

Marketing Farm-Raised Fish in Missouri

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MISSOURI FISH AND SEAFOOD CONSUMER STUDY

EXECUTIVE SUMMARY

Missouri consumers answered 1,050 questionnaires in grocery stores and responded to 400 telephone surveys about their preferences and demands for seafood and fish products. The grocery store surveys were done during late 1997 and early 1998 in Columbia, St. Louis, Kansas City, and Springfield. The U.S. Department of Agriculture's Missouri Agricultural Statistics Service (MASS) was consulted to develop valid study methods. The telephone surveys were conducted by Doane Marketing Research, Inc. of St. Louis, Missouri. The results of the surveys pointed out important factors in developing marketing and industry directions.

- Fish and seafood consumption in Missouri is low relative to other states. The average person in the U.S. consumes about 14 pounds of fish or seafood annually. In Missouri, the average person consumes about half the national rate.
- Total annual consumption, however, is a significant market and worth noting because only about one percent of consumable product comes from Missouri.
- There is an opportunity for an educational program directed at Missourians who do not eat fish or shellfish. This group of people represents a third of the population. A program designed to emphasize the health benefits and quality of farm-raised products may be used to penetrate this market.
- Only 2.4 percent of the non-fish eaters listed price as a consideration within all age groups. However, household income data indicates this is the largest group of Missouri consumers, with household incomes of \$30,000 or less.
- Other top factors that influenced purchasing fish or fish products are: assurance of quality every time fish is purchased; fresh products, not frozen and thawed; and a greater variety of products to choose from. These responses are indicative of the importance of quality and freshness to consumers.
- Even though past surveys have indicated that fish and shellfish were selected primarily for health reasons, both surveys showed that the predominate reason for selecting fish products was because the customer enjoyed eating fish and liked the taste. This fact emphasizes the need for fresh product, backed by excellent quality control programs.

- Most Missouri consumers buy fish and fish products at grocery stores or restaurants. Female shoppers represent more than 70 percent of the shoppers in grocery stores.
- What specific products do Missouri customers desire? Canned fish is most often purchased, with shellfish (shrimp) second, and freshwater, farm-raised fish a close third. However, only 50 percent indicated purchases identified as farm-raised. The other half did not recognize the origin of the product. Any fresh product sold in stores in Missouri must be clearly marked and identified as Missouri-grown products.
- What species of farm-raised fish is most often mentioned as most desirable? More than 75 percent of the people surveyed wanted high quality catfish fillets. Catfish nuggets were ranked next, and trout and crappie fillets tied for third. Most people interviewed indicated a desire to have a variety of high quality, locally grown, fresh products available.

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Introduction

Although the amount of fish and seafood people eat in the United States has virtually stayed the same over the past ten years, there is a definite increase in the use of aquaculture products as compared to wild harvest fish and shellfish. This trend is expected to continue, providing opportunities for the aquaculture industry to contribute more and more farm-raised products. U.S. processed catfish production is close to one pound per person, imports of farm-raised shrimp were likely more than one pound, and the combination of farm-raised salmon, trout, tilapia, crawfish, and other aquaculture products probably added another pound. With aquaculture products contributing more than 20 percent of U.S. seafood consumption, it is easy to see why the aquaculture industry is recognized as a vital component of the livestock industry.

A Look at Missouri's Aquaculture Industry

Missouri produces more pounds of fish than any other state in the North Central Region of the U.S., and annual sales have been increasing at a steady but slow rate. Missouri's aquaculture industry provides a variety of products, with most fish sold live for restocking in private lakes and ponds, for enjoyment in aquariums, for use as fishing bait, for fee fishing areas, and for export to other states and countries. Because of product variety, no two businesses are alike.

In Missouri, more pounds of channel catfish are sold than any other species, but other warm-water fish, such as black bass, crappie, sunfish, paddlefish, walleye, and Chinese carps are commonly produced. The market for live fish for restocking is reaching saturation, and growth of this particular part of the industry is not expected to increase substantially. Many fingerling or small warm-water fish are sold at "Fish Days", where producers team up with local agriculture supply businesses or local feed supply stores to sell their fish. Often a fish producer will share advertising expenses to advertise "Fish Days" at specific locations on selected dates. Most private pond and lake owners pick up their fish at one of these locations. "Fish Days" are normally held in both the spring and fall.

Missouri has a substantial trout industry because the state has many large spring water sources, and also is a leader in the production and sales of fancy goldfish and Koi carp. Producers also raise bait fish, primarily fathead minnows, golden shiners, gold fish, and small crayfish for the state's large-sport fishing industry.

Survey Objectives

Obtaining information about consumer behavior and preferences is normally obtained from trade associations, government statistics, or publications. When the information is not available, original information is collected through observation, experimentation or surveys (Chaston 1983). Observation methods provide the least information and experimentation methods in Missouri are not feasible because of limited product. Surveys that incorporate questionnaires administered by trained personnel can provide accurate information and were chosen to be the most practical method of obtaining usable information.

Future growth and development of Missouri's aquaculture industry depends on a number of factors: infrastructure development, education, research, information delivery and involvement of the food fish industry. Because the food fish industry offers the greatest possibility for aquaculture expansion, information is needed to determine specific marketing opportunities and targets. The purpose of this study is to determine characteristics of aquaculture products purchased and analyze consumer demands and desires for farm-raised aquaculture products.

The information can then be used to develop market strategies to educate consumers:

- who do not purchase fish or seafood;
- develop methods for marketing fish to those customers who normally choose other protein sources;
- and to determine what factors will influence current fish consumers to buy fresh Missouri-raised products.

Specific objectives developed for the survey are as follows:

I. Determine behavior aspects of customer demand.

1. Identify current consumption level of seafood and farm-raised aquaculture products in Missouri.
2. Identify what type of fish products Missouri residents are consuming.
3. Identify reasons for purchase (price, quality, product recognition, availability etc.).
4. Identify most desirable product forms.
 - A. Type of product (species)
 - B. Preparation of product (fillets, breaded sticks, whole fish, etc.)

II. Develop marketing strategies based on consumer demand.

5. Identify best market opportunities.

Only a few of Missouri aquaculture enterprises produce fish for the food market. Missouri mostly imports food fish and seafood, even though there are substantial markets in-state and in large cities within a day's drive. Missouri has the natural and human resources to become a major player in the freshwater food fish market, but local enterprises have not entered this market because of several reasons:

- The difference in price for fish sold for restocking as compared to fish sold to out-state processors;
- Fear of competition with large food fish producers in the Southeastern states;
- The low level of infrastructure development in the state.

No fish processors in the state accept sales on contract or from other production locations. Most processors primarily use fish grown in their own facilities and serve rather limited niche markets.

Consumption Information

Information about the preferences and behavior of fish and seafood consumption in Missouri is limited. Missouri is a mid-western land locked state with consumer habits and preferences for fish and seafood which may or may not be similar to other mid-western states or other states in the U.S. Traditionally Missouri is thought of as a beef and potatoes state. Coastal areas normally have much higher consumption levels mainly because of the availability of high quality fresh products and traditional consumer characteristics. There are regional differences in seafood consumption patterns. In general, estimates by the U.S. Department of Labor statistics indicate the Northeast has the highest average annual household expenditures for seafood consumed at home (Gall and O'Dierno). A survey report of North Central Region states in 1993 indicated that channel catfish, trout, salmon, freshwater shrimp, and tilapia were the five freshwater species that were most frequently sold (Hushak 1993). Survey respondents also indicated that fish and seafood species with the most marketing potential in the region were walleye, yellow perch, bluegill, large mouth bass, and frogs. Farm-raised products were generally perceived as superior to wild-caught fish in quality, better size uniformity, easier availability, and other factors. The results seemed to indicate that farm-raised products can compete, even at a higher price, with wild-caught products and marketed within the same distribution channels as higher priced alternatives to wild-captured species. Opportunities for increasing market share of aquaculture products in the North Central States is good and larger salmon, trout, and catfish supplies could be handled by consumers. In the East preference of aquaculture products is somewhat different. In a New Jersey and New York survey, chain stores identified tilapia, hybrid striped bass, mussels, and trout as the only aquaculture products that they used. Independent retail stores identified trout, tilapia, and catfish as the aquaculture products used most frequently (Gall and O'Dierno).

Methods

Retail Store Surveys

The U.S. Department of Agriculture's Missouri Agricultural Statistics Service (MASS) was consulted to develop study methods that would assure results were valid and representative of Missouri consumers. Personnel from MASS suggested grocery store interviews and telephone surveys could provide the information needed to obtain valid results. Enumerators trained and employed by MASS conducted the interviews. Adequate sample size was determined to be approximately 1,000 interviews conducted in Columbia, Springfield, Kansas City, and St. Louis grocery stores. Store managers were contacted to schedule the interviews and to obtain their approval and support. Interviews were conducted at one Gerbes Market in Columbia, two Gerbes Markets in Springfield, four Hy-Vee Stores in Kansas City, and four National Stores in St. Louis. Each store manager was contacted upon arrival and asked for a preferred location to conduct the interviews. At least two enumerators were used at all locations. Customers were approached and asked if they purchased fish or seafood. If the response was affirmative they were asked if they would be willing to take about five minutes of their time to complete a questionnaire designed to assist the aquaculture industry in Missouri. In most cases enumerators, helped customers complete the questionnaires. The first interviews were completed in Columbia to test the procedures and the questionnaire content.

Telephone Surveys

To obtain a more representative sample of primary shoppers and consumers of seafood and aquaculture products in Missouri, more than 400 telephone surveys were completed. Trained market research interviewers at Doane Marketing Research used a list of random digit telephone numbers, prepared by Survey Sampling Incorporated, to contact households and interview respondents about their preferences in relation to seafood and other fish. Ten test interviews were conducted to assure that the wording of the questions was clearly stated and easily understood by the respondents and that the instructions were followed.

Questionnaire Design

Retail Stores

A survey questionnaire (Appendix A.) was developed with help from the Missouri Agricultural Statistics Service (MASS). The questionnaire used in the stores was designed to determine how often shoppers prepared fish or shellfish or ate it in a restaurant. Question number 7, "Please rank from 1 to 10 the farm-raised products you would purchase if available?" (Rank 1 as your first choice), confused almost every customer during the first interviews completed in Columbia. Most customers did not have ten choices and simply would stop at about the fifth ranking. Question 7 was changed to include only five choices. The results appeared to be more indicative of the customers' intentions. After completing the interview, customers were asked if they had any questions and were given a brochure describing Missouri Aquaculture.

Telephone surveys

A specific questionnaire (Appendix B) was developed for the telephone interviews. The question format was modified to be used on the telephone. Respondents were directed through the questions by the interviewer because the respondents could not visually identify choices as the retail store respondents had. Qualified respondents were defined as those who were primary grocery shoppers in the household and who had personally eaten or prepared for others any kind of fish or shellfish during the past twelve (12) months. The retail store questionnaire did not differentiate between those that had eaten or prepared fish and those who had not. This question helped define those who were fish and seafood consumers and those who were not. If the respondent answered "no" to the first question the interviewer skipped to questions 12 and 13 to determine demographic information. Respondents were asked to place themselves in one of six age groups and one of six income groups. The interviewer was also asked to identify if the respondent was male or female. Those that responded "yes" to the first question were then led through a series of questions defined to illicit responses to meet study objectives. The telephone survey also included three other locations for obtaining fish or seafood (questions 3a and 3b). These questions were designed to determine levels of fish consumption from sport fishing in Missouri.

Results

Telephone survey

Consumption levels of fish and seafood in Missouri are significant, but lower than the national average. Sixty-nine percent (69%) of the respondents indicated they had eaten or prepared fish or shellfish during the last twelve months. Of those who had eaten fish or shellfish, the largest percentage of responses said they had eaten or prepared fish or shellfish 21 to 50 times (almost once a week) during the year (Figure 1).

How Many Times Have You Eaten and/or Prepared Fish or Shellfish During the Past 12 Months?

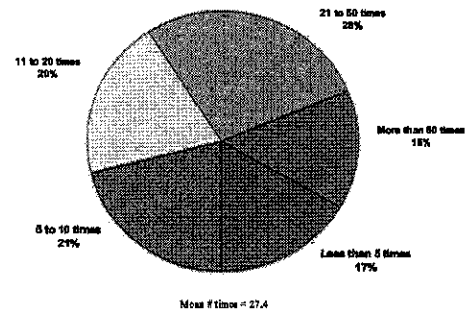
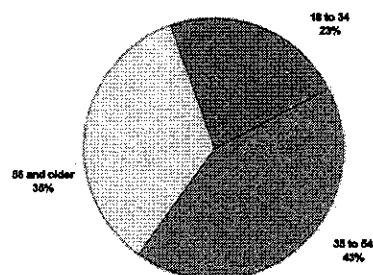


Figure 1

Assuming the 400 telephone surveys are a representative sample of Missouri households, sixty-nine percent (69%) or 3,670,341 residents had fish or shellfish during the year (1995 Missouri Census, general population, 5,319,335). Fifteen percent (15%) said they had eaten or prepared fish or shellfish more than 50 times during the year. A normal six-ounce serving, multiplied by the frequency and number of residents, results in about 200,000 pounds eaten weekly. Adding the other groups, twenty-one (21%) percent 5 to 10 times, twenty percent (20%) 11 to 20 times and twenty-eight percent (28%) 21 to 50 times, total weekly consumption is from 466,113 to 756,476 pounds per week. Annual consumption is between 25 to 39 million pounds or 4.5 to 7.4 pounds a person per year. However, the mean number of times residents had eaten or prepared fish or shellfish was 27.4. If 3,670,341 residents ate 6 ounces of fish per serving, the consumption level would be 10.3 pounds per person. The national average consumption of fish and seafood is about 14.2 pounds annually. The indication is that fish and seafood consumption in Missouri is 2- 3 times less than the national average. Thirty-one percent (31%) of the shoppers indicated that they did not eat or prepare fish or shellfish during the last twelve months. When asked why, sixty-four percent (64%) said they did not like fish or fish taste, thirty-one percent (31%) indicated that they did not eat fish and it was not part of their diet, and the remainder responded with various other reasons for not eating fish.

Which Category Best Represents Your Age?

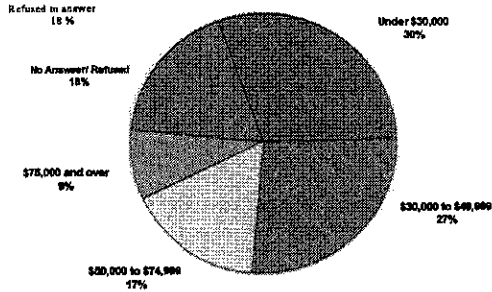


Q12
n = 400

Figure 2

Who are the primary shoppers for fish and seafood in Missouri? Seventy-six percent (76%) are female and twenty-four percent (24%) male. Age categories that best represent fish and seafood consumers are: eighteen percent (18%) 18 to 24 years of age; forty-three percent (43%) 35 to 45 years of age; and thirty-five percent (35%) 55 years and older (Figure 2).

Which Category Best Represents Your Income Level?



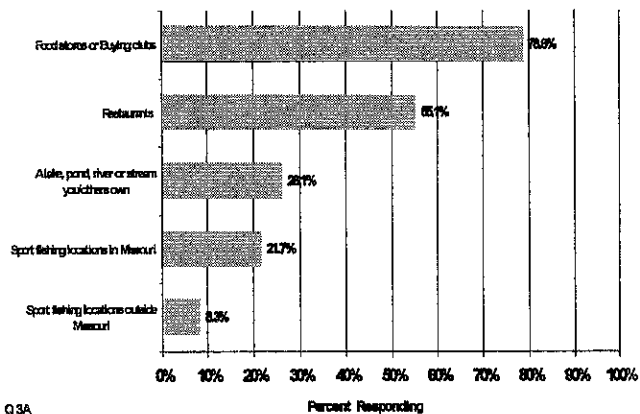
Q14
n = 400

Figure 3

Categories that best represent household income are: thirty percent (30%) under \$30,000 annually; twenty-seven percent (27%) \$30,000 to \$49,000; seventeen percent (17%) \$50,000 to 74,999; nine percent \$75,000 and over, and eighteen percent (18%) who refused to answer the question (Figure 3).

Where do Missourians typically go to get fish or shellfish? Seventy-eight percent (78%) of the time was attributed to food stores and buying clubs; fifty-five (55%) percent to restaurants; twenty-six percent (26%) to lakes, ponds, or streams that are in private ownership; twenty-one percent (21%) to sport fish locations in Missouri; and eight percent (8%) to sport fish locations outside Missouri (Figure 4).

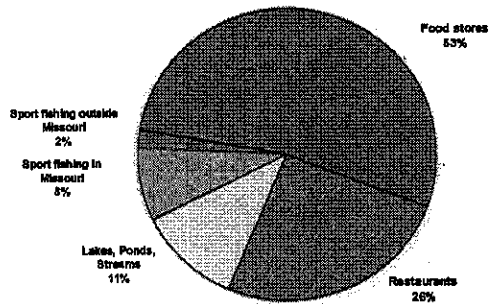
From Which of the Following Locations Do You Typically Get Fish or Shellfish?



Q3A
n = 276

Figure 4

What Percentage of the Fish or Shellfish You Eat or Prepare Was Obtained at Each Location You Mentioned?



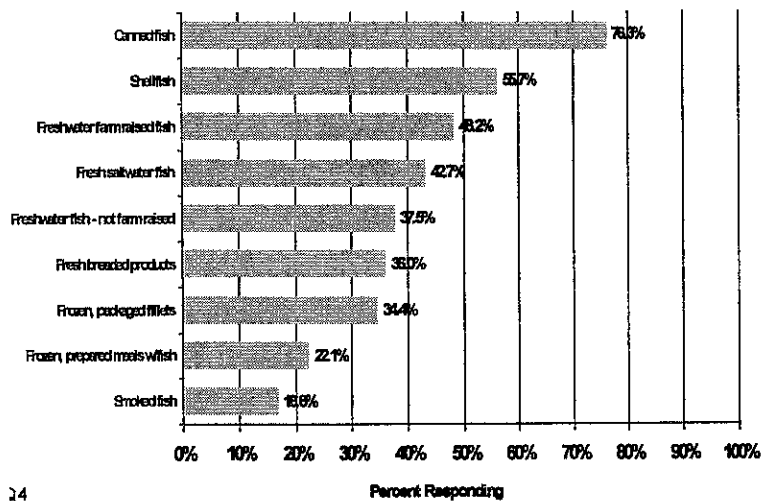
Q3B
n = 276

Figure 5

When people were asked what percentage of fish or shellfish was obtained from each location the results were different: fifty-three percent (53%) indicated from stores; twenty-six percent (26%) from restaurants; eleven percent (11%) from lakes, ponds, and streams in private ownership; eight percent (8%) from sport fishing in Missouri and two percent (2%) from sport fishing outside Missouri (Figure 5).

Canned fish, as expected, was the number one fish product consumed by most of the people. When asked what kind of fish or shellfish was served at home, the majority, seventy-six percent (76%), indicated canned fish (Figure 6). Shellfish was the second choice at fifty-five percent (55%), and freshwater farm-raised fish was third at forty-eight percent (48%). Fresh salt-water fish and freshwater, not farm-raised fish, were the next two choices.

What Kind of Fish or Shellfish Do You Normally Get for Preparing or Serving at Home?

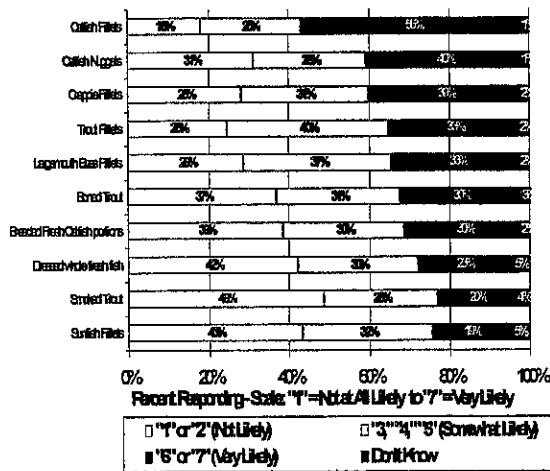


Q4
n = 253

Figure 6

When asked why they purchased fish or shellfish for home preparation, ninety percent (90%) chose enjoyment, because they liked the flavor and variety it provided for meal preparation. Forty-eight percent (48%) selected health and diet reasons for purchasing fish or shellfish. Twenty-nine percent (29%) thought that fish meals were easy to prepare and quick or short cooking time showed a response level of twenty percent (20%).

Likelihood to Buy Farm-Raised Fish Products

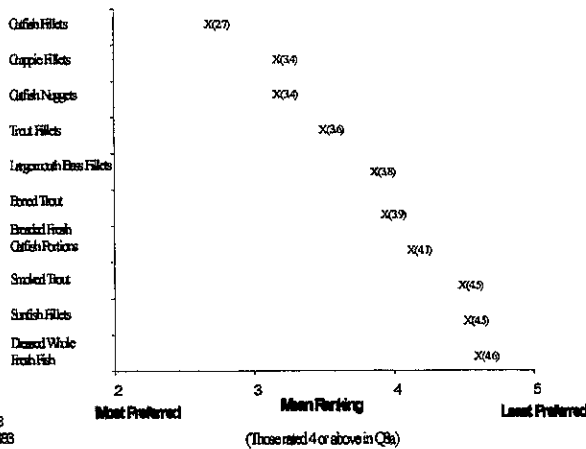


Q8A
n=194

Figure 8

The 122 respondents who indicated they normally chose fresh farm-raised fish were also asked what kinds of fish they preferred to buy. Catfish received 107, eighty-seven percent (87%) favorable responses. Thirty-two (26%) indicated that trout was their choice when selecting farm-raised fish for eating or preparing in the home. When they were asked to rank, (with 7 being very likely to purchase and one not at all likely to purchase) specific farm-raised fish products, assuming that all listed products were available, catfish fillets ranked highest with fifty-six percent (56%) indicating a high probability of purchase. Twenty-five percent (25%) also indicated a medium probability of purchase and only eighteen percent (18%) indicated they were not likely to purchase catfish fillets (Figure 7). Catfish nuggets received the next highest very likely responses at forty percent (40%). However this product also had a high not likely response level at thirty-one percent (31%). As indicated by Figure 7, crappie fillets and trout fillets were selected as the next two choices respondents were most likely to buy.

Rankings Of Most Preferred Farm-Raised Fish Products



Q8B
n=122

Figure 7

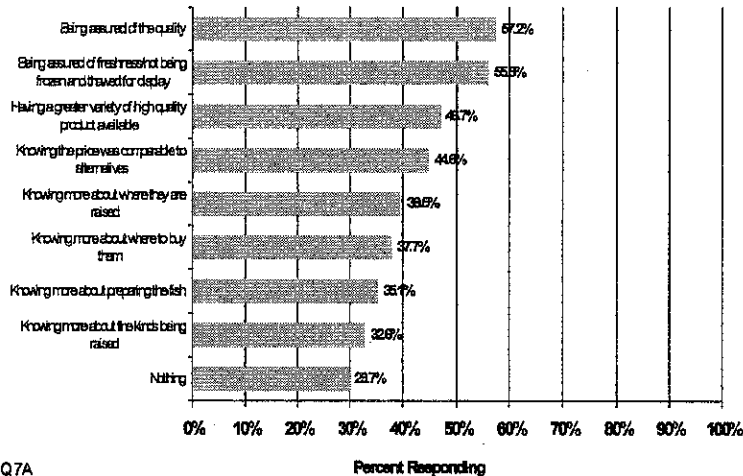
If a mean ranking is calculated on the basis of most preferred (2) to least preferred (5), catfish fish fillets with a rank of 2.7, are the most preferred. Crappie fillets and catfish nuggets tie for second place, and trout and large mouth bass are next. (Figure 8)

Question six (6) asked if the stores where fish

purchases were made carry freshwater fish identified as farm-raised or aquaculture products. Forty-two percent (42%) indicated the store did identify the products and fifty-eight percent (58%) indicated the store did not identify the products. When asked if they bought fish identified as farm-raised or if they were interested in purchasing fish identified this way, forty-eight percent (48%) said yes and fifty-two percent (52%) said no.

To follow up on the same theme the respondents were asked if specific statements would

Could Any of the Following Encourage Your Purchasing Farm-Raised Fish at Grocery Stores?



encourage them to purchase farm-raised fish at grocery stores. Figure 9 expresses the percent responding to each of the statements. More responses cited quality and freshness as being the two top reasons to purchase farm-raised fish. Price was important to over forty-four percent (44%) of the responses. Almost thirty percent (30%) of the responses indicated that nothing would encourage them to purchase farm raised fish at grocery stores.

Figure 9

To elicit additional responses or ideas the next question asked: What else could encourage you to buy retail farm-raised fish? Fifty percent (50%) responded nothing. Ten percent (10%) had no answer, nine percent (9%) mentioned price, and just under nine percent (9%) indicated availability. The response level was fairly uniform across the age categories. Less cost or lower price responses were more frequent; forty-four percent (44%) in the under \$30,000 group than any of the other income categories.

Grocery Store Interviews

Grocery Store Surveys

More than 1,000 individual interviews were completed in grocery stores in Missouri cities. A series of 12 questions were given to shoppers who agreed to complete the survey. In most cases the interviewer helped the shopper complete the questionnaire. The store surveys did not ask if the shopper purchased or prepared seafood or fish. As a result, the results did not show a comparison between those who ate fish and those who did not eat fish. Normally those respondents who refused to complete the survey indicated they were in a hurry, did not eat meat or fish or gave some other reason for not participating.

HOW OFTEN DO YOU PREPARE SEAFOOD OR FISH MEALS?

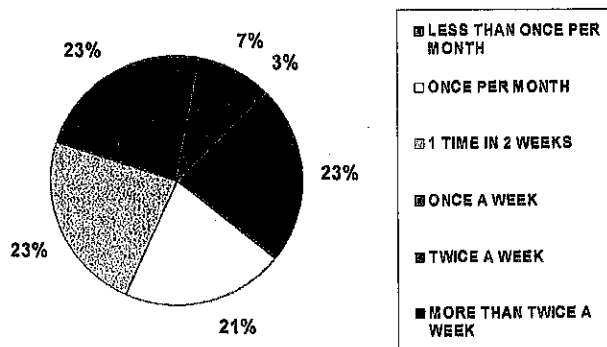


Figure 10

Question 1 asked how often they prepared seafood or fish meals. The question included six categories to choose from. Figure 10 summarizes the results.

Interestingly, three categories received about the same level of response. These categories were: less than once per month, once a week, and one time in two weeks. Seven percent (7%) indicated they prepared seafood or fish twice a week. This group may represent as many as a quarter million Missouri residents and is a significant market for aquaculture products.

When shoppers were asked what kind of seafood or fish they buy, the highest response was shrimp (Figure 11). However, canned tuna or other canned products were not offered as a choice. Had they been listed, these products would most likely receive the most responses. Selections for fresh saltwater fish (20%) and farm-raised fish (17%) were next in frequency. Other freshwater fish, smoked fish, and others were the last choices. There was little difference between the top three choices, showing farm-raised fish purchases represent a significant portion of the total seafood purchased for home preparation.

WHICH KIND OF SEAFOOD DO YOU NORMALLY BUY FOR PREPARATION AT HOME?

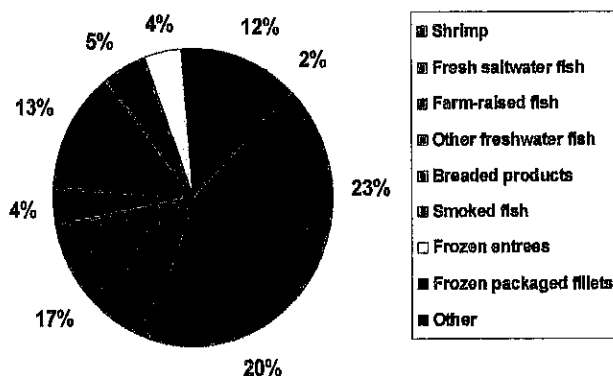


Figure 11

The next question asked for the reasons individuals purchase fish to prepare at home. They were given five specific statements and were instructed to mark all that apply. "I enjoy eating fish," received the highest percent of responses (Figure 12). The second and third responses were: fish are low fat and healthy to eat, and fish are easy to prepare. Only eight percent (8%) listed the price being comparable to other meat as a reason to buy fish to prepare at home.

WHAT ARE THE REASONS YOU PURCHASE FISH TO PREPARE AT HOME?

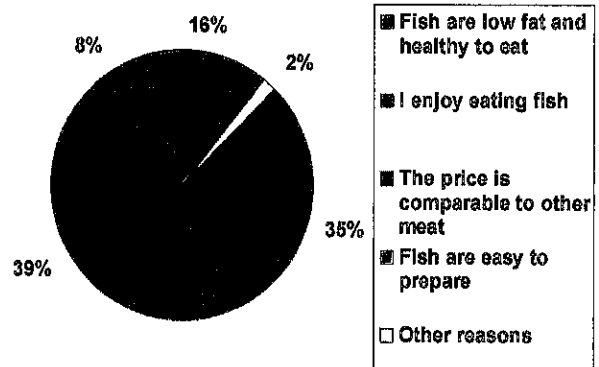


Figure 12

WHAT REASONS WOULD MOTIVATE YOU TO PURCHASE FARM-RAISED FISH

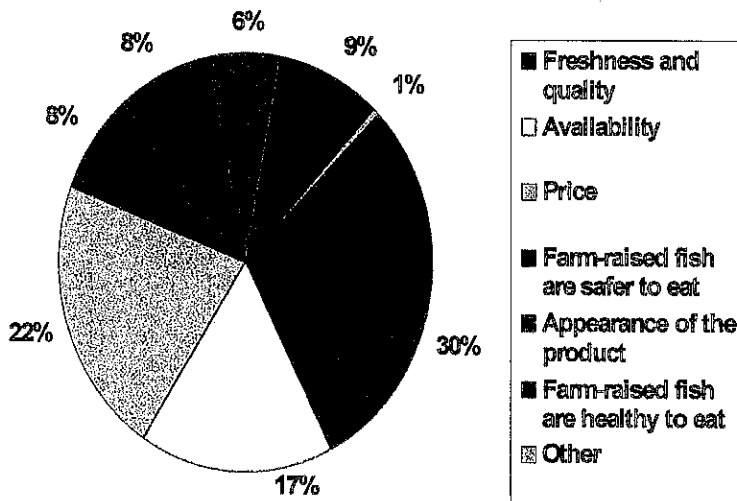


Figure 13

Shoppers were asked if they purchased products identified as farm-raised or aquaculture products. Half said they did and half said they did not. This response seems to indicate that it is questionable whether purchasers recognize the origin of the products. A follow-up question asked what reasons would motivate you to purchase farm-raised products. Respondents were given the opportunity to select each statement that applied. Figure 13 indicates that the greatest reason was freshness and quality. Price and availability measured third and fourth respectively. The next three statements registered about the same level of responses, with little difference between the three.

Respondents were also asked which factor or factors would encourage the purchase of more farm-raised fish. Shoppers were asked to choose from a list of six different responses. Figure 14 is a summary of the results. The question concerning price compared to boneless chicken breasts received the most responses. Other important factors were: the quality of the product (18%); source of the product from Missouri farms (17%); fresh product and not frozen (16%). Two other factors; a greater variety of products available and information about preparing fish; also were chosen frequently as reasons to buy more farm-raised fish.

WHICH FACTORS WOULD ENCOURAGE YOU TO PURCHASE MORE FARM-RAISED FISH

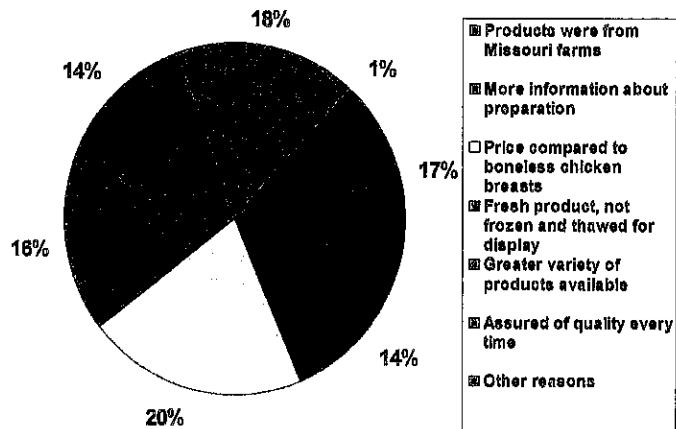


Figure 14

Shoppers were next asked to rank five (1 - 5, with "1" the first choice and "5" the last choice) of the listed products that they would purchase if available. A summary of the choices is presented in Table 1.

Table 1. Ranking of Products Purchased if Available

PRODUCTS	RANKINGS					Total
	1	2	3	4	5	
Catfish fillets	391	107	79	51	38	666
Catfish nuggets	141	121	58	48	52	420
Boned trout	100	61	58	45	45	309
Trout fillets	125	90	68	46	40	369
Smoked trout	60	40	54	48	45	247
Largemouth bass fillets	80	43	61	50	44	278
Sunfish fillets	35	34	30	28	39	166
Crappie fillets	138	67	61	76	50	392
Dressed whole fresh fish	83	33	56	56	60	288
Breaded fresh catfish portions	90	66	68	51	97	372

Table 2. Weighted Ranking of Products Purchased if Available

PRODUCTS	RANKINGS					Total
	1	2	3	4	5	
Catfish fillets	1173	214	79	-102	-114	1250
Catfish nuggets	423	242	58	-96	-156	471
Boned trout	300	122	58	-96	-135	249
Trout fillets	375	180	68	-92	-120	411
Smoked trout	180	80	54	-96	-135	83
Largemouth bass fillets	240	86	61	-100	132	419
Sunfish fillets	105	68	30	-56	-117	30
Crappie fillets	414	134	61	-152	-150	307
Dressed whole fresh fish	249	66	56	-112	-180	79
Breaded fresh catfish portions	270	132	68	-102	-291	77

Weighted values for the same data were determined by assigning the following multipliers to the respective rankings.

Ranking	1	2	3	4	5
Value	3	2	1	-2	-3

The rankings were assigned based on the instructions respondents received to rank their choices by using 1 as their first choice of purchase and 5 as their least likely purchase. The multipliers were selected to emphasize the positive of first choice and negative of last choice. Rankings were changed as a result of using the multipliers. Table 3 compares the two ranking approaches.

Table 3. Comparison of Two Ranking Systems

Product	Normal Ranking	Weighted Ranking
Catfish fillets	1	1
Catfish nuggets	2	2
Boned trout	6	6
Trout fillets	5	4
Smoked trout	9	7
Largemouth bass fillets	8	3
Sunfish fillets	10	10
Crappie fillets	3	5
Dressed whole fresh fish	7	8
Breaded whole catfish portions	4	9

**RANKING OF FARM-RAISED PRODUCTS
FIRST CHOICE 1 TO LAST CHOICE 5**

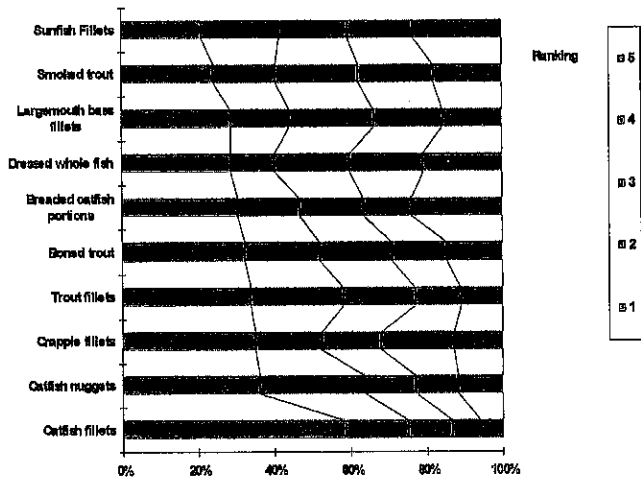


Figure 15

Figure 15 is a graphic representation of the non-weighted data.

The graphic representation lists the products in descending order according to the percent of number one rankings (red bars). The graph shows the high frequency of respondents choosing catfish filets as their first selection. The graph also clearly shows frequency of the lowest rankings (brown bars).

Figure 16 is a graphic representation of the weighted rankings of products customers would purchase if available. The graphic presentation of the weighted data points out those products that received the most first rankings and adds second and third choices to the positive side of the chart. The bar graph also separates the negative responses, fourth and fifth choices and those products with the highest level of fourth and fifth choices.

**WEIGHTED RANKING OF PRODUCTS CUSTOMERS
WOULD PURCHASE IF AVAILABLE**

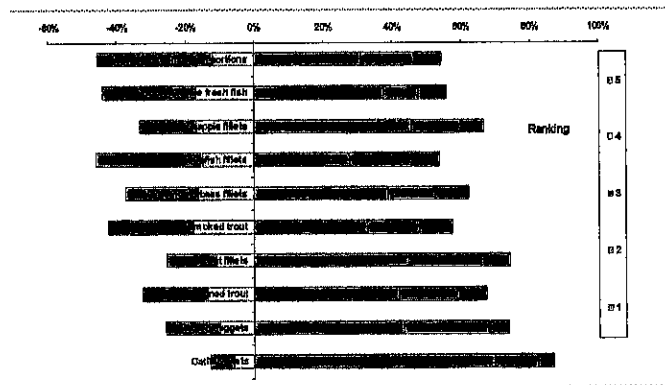


Figure 16

The next question asked shoppers to select where they prefer to buy seafood and other fish. The results indicate an overwhelming desire for the customers to obtain products from supermarkets. Eighty-six percent (86%) indicated the preference for this source.



Figure 17

The following two questions deal with eating seafood or fish in restaurants. The first question was asked to determine frequency of purchases in restaurants and the second to determine the types of products selected. Figure 17 divides purchasing frequency into six different categories. The highest number of people said they ate fish or seafood in a restaurant less than once per month or once per month. The next highest level of response, seventeen percent (17%), was one time in two weeks. Less than seven percent (7%) reported eating seafood or fish in a restaurant once a week.

Figure 18 is a graphical display of the frequency of choosing specific seafood or fish species or products. Shrimp was chosen most with about forty percent (40%) saying they would order it in a restaurant. Catfish was next with a nineteen percent (19%) response. Other species and products had less frequent responses.

WHICH SEAFOOD OR FISH DO YOU ORDER MOST OFTEN IN A RESTAURANT?

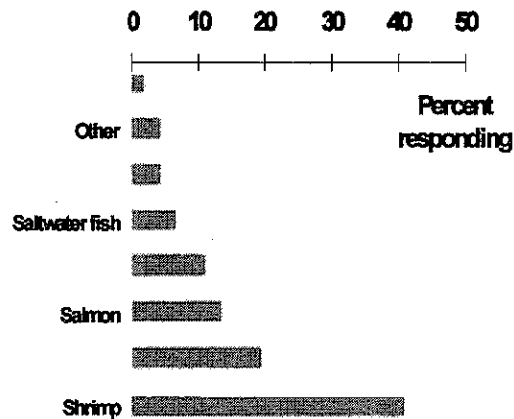


Figure 18

The last two questions of the interview deal with demographic information. Shoppers were asked to indicate their age within a specific age group. There were seven different groups to choose from. They were also asked to check a category that best describes their total household income. Income levels were divided into six categories from less than \$30,000 to more than \$100,000. Figures 19 and 20 show the graphical depictions of age groups and income levels of the survey respondents. Of the 1,050 interviews, 97 or nine percent (9%) declined to answer the question about income levels.

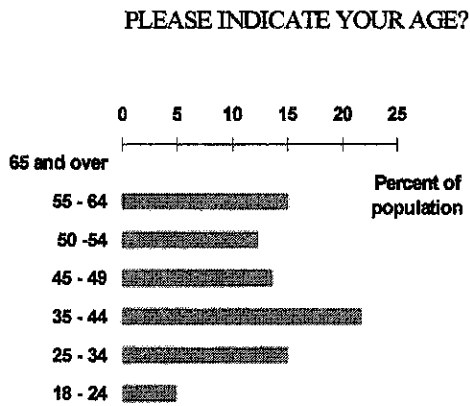


Figure 19

The largest group sampled in the grocery store surveys was the group between 35 - 44. This group represented just more than twenty percent (20%) of the total sample. In the general population, this a part of the "Baby Boomer" group and represents about fifteen percent (15%) of the population of Missouri residents.

Figure 20 indicates the highest percent of survey respondents indicating household income levels below \$30,000. The next largest group was \$50,000 to \$74,999. The data also shows about twelve percent (12%) of the households in the \$50,000 to \$74,999 group. Apparently our data is skewed to the upper end. Missouri census data from 1990 indicates forty-seven percent (47%) of household incomes are below \$25,000.

PLEASE INDICATE THE CATEGORY THAT BEST DESCRIBES YOUR TOTAL HOUSEHOLD INCOME

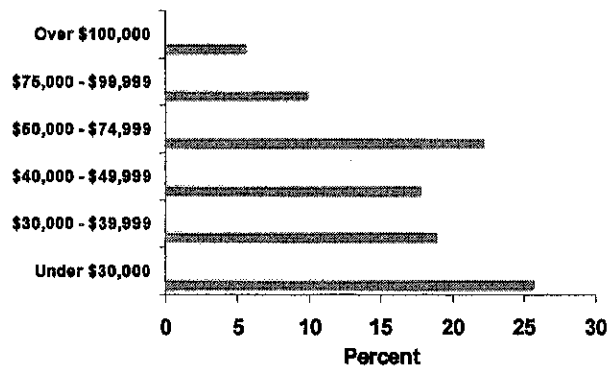


Figure 20

When age group data is compared with frequency of eating or preparing shellfish or fish, the 55 or older group shows the highest value (Figure 21). The mean number of times per year were calculated and are; 27.4 times per year for those age 18 to 34; 21.6 times per year for those 35 to 54 and 32.8 times per year for those 55 and older. However, both the 18 to 34 and the 35 to 54 age groups had high responses: 21 to 50 times per year.

FREQUENCY OF EATING OR PREPARING SEAFOOD AT HOME FOR VARIOUS AGE GROUPS

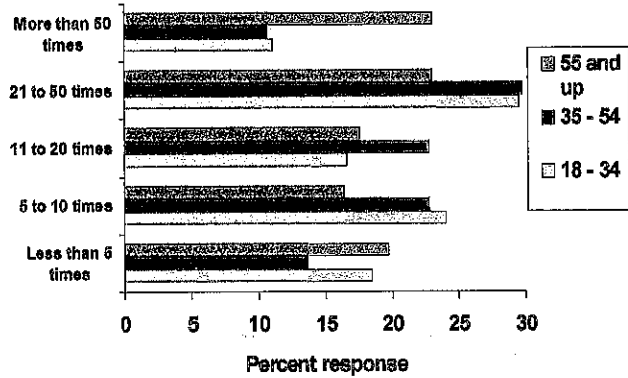


Figure 21

FREQUENCY OF EATING OR PREPARING SEAFOOD AT HOME FOR VARIOUS INCOME GROUPS

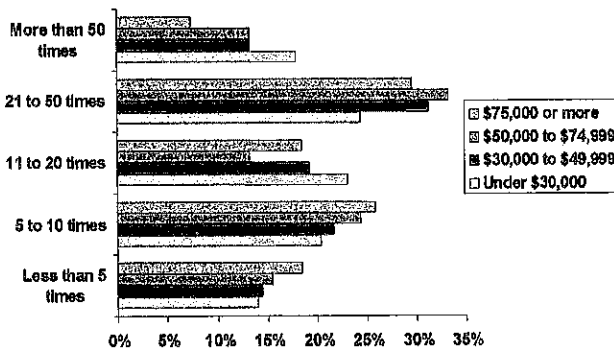


Figure 22

Comparing frequency of eating or preparing fish or shellfish with income groups seems to indicate that the highest income level has the lowest frequency response (Figure 22). The mean frequencies for the income groups are: under \$30,000 - 29 times per year; \$30,000 to \$49,999 - 26.9 times per year; \$50,000 to \$74,999 - 27 times per year; and \$75,000 or more - 19.3 times per year. All groups had the highest response to the 21 to 50 times a year frequency.

Discussion

Missouri consumers answered 1,050 questionnaires in grocery stores, and 400 responded to telephone surveys about their preferences and demands for seafood and fish products. The information obtained from the surveys provided a basis for developing marketing and industry direction.

- Missouri residents are not large consumers of fish and seafood products. With nearly a third of the population indicating they did not eat fish or seafood, estimated values of consumption per capita range from a low of 4.5 pounds per year to a high of 10.3 pounds per year. Pounds of product per week is calculated to be from 317,600 pounds to 719,900 pounds.
- Total annual consumption is a significant market and worth noting because only about one percent of consumable product comes from in-state. The remainder is imported from other states or countries. This market represents a valid opportunity for Missouri producers.
- The 35 to 54 age group was strongly represented as eating fish and shellfish. Even though this group represents only about twenty-five percent (25%) of the Missouri population, the same age category represented forty-three percent (43%) of the affirmative responses to eating or preparing fish meals.
- The group of people who indicated they did not eat fish also provides an opportunity for an educational program about the health benefits and quality of farm-raised products. The age distribution of this group is fairly uniform: 37 aged 18 - 34, 40 aged 35 - 54, and 47 aged 55 and older. Consequently, there is no age group to target with an educational program. The most frequent response of this group was that they did not eat fish because they did not like fish and did not like the taste of fish. Special in-store sampling of high quality products, in addition to recipes and educational material explaining the benefits of eating fish, may penetrate the population that does not eat fish or seafood.
- Only 2.4 percent of the non-eaters listed price as a consideration within all age groups. When the groups were separated by income only 2.4 percent of the under \$30,000 household income group indicated price or cost as a reason for not eating fish. However, this group is the largest single group within the sample representing 33 percent of those who do not eat fish. As a result, price should be considered in developing suitable products. Price concern is verified in the results obtained from the grocery store interviews. When shoppers were asked what reasons would motivate them to purchase farm-raised products the 2nd highest response was price, with twenty-two percent (22%). This was only eight percent less than the top response, freshness and quality with thirty percent (30%). When asked which factors would encourage shoppers to purchase more farm-raised fish, the highest response was prices comparable to boneless chicken breasts.

- Other factors that received high responses were: assurance of quality every time fish is purchased; fresh products, not frozen and thawed; and a greater variety of products to choose from. The same factors were chosen during the telephone surveys, although the sequence was slightly different except for the top choice, which was assurance of quality. These responses are an indication of how important quality and freshness are to consumers. Missouri consumers who eat fish are not going to buy it unless the quality is unquestionable. They will also buy more product if the product is fresh and priced right.
- Even though past surveys have indicated that fish and shellfish were selected primarily for health reasons, both surveys showed that the predominate reason for selecting fish or other seafood products was because the customer enjoyed eating fish and liked the taste. Shoppers or restaurant-goers select fish or seafood because they like the products and desire a variety of tastes in their diets. This fact emphasizes the need for fresh product, backed by excellent quality control programs. Shoppers will not purchase products that do not meet their taste standards. One batch of off-flavor catfish fillets can quickly ruin an established market. Servicing a fresh market, especially with fish, is very difficult and does not usually fit into normal distribution channels that provide frozen fish. The shelf life of filleted fish is comparatively short and requires greater frequency of deliveries and, if necessary, product exchange.
- Where do shoppers buy fish and seafood and who does the shopping? The results indicate that marketing programs should target food stores and female shoppers. The results also indicate that a majority of fish eaters seek fish and shellfish when dining out. Restaurants are selected over fifty percent (50%) of the time for fish or shellfish meals. However, when asked what percentage of fish or shellfish was obtained at various locations, food stores had the highest number of responses. Supplying either food stores or restaurants with fresh product normally requires the services of a wholesale food business willing to work with a processor and indirectly, a producer. The steps to success are more difficult and quality control becomes the processor's responsibility. However the processor relinquishes control of the product when delivered to the wholesale business. Often this is the weak link in the chain because product control becomes more difficult.
- What specific products do Missouri customers desire? Figure 6 shows that canned fish is most often purchased, with shellfish (shrimp) second, and freshwater, farm-raised fish a close third. However, only fifty percent (50%) indicated purchases identified as farm-raised. The other half did not know where the product was produced and did not indicate the source as important. In most cases, the data seemed to indicate that only fifty percent (50%) seek product identification, or product identification is not obvious enough for customers to pick special products. Product identification of locally grown products is often used as a marketing tool.

Normally these products receive premium prices and create demand because of customer identification with local products. In food stores shoppers were asked what kind of seafood or fish they buy. Responses were similar to the telephone answers, except they were not given canned fish as a choice. Shrimp had the highest response with fresh, saltwater fish second and farm-raised fish a close third. When shoppers were asked to rank products, catfish fillets again drew the highest frequency of responses and catfish nuggets ranked second. Two methods of comparing the rankings were rated. The first method simply summed all responses for a specific product. The second method emphasized positive and negative responses by assigning a plus three to the top choice and a negative three to the lowest choice.

Rankings changed somewhat with the weighted method. Even though catfish fillets and nuggets were ranked number 1 and 2 using both methods, changes occurred with choices after the top two. With the normal ranking, crappie fillets became the third choice, and in the weighted ranking, large mouth bass fillets were third. The information clearly indicates that consumers desire catfish fillets as their first choice, that catfish nuggets are acceptable and crappie and large mouth bass fillets may be selected as alternate products. Breaded whole catfish portions ranked number four in the un-weighted method and ninth in the weighted method. Figure 16, *Weighted Ranking of Products Customers Would Purchase if Available*, points out those products that received the most first choices and those that received the most negative responses or were fourth and fifth choices. Even though breaded catfish portions were ranked fourth in positive responses, the product ranked second in the most negative responses. A similar ranking system was used in the telephone surveys to compare choices of the most preferred farm-raised products. In this case, a mean ranking was calculated on the basis of 2 being the most preferred and 6 the least preferred. Channel catfish fillets were the most preferred, crappie fillets and catfish nuggets tied for second, trout fillets placed third and large mouth bass came in fourth.

- Most shoppers (85.6 percent) preferred to purchase seafood or other fish at food stores, and a majority (74%) ate seafood or fish in a restaurant once a month or less often. Shrimp was the overwhelming choice at a restaurant, with catfish and salmon second and third. The selection of catfish as second is significant because other choices such as crab legs, saltwater fish or others are often reported in other surveys as top choices in restaurants. Missouri consumers undoubtedly prefer catfish to most other choices except shrimp.

Table 4. A Comparison of Age Group Data

Age Group	Food Stores	Telephone Surveys	1995 Census
18 - 34	19.9%	23%	26.7%
35 - 54	47.7%	35%	24.7%
55 and older	32.4%	35%	22.9%

Comparisons of the demographic data for the two survey methods shows only minor differences. The comparison shows that both survey samples over-represented the 35 - 54 and 55 and older age groups. However, these are the primary purchasers in a household. Census information indicates the 18 - 34 age group is the largest group. The telephone survey would be expected to be closer to general population ratios especially if the households are randomly selected households. The time that the calls were made may influence the response unless time was also selected randomly.

Table 5. A Comparison of Household Income Data

Household Income Group	Food Store Survey	Telephone Survey	1990 Census
Under \$30,000	25.7%	30%	55.4%
\$30,000 to \$49,999	36.7%	27%	25.7%
\$50,000 to \$74,999	22.2%	17%	12.6%
\$75,000 and over	15.5%	9%	6.3%

Both sampling methods are skewed to higher household income than the 1990 Missouri Census indicates. There are a number of explanations. The lower income group was smaller than the census indicates because this group does not consume much fish or shellfish. This group may be characteristically more rural and not equally represented in urban food store samples. Almost 20% refused to answer this question and most may have been from the lower income group.

Recommendations and Opportunities

The group of Missouri residents that do not eat fish nor include any shellfish in their diet is at least thirty percent of the total population. A program designed to educate this group about the benefits of eating fish and the quality of the products could provide opportunities for additional markets for fish and shellfish. If this group ate six ounces of product once a year an additional 824,500 pounds would be consumed. The additional consumption would represent more than \$3 million in retail sales and over two million pounds of live-weight fish. Educational programs and materials should be prepared for University Extension and Outreach and for vocational agriculture programs in secondary schools.

Residents in Missouri consume less fish and shellfish than the national average. Markets for more product could be developed by producing short educational video tapes for public service television and other stations. The industry should also develop information for public education. Short video messages about the products and benefits to the state will develop market demand in the future.

There is very good demand for high quality catfish fillets and other catfish products in Missouri. A promotional plan involving advertising, product testing, and analysis should be funded and completed in the 2000 fiscal year. The products should be clearly labeled and marketed with assistance and guidance from the AgriMissouri program.

MISSOURI CONSUMER SURVEY, AQUACULTURE PRODUCTS

1. How often do you prepare seafood or fish meals?

- one
- less than once a month 001 _____
- once a month _____
- once every two weeks _____
- once a week _____
- twice a week _____
- more than twice a week _____

2. Which kind of seafood do you normally buy for preparation at home?

- all that apply
- Shrimp _____
- Fresh (not frozen) salt water fish (salmon, tuna, swordfish, orange roughy, lobster etc.) _____
- Farm raised fish (catfish, trout, tilapia, etc.) _____
- Other freshwater fish (lake trout, walleye pike, yellow perch, etc.) _____
- Breaded products (fish sticks, blocks, fillets) _____
- Smoked fish (trout, salmon, whitefish, etc.) _____
- Frozen prepared entrees _____
- Frozen and packaged fillets _____
- Other (please specify) _____

3. What are the reasons you purchase fish to prepare at home?

- Fish are low fat and healthy to eat _____
- I enjoy eating fish _____
- The price is comparable to other meat products of similar quality _____
- Fish are easy to prepare _____
- Other reasons (please explain) _____

4. Do you purchase products that are identified as farm raised or aquaculture products?

Yes _____ No _____

5. Which reasons would motivate you to purchase farm raised products?

- Freshness and quality _____
- Availability _____
- Price _____
- Fish farming is a business I wish to support _____
- Farm raised fish are safer to eat than others _____
- Appearance of the product _____
- Farm raised fish are healthy to eat _____
- Other (please specify) _____

6. Which factor or factors would encourage you to purchase more farm raised fish?

- If I was positive the products were from Missouri farms _____
- If I had more information about preparing fish and other farm raised products. _____
- If the price compared to the price for boneless chicken breast meat. _____
- If the product was fresh, not frozen and thawed for display _____
- If there were a greater variety of high quality farm raised products available. _____
- If I could be assured of the quality of the product every time. _____
- Or (please explain) _____

7. Please rank from 1 to 10 the farm raised products you would purchase if available?

- _____ catfish fillets
- _____ catfish nuggets
- _____ boned trout
- _____ trout fillets
- _____ smoked trout
- _____ large mouth bass fillets
- _____ sunfish fillets
- _____ crappie fillets
- _____ dressed whole fresh fish
- _____ breaded fresh catfish portions

8. Where do you prefer to purchase seafood or other fish?

- _____ supermarket
- _____ speciality store
- _____ buying club
- _____ independent fish market

9. How often do you eat seafood or fish in a restaurant?

- less than once a month _____
- once a month _____
- once every two weeks _____
- once a week _____
- twice a week _____
- more than twice a week _____

10. Which seafood or fish products do you order most often in a restaurant?

- shrimp _____
- salt water fish _____
- farm raised trout _____
- salmon _____
- catfish _____
- crab legs _____
- fresh tilapia _____
- other (please list) _____

11. Please indicate your age:

- _____ 18-24 _____ 45-49 _____ 65 and over
- _____ 25-34 _____ 50-54
- _____ 35-44 _____ 55-64

12. Please check the box that best describes your total household income:

- under \$30,000 _____
- \$30,000 - \$39,999 _____
- \$40,000 - \$49,999 _____
- \$50,000 - \$74,999 _____
- \$75,000 - \$99,999 _____
- \$100,000 and above _____

Thanks for your help!!

Office use

F _____ M _____ Store _____

Date _____ a.m. _____ p.m. _____

Enumerator _____

Job # 232966-01

Date _____
 Interv'r _____

MISSOURI CONSUMER SURVEY--AQUACULTURE PRODUCTS

Hello, this is _____ calling from Doane Marketing Research in St. Louis. May I speak with the primary grocery shopper in your household?

[REPEAT INTRODUCTION, IF APPROPRIATE] We are helping the Missouri Department of Agriculture learn more about the fish and shellfish that Missourians eat. I would like to ask you a few questions which will take no more than 5 minutes to answer. This information will help the Department serve Missouri residents better.

1. Have you personally eaten and/or prepared for others to eat any kind of fish or shellfish during the past 12 months?

- 1 -- YES
- 2 -- NO >>> Why not? _____

 [SKIP TO Q. 12]

2. Approximately how many times have you eaten and/or prepared fish or shellfish during the past year?

_____ times a year

3a. From which of the following places do you typically get the fish or shellfish you eat and/or prepare? [READ LIST BELOW. CIRCLE ALL THAT APPLY]

3b. Based on 100 percent, approximately what percentage of the fish or shellfish you eat or prepare was obtained at each location you mentioned: [ASK FOR EACH MENTION. TOTAL MUST EQUAL 100]

	<u>Where</u>	<u>Percent</u>
1. Restaurants of any kind	1	_____ %
[IF <i>Only answer</i> is 1, Then SKIP to Q.7A]		
2. Food stores or buying clubs (grocery, specialty)	2	_____ %
3. A lake, pond, stream or river we / others own	3	_____ %
4. Sport fishing locations in Missouri	4	_____ %
5. Sport fishing locations outside of Missouri	5	_____ %
6. Other: [SPECIFY] _____	6	_____ %
7. Other: [SPECIFY] _____	7	_____ %

[IF 2-7 are answered, Then Proceed to Q.4]

4. From the list that follows please tell me which kind of fish or shellfish do you normally get for preparing or serving at home? Do you get... [READ CATEGORIES AND CIRCLE ALL THAT APPLY.]

- 1 -- **Shellfish** like scallops, shrimp, oysters or lobster
- 2 -- **Fresh, that is, not frozen, salt water fish** like salmon, tuna, swordfish, orange roughy, halibut, haddock, etc.
- 3-- **Fresh, farm raised fish** [CIRCLE: 1) catfish, 2) trout, 3) tilapia.
ADD: _____)
- 4 -- **Freshwater fish** [CIRCLE: 1) lake trout, 2) walleye pike, 3) yellow perch. ADD: _____)
- 5 -- **Fresh, breaded fish products** like fish sticks, blocks, fillets.
- 6 -- **Smoked fish** like, trout, salmon, whitefish, etc.
- 7 -- **Frozen, packaged salt or fresh water fillets** (uncooked)
- 8 -- **Frozen prepared meals** featuring some type of fish (cooked)
- 9 -- **Canned fish** like tuna, salmon or oysters
- Other [PLEASE SPECIFY] _____

5. What are the reasons you purchase fish to prepare or serve at home?

- 1 -- Health / diet reasons: low fat, low in calories, easy to digest
- 2 -- Enjoyment; like the flavor; for variety / something different
- 3 -- Affordable; comparable in price to other protein sources
- 4 -- Easy to prepare; few preparation steps.
- 5 -- Quick; short cooking time
- 6 -- Other reasons [PLEASE EXPLAIN] _____

[ONLY ASK Q. 6a - 6d IF '2' IS SELECTED IN Q. 3a IF NOT, SKIP TO Q. 7a]

6a. Do the stores you purchase fish at carry freshwater fish identified as farm raised or aquaculture products?

1 --YES >> 6b. Do you purchase fish identified as farm raised or an aquaculture product?

- 1 -- YES
- 2 -- NO

2 -- NO >> 6c. Would you be interested in purchasing fish that is identified in this way?

- 3 -- DON'T>> KNOW
- 1 -- YES
- 2 -- NO

6d. What are the things about farm raised fish products that do or might motivate you to purchase them? [DO NOT READ. CIRCLE ALL THAT APPLY.]

- 1 -- Freshness and quality
- 2 -- Appearance of the product
- 3 -- Availability
- 4 -- Price
- 5 -- Safer to eat than other sources of supply
- 6 -- Healthy to eat
- 7 -- Fish farming is a business I wish to support
- 8 -- Nothing could motivate me.
- 9 -- Other [PLEASE SPECIFY] _____

7a. Could any of the following items encourage your purchasing of farm raised fish like catfish, trout and tilapia at grocery stores or outlets? [READ. CIRCLE ALL THAT APPLY.]

- 1 -- Knowing more about where to buy them
- 2 -- Knowing more about where they are raised.
- 3 -- Knowing more about the kinds of fish being raised.
- 4 -- Knowing more about preparing the fish.
- 5 -- Knowing the price was comparable to other alternatives.
- 6-- Being assured of freshness/ not being frozen and thawed for display
- 7-- Being assured of the quality of the products.
- 8-- Having a greater variety of high quality farm raised products available.
- 9-- [DO NOT READ] Nothing [IF CIRCLED, SKIP TO Q. 10]

7b. Anything else that could encourage retail purchasing of farm raised fish?

8a. Please rate the following farm raised fish products according to the likelihood of you purchasing them, assuming they are available. Use any number from "1 to 7" with "1" at one end of the scale meaning "Not at all likely to purchase" and "7" at the other end, meaning "Very likely to purchase." [ROTATE.]

8b. [FOR 2 OR MORE PRODUCTS WITH THE TWO HIGHEST RATINGS BETWEEN 4 - 7:] Please rank these products (1, 2 etc.) starting with your most preferred purchase and continue with the next preferred. [READ]

<u>Rating</u>	<u>Rank</u>
_____ catfish fillets	_____
_____ catfish nuggets	_____
_____ boned trout	_____
_____ trout fillets	_____
_____ smoked trout	_____
_____ large mouth bass fillets	_____
_____ sunfish fillets	_____
_____ crappie fillets	_____
_____ dressed whole fresh fish	_____
_____ breaded fresh catfish portions	_____

9. At what kind of store do you prefer to purchase fish and/or shellfish?

- 1 -- Supermarket
- 2 -- Specialty store
- 3 -- Buying club
- 4 -- Independent fish market

ASK Q. 10 & 11 ONLY IF "1" SELECTED IN Q. 3a. OTHERWISE GO TO Q. 12.

10. Approximately how many times in the past year have you purchased prepared fish or shellfish at a restaurant, either for eating in or carry out?

11. Which seafood or fish products do you order most often in a restaurant?

- 1 -- Shellfish like scallops, shrimp, oysters, lobster or crab legs
- 2 -- Salt water fish like salmon, tuna, swordfish, orange roughy, halibut, haddock, red snapper etc.)
- 3 -- Catfish
- 4 -- Trout
- 5 -- Tilapia
- 6 -- Other freshwater (lake trout, walleye pike, yellow perch, etc.)
- 7 -- Other [PLEASE SPECIFY] _____

12. As I read the following categories, please tell me which best represents your age?

- 1 -- 18 to 24
- 2 - 25 to 34
- 3 - 35 to 44
- 4 - 45 to 54
- 5 - 55 to 64
- 6 - 65 and over

13. The last question deals with the total annual income of your household. Please stop me when I get to the category that represents your household.

- 1 -- Under \$30,000
- 2 -- \$30,000 to \$39,999
- 3 -- \$40,000 to 49,999
- 4 -- \$50,000 to \$74,999
- 5 -- \$75,000 to \$99,999
- 6 -- \$100,000 or more

14. What is your zip code? [RECORD DIGITS] _____

[FROM LISTENING TO VOICE, DETERMINE IF ...]

- 1 -- Female
- 2 -- Male

THANKS FOR TAKING TIME TO DO THIS SURVEY. YOUR OPINION COUNTS.

