

# **An Assessment of the Economic Importance of the San Carlos Island Shrimp Processing Industry to the Lee County Economy**

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## **Overview and Purpose of the Study**

A study was recently funded by the West Coast Inland Navigation District (WCIND) to measure how much the shrimp processing industry on San Carlos Island contributes to the Lee County economy. Most of the shrimp offloading, grading, packing, and processing in Lee County occurs on San Carlos Island. Shrimp-laden vessels returning from extended trips navigate the federal channel into the anchorage basin so that they may dock and unload at one of the processing facilities. Shrimp are offloaded and the vessels then move to an adjacent moorage location to refuel, make repairs, and prepare for the next trip. During this process, most of the revenues earned on a trip are spent within the Lee County economy.

During seasons when shrimp landings are relatively high, the limited commercial dock space can become overcrowded, with some vessels being diverted to Key West or Tampa Bay. Expanded dock space would allow additional commercial vessels to tie-up and eliminate the need to divert vessels. However, the Matanzas Pass anchorage basin also serves as an important anchorage location for a number of recreational craft. Proposals by San Carlos Island processors to expand moorage space and attract additional commercial vessels have been met with considerable resistance by representatives of Ft. Myers Beach, which lies directly across the Matanzas Pass basin (Ft. Myers News-Press 1997a; 1997b; 1998). The WCIND felt that a study assessing the contribution of the commercial shrimp processing industry (and the lost economic contribution of each diverted shrimp vessel) to the local economy would be useful information in the ongoing debate.

The specific study objectives were to:

- (1) describe how shrimp processing activities on San Carlos Island are linked to other businesses within Lee County,
- (2) estimate the economic impact (i.e., expenditures, economic output, incomes, and jobs) of the San Carlos Island shrimp processing/packing industry to the Lee County economy, and
- (3) estimate how much economic activity is lost when a typical shrimp vessel is diverted from off-loading at the shrimp processing facilities on San Carlos Island.

## **The San Carlos Island Shrimp Processing Economy**

The commercial fisheries industry of Lee County represents an important component of the Florida commercial seafood industry. During 1997, approximately 8.7 million pounds of finfish and shellfish were landed in Lee County (Florida Dept. of Environmental Protection 1998). Only Monroe, Pinellas, and Brevard Counties produce greater volumes of commercial fisheries products than does Lee County. Many different varieties of finfish and shellfish are commercially targeted by vessels which homeport on Pine Island and San Carlos Island. The most important species group landed commercially in Lee County, however, is shrimp.

Shrimp are not typically harvested in the waters immediately adjacent to Lee County, but rather are harvested from Florida Bay and the Dry Tortugas regions. Within the south Florida region, the shrimp are off-loaded primarily in Key West, Tampa Bay, and San Carlos Island in Lee County. Of the three ports, San Carlos Island has become the most important off-loading site for shrimp. In 1997, 2.703 million pounds (heads-off) of shrimp, with a dockside value of \$13.399 million, were off-loaded on San Carlos Island (National Marine Fisheries Service 1998). San Carlos Island has become an important off-loading site due to the proximity to the fishing grounds, the presence of several processing/packing firms, the availability of a wide range of repair and maintenance services, the availability of fuel and ice, and significant, albeit limited, room for off-loading and moorage.

The off-loading of shrimp at the processing/packing facilities on San Carlos Island sets in motion a number of economic activities that results in the sale of shrimp outside of Lee County. These economic activities include spending and respending of dollars, which creates incomes and jobs within several associated industries and markets. This process begins with the off-loading of raw shrimp at a processing/packing facility following a trip by a commercial shrimp vessel. The price per pound of shrimp received by the vessel is determined by the size and product form (heads-on or heads-off) of shrimp landed. The vessel uses the payment to pay the crew and make purchases necessary for the next trip. These purchases include fuel, ice, supplies, net/door repairs, deck equipment and hull maintenance, electrical services, groceries for the next trip, and other goods and services. The vessel crew also spends money within the local economy for lodging, transportation services, eating and drinking establishments, entertainment, and other activities.

Prior to being sold into the next market level, the processing/packing facility processes the off-loaded shrimp by heading if necessary, sorting by size, boxing/icing for shipment. In doing so, a "value-added" margin is created as expenditures are incurred (labor, storage, refrigeration, packing materials, etc.) as the shrimp is processed and packed for shipment. The resulting wholesale price then includes the original dockside price plus the margin and a profit markup. The wholesale buyer ships the shrimp out of the Lee County area for further processing elsewhere or sells to distributors, food service buyers, grocery markets, or retail customers within Lee County. If sold to either buyers outside of Lee County or non-residents visiting in Lee County, the transaction will bring "new" revenue into the local economy. In contrast, sales within Lee County result in a redistribution of existing dollars, without the injection of new revenue.

The amount of economic activity associated with the San Carlos Island shrimp processing/packing industry is directly related to the volume of shrimp off-loaded into the dockside

processing facilities. The volume harvested is determined by a number of factors such as stock abundance and shrimping effort, which are in turn affected by environmental conditions in Florida Bay and the Tortugas, short-term weather conditions, and the general market for shrimp. San Carlos Island commercial landings of shrimp, which comprise approximately 92 percent of the shrimp landed within Lee County, have varied considerably since 1981. For example, landings peaked at 3.1 million pounds (heads-off) in 1985, and then fell to an average of 1.5 million pounds during 1987-92 (National Marine Fisheries Service 1998). Landings then steadily increased to 4.2 million pounds in 1996, then declining to 2.7 million pounds the next year. In addition, the landings of shrimp, especially pink shrimp, are seasonal in nature. Approximately 90% of the landings occur during the Nov-June months of each fishing year. This is due to the seasonal abundance of pink shrimp on the Florida Bay/Tortugas fishing grounds and the relaxing of the Texas Closure. Shrimp vessels from throughout the southeast US region converge on the Texas waters in July of each year to take advantage of the season opening and larger shrimp. During this period, the number of off-loading events and, thus, landings at San Carlos Island decline dramatically.

## **Methodology**

### **Collecting the Necessary Data**

In order to understand the linkages with related industry sectors associated with off-loading, processing and packing shrimp on San Carlos Island, in depth interviews were conducted with the managers and owners of the four shrimp processing/packing facilities on San Carlos Island. These interviews yielded detailed information on disposition of initial payment to off-loading shrimp vessels, vessel revenue/expense categories and amounts, expenditures associated with processing the shrimp (i.e., sorting, washing, thawing, heading, packaging, storing, and shipping and packing), related industries in the immediate area and the greater Ft. Myers area, prices for shrimp by size class and form (i.e., heads-on and heads-off), estimates of percentage processed shrimp exported from the Lee County, numbers of vessels off-loading during a typical season, number of off-loading events per vessel per season, estimates of the number of off-loading events that are diverted to other ports, and other related information. Representatives of other types of local businesses, such as marine repair facilities, seafood distributors, and marine electrical suppliers were also interviewed. In addition, the National Marine Fisheries Service (NMFS) port agent for the Ft. Myers region provided annual and monthly landings and dockside value data and the number of offloading events (1993-97) for the four-processing/packing facilities on San Carlos Island. Additional information was provided regarding the seasonal nature of the shrimp fishery, described interactions between the shrimp industry and other related industries in the region, and provided advice on the interpretation of the NMFS current price and landings data in terms of the study objectives. The information solicited from these various sources was utilized to create a schematic which illustrates the flow of shrimp, dollars, and associated goods and services among the industry sectors linked within the San Carlos Island and Lee County shrimp markets.

## **Economic Impact Estimation**

The information collected is utilized in estimating the economic activities in the Lee County economy associated with the San Carlos Island shrimp processing/packing industry. These economic activities take the form of initial expenditures, economic output, wages and salaries, and employment. Values for each of these are estimated by employing the IMPLAN model, a computer software and database package designed for regional economic impact analysis in the United States at the county level (Minnesota Implan Group, Inc., 1997). The analytical framework for IMPLAN is the “input-output” economic modeling approach originally described by Lontief (1959). The model utilizes databases consisting of a set of social/economic accounts which describe the structure of the US economy in terms of transactions between households, governments, and over 500 standardized industry sectors classified on the basis of the primary commodity or service produced.

Regional models may be constructed in IMPLAN for any county, group of counties, or state or territory in the United States. Economic impacts and activities for a given region are specified in IMPLAN as a change in final demand, output, or employment for a particular industry sector or social institution (e.g., households, government). The aggregate economic impact of these changes is calculated by a matrix inversion procedure that develops economic multipliers, which reflect the direct, indirect, and induced impacts. Direct, indirect, and induced impacts are set in motion within Lee County by changes in the supply and demand of raw shrimp, which in turn affects the demand for the goods and services associated with producing raw shrimp.

The commercial shrimp industry on San Carlos Island represents a “basic” industry in that it produces a product for sale outside the county. Dollars generated through these out-of-county sales (or consumption locally by non-residents), when respent in the county, produce additional countywide economic impacts. A “basic” industry directly affects economic activity in the county when its product is sold outside the local area. For the commercial shrimp industry in Lee County, this would include sales, jobs, and earnings generated in commercial shrimping and other activities related to the preparation of the raw shrimp for shipping to market. These direct activities produce additional indirect effects in the local economy as dollars earned through the sale of shrimp are respent locally. Indirect effects represent purchases of local products by shrimp vessels, such as ice, fuel, gear and net repair, groceries, etc. All the indirect effects are additional economic activity in the county and are indicative of additional jobs and income generated by the sale of shrimp outside Lee County.

Direct and indirect activities associated with commercial shrimping and the sale of shrimp outside Lee County then produce additional (induced) local impacts. These impacts are associated with the spending of income earned in the direct and indirect activities. This spending translates into local retail sales, local bank deposits, and the purchase of a diverse mix of consumer goods. An assessment of the total economic impact of a basic industry, such as commercial shrimping on San Carlos Island, must consider the sum of the direct, indirect, and induced activities. In essence, the sale of San Carlos

Island shrimp outside the county triggers a chain of local spending, which generates income and leads to additional spending. This process, however, is not infinite in nature. At each round of spending, for example, some dollars are lost (leaked) from the local economy. Leakages are in the form of savings in non-local institutions, taxes/fees paid to the state and federal governments, and payments for goods and services used in the preparation of raw shrimp for market, which are initially purchased outside the local area. Thus, the true economic impact from non-local sales of San Carlos Island-landed shrimp is represented by the new dollars remaining after accounting for the various leaks in the “economic hull” of the Lee County economy and the San Carlos Island shrimp processing/packing industry.

Thus, total economic activities and impacts to the Lee County economy that are associated with off-loading shrimp on San Carlos Island are estimated. The direct, indirect, and induced affects, in terms of economic output (sales of shrimp), personal incomes, total value added (wholesale margin), and employment is estimated via the IMPLAN model. The estimates are measured for several different scenarios, which embody several sets of assumptions relating to shrimp landings, dockside price, wholesale markup, and share of product exported from Lee County.

### **Vessel Diversion Impacts**

Similar to the analysis done for the entire Lee County economy, the economic activities associated with an individual shrimp off-loading event on San Carlos Island are also analyzed. This is a pertinent issue given the constraints that may exist for moorage space during periods of relatively high pink shrimp landings volumes. The total volume of shrimp that is eventually off-loaded on San Carlos Island during the course of a fishing year is the total of a large number of individual off-loading events. Each off-loading event is associated with a specific trip for a vessel. If a vessel is not able to off-load at San Carlos Island in a timely manner due to overcrowding at the docks, the vessel may divert to an alternate port, such as Tampa or Stock Island. If so, the economic activity associated with the eventual out-of-county sales from that specific load of shrimp will be lost to the Lee County economy. This represents an opportunity cost of the moorage constraint, which purportedly exists on San Carlos Island. The actual number of vessels that are forced to off-load elsewhere is unknown. Thus, the analysis was intended to estimate the economic activities associated with an “average” off-loading event. An average off-loading event is a determined by the number of trips and the total volume of shrimp off-loaded for a given year as reported by the National Marine Fisheries Service port agent office in Ft. Myers. Thus, the average off-loading event is defined as the average weight per trip.

## **Results**

### **San Carlos Island Industry / Lee County Economy Linkages**

The economic linkages between the San Carlos Island shrimp processing/packing industry and other sectors of the Lee County economy are shown in the schematic model presented in Figure 1.

These linkages were revealed in part through individual interviews and consultations with members of the local business community on San Carlos Island and Ft. Myers Beach. However, additional insight into the economic linkages was obtained by a review of annual cost data for 15 commercial shrimp vessels that utilize the San Carlos Island anchorage as their homeport. During the 1997 season, these vessels incurred an average of \$199,610 in total expenses (i.e., \$186,870 in trip expenses and \$12,740 in overhead expenses) (**Table 1**). The largest single expense was crew share (30.1%). Fuel (20.3%), maintenance and repair (17.0%), and supplies (11.1%) were also notable cost categories. Other costs included nets and gear, groceries, insurance, and loan interest. Crew share (shrimp vessels typically have up to 3 crew members) represents incomes spent within the local economy, particularly if the crewmembers reside in households within Lee County. Crew members from non-local vessels also spend a large portion of their crew share within the local economy for lodging, food, entertainment, transportation, etc. while waiting for their vessel to make the next trip.

The economic activities associated with the San Carlos shrimp industry are set in motion by the landing of shrimp (A) (**Figure 1**). Raw shrimp flows to the processors/packers (B) as dockside revenues flow to the vessels. The raw shrimp is then processed (headed, graded, boxed, iced, etc.) by the processors/packers. To accomplish this task, however, supplies are purchased from local suppliers of goods and services (C), while labor is purchased from local households (F).

Some shrimp is sold to local seafood distributors and retailers (D), but the majority is sold to wholesale firms out of the region. The revenue generated by these “export” sales represents *new* dollars in the Lee County economy are then spent again and again within the local economy as earnings by local households (F) are used to purchase goods and services from other local businesses (G) and shrimp from local seafood dealers (D). In addition, dockside revenues initially paid to shrimp vessels (A) is used by crewmembers to purchase goods and services from both fishing-related suppliers (C) and other local businesses (G). Some dockside revenues are used to purchase labor from local households (F) as shrimp vessel crewmembers. Some dockside revenues may also be retained in the local economy by vessel owners who reside within Lee County households (F). Finally, some of this revenue is used to re-initiate the process by purchasing the next load of shrimp that arrives at the dock.

### **Economic Impacts Associated with San Carlos Island Shrimp Industry**

The economic impacts associated with the shrimp industry on San Carlos Island were estimated with IMPLAN. Several scenarios were examined, each with a different set of underlying assumptions regarding shrimp landings, dockside price, wholesale markup, and other factors. The assumptions associated with each scenario are presented in **Table 2**. The impacts resulting from each scenario provide a range of impact estimates, which capture the highly volatile nature of the resource and market. Estimates for only one set of underlying assumptions for a given year or set of resource/market conditions may be rendered obsolete the following year. Thus, a range of estimates provides insight into the sensitivity of the associated economic impact measures to changes in some of the key underlying factors, which can influence the shrimp industry and the local economy. Three separate scenarios were

estimated. The underlying assumptions of each are discussed below.

### ***Assumptions Underlying the IMPLAN Economic Impact Analysis Scenarios***

**The Base Case** - The “Base Case” scenario utilizes an average for the heads-off *shrimp landings* (2.18 million pounds) during the period from 1981-1997. NMFS data were utilized to estimate this average. The *average dockside price*, however, was derived from interviews with managers or owners of the four shrimp processing/packing facilities on San Carlos Island. The price (\$6.30 / lb) represents an anecdotal estimate of the per pound average price, weighted by predominant size class and species, for heads-off shrimp off-loaded at the local facilities during the last 2-3 years. The estimated *dockside value* is the product of these two estimates. The *wholesale markup per pound* is defined as the increase in the dockside price per pound that is added by the processor/packer to cover all costs of processing and packing (e.g., off-loading, washing, sorting, grading, packaging, storage, etc.) prior to sale to the next market level. This markup also includes a profit margin added by the processor/packer. The markup (\$1.25 / lb) was derived from interviews with each of the shrimp processing/packing facility managers on San Carlos Island. The *wholesale value of shrimp sales* is derived by multiplying the wholesale markup per pound to the total volume of heads-off shrimp landings. This value is then added to the dockside value. The *share of product domestically exported* represents the percent of the total volume of wholesale shrimp sales that are sold to buyers outside of Lee County. This value (75%) was also derived from interviews with the managers or owners of the San Carlos Island shrimp processing/packing facilities. This value is then applied to the wholesale value of shrimp sales to yield the estimate for *domestic export sales*. These values were then utilized by IMPLAN to estimate the economic activities associated with the Base Case scenario. The equations presented above apply to the following scenarios as well.

**High Case** - This scenario attempts to duplicate conditions that might exist in a “best” case situation, where landings, dockside price, wholesale markup, and export share are assumed to be extremely favorable relative to the Base Case scenario. Shrimp landings are held at the 1996 level (4.18 million pounds heads-off) as reported by NMFS. Landings during that year were well above the average experienced during the 1981-1997 period (2.18 million pounds). Average dockside price is assumed to be \$7.00 / lb heads-off. This is approximately 10% higher than the Base Case assumption, but suggested to be reasonable by the processing/packing facility managers and owners interviewed during the study. The wholesale markup is assumed to be \$1.50, or a 20% increase over the Base Case assumption. This markup percentage was within the upper range provided via the interview process. Finally, the export share was increased to 90%, which is 33% over the Base Case. This may be a reasonable assumption during years when landings are higher than average, thereby creating an excess supply that cannot be absorbed by the local markets. Such conditions may necessitate a greater percentage being exported to out-of-county wholesale buyers.

**Low Case** - This scenario attempts to duplicate conditions that might prevail in a “worst” case situation. In other words, landings, dockside price, wholesale markup, and export share are assumed to

be less than favorable relative to the Base Case scenario. Shrimp landings are assumed to be 2.18 million pounds. This is the average for the 1981-1997 period and is almost 50% and 19% lower than for 1996 and 1997 landings as reported by NMFS, respectively. During the 17-year period, reported landings exceeded the assumed average value only six times. Average dockside price is assumed to be \$5.00 / lb, while the wholesale markup is assumed to be \$1.00 / lb. These values are within the lower range of possible estimates provided by those interviewed on San Carlos Island during the course of the study. Finally, the export share is assumed to be only 60%. A lower percentage may be reasonable during years when landings are low and a relatively larger share of the total production is allocated to the local market. In addition, a lower export percentage may illustrate market conditions characterized by high levels of imported shrimp or reduced consumer/retail buyer demand. Higher levels of imported shrimp serve as competition for domestically produced shrimp in the overall market for green, raw, headless shrimp to be further processed into peeled, deveined, cooked, breaded or other valued-added products.

### ***Findings of the IMPLAN Economic Impact Analysis***

As might be expected, the results of the IMPLAN analysis varied with the set of assumptions utilized. The largest economic impact estimates were associated with the High Case scenario, whereas the lowest impact estimates resulted from the conservative Low Case assumptions (**Table 3**). Findings from the High Case scenario suggest that the direct, indirect, and induced impacts total to \$54.96 million of economic output. Personal incomes were estimated to be \$22.24 million, while total value added (export sales) and employment total to \$35.0 million and 1,555, respectively. Findings associated with the Base Case scenario suggested that total economic output would be \$21.21 million. Personal incomes and value added were estimated to be \$8.58 million and \$13.5 million, respectively. The number of jobs associated with the Base Case scenario was estimated to be 600. The lowest estimates were associated with the conservative assumptions, which defined the Low Case scenario. Total economic output impacts were estimated to be \$13.48 million, while incomes, total value added, and jobs totaled to \$5.46 million, \$8.59 million, and 382, respectively.

The magnitude of the estimated economic impacts is directly related to landings volumes, dockside price, wholesale markup, and the export percentage. Thus, the actual economic impacts associated with the San Carlos Island shrimp industry will vary from year to year. As landings increase, the economic impacts will increase (assuming all other factors remain proportionally constant). Similarly, as landings or market price for shrimp decrease, the economic impacts will also likely fall. The range of estimates presented in **Table 3** provides insight into the fallacy of assigning a given economic value to an industry influenced so strongly by fluctuating environmental and general economic conditions.

### **Economic Consequences of Off-loading Event Diversion**

The economic activities associated with an “average” off-loading event were also estimated.



This is of interest given the reported constraints on moorage space that confront the shrimp processing/packing activities on San Carlos Island. Shrimp-laden vessels returning from a trip will moor in a parallel fashion at the dock in front of one of the facilities. The shrimp are off-loaded by hand or mechanically. This task is time consuming and requires the use of both vessel deckhands and workers from the processing facility. Once the vessel is emptied, it will move out of the way to make room for the next vessel to be off-loaded. The empty vessel will moor at an adjacent location and begin servicing (i.e., maintenance, refueling, repair, etc.) required for the next trip. Vessels will be moored three and four abreast for several days as they await servicing for the next trip. The logistics of accepting additional vessels to be off-loaded becomes a problem when there is insufficient room at the docks to moor empty vessels. When the moorage space within the basin is fully utilized, incoming vessels may need to be off-loaded at another location, such as Tampa Bay. Thus, the economic activity associated with those shrimp that would have been off-loaded on San Carlos Island is lost to the local economy.

The economic activity associated with an average off-loading event was estimated simply as the quotient of the individual total economic impact values (**Table 3**) and the average number of trips (i.e., off-loading events) taken during the 1992-1996 period. The number of off-loading events (trips) that occurred on San Carlos Island during the 1992-1996 period ranged from 976 (1992) to 1,436 (1996) (National Marine Fisheries Service 1998). The average number of trips during this period was 1,126. The average weight of shrimp off-loaded per event during the same period was 2,318 pounds heads-off. The economic impacts associated with an average off-loading event were derived for the same three scenarios as discussed for the total economic impact analysis.

The relative magnitude of the economic impact estimates for an average off-loading event across the three scenarios mirror that found for the total economic impact estimates (**Table 4**). The largest impact is associated with the High Case scenario. The total economic output (i.e., summed across the direct, indirect, and induced impact components) associated with an average off-loading event is estimated to be \$48,790. The total personal income impact is estimated to be \$19,750, while the total value added impact is \$31,070. The number of jobs associated with an off-loading event is estimated to be 1.38. The lowest impact estimates are associated with the Low Case scenario. In that scenario, less than one-half of a full-time equivalent job is associated with an average off-loading event.

These values provide an estimate of the economic impact that is lost to the local economy if a shrimp vessel is turned away from San Carlos Island and off-loaded in an alternative port facility out of Lee County. This can be referred to as an “opportunity” cost of allowing the moorage constraints that reportedly characterize the San Carlos Island docks to continue to exist.

The total number of diverted off-loading events during a typical year is difficult to estimate. However, the economic impact associated with the total number of diverted off-loadings can be estimated by simply multiplying the reported number of diverted off-loadings by the values found in **Table 4**. For example, if it is suspected that during 1996 a total of 12 vessels were diverted to Tampa Bay due to moorage constraints, then the Base Case loss in economic impact to the Lee County economy would have been \$225,960 in economic output, \$91,440 in personal incomes, \$143,880 in value added

impacts, and 6.36 jobs. Further, it is possible that a vessel diverted to an alternative port facility may continue to off-load at that alternative location for the entire fishing season, rather than for just the single off-loading event. If so, the economic activity associated with those off-loading events (1-2 trips per month during the pink shrimp season) would be lost to the Lee County economy.

### **Conclusions**

The shrimp processing/packing industry on San Carlos Island represents an important component of the Lee County economy. Activities associated with harvesting, offloading, processing, packing, and shipping shrimp from the San Carlos Island facilities has been shown to be intrinsically linked with several sectors of the local economy. These activities create positive economic impacts to the local economy as shrimp products are sold to buyers located outside of Lee County and non-residents purchase shrimp locally. The sale of shrimp to both local and non-local buyers results in the purchase of inputs from a variety of service and supply firms, and the distribution of incomes to local employees. These expenditures are circulated within the Lee County economy as these dollars are spent and respent. The total economic impact of the San Carlos Island shrimp industry depends on the amount of shrimp landings and the general economic conditions that exist at any given time. Thus, the actual impact values will vary from year to year.

Similarly, the economic impacts associated with an average off-loading event can vary. Under favorable conditions with landings at the volumes reported during 1996 and a strong market for shrimp prevailing, the total economic output associated with a single off-loading event may approach \$49,000. In addition, \$20,000 in personal incomes, \$31,000 in value added impacts, and almost 1-½ jobs may result. These values can also be viewed as the losses associated with an offloading event that may be diverted from Lee County if moorage space on San Carlos Island is unavailable.

This study has shown that the shrimp processing/packing industry on San Carlos Island generates positive economic impacts to the Lee County economy. Any decisions to address the purported moorage constraints that currently exist should carefully consider the economic contributions associated with the industry, while comparing against the costs of creating additional moorage space or reconfiguring the existing dock space.

## References

- Florida Department of Environmental Protection. Marine Fisheries Information System. Trip Ticket Program. Unpublished commercial fisheries landings data. St. Petersburg, FL. 1998.
- Ft. Myers News-Press. *As industry bulges, conflict brews.* 25 April 1997 (a).
- Ft. Myers News-Press. *Nets reflect industry rebound.* 21 February 1997 (b).
- Ft. Myers News-Press. *Shrimping grows to a whopping \$4 billion business in the US.* 4 October 1998.
- Liontief, W. *Studies in the Structure of the American Economy.* Oxford University Press. New York. 1953.
- Minnesota Implan Group, Inc. *Implan Professional Social Accounting and Impact Analysis Software User's Guide.* Stillwater, MN. 1997.
- National Marine Fisheries Service. Unpublished commercial fisheries landings data. 1998.

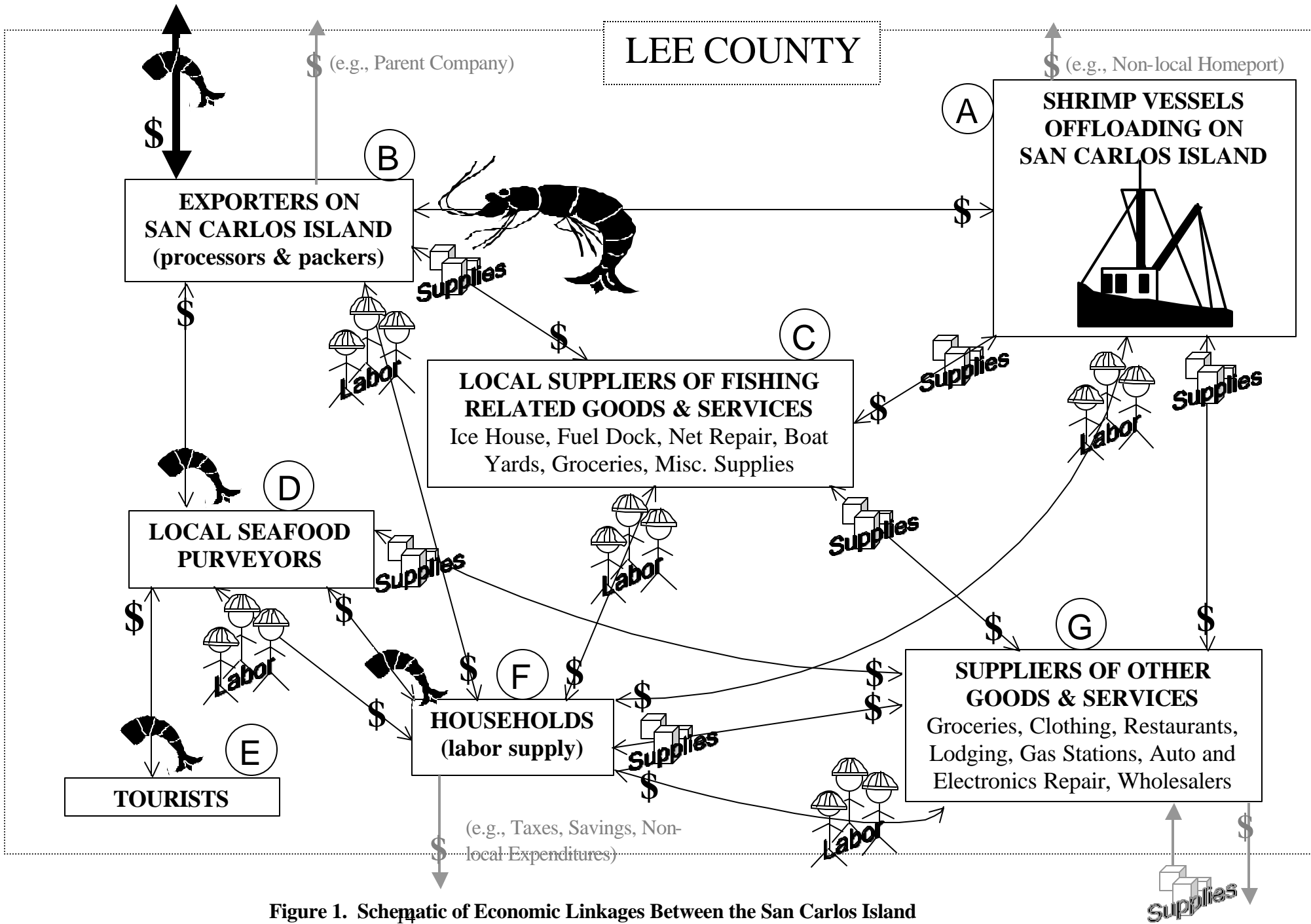


Figure 1. Schematic of Economic Linkages Between the San Carlos Island Shrimp Industry and the Lee County Economy

**Table 1. Annual Average Expenses for San Carlos Island-based Commercial Pink Shrimp Vessels, 1997**

<b>Expenses Category</b>	<b>Annual Average per Vessel</b>	<b>Percent of Annual Total (%)</b>
<b>Operating Expenses -</b>		
Crew Share	\$ 60,149	30.1
Groceries	\$ 9,290	4.7
Taxi	\$ 125	0.1
Packing	\$ 3,053	1.5
Vessel Maintenance / Repair	\$ 33,866	17.0
Electronics Maintenance / Repair	\$ 2,770	1.4
Ice	\$ 2,286	1.1
Fuel	\$ 40,582	20.3
Lube / Oil	\$ 467	0.2
Nets / Gear	\$ 10,770	5.4
Supplies	\$ 22,174	11.1
Dues / Licenses	\$ 1,260	0.6
Transportation	\$ 78	0.1
<i>Total Operating Expenses</i>	\$186,870	93.6
<b>Overhead Expenses -</b>		
Contract labor	\$ 1,359	0.7
Insurance	\$ 6,078	3.0
Interest	\$ 3,220	1.6
Legal / Accounting	\$ 1,808	0.9
Taxes	\$ 99	0.1
Miscellaneous	\$ 116	0.1
Depreciation	--	--
Medical	\$ 60	0.1
<i>Total Overhead Expense</i>	\$ 12,740	6.4
<b>Total Expenses</b>	\$199,610	100.0

Source: Data obtained from informal consultations and interviews with industry representatives. Data reflects costs associated with trips originating from Florida and Texas ports.

**Table 2. Scenarios Analyzed in the IMPLAN Economic Impact Analysis**

Assumption	Scenario		
	Base Case	High Case	Low Case
Shrimp Landings <sup>1</sup>	2.18	4.18	2.18
Average Dockside Price <sup>2</sup>	\$ 6.30	\$ 7.00	\$ 5.00
Dockside Value <sup>3</sup>	\$13.734	\$29.272	\$10.900
Wholesale Markup Per Pound <sup>2</sup>	\$ 1.25	\$ 1.50	\$ 1.00
Wholesale Value of Shrimp Sales <sup>3</sup>	\$16.459	\$35.545	\$13.080
Share of Product Domestically Exported <sup>4</sup>	75 %	90%	60%
Domestic Export Sales <sup>3</sup>	\$12.344	\$31.990	\$7.848

<sup>1</sup> Heads-off, million pounds. <sup>2</sup> Per pound heads-off. <sup>3</sup> Million dollars. <sup>4</sup> Percent of wholesale value of shrimp sales.

**Table 3. Total Economic Impact Estimates Associated with Various IMPLAN Scenarios**

Scenario	Impact Type	Value in Million of Dollars (1998) or Number of Jobs			
		Direct	Indirect	Induced	Total
<b>(1)</b> Base Case	Output	\$12.55	\$ 3.33	\$ 5.33	\$21.21
	Personal Income	\$ 5.38	\$ 1.22	\$ 1.98	\$ 8.58
	Value Added	\$ 8.34	\$ 1.68	\$ 3.49	\$13.50
	<i>Employment</i>	481	44	75	600
<b>(2)</b> High Case	Output	\$32.51	\$ 8.63	\$13.81	\$54.96
	Personal Income	\$13.94	\$ 3.17	\$ 5.13	\$22.24
	Value Added	\$21.61	\$ 4.35	\$ 9.04	\$35.00
	<i>Employment</i>	1,247	113	195	1,555
<b>(3)</b> Low Case	Output	\$ 7.98	\$ 2.12	\$ 3.39	\$13.48
	Personal Income	\$ 3.42	\$ 0.78	\$ 1.26	\$ 5.46
	Value Added	\$ 5.30	\$ 1.07	\$ 2.22	\$ 8.59
	<i>Employment</i>	306	28	48	382

**Note:** The economic impact estimates are additive across impact components (i.e., direct, indirect, and induced), but not across type of impact measure (i.e., output, income, value added, and jobs).

**Table 4. Economic Impact Estimates Associated with Diverting a Shrimp Off-loading Event from the San Carlos Island Port Facility**

Scenario	Impact Type	Value in Thousands of Dollars (1998) or Number of Jobs			
		Direct	Indirect	Induced	Total
(1) Base Case	Output	\$11.14	\$ 2.96	\$ 4.73	\$18.83
	Personal Income	\$ 4.78	\$ 1.09	\$ 1.76	\$ 7.62
	Value Added	\$ 7.40	\$ 1.49	\$ 3.10	\$11.99
	<i>Employment</i>	<i>0.43</i>	<i>0.04</i>	<i>0.07</i>	<i>0.53</i>
(2) High Case	Output	\$28.87	\$ 7.66	\$12.26	\$48.79
	Personal Income	\$12.38	\$ 2.82	\$ 4.56	\$19.75
	Value Added	\$19.19	\$ 3.86	\$ 8.02	\$31.07
	<i>Employment</i>	<i>1.11</i>	<i>0.10</i>	<i>0.04</i>	<i>1.38</i>
(3) Low Case	Output	\$ 7.08	\$ 1.88	\$ 3.01	\$11.97
	Personal Income	\$ 3.04	\$ 0.69	\$ 1.12	\$ 4.84
	Value Added	\$ 4.71	\$ 0.95	\$ 1.97	\$ 7.62
	<i>Employment</i>	<i>0.27</i>	<i>0.02</i>	<i>0.04</i>	<i>0.34</i>

**Note:** The economic impact estimates are additive across impact components (i.e., direct, indirect, and induced), but not across type of impact measure (i.e., output, income, value added, and jobs).