

TRENDS IN COMPOSITION
OF THE TEXAS COMMERCIAL SHRIMP FLEET,
1986-1999

by

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ABSTRACT

Texas Parks and Wildlife commercial license records were compiled to identify trends in number of licenses, license type, vessel length, homeport of vessels, and county of residence for the Texas commercial shrimp fleet. Tables were used to quantitatively analyze and evaluate the trends in the Texas commercial shrimp fleet from 1986 to 1999. Total number of licensed commercial shrimp vessels decreased from 5,811 in 1986 to 2,922 in 1999. Gulf licenses were the most abundant individual license and multiple bay and bait licenses were the most abundant combination licenses held by a single vessel. Vessel length class > 21.3 m was the only length class to increase in total number of vessels from 1986 to 1999. Eighty-seven percent of licensed vessels resided in coastal counties. Twelve major ports harbored 67% of the commercial fleet. Vessels registered in the Houston/Pasadena/Baytown area accounted for 46% of all licensed vessels in 1995, which represented nearly a three-fold increase in total vessels, compared to 1986 (16% of all licensed vessels). Decreases in the number of licensed commercial shrimp vessels can be attributed to changes in regulations and license fees, changes in the economic value of shrimp, declines in catch despite increases in effort, changes in the overall economy, and alternative labor opportunities.

INTRODUCTION

The shrimp fishery in Texas is the most valuable commercial fishery in Texas (Robinson et al. 1998). Brown shrimp, *Farfantepenaeus aztecus*, white shrimp, *Litopenaeus setiferus*, and pink shrimp, *Farfantepenaeus duorarum* are the primary species involved. Shrimp landings in Texas for 1999 were reported to be 34,000 metric tons (76 million lbs) heads-on with an ex-vessel value of \$166 million (Auil-Marshalleck et al. in press). Shrimp comprised 81% of the total weight and 88% of the total value for all commercial fisheries landings in Texas during 1999 (Auil-Marshalleck et al. in press). Gulf of Mexico inshore/offshore commercial landings and ex-vessel values for brown, white, and pink shrimp combined were reported to be 103,000 metric tons (228 million lbs) heads-off with an ex-vessel value of \$463 million in 1999 (Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division, Silver Spring, MD).

Landings data from commercial shrimpers are necessary to assess the needs for and the impacts of fishing regulations (Robinson et al. 1998). Despite yearly fluctuations, the overall trend for both bay landings and bay ex-vessel value from 1986 to 1999 has decreased. Landings decreased from 44,000 metric tons (97 million lbs) in 1986 to 34,000 metric tons (76 million lbs) in 1999 and ex-vessel value decreased from \$229 million in 1986 to \$194 million in 1999 (Auil-Marshalleck et al. In press). Ex-vessels mean price per pound for brown and white shrimp from 1986 to 1999 ranged from \$1.91-\$2.82 with prices fluctuating from year to year.

Historically, the Texas Legislature managed the shrimp fishery in Texas based on maximizing ex-vessel value of shrimp landed. In 1985, regulatory authority was delegated to the Texas Parks and Wildlife Commission by the Texas Legislature to manage the shrimp fishery in Texas marine waters contingent upon developing a shrimp management plan. Adopted in 1989, the Texas Shrimp Fishery Management Plan (TSFMP) provides a management strategy for the Texas shrimp fishery, that includes regulating the quantity, size, means, methods, times and places that shrimp can be caught. Under the authority of the TSMFP, Texas Parks and Wildlife (TPW) manages the shrimp fishery to prevent overfishing while achieving optimum yield for the shrimp industry (Cody et al. 1989).

The shrimp fishery in Texas is an overcapitalized, open-access, multiple fleet industry (Krauthamer et al. 1984, Riechers et al. 1989). Growth overfishing is documented in the Texas fishery (Rothschild and Brunenmeister 1984, Klima 1989, TPW 1995). In recent years, the mean sizes of both brown and white shrimp have decreased due to increases in effort and landings of small shrimp. Numbers of shrimp landed in the bay fishery has increased over 300% and fishing effort has increased by 400% in the bay fishery since 1972 (TPW 1995). To stabilize these trends, the 75th Legislature passed Senate Bill 750, which established a shrimp limited entry and shrimp license buy back program for the Texas inshore fishery in 1995. This legislation is designed to regulate and manage the number of licensed commercial shrimp vessels utilizing the inshore shrimp fishery while providing long-term conservation for shrimp stocks (State of Texas 1999).

The Texas shrimp fishery is comprised of licensed vessels that participate in two distinct divisions of the fishery. The "inshore fishery" consists of vessels that trawl

“inside waters” described as including all bays, passes, and rivers landward from the Gulf of Mexico. The “offshore fishery” consists of vessels that utilize “outside waters” described as including all waters extending from the shoreline seaward and within jurisdiction of Texas (State of Texas 1999). Commercial licenses include a commercial bay shrimp license, commercial bait shrimp license, and a commercial Gulf license. Recreation/sport licenses include a sport fishermen license and an individual bait shrimp trawl license. A commercial bay shrimp boat is a registered boat used for the purpose of catching shrimp and other edible aquatic products from inside waters of this state for pay or sale. Commercial bay shrimp boats are limited to 600 pounds of any size shrimp/day during the open spring season (15 May through 15 July) and may catch any amount during the open fall season (15 August through 15 December); a count size restriction is in effect from 15 August-October 31, with no count during November.

A commercial bait boat is a registered boat used in inside waters for the purpose of catching or assisting in catching shrimp or finfish for use as bait for pay or sale. Commercial bait boats are limited to 200 pounds of any size shrimp per day during the bait shrimp season. Bait fishing is open year-round, but restricted to certain areas, times, and means. Vessels are required to maintain at least 50 percent of the onboard shrimp catch alive except during the period of August 16 through November 14.

A commercial Gulf boat is a registered boat used for the purpose of catching or assisting to catch shrimp for pay or sale from “outside waters” of the state. Licensed Gulf vessels are allowed to harvest shrimp only during specific seasons, areas, and legal shrimping hours in Gulf waters with no bag limit restrictions.

Registered vessels operating under an individual bait-shrimp trawl license or sport-fishing license refers to individuals who use a trawl, net, or rig for the purpose of catching shrimp for one’s own personal use. Catches are limited to 4 quarts per boat per day for bait shrimping and to 15 lbs per person per day (inside waters) and 100 lbs per person per day (outside waters) for those shrimping for a purpose other than bait. Because the catch limits for personal uses are considerably smaller than those for commercial licenses, historically many recreational/sport and individual bait shrimpers purchased commercial licenses (Christmas and Etzold 1977).

Shrimp license fees are a privilege tax on catching, buying, selling, unloading, transporting, or landing of shrimp within the jurisdiction of the state. The TPW Commission is responsible for setting license fees. Increases in license fees can be attributed to changes in operation and management costs associated with the fishery. Shrimp license fees for resident bay, bait, and Gulf vessels more than doubled from 1986 to 1999 (Table 1). In comparison, non-resident (out-of-state) bay, bait, and Gulf license fees increased by 6, 6, and 10 fold, respectively. With the establishment of the Shrimp License Management Program the Texas Legislature also established a Shrimp License Buyback Account in 1995 (State of Texas. 1995). This proclamation further increased license fees by an additional 15 %, but not more than \$25, for all commercial shrimp licenses as well as any license holder that handled shrimp (e.g. bait shrimp dealers, wholesale seafood dealers, retail seafood dealers, truck dealers, etc.).

The complexity of the Texas shrimp fishery requires an understanding of the biological, economic, sociological, and legal issues that correspond between user groups. TPW works with commercial shrimpers through the Shrimp Advisory Committee, outreach programs, National Marine Fisheries Service, the Gulf of Mexico Fishery

Management Council, Gulf States Marine Fisheries Commission, Texas Sea Grant Program and various universities to provide the best possible management of shrimp in Texas. The present study characterizes the Texas shrimp fleet during years 1986-1999 and evaluates changes in fleet composition.

METHODS AND MATERIALS

By law, vessels are required to purchase a license for each fishery (bay, bait, Gulf) in which it participates. When purchasing a license, owners of vessels must report vessel length, homeport, county of origin, and vessel identification number (U.S. Coast Guard or TPW number). TPW license records provide a data set from which a characterization of the commercial shrimp fleet can be generated.

TPW data were summarized from computer records of commercial license sales during license years 1986 through 1999. Each license year starts on 1 September of one year and runs to 31 August of the following year. License sales alone do not accurately represent the total number of vessels in the fleet because vessels can hold more than one license (Warren and Bryan 1981, Crowe and Bryan 1986). As a result, vessels were entered in the database with more than one record leading to duplication in number of vessels. To eliminate this duplication, TPW license data were sorted according to license year and vessel number to identify multiple license holders. The difference between total licenses purchased and number of licenses purchased with duplicate vessel numbers would represent a more accurate number of the licensed vessels in the shrimp fleet. Data were tabulated according to vessel length classes, license type, homeport, and county of residence.

Vessels were grouped into five length classes originally used by Warren and Bryan (1981): ≤ 7.6 m; $>7.6-12.2$ m; $>12.2-16.8$ m; $>16.8-21.3$ m; and > 21.3 m. Boundaries for the five classes were based on the assumption that most part-time, occasional, and recreational shrimpers used small vessels ≤ 7.6 m. Further, most bay and bait shrimpers and including a few Gulf shrimpers use vessels >7.6 to 16.8 m; most Gulf shrimpers used vessels > 16.8 m (Warren and Bryan 1981, Krauthamer et al. 1984). Homeports with $>2\%$ of the reported licenses were grouped into 12 major ports according to geographic area. All remaining ports were pooled together for comparison with major ports (Crowe and Bryan 1986). Beginning in 1996, port data was no longer collected.

RESULTS

Number of Licenses

Number of licenses purchased from 1986 to 1999 decreased from 8,759 in 1986 to 4,415 in 1999, a 50 % decrease (Table 2). Individual bay, bait, and Gulf licenses decreased by 57%, 42%, and 47%, respectively. In 1995, the shrimp fishery experienced the largest increase in total number of licenses during the 14-year period; an additional 785 licenses were purchased. Sixty percent of the additional licenses were comprised of commercial bait licenses, representing the single largest annual increase (37%) for all

individual license types purchased. The decreasing trend in license purchases began to stabilize in 1994 after reaching historical all-time lows (Figure 1). Despite the decreasing trend, the number of individual Gulf licenses appeared to fluctuate more frequently than the bay or bait licenses (Figure 1). Variations in Gulf licenses can be attributed to fluctuating numbers of out-of-state licenses purchased each year, and to a significant decrease in the number of coastal Gulf licenses purchased in vessel length class >16.8-21.3 m from 1986 through 1999.

Total number of licenses decreased for all vessel length classes during this 14 year period except for vessels >21.3 m. Vessel length class >7.6-12.2 m held most of the licenses (34%). The proportion of licenses held by a given length class changed extensively for all length classes except vessel length class >7.6-12.2 m. This change in the composition of the fleet can be attributed mostly to a large decrease in number of licenses being purchased in the ≤ 7.6 m vessel length class (Table 3).

In 1999, individual Gulf licenses accounted for 44% of all license types held by vessels. Further, Gulf licenses averaged 26% of the total number of licenses purchased from 1986 through 1999, the highest average for all license types purchased (Table 4). The second most popular license from 1986 through 1999 was the multiple bay/bait combination license class, which averaged about 15% of all license classes. During this 14-year period individual bay and individual bait licenses combined accounted for <10% of all license classes. Comparison between the number of individual licenses purchased and number of multiple license combinations purchased indicated an average 32% of all licenses from 1986 through 1999 were purchased by individuals already holding at least one license (Table 4). Vessels holding multiple licenses were comprised mostly of those in length classes >7.6-12.2 m and >12.2-16.8 m. The Gulf/bait multiple license was the least common of all multiple licenses for each year. In 1999, 5% of all vessels held a combination of all three licenses; bay, bait, and Gulf and were comprised mostly of vessels in length class >12.2-16.8 m. From 1986 through 1999 vessels >21.3 m held less than 1% of the total number of licenses for all license classes except Gulf. Thus, vessels licensed with Gulf licenses were comprised predominately by vessels > 16.8 m in length.

Individual bay licenses had the largest decrease in number of licenses. Individual bay and bait licenses were comprised mostly by vessels in length class > 7.6-12.2 m. However, prior to 1992 individual bay and bait licenses were comprised mostly of vessels ≤ 7.6 m (Warren and Bryan 1981, Krauthamer et al. 1984, Crowe and Bryan 1986). This is evidenced by a 95% decrease in bay licenses and an 80% decrease in bait licenses from 1986 through 1999, which occurred for vessels ≤ 7.6 m in length.

Number of Vessels

Total number of licensed vessels from 1986 to 1999 decreased from 5,811 to 2922, a 50% decrease (Table 4). The rate of decrease for number of licensed vessels is similar to the rate of decrease for total number of licenses except for 1993 and 1995 (Figure 2). Decreases in both number of licenses and number of licensed vessels can be attributed mostly to smaller vessels (≤ 7.6 m) leaving the fishery. Smaller vessels accounted for 60% of the overall decrease. The proportional length class composition changed significantly from 1986 to 1999. In 1986, vessels ≤ 7.6 m were the most abundant licensed vessels. In contrast, vessels >21.3 m comprised the smallest

proportion of the fleet. In 1999, after most of the smaller vessels left the fishery, the proportion of licenses held by each vessel length class increased except for vessels >7.6-12.2 m in length, resulting in licenses being more equally distributed among each vessel class (Table 5).

Home Ports

Forty-two ports reported having >2% of the registered licensed vessels. Distribution of licensed shrimp vessels for each homeport remained relatively constant from 1986 to 1995. However, the proportion of vessels that claimed a major port increased from 67% in 1986 to 78% in 1995 (Table 6). Vessels claiming major ports were comprised mostly of vessels >7.6-12.2 m long. This was consistent for all major ports except Brownsville. This port primarily supports vessels >16.8-21.3 m and >21.3 m which make up the Gulf fleet. The pooled (non-major) ports were comprised mostly of vessels \leq 7.6 m. Of the pooled ports, around 44% of the vessels were licensed as out-of-state and were comprised mostly of vessels >16.8-21.3 m and >21.3 m long.

The Houston/Pasadena/Baytown, Palacios/Port Lavaca/Port O'Connor, and Corpus Christi ports (by number) were the most important ports from 1986-1995. Combined, these ports comprised about 74% of the shrimp fleet. The Houston/Pasadena/Baytown port had the greatest number of licensed vessels each year, comprised mostly of vessels >7.6-12.2 m, >12.2-16.8 m, and >16.8-21.3 m long. The number of vessels using this port increased from 16% to 46% from 1986 to 1995.

On average, 48% of the vessels \leq 7.6 m utilized one of the 12 major ports from 1986 to 1995. Bay licenses were the primary licenses held by these vessels. Eighty-six percent of the vessels in the >7.6-12.2 m and >12.2-16.8 m combined lengths classes, claimed one of the 12 major ports; individual bay and bait licenses, as well as, multiple bay/bait combination licenses were the primary licenses held. Sixty-four percent of the vessels >16.8-21.3 m and >21.3 m in length claimed one of the 12 major ports as homeport; Gulf licenses were the primary license held by these vessels.

Counties

The Texas coast is comprised of eighteen counties (Figure 3). Most (82%) licensed vessel owners claimed Texas coastal counties as their county of residence (Table 7). Distribution of licensed vessels by class was consistent for all vessel classes except for vessels >21.3 m where the percentage of coastal resident licenses decreased and the percentage of out-of-state licenses increased. Coastal and non-coastal counties were comprised mostly of vessels <21.3 m that shrimp the inshore bay fishery. In contrast, out-of-state licenses were comprised mostly of larger vessels >21.3 m.

From 1986 through 1999, the number of vessels claiming any category of residency decreased for all vessel length classes except for vessels >21.3 m where coastal and non-coastal counties increased by 53 licenses and 20 licenses respectively, and out-of-state licenses more than doubled from 151 to 335 licenses. The proportion of licensed vessels \leq 7.6 m long for all coastal, non-coastal, and out-of-state residence combined decreased from 36% in 1986 to 7% in 1999. The vessel length class >7.6-12.2 m averaged 28% of all licensed vessels for all counties of residence combined from 1986 to

1999. Krauthamer et al. (1984) noted that as vessel size increased, percentage of vessels claiming coastal and non-coastal county residency decreased and out-of-state residency increased. This same trend is still evident, however, only for those vessels >7.6 m long. Vessels ≤ 7.6 m no longer fit this trend due to significant decreases in number of licenses.

DISCUSSION

Management of the Texas shrimp fishery requires understanding of biological, economical, and sociological parameters, which are necessary to meet goals of optimum yield. Without proper regulations and law enforcement, shrimp resources would be subjected to long-term unsustainable fishing pressure and landings. Increases in fishing pressure are usually associated with an increase in number of fishing units in a fishery: e.g. number of shrimp vessels or with corresponding increases in fishing power (Waters 1991). The dynamics of the Texas shrimp fleet is dependent on number of vessels, size of vessels, types of gear used and costs associated with owning and operating a shrimp vessel. Thus, changes in dynamics within the fleet can be attributed in part to management regulations and to economic variability within the fishery.

Evaluation of TPW license records reveals the number of shrimp licenses and number of licensed vessels participating in the Texas shrimp fishery decreased by 50% from 1986 to 1999. The overall decrease in number of licenses and licensed vessels can be attributed to the smallest vessels ≤ 7.6 m leaving the fishery. Historically, these vessels were classified as part-time, occasional commercial and sport/recreational shrimpers (Warren and Bryan 1981, Krauthamer et al. 1984, Crowe and Bryan 1986, Crowe and Bryan 1987). These relatively small boats can be transported easily and do not necessarily require close affiliation with a specific icehouse, fuel dock, or market (Warren 1979). Part-time shrimpers operating under a commercial license could harvest larger quantities of shrimp under a commercial license than with a recreational shrimp tag. However, operating under a commercial license required the license holder to provide an affidavit supporting that they intend to derive the major portion of their livelihood from the commercial fishery.

Declines in smaller part-time vessels ≤ 7.6 m can be attributed to a number factors. First, during low shrimp production years and subsequent economic uncertainties part-time shrimpers may find it less beneficial to remain in the fishery. Krauthamer et al. (1984) reported that smaller vessels may be unable or unwilling to invest during times of economic stress. Waters (1991) pointed out that fishermen will leave a fishery if they cannot earn as much as they could elsewhere. Second, larger vessels are able to overcome added costs and economic losses attributed to overcapitalization and over exploitation by increasing their fishing power, thus larger vessels will replace or displace smaller marginal vessels. Third, part-time shrimpers who purchased commercial licenses instead of a recreational license may be unwilling to pay increased commercial license fees. Finally, better paying, fulltime job opportunities outside the shrimping industry may also contribute to the decline in smaller vessels. Other factors such as high fuel prices, low shrimp prices, and increased operating costs contribute to the displacement of these marginal vessels.

Regulations are used as a management tool to help stabilize, manage, and prevent the depletion of resources. When utilized properly they can provide biological and economic stability within a fishery. However, under certain conditions regulations can create biological and economic inefficiencies in such a way that users of the resource may be unable to fish to their maximum potential or be able to maximize their profits. Since 1986 shrimp regulations have undergone two crucial changes; 1) adoption of the Texas Shrimp Fishery Management Plan in 1989 and; 2) Shrimp License Management Program in 1995. It is unlikely that the implementation of either of these regulations has led to the overall decrease in shrimp licenses purchased in Texas. It is possible however, that regulations such as those established by the TSFMP may contribute to economic inefficiencies experienced by the shrimpers and ultimately resulted in a small portion of the vessels leaving the fishery. Waters (1991) reported that restricting allowable catches, trips limits, size limits and seasonal land area closures forces fishermen to adopt less productive and less profitable harvesting techniques and/or to incur higher costs in order to comply with regulations. The implementation of the Shrimp License Management Program actually resulted in an increase in number of licenses followed by a slow but stable decline in licenses.

The Shrimp License Management Program was signed into law in June 1995 when the Texas Legislature passed Senate Bill 750. Senate Bill 750 states that after 31 August 1995, TPW may not issue a commercial bay or bait shrimp boat license unless the person seeking the license documents owned the vessel for which the license was being purchased, or was under construction and at least 50 percent completed on 1 April 1995. Furthermore, for the license year ending 31 August 1996, TPW may renew a commercial bay or bait license only if the person seeking renewal of the license owns the commercial vessel for which the renewal is sought, and held the license to be renewed on 1 April 1995, or obtained the license after that date through license transfer. In response to the Shrimp License Management Program, specifically shrimp limited entry, the total number of commercial bay and bait licenses purchased in 1995 increased 27% from the 1994 levels (Figure 2). By the end of license year 1996 the number of bay and bait licenses purchased had returned to numbers similar to 1994. Krauthamer et al. (1984) had reported a similar increase and decrease in number of licenses in 1981 when the Texas Legislature placed a 2-year moratorium on commercial bay and bait shrimp licenses in Texas. The increase in licenses in 1995 can be attributed to speculators attempting to meet the 1 April 1995 licensing cutoff date, to shrimpers who traditionally purchased only an individual bay and/or bait license, to new participants entering the fishery, and to vessels being transferred from one person to another during that license year resulting in both owners holding licenses. The decline in licenses in 1996 can be attributed to natural attrition and to those speculators who purchased licenses in 1995 after the licensing cutoff date and were not allowed in the fishery. Increases in number of licenses in 1997 and 1999 are most likely the result of the dual holding of licenses during license transfers and to the time of year when licenses are purchased. For example, if a shrimp vessel owner waited until August 1997 to purchase his 1996 license this record of purchase would show up on the 1997 license record year thus increasing the number of licenses for that year. Total number of licenses for the last complete license year 1999, revealed the number of commercial bay licenses purchased was 1469 and the numbers of commercial bait licenses were 1398.

The TPW Commission established administrative procedures for the license buyback program in August 1996. The first license buyback period opened in October 1996. Six license buyback rounds have been held through 1999 and a total of 372 commercial bay and bait licenses in combination have been purchased by TPW. There has been a total decrease of 684 licenses since 1995 with 54% of these licenses being removed through license buyback. Attrition, lapse in keeping licenses current, and removal of duplicate licenses associated with license transfers are factors contributing to the remaining decrease in licenses. Overall, the license buyback program has accounted for a 10% decrease in total number of licenses since 1995.

Increases in shrimp license fees in 1986, 1987, and 1993 led to a 1%, 7%, and 13% decrease in number of licenses purchased by Texas coastal and non-coastal residents for each of the immediate following years. Increasing non-resident license fees from \$200 to \$1000 in 1993 contributed to a 62% decrease in out-of-state vessels during 1994. Most of the decrease occurred in vessel length classes >16.8-21.3 m and >21.3 m, which are primarily Gulf vessel.

A key component in the composition of the Texas shrimp fishery is the number of multiple licenses held by individual vessels. These vessels were comprised mostly of vessels >7.6-12.2 and >12.2-16.8 m in length and operate predominantly in the inshore bay and bait fishery. Despite an overall decrease in number of multiple licenses the proportion of vessels holding more than one license type increased during 1986 to 1999. Vessel owners holding more than one license type are able to maximize their shrimping opportunities by utilizing different sectors of the shrimp fishery. Furthermore, holding multiple licenses allows vessel owners opportunity to shrimp year-round during different shrimp seasons. The number of vessels holding multiple licenses that included a Gulf license decreased by more than 77% during 1986 to 1999. This decrease suggests that inshore vessels are no longer supplementing their incomes by harvesting in Gulf waters as reported by Krauthamer et al. (1984). Displacement of smaller vessels from Gulf waters corresponds with an increase in larger Gulf vessels >21.3 m. Larger vessels can operate in adverse seas and weather conditions and are able to maximize fishing effort by utilizing multiple gears, larger gear sizes, and increased horse power.

Review of the shrimp license data set will provide a good tool by which fishery managers can evaluate changes in the composition of the shrimp fleet. Analysis of license records however should be used cautiously when evaluating fishing effort, specifically when looking at number of licenses. Total number of licenses does not represent the actual number of vessels participating or actively shrimping in the fishery. In fact, number of licenses will over estimate the number of individuals participating in the fishery e.g. those individuals who hold more than one license but only own one boat. Also, vessel owners may purchase a license each year to maintain eligibility in the fishery or for the purpose of maintaining an investment in the fishery. Additionally, number of license does not account for other extenuating circumstances such as, medical/health problems or mechanical problems with vessels which will limit actual fishing time. Perhaps a better component of the license data set would be to use number of vessels. Number of vessels is more closely correlated to fishing effort and would provide a better estimate of expansion or participation in the fishery. Ricker (1975) suggests one approach for measuring effort is to multiply number of vessels by some factor of time, either days at sea or days or hours of actual fishing time. Poffenberger (1981) suggested a correlation

between effort and number of vessels. He demonstrates this by dividing days fished by number of vessels and comparing variations in the ratio over time. The goal in estimating effort is to obtain a value which is relative to the rate of fishing. In Texas, number of vessels has decreased and shrimping effort has increased. Bay shrimping effort in Texas has increased by over 300% since 1972. Effort reached an all time high of greater than 37,000 days fished in 1987 and since 1988 it has remained within a high range of 18,000 to 30,000 days fished (TPW 1999). Despite decreases in number of licenses and number of vessels fishing effort can increase. This occurs when vessel owners increase their fishing power through improvements or upgrades. Examples include larger vessels replacing smaller vessels, use of newer more sophisticated fish finders, upgrading their engines, changing or adding more gear, and fishing more and/or longer trips (Waters 1991). Such changes increase their ability to harvest more product and will result in increased fishing mortality.

The Texas shrimp fleet declined dramatically from 1986 to 1999. Total number of licenses and licensed vessels as well as the overall composition of the fleet changed in response to the decline. This combined with overcapitalization has led to instability and uncertainty within the fishery. Stability, both economically and biologically within the fishery is dependent on the success of good management practices. The Texas Shrimp Fishery Management Plan has been in place since 1989 and has restricted catches through the use of trip limits, gear restrictions and seasonal and area closures. However, methods such as these only work biologically for a short term and create economic inefficiencies (Waters 1991). Shrimp Limited Entry in the Texas inshore shrimp fishery will provide restricted access to the fishery. Over time restricted access and license buybacks should help increase the existing value of shrimp licenses and create a stable work force. Fewer vessels would more than likely improve the economic performance in the restricted fishery (Waters 1991). The future of the Texas shrimp fleet is unclear. It is clear however, that the dynamics within the fleet are always changing. In order to understand how these changes and how management regulations affect the fishery it is pertinent that fishery managers continue monitoring the composition of the fleet. Further understanding of their fishing effort and harvest is recommended.

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Table 1. Commercial Shrimp Boat License fees for Resident and Non-Resident Bay, Bait, and Gulf licenses purchased in Texas during each license year 1986-1999.

Year	Resident			Non-Resident		
	Bay	Bait	Gulf	Bay	Bait	Gulf
1986	\$80	\$80	\$100	\$80	\$80	\$100
1987	\$80	\$80	\$100	\$320	\$320	\$200
1988	\$80	\$80	\$100	\$320	\$320	\$200
1989	\$80	\$80	\$100	\$320	\$320	\$200
1990	\$80	\$80	\$100	\$320	\$320	\$200
1991	\$80	\$80	\$100	\$320	\$320	\$200
1992	\$80	\$80	\$100	\$320	\$320	\$200
1993	\$170	\$170	\$250	\$500	\$500	\$1,000
1994	\$170	\$170	\$250	\$500	\$500	\$1,000
1995	\$195	\$195	\$275	\$525	\$525	\$1,025
1996	\$195	\$195	\$275	\$525	\$525	\$1,025
1997	\$195	\$195	\$275	\$525	\$525	\$1,025
1998	\$195	\$195	\$275	\$525	\$525	\$1,025
1999	\$195	\$195	\$275	\$525	\$525	\$1,025

Table 2. Total number of bay, bait, and Gulf licenses purchased in Texas during each license year 1986-1999. Numbers in parentheses represent the net change in number of licenses purchased from previous year.

Year	Type of license			Total
	Bay	Bait	Gulf	
1986	3429	2414	2916	8759
1987	3313 (-116)	2425 (+11)	3049 (+133)	8787 (+28)
1988	2902 (-411)	2351 (-74)	2904 (-145)	8157 (-630)
1989	2716 (-189)	2113 (-218)	2696 (-208)	7525 (-632)
1990	2416 (-300)	1800 (-313)	2746 (+50)	6962 (-563)
1991	2329 (-87)	1691 (-109)	2526 (-220)	6546 (-416)
1992	1909 (-420)	1362 (-329)	1906 (-620)	5177 (-1369)
1993	1733 (-176)	1499 (+137)	2034 (+128)	5266 (+89)
1994	1499 (-234)	1279 (-220)	1356 (-678)	4134 (-1132)
1995	1805 (+306)	1746 (+467)	1368 (+12)	4919 (+785)
1996	1494 (-311)	1331 (-415)	1322 (-46)	4147 (-722)
1997	1493 (-1)	1444 (+113)	1638 (+316)	4575 (+428)
1998	1455 (-38)	1409 (-35)	1539 (-99)	4403 (-172)
1999	1469 (+14)	1398 (-11)	1548 (+9)	4415 (+12)
Total Change	-1974	-1005	-1137	-4356

Table 3. Total number of licenses purchased in Texas, by vessel length class (m), for each license year 1986-1999. Numbers in parentheses represent the percentage of total licenses held by each vessel length class for a given year.

Years	Vessel length class(m)					Total
	≤7.6	>7.6-12.2	>12.2-16.8	>16.8-21.3	>21.3	
1986	2685 (31)	3073 (35)	1513 (17)	1085 (12)	403 (5)	8759
1987	2429 (28)	3145 (36)	1553 (17)	1137 (13)	523 (6)	8787
1988	2064 (25)	2936 (36)	1530 (19)	1078 (13)	549 (7)	8157
1989	1716 (23)	2703 (36)	1520 (20)	1032 (14)	554 (7)	7525
1990	1349 (19)	2415 (35)	1526 (22)	1081 (16)	591 (8)	6962
1991	1194 (18)	2263 (35)	1477 (22)	1046 (16)	566 (9)	6546
1992	711 (14)	1871 (36)	1233 (24)	921 (18)	436 (8)	5172
1993	661 (12)	1822 (35)	1345 (26)	920 (17)	518 (10)	5266
1994	477 (11)	1480 (35)	1061 (27)	736 (18)	380 (9)	4134
1995	588 (12)	1861 (38)	1289 (26)	759 (15)	422 (9)	4919
1996	409 (10)	1506 (36)	1119 (27)	722 (17)	391 (10)	4147
1997	382 (8)	1671 (36)	1214 (27)	674 (15)	632 (14)	4573
1998	348 (2)	1504 (34)	1206 (27)	691 (16)	654 (15)	4403
1999	303 (7)	1505 (34)	1289 (29)	657 (15)	661 (15)	4415
% change	[-89]	[-51]	[-15]	[-39]	[+64]	[-50]

Table 4. Number of commercial shrimp boats licensed in Texas by license class and vessel length class (m) for license years 1986-1999.

Year	Length class	License Class						Total
		Bay	Gulf	Bait	Bay and Bait	Bay and Gulf	Gulf and Bait	
1986								
	≤7.6	1032	217	343	225	149	27	2090
	>7.6-12.2	242	36	160	646	72	40	1569
	>12.2-16.8	68	93	46	120	73	28	716
	>16.8-21.3	7	986	2	3	20	1	1033
	>21.3	0	402	1	0	0	0	403
	Total	1349	1734	552	994	314	96	5811
	% of total licenses	(15.4)	(19.7)	(6.4)	(11.5)	(3.5)	(1.0)	(8.8)
	% of vessels	[23.2]	[29.8]	[9.4]	[17.1]	[5.4]	[1.6]	[13.2]
1987								
	≤7.6	927	207	369	199	149	22	1935
	>7.6-12.2	244	44	185	630	57	31	1603
	>12.2-16.8	79	88	47	120	78	14	731
	>16.8-21.3	9	1021	4	3	21	2	1077
	>21.3	0	519	2	1	0	0	522
	Total	1259	1879	607	953	305	69	5868
	% of total licenses	(14.3)	(21.3)	(6.6)	(10.8)	(3.4)	(0.1)	(9.0)
	% of vessels	[21.4]	[32.0]	[10.3]	[16.2]	[5.1]	[1.1]	[13.5]
1988								
	≤7.6	682	209	355	192	97	33	1626
	>7.6-12.2	211	54	165	677	53	31	1519
	>12.2-16.8	48	104	25	144	66	18	704
	>16.8-21.3	8	967	2	4	20	4	1020
	>21.3	0	548	1	0	0	0	549
	Total	949	1882	548	1017	236	86	5418
	% of total licenses	(11.6)	(16.3)	(6.7)	(12.4)	(2.8)	(1.0)	(8.5)
	% of vessels	[17.5]	[24.6]	[10.0]	[18.7]	[4.3]	[1.5]	[12.9]

Table 4. (Cont'd.)

Year	Length class	License Class						Total	
		Bay	Gulf	Bait	Bay and Bait	Bay and Gulf	Gulf and Bait		
1989									
	≤7.6	598	161	260	166	87	19	51	1342
	>7.6-12.2	232	70	163	678	41	25	250	1459
	>12.2-16.8	60	137	31	174	74	17	254	747
	>16.8-21.3	7	923	0	7	20	0	16	973
	>21.3	0	551	1	1	0	0	0	553
	Total	897	1842	455	1026	222	61	571	5074
	% of total licenses	(11.9)	(24.4)	(6.0)	(13.6)	(2.9)	(0.8)	(7.5)	
	% of vessels	[17.6]	[36.3]	[8.9]	[20.2]	[4.3]	[1.2]	[11.2]	
1990									
	≤7.6	474	151	190	124	70	16	38	1063
	>7.6-12.2	248	68	128	560	44	26	237	1311
	>12.2-16.8	79	114	32	132	82	15	281	735
	>16.8-21.3	10	982	0	3	18	1	15	1029
	>21.3	0	587	2	0	1	0	0	590
	Total	811	1902	352	819	215	58	571	4728
	% of total licenses	(11.6)	(27.3)	(5.0)	(11.7)	(3.0)	(0.8)	(8.2)	
	% of vessels	[17.1]	[40.0]	[7.4]	[17.3]	[4.5]	[1.2]	[12.1]	
1991									
	≤7.6	446	133	146	113	59	10	35	942
	>7.6-12.2	230	51	115	576	46	10	201	1229
	>12.2-16.8	75	96	24	160	70	12	266	703
	>16.8-21.3	14	928	0	2	25	0	20	989
	>21.3	0	563	0	0	0	0	1	564
	Total	765	1771	285	851	200	32	523	4427
	% of total licenses	(11.6)	(27.0)	(4.3)	(13.0)	(3.0)	(0.4)	(7.9)	
	% of vessels	[17.3]	[40.0]	[6.4]	[19.2]	[4.5]	[0.7]	[11.8]	

Table 4. (Cont'd.)

Year	Length class	License Class						Total	
		Bay	Gulf	Bait	Bay and Bait	Bay and Gulf	Gulf and Bait		
1992									
	≤7.6	224	100	105	62	39	7	22	559
	>7.6-12.2	305	49	107	558	21	9	78	1127
	>12.2-16.8	120	82	16	231	64	8	138	659
	>16.8-21.3	4	816	0	7	23	1	13	864
	>21.3	0	436	0	0	0	0	0	436
	Total	653	1483	228	858	147	25	251	3645
	% of total licenses	(12.6)	(28.6)	(4.4)	(16.5)	(2.8)	(0.4)	(4.8)	
	% of vessels	[17.9]	[40.6]	[6.2]	[23.5]	[4.0]	[0.6]	[6.8]	
1993									
	≤7.6	161	93	124	55	29	19	23	504
	>7.6-12.2	214	49	146	547	17	9	89	1071
	>12.2-16.8	74	73	34	220	65	12	190	668
	>16.8-21.3	3	810	0	6	23	2	15	859
	>21.3	0	516	0	1	0	0	0	517
	Total	452	1541	304	829	134	42	317	3619
	% of total licenses	(8.5)	(29.2)	(5.7)	(15.7)	(2.5)	(0.7)	(6.0)	
	% of vessels	[12.4]	[42.4]	[8.3]	[22.8]	[3.6]	[1.1]	[8.7]	
1994									
	≤7.6	125	43	122	47	19	11	11	378
	>7.6-12.2	237	16	157	482	4	7	28	931
	>12.2-16.8	132	54	38	263	26	8	81	602
	>16.8-21.3	6	641	1	12	16	1	10	687
	>21.3	0	380	0	0	0	0	0	380
	Total	500	1134	318	804	65	27	130	2978
	% of total licenses	(12.0)	(27.4)	(7.6)	(19.4)	(1.5)	(0.6)	(3.1)	
	% of vessels	[16.7]	[38.0]	[10.6]	[26.9]	[2.1]	[0.9]	[4.3]	

Table 4. (Cont'd.)

Year	Length class	License Class						Total	
		Bay	Gulf	Bait	Bay and Bait	Bay and Gulf	Gulf and Bait		
1995									
	≤7.6	134	43	150	88	9	5	19	448
	>7.6-12.2	177	11	191	672	3	3	42	1099
	>12.2-16.8	100	40	69	391	35	9	70	714
	>16.8-21.3	10	629	1	14	19	1	17	691
	>21.3	1	411	2	2	2	0	0	418
	Total	422	1134	413	1167	68	18	148	3370
	% of total licenses	(8.5)	(23.0)	(8.3)	(23.7)	(1.3)	(0.3)	(3.0)	
	% of vessels	[12.5]	[33.6]	[12.2]	[34.6]	[2.0]	[0.5]	[4.0]	
1996									
	≤7.6	83	33	106	51	9	8	17	307
	>7.6-12.2	185	8	118	527	5	4	41	888
	>12.2-16.8	97	39	24	324	32	5	79	600
	>16.8-21.3	7	629	4	12	15	2	8	677
	>21.3	1	387	0	0	0	0	1	389
	Total	373	1096	252	914	61	19	146	2861
	% of total licenses	(8.9)	(26.4)	(6.0)	(22.0)	(1.4)	(0.4)	(3.5)	
	% of vessels	[13.0]	[38.3]	[8.8]	[31.9]	[2.1]	[0.6]	[5.1]	
1997									
	≤7.6	55	21	90	62	9	6	20	263
	>7.6-12.2	108	10	89	601	11	7	74	900
	>12.2-16.8	39	48	13	294	31	5	153	583
	>16.8-21.3	4	583	1	8	4	2	18	620
	>21.3	0	637	0	0	0	0	0	637
	Total	206	1299	193	965	55	20	265	3003
	% of total licenses	(4.5)	(28.3)	(4.2)	(21.0)	(1.2)	(0.4)	(5.8)	
	% of vessels	[6.9]	[43.2]	[6.5]	[32.2]	[1.8]	[0.6]	[8.8]	

Table 4. (Cont'd.)

Year	Length class	License Class						Total	
		Bay	Gulf	Bait	Bay and Bait	Bay and Gulf	Gulf and Bait		
1998									
	≤7.6	46	17	82	65	8	3	17	238
	>7.6-12.2	107	12	104	579	9	0	35	846
	>12.2-16.8	37	30	12	365	25	0	115	584
	>16.8-21.3	4	579	1	8	14	3	19	628
	>21.3	0	653	0	0	1	0	0	654
	Total	194	1291	199	1017	57	6	186	2950
	% of total licenses	(4.4)	(29.3)	(4.5)	(23.0)	(1.3)	(0.1)	(4.2)	
	% of vessels	[6.6]	[43.8]	[6.7]	[34.5]	[1.9]	[0.2]	[6.3]	
1999									
	≤7.6	43	18	72	58	5	4	12	212
	>7.6-12.2	107	14	88	567	10	2	46	834
	>12.2-16.8	50	29	10	363	22	1	142	617
	>16.8-21.3	5	553	1	12	8	2	18	599
	>21.3	0	659	0	0	1	0	0	660
	Total	205	1273	171	1000	46	9	218	2922
	% of total licenses	(4.6)	(28.8)	(3.9)	(22.6)	(1.0)	(0.2)	(4.9)	
	% of vessels	[7.0]	[43.6]	[5.8]	[34.2]	[1.6]	[0.3]	[7.5]	

Table 5. Number of licensed shrimp vessels in Texas by vessel length class (m) and license year for 1986-1999. Numbers in parentheses represent the percentage of licensed vessels for each vessel length class each year.

Years	Vessel Length Class (m)					Total
	≤7.6	>7.6-12.2	>12.2-16.8	>16.8-21.3	>21.3	
1986	2090 (36)	1569 (27)	716 (12)	1033 (18)	403 (7)	5811
1987	1935 (33)	1603 (27)	731 (12)	1077 (18)	522 (9)	5868
1988	1626 (30)	1519 (28)	704 (13)	1020 (19)	549 (10)	5418
1989	1342 (26)	1459 (29)	747 (15)	973 (19)	553 (11)	5074
1990	1063 (22)	1311 (28)	735 (16)	1029 (22)	590 (12)	4728
1991	942 (21)	1229 (28)	703 (16)	979 (22)	564 (13)	4417
1992	559 (15)	1127 (31)	659 (18)	864 (24)	436 (12)	3645
1993	504 (14)	1071 (30)	668 (18)	859 (24)	517 (14)	3619
1994	378 (13)	931 (31)	602 (20)	687 (23)	380 (13)	2978
1995	448 (13)	1099 (33)	714 (21)	691 (21)	418 (12)	3370
1996	307 (10)	888 (31)	600 (21)	677 (24)	389 (14)	2861
1997	263 (9)	899 (30)	584 (19)	620 (21)	637 (21)	3003
1998	238 (8)	846 (29)	584 (20)	628 (21)	654 (22)	2950
1999	212 (7)	834 (29)	617 (21)	599 (21)	660 (23)	2922

Table 6. Number of commercial shrimp vessels licensed in Texas by vessel length class (m) and major ports for license years 1986-1995.

Vessel length class (m)	Ports ^a												Number using major ports	% using a major port	Pooled ports	Totals
	1	2	3	4	5	6	7	8	9	10	11	12				
1986																
≤7.6	129	76	278	91	124	38	25	71	21	57	120	6	1036	(49.5)	1054	2090
>7.6-12.2	4	29	252	204	169	27	48	202	86	168	111	2	1302	(82.9)	267	1569
>12.2-16.8	0	27	146	96	68	4	9	126	37	42	53	6	614	(85.6)	103	717
>16.8-21.3	0	39	203	4	40	5	1	51	0	11	130	235	719	(69.6)	314	1033
>21.3	0	16	59	0	11	2	0	14	0	2	40	71	215	(53.3)	188	403
Total	133	187	938	395	412	76	83	464	144	280	454	320	3886	(66.8)	1925	5811
1987																
≤7.6	109	60	238	94	135	36	25	85	18	42	104	8	954	(49.3)	981	1935
>7.6-12.2	4	24	265	187	170	25	38	211	90	174	101	2	1291	(80.5)	312	1603
>12.2-16.8	0	15	163	92	79	1	11	130	33	56	40	5	625	(85.2)	108	733
>16.8-21.3	0	22	246	10	33	6	1	47	0	11	104	218	698	(64.8)	379	1077
>21.3	0	7	122	0	10	2	0	15	0	2	33	71	262	(50.1)	260	522
Total	113	128	1034	383	425	70	75	488	141	284	382	304	3830	(65.2)	2040	5867
1988																
≤7.6	64	59	188	59	135	31	16	78	24	40	98	11	803	(49.3)	816	1626
>7.6-12.2	5	20	298	166	165	26	34	183	73	178	116	2	1266	(83.3)	253	1519
>12.2-16.8	0	8	202	104	70	1	10	104	25	52	45	6	627	(89.0)	81	704
>16.8-21.3	0	13	277	13	27	2	1	54	0	9	98	191	685	(66.8)	335	1020
>21.3	0	5	169	1	11	2	0	17	0	1	32	73	311	(56.6)	238	549
Total	69	105	1134	346	408	62	61	436	122	280	389	283	3692	(68.1)	1723	5418

Table 6. (Cont'd.)

Year	Ports ^a												Number using major ports	% using a major port	Pooled ports	Totals	
	1	2	3	4	5	6	7	8	9	10	11	12					
1989																	
≤7.6	77	54	169	49	96	28	15	70	16	26	85	9	694	(51.7)	648	1342	
>7.6-12.2	5	16	346	128	119	19	29	152	49	127	94	2	1086	(74.4)	242	1459	
>12.2-16.8	1	10	260	105	68	4	9	83	23	44	41	5	653	(87.4)	94	747	
>16.8-21.3	0	8	303	12	22	2	1	46	0	11	90	173	668	(68.6)	305	973	
>21.3	1	5	164	3	10	2	0	17	0	3	30	79	314	(56.7)	240	553	
Total	84	93	1242	297	315	55	54	368	88	211	340	268	3415	(67.3)	1529	5074	
1990																	
≤7.6	49	40	119	35	62	23	14	62	17	18	59	10	508	(47.7)	555	1063	
>7.6-12.2	5	16	346	128	119	19	29	152	49	127	94	2	1086	(82.8)	225	1311	
>12.2-16.8	1	5	614	90	48	5	5	72	20	36	39	4	639	(86.9)	89	735	
>16.8-21.3	0	8	311	9	17	3	1	44	0	10	86	170	659	(64.0)	370	1029	
>21.3	1	2	172	1	8	2	0	17	0	2	29	80	314	(53.2)	276	590	
Total	56	71	1269	262	254	52	49	347	86	193	307	266	3506	(74.1)	1515	4728	
1991																	
≤7.6	48	35	80	27	48	18	11	56	17	24	41	5	410	(43.5)	522	942	
>7.6-12.2	2	14	347	100	97	16	30	148	51	134	82	1	1022	(83.1)	207	1229	
>12.2-16.8	1	6	336	66	43	4	5	58	21	41	32	3	616	(87.6)	87	703	
>16.8-21.3	0	5	321	10	14	2	1	36	0	9	76	154	628	(64.1)	351	979	
>21.3	0	2	175	0	5	1	0	19	0	2	24	72	300	(58.0)	264	517	
Total	51	62	1259	203	207	41	47	317	89	210	255	235	2976	(67.3)	1441	4417	

Table 6. (Cont'd.)

Year	Ports ^a												Number using major ports	% using a major port	Pooled ports	Totals	
	1	2	3	4	5	6	7	8	9	10	11	12					
1992																	
≤7.6	26	33	33	16	30	10	9	34	10	23	29	5	258	(46.1)	290	559	
>7.6-12.2	2	10	330	90	83	15	25	117	55	143	70	0	940	(83.4)	181	1127	
>12.2-16.8	0	5	372	41	28	3	5	56	21	41	27	1	600	(91.0)	59	659	
>16.8-21.3	0	4	353	1	8	1	1	30	0	10	64	130	602	(69.6)	263	864	
>21.3	0	2	182	0	5	1	0	16	0	1	22	55	284	(65.1)	152	436	
Total	28	54	1270	147	154	30	40	253	86	218	212	191	2683	(73.6)	956	3645	
1993																	
≤7.6	34	28	38	13	21	8	5	34	5	18	39	4	247	(49.0)	257	504	
>7.6-12.2	3	7	353	69	58	15	26	103	50	132	71	71	958	(89.4)	184	1071	
>12.2-16.8	0	4	377	36	27	3	4	60	20	54	28	1	614	(91.9)	54	668	
>16.8-21.3	0	2	374	2	6	1	1	27	0	10	58	111	592	(68.9)	267	859	
>21.3	0	0	193	0	6	1	0	14	0	1	22	49	286	(55.3)	231	517	
Total	37	41	1335	120	118	28	36	238	75	215	218	165	2697	(74.5)	993	3619	
1994																	
≤7.6	21	21	26	11	14	6	2	25	5	17	26	4	178	(47.0)	200	378	
>7.6-12.2	2	3	368	52	40	8	20	83	45	114	52	1	788	(84.6)	143	931	
>12.2-16.8	0	1	378	27	21	2	5	54	14	44	24	1	571	(94.8)	31	602	
>16.8-21.3	0	1	362	1	6	0	1	24	0	10	57	104	566	(82.3)	121	687	
>21.3	0	0	184	0	3	1	0	13	0	0	19	49	269	(70.7)	111	380	
Total	23	26	1318	91	84	17	28	199	64	185	178	159	2372	(79.6)	606	2978	

Table 6. (Cont'd.)

Year	Ports ^a												Number using major ports	% using a major port	Pooled ports	Totals	
	1	2	3	4	5	6	7	8	9	10	11	12					
1995																	
≤7.6	18	27	23	10	18	6	3	33	5	31	41	4	219	(48.8)	229	448	
>7.6-12.2	1	2	470	62	35	9	18	90	51	111	74	0	923	(83.9)	176	1099	
>12.2-16.8	0	0	496	24	23	3	6	44	15	39	23	1	674	(94.3)	40	714	
>16.8-21.3	3	3	371	2	7	0	1	17	0	11	48	95	558	(80.7)	133	691	
>21.3	0	1	188	0	3	1	0	10	0	0	16	45	264	(63.1)	154	418	
Total	22	33	1548	98	86	19	28	194	71	192	202	145	2638	(78.2)	732	3370	

^a 1 = Beaumont/ Nederland; 2 = Port Arthur/ Sabine Pass; 3 = Houston/Pasadena/Baytown;
 4 = Seabrook/Kemah/San Leon/Texas City; 5 = Galveston; 6 = Freeport; 7 = Matagorda;
 8 = Palacios/Port Lavaca/Port O'Connor; 9 = Seadrift; 10 = Fulton/Rockport/Aransas Pass;
 11 = Corpus Christi; 12 = Brownsville.

Table 7. Number of commercial shrimp vessels licensed in Texas by vessel length class (m) and county of residence for license years 1986-1999. Numbers in parentheses represent the percentage of vessels in each category.

County of Residence	Vessel length class (m)					Total Vessels
	≤7.6	>7.6-12.2	>12.2-16.8	>16.8-21.3	>21.3	
1986						
Coastal	1823 (87)	1464 (93)	637 (89)	838 (81)	250 (62)	5012
Non-coastal	261 (12)	88 (6)	36 (5)	12 (1)	2 (<1)	399
Out-of-state	6 (<1)	17 (1)	43 (6)	183 (18)	151 (37)	400
Total	2090	1569	716	1033	403	5811
1987						
Coastal	1699 (88)	1463 (91)	645 (88)	831 (77)	299 (57)	4937
Non-coastal	231 (12)	104 (7)	36 (5)	11 (1)	6 (1)	388
Out-of-state	5 (<1)	36 (2)	50 (7)	235 (22)	217 (42)	543
Total	1935	1603	731	1077	522	5868
1988						
Coastal	1424 (88)	1397 (92)	639 (91)	808 (79)	331 (60)	4599
Non-coastal	192 (12)	106 (7)	36 (5)	37 (4)	15 (3)	386
Out-of-state	10 (<1)	16 (1)	29 (4)	175 (17)	203 (36)	433
Total	1626	1519	704	1020	549	5418
1989						
Coastal	1185 (88)	1338 (92)	673 (90)	803 (83)	341 (62)	4340
Non-coastal	151 (11)	105 (7)	36 (5)	18 (2)	11 (2)	321
Out-of-state	6 (<1)	16 (1)	38 (5)	152 (15)	201 (36)	413
Total	1342	1459	747	973	553	5074

Table 7. (Cont'd.)

County of Residence	Vessel length class (m)					Total Vessels
	≤7.6	>7.6-12.2	>12.2-16.8	>16.8-21.3	>21.3	
1990						
Coastal	937 (88)	1205 (92)	663 (90)	795 (77)	340 (58)	3940
Non-coastal	119 (11)	91 (7)	31 (4)	12 (1)	3 (<1)	256
Out-of-state	7 (<1)	15 (1)	41 (6)	222 (22)	247 (42)	532
Total	1063	1311	735	1029	590	4728
1991						
Coastal	847 (91)	1136 (92)	644 (92)	755 (77)	334 (59)	3716
Non-coastal	91 (10)	80 (7)	28 (4)	14 (1)	7 (1)	220
Out-of-state	4 (<1)	13 (1)	31 (1)	210 (22)	223 (40)	481
Total	942	1229	703	979	564	4417
1992						
Coastal	486 (87)	1050 (93)	613 (93)	725 (84)	308 (71)	3182
Non-coastal	69 (15)	71 (6)	31 (5)	13 (2)	9 (2)	193
Out-of-state	4 (<1)	6 (<1)	15 (2)	126 (14)	119 (27)	270
Total	559	1127	659	864	436	3645
1993						
Coastal	453 (90)	1004 (94)	640 (96)	680 (80)	300 (58)	3077
Non-coastal	51 (10)	61 (6)	17 (3)	16 (2)	7 (1)	152
Out-of-state	0 (0)	6 (<1)	11 (1)	163 (18)	210 (41)	390
Total	504	1071	668	859	517	3619

Table 7. (Cont'd.)

County of Residence	Vessel length class (m)					Total Vessels
	≤7.6	>7.6-12.2	>12.2-16.8	>16.8-21.3	>21.3	
1994						
Coastal	337 (89)	873 (94)	569 (95)	622 (91)	273 (72)	2674
Non-coastal	41 (11)	57 (6)	29 (5)	18 (2)	9 (2)	154
Out-of-state	0 (0)	1 (<1)	4 (<1)	47 (7)	98 (26)	150
Total	378	931	602	687	380	2978
1995						
Coastal	397 (89)	1061 (97)	692 (97)	622 (90)	274 (66)	3046
Non-coastal	51 (11)	37 (3)	16 (2)	8 (1)	9 (2)	121
Out-of-state	0 (0)	1 (<1)	6 (<1)	61 (9)	135 (32)	203
Total	448	1099	714	691	418	3370
1996						
Coastal	278 (91)	838 (94)	578 (97)	610 (90)	257 (66)	2561
Non-coastal	28 (9)	49 (6)	18 (3)	9 (1)	20 (5)	124
Out-of-state	1 (<1)	1 (<1)	3 (<1)	58 (9)	112 (29)	176
Total	307	888	599	677	389	2861
1997						
Coastal	238 (91)	855 (95)	561 (96)	560 (90)	285 (45)	2499
Non-coastal	24 (9)	41 (5)	20 (3)	12 (2)	17 (3)	114
Out-of-state	1 (<1)	3 (<1)	3 (1)	48 (8)	335 (53)	390
Total	263	899	584	620	637	3003

Table 7. (Cont'd.)

County of Residence	Vessel length class (m)					Total Vessels
	≤7.6	>7.6-12.2	>12.2-16.8	>16.8-21.3	>21.3	
1998						
Coastal	214 (95)	807 (94)	564 (96)	554 (87)	296 (46)	2435
Non-coastal	22 (4)	36 (6)	18 (3)	14 (4)	19 (1)	109
Out-of-state	1 (<1)	3 (<1)	2 (<1)	62 (10)	338 (53)	406
Total	237	846	584	630	653	2950
1999						
Coastal	189 (89)	791 (94)	595 (96)	528 (88)	303 (46)	2406
Non-coastal	22 (10)	40 (5)	21 (3)	10 (2)	22 (3)	115
Out-of-state	1 (<1)	3 (<1)	1 (<1)	61 (10)	335 (51)	401
Total	212	834	617	599	660	2922

Figure 1. Total number of bay, bait, and Gulf licenses purchased in Texas by license year for 1986-1999.

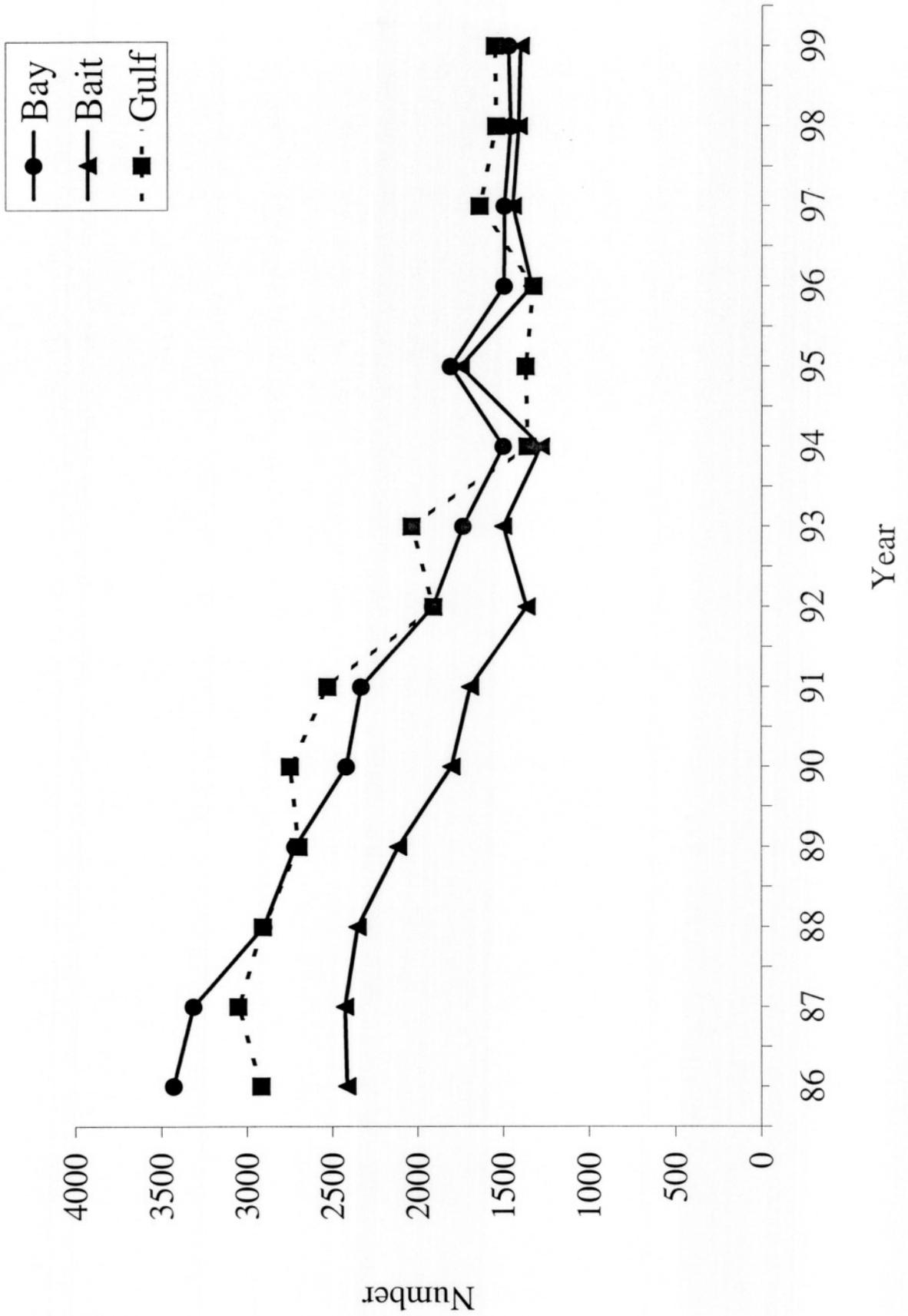


Figure 2. Comparison between number of licenses purchased and number of licensed vessels in Texas by license year for 1986-1999.

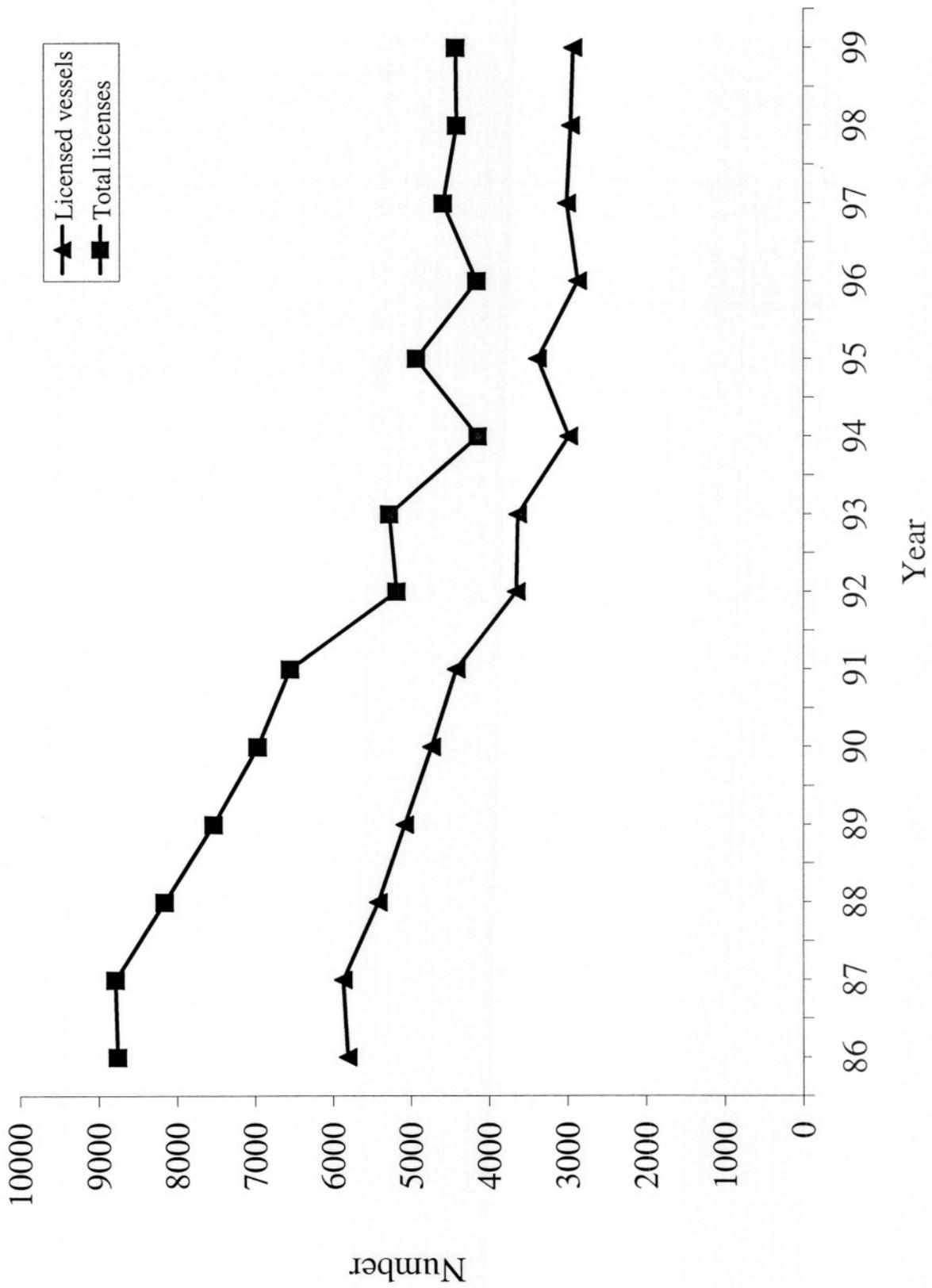


Figure 3. Texas coast illustrating coastal counties, bay systems, and major shrimp ports (1 = Beaumont/Nederland; 2 = Port Arthur/Sabine Pass; 3 = Houston/Pasadena/Baytown; 4 = Seabrook/Kemah/San Leon/Texas City; 5 = Galveston; 6 = Freeport; 7 = Matagorda; 8 = Palacios/Port Lavaca/Port O'Connor; 9 = Seadrift; 10 = Fulton/Rockport/Aransas Pass; 11 = Corpus Christi; 12 = Brownsville).

