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THE LOUISIANA SHRIMP INDUSTRY

A Preliminary Analysis of the Industry's Sectors

prepared for the

Natural Resources Committee
Louisiana State Senate

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES
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OVERVIEW

The objectives of this preliminary investigation are to analyze the structure of Louisiana's shrimp industry and to describe how shrimp products flow from one sector of the industry to the next. To accomplish these objectives, this investigation provides a conceptual framework of the shrimp industry. The framework describes how shrimp is distributed from harvest, through a series of handling, processing, and distribution activities, until it reaches the final consumer.

Information pertaining to the various sectors of the shrimp industry are presented. Depending upon availability, data on participation and prices are provided. Lack of data pertaining to the retail sector has resulted in the non-inclusion of the sector in this current report.

To address the issue of data deficiency, the development of a survey instrument is proposed. This survey, complemented with on-site personal interviews, is expected to provide information regarding industry participants' cost of operations, sectoral sources of raw materials, and sale of finished products to other sectors of the industry.

PART 1: INTRODUCTION

Shrimp has traditionally been an important commodity, and industry, to the State of Louisiana. From 1950 to 1998, close to 80 million pounds of shrimp has been landed annually in the state. This has accounted for approximately 10% of average annual landings of fisheries in Louisiana. In terms of monetary significance, the average annual value of shrimp landed over the past half century has been estimated at around $75.8 million. This has represented 56% of the average annual value of fisheries landed in the state.

As an industry, the harvesting, handling, processing, distribution, and retailing of shrimp provides a significant contribution to the state's economy. In a study prepared for the Louisiana Department of Wildlife and Fisheries (Southwick and Associates, 1997), the 1996 total economic effect[1] generated by the various sectors of the shrimp and shellfish[2] industry was estimated at $1.9 billion. This economic impact was responsible for roughly $60 million and $14.5 million in state sales tax and state income tax revenues, respectively. In addition, approximately 22,000 jobs[3] are directly and indirectly tied to the industry.

In 1998 the Select Council on Shrimp Management was created to study the existing and future management of the state's shrimp resources and to provide recommendations pertaining to future management objectives. A number of opportunities were recommended to meet these objectives. These recommendations were based on the council's findings which included: depressed prices paid to participants in several sectors of the industry; overcapitalization; decreased participation in various sectors of the industry; and, increased competition from imports of shrimp in various product forms (LDWF, 1998).

An industry review panel was convened to review the opportunities set forth in the council's report and to propose recommendations for actions to be taken (LDWF, 1999). One of the recommendations brought forth was to study historical price trends along each sector of the industry. This recommendation was bolstered by the passage of Senate Concurrent Resolution Number 45 in

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1 This represents the multiplier effect associated with successive rounds of spending generated by sectors (e.g., harvesters, handlers, wholesalers, processors, retailers, and others) involved in the shrimp and shellfish industry. These rounds of spending, which become smaller with each successive round of spending, denote the purchases of goods and services needed for production and personal consumption.

2 Limited information exists as to the exact impact of the shrimp industry on the economy of Louisiana. An investigation of the data used for the study prepared for the Louisiana Department of Wildlife and Fisheries found that shrimp accounted for approximately 58% of the volume and 71% of ex-vessel value of shellfish landed in the state for the period under study. Given the inclusion of other shellfish products, the economic impact presented in this current investigation overestimates the actual contributions of the shrimp industry to Louisiana's economy.

3 Full-time equivalent jobs.

the 1999 Regular Session of the Louisiana State Legislature. See Appendix C for a copy of the resolution.

In adherence to the spirit of this legislation, the purposes of this preliminary investigation are to analyze the structure of Louisiana's shrimp industry and describe how the product flows from one sector of the industry to the next. Developing an understanding of this structure and how it affects the performance of various sectors of the industry will provide policy planners and decision makers with insights into the pricing structure[4] of the industry.

This initial report commences with the introduction of a conceptual framework of the shrimp industry. This framework illustrates the various stages by which shrimp is distributed from harvest, through a series of handling, processing, and distribution activities, to final consumption.

Upon presentation of the framework, this preliminary investigation describes conditions that exist in selected[5] sectors of the industry. Conditions such as the number of participants and prices paid and received by businesses in the sector are given consideration. This is accomplished through the presentation of secondary data pertaining to each sector.

It should be noted that while the framework may depict a seamless movement of shrimp along the distribution channels, the same condition cannot be brought to bear on the accompanying secondary data. This limits the present investigation's ability to provide a comprehensive description of the industry.

To address the issue of data deficiency, a survey questionnaire has been developed for use in obtaining information to fill in the gaps. Results obtained from this survey will be analyzed and supplemented with personal interviews. Administration of the survey is subject to the availability of funds. See Appendix A for a copy of the survey questionnaire.

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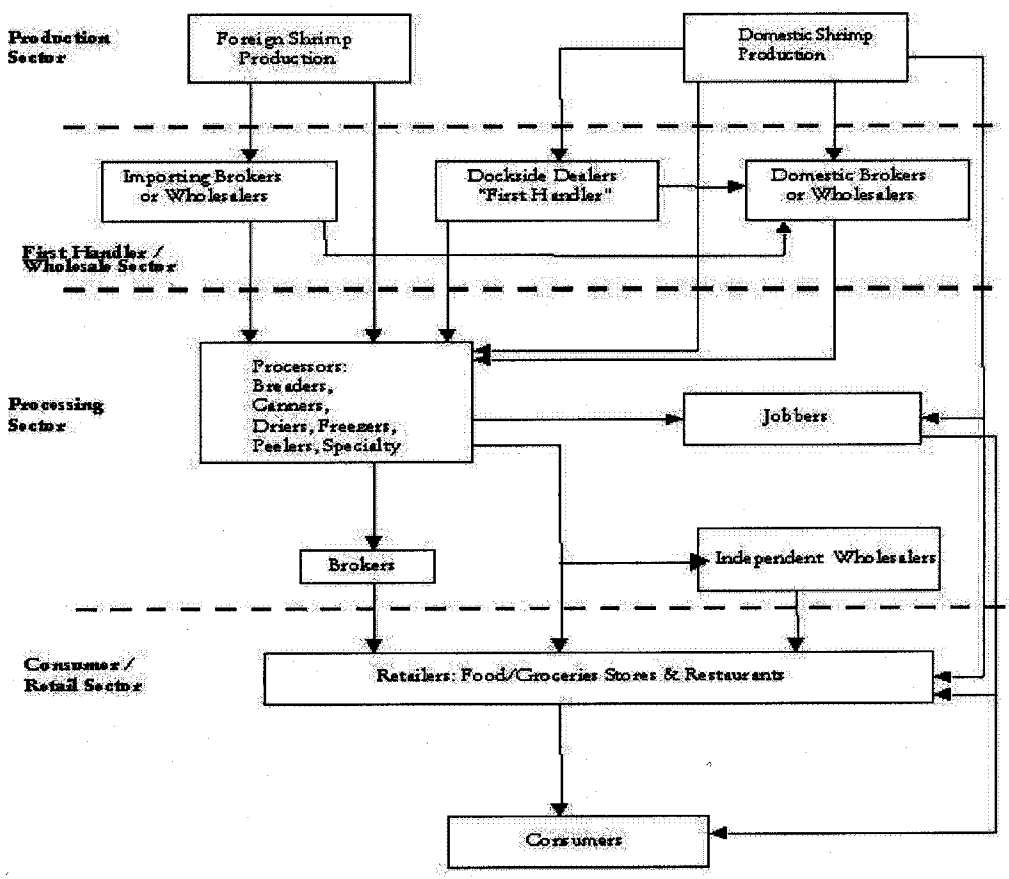
4 This pertains to the prices paid and received in each sector of the industry.

5 At present, adequate information regarding the structure of the retail sector of the shrimp industry is not available. Given the diverse nature of this sector, an approximate determination of the number of participants, especially restaurants, is difficult to obtain. Efforts are underway to appraise the number of firms in this sector and the extent to which they utilize shrimp products.

PART 2: INDUSTRY FRAMEWORK

In order for shrimp to get from the sea to the dinner table, it passes through a complex network of processes related to the harvesting, handling, packaging, processing, and delivery of shrimp products. Firms engaged in these activities comprise the various sectors of the shrimp industry. Figure 1 presents a diagram of these sectors of the industry.

Figure 1: Shrimp Industry Framework



Source: Diop, H. *Impact of Shrimp Imports on the United States' Southeastern Shrimp Processing Industry and Processed Shrimp Market.* Unpublished Ph.D. dissertation. Department of Agricultural Economics. Louisiana State University. August 1999.

Figure 1 divides the shrimp industry into four distinct sectors. These sectors: production, handling/wholesaling, processing, and retailing, pertain to the types of activities that shrimp passes through prior to final consumption.

Businesses engaged in the production sector of the industry are commonly composed of commercial fishermen or harvesters. These enterprises utilize fishing gears and vessels to harvest shrimp.

In addition to domestic shrimp harvesting, another component of this sector of the industry is imported shrimp or foreign shrimp production. This includes shrimp products that are produced and harvested in foreign countries and are shipped and sold in the United States. Domestic harvesters contend that competition from imports is one factor that endangers their economic survival (LDWF, 1998). Diop (1999) noted that a U.S. International Trade Commission report found that domestic shrimp harvesters were impacted by increasing shrimp imports.

Another sector of the shrimp industry is comprised of enterprises engaged in the handing of shrimp landed. These handlers, dealers, and brokers purchase shrimp from domestic harvesters and some are engaged in the importation of shrimp from other countries.

The third sector of the shrimp industry primarily consists of firms engaged in the processing of shrimp. Processing involves the canning, breading, drying, freezing, or peeling of shrimp.

Once shrimp has been processed, it moves into the hands of wholesalers who distribute the shrimp to retailers. These retailers represent restaurants, institutional clients[6], grocery stores, and retail outlets.

Figure 1 shows that the flow of shrimp in the industry does not necessarily follow the production-handling-processing-retail route. Domestic harvesters can bypass handlers and pass on their shrimp directly to processors, retailers, or even final consumers. Such an arrangement is dependent on the fact that some harvesters also hold wholesale/retail licenses which enable them to sell directly to retailers or final consumers. Another set-up is based upon contractual arrangements that exist between firms in various sectors of the industry.

In a study of small shrimp marketing in Louisiana (Roberts and Pawlyk, 1986), it was noted that varying degrees of integration exist in the state's shrimp industry. Firms engaged in the handling sector may also own vessels utilized in the production sector. Another finding was that several firms engaged in the processing/wholesale sector were also involved in the production and handling sectors through ownership of vessels and docks.

The succeeding sections of this report focus on the structure of the various sectors of the shrimp industry. It also provides historical information on prices and participation by firms.

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6 Institutional clients include hospitals and schools.

PART 3: INDUSTRY SECTORS

3.1 Domestic Production

3.1.1 Landings

Based on information gathered from the National Marine Fisheries Service from 1950 to 1998, the volume of shrimp landed in Louisiana has increased from 77.8 million pounds in 1950 to over 104 million pounds in 1998. Despite this 26.2 million pound increase in forty-nine years, the increase in landings have not been smooth. Figure 2 provides an illustration of Louisiana shrimp landings for this time period.

Figure 2: Louisiana Shrimp Landings, 1950-1998

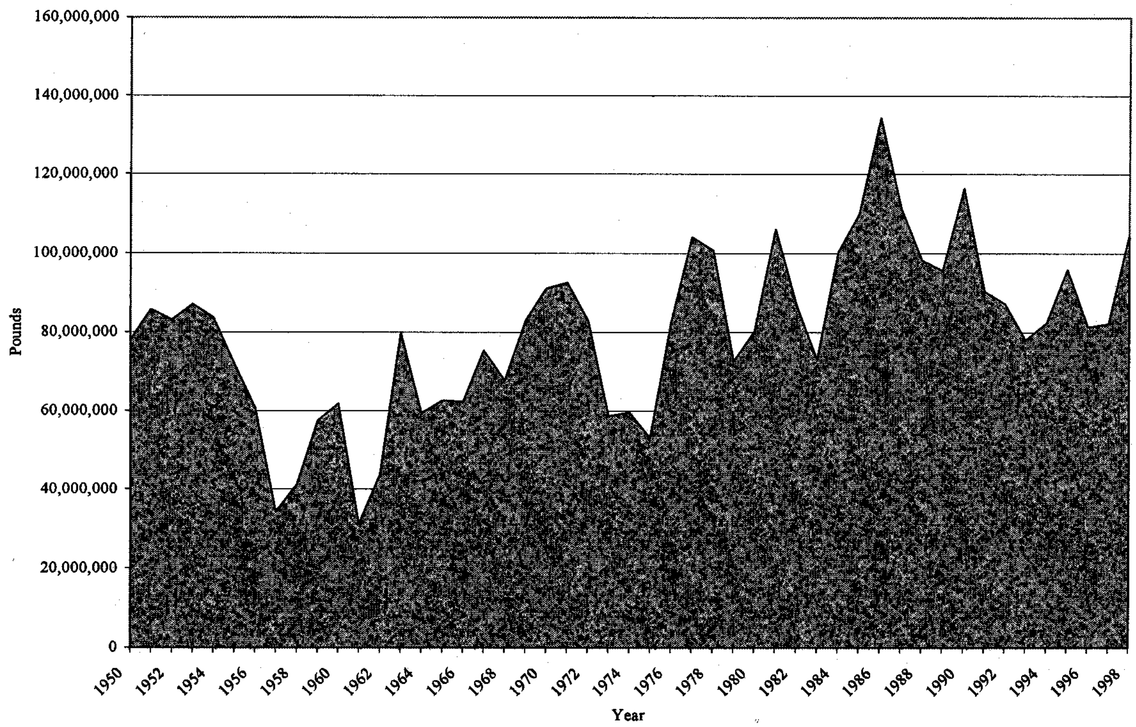
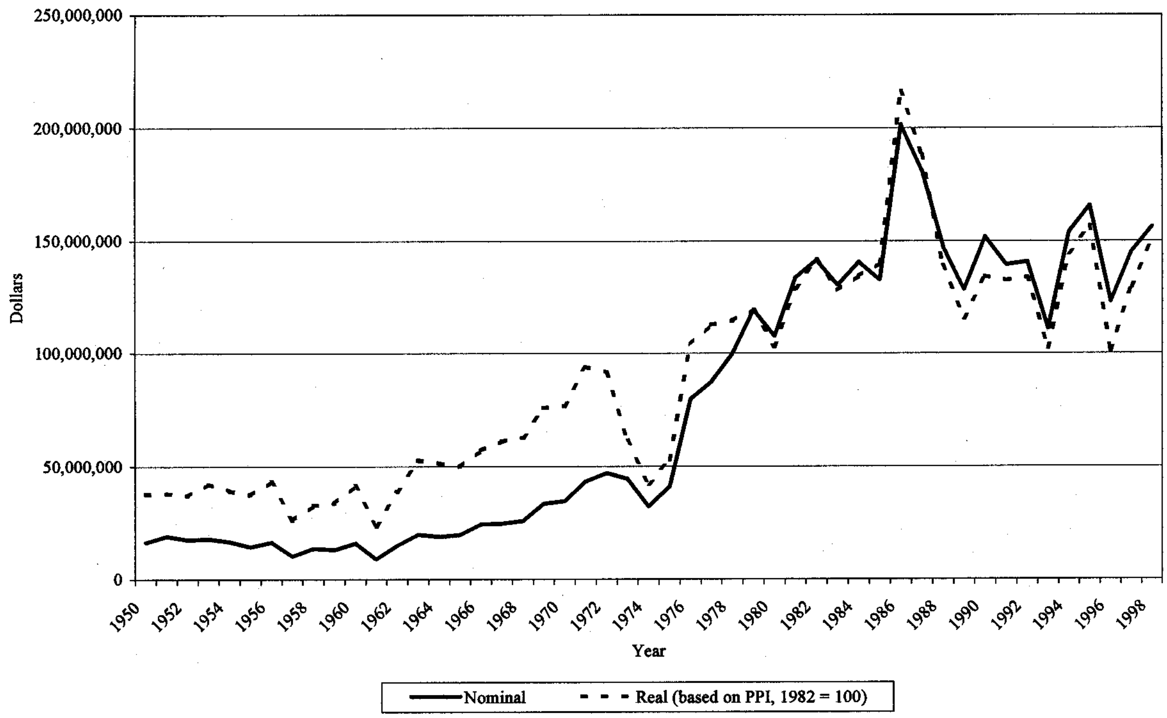


Figure 2 shows that the lowest volume of shrimp landed in Louisiana was posted in 1961 at roughly 31 million pounds. On the other hand, the state experienced its highest landings volume in 1986 at a little over 135 million pounds of shrimp. In spite of these relatively large changes in volume of shrimp landed, the average annual change in volume increased by 4% from 1950 to 1998.

3.1.2 Value of Landings

Figure 3 provides a graphical representation of the total value of shrimp landed in Louisiana from 1950 to 1998. It can be seen that the value of shrimp landings steadily increased over the last half century. In nominal terms, the value of landings increased a little under tenfold from $16 million in 1950 to $156 million in 1998. This represented an 8% average annual increase in landings value. This translated to a yearly average landings value of approximately $75.8 million.

Figure 3: Total Value of Louisiana Shrimp Landings, 1950-1998



In real[7] dollar terms, the value of landings has increased from approximately $37.6 million in 1950 to $150 million in 1998. This represented a 6% increase in average annual landing value.

In terms of value[8] per pound of shrimp landed, Figure 4 provides a similar illustration to that of total value landed. From 1950 to 1998, the price per pound of shrimp landed in Louisiana has

7 Represented in 1982 dollars. In order to counter the impact of inflation on annual landing values, nominal landing values were deflated using the Producer Price Index (PPI). The base year for this PPI was 1982.

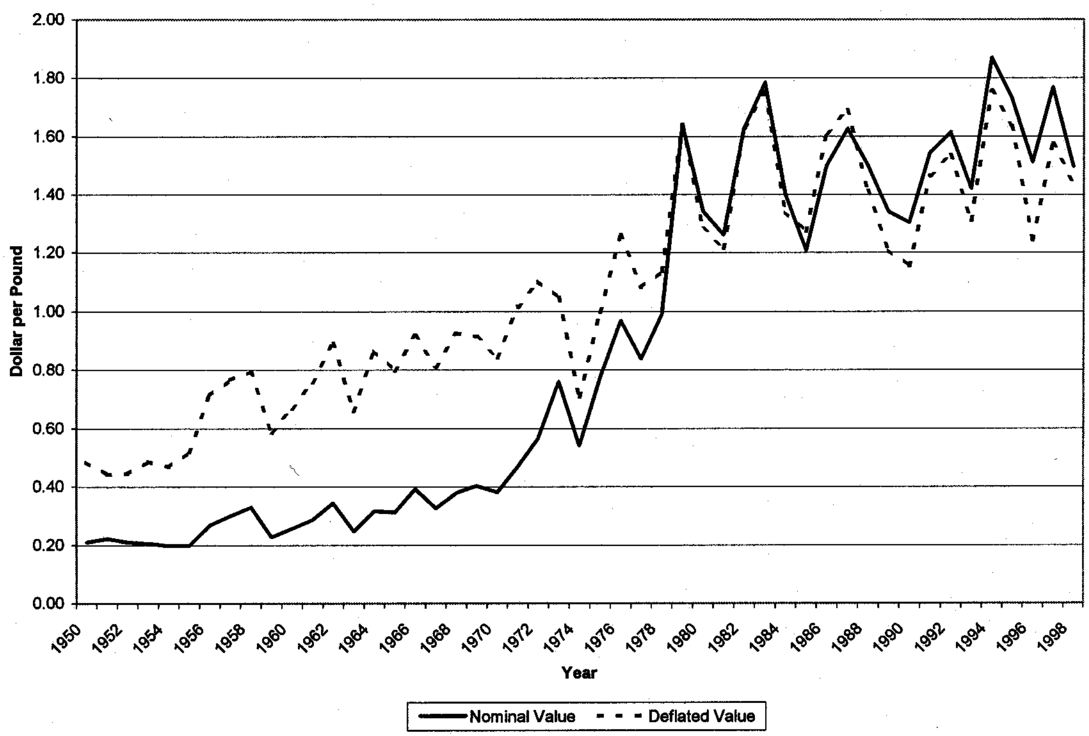
Given the framework used in this analysis, it is argued that the PPI would be the more appropriate deflator to use. This is because of the fact that shrimp landed by harvesters is used as an input in additional processes prior to it reaching the consumer for final consumption.

8 Value, in this case, is based on average price per pound. The value per pound does not take into consideration size count of shrimp landed.

increased, in nominal terms, from $0.21 per pound in 1950 to $1.50 per pound in 1998. This represents an average annual increase of approximately 6%.

If the influence of inflation was taken into consideration, the rise in real price per pound[9] of shrimp landed would not be as steep as the nominal increase. In real terms, the price per pound of shrimp landed increased by an average annual rate of 4%.

Figure 4: Average Price per Pound of Shrimp Landed in Louisiana (1950-1998)



3.1.3 Monthly Price Trends in Shrimp Landed Based on Shrimp Species

Figure 4 has shown that the average price per pound of shrimp landed in Louisiana has exhibited a generally upward trend. It should be noted that these prices reflect annual averages for all species of shrimp landed in the state. If the average price per pound of shrimp landed were tracked on a monthly basis, these prices would display fluctuations based on the month and the type of shrimp species landed.

Using average monthly price and volume of brown and white shrimp landed data from the National Marine Fisheries Service, Figures 5 and 6 illustrate fluctuations in the prices per pound of brown and white shrimp. In terms of landings of brown and white shrimp, fluctuations in volume

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9 The nominal or actual values were deflated using the PPI (1982 based year).

Figure 5: Average Monthly Price per Pound of Brown Shrimp Landed in Louisiana (1990-1998)

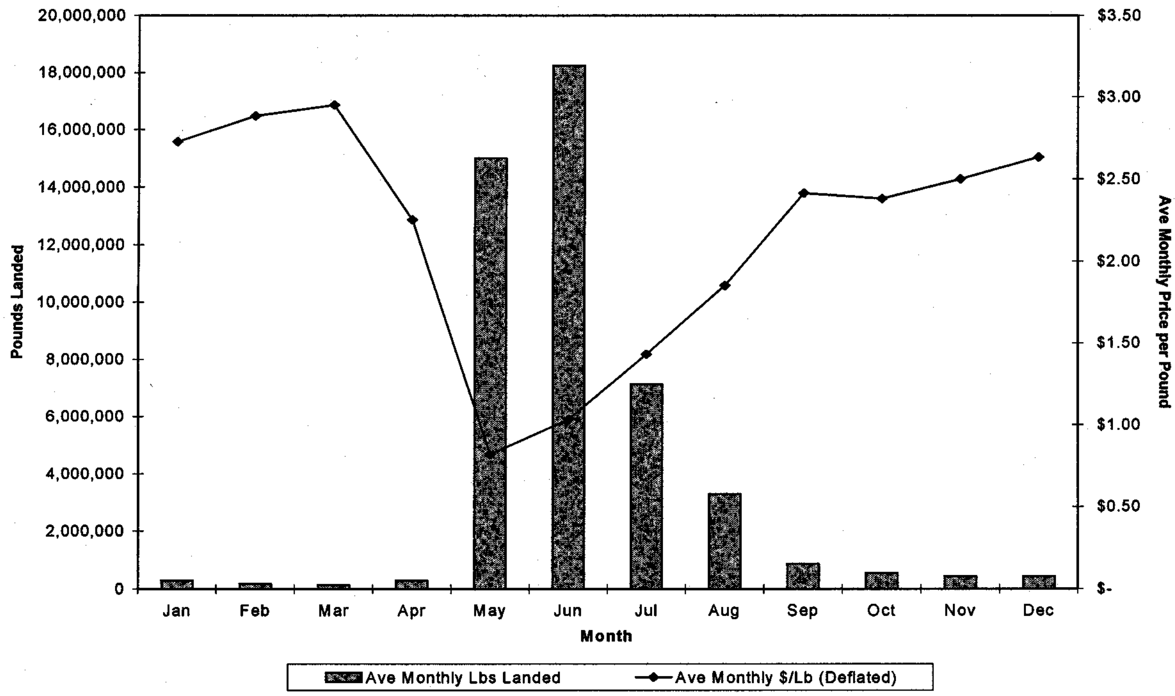
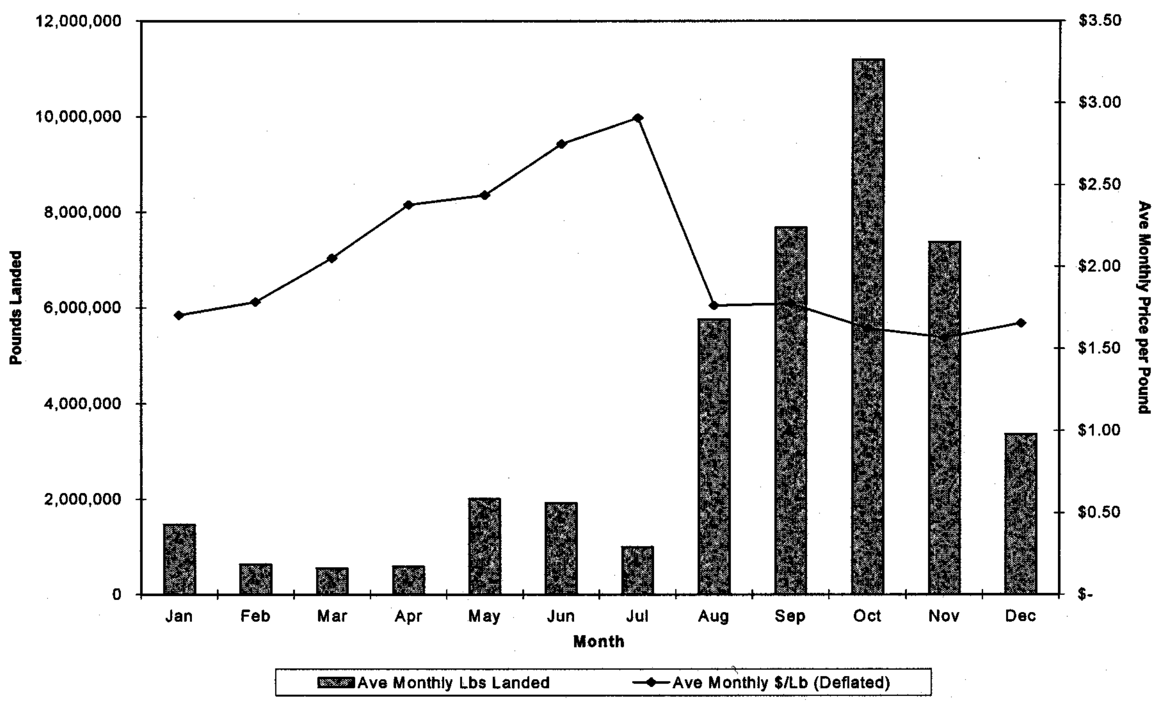


Figure 6: Average Monthly Price per Pound of White Shrimp Landed in Louisiana (1990-1998)



landed coincide with the traditional seasons[10] for the harvests in Louisiana of brown and white shrimp.

In the case of brown shrimp, the average price per pound drops from an average high value of $2.95 in March to an average low value of $0.82 in May[11]. This drop in prices corresponds with the harvest season for brown shrimp in Louisiana which traditionally run from May to July.

Price trends for white shrimp exhibit similar characteristics as that of brown shrimp. The average monthly price per pound of white shrimp tends to decrease from August through December, which are the months that represent the traditional period for the harvest of white shrimp in Louisiana.

A cursory inspection of the data presented in Figures 5 and 6 suggest that price trends between brown and white shrimp, when compared across months in a year, are inversely related. While no attempt has been made to conduct an in-depth investigation of this inverse relationship, it remains feasible that the time period for harvesting these respective species of shrimp is one major reason for these divergent prices for brown and white shrimp.

3.1.4 Vessels and Gears

It is difficult to determine with certainty the number of participants in the domestic shrimp harvesting sector. Members of this sector are represented by fishermen and deckhands. An alternative means[12] of estimating participation is to use the number of persons who possess vessels and fishing gear licenses for use in the harvesting of shrimp.

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10 Louisiana Department of Wildlife and Fisheries, *A Fisheries Management Plan for Louisiana's Penaeid Shrimp Fishery*, Louisiana Department of Wildlife and Fisheries, Office of Fisheries, 1992.

11 These prices are derived by taking the average monthly prices for each month from 1990 to 1998. For example, January average prices from 1990 to 1998 are averaged to arrive at a mean/average price that is used in this analysis.

12 This proxy method will not provide an accurate number of persons involved in the harvesting sector. Measuring participation using the number of vessels licensed may underestimate the total number of participants. A vessel may be licensed to an owner who is not necessarily directly engaged in the harvest of shrimp. Furthermore, this measure does not take into consideration the hiring of deckhands.

On the other hand, reporting the number of licensed fishing gear may overestimate the number of vessels in the state's commercial shrimp fishing fleet. Issuance of gear licenses is not specifically tied to the vessel which uses the gear. One person, who possesses a license for one vessel, may possess more than one type of gear license.

Figure 7: Individuals Holding Shrimping Gear Licenses (Any Type)

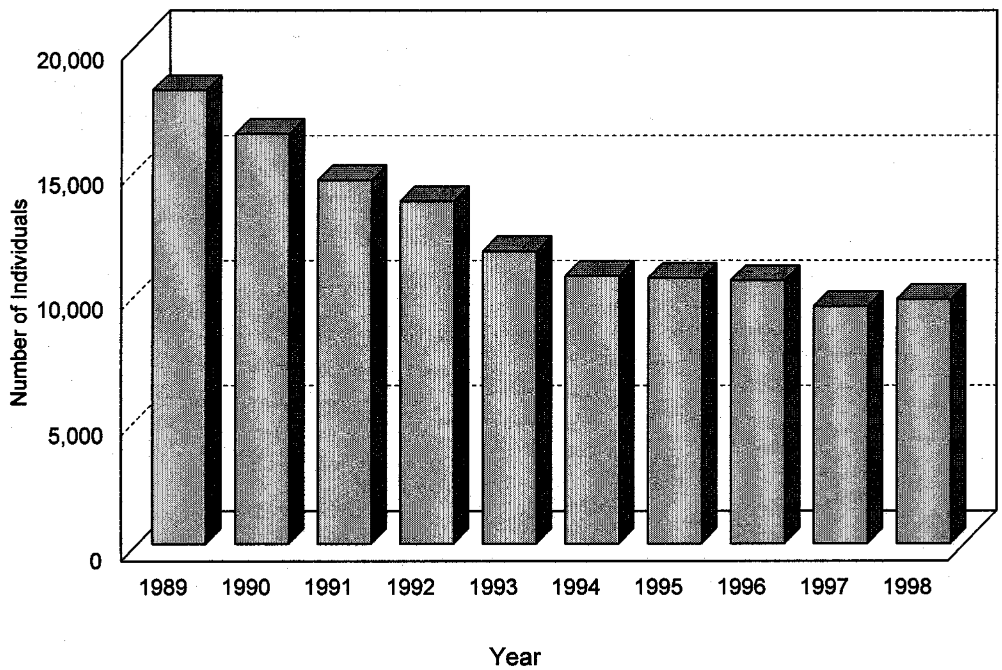


Figure 7 provides an illustration of the number of individuals who are licensed in the State of Louisiana to possess shrimp gears[13]. Based on data collected by the Louisiana Department of Wildlife and Fisheries' Socioeconomic Research and Development Section, the number of individuals possessing any type of shrimp gear license has decreased 46.5% from 1989 to 1998. Over this ten year period, the number of license holders declined from 16,509 in 1989 to 8,825 in 1998.

This graph does not portray a long-term trend of decreasing participation. As with most industries, participation takes on a cyclical nature. It should be noted that 1998 license holders increased by 362 from the previous year.

In terms of parish of residence, Figure 8 shows the geographic composition of 1998 shrimp gear license holders. This pie chart shows that Terrebonne Parish residents possess 17.3% of 8,825 shrimp gear licenses sold in 1998. Jefferson and Lafourche Parishes rounded up the top three parishes in terms of possession of shrimp gear licenses with 15.4% and 13.6%, respectively. These three parishes have consistently held the most number of individuals possessing shrimp gear licenses over the past ten years.

The same trend of declining license holders also characterize the number of licensed commercial fishing vessels in Louisiana. Figures 9, 10, and 11 provide illustrations of the number

13 The most common shrimp gear licenses in Louisiana are as follows: (1) shrimp trawls; (2) butterfly nets; and, (3) skimmer nets.

of vessels licensed to holders of shrimp trawls, butterfly nets, and skimmer nets. It should be noted that the holders of vessel licenses can possess more than one gear type license.

Figure 8: License Holders by Parish (1998)

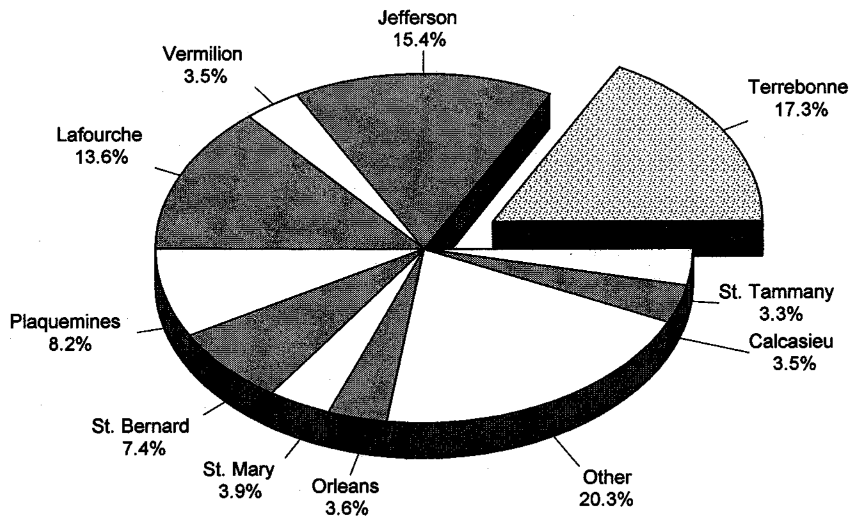


Figure 9: Vessels Licensed to Holders of Shrimp Trawl Licenses

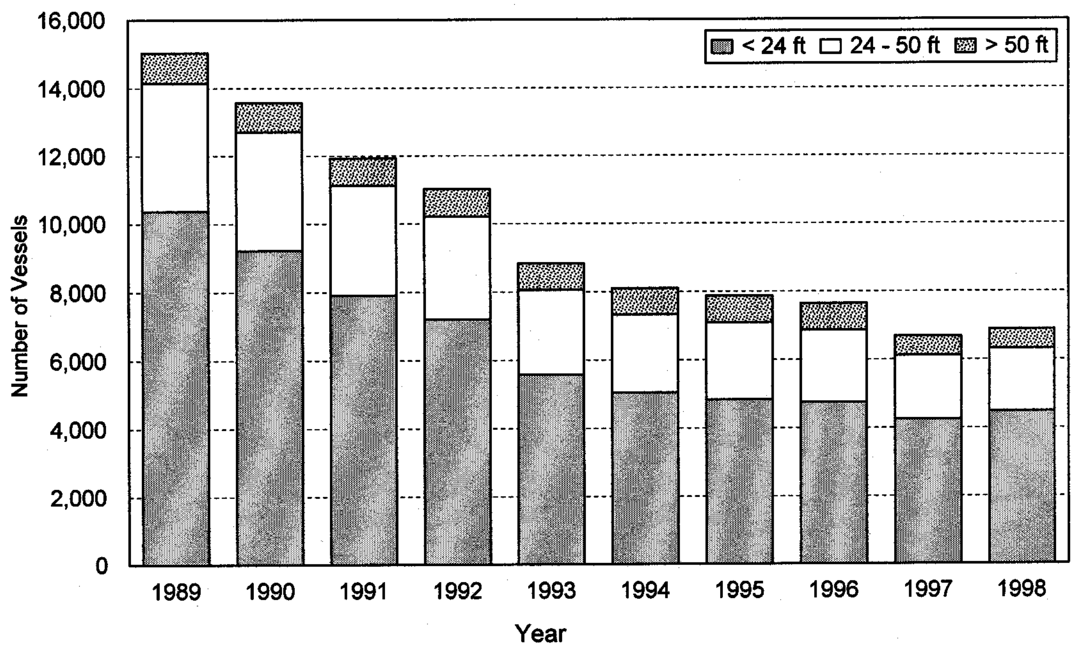
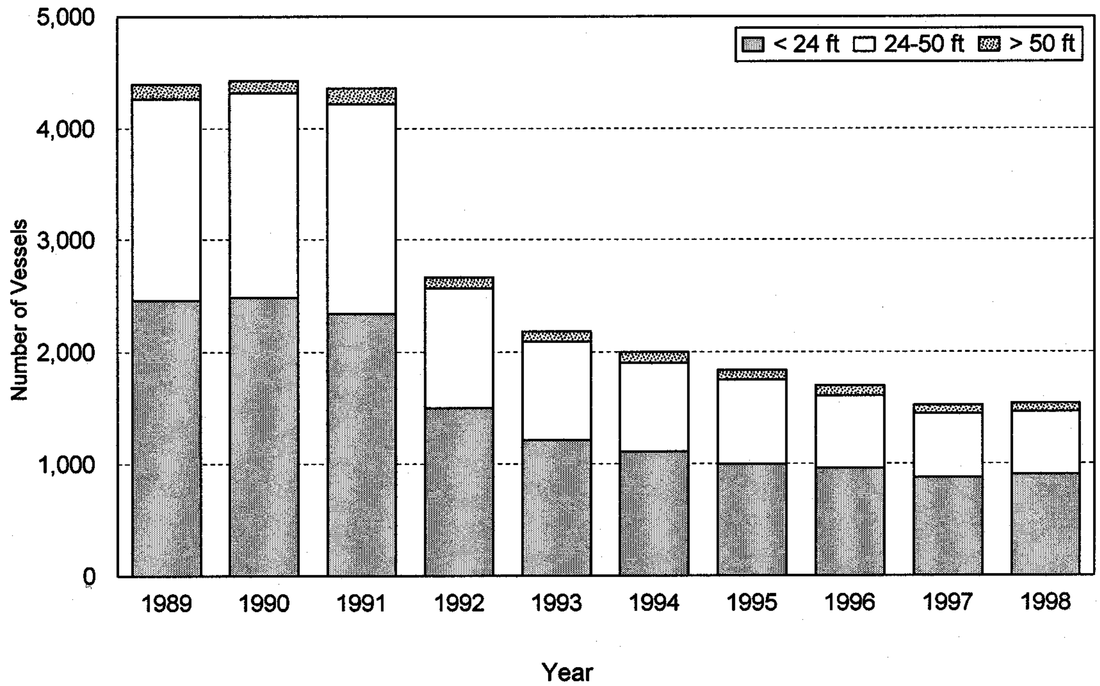


Figure 9 shows that the number of vessels licensed to shrimp trawl license holders decreased from 15,042 in 1989 to approximately 6,887 in 1998. This represented a 54% drop in the number of commercial shrimp fishing vessels that utilized trawl gears. This decreasing rate was not the same based on vessel length category.

The number of licensed vessels less than 24 feet in length dropped from 10,373 in 1989 to 4,488 in 1998. This represented an approximate decrease of 57% over the ten year period. In the case of the number of licensed vessels between 24 to 50 feet in length, the number of licensed vessels decreased from 3,774 in 1989 to 1,831 in 1998. This represented a 52% decline in the number of vessels in this length category. Vessels in the over 50 feet category experienced the lowest decline in terms of shrimp trawl usage. Over the ten year period, this vessel length category registered a 37% decline from 895 vessels in 1989 to 568 vessels in 1998.

Figure 10: Vessels Licensed to Holders of Butterfly Net Licenses



In the case of vessels licensed to holders of butterfly nets, the number of vessels licensed decreased from 4,393 in 1989 to 1,544 in 1998. This represented a 65% decline in the number of vessels licensed to butterfly net license holders.

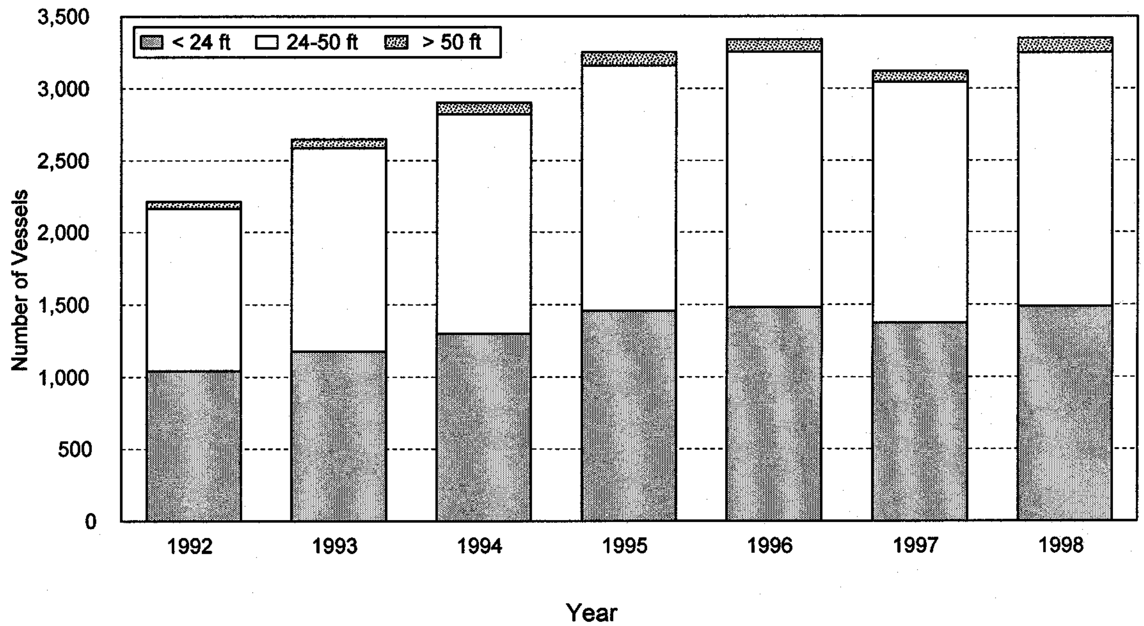
In terms of vessel length, butterfly net license holders who possess licenses for vessels under 24 feet in length experienced a 63% decline in the number of vessels licensed. From 2,461 vessels in 1989, the number of vessels less than 24 feet declined to 907 vessels in 1998.

Vessels in the 24 to 50 feet range experienced the largest decline for butterfly license holders. From 1,805 vessels licensed in 1989, the number decreased to 562 in 1998. This represented a 69% decline in the number of vessels licensed to butterfly net license holders.

Butterfly net license holders, who possess licenses for vessels in the greater than 50 feet length category, experienced the lowest rate of decrease. Out of the 127 vessels licensed in 1989, approximately 75 remained as licensed vessels in 1998. This signified a 41% drop in licensed vessels with butterfly nets over the time period under investigation.

Vessels licensed to skimmer net license holders were the only group that did not experience any decline in the number of licensed vessels from 1992 to 1998. In this seven year period, the number of licensed vessels increased from 2,214 to 3,348, a 51% increase over the period under consideration.

Figure 11: Vessels Licensed to Holders of Skimmer Net Licenses

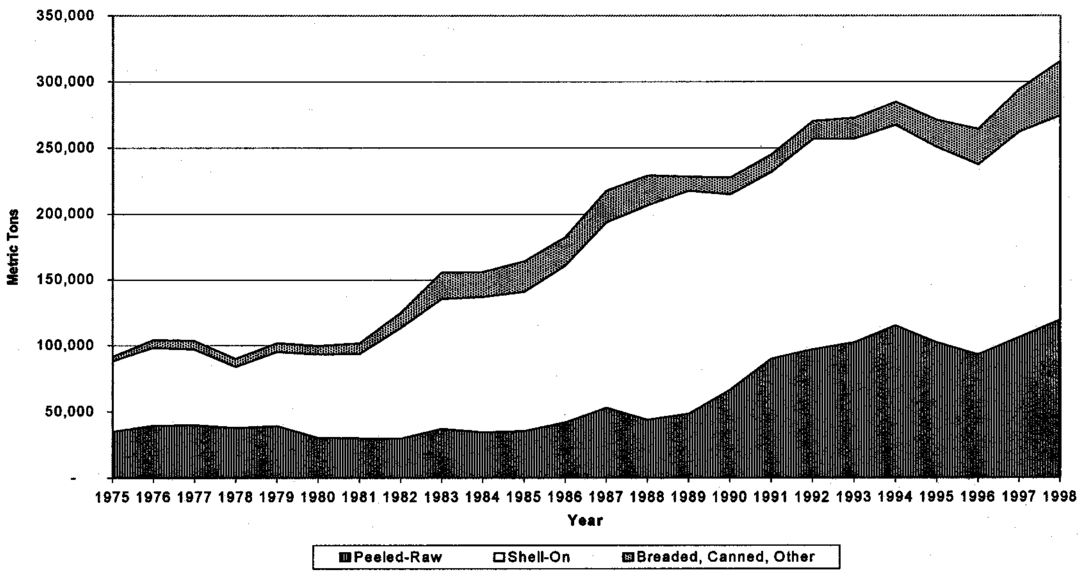


Vessels in the greater than 50 feet in length category posted the largest increase at 96%, from 51 vessels in 1992 to 100 vessels in 1998. The 25 to 50 feet vessel category showed the next largest gain at 57%. This category experienced an increase of 640 vessels from 1,118 in 1992 to 1,758 in 1998. Vessels in the less than 24 feet category posted the lowest increase at 43% from 1992 to 1998. This meant that the number of vessels in this category increased from 1,045 in 1992 to 1,490 in 1998.

3.2 Shrimp Imports

In addition to domestic shrimp harvests, another component of the production sector is the importation of shrimp from foreign countries. Based on data gathered from the National Marine Fisheries Service, the volume of shrimp imported into the United States has steadily increased from 91,380 metric tons in 1975 to 315,442 metric tons in 1998. This represents a 6% average annual increase in shrimp imports of various product types. Figure 12 provides a visual representation of U.S. shrimp imports.

Figure 12: Volume of U.S. Shrimp Import (1975-1998)

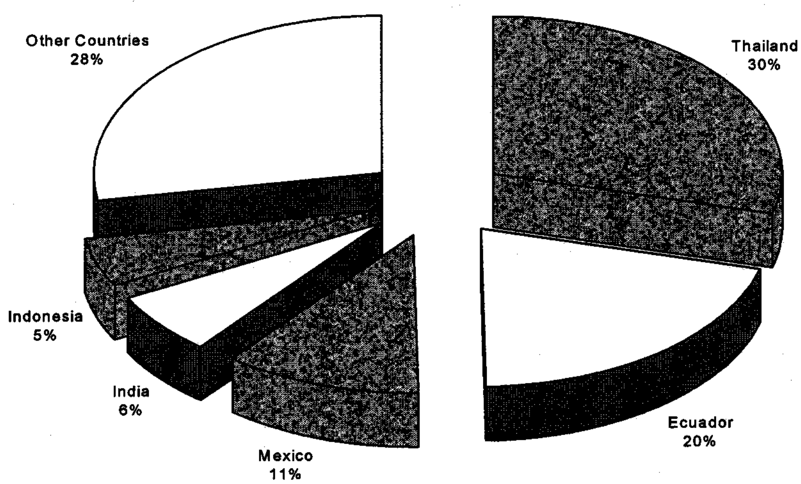


The largest component of shrimp imports into the U.S. has been in the form of headless, shell-on shrimp. From 1975 to 1998, close to 60% of annual imports has been in this product form. The second largest component of U.S. shrimp imports has been in the peeled product form. Imports of this form have risen from 34,772 metric tons in 1975 to 119,250 metric tons in 1998. This represents approximately 32% of average annual imports. Processed forms, such as breaded and canned shrimp, represent another group of shrimp imports. Shrimp imported in these forms have accounted for 8% of average annual imports from 1975 to 1998. For a more detailed treatment of shrimp imported into the U.S. by product type, please see Appendix C.

From which countries do U.S. shrimp imports come from? The U.S. imports shrimp from more than 60 countries (National Marine Fisheries Service, 1999) ranging in volume from several metric tons to thousands of metric tons. Figure 13 provides a pie chart of the top five nations from which the U.S. imports shrimp.

In 1998, the top five exporters of shrimp to the U.S. came from Asia and Latin America. Thailand exported the largest volume of shrimp in 1998 at around 92,265 metric tons. The volume of Thailand's 1998 shrimp exports to the U.S. was slightly lower than the combined volumes of the second and third largest exporters, Ecuador and Mexico. Asian and Latin American dominance of 1998 U.S. shrimp imports extended beyond the Top Five. If all Asian and Latin American sales of shrimp to the U.S. were combined, this would represent 99% of the total volume of U.S. shrimp imports for 1998.

Figure 13: Top Exporters[14] of Shrimp to the U.S. (1998 Imports = 315,000 MT)



3.3 Handling/Wholesaling Sector[15]

The handling/wholesaling sector forms the second link in the shrimp industry's distribution channel. Based on information provided in Figure 1, this sector includes dockside dealers/first handlers and brokers/wholesalers, which are classified as importing or exporting brokers/wholesalers. These firms engage in the purchase of shrimp in its raw form[16] and sell the shrimp to firms further down the distribution channel.

To further understand the characteristics of this sector, information on the number of firms in this sector and the volume of shrimp product handled are discussed. Upon presentation and discussion of this information, an analysis of the sector's structure is conducted in order to appraise the market power of firms in the sector.

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14 For purposes of this analysis, the terms "exports" and "imports" are used interchangeably to refer to the same volume. The term "exports" are used in reference to the product's country of origin while "imports" refer to U.S. purchases of this product.

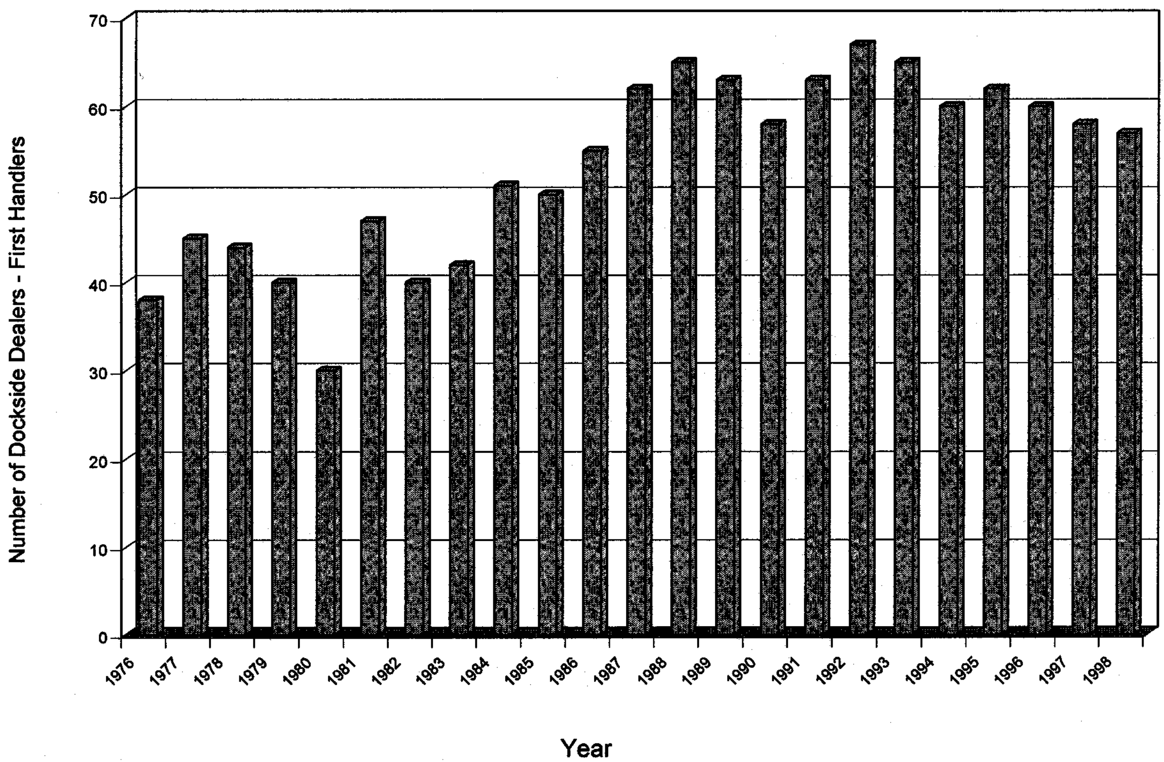
15 The information presented in this section pertains to dockside dealers - first handlers. The figures developed in this section were derived from data obtained from the National Marine Fisheries Service office in Galveston, Texas.

16 This definition of the handling sector was derived from the study conducted by Roberts and Pawlyk (1986).

3.3.1 Number and Distribution of Dockside Dealers - First Handlers

Based on information presented in Figure 14, the number of dockside dealers - first handlers in Louisiana increased from 38 in 1976 to 57 in 1998. Despite the 50 percent increase in the number of dockside dealers - first handlers over the 23 year time period, this rise was marked with peaks and troughs. From a low of 30 in 1980, the number of Louisiana dealers/handlers climbed to a total of 67 in 1992. Since that time, the number of dealers has decreased at an annual rate of 3 percent.

Figure 14: Number of Dockside Dealers - First Handlers in Louisiana (1976-1998)



Most dockside dealers/ first handlers operate out of more that one port. Figure 15 illustrates the average distribution of dealers/handlers in various parishes throughout the state. The figure shows that a considerable number of dealers/handlers conduct their business activities at ports located in Terrebonne Parish. Approximately 36 percent[17] of dealers/handlers transact the purchase of raw shrimp out of ports in the western and eastern portions of this parish. In addition to Terrebonne Parish, several other parishes in Southeast Louisiana exhibit a considerable presence of dockside dealers/first handlers of shrimp. These parishes are Plaquemines, Lafourche, Jefferson, and St. Bernard.

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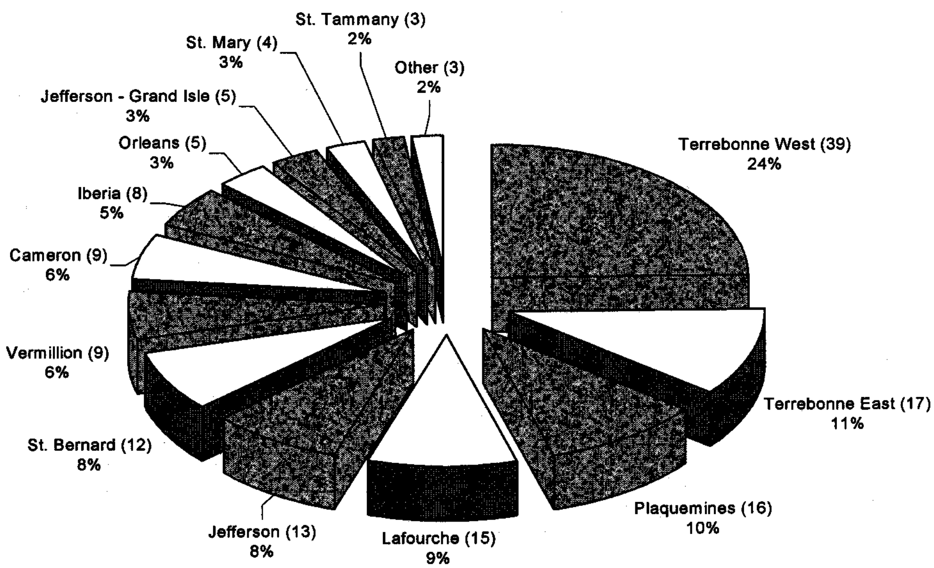
17 On average, 24.7 percent of dealers/handlers operate in western Terrebonne Parish and 10.8 percent of dealers/handlers operate in eastern Terrebonne Parish.

Figure 15: Average Distribution of Dockside Dealers - Fist Handlers by Port/Parish
(number of dealers in parenthesis next to Port/Parish name)



3.3.2 Shrimp Landings by Condition

Information presented in the Production Sector regarding landings has not take into account the condition[18] of the shrimp landed. Figure 16 illustrates the volumes of heads-on and heads-off shrimp landed at dockside in Louisiana from 1986 to 1998. Over the 13 year period, the volume of heads-on shrimp landed in Louisiana has been approximately five-times greater than the volume of landed heads-off shrimp.

In an average year, western Terrebonne Parish[19] receives the largest volumes of heads-on and heads-off shrimp in the state. Roughly 24.4 percent of heads-on and 27.7 percent of heads-off annual shrimp landings in Louisiana take place in the western end of the parish. Ports in Plaquemines and Lafourche Parishes round off the top three ports for average annual landings of heads-on and heads-off shrimp in the state. Please refer to Figures 17 and 18 for a geographic distribution of average annual landings by condition in Louisiana.

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18 For the purpose of this analysis, condition refers to either heads-on or heads-off.

19 Based on information provided by the National Marine Fisheries Service, the Port of Dulac is the primary port in western Terrebonne Parish.

Figure 16: Volume of Shrimp Landed in Louisiana by Condition

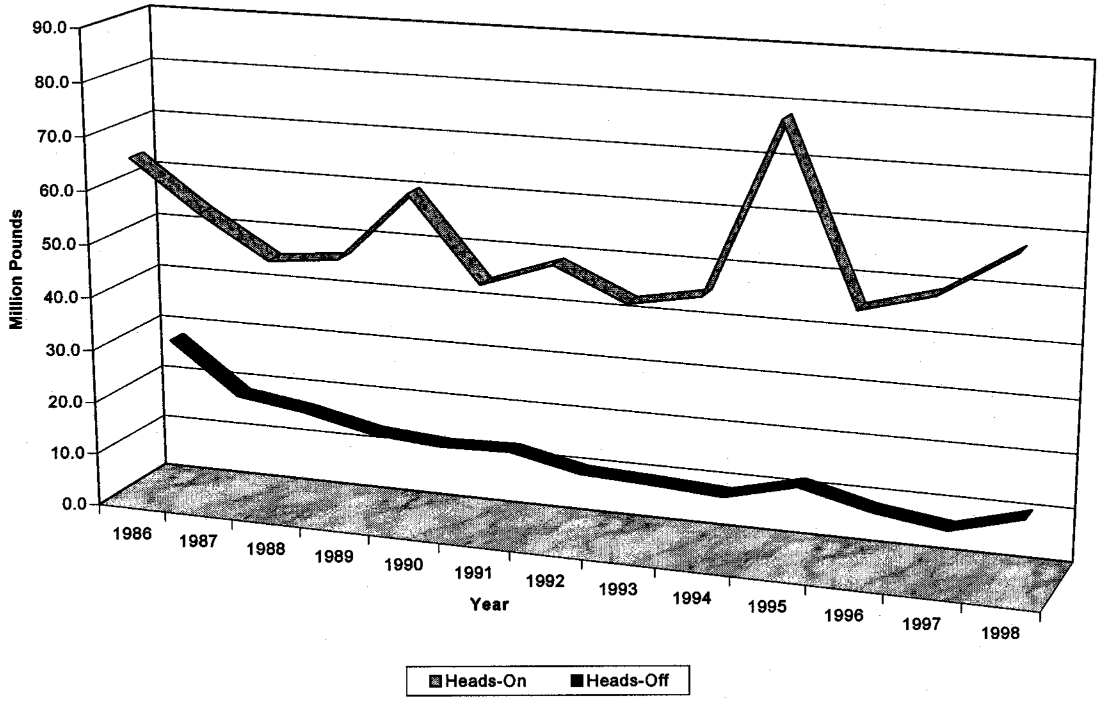


Figure 17: Average Annual Landings of Heads-On Shrimp by Port/Parish
(landings in million of pounds in parenthesis next to Port/Parish name)

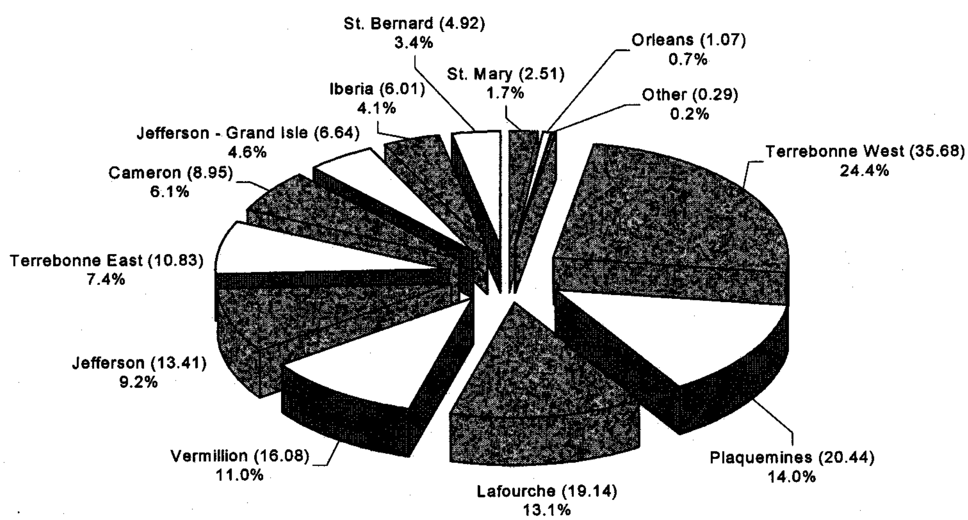
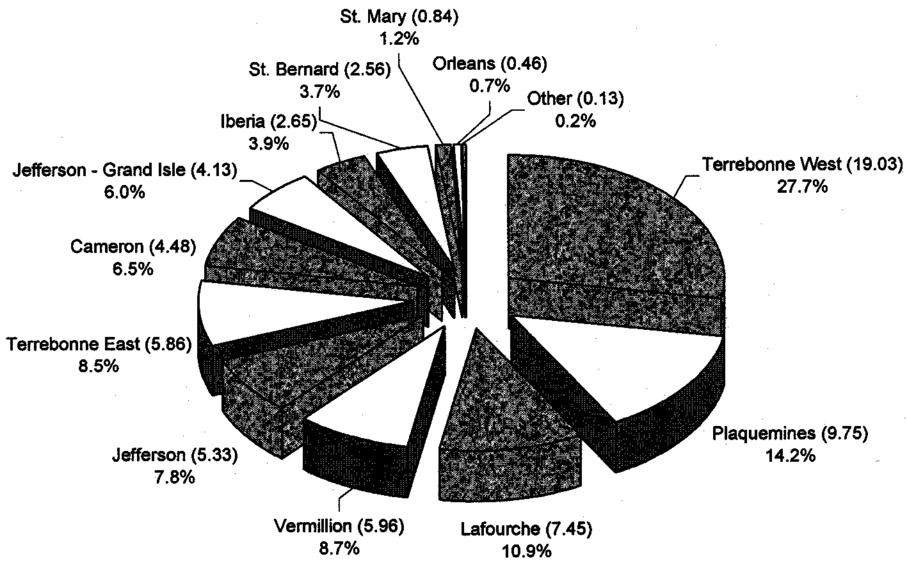


Figure 18: Average Annual Landings of Heads-Off Shrimp by Port/Parish
(landings in million of pounds in parenthesis next to Port/Parish name)



3.3.3 Average Prices Paid Based on Condition[20]

Figure 19 exhibits the trends in prices paid[21] by dealers-handlers for shrimp based on condition. As the graph shows, average prices handled per pound by dealers-handlers for heads-on shrimp has been relatively stable over the 1986-1998 period. Except for average prices per pound in 1994 and 1995, which were $2.30 and $2.11, respectively, the average prices paid by dealers-handlers did not increase considerably from 1986 ($1.38) to 1998 ($1.74).

On the other hand, average prices pound of heads-off shrimp have exhibited an upward trend from 1986 to 1997. Excluding the decline in average prices paid per pound of heads-off shrimp in 1998, average prices increased by 42 percent from $4.15 per pound in 1986 to $5.90 per pound in 1997.

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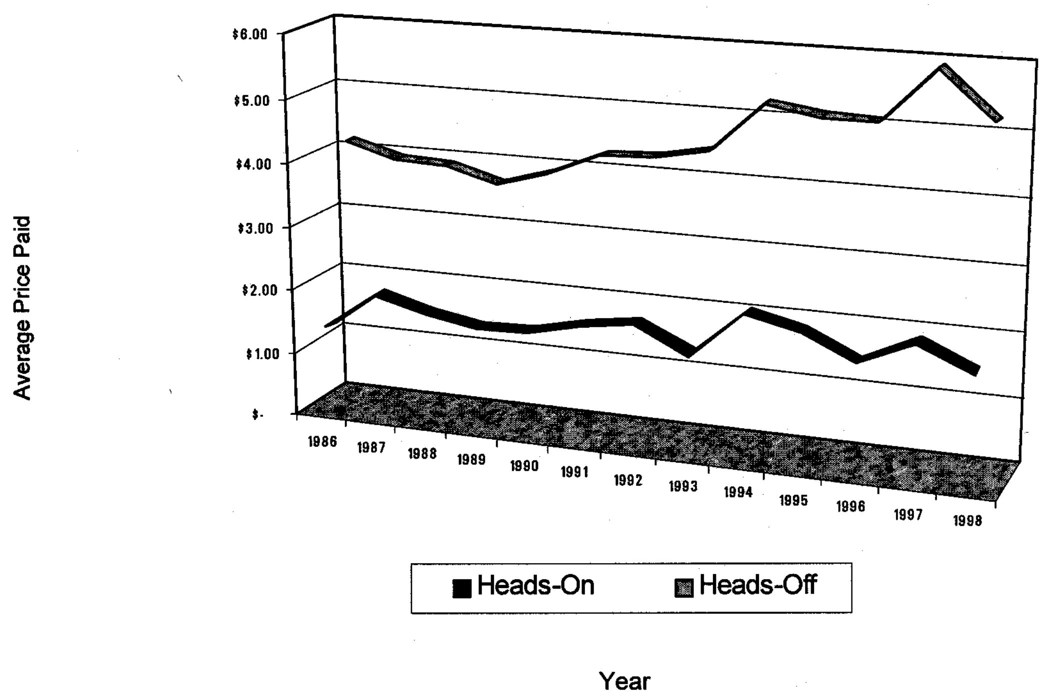
20 For a discussion of average prices paid by size category, refer to Appendix D.

21 These prices paid by dealers/handlers for shrimp equate to the prices received by fishers.

It is interesting to note the magnitude of difference in prices paid by dealers-handlers based on shrimp condition. Comparing average prices based on condition, the price per pound of heads-off shrimp has averaged around 2.5 times greater than the price per pound of heads-on shrimp.

Figure 19: Average Price Paid per Pound of Shrimp Based on Condition



3.3.4 Market Structure of Dockside Dealer - First Handler Sector

Analyzing the market structure of the dealer-handler sector is important in order to understand the behavior of firms operating in this sector. In order to determine market structure, information on the number of dealer-handler firms and value of shrimp that they procure are combined to develop several indicators of market structure. The indicators or measures used in this study are the *Concentration Ratio*[22] and the *Herfindahl-Hirschman Index.*

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22 Concentration Ratios are calculated as follows:

CRn = X1 + X2 + X3 + X4 + ... + Xn

where: **CRn** - concentration ratio for n number of firms; and,
Xi - percent of Total Value of shrimp procured that is attributable to the *ith* dealer-handler.

Example: CR4 = X1 + X2 + X3 + X4 where X1 ... X4 refer to total value procured by 4 largest firms (dealers-handlers).

Concentration Ratios (CR) measure the proportion of total value procured in the dealer-handler sector that is attributable to a given number of the largest firms in that sector. In this report, concentration ratios have been calculated for the proportion of the total value of shrimp products procured by the top four, ten, and twenty Louisiana shrimp dealers-handlers. These ratios represent the market share that those firms have in the sector.

Figure 20: Concentration Ratios for the Top Four, Ten, and Twenty LA Dealers-Handlers

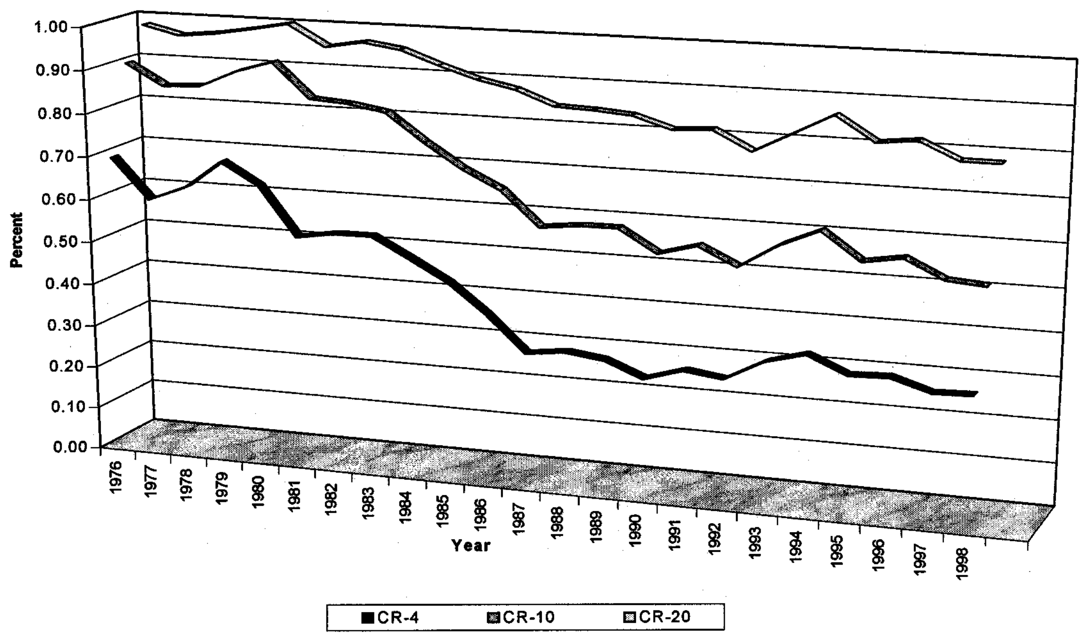


Figure 20 exhibits that over the period of 1976 to 1998, the market shares of the top four, ten, and twenty dealers-handlers in Louisiana have been decreasing over time. The CR-4, which estimates the market share of the top four dealers-handlers in the state, has declined from 70 % in 1976 to 31 % in 1998. This means that in 1976 the top four firms in the dealer-handler sector procured 70 % of shrimp landed in the state. This share steadily declined to 31 % in 1998.

Looking at the market shares of the top ten and twenty dealers-handlers in Louisiana gives us the same indication. The CR-10 for the top ten firms indicates that these firms' market share of shrimp procured has decreased from 90% in 1976 to 53% in 1998. The CR-20 also paints a similar picture. Market share for the top twenty firms has dropped from 98 % in 1976 to 78 % in 1998.

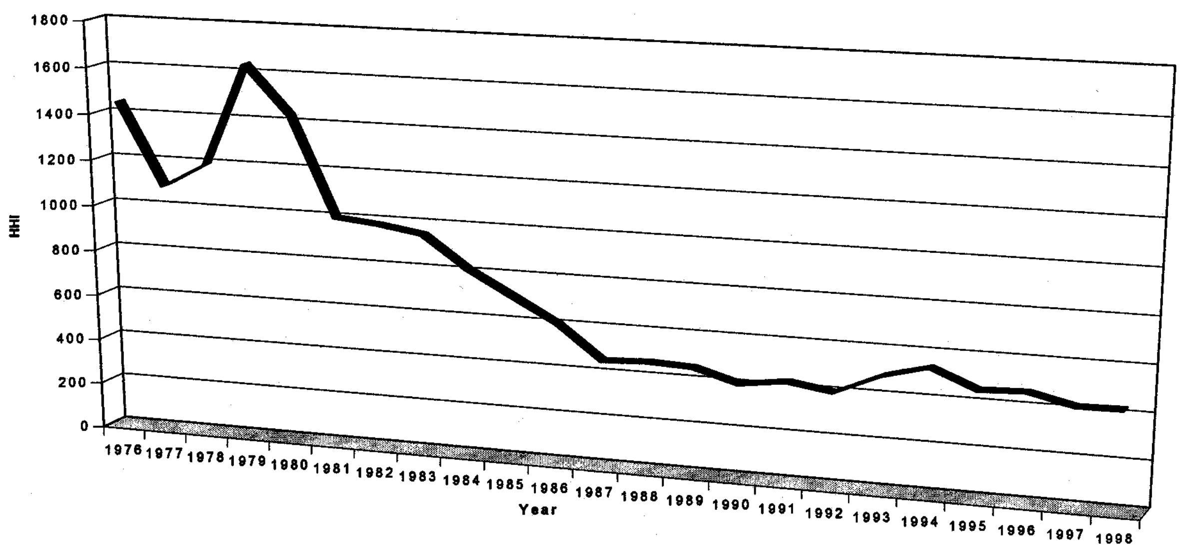
What do the concentration ratios tell us about the Louisiana shrimp dealer-handler sector? The declining ratios indicate that the top four, ten, and twenty dealers-handlers do not have a firm grip on the market for procuring shrimp.

It should be noted that the concentration ratios used in this study only look at certain numbers of firms in the sector. These select number of firms do not necessarily comprise the whole Louisiana dockside dealer - first handler sector. All firms in the sector or industry need to be taken into consideration when analyzing market structure. To remedy this deficiency, the Herfindhal-Hirschman Index is employed to verify the results obtained from the concentration ratios.

The Herfindhal-Hirschman Index (HHI), unlike the concentration ratios, takes into account all the firms in a given sector or industry. It is estimated by summing the squares of the market shares of all the firms in the sector or industry. The higher the HHI value[23] calculated indicates a higher possibility of a concentrated market. Higher HHI values are indicative of potential monopoly power being exercised.

Figure 21 shows the HHI for Louisiana's dealer-handler sector. From 1976 to 1998, the HHI value has decreased from 1449 to 426. This does not suggest the incidence of a concentrated market. Furthermore, coupling this information with the concentration ratios and the increasing number of firms in the sector illustrated in Figure 14, this alludes to the situation wherein there is little friction with respect to firms entering the sector.

Figure 21: Herfindahl-Hirschman Index of the Louisiana Dealer-Handler Sector



23 HHI values range from 0 to 10,000. If the HHI is close to zero, this is indicative of a market where there are numerous small firms. On the other hand, a HHI value close to 10,000 signals that the market is controlled by a few large firms.

The U.S. Department of Justice uses the HHI as a guide for evaluating industry mergers. If a proposed merger will result in a HHI of less than 1,000, the merger will not be challenged. In contrast, proposed mergers which result in HHI values above 1,800 will face a challenge from the department.

3.4 Processing Sector

The processing sector comprises the third portion of the shrimp industry. This sector is composed of firms engaged in the conversion of raw or semiprocessed shrimp into a product suitable for consumption or further processing (Diop, 1999). Firms in this sector are engaged in a number of activities. The shrimp processing activities are as follows: (1) breading; (2) canning; (3) drying; (4) freezing; (5) peeling; and, (6) specialty processing.

In Diop's study of the Southeastern U.S. shrimp processing industry, most shrimp processors in the Gulf Coast and South Atlantic regions are single plant operations. They engage in the processing of several shrimp product forms. In addition to shrimp, these firms also process other seafood products such as crabs, oysters, and other fish products.

Information pertaining to Louisiana's shrimp processing sector is limited. The most definitive study conducted on this matter was by Roberts and Pawlyk in 1986 on marketing of small shrimp in Louisiana. Given the time frame in which this study was conducted, the study's findings may not be reflective of current conditions in this sector.

3.4.1 Number of Louisiana Shrimp Processors and Value of Shrimp Products Processed

Using information obtained from the National Marine Fisheries Service, Figures 22 and 23 provide information on the number of Louisiana shrimp processors and the value of shrimp products processed by these firms. Figure 22 shows that from 1975 to 1997 the number of processors in the state has declined from 48 processors in 1975 to 31 processors in 1997. Despite this overall decline, the number of processors increased to 57 in 1977 before starting its descent to the 1997 level.

Figure 23 provides an illustration of the annual value of shrimp products processed in Louisiana. In nominal terms, the value of shrimp processed increased from $66 million in 1975 to approximately $150 million in 1997. In real[24] terms, the value of processed shrimp products exhibited drastic changes over the 23 year period. From a high level of approximately $350 million of shrimp products processed in 1977, the real value of shrimp products processed by the state's shrimp processing sector has declined and hovered around $150 million throughout the 1990s.

3.4.2 Market Structure

The decline in the number of shrimp processors coupled with the reduction in the real value of shrimp products processed can yield some indication of the structure of Louisiana's shrimp processing sector. An understanding of the sector's structure will allow us to appraise how firms in the sector behave.

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[24] The deflator used in this analysis was the Consumer Price Index. The base year was 1997.

Figure 22: Number of Processors in Louisiana (1975-1997)

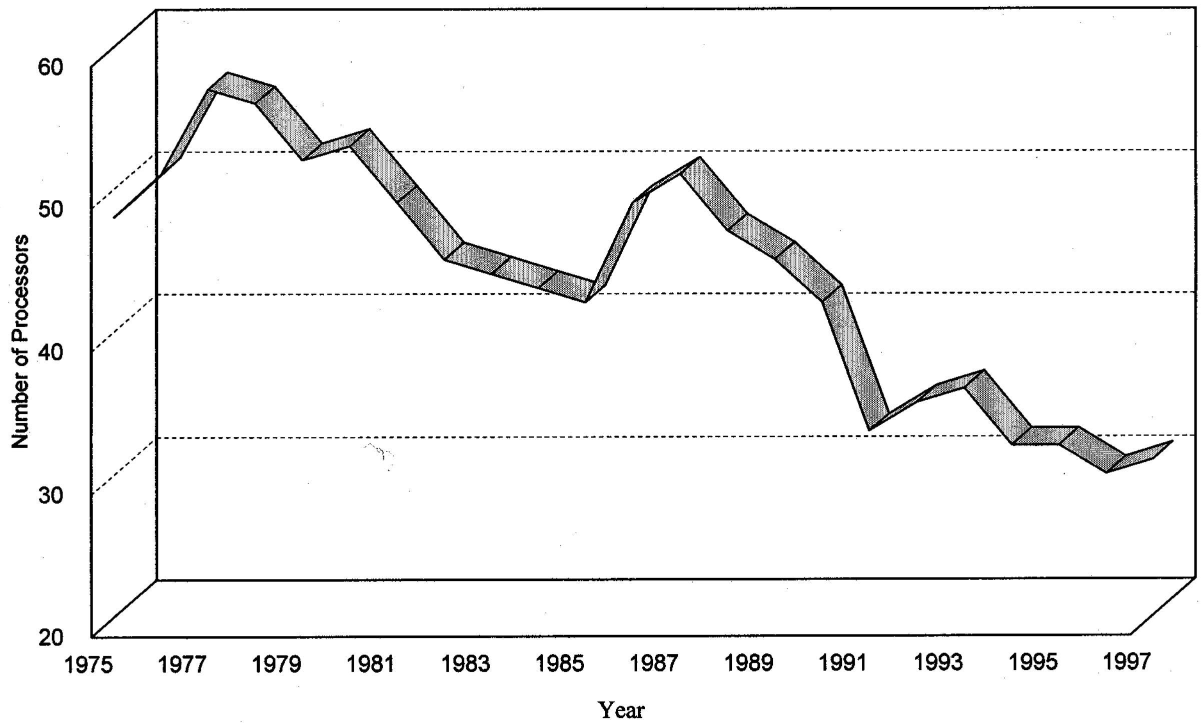


Figure 23: Total Value of Processed Shrimp Products in Louisiana (1975-1997)

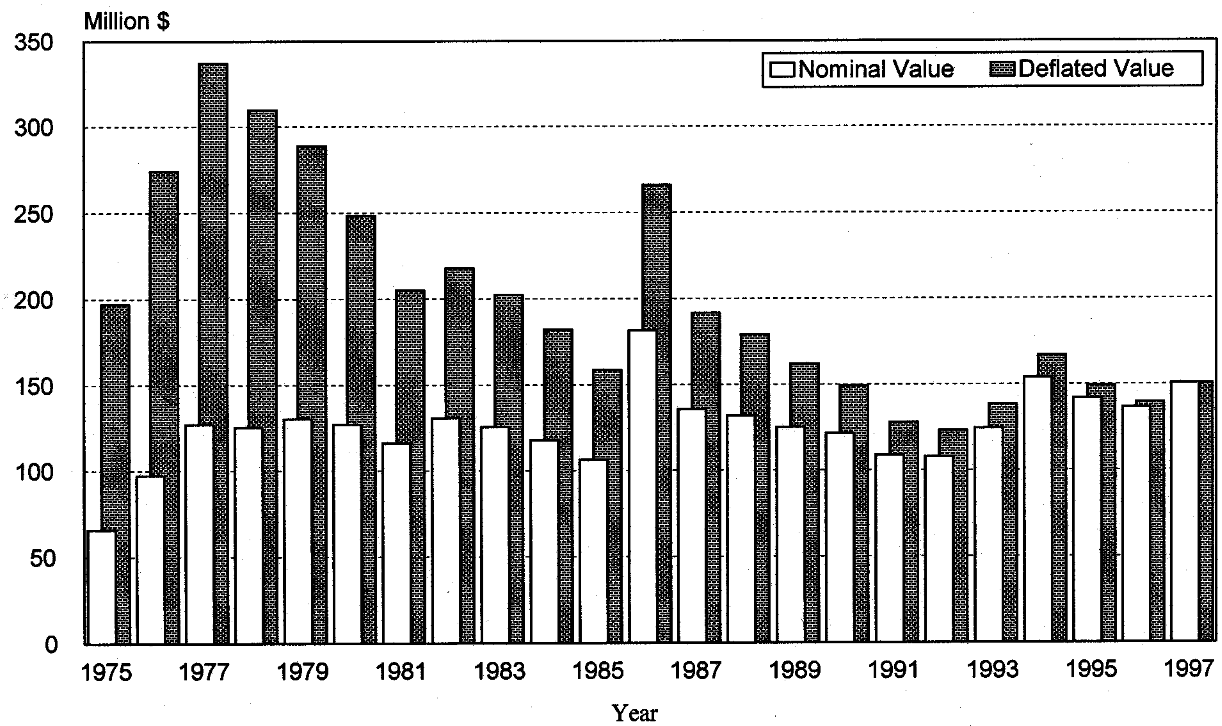


Figure 24: Concentration Ratios for the Top Four, Ten, and Twenty LA Shrimp Processors

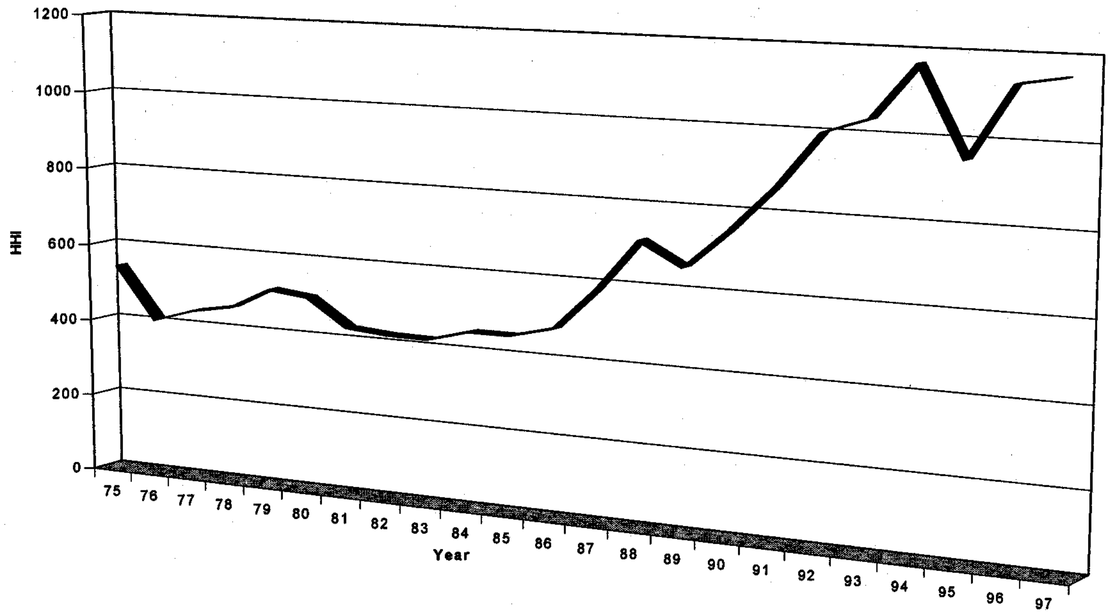
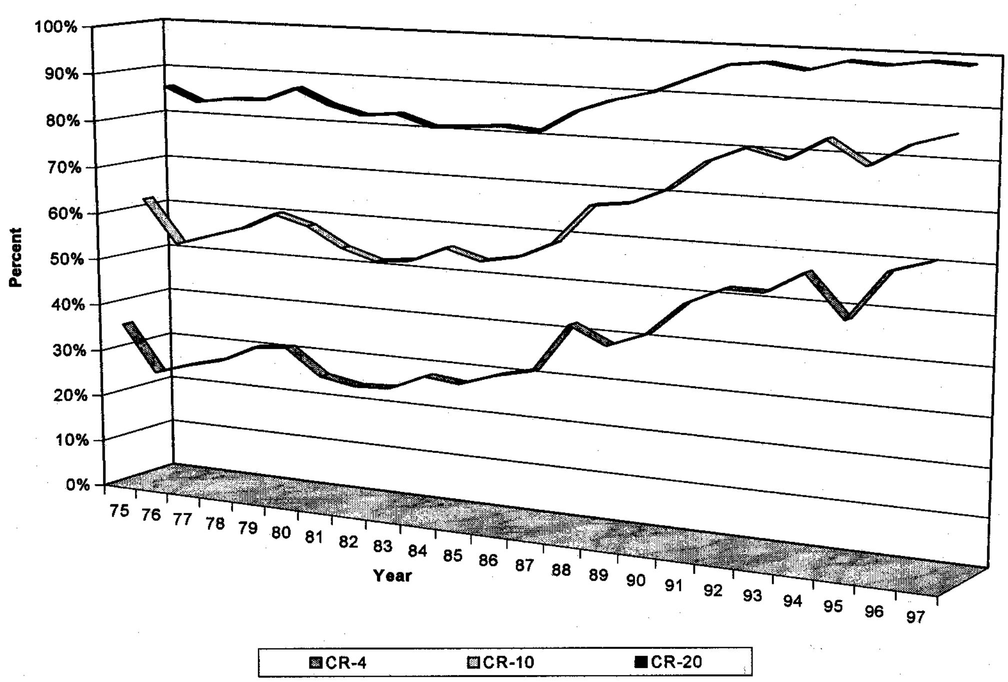


Figure 25: Herfindahl-Hirschman Index of the LA Shrimp Processing Sector



Figures 24 and 25 provide several analytical measures of the market structure of Louisiana's shrimp processing sector. These measures are the concentration ratios for the top four, ten, and twenty shrimp processors in the state and the Herfindahl-Hirschman Index.

Figure 24 shows that the concentration ratios for the top four, ten, and twenty shrimp processors in the state have been increasing over time. The market share of the top four processors, in terms of value of shrimp product processed, has grown from approximately 36% in 1975 to 63% in 1997. Increasing the number of processors to ten and twenty has resulted in ever increasing market share. The top ten firms' market share increased from 62 % of shrimp products processed in 1975 to 86 % by 1997. On the other hand, the top twenty firms increased their market share by 12 percentage points from 86 % in 1975 to 98 % in 1997.

If we take all of the state's shrimp processors into account, the HHI shows us that the shrimp processing sector has become more concentrated. The index increased from 543 in 1975 to 1151 in 1997. The decreasing number of processors and the total value of shrimp processed, as shown in Figures 24 and 25, provide some justification for this increasing concentration.

Do the estimates presented by the concentration ratios and the HHI point to increasing monopoly power in the Louisiana shrimp processing sector? There is no direct evidence that supports this assertion. It has been noted that high market concentration does not necessarily lead to increasing exercise of monopoly power. If a sector or industry faces stiff foreign competition, the concentrated number of firms in the sector or industry will behave in a competitive manner[25].

In the case of the shrimp processing sector, Diop (1999) notes that the sector is facing competition from increasing imports of processed shrimp products. Figure 12 validates this.

3.5 Consumer-Retail Sector

As stated above, the retail sector of the shrimp industry is composed of a fairly diverse set of establishments. These enterprises range from restaurants and grocery stores to institutional clients and retail outlets. Given the diversity of this sector, information on shrimp purchases and sales were not available. In order to rectify data deficiency surrounding this sector, the succeeding section presents a possible avenue to obtain information.

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25 A good analogy is the case of the U.S. automobile industry. Over time, the number of auto makers in the United States has decreased to three firms. In the last quarter of the 20th century, these companies faced a fierce challenge from automobile makers in Asia and Europe. Consequently, these U.S. companies were unable to exercise monopoly power for fear of further eroding their respective market shares in the American automobile market.

PART IV: SUMMARY AND RECOMMENDATIONS

This preliminary investigation set out to analyze the structure of Louisiana's shrimp industry and describe the flow of products through various sectors of the industry. A conceptual framework was illustrated to show the various sectors of the shrimp industry and how shrimp is harvested, handled, processed, and distributed. In addition, information pertaining to the structure of the various sectors, where information was available, was presented.

In order to develop a better understanding of the state's shrimp industry, additional effort must be expended on the collection of data for the various sectors of the industry. Questions linger as to the cost structure of establishments and how much shrimp is purchased and sold through these sectors. One way to address these deficiencies in information is by administering a survey directed at establishments in this industry. Conducting such a survey has its corresponding cost.

A survey questionnaire has been developed to address issues pertaining to purchases and sales of shrimp of the various sectors; importation of shrimp by these sectors; and costs of operation of establishments in each sector of the industry. The survey instrument, which is generic in format, is targeted to illicit responses from several sectors[26] in the shrimp industry. A copy of the survey questionnaire is presented in Appendix A.

At the present time, proper survey administration and development of a comprehensive study of Louisiana's shrimp industry is hindered by logistical and financial constraints imposed on the Louisiana Department of Wildlife and Fisheries. The department has estimated a budget that would be needed to undertaking this succeeding phase of the project. This is presented in Appendix B.

26 The generic nature of the survey instrument will allow dealers/handlers, processors, and retailers to provide responses that could be used in this study.