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Opinions of U.S. Consumers toward Oysters: Results of a 2000-2001 Survey

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Introduction

Shellfish products are enjoyed by Americans and include several animals, such as clams, crabs, crawfish, lobsters, mussels, scallops, oysters, shrimp, and other products. Overall per capita shellfish, fresh and frozen, consumption in the United States has increased from 3.4 pounds in 1989 to 4.7 pounds in 2000 (USDC, 2001; Figure 1). During the same time period, per capita consumption of oysters has decreased from an average of 0.29 pounds per year in 1989 to 0.21 pounds in 1999, with a recent increase in 2000 to 0.24 pounds (Figure 2).

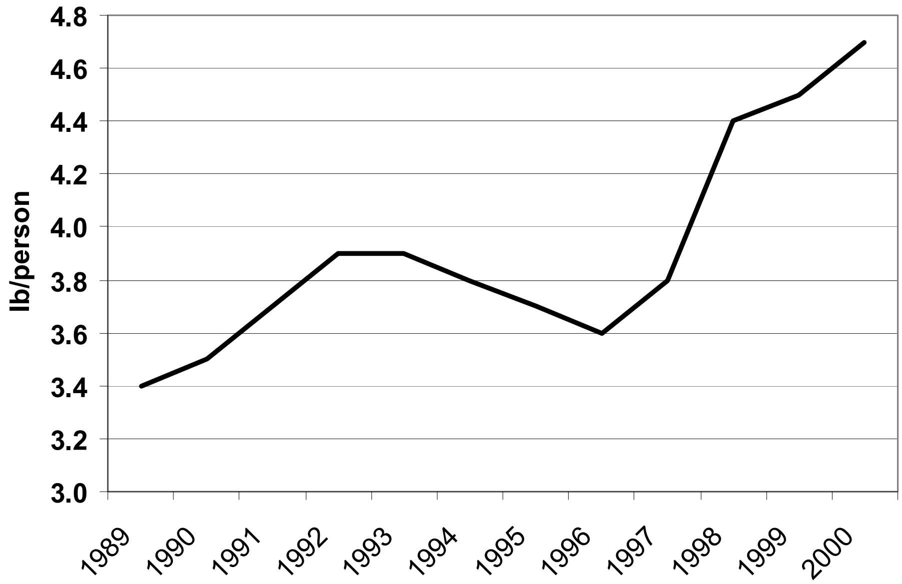
U.S. oyster landings in 2000 amounted to 41.1 million pounds of meat valued at $90.7 million. The Gulf of Mexico accounted for 27.5 million pounds of oyster meat, 67% of the national total. Among the Gulf States, oyster landings were greatest in Louisiana with 47% of the total in 2000, followed by Texas (25%), Mississippi (14%), Florida (10%), and Alabama (3%). The amount and value of oysters processed in Mississippi have varied over time (Figure 3). Nonetheless oyster products still make an important contribution to the economy of coastal Mississippi and neighboring States in the Gulf of Mexico.

An understanding of why consumers increase or decrease their purchase and consumption of oyster products is important. Food safety is a factor often attributed to the decrease in consumption of oysters. A 1993 news release reported a multi-state outbreak of viral gastroenteritis related to consumption of oysters in Louisiana, Maryland, Mississippi, and North Carolina (CDC, 1993). In 1998, bacterially tainted oysters from Texas were identified as the cause of sickness for 368 people, and during the preceding summer, 209 lab-confirmed cases of illnesses were linked to raw oysters harvested in the Pacific Northwest (ABC News, 1998). The Center for Science in the Public Interest has asked FDA "…to take immediate action to protect consumers from raw oysters contaminated with deadly bacteria…" (CSPI, 2000). They cite 36 deaths in the prior two years and 119 deaths since 1989 associated raw oysters and other shellfish contaminated with *Vibrio vulnificus*. In 1995, 31% of the respondents to a University of Florida study considered raw oysters “not at all safe” compared to only a 9% rate for a similar study conducted 5 years earlier (Billups, 2001).

Although food safety is suspected of being a major factor in decisions to consume raw oysters, other factors may be involved. Regional and national oyster consumption can be affected by many determinants that may vary across geographical region, ethnicity, income levels, and perceptions of nutrition. In 2000 and 2001, Mississippi State University, with support from the Mississippi-Alabama Sea Grant and the United States Department of Agriculture Higher Education Program, administered a survey to U.S. residents on the topic of seafood consumption. Information on consumer perceptions of oysters obtained from this survey is summarized in this report.

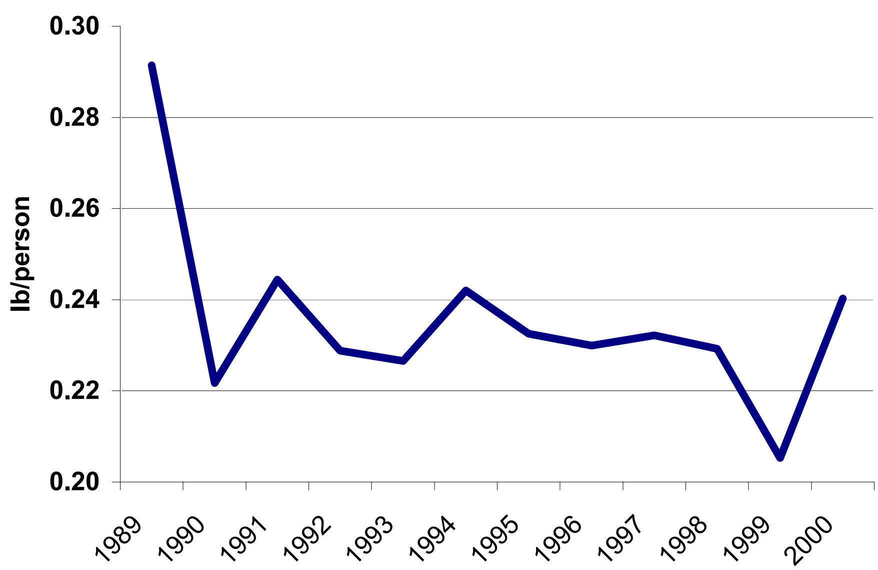
The results from the 2000-2001 survey described in this paper should be very interesting and useful to the oyster industry, government agencies, and seafood retailers/marketers for a variety of reasons. One important use of these results would be as a guide for sellers to use in targeting consumers who are most likely to increase their oyster consumption. A second area of interest is oyster purification methods that consumers are most willing to accept, the amount they would be pay for purified oysters, and the methods effect on consumer's total oyster consumption. Another use of these results is the knowledge gained about food safety considerations and programs that consumers feel are safest and most likely to trust when purchases from a grocery or restaurant is considered.

Figure 1. Per Capita Fresh Shellfish Consumption in the United States



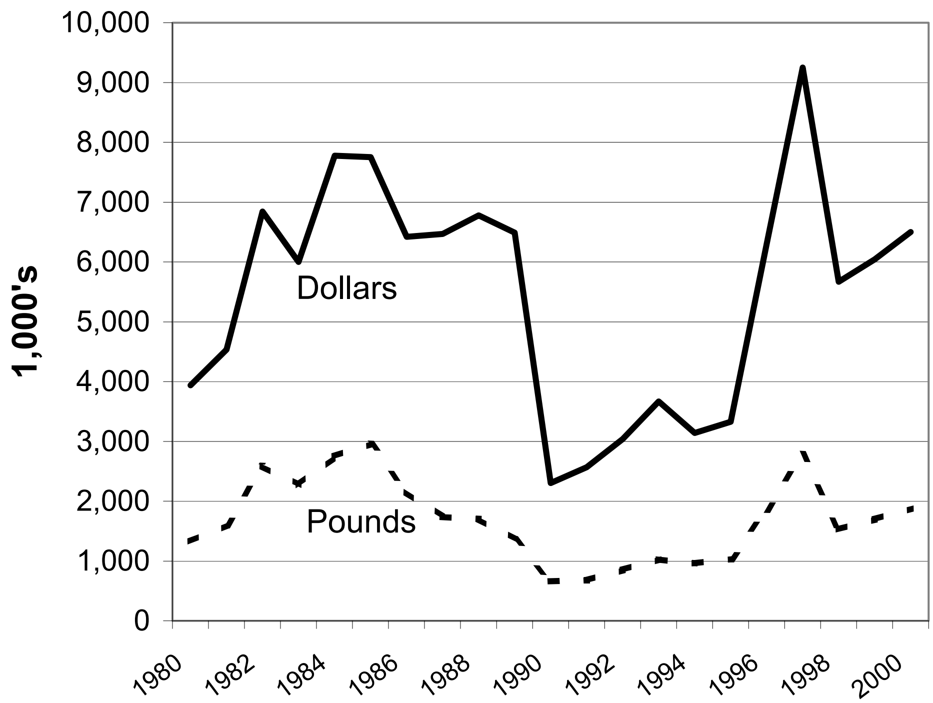
Source: USDA, ERS (1999)

Figure 2. Per Capita Consumption of Oysters, U.S.



Source: NOAA, NMFS Fisheries of the U.S., 2000 (August 2001)

Figure 3. Pounds and value of oysters processed in Mississippi, 1980 - 2000.



Source: NMFS, Fisheries Statistics and Economic Division, Silver Springs, MD.

Data and Procedures

The data for this study were obtained through 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 census regions. The stratified sample was chosen as region is expected to be a significant determinant of both the choice to consume and the choice of how often to consume oysters. The surveys were mailed in late 2000 and early 2001, if households did not return the first, a second copy of the survey was sent. A return total of 1,790 surveys or 20.1% (after accounting for returned surveys) was returned. Of these responses, 1,376 responded (15.5%) to the questions regarding consumption of oysters. The information obtained from these 1,376 responses is summarized in this report. Overall, 43% of the 1,376 respondents indicated that they consumed oysters.

The demographic data collected indicated that the response rate per region was comparable (Table 1), ranging from 139 usable responses from the Mid-Atlantic region to 176 responses from the West North Central region. Responses did appear to be biased towards Caucasians, with 84.1% of the respondents indicating they were Caucasian, 3.1% Black or African-American, 2.0% Asian, 1.8% Hispanic, and 5.3% other (3.7% of the respondents did not answer this question). The 2000 U.S. Census indicates that approximately 75% of the U.S. population is Caucasian, 12.5% of Hispanic origin, 12.3% of Black or African-American, and 3.6% Asian.

Table 1. Region of Residence of Survey Respondents

Region of Residence	States Included in Region	Number of Respondents	% of Survey Respondents who live in each Region
New England	Maine, Rhode Island, New Hampshire, Massachusetts, Vermont, Connecticut	164	11.9
Mid-Atlantic	Pennsylvania, New York, New Jersey	139	10.1
Southeast Atlantic	Florida, Georgia, North Carolina, South Carolina, West Virginia, Virginia, Maryland, Delaware, Washington D.C.	153	11.1
East North Central	Ohio, Indiana, Illinois, Michigan, Wisconsin	153	11.1
East South Central	Kentucky, Mississippi, Tennessee, Alabama	133	9.7
West North Central	Iowa, Minnesota, South Dakota, North Dakota, Missouri, Kansas, Nebraska	176	12.8
West South Central	Texas, Oklahoma, Arkansas, Louisiana	140	10.2
Mountain	Nevada, New Mexico, Arizona, Utah, Wyoming, Colorado, Montana, Idaho	175	12.7
Pacific	Alaska, Hawaii, California, Oregon, Washington	143	10.4

As shown in Figure 4, respondents to this survey also tended to be older than the population average. Considering only the U.S. population above the age of 25 years, 53% of the adult population in the U.S. is above the age of 45, compared to 74% of the respondents to the survey. Figure 5 is a comparison of household income for survey respondents compared 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 do. The mean income of survey respondents fell in the $50,000 - $59,999 category compared to an U.S. mean income of $42,148. Additionally, respondents to the survey tended to have higher education, with 47.7% of the survey sample having some form of college degree compared to 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. Our survey results indicated 83% were Christian with 25% Catholic and 3% practicing Judaism.

Figure 4. Comparison of U.S. population and Survey Respondents by Age

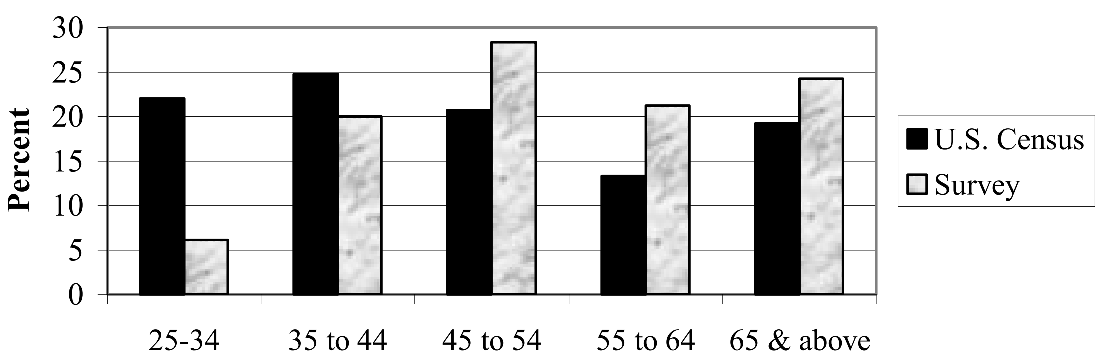
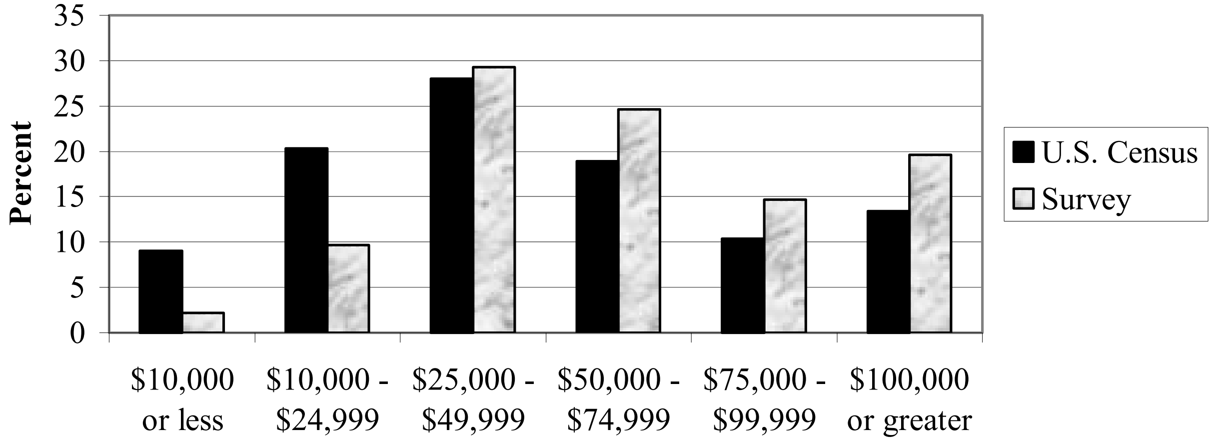


Figure 5. Comparison of U.S. Population and Survey Respondents by Household Income



Results

Oyster Consumption

Consumers were asked to identify how often they consumed oysters both at-home and away-from-home for each meal: breakfast, lunch, and dinner. Table 2 shows the frequency a consumer eats oysters for each of the mentioned meals. Average consumption of the 593 oyster consumers was 2.55 times per month.

Table 2. Frequency of Consumption of Oysters[1]

Level of Consumption	Breakfast		Lunch		Dinner	
	At-home	Away-from-home	At-home	Away-from-home	At-home	Away-from-home
2-3 times per week[2]	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%
1 time per week	0.4%	0.1%	0.7%	0.9%	0.9%	1.2%
More than once a month but less than weekly	1.5%	0.2%	3.5%	4.2%	4.9%	8.1%
Infrequently (< 1 time per month)	5.9%	2.4%	13.7%	19.2%	21.2%	26.2%
Never	92.2%	97.2%	82.1%	75.7%	73.0%	64.4%

[1]n=1,376 respondents, values indicate percent of respondents who indicated the level of consumption for the meal occasion.
[2]There were no respondents who answered daily or 4-6 times/week consumption of oysters for any meal occasion.

Demographics for oyster consumers versus non-consumers are presented in Table 3. Oyster consumption did vary by region of residence, with consumers in the East and West South Central regions of the United States most likely to consume oysters (Figure 6). Overall, 56% of the respondents from the East South Central region consumed oysters, compared to the low of 28% in the East North Central region. Other demographic variables that significantly differed between consumers and non-consumers include gender (Figure 7), income level (Figure 8), and education level (Figure 6). More of the male respondents reported to have consumed oysters, Figure 7. Higher oyster consumption was reported among the lowest ($10,000 or less) and highest ($100,000 or greater) income groups, Figure 8. Oyster consumption tended to be higher among respondents who received higher educational attainment, Figure 9. (Chi-squared tests on significance are included below each table. Chi-square probabilities below 0.05 indicate a significant difference in the variables. For example, in Figure 6, the chi-square probability of 0.001 indicates oyster consumption is significantly different in the different regions.)

Table 3. Summary of demographics Comparing Oyster Consumers to Non-Consumers

	Oyster Non-Consumers (%)	Oyster Consumers (%)
Age of Respondent		
Greater than 65	24.0	26.6
Between 50 and 65	33.8	36.3
Between 35 and 50	34.7	30.9
Under 35	7.4	6.2
Gender		
Percent Male	54.4	65.0
Household Income		
Less than $29,999	25.3	22.9
Between $30,000 and $59,999	34.7	30.7
Between $60,000 and $99,999	25.7	24.3
$100,000 or greater	14.3	22.1
Region of Residence		
New England	13.3	10.1
Mid-Atlantic	10.3	9.8
Southeast Atlantic	9.2	13.7
East North Central	14.2	7.1
East South Central	7.4	12.6
West North Central	14.3	10.8
West South Central	8.2	12.8
Mountain	13.4	11.8
Pacific	9.7	11.3
Lives within 50 miles of Coast	33.3	31.9
Religion		
Catholic	25.5	25.1
Christian	57.8	58.2
Other	16.7	16.7
Ethnicity		
Caucasian	88.3	86.1
Non-Caucasian	11.7	13.9
Education		
High School or less	23.8	18.7
Some College	30.7	30.7
College degree(s)	45.6	50.6

Figure 6: Regional Percentage of Respondents Consuming Oysters (Chi-square probability = 0.001).

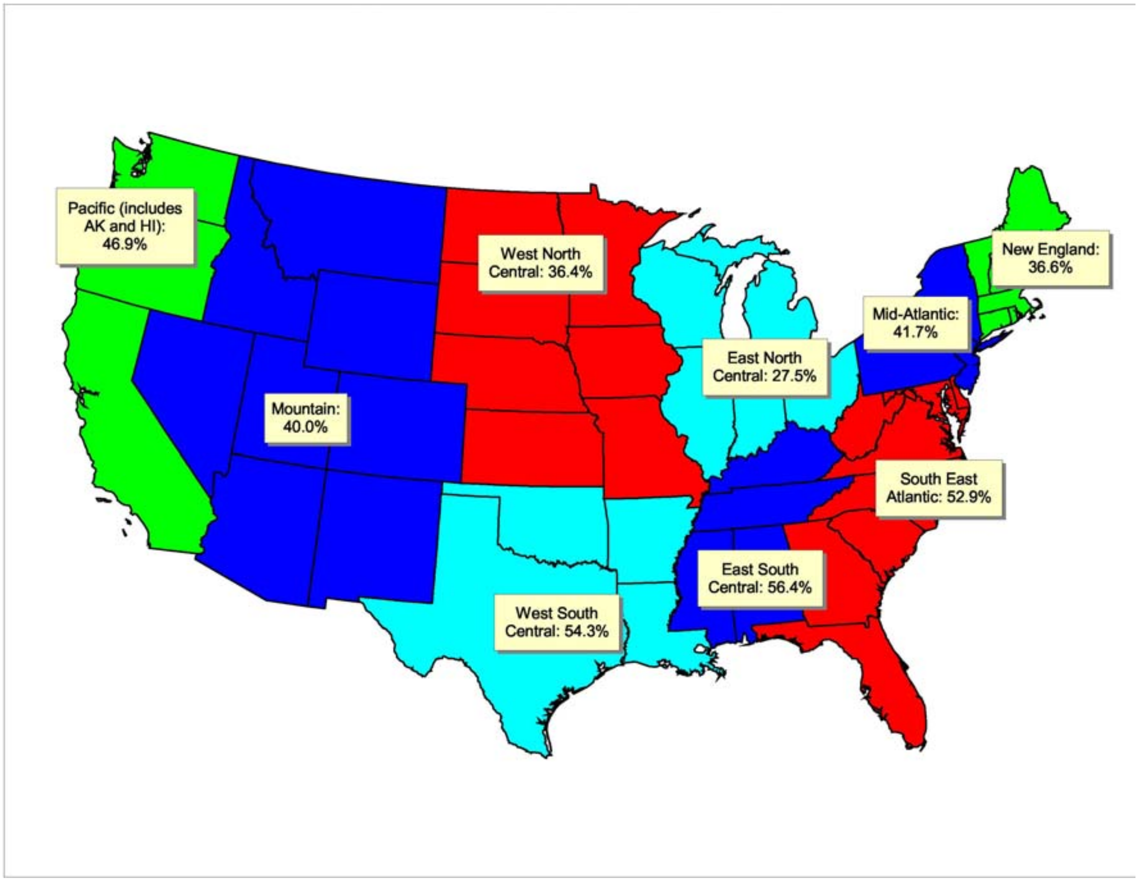
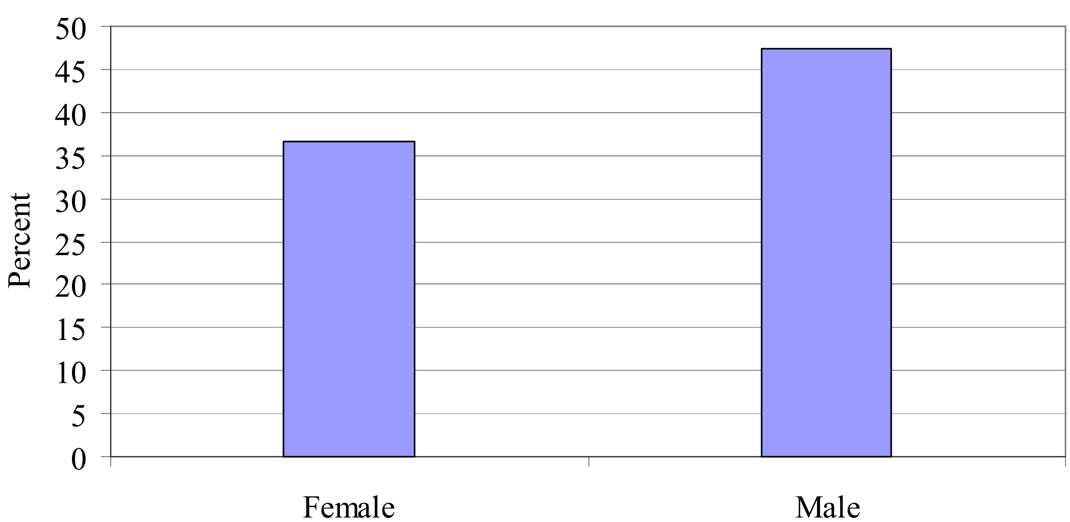
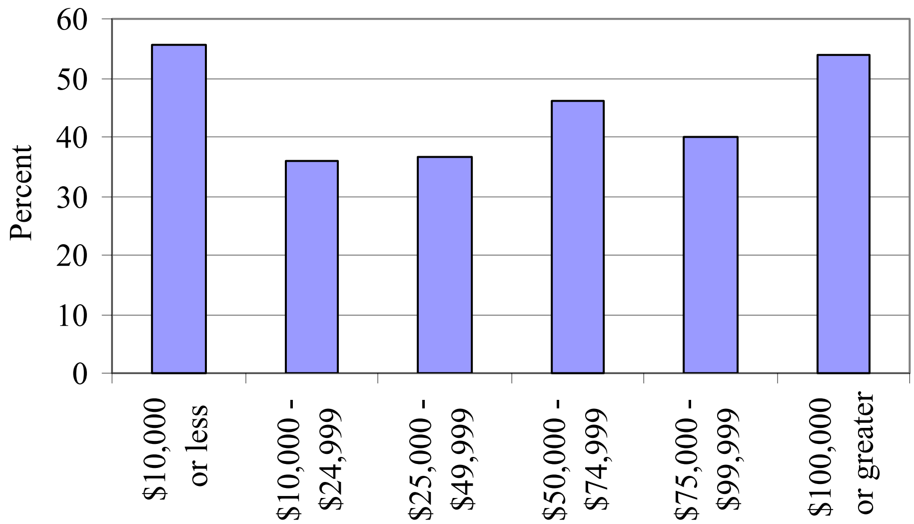


Figure 7. Gender Percentage of Respondents Consuming Oysters[a].



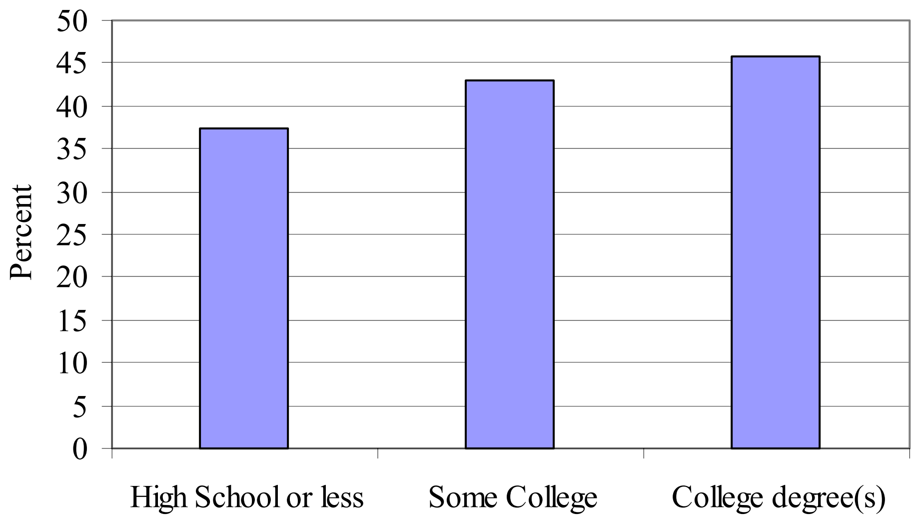
[a] Chi-square probability = 0.001.

Figure 8. Percent of Individuals Who Consume Oysters According to Income Level[a]



[a] Chi-square probability = 0.001.

Figure 9. Percent of Individuals Who Consume Oysters According to Education Attainment[a]



[a] Chi-square probability = 0.057.

Farm-Raised Seafood

Eastern oysters are primarily grown from the Gulf of St. Lawrence in Canada to the Gulf of Mexico and the Pacific oyster grown along the western coast of the United States. Most cultivated or farm-raised oysters are grown in the Western U.S. coastal states of Washington, Oregon, California, and Alaska. The second and third most important regions of oyster cultivation are the northeastern U.S. states of Massachusetts and Maine, and the southern states, primarily Chesapeake Bay. In the U.S., 45% of all oysters consumed are cultured (USDC, 2000; Wallace, 2001; USDA/NASS, 2000).

Respondents were asked if they had ever consumed farm-raised oysters, as well as their opinions about these oysters. Only 27.4% of oyster consumers were aware they had eaten farm-raised oysters, but of those people, over 95% indicated they would eat farm-raised oysters again. Of the oyster consumers who had not eaten, or were not aware they had eaten, farm-raised oysters, over 76% indicated they would be willing to consume farm-raised oysters. A noteworthy fact is that 18.4% of the people who indicated they did not consume oysters also indicated they would consume farm-raised oysters.

Respondents were also asked to rate whether they preferred farm-raised to wild-harvested seafood for five different species (oysters, shrimp, salmon, tilapia, and catfish). Responses are shown in Figure 10. Regardless of species, the majority of people had no opinion, particularly in regards to oysters and tilapia. The opinions of oyster consumers and non-consumers were significantly different, as oyster consumers were more likely to express an opinion on oysters (Figure 11).

Figure 10. Level of Agreement with Statement "I prefer farm-raised to wild harvested _______"

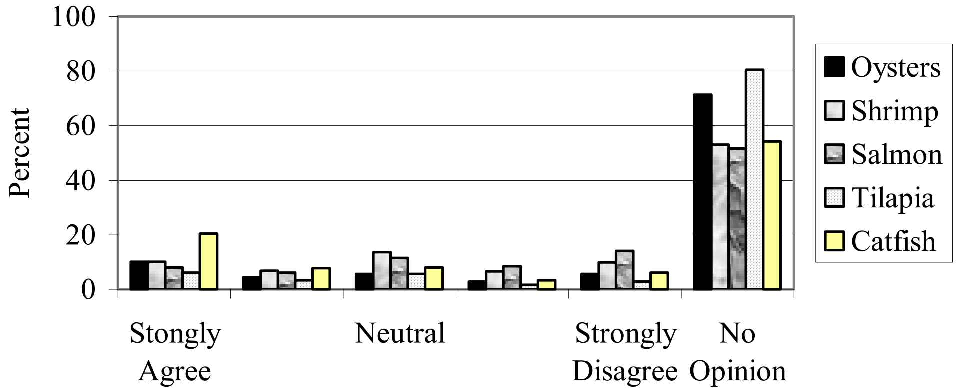
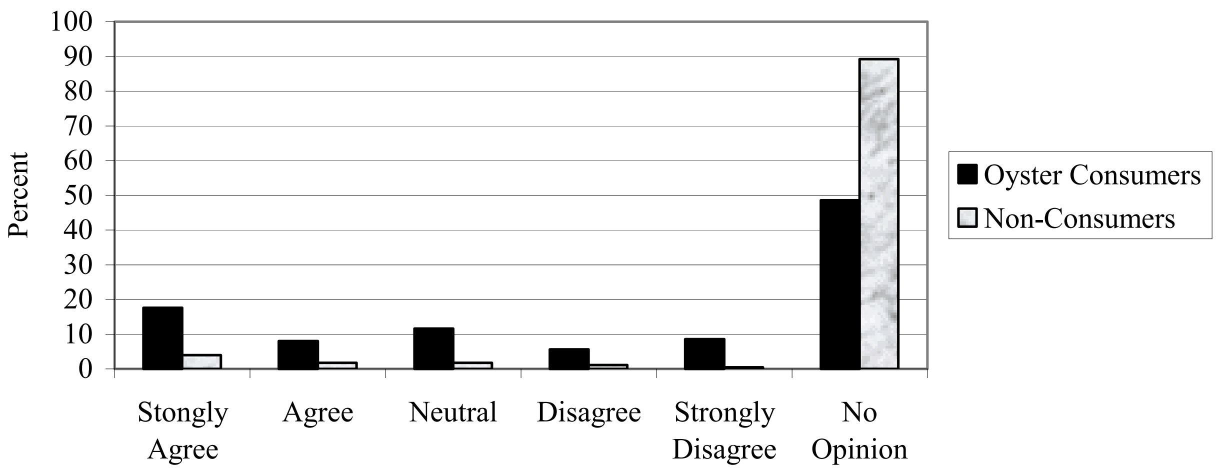


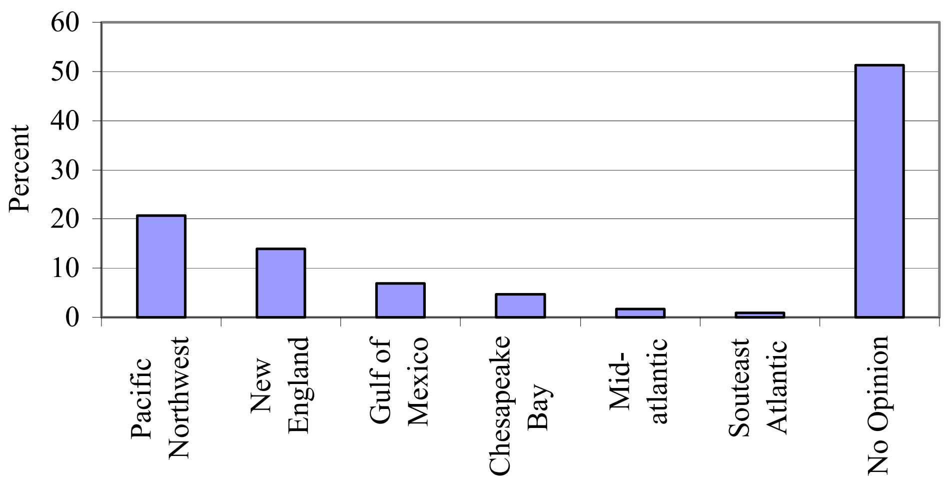
Figure 11. Comparison between Oyster Consumers and Non-consumers Relative to the Level of Agreement with Statement "I prefer farm-raised to wild harvested oysters."



Source of Supply of Oysters

Respondents were asked to identify a region where they believed the safest oyster products came from. Their choices were the: Pacific Northwest; Gulf of Mexico; Chesapeake Bay; New England; Southeast Atlantic; Mid-Atlantic; and No Opinion. The majority of respondents (65%) indicated they had no opinion; however, 51% of oyster consumers had no opinion compared to 76% of non-consumers. The majority of oyster consumers with an opinion about the safest region of supply, selected the Pacific Northwest followed by New England (Figure 12) and this response was influenced by region of residence. For example, 42% of oyster consumers from the Pacific region believed the Pacific Northwest was the safest source of supply (51% no opinion) whereas 22% of oyster consumers from the New England region believed New England was the safest source (57% no opinion). Over 70% of consumers from the East and West North Central regions had no opinion on the safest source of supply.

Figure 12. Region Believed by Oyster Consumers to Produce the Safest Oysters.



Reasons for Consumption and Non-Consumption

In addition to the frequency of consumption and the demographic variables, respondents were asked to identify reasons for their consumption of oysters. Results from the 483 oyster consumers who responded to this question are presented in Figure 13. As indicated by more than 80% of consumers, the principal reason among the top three reasons for consuming oysters was enjoyment of flavor (Figure 13). Next was variety to their diet, followed by availability of fresh products.

Both consumers and non-consumers were asked to identify the top reasons for either their lack of consumption or frequent consumption of oysters (Figure 14). For non-consumers, taste, texture and smell were the top three reasons. Consumers gave significantly different responses, price, followed by product safety concerns and unavailability of fresh products were the top three reasons.

Figure 13. Categories of Greatest Response to Reasons Why Oysters are Consumed

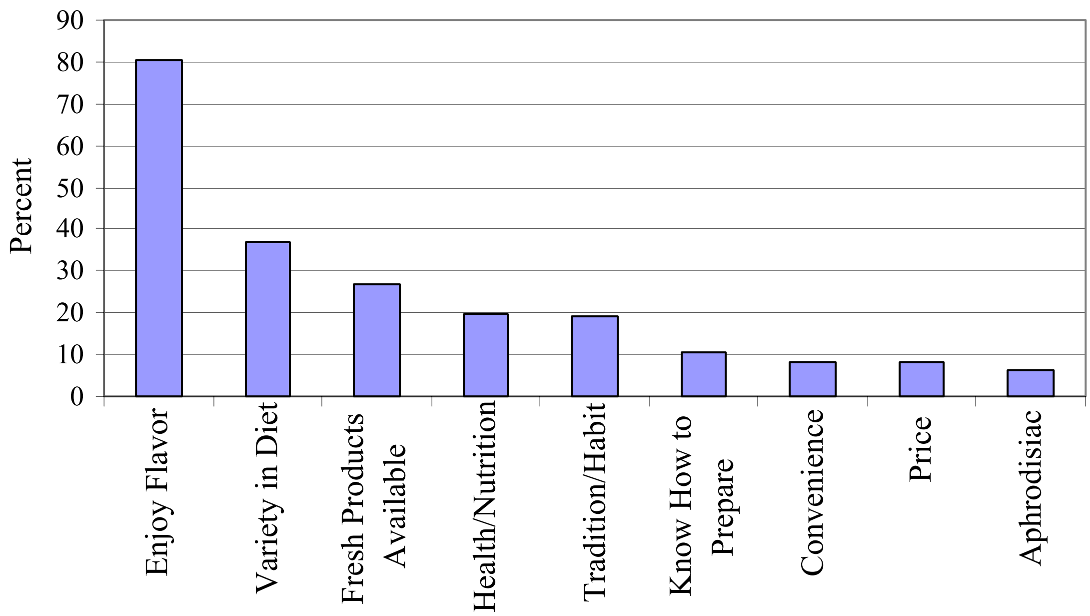
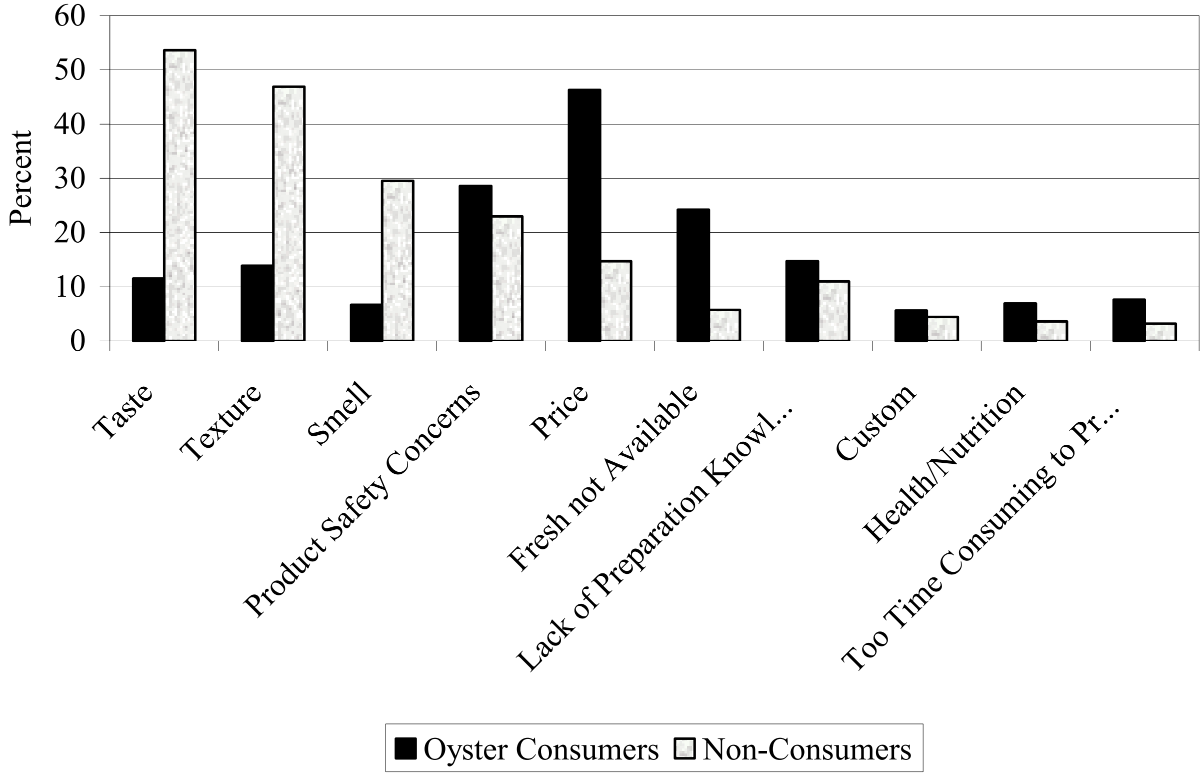


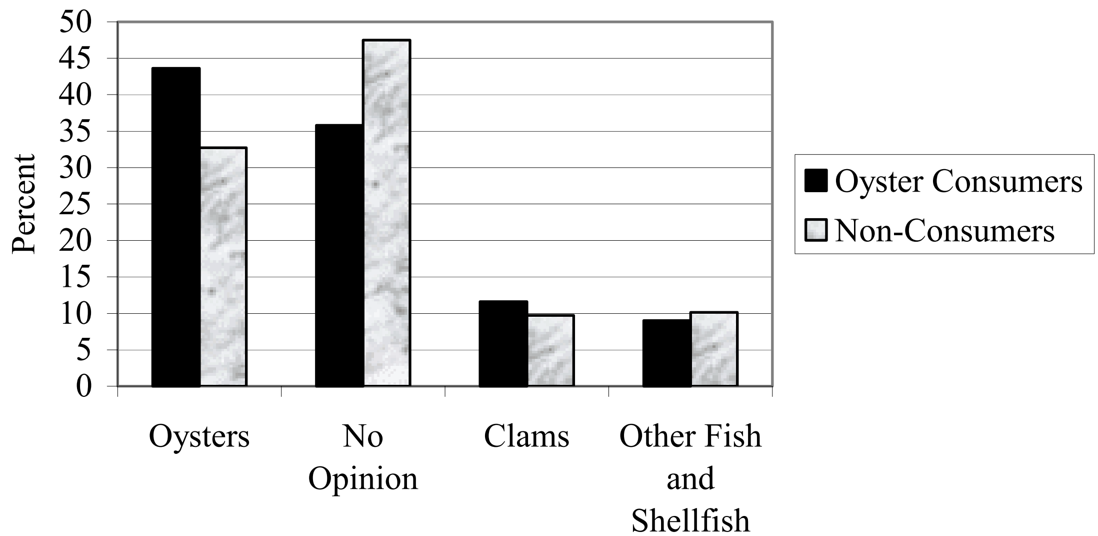
Figure 14: Categories of Greatest Response to Reasons Why Oysters are Not Consumed or Not Consumed More Frequently.



Product Safety Concerns

Product safety was a concern, with 23% of non-consumers indicating product safety concerns prevented them from eating oysters and 29% of consumers indicating they ate oysters less frequently due to these concerns (Figure 14). Respondents were also asked to identify which fish or shellfish product they considered to be the safest and least safe of all fish and shellfish products. The responses further emphasize consumer concerns about oyster safety. Of the 1,210 consumers who responded to the question, 36% had no opinion, over 22% considered tuna safest, and only 1 (<0.01%) consumer considered oysters the safest. Of the 1,283 consumers who answered the question about which product was considered the least safe, 43% had no opinion. Oysters were considered to be the least safe of all seafood products by over 37% of the respondents, followed by clams at 10%. Concern about oyster safety was significantly different between consumers and non-consumers (Figure 15), with approximately 44% of consumers rating oysters as the least safe product compared to only 33% of non-consumers. Apparently, consumers know and accept the risk oysters pose to their health.

Figure 15. Response to Question Asking Respondents to Identify Least Safe Seafood Product



[a] Chi-square probability = 0.001.

In an attempt to learn more about respondent's perceptions of safety, consumers were asked to rate four potential oyster post harvest treatment methods to increase their confidence in the safety of oysters. These safety treatments were described in lay terms to avoid potential confusion or bias derived from the name of the process (i.e. consumers may form an opinion about the process of irradiation based on the name containing the word radiation). The four treatments were as follows: Plan A –depuration; Plan B – ozonation; Plan C – irradiation; and Plan D – pressurization (Appendix 1).

The following is the question from the survey:

"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 or texture. Please indicate whether treatments A, B, C, or 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.			

The responses of consumers versus non-consumers to this question are significantly different. Results are presented in Figure 16. Additionally, the responses to this question were significantly different for consumers who had indicated that product safety was one of the top three reasons they did not eat oysters, or did not eat oysters more frequently (Figure 17). Overall, oyster consumers were most supportive of the depuration process, with 43.6% of all oyster consumers and 53.5% of oyster consumers who indicated safety was a concern responding that depuration would increase their consumption of oysters. More non-consumers of oysters indicated they would decrease consumption as a result of ozonation and irradiation than those who said these programs might increase their probability of consumption. More than 10% of oyster consumers said ozonation and irradiation would decrease consumption. When asked to select one of the four plans, 61% of the 962 respondents chose depuration, 16% selected pressurization, 12% selected ozonation, and 9% selected irradiation.

Respondents were also asked to identify the amount they would be willing to pay for a guaranteed safe oyster produced through the safety plan they preferred. Those who indicated a preference for one of the four plans indicated a willingness to pay a mean of $0.30/oyster, range of $0 to $9.99/oyster, above the initial raw oyster price. Approximately 36% of those who indicated a preference for one of the four plans indicated they were not willing to pay any additional amount above the initial raw oyster price for this plan (a value of $0), 13%, 10% and 10% indicated they would pay $0.10, $0.25, and $1.00 more per oyster, respectively. Table 4 shows the amount consumers were willing to pay based on the guaranteed oyster treatment program they selected.

Figure 16. Estimated Effect of Oyster Treatment Programs on Consumption of Oysters.

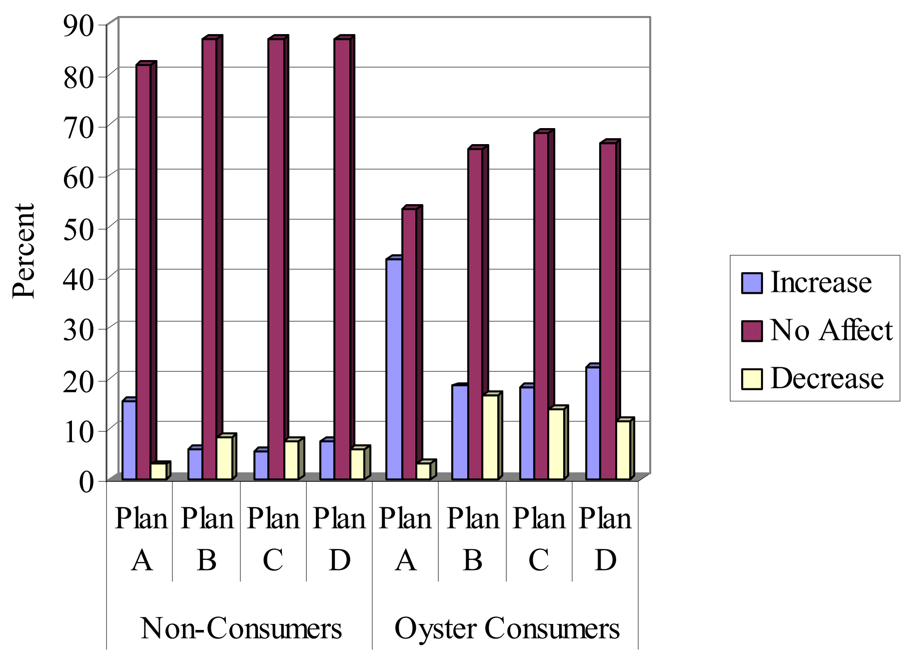


Figure 17. Estimated Effect of Oyster Treatment Programs on Consumption of Oysters for Respondents Who Indicated Product Safety was a Deterrent to Consumption (n = 260-270)

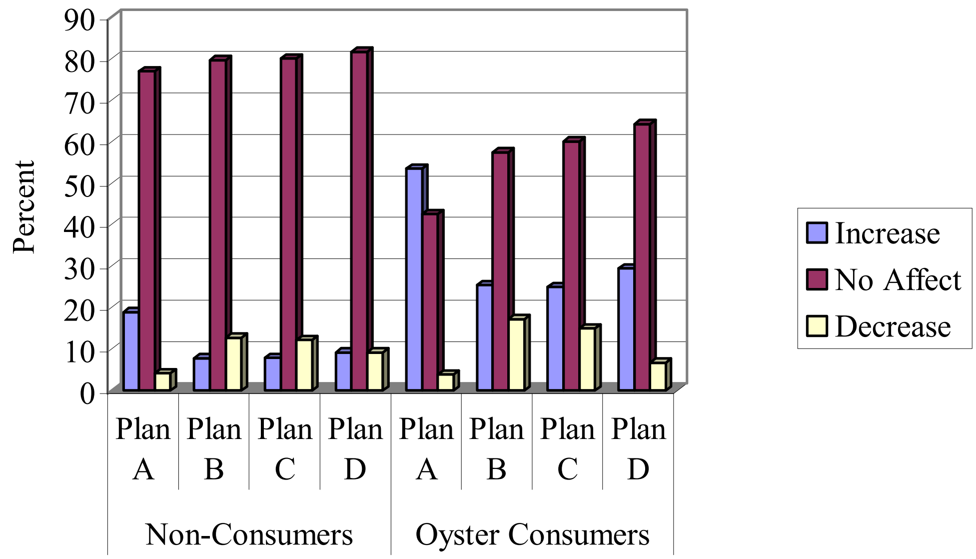


Table 4. Willingness to pay for preferred oyster safety treatment program that would guarantee a safe oyster product.

Treatment	Number who Preferred Plan	Willingness to Pay Per Oyster /1						
		Mean	$0.00	$0.10 or less	$0.11 - $0.25	$0.26 - $0.50	$0.50 - $1.00	> $1.00
Depuration	391	$0.34	34%	23%	15%	12%	13%	4%
Ozonation	84	$0.25	37%	24%	14%	17%	5%	4%
Irradiation	65	$0.18	38%	32%	18%	2%	8%	2%
Pressurization	95	$0.29	42%	22%	15%	5%	14%	2%

* Chi-Square probability = 0.09

/1 This willingness to pay amount is in addition to the initial raw oyster price.

To further learn about consumer perceptions of seafood safety, respondents were asked if they were currently aware of any governmental inspection programs for seafood and HACCP (hazard analysis of critical control points). Overall, 30% indicated that they were aware of current government safety inspections for fish, while only 6% indicated awareness of HACCP. Of those aware of HACCP, 61% indicated it had no effect on their seafood consumption, 17% indicated it increased consumption and 22% indicated it decreased consumption. Oyster consumers were significantly (chi-square probability = 0.004) more likely to believe there was a government safety inspection program (34% of oyster consumers and 27% of non-consumers believed there was inspection).

Respondents were also asked to indicate if any of three possible seafood inspection and safety programs would increase, have no effect on, or decrease consumption of seafood. These three programs were described in lay terms and were designed to represent: HACCP, the old USDA visual meat (beef and pork) inspection system, and third party certification. Results are presented in Table 5. Plan B, government visual inspection, was most likely to increase seafood consumption with 55% of the respondents indicating this type of seafood inspection program would increase their consumption, compared to 41% for third party certification and 15% for HACCP. HACCP was most likely to decrease seafood consumption with 26% indicating this type of seafood inspection program would decrease consumption, compared to 8% for third party certification and 3% for government inspection. Respondents who believed oysters were the least safe of all seafood products and respondents who indicated product safety was a reason for not eating oysters (or not eating oysters more frequently) were significantly more likely to indicate government inspection and third party certification plans would increase consumption and that HACCP would decrease consumption. Keep in mind that only 6% of respondents indicated an awareness of HACCP so while the latter result is true the meaning may not be indicative of people knowledgeable of this program.

Table 5. Effect of safety programs on seafood consumption.

Plan as described in survey	Increase	No Affect	Decrease
Food companies are legally required to maintain their own food safety program using detailed record keeping procedures.	14%	59%	26%
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.	55%	43%	3%
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.	41%	51%	8%

Increasing Consumption

Respondents were asked to identify factors that might increase their consumption of oysters. 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, 53% of the respondents did not select any of the eleven factors, indicating none of the above reasons would increase their consumption. As expected, those who did not consume oysters were more likely to indicate nothing could increase consumption (76% of non-consumers) compared to oyster consumers (only 22% indicated nothing could increase consumption). The likelihood of factors (reasons) indicating nothing could increase consumption of oysters was also significantly tied to the reasons for not increasing consumption of oysters (Table 6).

Figure 18. Factors that respondents indicated would increase consumption of oysters.

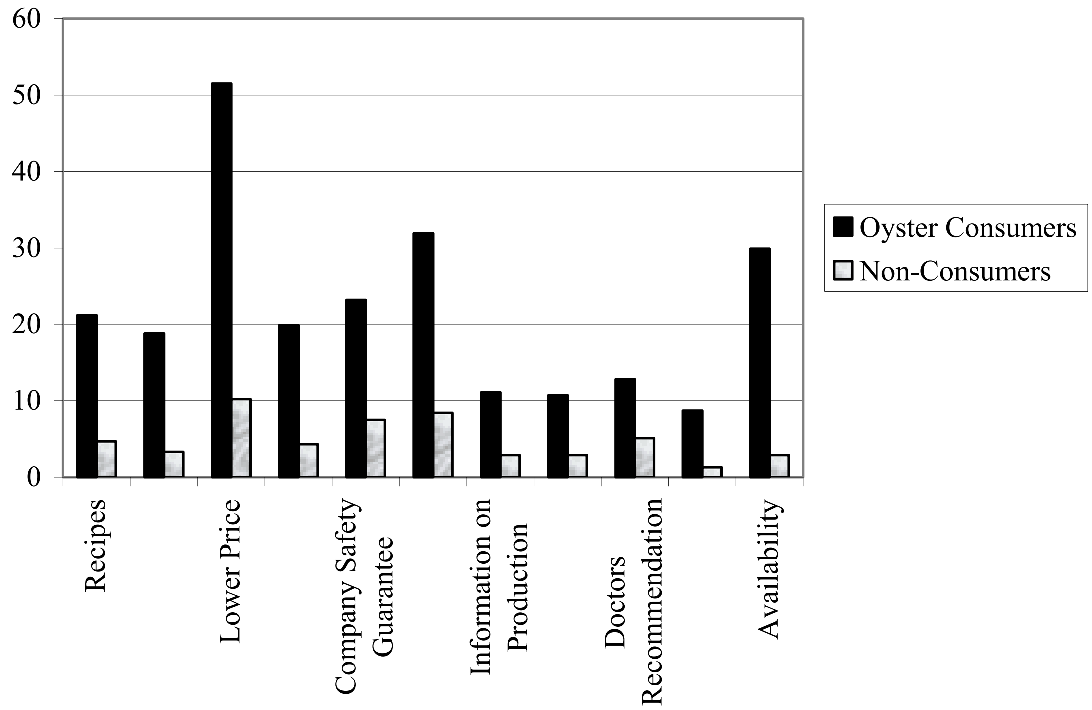


Table 6. Relationship between reasons for not consuming oysters and indicating factors that would increase consumption of oysters.

	Likelihood anything would:	
Reason for Not Consuming Oysters	NOT increase consumption	Increase consumption
Taste	47%	10%
Texture	40%	13%
Smell	26%	6%
Product Safety	15%	27%
Price	8%	39%
Lack of fresh products available	4%	19%
Lack of preparation knowledge	7%	14%
No Custom	3%	5%
Nutrition/Health	2%	6%
Too time consuming to prepare	2%	7%

As can be observed from table 6, those who indicated taste and texture as reasons for not consuming (or not increasing consumption of) oysters were less likely to be convinced to increase their oyster consumption than those who indicated their reason for not consuming oysters was price, product safety, and lack of fresh products available. More relationships between these variables exist. For example, of those who indicated product safety as a reason for not consuming oysters, 38% indicated government safety inspection, 32% indicated company safety guarantee, and 19% indicated company quality guarantee would increase consumption of oysters. These numbers increase when oyster consumers are exclusively considered. Among oyster consumers who indicated product safety as a reason for not consuming oysters more frequently, 57% indicated government inspection, 43% indicated company safety and 30% indicated company quality guarantees would increase consumption.

Factors that can lead to increased oyster consumption are recipes, coupons, and lower prices. A majority (54%) of oyster consumers citing lack of knowledge of preparation stated that the availability of recipes would increase their consumption. Of consumers who indicated price reduced consumption, 75% reconfirmed that a lower price would increase consumption, as opposed to 27% who supported coupons. The majority (61%) of oyster consumers who indicated lack of availability of fresh products as a reason for not consuming more frequently indicated availability of fresh products would increase their consumption.

Another relationship was found concerning information on food safety programs. Of those respondents who indicated the government safety inspection program would increase consumption of seafood in general (asked earlier in the survey), only 25% indicated that government safety inspection would increase their consumption of oysters.

Conclusions

The results of this survey identified characteristics and opinions of oyster consumers and non-consumers that can be used to develop marketing segments and understand better consumer attitudes towards oysters. Of a sample of 1,376 respondents to a nationwide mail survey on seafood consumption, 43% consumed oysters at least occasionally. The average oyster consumer ate oysters 2.6 times per month. This bulletin provides a summary of the data collected and can be used to provide general directions, but not specific recommendations, as further econometric analysis is needed to establish specific recommendations. Another potential limitation of use of this report is that respondents to the survey were mainly seafood consumers. As indicated previously, respondents were also slightly older and wealthier than U.S. averages, as well as more educated than the national average. Although most respondents were seafood consumers, we believe this to not to be a major limitation because only 43% of the respondents ate oysters. The limitations of the data do not warrant a conclusion that 43% of the U.S. population eats oysters, however, general statements about the differences and preferences of oyster consumer and non-consumers can be obtained with this sample.

Results of an econometric study (House, Hanson and Sureshwaran) indicate that there are statistically significant differences among the reasons why people choose to eat oysters and the reasons why oyster consumers choose how often to eat oysters. For this reason, this study divides the data into consumers of oysters and non-consumers and examines their characteristics. Targeting existing consumers for increased sales is called market penetration while targeting non-consumers for consumption is termed market development. This study provides guidance toward addressing the challenges confronted by the oyster industry that is pursuing both market penetration and development to increase sales.

Reasons for eating oysters included enjoyment of the flavor (80% of consumers) and addition of variety to their diet (37%). Oyster consumers identified the main reasons for not consuming oysters more often as price (38%), product safety (29%), and lack of availability of fresh product (20%). People who indicate product safety and lack of fresh product are likely concerned about the same underlying reason, i.e. the safety of the oyster product. Enhancing product safety appears to be an important need to improve their image among oyster consumers. Approximately 44% of oyster consumers rated oysters as the least safe of all seafood products when offered the choice of 4 shellfish and 8 finfish products.

The possibility of using a process such as depuration to increase consumer confidence in oysters was examined. Overall, 43% of oyster consumers in total and 54% of those concerned about product safety indicated their consumption of oysters would increase if depuration was used as a method to increase the safety of oysters. In response to additional inquiries, 61% of the 635 respondents stated a preference for the depuration cleansing process and indicated a mean willingness to pay of an additional $0.34 per oyster. The oyster industry may be able to increase the perception of safety through implementation of a program of depuration and thereby pay for the program through higher selling prices. This would be profitable if the depuration costs do not exceed the increase in cost that the consumer is willing to pay. Consumers did not indicate a preference or non-preference for farm-raised (cultivated) oysters, nor did they indicate that a cultured oyster product is a reason to consume oysters or consume oysters less frequently. Further research could be conducted to determine if consumers would perceive cultured oysters to be safer with certain advertising messages. If depuration efforts were associated with cultured oysters, consumers could possibly be educated to view cultured oysters as a safer oyster product.

Finally, consumers were asked what would increase their consumption of oysters. Respondents who indicated price, product safety and lack of availability of fresh products were most likely to indicate that there were factors that could increase consumption. As expected, consumers indicated a lower price would increase their frequency of consumption, but other factors, such as government safety inspection, availability of fresh products, and company safety and quality guarantees also were indicated as factors that might increase consumption for at least 20% of consumers. Again, the importance of perception of a fresh, safe product is emphasized.

Non-consumers had different reasons for not consuming oysters, mainly taste, texture and smell, followed by product safety concerns. As flavor is the most important reason consumers ate oysters, it appears to be the biggest reason why non-consumers do not eat oysters. Although product safety is again important, it is unlikely the industry could persuade non-consumers to eat oysters through the same methods as those used to convince oyster consumers to eat more frequently.

Changing non-consumer perceptions of taste, smell and texture is likely more difficult to achieve than perceptions of safety or price. In focus groups, non-consumers who focused on taste, texture, and smell generally had very strong negative reactions to discussing oysters. These results suggest that the industry should focus expansion activities on those who currently eat oysters. Additionally, identifying characteristics about the demographics of oyster consumers might provide insight into the types of people who will likely be future oyster consumers and the regions from where they will come. For instance, larger percentages of consumers were in the South East Atlantic, East South Central and West South Central regions of the United States, suggesting that these regions may be fertile grounds to target advertising (particularly of cleansing methods (depuration) that produce a safe oyster product). Oyster consumption also increased with education and in the number of males compared to females.

These characteristics could be targeted in a promotional campaign.

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APPENDIX 1. Survey Instrument

2001 SURVEY OF U.S. FISH AND SEAFOOD CONSUMPTION

Conducted by:
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and
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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 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 3 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?
9 YES 9 NO

4. Have you ever heard the phrase AHACCP@? 9 YES 9 NO
If yes, how does AHACCP@ affect your consumption of fish?
9 Increases 9 Decreases 9 No Affect

5. Have you ever consumed farm-raised catfish? 9 YES 9 NO
If YES, would you consume it again? 9 YES 9 NO
If NO, would you consider consuming farm-raised catfish? 9 YES 9 NO

6. Have you ever consumed farm-raised oysters? 9 YES 9 NO

If YES, would you consume it again? 9 YES 9 NO

If NO, would you consider consuming farm-raised oysters? 9 YES 9 NO

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

9 **Fresh**	9 **Frozen**	9**No home consumption**
9 Fillets	9 Fillets	
9 Nuggets	9 Nuggets	
9 Steaks	9 Steaks	
9 Strips	9 Strips	
9 Whole (without head)	9 Whole (without head)	
9 Other (Write-in)	9 Other (Write-in)	
____________	____________	

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

9 Tuna	9 Shrimp	9 Pollock	9 Salmon	9 Cod
9 Catfish	9 Clams	9 Crabs	9 Flounder/Sole	9 Halibut
9 Oyster	9 No Opinion			

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

9 Tuna	9 Shrimp	9 Pollock	9 Salmon	9 Cod
9 Catfish	9 Clams	9 Crabs	9 Flounder/Sole	9 Halibut
9 Oyster	9 No Opinion			

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

9 Pacific Northwest	9 Gulf of Mexico	9 Chesapeake Bay
9 New England	9 Southeast Atlantic	9 Mid-Atlantic
9 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 Affect	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?

9 **Plan A** 9 **Plan B** 9 **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 Affect	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?

9 **Plan A** 9 **Plan B** 9 **Plan C** 9 **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: 9 Strongly Agree 9 Agree 9 Neutral 9 Disagree 9 Strongly Disagree 9 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 **<u>EAT</u>** 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 recommendation (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:
    - 9 Large Metropolitan area (City) population greater than 100,000 people
    - 9 City with a population less than 100,000 people
    - 9 Small Town with a population less than 10,000 people
    - 9 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? 9 Male 9 Female

23. Please indicate the number of members in your household in each age group including yourself.
    ____0-10 yrs. _____11-20 yrs. _____21-40 yrs.
    _____41-60 yrs. _____ 61 yrs. or above

24. What is the highest level of education you have achieved?
9 Less than High School
9 High school diploma or GED
9 Some college
9 Completed 2-year college degree
9 Completed 4-year degree (B.A. or B.S.)
9 Education beyond B.A. or B.S.

25. What is your current level of household income?
9 Less than $9,999 9 $10,000-19,999 9 $20,000-29,999
9 $30,000-39,999 9 $40,000-49,999 9 $50,000-59,999
9 $60,000-74,999 9 $75,000-99,999 9$100,000-124,999
9 $125,000 and above

26. Please indicate your religious affiliation.
9 Catholic 9 Jewish 9 Muslim 9 Buddhist
9 Christian (Not Catholic)9 Hindu
9 Other ___________________

27. Which of the following groups represents your ethnic background?
9 Black/African American 9 Caucasian
9 Native American 9 Asian or Pacific Islander
9 Hispanic 9 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.