Bulletin 1149 June 2006

OPINIONS OF U.S. CONSUMERS TOWARD MARINE SHRIMP:

RESULTS OF A 2000-2001 SURVEY

Experiment Station
Vance H. Watson, Director

Mississippi Agricultural & Forestry Experiment Station
Robert H. Foglesong, President • Mississippi State University • Vance H. Watson, Vice President

Opinions of U.S. Consumers Toward Marine Shrimp: Results of a 2000-2001 Survey

Terrill Hanson
Associate Professor
Department of Agricultural Economics
Mississippi State University

Lisa House
Associate Professor
Department of Food and Resource Economics
University of Florida

S. Sureshwaran
National Program Leader
Higher Education Programs
Cooperative State Research, Education, and Extension Service, USDA

Gwen Hanks
Assistant Professor
Department of Marketing
South Carolina State University

Stephen Sempier
Research Associate
Department of Agricultural Economics
Mississippi State University

This material is based upon work supported by the Cooperative State Research, Education and Extension Service, U.S. Department of Agriculture (USDA), under Agreement No. 99-38814-8202. It is a result of research sponsored in part by the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce under Grant #GMO-99-24, the Mississippi-Alabama Sea Grant Consortium, Mississippi State University, and University of Florida. The U.S. Government and the Mississippi-Alabama Sea Grant Consortium are authorized to produce and distribute reprints notwithstanding any copyright notation that may appear hereon. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of NOAA or USDA. For more information, contact Dr. Hanson by telephone (662) 325-7988 or by e-mail at hanson@agecon.msstate.edu. Bulletin 1149 was published by the Office of Agricultural Communications, a unit of the Division of Agriculture, Forestry, and Veterinary Medicine at Mississippi State University.

ABSTRACT

This bulletin presents results from a 2000-2001 fish and seafood consumption survey and should be of interest to the shrimp industry, government agencies, and seafood retailers/marketers. Survey results identify characteristics and opinions of shrimp consumers and nonconsumers. Of a sample of 1,398 respondents to a nationwide mail survey on seafood consumption, 86% consumed shrimp, with an average shrimp consumer eating shrimp 4.4 times per month. Shrimp consumers were most likely to purchase seafood at restaurants and grocery stores.

Shrimp consumers primarily ate shrimp because of enjoyment of flavor. Additional attributes that shrimp consumers enjoyed included variety in diet, availability of fresh products, and health/nutrition. Price, lack of available fresh product, and lack of preparation knowledge were the top three reasons shrimp consumers did not eat more shrimp. Nonconsumers identified taste, smell, and texture as the three principle reasons why they did not eat shrimp. A small number of nonconsumers (9%) and consumers (3%) suggested that product safety concerns were a reason for not eating shrimp (or not eating shrimp more frequently).

Respondents were asked what factors would increase their shrimp consumption. Seventy-six percent of nonconsumers indicated that nothing would increase their consumption. Alternatively, 81% of shrimp consumers believed there were factors that would increase their consumption. The number-one method to increase shrimp consumption for consumers was lower shrimp prices. Additional factors included coupons (to reduce cost), availability of fresh products, government safety inspections, and recipes.

Survey results suggest there are opportunities to increase shrimp consumption in the U.S., especially with individuals who already purchase shrimp. According to the options presented in the survey, the primary catalyst to increase shrimp consumption is to decrease the price of the product and target shrimp consumers. In contrast, it would be more challenging to attract nonconsumers of shrimp to the shrimp market. Most nonconsumers are unwilling to eat shrimp because of its taste, smell, and texture, which would be difficult, if not impossible, to change.

Keywords: marine shrimp, shrimp consumption, shrimp consumers, shrimp attributes, opinions toward shrimp, shrimp nonconsumers, farm-raised, wild caught

Opinions of U.S. Consumers Toward Marine Shrimp: Results of a 2000-2001 Survey

Introduction and Background

Fish and shellfish products are enjoyed by Americans, and consumption of these products has recently increased after a relatively flat consumption level during the 1990s (Figure 1). During the 1990s, shellfish products made up an increasingly greater share of the total amount of seafood consumed (Figure 2). Shellfish products include several animals, such as clams, crabs, crawfish, lobsters, mussels, oysters, scallops, and shrimp. Overall per capita fresh and frozen shellfish consumption in the United States has increased from 3.4 pounds in 1989 to 5.7 pounds in 2003 (Figure 2). During the same time period, per capita consumption of shrimp has increased from an average of 2.3 pounds per year in 1989 to a record high of 4 pounds in 2003 (Figure 3). This is 25% of all seafood consumed and 66% of all shellfish products consumed in the U.S. In 2001, shrimp surpassed canned tuna for the first time as the most consumed seafood species in the U.S., and shrimp continued to be the highest consumed seafood product in 2002 and 2003 (Figure 4). Annual shrimp consumption steadily increased at a rate of 0.2 to 0.3 pounds per person from 2000 through 2003 (Table 1).

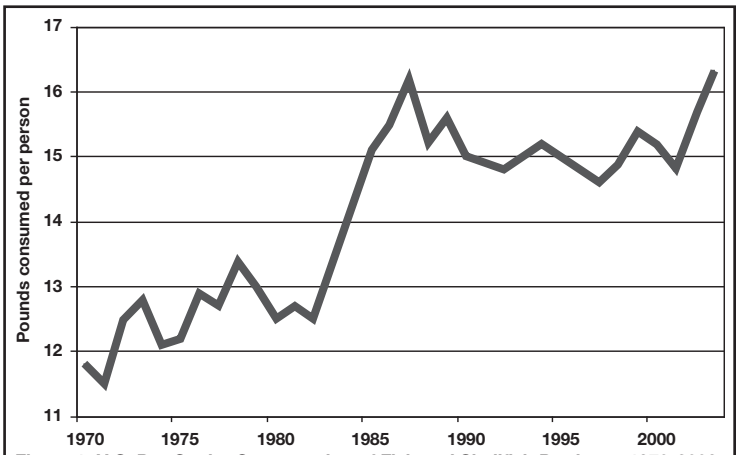

Figure 1. U.S. Per-Capita Consumption of Fish and Shellfish Products, 1970-2003.
Sources: USDOC/NOAA/NMFS, 2001; USDOC/NOAA/NMFS, 2003.

An increasing amount of shrimp consumed in the U.S. comes from imports. In 1986, imports supplied 67% of the U.S. shrimp consumed, and in 2003, imports provided 1.5 billion pounds (heads-off weight) or 88% of the total U.S. shrimp supply (Figure 5). In 2003, the top three countries supplying shrimp to the U.S. were Thailand, China, and Vietnam. In that year, these three countries provided 54%

Table 1. Comparison of U.S. Per-Capita Consumption of the Top 10 Fish and Shellfish Species, 2000-2003.

Rank	2000		2001		2002		2003	
	Species	Pounds	Species	Pounds	Species	Pounds	Species	Pounds
1	Tuna*	3.50	Shrimp	3.40	Shrimp	3.70	Shrimp	4.00
2	Shrimp	3.20	Tuna*	2.90	Tuna*	3.10	Tuna*	3.40
3	Pollock	1.59	Salmon	2.02	Salmon	2.02	Salmon	2.22
4	Salmon	1.58	Pollock	1.21	Pollock	1.13	Pollock	1.71
5	Catfish	1.08	Catfish	1.15	Catfish	1.10	Catfish	1.14
6	Cod	0.75	Cod	0.56	Cod	0.66	Cod	0.64
7	Clams	0.47	Clams	0.47	Crabs	0.57	Crabs	0.61
8	Crabs	0.38	Crabs	0.44	Clams	0.55	Tilapia	0.54
9	Flatfish	0.42	Flatfish	0.39	Tilapia	0.40	Clams	0.53
10	Scallops	0.27	Tilapia	0.35	Flatfish	0.32	Scallops	0.33
Total		13.25		12.88		12.88		12.88

*Canned Tuna
Source: Table reproduced from data from the National Fisheries Institute, 2005.

of the total shrimp imports into the U.S. However, their supply to the U.S. in 2004 declined due to the weak dollar and their interest in marketing shrimp to other countries (USDA/ERS, 2005).

In 2004, the U.S. Department of Commerce released findings from an antidumping investigation on certain frozen and canned warmwater shrimp from China, the Socialist Republic of Vietnam, Brazil, Ecuador, India, and Thailand. The result of these investigations indicated that producers/exporters from these countries sold frozen and canned warmwater shrimp in the U.S. below fair market value. Antidumping tariffs were put into place for certain frozen warmwater shrimp and prawns for these countries. However, the U.S. Department of Commerce has offered to send teams to India and Thailand to assess the status of the shrimp industry after the December 2004 tsunami to evaluate if the tariffs will remain in place for Thailand and India (USDC/IA, 2005). Tariffs and the weakened U.S. dollar may affect the amount and form of shrimp imports in 2005 and subsequent years.

The recent import statistics show frozen shrimp was the dominant item accounting for 76% of all shrimp product imports in 2004 (Figure 6). Fresh shrimp import quantities are small (<1%), and the majority of the supply comes from Thailand, China, India, and Vietnam. The third shrimp import category of prepared products (canned, cooked, etc.) is growing fast due to shrimp farmers and processors developing value-added products and U.S. firms looking to use these products in prepared meals, as well as retail and restaurant sales. In 1998, prepared products represented 13% of the total imports, while in 2004 they represented 23% of the total imports (USDA/ERS, 2005).

Shrimp farming in the U.S. occurs primarily in Texas but is small compared with total U.S. supply, which mainly comes from wild shrimp harvesting (4.8 million pounds grown in Texas represented 2% of the U.S. domestic production in 2000). A much larger portion of the total imported shrimp quantity is produced through aquaculture. Total world farmed-shrimp production has grown from 72.8 million pounds in 1975 (2.3% of world supply) to 1.72 billion pounds in 1998 (25% of world supply); 75-85% of this cultured shrimp comes from Asia, and the remaining 20-25% is produced in Central and South America (Treece, 2000). U.S. shrimp landings in 2003 amounted to 323 million pounds valued at

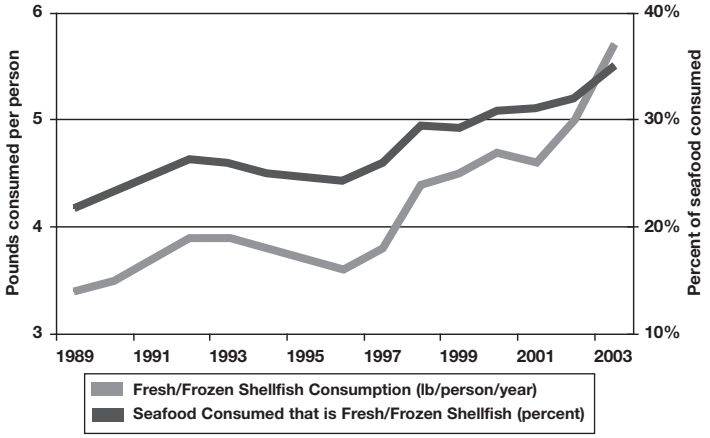

Figure 2. Per-Capita Fresh and Frozen Shellfish Consumption and Fresh and Frozen Shellfish as a Percent of Seafood Consumption in the United States, 1989-2003. Sources: USDOC/NOAA/NMFS, 2001; USDOC/NOAA/NMFS, 2002; and USDOC/NOAA/NMFS, 2004.

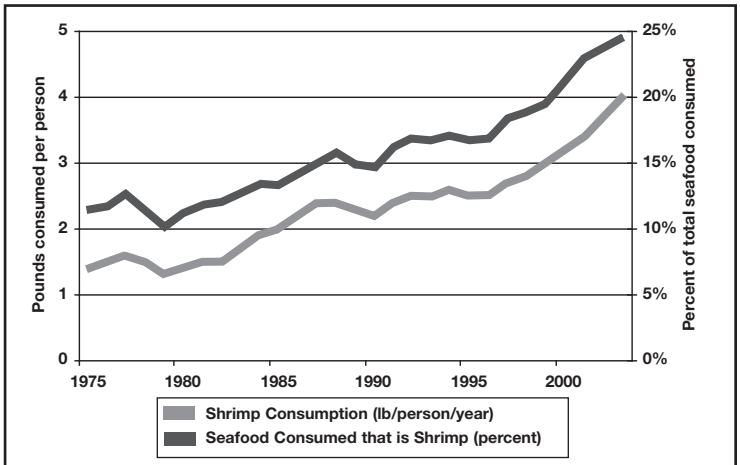

Figure 3. Per-Capita Shrimp Consumption and Shrimp as a Percent of Total Seafood Consumption in the United States, 1990-2003. Sources: USDOC/NOAA/NMFS, 2001; USDOC/NOAA/NMFS, 2003.

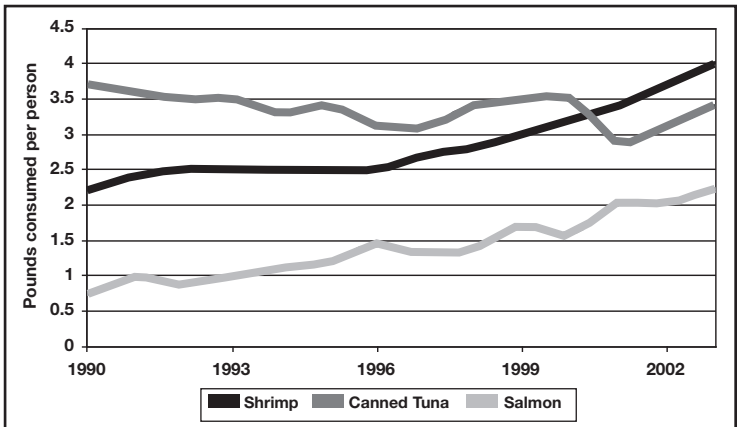

Figure 4. U.S. Per-Capita Consumption of the Top Three Seafood Products, 1990-2003. Source: National Fisheries Institute, 2005.

$441 million. The Gulf of Mexico accounted for 256 million pounds ($365 million) or 79% of the national total. Among the Gulf states in 2003, shrimp landings were greatest in Louisiana with 125.7 million pounds and 49% of the total Gulf catch, followed by Texas (79.2 million pounds, 31% of total Gulf catch), Florida (west coast, 18.1 million pounds, 7%), Mississippi (17.5 million pounds, 7%), and Alabama (15.7 million pounds, 6%) (USDOC/NOAA/NMFS, 2005). The amount and value of shrimp landings have varied over time in Mississippi. Nonetheless, the wild shrimp harvesting/processing industry contributes significantly to the local economies of coastal Mississippi and neighboring states in the Gulf of Mexico (Posadas, 2000a and 2000b). The pounds of shrimp processed in Mississippi from 1990 through 2003 have not varied as much as the total value of the shrimp processed in the state (Figure 7). This discrepancy is due to changing shrimp prices, which dramatically dropped in 2000.

Shrimp is a popular seafood in the U.S., and an increased understanding of why consumers purchase and consume shrimp products is important to producers, marketers, and consumers of this commodity. Regional and national shrimp consumption can be affected by factors that vary across geographical regions, ethnic groups, income levels, and nutritional perceptions. In 2001, Mississippi State University, with support from the Mississippi-Alabama Sea Grant and the United States Department of Agriculture Higher Education Program, administered a nationwide mail survey to U.S. residents on the topic of seafood consumption. Information on consumer perceptions toward marine shrimp obtained from this survey is summarized in this bulletin. The results from the 2000-2001 survey described in this publication should be useful to the U.S. shrimping industry, governmental agencies, and seafood retailers/marketers for a variety of reasons, namely for effective marketing. Knowledge of shrimp consumer demographics, consumption frequency, and regional seafood preferences can help harvesters, buyers, and sellers determine more precisely their markets and potential market niches. Additional issues addressed in this survey provide insights into shrimp consumers attitudes and preferences toward factors that affect consumption, such as seafood safety, aquacultured or farm-raised product, country of origin, product attributes, and other factors affecting consumption frequency.

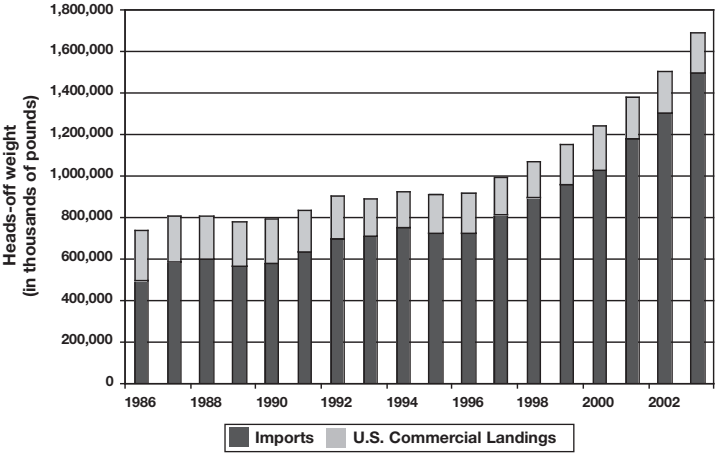

Figure 5. Origin of the U.S. Shrimp Supply, 1986-2003. Sources: USDOC/NOAA/NMFS, 1995; USDOC/NOAA/NMFS, 2003.

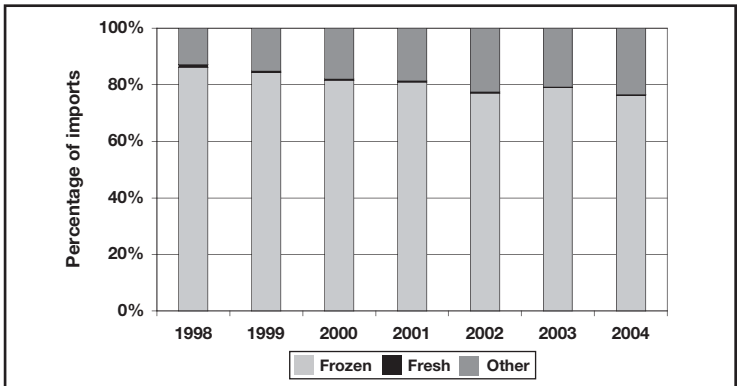

Figure 6. Percent of Imported Shrimp by Product Form (Frozen, Fresh, or Other), 1998-2004. Sources: USDA/ERS, 2002; USDA/ERS, 2005.

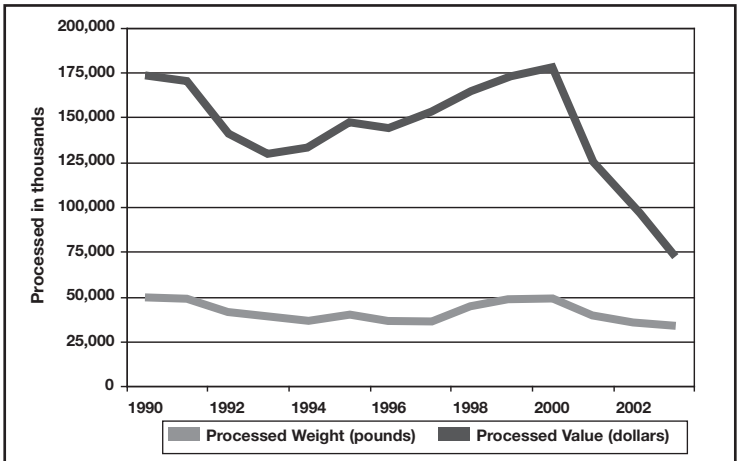

Figure 7. Pounds and Value of Shrimp Processed in Mississippi, 1990-2003. Sources: USDOC/NOAA/NMFS, 2005, Posadas, B., personal communication, 2005.

DATA AND PROCEDURES

The data for this study were obtained through a nationwide survey of U.S. consumers toward fish and seafood consumption via a mail survey (Appendix 1). Before the survey instrument was prepared, a number of focus groups were conducted in South Carolina, Mississippi, and Kansas to elicit issues to be addressed in a fish and seafood consumption survey. Results from these focus groups were used to develop categories for the questionnaire as well as test questions and phrasing of questions. The questionnaire was then mailed to a sample of 9,000 households in the United States, with 1,000 mailed to each of the nine major U.S. census regions (Table 2). The stratified sample was employed because region was expected to be a significant determinant of both the choice to consume and the choice of how often to consume marine shrimp. Surveys were mailed in late 2000 and early 2001, with households receiving a second copy of the survey if they did not return the first. This approach resulted in a return of 1,790 surveys or 20.1% (after accounting for returned surveys). Of these responses, 1,398 responded to the questions regarding shrimp consumption, and this information is summarized here.

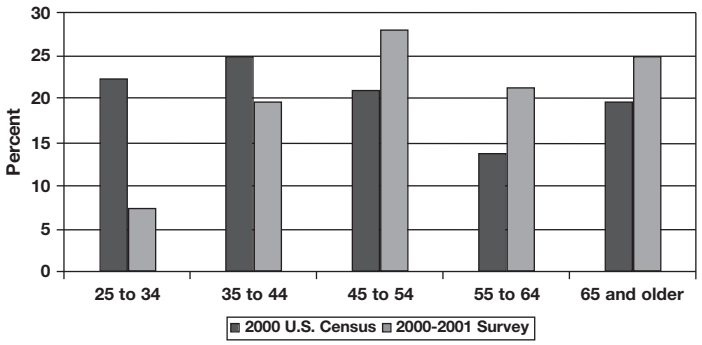

Figure 8. Comparison of U.S. Population and Survey Respondents by Age. Source: USDOC, 2000 Census.

Demographic data indicated that the response rate per region was comparable (Table 2), ranging from a low of 133 usable responses from the East South Central region of the U.S. to a high of 177 responses from the West North Central region. Caucasians were slightly overrepresented, with 87.4% of the respondents indicating they were Caucasian, while the other respondents were Black or African American (3.1%), Asian (2%), and Hispanic (1.9%). The 2000 U.S. Census indicates that approximately 75% of the U.S. population is Caucasian, with 12.5% of the population of Hispanic origin, 12.3% of the population Black or African American, and 3.6% Asian (USDOC, 2000).

As shown in Figure 8, older people responded to this survey more than any other age group. Considering only the U.S. population above 25 years of age, 53% of the adult population in the U.S. is above the age of 45, compared with 80% of the respondents to the survey. Figure 9 shows a comparison of household income for survey respondents to that obtained by the U.S. census. Survey respondents tended to have slightly higher household incomes than those from the U.S. census data. The mean income of survey respondents fell in the $50,000 –

Table 2. Region of Residence of Survey Respondents.

Region of residence	States included in region	Number of respondents	Pct. of survey respondents who live in each region
New England	Maine, Rhode Island, New Hampshire, Massachusetts, Vermont, Connecticut	168	12.0
Mid-Atlantic	Pennsylvania, New York, New Jersey	146	10.4
South East Atlantic	Florida, Georgia, North Carolina, South Carolina, West Virginia, Virginia, Maryland, Delaware, Washington, D.C.	159	11.4
East North Central	Ohio, Indiana, Illinois, Michigan, Wisconsin	154	11.0
East South Central	Kentucky, Mississippi, Tennessee, Alabama	133	9.4
West North Central	Iowa, Minnesota, South Dakota, North Dakota, Missouri, Kansas, Nebraska	177	12.7
West South Central	Texas, Oklahoma, Arkansas, Louisiana	143	10.2
Mountain	Nevada, New Mexico, Arizona, Utah, Wyoming, Colorado, Montana, Idaho	176	12.6
Pacific	Alaska, Hawaii, California, Oregon, Washington	143	10.2

$59,999 category compared with a U.S. mean income of $42,148. Additionally, respondents to the survey tended to have more formal education, with 48% of the survey sample having some form of college degree compared with 26% of the U.S. population. Religious composition of the survey respondents corresponds to that presented in the *World Almanac and Book of Facts* (1999); i.e., 85% of the U.S. population practices Christianity (including 23% Catholic), and approximately 2% and 1% of the U.S. population practices Judaism and Islam, respectively. Eighty-three percent of survey respondents reported to be Christians, with 25% of those Catholic. Three percent reported that they practiced Judaism. Thus, we feel confident the results of this survey do generally represent the views of the U.S. adult population.

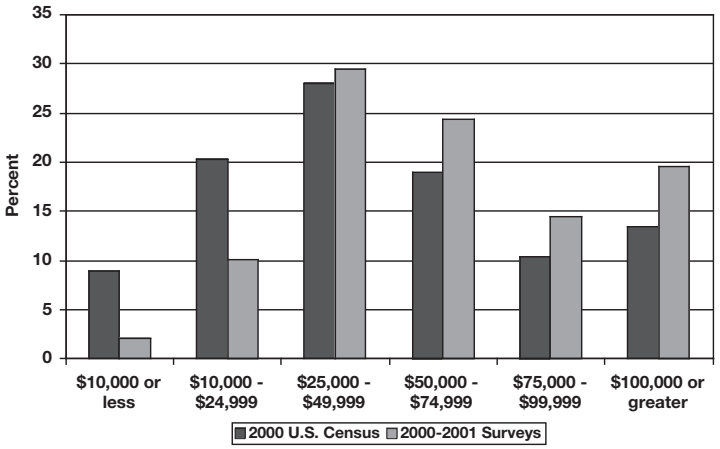

Figure 9. Comparison of U.S. Population and Survey Respondents by Household Income. Source: USDOC, 2000.

RESULTS

The results were examined according to several different categories, including demographics of shrimp consumers, preferred outlets for purchasing shrimp, seafood safety issues, reasons for consuming or not consuming shrimp, and factors that would increase shrimp consumption. Consumer behavior was revealed, including preferences for where, when, and how often shrimp was consumed. In addition, survey results identified features that make shrimp desirable and consumer and nonconsumer perceptions toward shrimp taste, value, and safety.

Shrimp Consumption

Overall, 86% of the 1,398 respondents indicated that they consumed shrimp. Consumers were asked to identify how often they consumed shrimp both at-home and away-from-home for each meal: breakfast, lunch, and dinner. Table 3 presents the frequency with which a consumer eats shrimp for each meal. Dinner was the meal in which most respondents consumed shrimp, and away-from-home consumption of this meal was most frequent, more than for any other meal-location combination. The lunchtime, away-from-home meal had greater shrimp consumption than the at-home lunch meal. The lowest shrimp consumption occurred during breakfast with at-home consumption being greater than for breakfast away-from-home consumption. Average shrimp consumption was 4.39 times per month for the 1,206 shrimp consumers who responded to this question.

Respondents were also asked where they purchased fish and shellfish products. Eighty-five percent of respondents shopped for seafood in restaurants, 84% purchased seafood at grocery stores, 24% purchased seafood at specialty stores (such as gourmet stores or fish markets), and 21% consumed seafood that was recreationally caught. This pattern differed significantly between shrimp consumers and nonconsumers. For instance, 27% of shrimp consumers purchased seafood at specialty stores, compared with 6% of nonconsumers; and 23% of shrimp consumers consumed

Table 3. Frequency of Shrimp Consumption by Meal and Location.

Level of consumption	Breakfast		Lunch		Dinner	
	Home	Away	Home	Away	Home	Away
	%	%	%	%	%	%
Daily	0.0	0.0	0.0	0.1	0.0	0.0
4-6 times per week	0.0	0.0	0.1	0.1	0.0	0.1
2-3 times per week	0.1	0.1	0.6	0.3	0.6	0.6
1 time per week	1.7	0.4	2.8	2.9	4.4	4.5
More than once a month but less than weekly	4.2	0.7	13.8	18.4	25.8	30.8
Infrequently (< 1 time per month)	7.4	5.9	28.2	41.8	40.5	45.9
Never	86.5	92.8	54.5	36.3	28.6	18.1

recreational catch, compared with 8% of nonconsumers. Shrimp consumers were also more likely to purchase seafood at restaurants (90% of shrimp consumers compared with 58% of nonconsumers) and grocery stores (87% of shrimp consumers compared with 63% of nonconsumers).

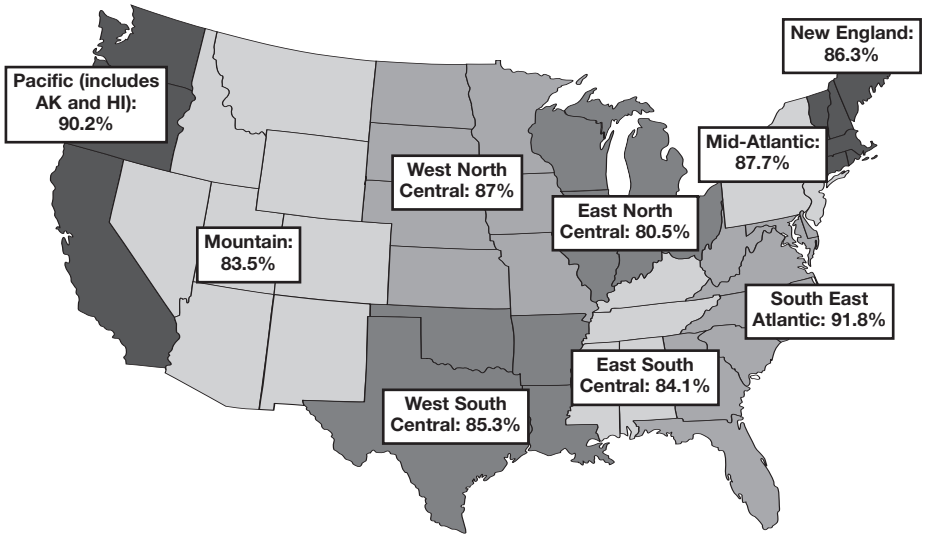

Figure 10. Regional Percentage of Respondents Consuming Marine Shrimp (Chi-square probability = 0.134).

Demographics for shrimp consumers versus nonconsumers are presented in Table 4. Shrimp consumption did not significantly vary by region of residence (Figure 10). Overall, 91.8% of the respondents from the South East Atlantic region consumed shrimp, compared with the low of 80.5% in the East North Central region. Other demographic variables that were significantly different between consumers and nonconsumers include income (Figure 11), age (Figure 12), and education (Figure 13). Higher shrimp consumption was reported among the $30,000-$49,999 and $50,000-$74,999 income groups (Figure 11). People over 35 years of age made up the majority of shrimp consumers (Figure 12), while 50% of shrimp consumers had college degrees (Figure 13). There was no difference in consumption or nonconsumption of shrimp based upon gender. Chi-squared tests of significance are included below each figure. Chi-square probabilities below 0.05 indicate dependence between the variables involved, and probabilities above 0.05 indicate independence between the variables. For example, in Figure 10, the chi-square probability of 0.134 is greater than 0.05 and therefore indicates shrimp consumption does not significantly differ among U.S. regions.

Table 4. Summary of Demographics Comparing Shrimp Consumers and Nonconsumers.

Demographic	Nonconsumers	Consumers	Demographic	Nonconsumers	Consumers
	%	%		%	%
Age of Respondent			**Region of Residence**		
Older than 65	37.0	23.1	New England	12.0	12.0
Between 55 and 65	21.4	20.9	Mid-Atlantic	9.4	10.6
Between 45 and 55	20.8	28.7	South East Atlantic	6.8	12.1
Between 35 and 45	14.6	20.3	East North Central	15.9	10.3
Under 35	6.3	7.0	East South Central	10.9	9.2
Gender			West North Central	12.0	12.8
Percent Male	44.3	41.4	West South Central	10.9	10.1
Household Income			Mountain	15.1	12.2
Less than $29,999	26.0	14.7	Pacific	7.3	10.7
Between $30,000 and $59,999	44.9	35.6	Lives within 50 Miles of Coast	30.2	33.7
Between $60,000 and $99,999	19.4	28.5	**Religion**		
$100,000 or More	9.7	21.0	Catholic	21.8	26.0
Education			Christian	55.7	57.6
High School or Less	37.0	19.6	Other	22.4	16.4
Some College	27.6	31.0	**Ethnicity**		
College Degree(s)	35.4	49.4	Caucasian	87.8	87.4

Seafood Safety

Consumers were asked to identify which of seven finfish (tuna, pollock, salmon, cod, catfish, flounder/sole, and halibut) and four shellfish (shrimp, clams, crabs, and oysters) products they felt were least and most safe to eat. Approximately 9.6% of shrimp consumers felt shrimp was the safest product, and 1.3% felt it was the least safe. Only 1.3% of nonconsumers felt shrimp was the safest product, and 7% thought shrimp was the least safe of the products. By comparison, 22% considered tuna safest, 37% considered oysters the least safe, and 10% considered clams the least safe. Overall, product safety concerns appear to be low for marine shrimp. Only 9% of nonconsumers and 3% of consumers indicated product safety concerns were a reason for not consuming shrimp (or not consuming more frequently).

Respondents were asked to identify whether food inspection and safety programs would increase consumption of seafood in general. Respondents were given basic descriptions of HACCP (Hazard Analysis of Critical Control Points), USDA visual inspection, and third party certification programs. Overall, 55% of respondents indicated government visual inspection would increase consumption, 41% indicated third-party certification would increase consumption, and 15% indicated HACCP would increase consumption. Some respondents indicated the programs would decrease consumption: 26% for HACCP, 8% for third-party certification, and 3% for government inspection.

Respondents were also asked to rate whether they preferred farm-raised or wild-harvested seafood for five different species (oysters, shrimp, salmon, tilapia, and catfish). Responses are shown in Figure 14. Regardless of species, the majority of people had no opinion. The opinions of shrimp consumers and nonconsumers were significantly different. Shrimp consumers were more likely to express an opinion on shrimp origin than nonconsumers, but most shrimp consumers were neutral and equal numbers of respondents were observed on levels of agreement and disagreement to the preference toward farm-raised or wild-caught shrimp (Figure 15).

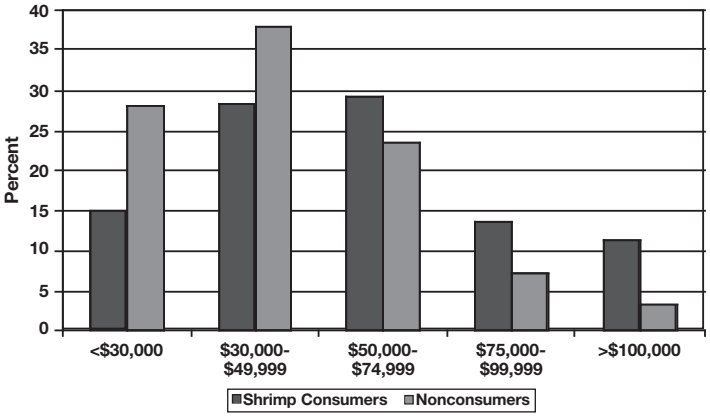

Figure 11: Percent of Respondents Who Consume Shrimp According to Household Income. (Chi-square probability = 0.001)

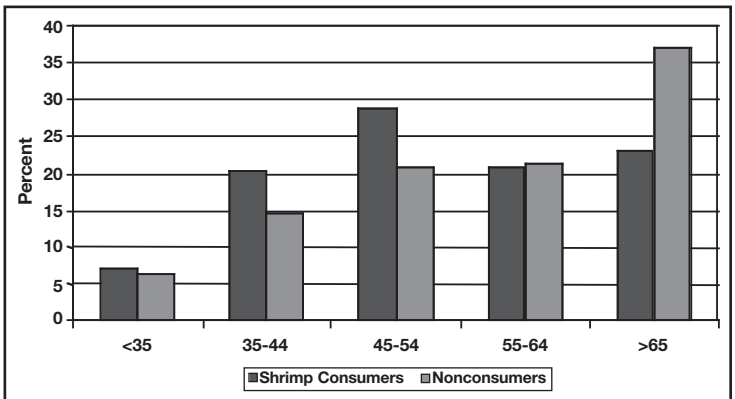

Figure 12. Percent of Respondents Who Consume Shrimp According to Age Category. (Chi-square probability = 0.001)

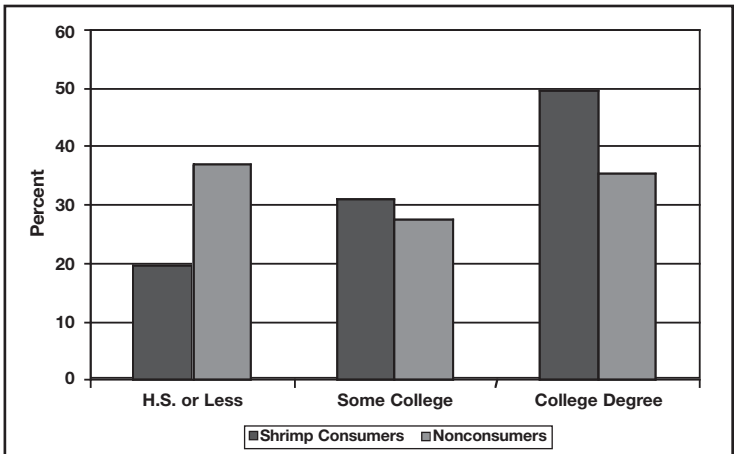

Figure 13. Percent of Respondents Who Consume Shrimp According to Education Level. (Chi-square probability = 0.001)

Reasons for Consumption and Nonconsumption

In addition to the frequency of consumption and the demographic variables, respondents were asked to identify reasons why they consume shrimp. Results from the 1,206 shrimp consumers who responded to this question are presented in Figure 16. Each respondent was asked to provide their top three reasons for consuming shrimp. More than 80% of consumers indicated that the principal reason for consuming shrimp was enjoyment of flavor. The second most common reason given for consuming shrimp was variety to the diet. This was followed by availability of fresh products and health/nutrition. Note that fewer respondents (10%) chose price as a reason for shrimp consumption compared with other reasons for consumption. This finding for price was in line with that found from oyster consumers (8%) who said price was a factor in their decision to consume oysters (Hanson et al., 2003). In contrast, 21% of catfish consumers cited price as a reason to consume catfish products (House et al., 2003).

Both consumers and nonconsumers were asked to identify the top reasons for either their lack of consumption or frequent consumption of shrimp (Figure 17). For nonconsumers, taste, smell, and texture were the top three reasons. Shrimp consumers gave substantially different responses, with price, lack of availability of fresh products, and lack of preparation knowledge being the top three reasons for not consuming shrimp more frequently.

Increasing Consumption

Respondents were asked to identify factors that might increase their consumption of shrimp. Choices included recipes, coupons, company quality guarantee, company safety guarantee, government safety inspection, nutritional information, doctor's recommendation, packaging (convenience/microwavable), availability of quality products, information on production processes, and lower prices. The percent of respondents who indicated these factors would increase consumption are presented in Figure 18. Overall, 27% of the

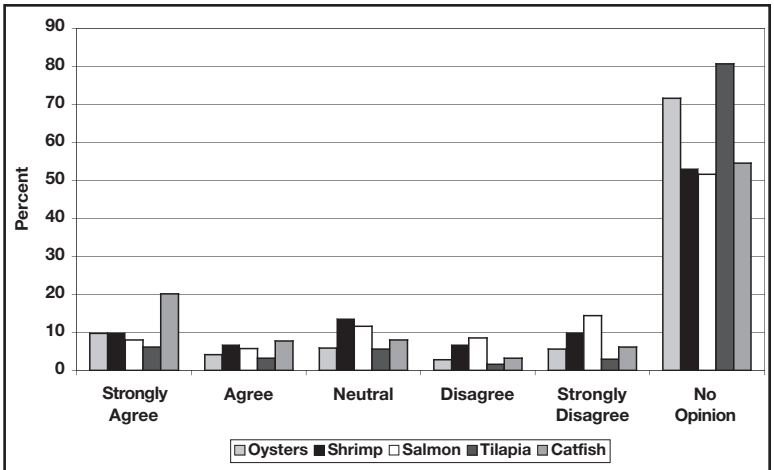

Figure 14. Level of Agreement with the Statement, "I Prefer Farm-Raised to Wild-Harvested _____."

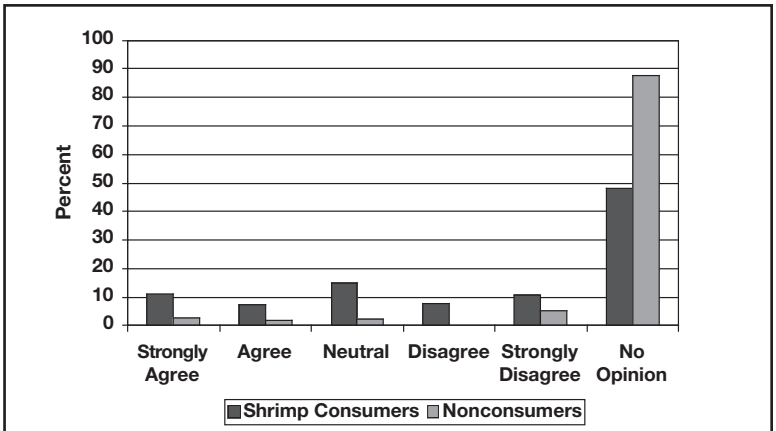

Figure 15. Comparison Between Shrimp Consumers and Nonconsumers Relative to the Level of Agreement with the Statement, "I Prefer Farm-Raised to Wild-Harvested Shrimp."

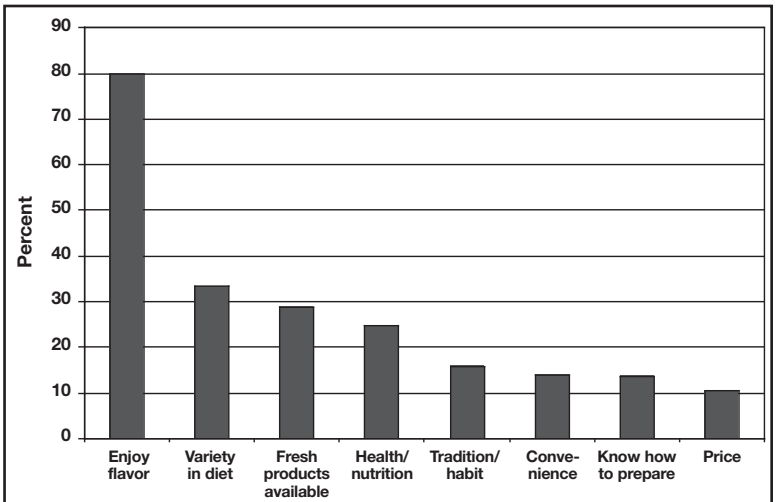

Figure 16. Comparison of Greatest Response to Reasons Why Shrimp Are Consumed (Only Shrimp Consumers are Reported).

respondents did not select any of the 11 factors, indicating none of these reasons would increase their consumption. As expected, those who did not consume shrimp were more likely to indicate nothing would increase consumption (76% of nonconsumers), compared with shrimp consumers (only 19% indicated nothing would increase consumption).

For shrimp consumers, the single most important factor that could lead to increased shrimp consumption was lower price. A second lower tier of factors that could increase consumption among consumers included coupons, availability of fresh products, government safety inspection programs, and recipes. Fifty percent of shrimp consumers indicating lack of preparation knowledge indicated recipes would increase their consumption, compared with only 17% of those that did not indicate lack of preparation knowledge. Of consumers who indicated price was a deterrent to consumption, 79% reconfirmed that a lower price would increase consumption, as opposed to only 34% who supported coupons. The majority (54%) of shrimp consumers who indicated lack of availability of fresh products as a reason for not consuming more frequently indicated the availability of fresh products would increase their consumption.

Another relationship was found in the information on food safety programs. Of the respondents who indicated the government safety inspection program would increase consumption of seafood in general (asked earlier in the survey), only 28% indicated that government safety inspection would increase their consumption of shrimp.

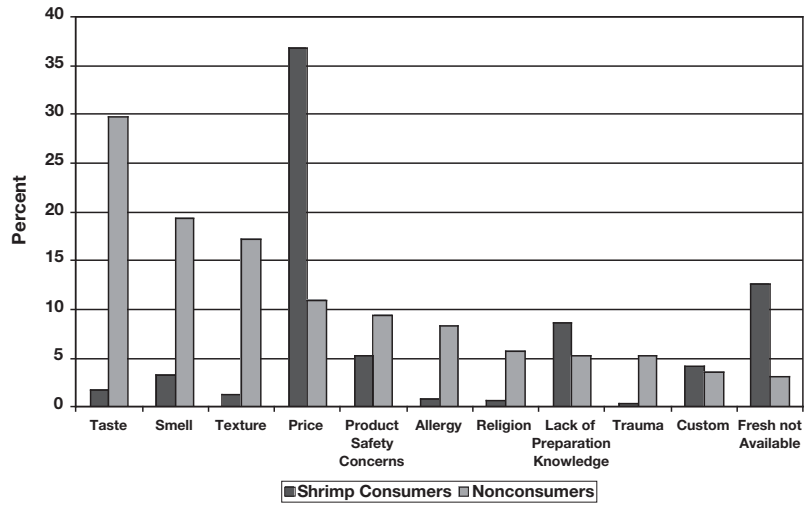

Figure 17: Categories of Greatest Response to Reasons Why Shrimp Are Not Consumed or Not Consumed More Frequently.

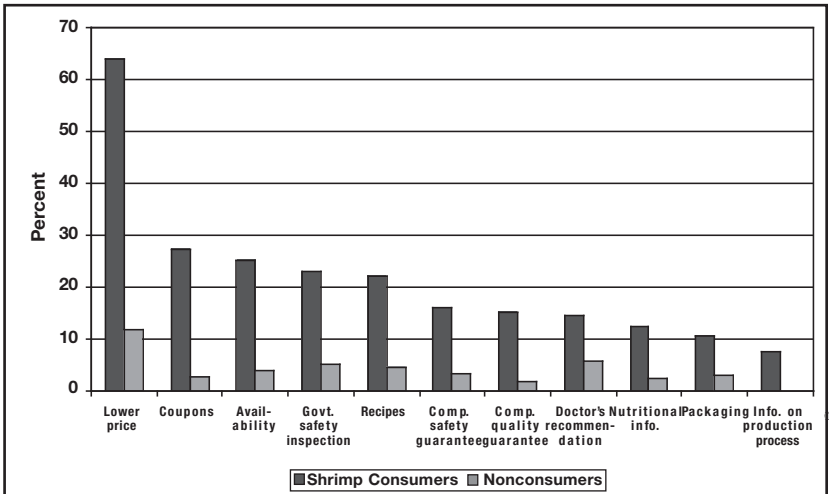

Figure 18. Factors that Respondents Indicated Would Increase Consumption of Shrimp.

CONCLUSIONS

The results of this survey can help to identify characteristics and opinions of shrimp consumers and nonconsumers that can be used to develop marketing segments and better understand consumer attitudes towards shrimp. Of a sample of 1,398 respondents to a nationwide mail survey on seafood consumption, 86% consumed shrimp at least occasionally. The average consumption rate of shrimp was 4.4 times per month among people who ate shrimp.

Consumers and nonconsumers appear to have significantly different reasons for consuming or not consuming shrimp. Targeting existing consumers for increased sales is called market penetration. Targeting nonconsumers for consumption is termed market development. This study gives some indication as to the challenges the shrimp industry faces pursuing both market penetration and development strategies.

For market penetration, the reasons given for eating shrimp (enjoyment of the flavor, variety to diet, and availability of fresh products) and the reasons for not consuming more shrimp (price, lack of availability of fresh product, lack of preparation knowledge) can be used in developing plans to increase shrimp sales. Consumers indicated a lower price would increase their frequency of consumption, but other factors, such as coupons, availability of fresh products, government safety inspection, and recipes also were indicated as factors that might increase consumption for at least 20% of consumers.

For market development, reasons given for not consuming shrimp (taste, texture and smell) must be overcome to increase the number of shrimp consumers. Nonconsumers listed flavor as the principal reason why they do not eat shrimp. Lack of preparation knowledge was also important. Overcoming the dislike of flavor attributes is a big challenge, and it may be less likely the industry can persuade nonconsumers to eat shrimp, as 76% of nonconsumers indicated nothing would increase their consumption of shrimp.

References

Hanson, T., L. House, S. Sureshwaran, B. Posadas, and A. Liu. 2003. "Opinions of U.S. Consumers Toward Oysters: Results of a 2000-2001 Survey." Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, MS. Bulletin 1133.

House, L., T. Hanson, S. Sureshwaran, and H. Selassie. 2003. "Opinions of U.S. Consumers About Catfish: Results of a 2000-2001 Survey." Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, MS. Bulletin 1134.

National Fisheries Institute. "U.S. Consumption of Seafood." http://www.nfi.org

Posadas, B.C. 2000a. "Economic Impact of Shrimp Harvesting, Processing and Distribution in Mississippi." Mississippi State University Coastal Research and Extension Center, Biloxi, Mississippi, June 2000. http://www.msstate.edu/dept/crec/publish/Shrimp99.ppt

Posadas, B.C. 2000b. "Relative Size of Mississippi Commercial Seafood Production." Mississippi State University Coastal Research and Extension Center, Biloxi, Mississippi, September 2000. http://msstate.edu/dept/crec/publish/Market99.ppt

Treece, G.D. 2000. "Shrimp Culture," In: Stickney, R. (Ed.) *Encyclopedia of Aquaculture*, John Wiley and Sons, Inc.: New York.

U.S. Department of Agriculture, Economic Research Service. 2002. "Aquaculture Outlook Report." October 10, 2002.

U.S. Department of Agriculture, Economic Research Service. 2005. "Aquaculture Outlook Report." March 29, 2005.

U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. 2001. "2000 Census of Population and Housing." http://www.census.gov/prod/cen2000/dp1/2kh00.pdf

U.S. Department of Commerce, Import Administration. http://www.ia.ita.doc.gov/.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fishery Service. "Annual Commercial Landing Statistics." http://www.st.nmfs.gov/st1/commercial /landings/annual_landings.html.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fishery Service. 1995. "Fisheries of the United States, 1995." Current Fishery Statistics No. 1995. Silver Springs, MD. http://www.st.nmfs.gov/st1/fus/fus95/index.html.

U.S. Department of Commerce, National Oceanic Atmospheric Administration, National Marine Fishery Service. "Fisheries of the United States, 2000." Current Fishery Statistics No. 2000. Silver Spring, MD, August 2001. http://www.st.nmfs.gov/commercial/index.html

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fishery Service. 2002. "Fisheries of the United States, 2001." Current Fishery Statistics No. 2001. Silver Springs, MD, September 2002.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fishery Service. 2004. "Fisheries of the United States, 2003." Current Fishery Statistics No. 2003. Silver Springs, MD, October 2004.

The World Almanac and Book of Facts, *1999,* World Almanac Books, Mahwah NJ.

Appendix I
Survey Instrument

2001 SURVEY OF U.S. FISH AND SEAFOOD CONSUMPTION

Conducted by

Dr. House and Dr. Hanson, Mississippi State University, Department of Agricultural Economics

and

Dr. Sureshwaran, South Carolina State University, Department of Agribusiness and Economics

NOTICE: Any information reported below is strictly confidential. This data will be used only by persons engaged in this survey, and will not be disclosed or released to others for any purpose.

This research is supported by grants from the USDA Higher Education and Mississippi-Alabama Sea Grant Programs and the survey was reviewed by Mississippi State University's Institutional Review Board of the Regulatory Compliance Office, docket number 99-297.

Directions: Please have the member of the household that usually decides what food you purchase fill out this survey. Refer to the following definitions to aid you when in doubt if the item is shellfish or finfish. Thank you in advance for taking the time to fill out this survey.

Definitions:

Shellfish: an aquatic animal with a shell (e.g., oyster, clam, mussel, crab, crawfish, lobster, and shrimp)
Finfish: a true fish as distinguished from a shellfish (e.g., cod, catfish, carp, trout, tilapia, tuna, bass, sole, flounder, haddock, perch, snapper, and salmon)

The following three charts will ask you to estimate the number of times you eat various kinds of meat for dinner, lunch, and breakfast. **AT-HOME** refers to eating food at home, or prepared at home. **AWAY-FROM-HOME** refers to eating food prepared by others (i.e., restaurants). In answering the following questions, refer to your average eating habits over the last three years.

1a. Please indicate how often you eat each of the following products for **BREAKFAST AT-HOME** by placing an **X** in the appropriate box.

	Daily	4-6 times weekly	2-3 times weekly	1 time per week	More than 1 time monthly, but less than weekly	Infrequently (less than once per month)	Never
Catfish							
Tuna							
Other finfish							
Shrimp							
Oysters							
Other shellfish							

1b. Please indicate how often you eat each of the following products for **BREAKFAST AWAY-FROM-HOME** by placing an **X** in the appropriate box.

	Daily	4-6 times weekly	2-3 times weekly	1 time per week	More than 1 time monthly, but less than weekly	Infrequently (less than once per month)	Never
Catfish							
Tuna							
Other finfish							
Shrimp							
Oysters							
Other shellfish							

1c. Please indicate how often you eat each of the following products for **LUNCH AT-HOME** by placing an **X** in the appropriate box.

	Daily	4-6 times weekly	2-3 times weekly	1 time per week	More than 1 time monthly, but less than weekly	Infrequently (less than once per month)	Never
Catfish							
Tuna							
Other finfish							
Shrimp							
Oysters							
Other shellfish							

1d. Please indicate how often you eat each of the following products for **LUNCH AWAY-FROM-HOME** by placing an **X** in the appropriate box.

	Daily	4-6 times weekly	2-3 times weekly	1 time per week	More than 1 time monthly, but less than weekly	Infrequently (less than once per month)	Never
Catfish							
Tuna							
Other finfish							
Shrimp							
Oysters							
Other shellfish							

1e. Please indicate how often you eat each of the following products for **DINNER AT-HOME** by placing an **X** in the appropriate box.

	Daily	4-6 times weekly	2-3 times weekly	1 time per week	More than 1 time monthly, but less than weekly	Infrequently (less than once per month)	Never
Catfish							
Tuna							
Other finfish							
Shrimp							
Oysters							
Other shellfish							

1f. Please indicate how often you eat each of the following products for **DINNER AWAY-FROM-HOME** by placing an **X** in the appropriate box.

	Daily	4-6 times weekly	2-3 times weekly	1 time per week	More than 1 time monthly, but less than weekly	Infrequently (less than once per month)	Never
Catfish							
Tuna							
Other finfish							
Shrimp							
Oysters							
Other shellfish							

2. What percentage of the fish (shellfish or finfish) you consume is from: (For example, if you purchase fish from a restaurant half of the time and from a grocery store the other half of the time, your answer would be 50% Grocery Store or Supermarket and 50% restaurant. All answers should total 100%.)

_____ Grocery Store or Supermarket
_____ Restaurant
_____ Recreational Catch
_____ Fish peddler or roadside vendor
_____ Gourmet Specialty Store
_____ Fish Farm
_____ Fish or Seafood Market
_____ Don't Purchase Fish

3. Are you currently aware of any government safety inspections for fish?
☐ YES ☐ NO

4. Have you ever heard the phrase "HACCP"? ☐ YES ☐ NO
If yes, how does "HACCP" affect your consumption of fish?
☐ Increases ☐ Decreases ☐ No Effect

5. Have you ever consumed farm-raised catfish? ☐ YES ☐ NO
If YES, would you consume it again? ☐ YES ☐ NO
If NO, would you consider consuming farm-raised catfish? ☐ YES ☐ NO

6. Have you ever consumed farm-raised oysters? ☐ YES ☐ NO
If YES, would you consume it again? ☐ YES ☐ NO
If NO, would you consider consuming farm-raised oysters? ☐ YES ☐ NO

7. What product forms (fresh fillets, fresh nuggets, . . . frozen fillets, frozen nuggets, etc.) of catfish do you normally purchase for home consumption? Check all that apply.

☐ **Fresh**
☐ Fillets
☐ Nuggets
☐ Steaks
☐ Strips
☐ Whole (without head)
☐ Other (Write-in)
_____

☐ **Frozen**
☐ Fillets
☐ Nuggets
☐ Steaks
☐ Strips
☐ Whole (without head)
☐ Other (Write-in)
_____

☐ **No home consumption**

8a. In your opinion, which of the following is the **SAFEST** shellfish or finfish product to eat? Please mark one.

☐ Tuna ☐ Shrimp ☐ Pollock ☐ Salmon ☐ Cod
☐ Catfish ☐ Clams ☐ Crabs ☐ Flounder/Sole ☐ Halibut
☐ Oyster ☐ No Opinion

8b. In your opinion, which of the following is the **LEAST SAFE** shellfish or finfish product to eat? Please mark one.

☐ Tuna ☐ Shrimp ☐ Pollock ☐ Salmon ☐ Cod
☐ Catfish ☐ Clams ☐ Crabs ☐ Flounder/Sole ☐ Halibut
☐ Oyster ☐ No Opinion

9. In your opinion, from which growing **REGION** do the **SAFEST** oyster products come from?

☐ Pacific Northwest ☐ Gulf of Mexico ☐ Chesapeake Bay
☐ New England ☐ Southeast Atlantic ☐ Mid-Atlantic
☐ No Opinion

10a. The following statements are descriptions of three possible food inspection and safety programs. Please indicate by placing an **X** in the box whether a program as described would increase, have no effect on, or decrease the amount of fish or shellfish you eat.

Plan	Program Description	Increase	No Effect	Decrease
A	Food companies are legally required to maintain their own food safety program using detailed record keeping procedures.			
B	Food companies are legally required to have government agencies visually inspect along with taste tests. If the plant receives a passing grade, their product is labeled with a uniform product safety seal.			
C	A private, independent third party is hired to monitor the food company and determine if the product is safe for consumption and if the plant is operating under sanitary conditions.			

10b. If only one of the above three plans were used to ensure fish or shellfish safety, which plan would you prefer?

☐ **Plan A** ☐ **Plan B** ☐ **Plan C**

11a. Each of the following treatments can be used to kill bacteria and viruses that may be present in raw oysters. Each treatment works equally well and provides a safer oyster without causing any difference in taste and texture. Please indicate whether Treatments A, B, C, and D would increase, have no effect on, or decrease the amount of oysters you eat.

Plan	Program Description	Increase	No Effect	Decrease
A	A process of flushing bacteria and viruses from the oyster with purified water.			
B	A process of exposing oysters to an indirect energy source.			
C	A process of exposing oysters to a direct light energy.			
D	A process of placing oysters in an extremely high pressure			

11b. If only one of the above four plans were used to ensure oyster safety, which plan would you prefer?

☐ **Plan A** ☐ **Plan B** ☐ **Plan C** ☐ **Plan D**

11c. If you chose one of the above processes for ensuring a safe raw oyster product, how much more than the initial raw oyster price would you be willing to pay for a guaranteed safe raw oyster?

$_____ per individual oyster.

12a.The following is a description of a finfish that can be farm-raised in the United States. After reading the description, please indicate whether or not you would be willing to purchase this product:

Fillets have a firm texture with a mild, slightly nutty flavor. Fillets are guaranteed boneless and lack the fishy odor associated with some fish products. Because the fish is farm-raised, fresh product is available year-round and is raised in a quality-controlled environment with stringent control measures (including taste testing).

12b. **I would purchase this fish:**

☐ **Strongly Agree** ☐ **Agree** ☐ **Neutral** ☐ **Disagree** ☐ **Strongly Disagree** ☐ **No Opinion**

If AGREE or STRONGLY AGREE: For boneless fillets, I would be willing to pay $_____/pound (See below for typical meat and fish prices).

Typical prices for other products are: Ground Beef $1.49/lb; Catfish $3.99/lb; Boneless Chicken Breasts $5.99/lb; Salmon Fillets $7.99/lb; Steak $10.99/lb; Shrimp $9.99/lb

13. For each product, please **rank up to the top three reasons (1,2,3)** you **EAT** the product. If you do not eat the product, leave the column blank.

	Enjoy flavor	Health/nutrition	Tradition/habit	Price	Availability	Farm-raised	Convenience	Product safety	Religion	Variety in diet	Know how to prepare	Aphrodisiac properties
Catfish												
Tuna												
Shrimp												
Oyster												

14. For each product, please **rank up to the top three reasons (1,2,3)** you **DO NOT EAT** more of, or do not eat any of the product.

	Price	Fresh products not available	Custom	Religion	Lack of preparation knowledge	Too time consuming to prepare	Don't like texture	Don't like smell	Don't like taste	Traumatic experience	Concerned about product safety	Allergy	Vegetarian	Health and/or nutrition	Only farm-raised is available
Catfish															
Tuna															
Shrimp															
Oyster															

15. Please indicate how you feel about the following statement for the following products. Circle the number which agrees with your preference using 1 as "Strongly Agree" to 5 being "Strongly Disagree" or Zero (0) as "No Opinion."

I prefer farm-raised to wild harvested **Catfish**: 1 2 3 4 5 0
I prefer farm-raised to wild harvested **Tilapia**: 1 2 3 4 5 0
I prefer farm-raised to wild harvested **Salmon**: 1 2 3 4 5 0
I prefer farm-raised to wild harvested **Oysters**: 1 2 3 4 5 0
I prefer farm-raised to wild harvested **Shrimp**: 1 2 3 4 5 0

16. Which of the following would **INCREASE** your consumption of (place an **X** in all boxes that apply):

	Recipes	Coupons	Company quality guarantees	Nutritional information	Doctor's recommendations (diet program)	Packaging (microwavable/convenience)	Availability of quality products	Information on production process	Company safety guarantee	Government safety inspection	Lower price
Catfish											
Tuna											
Shrimp											
Oyster											

17. Do you reside in a:
- ☐ Large Metropolitan area (City) population greater than 100,000 people
- ☐ City with a population less than 100,000 people
- ☐ Small Town with a population less than 10,000 people
- ☐ Rural Area

18. What is your zip code? _____

19. How close do you currently live to a coastal area? (Check one)
_____ Within 0-10 miles _____ 50-100 miles
_____ 10-50 miles _____ > 100 miles

20. What is the closest you have ever lived (including all prior residences) to a coastal area?
_____ Within 0-10 miles _____ 50-100 miles
_____ 10-50 miles _____ > 100 miles

21. In what year were you born? _____

22. What is your gender? ☐ Male ☐ Female

23. Please indicate the number of members in your household in each age group including yourself.

_____0-10 years _____11-20 years _____21-40 years
_____41-60 years _____ 61 years or above

24. What is the highest level of education you have achieved?

☐ Less than High School
☐ High school diploma or GED
☐ Some college
☐ Completed 2-year college degree
☐ Completed 4-year degree (B.A. or B.S.)
☐ Education beyond B.A. or B.S.

25. What is your current level of household income?

☐ Less than $9,999 ☐ $10,000-19,999 ☐ $20,000-29,999
☐ $30,000-39,999 ☐ $40,000-49,999 ☐ $50,000-59,999
☐ $60,000-74,999 ☐ $75,000-99,999 ☐ $100,000-124,999
☐ $125,000 and above

26. Please indicate your religious affiliation.

☐ Catholic ☐ Jewish ☐ Muslim ☐ Buddhist
☐ Christian (Not Catholic) ☐ Hindu
Other _____

27. Which of the following groups represents your ethnic background?

☐ Black/African American ☐ Caucasian
☐ Native American ☐ Asian or Pacific Islander
☐ Hispanic ☐ Other

We would like to thank you for your time in completing this survey. Please return the survey in the enclosed postage paid envelope. If you have any questions about the survey, please contact us at (662) 325-7988.

Mississippi State University

Printed on Recycled Paper