regions with later expansion into other regions was noted. Twenty-nine percent of the retail groceries selling catfish sold over 50 pounds of catfish per week.

Fresh whole dressed and fresh fillets were found to be the most available and best selling catfish product forms. Fresh whole dressed was the top seller in all regions except NE, MA, and WSC, where fresh fillet was the top selling product form.

Store managers selling catfish were asked if they had any problems with the consistency of catfish product supply and quality. Eleven percent of the stores selling catfish reported that they had experienced supply problems. Seasonality of supply and insufficient quantities were cited as the major supply problems. Seasonality of supply was reported most frequently in the P region, while insufficient quantities were most often a problem in the SA region. Exhibiting a response rate similar to that reported for product supply problems, 9 percent of grocers selling catfish indicated that they were

having catfish quality problems. The ENC and P regions reported the largest percentages of quality problems. Lack of freshness and off-flavor were the two primary quality issues.

Store managers not selling catfish were asked to categorize their reasons for not carrying the product. Ranked in decreasing order of importance, the following reasons for not selling catfish were reported: (1) negative consumer attitudes; (2) low demand; (3) storage problems; (4) lack of availability at certain times of the year; (5) wholesale price being too high; and (6) lack of product freshness. Negative consumer attitudes tended to increase as a reason why a store did not sell catfish as one moved from the two south central regions. Continued advertising efforts in the non-south central areas should provide a source of positive information about catfish, thus changing its consumer image. Industry expansion efforts may be further advanced by addressing supply availability, particularly in the M, MA, and P regions, and reported storage problems in the WSC and ESC regions. The largest frequency of grocers who had not heard of catfish was reported in the NE region.

Information on fish and seafood preferences, in terms of sales, indicated the competitive position of catfish. Catfish and cod tied for second place in sales behind shrimp. Catfish was the top seller in the WSC, ESC, and WNC regions, and ranked third in the SA region. Shrimp, cod, flounder, perch, and orange roughy appear to be the primary competitors with catfish for the fish and seafood market.

Quantitative assessment of the socio-economic factors influencing a store manager's decision to add catfish to the product line was analyzed using a logit model. Variables in the model included weekly sales volume, urban/suburban/rural location, income and race of clientele, membership in a chain, and census region. The estimated model was significant based on a likelihood ratio test at the 5 percent level. Probabilities for a selected representative base store type were then computed from the estimated logit model. Ranking of regional markets was quantified by a market potential index that incorporated the estimated logit probabilities, regional population, and the percentage of stores not selling catfish. The top three prospects in terms of new market development, in decreasing order of potential, were found to be the SA, ENC, and P regions.

Survey results indicate that a substantial potential exists for catfish market expansion if some obstacles can be surmounted. Obstacles obstructing the path of catfish development include: (1) negative consumer image; (2) supply problems in the form of seasonality and insufficient quantities; (3) freshness and off-flavor of catfish products; and (4) competition from other fish and seafood products. Continued advertising and other promotional activities should enhance the image of catfish among consumers. New production strategies and increased acreage may reduce seasonality and alleviate product shortages, respectively. Further infrastructure development should also aid in addressing these supply issues. A high level of quality control must be maintained that effectively limits off-flavor and other substandard quality catfish from entering market channels. Competition from other fish and seafood products may become tougher for some species, while becoming less of a factor for other species. Species such as shrimp that are increasingly being produced in aquacultural production systems may continue to be highly competitive. Conversely, fish and seafood species dependent on declining natural stocks may generally become less competitive due to reduced availability and increased price.

Areas of further research into markets for catfish include: (1) comparison of results from the restaurant, consumer, and grocery store surveys; (2) a follow-up survey of similar form for time-series comparison; and (3) detailed surveys of selected census regions or market segments. Analytical comparison of the three surveys may give insight into market outlet interactions and possible market signaling failures. For example, a comparison of results from the grocery survey with those of the consumer survey may suggest that consumer demand exists in a particular region, however, catfish products may not be available in the region's grocery stores. Product adoption changes in consumers' perception, perspectives on quality, and supply issues, etc. are questions that could potentially be answered by performing another survey. Finally, detailed surveys of census regions or market segments, e.g., middle income earners, could help the catfish industry identify and develop specific catfish market niches.

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APPENDIX A

Summary of Grocery Survey Responses, 1988[1]

1. Does your store sell catfish?
   (1) Yes—skip to Q. 2 (43%)
   (2) No (57%)

   1a. What are the reasons your store does not sell catfish?
   (1) Haven't heard of it (4%)
   (2) Negative consumer attitudes (21%)
   (3) Unreliable supply (6%)
   (4) Storage problem (11%)
   (5) Wholesale price too high (2%)
   (6) Not fresh (2%)
   (7) Unavailable at certain times of the year (8%)
   (8) Other (write in)[2]
   a. Low demand (17%)
   b. Catch own (2%)
   c. Store size (4%)
   d. Not available (4%)
   e. Miscellaneous (11%)
   (9) Don't know (9%)

   1b. Within the next year, what is the likelihood of your store beginning to sell catfish? Would you say . . .?
   (1) Very likely (4%)
   (2) Somewhat likely (14%)
   (3) Somewhat unlikely (9%)
   (4) Very unlikely (65%)
   (5) Don't know (8%)

SKIP TO Q. 12

2. How many years has your store been selling catfish?
   (1) Less than 6 months (6%)
   (2) 6 months-1 year (8%)

[1]Percentages may not sum to 100 due to rounding.
[2]"Other" was separated into the six categories listed after the survey was administered. This was done primarily to reflect the number of respondents citing "low demand" as a reason for not selling catfish.

(3) Between 1 and 2 years (12%)
(4) More than 2, but less than 5 years (21%)
(5) More than 5 years (45%)
(9) Don't know (8%)

3. Has your catfish supply been consistent?
(1) Yes—skip to Q. 4 (89%)
(2) No (11%)

3a. What problem(s) have you had? RECORD UP TO TWO RESPONSES.
(1) Insufficient quantity (27%)
(2) Unavailable at certain times of the year (30%)
(3) Certain product forms not always available (13%)
(4) Unreliable quality of product (12%)
(5) Inconveniently sized purchase lots (5%)
(8) Other (write in) (13%)

4. What forms of catfish do you sell?[3]
(1) Sell
(2) Do not sell
(9) Don't know
a. Fresh whole-dressed (61%)
b. Fresh fillet (62%)
c. Frozen whole-dressed (27%)
d. Frozen fillet (36%)
e. Individually frozen fillet (11%)
f. Breaded or processed (23%)

5. What *other* forms of catfish do you sell?

6. How many pounds of catfish, on the average, do you sell weekly?
(1) Less than 50 (60%)
(2) 51-99 (13%)
(3) 100-199 (6%)
(4) More than 200 (3%)
(7) It varies (4%)
(9) Don't know (13%)

[3]Percentages of stores selling a given product form relative to the total number of stores for each response.

7. What is your top selling catfish product?
   (1) Fresh whole dressed (34%)
   (2) Fresh catfish fillets (32%)
   (3) Frozen whole dressed (6%)
   (4) Frozen catfish fillets (13%)
   (5) Individually frozen fillets (1%)
   (6) Breaded or processed (2%)
   (8) Other (write in) (6%)
   (9) Don't know — skip to Q. 9 (6%)

8. What is this week's retail price of your top selling catfish product? (dollars per pound)? (999) Don't know

Price		%
1.	<$1.00	1
2.	$1.00-1.99	14
3.	$2.00-2.99	39
4.	$3.00-3.99	28
5.	$4.00-4.99	14
6.	$5.00-5.99	4
7.	$6.00-9.00	1

9. Have you had any problems with the quality of catfish products?
   (1) Yes (9%) (2) No—skip to Q. 10 (91%)

   9a. What problems have you had? RECORD UP TO TWO RESPONSES.
   (1) Off-flavor (17%)
   (2) Freshness (50%)
   (3) Packaging (13%)
   (4) Form of product (4%)
   (8) Other (write in) (7%)
   (9) Don't know (9%)

10. Does your store promote catfish?
   (1) Yes (57%)
   (2) No—skip to Q. 11 (43%)

   10a. What means of promotion do you use? RECORD UP TO 3 RESPONSES.
   (1) In store signs (30%)
   (2) Discounted specials (9%)
   (3) News circular (14%)
   (4) Radio (2%)
   (5) TV (1%)
   (6) Newspaper (36%)

(7) In store samples (5%)
(8) Other (write in) (2%)
(9) Don't know (0%)

11. Did the National Advertising Campaign for catfish result in the addition of catfish to your product line?
(1) Yes (13%)
(2) No (61%)
(9) Don't know (26%)

12. Does your store sell crawfish?
(1) Yes—skip to Q. 13 (8%)
(2) No (92%)

12a. What is (are) the reason(s) your store does not sell crawfish? RECORD UP TO TWO RESPONSES.
(1) Haven't heard of it (5%)
(2) Consumer attitudes (11%)
(3) Wholesale price too high (2%)
(4) Not fresh (2%)
(5) Lack of demand (53%)
(8) Other (write in) (20%)
(9) Don't know (8%)

12b. Within the next year, what is the likelihood of your store beginning to sell crawfish? Would you say . . . ?
(1) Very likely (2%)
(2) Somewhat likely (8%)
(3) Somewhat unlikely (9%)
(4) Very unlikely (72%)
(9) Don't know (9%)

13. How many years has your store been selling crawfish?
(1) Less than 6 months (14%)
(2) 6 months-1 year (14%)
(3) Between 1 and 2 years (13%)
(4) More than 2 years, but less than 5 years (19%)
(5) More than 5 years (29%)
(9) Don't know (12%)

14. Which of the following forms of crawfish does your store sell?[4]
    (1) Sell
    (2) Don't sell
    (9) Don't know
        a. Fresh tail meat (38%)
        b. Frozen tail meat (33%)
        c. Individually frozen tail meat (16%)
        d. Fresh whole crawfish (46%)
        e. Frozen whole crawfish (35%)
        f. Breaded or processed tail meat (17%)

15. What other forms of crawfish does your store sell?

16. Has your crawfish supply been consistent?
    (1) Yes—skip to Q. 17 (85%)
    (2) No (15%)

    16a. What problems have you had? RECORD UP TO TWO RESPONSES.
    (1) Insufficient quantity (31%)
    (2) Unavailable at certain times of the year (42%)
    (3) Certain product forms not always available (8%)
    (4) Inconveniently sized purchased lots (4%)
    (8) Other (write in) (15%)
    (9) Don't know (0%)

17. How many pounds of crawfish do you sell weekly?
    (1) Less than 10 (39%)
    (2) 11-50 (25%)
    (3) 51-99 (1%)
    (4) More than 100 (11%)
    (9) Don't know (23%)

18. Have you had any problems with the quality of crawfish products?
    (1) Yes (6%)
    (2) No—skip to Q. 19 (94%)

[4]Percentages of stores selling a given product form relative to the total number of stores for each response.

18a. What problems have you had? RECORD UP TO TWO RESPONSES.
(1) Freshness (13%)
(2) Packaging (25%)
(3) Wholesale price too high (0%)
(4) Form of product (25%)
(8) Other (write in) (38%)
(9) Don't know (0%)

19. Does your store promote crawfish?
(1) Yes (35%)
(2) No—skip to Q. 20 (65%)

19a. What means of promotion do you use? RECORD UP TO THREE RESPONSES.
(1) In-store signs (35%)
(2) Discounted specials (9%)
(3) News circular (12%)
(4) Radio (5%)
(5) TV (0%)
(6) Newspaper (32%)
(7) In-store samples (6%)
(8) Other (1%)

20. What is the overall weekly sales volume of your store? IF NECESSARY, ASK "IS IT . . ."
(1) Less than $40,000 (22%)
(2) $40,000-75,000 (8%)
(3) $76,000-99,000 (2%)
(4) $100,000-149,000 (5%)
(5) $150,000-200,000 (3%)
(6) over $200,000 (4%)
(8) Refused (33%)
(9) Don't know (23%)

21. How many square feet does your store have?
(1) Less than 20,000 (41%)
(2) 20,000-29,000 (13%)
(3) 30,000-39,000 (7%)
(4) 40,000 or more (9%)
(9) Don't know (30%)

22. Is your store located in a:
    (1) Rural (43%)
    (2) Suburban (32%)
    (3) Urban area (26%)

23. Which *two* of these groups make up the largest part of your customer base:
    (1) Low income black (9%)
    (2) Low income white (13%)
    (3) Middle class black (23%)
    (4) Middle class white (39%)
    (5) High income black (2%)
    (6) High income white (6%)
    (7) Asian (1%)
    (8) Hispanic (4%)
    (9) Other (1%)

24. What is the name of your store?

    24a. Is your store part of a chain?
        (1) Yes (41%)
        (2) No—skip to Q. 25 (59%)

    24b. How many stores does it have nationwide?
        (99) Don't know

25. Does your store have a specialized fish market section separate from the meat counter?
    (1) Yes—skip to Q. 26 (23%)
    (2) No (77%)

    25a. What is the likelihood of your store adding such a seafood section?
        (1) Very likely (6%)
        (2) Somewhat likely (10%)
        (3) Somewhat unlikely (9%)
        (4) Very unlikely (68%)
        (9) Don't know (7%)

26. What are the top five fish and seafood products in terms of sales?
    Shrimp—9%
    Catfish—7%

Cod—7%
Perch—4%
Orange roughy—4%
Red snapper—3%
Flounder—3%
Haddock—3%
Sole—3%
Salmon—3%
Halibut—3%
Other—51%

27. What are the three seafood items with fastest sales growth in the last year?
Shrimp—10%
Catfish—8%
Cod—6%
Orange roughy—4%
Red snapper—3%
Perch—3%
Haddock—3%
Flounder—3%
Halibut—3%
Other—57%

28. Census Subdivision

29. Area Code

APPENDIX B

SUMMARY OF SOCIO-ECONOMIC CHARACTERISTICS FOR RETAIL GROCERY SURVEY, BY CENSUS REGION, 1988[1]

Question	Total	Response, by region[2]								
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
20. What is the overall weekly sales volume of your store?										
ENTIRE SAMPLE										
a. <$40,000	49	54	45	48	58	51	60	51	44	35
b. $40-99,000	24	23	19	28	28	21	24	22	32	21
c. >$100,000	26	23	36	25	14	28	15	27	24	44
SELL CATFISH										
a. <$40,000	31	46	20	28	51	27	36	33	20	21
b. $40-99,000	30	25	24	43	29	24	40	27	37	15
c. >$100,000	39	29	56	30	20	49	24	41	43	65
21. How many square feet does your store have?										
ENTIRE SAMPLE										
1. <20,000	59	63	64	55	57	55	70	60	55	56
2. 20-29,000	19	17	17	22	20	28	19	17	12	18
3. >30,000	22	20	19	24	23	16	11	23	33	26
SELL CATFISH										
1. <20,000	43	44	44	45	47	42	62	46	21	35
2. 20-29,000	23	15	19	23	21	37	23	22	21	23
3. >30,000	33	41	37	31	32	21	15	32	57	42
22. Is your store located in a rural, suburban, or urban area?										
ENTIRE SAMPLE										
a. Rural	43	35	34	38	54	45	49	40	50	40
b. Suburban	32	41	32	31	26	33	28	32	29	32
c. Urban	26	25	34	31	20	22	23	27	21	28
SELL CATFISH										
a. Rural	35	28	30	36	44	35	38	33	32	29
b. Suburban	37	46	36	37	34	36	33	39	42	34
c. Urban	28	26	34	27	22	29	29	27	26	37
23. What two of the groups make up the largest part of your customer base? (two responses combined)										
ENTIRE SAMPLE										
a. Black/low	9	7	10	8	7	16	11	13	4	8
b. White/low	13	15	11	13	14	15	15	11	11	14
c. Black/middle	23	17	27	22	21	25	27	28	20	16
d. White/middle	39	41	41	45	49	33	39	35	41	31
e. Black/high	2	4	1	3	1	2	1	2	2	5
f. White/high	6	10	4	7	6	4	5	3	8	9
g. Asian	1	0	1	0	1	1	0	1	2	3
h. Hispanic	4	4	4	1	2	1	0	6	11	12
i. Other	1	2	1	1	0	3	1	1	0	1

Continued

SUMMARY OF SOCIO-ECONOMIC CHARACTERISTICS FOR RETAIL GROCERY SURVEY, BY CENSUS REGION, 1988[1] (CONTINUED)

Question	Total	Response, by region[2]								
		NE	MA	ENC	WNC	SA	ESC	WSC	M	P
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
SELL CATFISH										
a. Black/low	8	6	10	9	8	13	9	9	3	9
b. White/low	10	10	13	12	13	9	10	7	6	12
c. Black/middle	25	18	28	23	23	29	32	31	25	15
d. White/middle	39	39	40	41	45	36	40	36	45	29
e. Black/high	3	4	0	4	2	2	2	4	0	7
f. White/high	7	12	5	9	6	4	6	5	8	12
g. Asian	1	1	0	0	1	1	0	0	2	3
h. Hispanic	5	7	3	1	2	2	0	7	11	14
i. Other	1	2	1	1	0	4	2	1	0	0
24a. Is your store part of a chain?										
ENTIRE SAMPLE										
Yes	41	42	38	42	39	43	37	41	44	47
SELL CATFISH										
Yes	61	63	62	53	46	75	58	57	74	65
25. Does your store have a specialized fish market section separate from the meat counter?										
ENTIRE SAMPLE										
Yes	23	30	23	25	21	23	15	22	24	22
SELL CATFISH										
Yes	37	62	48	41	32	36	26	31	43	32
25a. What is the likelihood of your store adding such a seafood section?										
ENTIRE SAMPLE										
Likely[3]	17	21	16	23	11	14	14	9	15	17
SELL CATFISH										
Likely[3]	26	33	27	29	18	27	24	16	30	43

[1]Regional abbreviations used in this and following Appendix tables are as follows: NE = New England; MA = Middle Atlantic; ENC = East North Central; WNC = West North Central; SA = South Atlantic; ESC = East South Central; WSC = West South Central; M = Mountain; and P = Pacific.

[2]Percentages may not sum to 100 due to rounding.

[3]"Very likely" and "somewhat likely" responses were combined into "likely" category.

APPENDIX C

SUMMARY OF RETAIL GROCERY SURVEY FOR STORES THAT SELL CATFISH, BY SELECTED STORE CLASSIFICATIONS, 1988

Question	Sell catfish	Sell catfish	
		Catfish in top 5	<50 lb./wk.
	Pct.	*Pct.*	*Pct.*
2. How many years has your store been selling catfish?			
<6 months	6	5	4
6 mo.-1 yr.	9	7	7
1 yr.-2 yr.	13	11	11
2 yr.- 5 yr.	23	21	16
>5 years	50	56	62
3. Has your catfish supply been consistent?			
Yes	90	91	92
No	10	9	8
3A1-3A2. What catfish supply problems have you had? (both responses combined)			
Quantity	24	23	18
Seasonality	30	26	27
Forms	13	11	18
Quality	12	11	18
Lot size	5	9	9
Other	16	20	9
4A-F and 5. What forms of catfish do you sell?[2]			
Fresh whole dressed	62	67	72
Fresh fillets	63	60	71
Frozen whole dressed	27	30	25
Frozen fillet	37	40	34
Individually frozen fillets	11	12	13
Breaded/processed	23	24	23
Other	13	16	19
6. How many pounds of catfish, on the average, does your store sell weekly?			
<50	73	62	0
51-99	16	21	58
100-199	7	11	27
>200	4	6	15
7. What is your top selling catfish product?			
FRESH			
Whole dressed	36	38	37
Fillet	34	31	38
FROZEN			
Whole dressed	6	6	4
Fillet	14	16	10
Individually frozen	1	1	2
BREADED/PROCESSED	2	2	1
OTHER	7	8	8

Continued

SUMMARY OF RETAIL GROCERY SURVEY FOR STORES THAT SELL CATFISH, BY SELECTED STORE CLASSIFICATIONS, 1988 (CONTINUED)

Question	Sell catfish	Sell catfish	
		Catfish in top 5	<50 lb./wk.
8. What is this week's retail price/pound of your top selling catfish product?			
>$1.00	1	0	0
$1-1.99	14	17	14
$2-2.99	39	43	45
$3-3.99	28	27	27
$4-4.99	14	10	12
$5-5.99	4	2	1
$6-6.99	1	0	1
9. Have you had any problems with quality of catfish products?			
Yes	9	7	9
No	91	93	91
9A1-9A2. What catfish quality problems have you had? (two responses combined)			
Off-flavor	21	22	11
Freshness	44	56	56
Packaging	16	22	33
Form	5	0	0
Other	14	0	0
10. Does your store promote catfish?			
Yes	57	59	67
No	43	41	33
10A1-10A3. What means of promotion do you use? (three combined responses)			
1. Store signs	30	30	28
2. Discount specials	9	9	11
3. News circulars	14	14	14
4. Radio	2	2	3
5. Television	1	1	2
6. Newspaper	37	37	35
7. Samples	5	5	6
8. Other	2	2	2
11. Did the National Advertising Campaign for catfish result in the addition of catfish to your product line?			
Yes	17	20	18
No	83	80	82

[1]"Sell catfish" represents respondents who answered "yes" to question 1; "catfish in top 5" represents respondents who cited catfish for question 26; ">50 lb./wk." represents respondents who reported catfish sales exceeding 50 pounds per week.

[2]Reported percentages are for those respondents *selling* the product form.

APPENDIX D

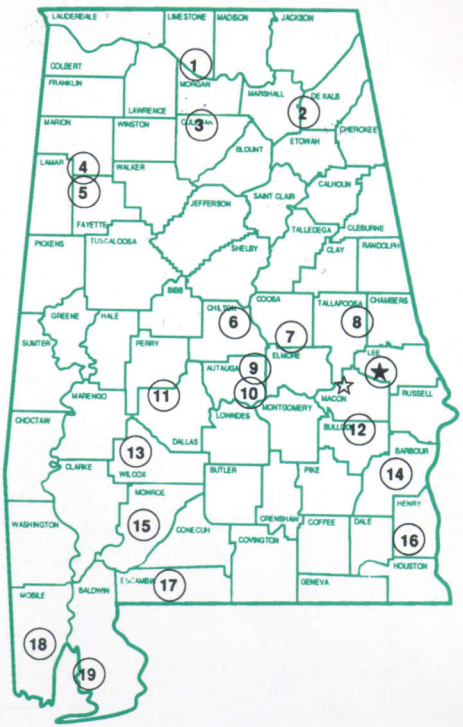
SUMMARY OF SOCIO-ECONOMIC CHARACTERISTICS FOR RETAIL GROCERY SURVEY BY SELECTED STORE CLASSIFICATIONS, 1988[1]

Question	Response, by store classification					
	Entire sample	Sell catfish	Sell catfish top 5	Sell catfish >50 lb./wk.	Do not sell catfish	Do not sell catfish but likely next year
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
20. What is the overall weekly sales volume of your store?						
<$40,000	49	31	32	22	64	51
$40-99,000	24	30	30	24	20	22
>$100,000	26	39	37	54	16	27
21. How many square feet does your store have?						
>20,000	59	44	47	39	72	66
20-29,000	19	23	24	24	15	18
>30,000	22	33	29	37	13	16
22. Is your store located in a rural, urban, or suburban area?						
Rural	43	35	35	28	49	51
Suburban	32	37	37	41	27	25
Urban	26	28	29	31	23	23
23. Which two of these groups make up the largest part of your customer base? (combined responses)						
INCOME/RACE						
Low/black	10	8	9	7	10	9
Low/white	13	10	10	7	16	15
Middle/black	23	25	28	32	21	21
Middle/white	39	39	38	38	40	31
High/black	2	3	2	2	2	3
High/white	6	7	5	7	6	6
Asian	1	1	1	1	1	1
Hispanic	4	5	5	4	4	5
Other	1	1	1	2	1	1
24A. Is your store part of a chain?						
Yes	41	61	60	68	27	40
No	59	39	40	32	73	60
24B. How many stores does your chain have nationwide?						
1-10	28	23	24	17	38	37
11-100	34	35	32	41	32	37
>100	38	42	44	42	30	26
25. Does your store have a specialized fish market section?						
Yes	23	37	32	44	12	21
No	77	63	68	56	88	79
25A. What is the likelihood of your store adding a specialized fish market section?						
Likely	17	26	24	28	11	28
Unlikely	83	74	76	72	89	72

[1]"Entire sample" represents all survey respondents; "sell catfish" represents respondents who sell catfish; "sell catfish top 5" represents respondents who sell catfish and report it among their top 5 sellers; "sell catfish > 50 lb./wk." represents those who sell more than 50 pounds of catfish per week; "do not sell catfish" represents all respondents who do not sell catfish; "do not sell catfish but likely next year" represents respondents who did not sell catfish at time of survey but indicated "very likely" or "somewhat likely" to sell catfish next year.

Alabama's Agricultural Experiment Station System
AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

✪ Main Agricultural Experiment Station, Auburn.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Chilton Area Horticulture Substation, Clanton.
7. Forestry Unit, Coosa County.
8. Piedmont Substation, Camp Hill.
9. Forestry Unit, Autauga County.
10. Prattville Experiment Field, Prattville.
11. Black Belt Substation, Marion Junction.
12. The Turnipseed-Ikenberry Place, Union Springs.
13. Lower Coastal Plain Substation, Camden.
14. Forestry Unit, Barbour County.
15. Monroeville Experiment Field, Monroeville.
16. Wiregrass Substation, Headland.
17. Brewton Experiment Field, Brewton.
18. Ornamental Horticulture Substation, Spring Hill.
19. Gulf Coast Substation, Fairhope.