THE IMPORTANCE
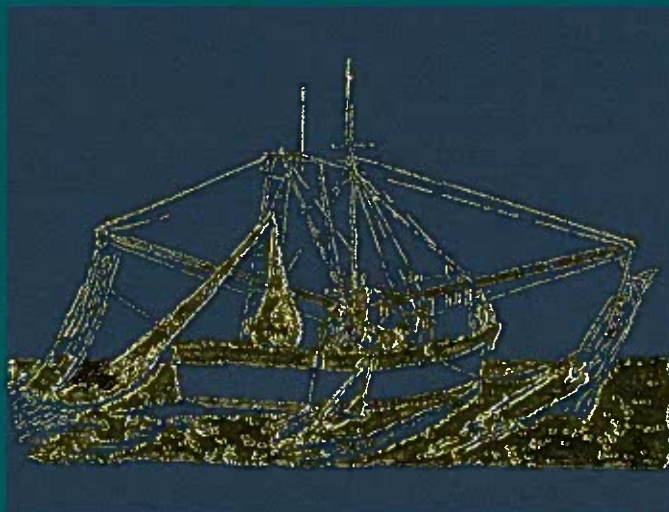# OF SEAFOOD-LINKED EMPLOYMENT
AND PAYROLL IN TEXAS

• HABY • EDWARDS • REISINGER •
• TILLMAN • YOUNGER •

The Importance of Seafood-Linked Employment and Payroll in Texas

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Preface

Few states can match the broad-based economic power of Texas. Nationwide, Texas has the third largest population. Our Gross State Product accounts for 7 percent of all U.S. economic activity. Texas' land mass is second only to Alaska's. Within agriculture, Texas is recognized as a world leader by any measure: technology, production acumen or agribusiness activity.

Texas is also a leader in commercial fisheries — an industry few residents know much about. Galveston Bay is Texas' most valuable commercial estuary, supplying two-thirds of the state's oyster harvest, and accounting for 40 percent of all seafood produced in the coastal bay complex. Productive offshore fishing grounds have made Texas a major seafood producing state. Shrimp accounts for 84 percent of Texas seafood landings, and 94 percent of dockside value. Texas fishermen alone produce 34 cents of every dollar's worth of shrimp harvested from Maine to Alaska.

Three Texas ports — Port Arthur, Aransas Pass/Rockport, and Brownsville/Port Isabel are among the top 20 most valuable fishing ports in the country. Brownsville/Port Isabel represents the most valuable fishing port among all Gulf states. In the lower 48 states, only the port of New Bedford, Massachusetts, can boast of a higher landed commercial fisheries value.
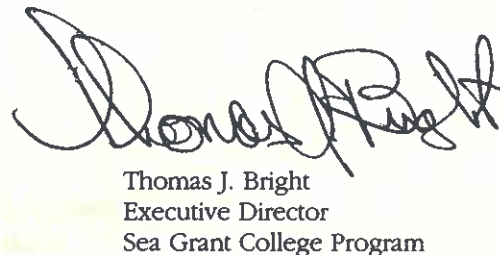
The economic importance of the seafood industry is obviously strongest along the coast, but the employment and payroll impacts of seafood production, processing and marketing are also felt statewide. Across Texas, seafood-linked employment amounts to roughly 30,000 fulltime jobs, with an annual payroll of $327 million.

The Texas Agricultural Extension Service and the Texas A&M Sea Grant College Program are broad-based organizations committed to various educational approaches that result in better understanding and use of coastal and marine resources. Their joint program is represented by the Texas Marine Advisory Service. The specific Marine Advisory goals are met through research, education, extension and information transfer. Those seeking more about the economic importance of seafood-linked firms in Texas, or needing assistance with other marine-related topics, should contact the local County Marine Advisory agent headquartered in County Extension offices along the coast.

Sincerely,

Zerle L. Carpenter
Director
Texas Agricultural Extension Service

Thomas J. Bright
Executive Director
Sea Grant College Program

Executive Summary*

Texas is a major seafood-producing state. Nationwide, the Lone Star State ranks *fifth* in landed value, and *fourteenth* in landings. This high landed value is due to the primary component of Texas' seafood production base—large, offshore shrimp. In 1989[1], an average year for shrimp production, Texas fishermen generated 34 percent of the total, domestic *dockside value* of shrimp and 23 percent of domestic landings. Texas fishermen also produce roughly 4 percent of the nationwide oyster and blue crab harvest.

Commercial fishing is but one step in the seafood marketing system. The seafood industry harvests a renewable, common property resource, processes the catch into a wide mix of marine food products (many ready-to-eat), and distributes them nationwide. Obviously, the scope of such business activity extends far beyond the harvest sector, but few Texans recognize the economic importance of the seafood industry.

One way to assess economic importance is to quantify the employment and payroll created by an industry. A primary reason for using employment and payroll data is the relationship among employment, personal spending and Gross National Product (GNP). In the U.S. economy, *two-thirds* of GNP is generated by personal consumption expenditures. Naturally,

creation and maintenance of jobs is a key issue for policy makers at *all* governmental levels.

This report quantifies "seafood-linked" employment and payroll beginning with those firms supplying commercial fishing enterprises and ending with retail interests. Importantly, a job and its associated payroll is seafood-linked by virtue of sales made to commercial fishing companies (in the case of firms supplying the fleet) or the sale of *indigenous* seafood products by processors, wholesalers, or retailers. Self-employed persons are excluded from published, secondary data sets (i.e., **County Business Patterns**) so there are more seafood-linked jobs and payroll than indicated by this study. Unfortunately, these additional jobs cannot be quantified because the necessary data are incomplete. Thus, cumulative estimates of seafood-linked employment and payroll err on the *conservative* side.

As shown in the accompanying

table, seafood-linked employment in 1989 is estimated at 30,036 *fulltime jobs* with an annual payroll of $326.5 million. This total reflects all commercial activity between the two end points of firms supplying commercial fishing enterprises and the retail sector. Thus, for every 1,000 Texas jobs, five are seafood-linked. For each $1,000 paid to working Texans, $3 are seafood-linked. Comparing seafood-linked employment and payroll with the massive Texas agribusiness complex, seafood-linked employment accounts for 29 out of every 1,000 agribusiness jobs, and $24 out of every $1,000 in agribusiness payroll.

Texas' Gross State Product amounts to $330 billion and accounts for 7 percent of total U.S. GNP. Therefore, it is easy to overlook the contributions individual industries make to the overall Texas economy. Among coastal counties, however, the seafood industry is often the largest taxpayer as well as the largest employer.

Sector	Estimated Seafood Linked Employment	Estimated Seafood Linked Payroll
Input Supply	5,843	$118,734,376
Production	9,798	$55,295,529
Seafood Processing	1,205	$28,117,000
Wholesaling	1,579	$30,399,631
Retail Food	1,478	$15,855,779
Food Service	10,133	$78,133,757
Total	30,036	$326,536,072

A vast array of industries are located in Texas, many of which do business around the globe. In part because of its large geographic size, Texas also supports one of the largest agribusiness sectors in the country. Agribusiness is the term used to include all functional steps necessary to produce basic commodities, store them, process these harvests into food products, distribute finished goods and retail them to consumers. Under this definition, the two end points of the system are those firms that supply inputs to production enterprises, and retail establishments (Figure 1) [1].
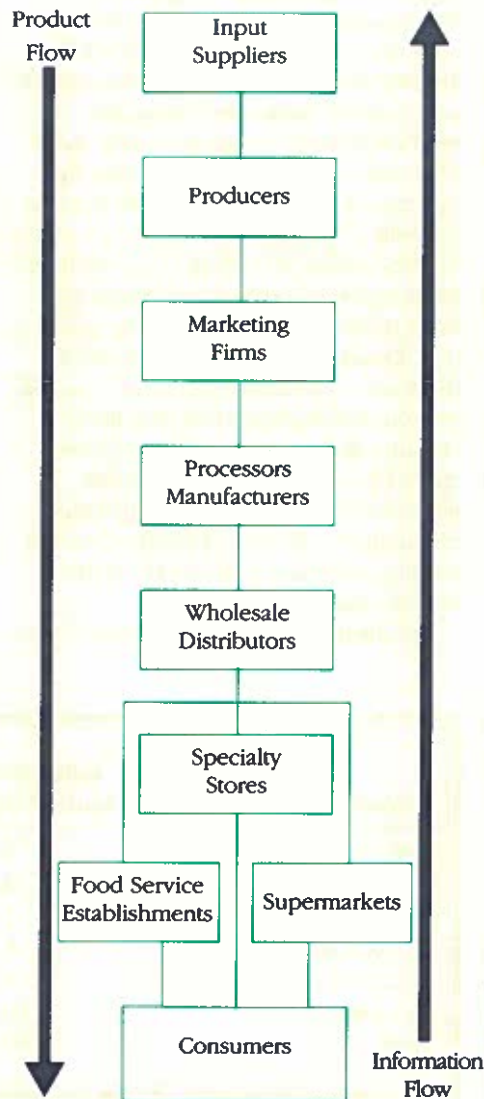
The Texas seafood indus-

try is a mature, sophisticated subset of the state's larger food producing, processing and marketing complex. The seafood industry harvests a renewable, common property resource, processes the catch into a wide mix of seafood products (many ready-to-eat), and distributes them nationwide.[2]

The scope of seafood-linked business activity extends far beyond the harvest sector, just as it does in the larger agribusiness arena. Except for those who work in the fisheries, however, few Texans know much about the seafood industry, or recognize its economic importance to the state's economy.[3]

The U.S. Agribusiness Industry

Product Flow →

- Input Suppliers
- Producers
- Marketing Firms
- Processors Manufacturers
- Wholesale Distributors
- Specialty Stores
- Food Service Establishments
- Supermarkets
- Consumers

← Information Flow

Approach

The significance of all industries is judged by the contribution each makes to a larger economic system—a city, county, region, state, etc. There are three broad approaches for assessing the economic contributions of specific industries. Contributions are sometimes quantified by reporting sales volume, value of assets, landed value or other readily available accounting measures and statistics. Such an approach, however, often misses the relationships generated by commerce, thereby understating the importance of a particular sector.

Agribusiness is a case in point. While production agriculture accounts for roughly two jobs per hundred, the broader agribusiness industry generates one in five jobs. The difference between the 2 percent who produce fishery or farm products and the 20 percent who subsequently process, manufacture, distribute and market food products is best explained by the high level of convenience we expect in our food purchases. By any measure, the extent of this convenience is astounding.[4]

Economic "multipliers" are more comprehensive measures of economic activity. This concept quantifies the idea that dollars earned by one entity repetitively "cycle" or "ripple" through a geographic trading area.

Another, inclusive means of assessing economic importance is to quantify the employment and payroll created in a sector or an industry. Data pertaining to employment and dollar payroll are collected annually by the Bureau of Census (an agency of the U.S. Department of Commerce) for every county in the country. These data are classified by county *and* by Standard Industrial Classification (SIC). The SIC is series of seven digit numbers under which all American industries can be placed.[5]

Employment and payroll data obviously focus on labor so they are not as inclusive as economic multipliers that quantify the entire spectrum of economic activity. However, such labor statistics draw attention to the human capital involved in particular industries. The most important reason for using employment and payroll data is the relation among employment, personal spending and Gross National Product (GNP). In the U.S. economy, *two-thirds* of GNP is generated by personal consumption expenditures. Naturally, creation and maintenance of jobs is a key issue for policy makers at *all* governmental levels.

This report quantifies seafood-linked employment and payroll across the types of industries reflected in Figure 1 (e.g. suppliers to commercial fishermen, producers, processors, wholesalers, and retail interests). Importantly, a job and its associated payroll is considered to be seafood linked *only* if it can be related to indigenous Texas harvests.

Several data sources were used to estimate seafood-linked employment and payroll. Suppliers to commercial fishing firms provided anonymous, proprietary information about the number of employees and associated payroll via a mail survey. Seafood-linked employment and payroll were factored out of the total employment and payroll reported by respondents based on each firm's reported percentage of sales made to Texas fishing firms.

Published landings and ex-vessel value data from the Texas Parks and Wildlife Department (TPWD) and the National Marine Fisheries Service (NMFS) were used to estimate the number of fishermen and their total payroll. Actual crew share arrangements provided by industry leaders facilitated the delineation of producer payroll from overall landed value.

Seafood-linked employment and payroll generated by seafood processors, wholesalers, retail food stores and food service establishments was determined (estimated) using *County Business Patterns* [5]. The most significant limitation of these data is that only corporate entities are included. This suggests that employment and payroll values are *understated* by the number of self employed persons. *The extent of understatement may be significant for some SIC codes.*[6] While additional seafood-linked jobs and payroll dollars do exist, they cannot be counted because the data are incomplete. Therefore, the values presented in this report are biased toward the conservative side.

The most current year's data reported via *County Business Patterns* was 1989, so all other data used in this report pertain to that year. Therefore, the results presented in this report represent a point in time "snapshot": Calendar 1989. While this "snapshot" represents the year under investigation, it is essential to note that within all ecological systems a certain amount of variability is inevitable. Seafood production is directly linked to such systems and thus fluctuates yearly.[7] While variable landings may not impact *all* sectors, producer payroll *will* vary since fishermen receive a percentage of landed value.

Analysis of 1989 Seafood Production in Texas

Texas is a major seafood-producing state. In 1989, a year that just equaled the 31-year production average for shrimp, the Lone Star State ranked *fourteenth* in landings, producing 96 million pounds of seafood (on a round weight basis). In terms of landed value, however, Texas ranked *fifth* among seafood-producing states with a 1989 commercial seafood harvest valued at $170.1 million. Among the major seafood-producing states, Texas *leads the nation* in ex-vessel price per pound at $1.764. This high per pound value is due to the primary component of Texas' seafood production base: large, offshore shrimp.[8] For each dollar's worth of shrimp produced domestically, 34 cents is generated solely by Texas fishermen.

While Texas produces a number of different seafood products, shrimp is the kingpin of the state's production sector, accounting for 84 percent of total tonnage and 94 percent of landed value. Texas shrimp production is dramatically skewed toward the offshore fishery. Long-term trends indicate that 84 percent of shrimp production and 91 percent of shrimp value was generated from the Gulf of Mexico.

Galveston Bay is Texas' most valuable commercial estuary. Of all seafood produced throughout the coastal bay complex, this bay system accounts for 33 percent of the commercial seafood tonnage and 40 percent of dockside value. Galveston Bay alone produces two-thirds of the Texas oyster harvest.

An examination of market share percentages highlights the importance of the Texas seafood industry to the nation. Texas fishermen produce 23 percent of the U.S. shrimp harvest, and roughly 4 percent of the nationwide oyster and blue crab harvest (Table 1). When imports of shrimp and oysters are added to domestic production, Texas still maintains a 6.75 percent market share in shrimp, and a 1.76 percent share in oysters.

Other measures suggest the importance of Texas to the national fisheries picture. In 1989, three of the 20 most valuable U.S. commercial fishing ports were in Texas.[9] Brownsville/Port Isabel is the highest valued fishing port in the Gulf states. Nationwide, only New Bedford, Mass., and four Alaskan ports generated higher landed values for seafood products than those in Cameron County. Additionally, Texas fishermen maintain one of the largest, most modern fleets in the country. Brownsville and Port Isabel collectively support the largest offshore shrimp fleet in the nation, perhaps the world.

While computing the actual number of vessels from licenses issued is straightforward, pinpointing the actual number of true commercial vessels in the fleet and, thus, the number of commercial fishermen is difficult.

Interviews with various industry leaders suggest that there may be 3,000 to 7,000 commercial shrimp fishermen (captains and crew members). Coastwide, producer payroll is generally calculated at 30 percent of landed value. Thus, in 1989 captain and crew-shares in the Texas shrimp fishery would have been roughly $47,153,729.

The oyster, crab, and finfish industries are much smaller. Many who operate within the Texas coastal bay complex may fish for oysters in the winter months, and thus would have to maintain several licenses. There were 941 oyster licenses issued in 1989. With a dockside value of roughly $5 million, the payroll for oystermen is estimated to be $3.7 million; about 75 percent of landed value. Crab fishermen are estimated to number about 350 coastwide. Of the $4 million ex-vessel value, crabbers took home approximately $3 million. Coastwide, $3,028,300 worth of finfish was landed in 1989. Seventy-eight percent originated from the Gulf of Mexico. The only license available for Gulf of Mexico producers is the Gulf Shrimp Boat License issued by the Texas Parks and Wildlife Department. Thus, finfishermen who operate in the Gulf of Mexico are commingled with Gulf shrimpers. Industry leaders estimate approximately 300 Gulf finfishermen. Assuming that their crew share is 50 percent, the payroll in this fishery amounts to $1.5 million. Based on license data and industry judgement, the total number of commercial fishermen is estimated to be 9,798. Collectively, these fishermen earned $55,295,529 in 1989.

Table 1. 1989 Texas Landings (in pounds) Compared Against Domestic Production and the Total Market by Major Product Category[a]

Product[b]	Texas Landings	U.S. Harvests	Texas Contribution to U.S. Harvests (%)	U.S. Market Size	Texas Share of U.S. Market (%)
Shrimp	50,184,507	215,825,507	23.25	743,292,000	6.75
Oysters	1,188,174	29,926,000	3.97	67,588,000	1.76
Blue Crab	9,066,200	206,720,000	4.39	—	—
Finfish	2,466,000	4,897,000,000	0.05	9,735,000,000	0.03

a. Texas landings data are from: Johns, M.A. 1990. Trends in Texas Commercial Fishery Landings, 1972-1989. TPWD Management Data Series Number 37, 136p. National fisheries data are reported in: U.S. Department of Commerce, National Marine Fisheries Service. 1990. Fisheries of the United States: 1989. 112p.

b. Shrimp production expressed in shell-on, headless pounds; approximately 60 percent of round weight. Oyster production is recorded on a meat weight basis. Blue crab harvests are recorded in round weight pounds. Note that the total domestic market data for blue crabs are unavailable. Finfish production expressed in round weight pounds.

Analysis of the Input Supply Sector

Commercial fishing is a capital-intensive operation. While history remembers the commercial fisherman as a self sufficient individual supplying all that is needed to produce seafood, today's commercial fishing enterprises generally rely on a host of suppliers. A survey was implemented in 1992 to estimate the seafood-linked employ-ment and payroll generated by firms that supply commercial fishing busi-nesses (mechanical replacement/ repairs, ice, fuel, hardware, netting, etc.). Suppliers were identified from the accounts payable rosters of approxi-mately 50 commercial fishing opera-tions in Aransas Pass, Brownsville, Palacios, Port Isabel and Rockport. Only suppliers located in Texas were queried.

Survey results indicate that the 1989 average wage paid to employees in firms supplying commercial seafood enterprises was $20,320.79. The average total seafood-linked employ-ment in the input supply sector amounted to 5,843 jobs. Besides these point estimates, interval estimates were computed for employment and wages paid.[10] At the 95 percent confidence interval, the true wage falls somewhere between $18,766 and $21,876 (i.e., $20,320.79 ± 7.65 percent). Similarly, the total number of seafood-linked jobs ranges from 5,436 to 6,250 (i.e., 5,843 ± 6.96 percent). Computing seafood-linked payroll for input supply firms using both the average values and the interval estimates places seafood-linked payroll for 1989 between $102 million and $137 million.

Analysis of Processing, Wholesaling, and Retailing Operations

Seafood-linked jobs in processing, wholesaling and retailing categories were estimated using *County Business Patterns* data. Only seafood process-ing, SIC 2091 and SIC 2092, contain "pure" values—that is employment and payroll data that can be used "as is." To sum seafood-linked jobs in the whole-sale and retail sectors, however, some quantitative means of establishing a "seafood-link" was required. Two variables establish the proportion of reported employment and payroll considered to be seafood-linked.

Establishing Seafood-Linked Coefficients

Seafood-linked coefficients are decimal values that combine two conditions for a particular sector or SIC code. The first condition is that percent-age of the Texas seafood market supplied by indigenous harvests. This value is consistent throughout all wholesaling and retailing operations. The second required percentage is that proportion of total sales comprised of seafood products. This particular condition varies across SIC codes.

In-State Market Share of the Texas Fishing Industry. On an edible meat basis, the Texas seafood industry produces approximately 41.5 million pounds of seafood products (Table 2). However, with Texas being the third most populous state in the country, some 270 million pounds of seafood

products were required in 1989 to meet demand.[11] Assuming, therefore, that every pound of product landed in Texas is consumed here, the indig-enous industry supplies 15.4 percent of total Texas seafood demand. This market share percentage is used for all wholesaling and retailing establish-ments.

Processing

SIC 2091 "Canned and Cured Seafoods" and SIC 2092 "Fresh or Frozen Packaged Fish" comprises the seafood processing sector in Texas. SIC 2091 includes firms that produce shelf stable, canned seafood products, while SIC 2092 incorporates such activities as shucking oysters, picking crabmeat and processing shrimp (i.e., sorting, pack-ing, peeling, breading, etc.). Seafood processing is essentially a coastal activity, with nine coastal counties supporting processing facilities in 1989. These counties are Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Harris, Jefferson and Matagorda.

Texas maintains some of the world's most modern shrimp processing infrastructure. Besides these huge, state-of-the-art facilities, there are a number of small sole proprietorships that custom process for local markets. Unfortunately, small operators such as these are excluded. Thus, the employ-ment from processing seafood in Texas is actually larger than that being reported. There were 1,205 seafood processing jobs in Texas in 1989, with an annual payroll of $28,117,000.

Wholesaling

Wholesaling is a broad category, including firms among the Fortune 500, and smaller specialty seafood wholesal-ers. Three SIC codes within the whole-sale trade were judged to have some degree of seafood linkage: SIC 5141 "General Line Groceries," SIC 5142

"Frozen Foods," and SIC 5146 "Fish and Seafoods." The total reported employ-ment across these three SIC codes amounted to 17,599 jobs, with a total payroll of $436,237,000. Of the 17,599 jobs, 1,579 were found to be seafood-linked. Of the $436 million in annual payroll, the seafood-linked portion amounted to $30,399,631.

Retail Food Stores

Employment and payroll data are reflected in SIC 5410, "Grocery Stores." To estimate the retail food store jobs attributable to indigenous Texas products, the Texas market share percentage and the proportion of total store sales generated by seafoods must be known to separate seafood-linked employment and payroll.

Seafood sales through the retail food sector amount to 5.7 percent of total store sales. This category is too inclu-sive, however, since it includes such items as canned tuna. Of the 5.7 percent, 87 percent is fresh or frozen seafood products. Thus, fresh and frozen seafoods contribute 4.96 percent to total store sales. Combining the percentage contribution fresh and frozen seafoods make to total store sales with the Texas market share held by the indigenous industry, 1,478 jobs with an annual payroll of $15,855,779 are seafood-linked.

Eating and Drinking Places: SIC 5800

Within the SIC retail category, the "lion's share" of employment and payroll is represented by food service establishments. Reported total employ-ment amounts to 600,119 jobs with an annual payroll of $4.63 billion. The seafood-linked coefficient was com-puted to be 1.69 percent. Thus, sea-food-linked jobs within food service total 10,133 with an annual payroll of $78,133,757.

Table 2. Estimated Quantity of Seafood Supplied to the Texas Market by Texas Seafood Producers and Processors

Species	Landings	Conversion Factor	Raw, Edible Quantity
Blue Crab[a]	9,066,200	14 percent	1,269,268
Oyster	1,979,900	100 percent	1,979,900
Shrimp[b]	50,184,507	75 percent	37,638,380
Finfish[a]	2,466,000	25 percent	616,500
Total			41,504,048

a. Landings for these major categories collected by the Texas Parks and Wildlife Department are expressed on a 100 percent of body weight (i.e., a round weight) basis.
b. Shrimp landings, collected by the National Marine Fisheries Service, are expressed on a shell-on, headless basis, which is roughly 60 percent of round weight.

Table 3. Composite Seafood-Linked Employment and Payroll by Primary Category

Sector	Estimated Seafood Linked Employment	Estimated Seafood Linked Payroll
Input Supply	5,843	$118,734,376
Production	9,798	$55,295,529
Seafood Processing	1,205	$28,117,000
Wholesaling	1,579	$30,399,631
Retail Food	1,478	$15,855,779
Food Service	10,133	$78,133,757
Total	30,036	$326,536,072

Discussion

Between the two endpoints of suppliers to commercial fishing and the retail sector, 1989 seafood-linked employment is *conservatively* estimated at 30,036 jobs with an annual payroll of $326,536,072 (Table 3). There are additional seafood-linked jobs and payroll that cannot be estimated because the required data are incomplete.

The importance of seafood-linked employment and payroll is best quantified when compared against a larger economic base. Ironically, Texas is not short of "larger economic bases." In fact, few states can match the broad-based economic power of Texas.

The Texas market is the third largest in the United States. Because of Texas' 17.4 million residents, statewide seafood demand is roughly 7 times greater than the indigenous seafood harvest.

At $330 billion, the 1989 Gross State Product of Texas (an inclusive measure of the state's economic activity) accounted for 6.8 percent of U.S. Gross National Product, exceeding that of almost all other states as well as that of many *countries*.

In part because of its 170 million-acre land mass, Texas agribusiness accounts for 1 million jobs (18 percent) out of a total Texas labor force of 5.6 million. The agribusiness payroll accounts for $14 billion (12 percent) out of the $126 billion paid to working Texans.

Based on the findings of this study, for every 1,000 Texas jobs, five are seafood-linked. For each $1,000 paid to working Texans, $3 are seafood-linked. Comparing seafood-linked employment and payroll with Texas agribusiness, seafood-linked employment accounts for 29 of every 1,000 agribusiness jobs,

and $24 of every $1,000 in agribusiness payroll.

The challenge to industries that are subsets of the overall Texas economic picture is to recognize that in any sort of comparative analysis a small quotient is *not* indicative of insignificance, but rather reflects the size of the comparative base.

While some may suggest that the Texas seafood industry is inconsequential to the large, diverse Texas economy, it is important perhaps to scale back the comparative analysis to a more localized level. In several coastal communities and counties seafood-linked enterprises are the largest taxpayers as well as the largest employers. The seafood industry is not inconsequential to these local residents; rather, the economic activity it generates binds these communities together.

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End Notes

1   To quantify seafood-linked employment and payroll, this report draws from a number of information sources. These include: 1) primary data collected via survey at the Texas A&M Agricultural Research and Extension Center in Corpus Christi, 2) landings and ex-vessel value information published annually by the Texas Parks and Wildlife Department and the National Marine Fisheries Service, and 3) *County Business Patterns*, an annual publication from the Census Bureau. The most current *County Business Patterns* publication was for 1989. Data from this publication were used to quantify employment and payroll in seafood processing, wholesale, and retail sectors. Therefore, even though more recent information from other sources exists, all other data used were for calendar 1989 as well.

2   For the purposes of this study, the idea of "seafood-linked" refers to any Texas firm that sells to Texas commercial fishing enterprises or purchases indigenous seafood, directly or indirectly (e.g., a retailer purchasing Texas products from a distributor). The number of seafood-linked jobs in a firm (or industry) is based on that proportion of sales made to seafood production enterprises; or in the case of wholesale or retail firms, sales of *Texas-produced* seafood expressed as a percentage of total sales. For example, if a firm had $10 million in sales, sold $1 million to fishing firms, and had 10 employees with an annual payroll of $400,000, then 1 job and $40,000 in payroll would be seafood-linked.

3   Because of time lags in some of the data required for this report, the most current year's figures are for calendar 1989. Prior to 1990, limited information existed about the size of the Texas aquaculture industry. The one estimate of industry size pegged bankside value at $12.2 million [2]. Because the data pertaining to aquaculture do not exist for 1989, this sector of the seafood industry will *not* be considered in this publication. However, as such analyses are completed for years beyond 1989, the contribution made by aquaculture will be incorporated into the data stream.

4   For example, 90 percent of all the foods sold in supermarkets can be consumed with only 10 minutes preparation time, while 50 percent of all supermarket food products are ready-to-eat [3].

5   The SIC codes for food processing go from a two-digit code for the entire food processing industry to seven-digit codes for very specific product classes [4]. For instance, the total employment and payroll generated by SIC 2092 refers to manufacturers of "Miscellaneous Food Preparations and Kindred Products—Prepared Fresh or Frozen Fish and Seafoods".

6   Under SIC 5800, "Eating and Drinking Establishments," some 19,087 establishments are reported by *County Business Patterns*. However, the State Comptroller's office indicates 30,409 Texas establishments classified as SIC 5800. Apparently, the number of outlets reported in *County Business Patterns* is *understated* by 11,322, or 37 percent. In discussing this discrepancy with Texas Restaurant Association management, the only cause for the difference was thought to be unincorporated food service establishments.

7   For example, 1989 shrimp production approximately equalled the 31-year average of 50 million pounds. The ex-vessel value of this harvest was $157 million. Two years later, Texas shrimpers produced 59 million pounds; a harvest that has been surpassed in only four years out of the last 31, with an ex-vessel value of $197 million. However, due to excessive rainfall in Winter 1991, the statewide brown shrimp harvest was projected to be off by 27 percent, or around 16 million pounds [6]. Perhaps the best example of how environmental conditions impact upon production can be found in a review of historical minimum and maximum harvests. In 1966, a paltry 25.1 million pounds was produced. The following year, however, shrimp production amounted to 64.8 million pounds, the largest harvest on record [7].

Environmental conditions likewise influence oyster production. In dry years, increased bay salinities result in increased predation by oyster drills. Production is also influenced by periodic closure of shellfish beds due to temporary concerns for public health. In 1979, statewide oyster production was just 889,000 pounds of meat. However, the 1983 harvest of 7.9 million pounds was *nine times* that of 1979.

8   In contrast, the computed ex-vessel price per pound for the Louisiana seafood harvest was 21.5 *cents* per pound while Florida's unit ex-vessel price was 94.1 *cents* per pound.

9   These are: (a) Brownsville/Port Isabel, ranked sixth with a 1989 landed value of $54.1 million; (b) Aransas Pass/Rockport, ranked thirteenth with a dockside value of $32 million; and (c) Port Arthur, ranked twentieth, with a landed value of $23.8 million.

10 While discrete, average values were computed for both the number of jobs and the average wage paid in 1989, an interval estimate can be computed by selecting: (a) a confidence interval (95 percent in this case); (b) an estimate of that proportion of the population that conforms to the survey (.5 used in this case since it represents the worst mathematical scenario); and (c) knowing the number of surveys returned. This approach allows the user to establish an interval estimate based on sample size and a preselected confidence interval.

11 This figure was estimated using reported per capita consumption information for 1989 and multiplying by the state's civilian resident population of 17.4 million.

Acknowledgments

The purpose of this report is to quantify the employment and payroll attributable to businesses that depend on the Texas seafood industry for sales or purchases. Two sources of data were used to measure employment and payroll: (1) a survey of firms that supply inputs to commercial fishing enterprises (i.e., primary data); and (2) various secondary data available from trade associations, state government and federal agencies.

Several hundred man-hours were required to complete this project and prepare the manuscript. A long lead time is often required to generate new information via the survey process. In addition, three principal components were necessary to plan and implement this survey successfully: (1) the trust of the commercial fishing industry, since the sample of input supply firms was generated from producers' accounts payable rosters; (2) a major time commitment from support staff employed by the Texas Agricultural Extension Service and the Sea Grant College Program; and (3) the support and diligence of respondents.

Fishing industry support for this primary data gathering effort was significant. Those who provided proprietary accounts payable rosters include Pete Aparicio (Anchor Seafood), Helen Calais (Gold Coast Seafood), Leslie Casterline (Casterline Fish Company), Harley Londrie (Zimco Marine), Polly and Nick Mirkovich (Nick Mirkovich Seafood and Marine Boats), Rita Stricklin (Stricklin Bookkeeping), Winnie Thompson (Thompson Bookkeeping), Craig Wallace (WW Marine), Jay Wheless (Herndon Marine Products), and Walter Zimmerman (Zimco Marine).

Records for some 2,500 firms had to be key-entered. In all but a few cases the data provided were incomplete for survey purposes, so calls were placed to obtain missing information and to verify that provided by cooperators. Such tasks were time consuming and repetitive, but absolutely necessary. This work was cheerfully and *accurately* completed by Lucie Cotten, Aransas County Extension secretary, Eva Youngblood, District 14 Extension secretary, and Linda Parsley, Lower Colorado River Authority Summer Fisheries Intern. Perhaps the best indicator of their collective talent, computer literacy and commitment is the fact that of 1,500 surveys ultimately mailed, fewer than 30 were returned as undeliverable! Once the completed surveys were returned, Mary Ann Ybarra, District 14 Extension secretary, key-entered responses.

This survey requested proprietary information about employment and payroll expense generated over several years. While absolutely essential to this project, these data are also very private. Response from those receiving the survey was overwhelming, and very gratifying. A large number of useable responses creates the luxury of making point estimates with "tight" confidence intervals. Those responding to the survey remain anonymous by design. However, their collective contributions quantified a large, important facet of overall employment and payroll generated by commercial fishing enterprises that is unavailable from published, secondary data sources.

In addition to generating new information, this project reviewed and assessed current employment and payroll data available through published sources. One such example is producer employment. License data provides a good starting point to estimate the number of commercial fishermen. Peter Allen and Lydia Salas with the Texas Parks and Wildlife Department not only provided these license data but also interpreted various numeric coding used in each record. Mike Gerst with the Texas Agricultural Extension Service's Computer Technology group converted these 7,071 license records stored on 9-track magnetic tape to information useful in a PC environment. Heidi Van Setten with the Texas Restaurant Association graciously provided much useful economic information about the Texas food service sector. Her contribution enabled us to quantify the differences between data published by the Census Bureau and those collected by state government.

Finally, and most importantly, this project was initially set in motion two years ago by Wilma Anderson, who today is the Executive Director of the Texas Shrimp Association.

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