LAVACA-TRES PALACIOS ESTUARY:

ECONOMIC IMPACT OF RECREATIONAL ACTIVITY AND COMMERCIAL FISHING

A REPORT TO
TEXAS WATER DEVELOPMENT BOARD

BY

DEPARTMENT OF RECREATION AND PARKS
DEPARTMENT OF AGRICULTURAL ECONOMICS

AUGUST, 1987

TEXAS AGRICULTURAL EXPERIMENT STATION
TEXAS A&M UNIVERSITY SYSTEM

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Summary

The quantification of sport fishing, other recreational activity, and commercial fishing along with the estimation of the economic impacts of these activities on the local and state economies has been carried out in this study. The methodology employed in doing so has involved the use of various statistical survey instruments, published statistical series on commercial fishing, and the development and construction of state and regional input-output models. The economic impacts for this study have focused on the contribution of these three economic activities to the economies of the local region and the state in the form of output, employment, income, and state and local tax revenues.

Sport fishing, like other recreational activity and commercial fishing, exerts an effect upon the economies of the local region where these activities occur and upon the entire state. These effects can be classified as to direct and indirect business impacts. Direct business impacts include expenditures for goods and services (transportation, food, lodging, equipment rental, fees and related fishing expenses) purchased by sport fishermen, other recreational activity participants, and commercial fishermen. Indirect business impacts are the dollar value of goods and services produced to supply the businesses which make direct sales to these three groups of participants. Still other indirect impacts include wages, salaries and other forms of income to employees, owners and stockholders.

Total economic output impacts from sport fishing, other recreational activity, and commercial fishing (both inshore and offshore) in the Lavaca-Tres Palacios estuary amounted to $154.0 million and $266.7 million for the region

and state, respectively. Of these totals, commercial fishing contributed the largest impact with $74.7 million or 49 percent for the region and $129.7 million or 49 percent for the state. Direct sport fishing expenditures in the Lavaca-Tres Palacios estuary of $35.9 million were seven times greater than those for other recreational activity ($5.1 millon). Sport fishermen also spent more outside the local region ($5.2 million) than did other recreational activity participants ($1.3 million).

Over 35 percent of the direct expenditures by sport fishermen and other recreational activity participants in the Lavaca-Tres Palacios estuary region resulted in increased personal income for regional households directly affected by the sport fishing and other recreational activity industry. Statewide, the income impacts amounted to over $34 million for sport fishing and over $5.5 million for other recreational activity. Sport fishing and other recreational activity expenditures not only generate additional personal income but they also create additional employment opportunities both within the region and elsewhere in Texas. The estimated total employment impacts to the state economy were 2,213 and 355 full-time job equivalents for sport fishing and other recreational activity, respectively.

Increased economic activity due to gross dollar flows from the sport fishing and other recreational activity industry also impact positively the revenues to state and local governments. The total state tax revenues amounted to $1.8 million for sport fishing and $277 thousand for other recreational activity statewide. Likewise, local tax revenues from sport fishing and other recreational activity were of $3.1 million and $493 thousand, respectiviely. Most of these tax revenues whether local or state were generated within the Lavaca-Tres Palacios estuary region.

Estimates were also made of the inshore-offshore commercial fish landings associated with the Lavaca-Tres Palacios estuary region. The three year (1984, 1985, 1986) average inshore annual commercial finfish and shellfish contributions were estimated at 7.366 million pounds with an ex-vessel value of $7.6 million. Inshore and offshore landings together, however, amounted to about $43 million with direct employment of 2,404 fulltime job equivalents and direct personal income of $11.3 million.

LAVACA-TRES PALACIOS ESTURARY: ECONOMIC IMPACT OF RECREATIONAL ACTIVITY AND COMMERCIAL FISHING

Introduction

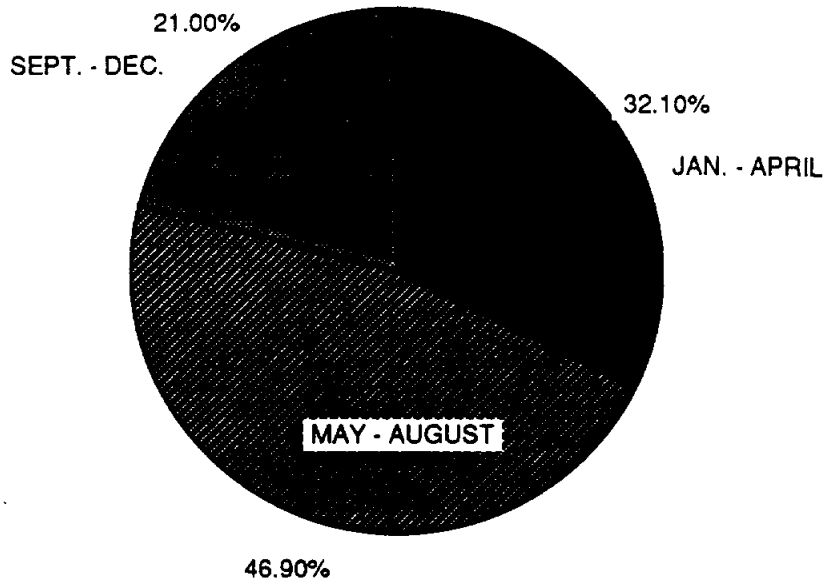
This study has been conducted as part of the Texas Water Development Board's on-going efforts to evaluate hydrological, biological, chemical and economic factors as they relate to the freshwater inflow needs of the six estuaries along the Texas Gulf Coast. Outdoor recreation, and sport fishing in particular, have been long recognized to exert significant economic impacts on local economies of the Texas Gulf Coast region. The primary focus of this study was to evaluate the economic impact of the estuarine-dependent fisheries resource; sport fishing and commercial fishing. However, since sport fishing is generally enjoyed as part of a complex of recreation activities, six other activities were included in the study. These are pleasure boating, hunting, camping, swimming, picknicking and sightseeing.

Visitation Patterns

The results of the study indicate that there were approximately 649,500 visits to the Lavaca-Tres Palacios estuary during calendar year of 1986; of these visits, 85.6 percent were made by those households involved in sport fishing.* As shown in Chart 1, there is substantial seasonal variation; approximately 31 percent of these visits occurred from January through April, 1986; whereas 47 percent of the total occurred during the summer months (May through August); finally, 21 percent occurred between September 1 and December 31, 1986.

*The methods and procedures for developing the participation and expenditure estimates are presented in Appendix A.

CHART 1: SEASONAL VISITATION



As part of the mail survey, information was collected concerning each household's current county of residence, the distance required to travel to each of the places visited along the Lavaca-Tres Palacios estuary, as well as the number of years members of the household had been visiting each place. The survey results indicate that Texas' households travel, on average, 109 miles to reach their destinations located along the Lavaca-Tres Palacios estuary. This relatively short travel distance is reflected by the counties in which these visitors reside. Harris county was the largest source for visitors; 24.3 percent of the visitors to the Lavaca-Tres Palacios estuary were from Harris County; 16.1 percent of the visitors were from Matagorda County and 12.8 percent were from nearby Wharton County. Only 33.6 percent of those survey indicated they had first visited places along the Lavaca-Tres Palacios estuary within the past six years (since 1980); another 19.3 percent started visiting this area of the Texas Coast between 1970 and 1980; finally, 47.1 percent of those survey indicated that they have been visiting the same place for over 16 years.

One of the important assumptions guiding the study was that a trip to the Texas Coast involved a number of recreation activities. The results of the study support this assumption; for the Lavaca-Tres Palacios estuary, sport fishing and camping account for 52.8 percent of the time allocated to recreation activity (32.4% and 20.4%, respectively). As one might expect, picnicking (11.5% of the time) and swimming (15.8%) were also popular activities (see Chart 2).

As indicated previously, a primary focus of this study was on the economic importance of sport fishing to communities along the Texas Gulf Coast. For those fishing in the Lavaca-Tres Palacios estuary, Sea Trout was caught most often, followed by Flounder and Red Drum. Chart 3 presents a list identifying the popularity of fish caught in this estuary. As part of the survey, fisherman

CHART 2:
RELATIVE POPULARITY OF RECREATION ACTIVITY

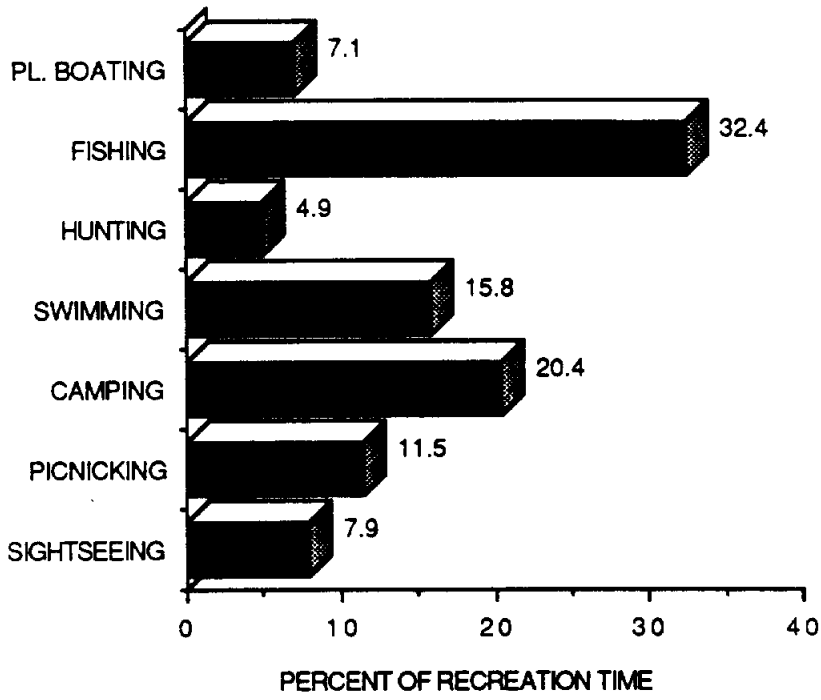
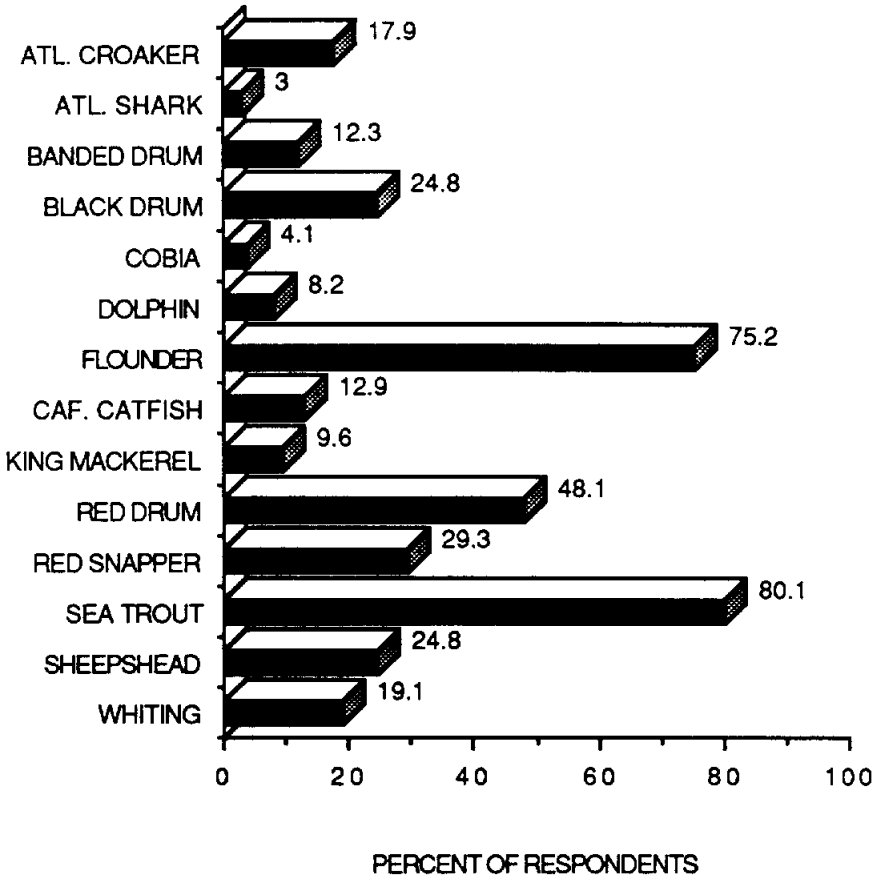


CHART 3: POPULARITY OF SELECTED FISH



were asked to evaluate the overall quality of the Texas Gulf Coast in the vicinity of the place(s) they went fishing. 8.6 percent of those surveyed indicated that this area was excellent for fishing; 38.4 percent and 40.2 percent thought the area was fair or good for fishing while only 8.9 percent indicated that places along the Lavaca-Tres Palacios estuary were poor to very poor.

Direct Expenditures

During the survey, respondents were asked to indicate their expenditures while on a "typical" or "average" trip to each particular place along the Lavaca-Tres Palacios estuary. Specifically, respondents were asked to estimate their total expenditures for seven types of goods and services: (1) overnight lodging (2) transportation (3) grocery store purchases (4) restaurants and other eating establishments (5) rental of recreation equipment (6) entrance, participation, and guided tour fees and (7) fishing-related items including bait and boat fuel. Based upon the estimation procedures discussed in Appendix A, the results of the study were used to estimate the total expenditures by Texans visiting places along the Lavaca-Tres Palacios estuary. As can be seen in Table 1, visitors spent approximately $40,963,046 during 1986. Of this total, 87.6 percent ($35,889,275) was spent by sport fisherman. Food costs accounted for a substantial portion of expenditures by fisherman; $13,339,805 was spent on grocery store purchases and an additional $4,305,943 was spent in restaurants. Transportation expenditures were also high at $7,692,547. Interestingly, for those visitors not fishing, transportation expenditures constituted the largest share of their trip-related cost.

Table 1. Visitor Expenditures in the Lavaca-Tres Palacios Estuary*

Category	"Fishing" Household Expenditures	"Nonfishing" Household Expenditures	Total
Lodging	$ 3,838,491	$ 927,177	$ 4,765,668
Transportation*	7,692,547	1,395,050	9,087,597
Restaurant	4,305,943	1,189,033	5,494,976
Grocery	13,339,805	1,280,598	14,620,403
Rental	833,522	127,357	960,879
Fees	915,619	154,556	1,070,175
Fishing-related items	4,963,348	-----	4,963,348
Total	$ 35,889,275	$ 5,073,771	$ 40,963,046

*For those households living outside the Lavaca-Tres Palacios region, transportation costs were reduced by 50 percent to provide a better estimate of "true" costs.

Economic Impact Analyses

Sport fishing and other recreational activities provide economic impacts or benefits to the economies of the local region where these activities occur and throughout the entire state. These economic impacts can be classified into direct and secondary impacts. Direct impacts are the direct sales of goods and services to recreationists and sport fishermen. For this study, the actual expenditures by recreationist and sport fishermen for goods and services constitute the direct or initial business impacts on the local economy and the state. These include expenditures with local restaurants, hotels and motels, grocery stores, bait shops and other recreational and sport fishing related businesses.

Direct expenditures associated with sport fishing and other recreational activities have a multiplying effect or impact on the economy of the local

region and the state in the form of secondary or indirect impacts. Secondary impacts arise because local and non-local businesses produce and sell inputs to eating and drinking establishments, hotels and motels, piers and guides, bait shops, and other recreational and sport fishing related businesses in order that they may serve their customers.

The total business effects or impacts of the sale of goods and services to recreationists and sport fishermen upon the local and state economies include both the direct and secondary impacts resulting from direct sport fishing and other recreational expenditures. This total impact in turn provides other economic benefits in the form of employment and wages, salaries, rents, profits and governmental revenues of which a portion is spent on goods and services. In this study, input-output analysis is used to estimate the total economic impact, both local and statewide, arising from fishing and other recreational expenditures.

Since economic impacts were estimated separately for the Lavaca-Tres Palacios estuary region and the state, it was necessary that both a regional and statewide input-output model be developed. State impacts are estimated using the 1986 Texas Input-Output Model developed specifically for this study. Likewise, regional impacts are estimated using the 1986 Lavaca-Tres Palacios four county regional input-output model also developed for purposes of this study. The methods and procedures for developing these models are presented in Appendix B.

Sport Fishing Economic Impact Analysis.

The results of the surveys conducted for this study were used to estimate the total expenditures by sport fishermen on the six types of goods and services presented earlier. These estimated expenditures are presented in

Table 1 by type of expenditure and between sport fishing and other recreational activities.

To estimate the total economic impacts of sport fishing, expenditures by sport fishermen were multiplied by their respective Type II multipliers obtained from the 1986 Texas Input-Output Model and the Lavaca-Tres Palacios Input-Output Model. The results of these calculations are summarized and presented in Table 2. As indicated in the table, regional sport fishing expenditures (output) in the Lavaca-Tres Palacios estuary region were over $35 million in 1986. Statewide expenditures that occured as a result of recreational fishing in the Lavaca-Tres Palacios estuary exceeded $41 million. The difference between regional and state direct expenditures is the estimated transportation expenditures made by fishermen from outside the Lavaca-Tres Palacios region. As can be observed, most direct expenditures (87 percent) accrue to the region. When the indirect and induced impacts are added to the direct impacts to obtain the regional total impact of over $74 million, this figure accounts for more than half (58 percent) of the gross output impacts statewide ($129.7 million). This difference reflects economic linkages between the Lavaca-Tres Palacios recreational fishing industry and product input suppliers throughout Texas.

The regional and statewide input-output models developed for this study enabled the estimation of employment impacts of recreational fishing within the Lavaca-Tres Palacios estuary region and within the state. The input-output analysis estimated a total of 1,230 full-time job equivalents directly related to sport fishing in the Lavaca-Tres Palacios estuary region during 1986. Statewide, an additional 309 full-time job equivalents were estimated to be directly related to the expenditures of sport fishermen. Taking account of the indirect and induced impacts along with the direct impacts, the total

employment impact on the Lavaca-Tres Palacios region was 1,521 jobs and 2,213 jobs in the state economy (Table 2).

Table 2. Direct and Total Economic Impact From Sport Fishing Expenditures, Lavaca-Tres Palacios Estuary, 1986

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	35.9	41.1	74.7	129.7
Employment (man-years)	1,230	1,539	1,521	2,213
Income (million $)	12.7	15.1	19.9	34.9
State Tax Revenues (million $)	a	0.20	1.5	1.8
Local Tax Returns (million $)	a	0.53	2.7	3.1

a. Local data were insufficient to estimate local tax effects.

Sport fishing expenditures in the Lavaca-Tres Palacios region not only created employment but also generated personal income to households both within the region and elsewhere in Texas. As shown in Table 2, about $12.7 million and $15 million of personal income was created directly for households within the region and state, respectively, by sport fishing expenditures within the Lavaca-Tres Palacios region. Moreover, total personal income impacts from sport fishing in the region amounted to over $19 million within the region and over $34 million within the state.

Increased economic activity due to gross dollar flows from the sport fishing industry also impact positively the revenues to state and local governments. About $1.5 million of the total statewide state tax revenues,

which amounted to over $1.8 million, were collected in the local region. As shown in Table 2, direct state tax revenues paid by the sport fishing industry were $198 thousand. Table 2 also shows that the total tax revenue impacts for local jurisdictions were concentrated within the Lavaca-Tres Palacios estuary region where an estimated $2.7 million resulted from direct, indirect, and induced sport fishing expenditures. Additionally, local governments outside the Lavaca-Tres Palacios estuary region collected an estimated $400 thousand in taxes on travel expenditures by sport fishermen for a total impact on local governments of $3.1 million statewide in 1986.

Other Recreational Activity Economic Impacts

Table 3 presents 1986 expenditures and related economic impacts from all recreational activity other than sport fishing in the Lavaca-Tres Palacios estuary region. As with recreational fishing, regional and statewide economic impacts of other recreational activity expenditures were estimated using the regional and state input-output models. It is estimated that in 1986 Lavaca-Tres Palacios non-fishing recreational participants spent just over $5 million within the Lavaca-Tres Palacios estuary region and a total of over $6 million in the state. These expenditures generated total economic impacts of over $10 million and $20 million within the region and state, respectively (Table 3).

Other economic benefits from recreational activity other than fishing, including local and statewide employment, personal income and state and local tax revenues were estimated as shown in Table 3. Hence, it is estimated that a total of 159 jobs were directly related to other recreational activity in the Lavaca-Tres Palacios estuary region. The analysis also estimated that an additional 90 jobs were generated thoughout the state because of other Lavaca-Tres Palacios recreational activity. Table 3 also shows the impacts accuring to

household income due to other recreational activity expenditures in the region. Regional income impacts amounted to $1.8 million of direct income and $2.8 million of total income. Direct state income impacts were about $2.4 million and total state income effects amounted to $5.5 million.

State and local tax revenue impacts from other recreational activity for the Lavaca-Tres Palacios estuary region are also presented in Table 3. Local tax revenue for all categories are greater than state tax revenue. Eighty percent of the total state tax revenue is generated within the region. Total state tax revenues amounted to $277 thousand while total local tax revenue was estimated at $493 thousand. Local tax jurisdictions elsewhere in the state also received an estimated $101 thousand in tax revenues from the travel expenditures of non-fishing recreationist to the Lavaca-Tres Palacios region.

Table 3. Direct and Total Economic Impact From Other Recreational Activity Expenditures, Lavaca-Tres Palacios Estuary, 1986

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	5.1	6.4	10.6	20.5
Employment (man-years)	159	249	199	355
Income (million $)	1.8	2.4	2.8	5.5
State Tax Revenues (million $)	a	0.03	0.22	0.28
Local Tax Returns (million $)	a	0.08	0.39	0.49

a. Local data were insufficient to estimate local tax effects.

Combined Economic Impacts from Sport Fishing and Other Recreational Activity

The combined impacts from both sport fishing and other recreational

activity for the Lavaca-Tres Palacios estuary in 1986 are presented in Table 4. Total state output was almost more than twice that of total regional output. The total employment impacts show that 67 percent of the jobs were generated locally while the other 33 percent were generated throughout the State. Both sport fishing and other recreational activity expenditures in the Lavaca-Tres Palacios region resulted in increased total household personal incomes of about $22 million for this region. In addition, household income generated outside the region was about $17.6 million bringing the total state personal income impact to $40.4 million from Lavaca-Tres Palacios recreational and fishing activities in 1986.

Table 4. Direct and Total Economic Impact From Sport Fishing and Other Recreational Activity Expenditures, Lavaca-Tres Palacios Estuary, 1986

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	41.0	47.5	85.3	150.1
Employment (man-year)	1,389	1,789	1,720	2,568
Income (million $)	14.5	17.4	22.8	40.4
State Tax Revenues (million $)	a	0.23	1.8	2.0
Local Tax Revenues (million $)	a	0.61	3.1	3.6

a. Local data were insufficient to estimate local tax effects.

Most of the state and local tax revenues were generated within the region. Total state tax revenues amounted to an estimated $2 million of which $1.8 million was collected within the region. Local tax jurisdictions within the

region received over $3.1 million in revenues while those outside the region received an additional $500 thousand for a total statewide tax impact on local jurisdiction of $3.6 million in 1986.

Economic Impact of Commercial Fishing

The analysis of the commercial fishing industry in the Lavaca-Tres Palacios estuary region was carried out using data available from the Texas Parks and Wildlife Department (TPWD) in conjunction with the regional and state input-output models developed for this study. The annual TPWD data consists of detailed information on the value and volumne of both inshore (bay system) and offshore commercial finfish and shellfish landings. Since offshore landings are reported only as a total for the state of Texas, it was necessary to allocate these landings to the different bay systems of the Texas Gulf Coast based on a weighting scheme developed for previous fisheries resource studies conducted by the Texas Water Development Board.

Given that the Lavaca-Tres Palacios bay system corresponds with the Lavaca-Tres Palacios estuary, for purposes of estimating direct and total economic impacts, the value of commercial fish landings in the Lavaca-Tres Palacios bay system were chosen to represent Lavaca-Tres Palacios estuary commercial fishing industry direct value of output. In addition, since commercial fish landings may vary significantly from year to year, an average of landings in 1984, 1985 and 1986 were computed to represent a typical current year. This procedure reduces the influence of annual variations. Hence, while reference is made to 1986 commercial fish landings, the values are, in fact, an average of the most recent three years.

The average annual inshore commercial fish landings (finfish and shellfish) for the Lavaca-Tres Palacios estuary were reported to be 7.366 million pounds

with an ex-vessel value of $7.655 million for the 1984 through 1986 period. Of this, white shrimp made up almost 67 percent of the total value of landings, while brown & pink shrimp, blue crab, and eastern oyster account for most of the remaining value. The combined inshore and offshore ex-vessel value of landings for this same time period was $43 million. This difference in the offshore-inshore value of landings suggests the importance of offshore landings supported by the Lavaca-Tres Palacios estuary.

The regional and statewide total economic impacts resulting from commercial fish catch attributed to the Lavaca-Tres Palacios estuary were estimated using the 1986 Lavaca-Tres Palacios Input-Output Model and the 1986 Texas Input-Output Model. These impacts, including total business activity, employment, personal income & state and local tax revenue estimates are presented in Table 5.

Total value of the inshore catch was $7.6 million, direct employment in the inshore fisheries industry was 425 full-time job equivalents and personal income paid to households by the inshore fishing industry was $2.4 million. In addition, the commercial fishing industry paid $37 thousand directly in state taxes and $52 thousand in local taxes (Table 5). Gross Texas business resulting from inshore commercial fishing, processing, and marketing fish attributed to the Lavaca-Tres Palacios estuary in 1986 was estimated at $25 million, of which $14.7 million was business within the estuary region. This regional inshore industry also supported a total of 477 full-time equivalent jobs and created personal income amounting to $6.3 million throughout the state. Also generated by this industry was statewide state taxes paid of $336 thousand and local taxes of $526 thousand to local jurisdictions throughout Texas.

The total value of offshore and inshore landings was reported to be about $43 million. Direct employment associated with this output was estimated at 2,404 fulltime job equivalents. Personal income paid to households by the inshore and offshore fishing industry was $11.3 million. The combined inshore and offshore state tax revenues from this industry was estimated at $172 thousand, while the local tax revenues were estimated to be $241 thousand (Table 5).

Table 5. Direct and Total Economic Impact of Commercial Fishing in the Lavaca-Tres Palacios Estuary, 1986

	Landings		Total Impacts			
	Inshore	Inshore - Offshore	Inshore Region	Inshore State	Offshore-Inshore Region	Offshore-Inshore State
Output (million $)	7.6	43.0	14.7	25.0	68.7	116.5
Employment (man-years)	425	2,404	477	545	2,700	3,082
Income (million $)	2.4	11.3	3.8	6.3	17.5	29.4
State Tax Rev. (million $)	0.04	0.17	a	0.34	a	1.6
Local Tax Rev. (thousand $)	0.05	0.24	a	0.53	a	2.4

a. Local data were insufficient to estimate local tax effects.

Gross Texas business resulting from inshore and offshore commercial fishing, processing, and marketing fish attributed to the Lavaca-Tres Palacios estuary in 1986 was estimated at $116.5 million of which almost $68.7 million was business within the estuary region. The combined inshore and offshore regional commercial fishing industry also supported a total of 3,082 full-time equivalent jobs and generated personal income of $29.4 million throughout the

state. Also, generated by this commercial fishing industry were statewide local tax revenue of $1.6 million and local taxes of $2.4 million to local jurisdictions thoughout the state.

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Appendix A

Participation and Expenditure Estimation Methodology

Description of Database

There are a number of approaches one might take in developing estimates of economic impact. In this study a particular approach is adopted which attempts to generate reliable estimates of expenditure levels while minimizing the cost of data collection and analysis. The study design takes advantage of recent advances in geographical, marketing, and transportation research indicating that people's travel patterns tend to be consistent and repetitive over time. That is, people tend to consistently visit places with which they are familiar while visiting "new" places very infrequently. In addition, because people tend to repeatedly visit the same place, they also can provide reliable information concerning the time and money spent at these places. The questionnaire used in this study focused upon the place (s) chosen for recreational outings. For each place identified, information was obtained which described a "typical" or "usual" trip to that place. This emphasis on the places (s) visited offers a number of methodological benefits including improved reliability of estimated expenditure levels and increased stability of the estimates against "unique" events that may effect travel patterns in the short term.

Data collection involved a two step strategy which incorporated the best aspects of both telephone and mail survey formats. In the first stage, information was obtained from a randomly drawn sample of Texans concerning their travel to the Texas Gulf Coast in order to develop weighting factors that can be used to estimate expenditures for the entire state population. A telephone survey was used in this step as a "filter" with which to identify those Texas households having traveled to the Texas Gulf Coast during 1986. The telephone format was adopted because it is relatively efficient in terms of cost per response and because personal communication affords greater

control over the quantity and quality of the responses.

The telephone survey first asked the respondent whether or not any member of the household visited the Texas Gulf Coast during 1986; a second question focused the respondent's attention onto travel to the Texas Coast for recreation-related purposes. Socioeconomic information was also gathered in order to incorporate into the estimation procedure differences between households that visited and those that did not visit the Texas Coast during 1986. Lastly, each respondent that indicated they had traveled to the Coast was informed of the need for additional information and asked if he/she would respond to a follow-up mail questionnaire. This telephone interview process required between two to three minutes of contact time.

Having agreed to complete a more indepth follow-up survey, a questionnaire was mailed to the household. The respondent was first asked to identify the place visited (along the Texas Gulf Coast) most often and then asked to estimate the time and money spent, the daily hours of participation in each of seven recreation activities as well as an evaluation of the quality of that place for the specific activities considered. Similar questions were asked for the place visited second most often and, with an abridged set of questions, for the place visited third most often. Finally, a series of attitude/evaluation questions were asked concerning the quality of respondents' experiences with particular emphasis on sport fishing.

In order to reduce recall error, the study utilized a "two phase" strategy. A fall survey was conducted which focused on trips made between January 1, 1986 and August 30, 1986. A spring survey was conducted to obtain information concerning travel to the Texas Gulf Coast from September 1, 1986 to December 31, 1986.

The sampling strategy of Texas households was designed to efficiently obtain information describing travel to the Texas Gulf Coast. First, it recognized that there are significant differences in travel patterns among Texans. Previous studies conducted for the Texas Department of Parks and Wildlife indicated that over fifty percent of those households living near the Coast (within 100 miles) regularly visit coastal areas. This contrasts sharply with those households living in El Paso and Amarillo where less than five percent travel to the Coast during any given year. Based upon the results of these previous studies, twelve state regions were identified to reflect the sharp behavioral differences throughout Texas. For each of the respective regions, households were randomly sampled from a panel of names provided by National List, Inc. (a subsidiary of Dun and Bradstreet, Inc.). The list was comprised of a large random sample of those households who own telephones in the state Texas.

Sample sizes for each region were determined with three goals in mind. First, the total number of households contacted should generate as large as possible the number of "completed" surveys for each estuary. Second, a minimum number of completed questionnaires must be generated in each region in order to allow adequate regional analysis and to guarantee sufficient variation within the data. This minimum was established at 100 completed questionnaires. With these first two goals in mind and using the results of previous studies for estimates, those regions where a "high" proportion of households visited the Texas Coast were targeted to generate a relatively large sample of households. Those regions showing low participation in Texas Gulf Coast related activities, on the other hand, were allocated only that number of households needed to generate the "minimum" number of completed

surveys. This "step" or "targeted" sampling strategy improved substantially the efficiency of the population based survey and guaranteed the variability and regional representation required for accurate and reliable statewide expenditures.

The results of the survey are presented in Table A1. For the fall telephone survey, 37,000 telephone numbers of Texas households were obtained and dialed; of these, 30,909 (83.5%) were contacted and resulted in 21,305 completed interviews (68.9%). 9,493 households either refused to participate or terminated the interview while in progress. Completion of the fall telephone phase took ten weeks and required, in total, 57,331 telephone calls.

Written questionnaires were mailed to all households (6152) that indicated they had visited the Texas Gulf Coast between January 1, 1986 and

Table A1. Results of Fall and Spring Survey

	Fall	Spring
Sample Size of Telephone Survey (Households)	37,000	16,678
# of Completed Telephone Surveys	21,305	9,486
# of Mailed Surveys	6,152	1,275
# of Returned Surveys	3,516	702
# of Completed Mail Surveys	2,711	513
Response Rate	(57.1%)	(55.1%)

August 31, 1986. To improve response rate of the mail surveys, two follow-up surveys were administered. As a result of this effort, 3516 questionnaires were returned (57.1%). However, 805 of these mail questionnaires were non-usable because they had not been completed correctly. Therefore, 2,711 completed mail interviews were generated by the fall survey effort.

In the second wave (the spring survey), the same procedures were employed to obtain information concerning travel to the Texas Gulf Coast between September 1, 1986 and December 31, 1986. Table 1 presents the results of this survey effort. 16,678 telephone numbers of Texas households were again obtained from National List, Inc. Of these, 12,766 households (76.5%) were contacted, resulting in 9,486 interviewed (56.9%). Follow-up mail surveys were sent to 1,275 households and resulted in 702 returned questionnaires. However, 189 of these questionnaires were deleted because they had not been completed correctly.

Recreation Visitation and Expenditure Estimation Procedures

Total visitation and resulting expenditures were estimated following a two phase process. The first phase focused on estimating the total number of households that visited the Lavaca-Tres Palacios estuary during 1986. As defined by the Texas Water Development Board, the Lavaca-Tres Palacios estuarine system includes Carancahua, Cox, Keller, Lavaca, Matagorda and Tres Placios Bays. The economic area around the Lavaca-Tres Palacios estuary includes Jackson, Matagorda, Victoria and Wharton Counties. The second phase estimated the total number of trips and the total dollars spent for transportation, food (restaurant and groceries), equipment rental, guide fees and bait and boat fuel by those households visiting this area along the Texas Gulf Coast. Based upon the results of these two stages, total visitation and expenditure estimates were

developed using the following equations:

$$THN_i = POP_i * Pl_i * PN_i \quad (1)$$

$$THF_i = POP_i * Pl_i * PF_i \quad (2)$$

where:

THN_i - the total number of households residing in region i that visited but did not fish at the Lavaca-Tres Palacios estuary;

THF_i - the total number of households residing in region i that went fishing at the Lavaca-Tres Palacios estuary;

POP_i - the population of households in region i;

Pl_i - the proportion of households from region i that visited the Texas Gulf Coast during 1986;

PN_i - the proportion of households from region i that traveled to the Texas Gulf Coast and visited (but did not fish at) places located along Lacaca-Tres Palacios estuary;

PF_i - the proportion of households from region i that traveled to the Texas Gulf Coast and went fishing at the Lavaca-Tres Palacios estuary.

$$TTN_i = THN_i * TRN_i \quad (3)$$

$$TTF_i = THF_i * TRF_i \quad (4)$$

where:

TTN_i - the total number of trips by "nonfishing" households residing in region i to the Lavaca-Tres Palacios estuary;

TTF_i - the total number of trips by fishing households residing in region i to the Lavaca-Tres Palacios estuary;

THN_i - same as before;

THF_i - same as before;

TRN_i - the mean number of trips per "nonfishing" household taken to the Lavaca-Tres Palacios estuary from region i;

TRF_i - the mean number of trips per "fishing" household taken to the Lavaca-Tres Palacios estuary from region i;

$$TEN_k = \sum_i^7 TTN_i * EXPN_{ik} \qquad (5)$$

$$TEF_k = \sum_i^7 TTF_i * EXPF_{ik} \qquad (6)$$

where:

TEN_k - the total expenditures by "nonfishing" households that visited the Lavaca-Tres Palacios estuary for expenditure category k;

TEF_k - the total expenditures by "fishing" households that visited the Lavaca-Tres Palacios estuary for expenditure category k;

TTN_i - same as before;

TTF_i - same as before;

$EXPN_{ik}$ - the mean expenditure per trip in category k by "nonfishing" households that reside in region i and visit the Lavaca-Tres Palacios estuary;

$EXPF_{ik}$ - the mean expenditure per trip in category k by "fishing" households that reside in region i and fish in the Lavaca-Tres Palacios estuary;

$$TEN = \sum_i^7 TEN_k \qquad (7)$$

$$TEF = \sum_i^7 TEF_k \qquad (8)$$

where:

TEN - the total expenditure level by "nonfishing" households that visited the Lavaca-Tres Palacios estuary;

TEF - the total expenditure level by households that fished in the Lavaca-Tres Palacios estuary;

TEN_k - the same as before;

TEF_k - the same as before;

$$TE = TEN + TEF \qquad (9)$$

where:

TE - the total expenditure level by Texas residents that visited places along the Lavaca-Tres Palacios estuary;

TEN - same as before;

TEF - same as before.

In the initial phase of the estimation procedure, households throughout the State were assigned to one of seven regions based upon their county of residence. Six of the regions corresponded to the six estuary "economic" regions developed by the Texas Water Development Board and the seventh region included all "non-estuary" counties. This regionalization process was necessary since visitation behavior including expenditure levels were likely to differ substantially for those households staying close to home (i.e., those who live near to the Coast) as compared to households that must travel farther to visit the Texas Gulf Coast. Based upon this regional distinction, data from the telephone interviews was used to calculate the proportion of households within each area that visited the Texas Gulf Coast during calendar year 1986. Data from the follow-up mail survey was then used to calculate the proportion of those households (given that they have traveled to the Coast) that visited places located along the Lavaca-Tres Palacios estuary. The total number of households visiting the estuary during 1986 was estimated by multiplying the respective proportions by the total number of households residing within each region (see equation 1). The total number of sport fisherman visiting the Lavaca-Tres Palacios estuary was estimated following the same procedure and is summarized in equation 2.

The second phase of procedure focused on developing accurate and reliable estimates of the total number of trips households throughout Texas made to the Lavaca-Tres Palacios estuary as well as the total dollars expended during these trips. Estimates of total visitation and expenditure levels were developed for "fishing" and "nonfishing" households residing in each of the seven regions and traveling to the Lavaca-Tres Palacios estuary following equations 3-6. As part of this step in the estimation procedure, statistical analyses were conducted to

test for regional differences in visitation and expenditure levels. These analyses confirmed prior expectations that visitation and expenditures levels vary substantially across Texas. Finally, estimates of the total dollars expended in the Lavaca-Tres Palacios estuary were calculated using equations 7-9 where the estimated total expenditure per category was summed across categories and then summed for "fishing" and "nonfishing" households.

Appendix B

Input-Output Methodology

Appendix B

Input-Output Methodology

Input-Output Methodology

Both the 1986 Texas Input-Output Model and the Lavaca-Tres Palacios Input-Output Model developed for this study are of the Leontief structure. As such these models may be expressed in matrix form as:

$$\mathbf{X} = (\mathbf{I}-\mathbf{A})^{-1}\,\mathbf{Y} \qquad (1)$$

where:

X = a vector of each sector's total value of output
I = an identity matrix
A = a matrix of direct requirement coefficients
Y = a vector of final demand

The **X** vector in this equation contains the dollar value for each sector that measures that sector's total value of output. The **A** matrix contains direct requirements coefficents which reflect the degree of interaction among sectors within the regional economy. Each column of this matrix shows the dollar value of purchases made from each sector of the economy per dollar of output by another sector. The **Y** vector contains values for each sector that measures that sector's total sales to final demand. It is from this model that the final demand, employment and income multipliers, both Type I and Type II, were estimated. A distinct advantage of this input-output technique over other methods is that it provides estimates of both direct and indirect effects of changes in the economy.

State Input-Output Model Development.

In this study, a procedure was designed to update the 1979 Texas Input-

Output Model to 1986 by a non-survey technique. This procedure involved; (1) setting up the definitional structure of the 1986 input-output sectors and then aggregation of the 1979 Texas Input-Output Model into these sectors, (2) the construction of state control totals and price indices for each sector, and (3) the development of microcomputer programs to perform the non-survey updating technique and complete the input-output analysis.

The 1986 Texas Input-Output Model was defined as having forty-one sectors. This model contains 34 processing sectors, seven final demand sectors, and seven final payment sectors. It was into this definitional structure that the 1979 Texas Input-Output Model was aggregated. Sector control totals for the 1986 Texas Input-Output Model were first obtained from secondary data for the year 1982. These control totals were then adjusted to 1986 by using wage data from the Texas Employment Commission. Various checks were performed to asertain the accuracy of each of the 1986 sector control totals estimated. The 1986 price indices for each of the sectors were also obtained from published secondary sources. The methodology employed in constructing the 1986 vector of price indices was essentially the same as that used by the Texas Department of Water Resources in the updating of the Texas Input-Output Model from 1972 to 1979. All price indices in this study use 1979 as a base.

The final step involved in developing the 1986 Texas Input-Output Model was the modification and adoption of the fortran programs designed to update an input-output model and to complete the input-output analysis. The updating procedure first uses the price indices to price adjust the 1979 transaction table and then uses the control totals along with a modified interactive RAS technique to update and near-balance the 1979 transaction table. The program

then uses a balancing routine to completely balance the new 1986 input-output transaction table. Once the 1986 input-output transaction table is formed, the procedure constructs the direct requirements; direct and indirect requirements; and direct, indirect, and induced requirements tables, and the necessary multipliers tables (Types I and II) that are used in this study. The 1986 Texas Input-Output Model developed for this study is available from the Texas Water Development Board.

Regional Input-Output Model Development.

Having constructed the 1986 Texas Input-Output Model and its subsequent multipliers, this model is then used to create the Lavaca-Tres Palacios Estuary Input-Output Model. To estimate this model regional control totals were first constructed using wage data from the Texas Employment Commission and the 1986 state control totals. These regional control totals were then used in conjunction with the location quotient technique to estimate the Lavaca-Tres Palacios Estuary Input-Output Model. This computerized location quotient program provided the necessary Type II input-output tables and Type II final demand, income, and employment multipliers used to calculate the total regional impacts. Direct requirement coefficients, interdependence coefficients and all multipliers developed for this study are presented in the tables of this appendix. The complete 1986 Lavaca-Tres Palacios Estuary Region Input-Output Model is available from the Texas Water Development Board.

Direct Requirement Coefficients for the Lavaca-Tres Palacios Estuary Region, 1986

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
1 Irrigated Agri	.00655416	.00505248	.03116521	.00002562	.00000000
2 Dryland Agri	.00011720	.01406189	.03786844	.00007259	.00000000
3 Lvestock & Pdt	.00000000	.00000000	.12830530	.02064256	.00000000
4 Agri Services	.08142541	.08918414	.03148745	.02570712	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00000000	.00000000	.00000196	.00000000	.00000000
7 Petro & NL,NGL	.00000000	.00000000	.00000000	.00016796	.00000000
8 Other Mining	.00000000	.00000000	.00000000	.00000000	.00000000
9 Construction	.00655001	.00781944	.00172227	.03283992	.00000000
10 Food & Kindred	.00000000	.00000000	.02206789	.00026894	.00000000
11 Text & Apparel	.00000000	.00000000	.00000072	.00003525	.00000000
12 Lum & Pap Pdts	.00057706	.00002621	.00041531	.00000976	.00000000
13 Print & Publih	.00000000	.00000000	.00000671	.00060989	.00000000
14 Chemicals	.05954107	.06930304	.00689888	.14085680	.00000000
15 Petro Refining	.00037443	.00065072	.00010588	.00032622	.00000000
16 Rub Leath Plas	.00239291	.00033568	.00011782	.00019889	.00000000
17 Glas Ston Clay	.00000000	.00000000	.00000718	.00014766	.00000000
18 Prim Metal Pdt	.00008705	.00022553	.00000674	.00000000	.00000000
19 Fab Metal Pdts	.00009694	.00010675	.00015589	.00005903	.00000000
20 Non-Elec Mach	.00066625	.00079564	.00019364	.00398002	.00000000
21 Elec Machinery	.00000918	.00002416	.00000875	.00001275	.00000000
22 Transpor Equip	.00074940	.00089467	.00013984	.00023897	.00000000
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00006484	.00007290	.00005483	.00018362	.00000000
25 Transportation	.00067560	.00068858	.00138286	.00117718	.00000000
26 Communications	.00057578	.00062655	.00072208	.00216455	.00000000
27 Utilities	.12155090	.00281416	.00957557	.04232423	.00000000
28 Wholesale Trde	.00774058	.01031356	.02149976	.03546850	.00000000
29 Eat&Drink Estb	.00000000	.00000000	.00008118	.00031315	.00000000
30 Other Ret Trde	.03147744	.04249509	.03710967	.01731459	.00000000
31 F.I.R.E.	.03139449	.02979149	.02598436	.02361310	.00000000
32 Health Service	.00000000	.00000000	.00000000	.00000000	.00000000
33 Educ Services	.00130086	.00136145	.00101887	.00044696	.00000000
34 Other Services	.00365760	.00020914	.00063905	.01171300	.00000000
35 Households	.26088830	.32838460	.21849400	.24871360	.00000000

Direct Requirements, Cont'd.

	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10
1 Irrigated Agri	.00007681	.00000000	.00000000	.00000000	.01418228
2 Dryland Agri	.00022084	.00000000	.00000000	.00000096	.01474219
3 Lvestock & Pdt	.00039367	.00000000	.00000000	.00000000	.14268990
4 Agri Services	.00040327	.00000000	.00000000	.00415265	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00167069	.00000000	.00000000	.00000000	.00679948
7 Petro & NL,NGL	.00014883	.13240600	.00000000	.00000030	.00472361
8 Other Mining	.00000000	.00041888	.00180165	.02637501	.00027151
9 Construction	.03497890	.00211409	.00726091	.00300918	.00310708
10 Food & Kindred	.00441489	.00001227	.00005307	.00000168	.02974243
11 Text & Apparel	.00317158	.00001626	.00008860	.00025489	.00085750
12 Lum & Pap Pdts	.00193180	.00005674	.00005241	.00316080	.00512643
13 Print & Publih	.00000000	.00028870	.00009150	.00030830	.00107335
14 Chemicals	.00114260	.00220896	.02352327	.00481593	.00484567
15 Petro Refining	.00117071	.00009363	.00029687	.00022909	.00010286
16 Rub Leath Plas	.00002768	.00002013	.00280827	.00178350	.00116902
17 Glas Ston Clay	.00000000	.00022146	.00384577	.03851446	.00904981
18 Prim Metal Pdt	.00007131	.00003226	.00430439	.01594881	.00055970
19 Fab Metal Pdts	.00001723	.00005929	.00079706	.00945737	.00504213
20 Non-Elec Mach	.00003904	.00208543	.01640347	.00330267	.00040091
21 Elec Machinery	.00000693	.00029040	.00069877	.00076645	.00003341
22 Transpor Equip	.00754661	.00001117	.00088433	.00016818	.00001602
23 Instruments	.00000000	.00000004	.00000000	.00000179	.00000026
24 Misc Manufactu	.00006241	.00001790	.00000000	.00063839	.00100733
25 Transportation	.00147236	.00094737	.00479437	.00153857	.00222962
26 Communications	.00141236	.00161416	.00172139	.00336724	.00655599
27 Utilities	.00357662	.00954685	.03825008	.00445644	.02317964
28 Wholesale Trde	.02593345	.00430000	.00312015	.01364409	.01717631
29 Eat&Drink Estb	.00053289	.00044316	.00000000	.00039591	.00498862
30 Other Ret Trde	.01575155	.00231241	.00582766	.00852867	.00840677
31 F.I.R.E.	.05229886	.01760328	.03694762	.03420065	.00911033
32 Health Service	.00000000	.00013996	.00000000	.00000462	.00014995
33 Educ Services	.00045608	.00538887	.00328413	.00044529	.00036208
34 Other Services	.00793346	.01073400	.01598006	.03771517	.00832904
35 Households	.31875470	.30736460	.28025330	.31092940	.13189100

Direct Requirements, Cont'd.

	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15
1 Irrigated Agri	.00730338	.00026834	.00039808	.00051745	.00000239
2 Dryland Agri	.00366727	.00033064	.00049061	.00063950	.00000294
3 Lvestock & Pdt	.00239103	.00226032	.00334249	.00432046	.00001991
4 Agri Services	.00000000	.00000000	.00000000	.00000054	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00001976	.00010612	.00015825	.00020460	.00000094
7 Petro & NL,NGL	.00166682	.00879858	.01302135	.04356515	.19067440
8 Other Mining	.00010719	.00076121	.00075895	.00479996	.00040463
9 Construction	.00103540	.01150518	.00481601	.01976088	.01269514
10 Food & Kindred	.00004583	.00025100	.00037175	.00050636	.00000385
11 Text & Apparel	.01313263	.00055697	.00027662	.00011259	.00003085
12 Lum & Pap Pdts	.00172750	.01746361	.01170819	.00110080	.00065909
13 Print & Publih	.00212138	.00042125	.02217024	.00061367	.00016976
14 Chemicals	.00381800	.02438916	.01353726	.16051660	.05827927
15 Petro Refining	.00003182	.00007492	.00013455	.00111770	.00110430
16 Rub Leath Plas	.00023045	.00270988	.00054682	.00115153	.00010874
17 Glas Ston Clay	.00007437	.00029915	.00041550	.00060150	.00012959
18 Prim Metal Pdt	.00230381	.00263223	.00128602	.00373444	.00140579
19 Fab Metal Pdts	.00077420	.00053702	.00050242	.00074556	.00106125
20 Non-Elec Mach	.00061247	.00306310	.00174806	.00167870	.00048881
21 Elec Machinery	.00002806	.00004525	.00007218	.00009084	.00009625
22 Transpor Equip	.00000766	.00001414	.00003102	.00004243	.00000565
23 Instruments	.00000004	.00000018	.00000433	.00000068	.00000048
24 Misc Manufactu	.00576452	.00015602	.00505962	.00046244	.00003553
25 Transportation	.00178063	.00304562	.00240376	.00281214	.00478886
26 Communications	.00280240	.00299820	.00737852	.00217058	.00080441
27 Utilities	.03316351	.04986218	.02277952	.10409840	.03716093
28 Wholesale Trde	.00592862	.02698957	.01165428	.01638520	.01228077
29 Eat&Drink Estb	.00062908	.00032251	.00104599	.00032214	.00005328
30 Other Ret Trde	.00121025	.01592398	.00545600	.00626102	.00033302
31 F.I.R.E.	.02898097	.01364037	.01117592	.01044729	.01426305
32 Health Service	.00001976	.00000951	.00001851	.00004941	.00001438
33 Educ Services	.00088767	.00007250	.00028609	.00052276	.00140749
34 Other Services	.00842905	.00420133	.01188556	.00652346	.00725717
35 Households	.35514110	.21950430	.31928020	.09424279	.04899720

Direct Requirements, Cont'd.

	Sector 16	Sector 17	Sector 18	Sector 19	Sector 20
1 Irrigated Agri	.00006396	.00007384	.00023865	.00019310	.00015540
2 Dryland Agri	.00415509	.00009197	.00029484	.00023845	.00019069
3 Lvestock & Pdt	.00055488	.00061834	.00199764	.00162682	.00141904
4 Agri Services	.00000000	.00000000	.00000000	.00000000	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00002331	.00002940	.00009466	.00007577	.00006097
7 Petro & NL,NGL	.00255354	.00241610	.00777205	.00632953	.00507520
8 Other Mining	.00014640	.07732411	.01717640	.00041083	.00031651
9 Construction	.00454140	.00244705	.01054828	.00601780	.00460909
10 Food & Kindred	.00113011	.00024455	.00028041	.00032697	.00015352
11 Text & Apparel	.00099098	.00002056	.00009019	.00009349	.00070202
12 Lum & Pap Pdts	.00184419	.00382294	.00045971	.00091320	.00080058
13 Print & Publih	.00075465	.00031226	.00031180	.00100369	.00061434
14 Chemicals	.15596740	.00417098	.01261641	.01473251	.00509615
15 Petro Refining	.00003692	.00003656	.00013638	.00008301	.00007034
16 Rub Leath Plas	.00737297	.00086128	.00072387	.00258589	.00758660
17 Glas Ston Clay	.00008339	.03470592	.00112057	.00269409	.00180325
18 Prim Metal Pdt	.00067287	.00071360	.05054519	.03169487	.02530285
19 Fab Metal Pdts	.00038923	.00014976	.00074027	.00797819	.00668948
20 Non-Elec Mach	.00278954	.00078763	.00129406	.00222440	.00921000
21 Elec Machinery	.00003877	.00001303	.00021838	.00025665	.00105001
22 Transpor Equip	.00000411	.00001898	.00001851	.00018794	.00005617
23 Instruments	.00000004	.00000003	.00000017	.00000026	.00000445
24 Misc Manufactu	.00052759	.00027081	.00069260	.00077304	.00080466
25 Transportation	.00348417	.01169631	.00408245	.00382540	.00187914
26 Communications	.00340163	.00342194	.00182423	.00411740	.00392066
27 Utilities	.04424455	.11330740	.10623220	.03941485	.01984470
28 Wholesale Trde	.01393653	.01333859	.01683383	.02051494	.02349463
29 Eat&Drink Estb	.00029535	.00027921	.00016394	.00071575	.00070716
30 Other Ret Trde	.01000581	.00678560	.04330502	.00518263	.00684562
31 F.I.R.E.	.01244700	.01814609	.01199099	.01551552	.01932129
32 Health Service	.00001478	.00006588	.00008418	.00004116	.00006395
33 Educ Services	.00026323	.00095216	.00031156	.00045999	.00034294
34 Other Services	.00536631	.01172214	.01238619	.00849626	.00904921
35 Households	.25315870	.21842060	.20896160	.29797880	.31981470

Direct Requirements, Cont'd.

	Sector 21	Sector 22	Sector 23	Sector 24	Sector 25
1 Irrigated Agri	.00014598	.00010304	.00015148	.00006516	.00000000
2 Dryland Agri	.00018099	.00012657	.00019143	.00008604	.00000000
3 Lvestock & Pdt	.00122212	.00086530	.00136493	.00058808	.00000000
4 Agri Services	.00000000	.00000000	.00001661	.00000000	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00005800	.00004025	.00006130	.00002757	.00000000
7 Petro & NL,NGL	.00502300	.00338198	.00534105	.00239658	.00030656
8 Other Mining	.00032153	.00021416	.00030771	.00013365	.00044105
9 Construction	.00222629	.00490993	.00355173	.00174669	.00542201
10 Food & Kindred	.00014664	.00012662	.00124945	.00009561	.00010506
11 Text & Apparel	.00004961	.00022476	.00004218	.00370546	.00004415
12 Lum & Pap Pdts	.00072195	.00202938	.00102568	.00758493	.00040786
13 Print & Publih	.00098080	.00191972	.00208079	.00443979	.00060798
14 Chemicals	.01158199	.01444459	.00917241	.05554326	.00149839
15 Petro Refining	.00004552	.00004994	.00007087	.00004220	.00076603
16 Rub Leath Plas	.00492695	.00358705	.00477952	.01565393	.00239396
17 Glas Ston Clay	.00046886	.00349024	.00665507	.00410476	.00059264
18 Prim Metal Pdt	.00933632	.01165203	.01710593	.00719384	.00060152
19 Fab Metal Pdts	.00111832	.00571340	.00228182	.00394610	.00040899
20 Non-Elec Mach	.00147638	.00248786	.01068159	.00170784	.00093959
21 Elec Machinery	.00519532	.00101837	.00030053	.00189057	.00034887
22 Transpor Equip	.00032337	.00327147	.00000767	.00103056	.00272779
23 Instruments	.00000186	.00000118	.00005647	.00002077	.00000241
24 Misc Manufactu	.00103948	.00073539	.00624243	.00378408	.00010693
25 Transportation	.00087269	.00236732	.00341179	.00150263	.00450089
26 Communications	.00617594	.00284222	.00635998	.00478698	.01339126
27 Utilities	.01565145	.02000852	.04311561	.01971564	.02350680
28 Wholesale Trde	.01371375	.01964118	.01549599	.01966911	.01211978
29 Eat&Drink Estb	.00015674	.00013552	.00206143	.00036254	.00056008
30 Other Ret Trde	.00608799	.00587631	.00319419	.00685896	.00598030
31 F.I.R.E.	.01610705	.00725899	.02036793	.01708738	.05198191
32 Health Service	.00003938	.00003484	.00116717	.00000000	.00000076
33 Educ Services	.00030262	.00046139	.00064034	.00064739	.00088808
34 Other Services	.00862150	.00883834	.01726359	.01228265	.01366578
35 Households	.39413710	.28468670	.28194000	.35216700	.36848250

Direct Requirements, Cont'd.

	Sector 26	Sector 27	Sector 28	Sector 29	Sector 30
1 Irrigated Agri	.00000000	.00000000	.00014336	.01044548	.00203074
2 Dryland Agri	.00000000	.00000000	.00017736	.00000837	.00000000
3 Lvestock & Pdt	.00000000	.00000000	.00019502	.02134262	.00001561
4 Agri Services	.00000000	.00000000	.00000805	.00000000	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00000000	.00000000	.00005675	.00013589	.00000048
7 Petro & NL,NGL	.00000000	.22767670	.00630064	.00001830	.00008580
8 Other Mining	.00000000	.00982668	.00028240	.00000000	.00000048
9 Construction	.00064708	.00275170	.00667133	.00279252	.00152266
10 Food & Kindred	.00000000	.00000000	.00014562	.04602003	.00049115
11 Text & Apparel	.00001818	.00008075	.00013504	.00012842	.00036782
12 Lum & Pap Pdts	.00209090	.00155766	.00052422	.00068546	.00025373
13 Print & Publih	.00968276	.00077507	.00352985	.00694894	.01394910
14 Chemicals	.00013950	.00272018	.00442134	.00039929	.00028213
15 Petro Refining	.00011922	.00005382	.00015911	.00003119	.00011246
16 Rub Leath Plas	.00007503	.00015403	.00160842	.00007314	.00013189
17 Glas Ston Clay	.00015770	.00202133	.00025466	.00002714	.00000558
18 Prim Metal Pdt	.00010450	.00017816	.00062019	.00000130	.00000559
19 Fab Metal Pdts	.00002859	.00102122	.00031908	.00028089	.00002382
20 Non-Elec Mach	.00009842	.00011656	.00062946	.00250124	.00026572
21 Elec Machinery	.00085551	.00005962	.00006545	.00015319	.00020385
22 Transpor Equip	.00006802	.00001151	.00017813	.00011681	.00049512
23 Instruments	.00000016	.00000055	.00000020	.00000000	.00000000
24 Misc Manufactu	.00004891	.00003882	.00075729	.00334620	.00103614
25 Transportation	.00060160	.00042572	.00296768	.00036657	.00055814
26 Communications	.00864440	.00210399	.01475682	.00756011	.01344526
27 Utilities	.02217214	.19018380	.04832440	.04496827	.02837375
28 Wholesale Trde	.00125054	.00366933	.00916129	.01924011	.02503727
29 Eat&Drink Estb	.00070471	.00000000	.00293213	.00017502	.00081628
30 Other Ret Trde	.00009661	.00309234	.01008691	.00865576	.03867892
31 F.I.R.E.	.03258177	.01961548	.05089289	.04616003	.05383506
32 Health Service	.00002889	.00000000	.00004034	.00000779	.00016464
33 Educ Services	.00636768	.00440468	.00116539	.00039754	.00084580
34 Other Services	.00901126	.00921573	.01699271	.02791966	.01382034
35 Households	.30561510	.13340570	.37850370	.31065510	.34363410

Direct Requirements, Cont'd.

	Sector 31	Sector 32	Sector 33	Sector 34	Households
1 Irrigated Agri	.00000000	.00000000	.00000000	.00000000	.00040608
2 Dryland Agri	.00000000	.00000000	.00000000	.00000000	.00100365
3 Lvestock & Pdt	.00000000	.00005418	.00000000	.00000665	.00101620
4 Agri Services	.00000000	.00000000	.00000000	.00000000	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00000000	.00000000	.00000000	.00000000	.00011573
7 Petro & NL,NGL	.00026838	.00000000	.00000000	.00000000	.00071411
8 Other Mining	.00000000	.00000000	.00000000	.00000492	.00000000
9 Construction	.01268603	.00235857	.00173370	.00656257	.00285701
10 Food & Kindred	.00004982	.00147306	.01077939	.00136450	.01923327
11 Text & Apparel	.00002996	.00025750	.00008782	.00052017	.00223008
12 Lum & Pap Pdts	.00044595	.00040849	.00212911	.00051052	.00035381
13 Print & Publih	.00304357	.00213783	.00364939	.00613988	.00190749
14 Chemicals	.00025176	.00617367	.00433987	.00711581	.00349167
15 Petro Refining	.00000789	.00001952	.00003555	.00013435	.00036817
16 Rub Leath Plas	.00002109	.00041784	.00063069	.00452250	.00128649
17 Glas Ston Clay	.00038762	.00011609	.00021432	.00030633	.00043963
18 Prim Metal Pdt	.00002349	.00003035	.00021213	.00084249	.00025457
19 Fab Metal Pdts	.00006289	.00031768	.00043635	.00232650	.00017458
20 Non-Elec Mach	.00000863	.00024966	.00074149	.00301760	.00004951
21 Elec Machinery	.00002240	.00018800	.00037123	.00024715	.00005152
22 Transpor Equip	.00000185	.00007236	.00002692	.00072710	.00153486
23 Instruments	.00000000	.00001256	.00002592	.00001178	.00000079
24 Misc Manufactu	.00028803	.00104349	.00159558	.00366962	.00047865
25 Transportation	.00016699	.00117062	.00041159	.00140692	.00259115
26 Communications	.01333119	.01065831	.00677696	.01571113	.00563739
27 Utilities	.02502461	.04749621	.04794794	.03058608	.03845744
28 Wholesale Trde	.00266919	.01651619	.00465365	.01404786	.03379163
29 Eat&Drink Estb	.00090239	.00243755	.00020562	.00235989	.01920691
30 Other Ret Trde	.00019023	.00450384	.00240805	.00623394	.09014136
31 F.I.R.E.	.10092900	.05482074	.02788747	.04643916	.05119436
32 Health Service	.00085787	.02218865	.00023437	.00132062	.04936458
33 Educ Services	.00165683	.00075272	.00006125	.00069029	.00296000
34 Other Services	.02193165	.02878161	.01181950	.02214026	.02461809
35 Households	.38211130	.45319520	.62224080	.43305220	.06249484

Interdependence Coefficients for the Lavaca-Tres Palacios Estuary Region, 1986

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
1 Irrigated Agri	1.00744800	.00612304	.03748190	.00160927	.00000000
2 Dryland Agri	.00105832	1.01530200	.04540385	.00192305	.00000000
3 Lvestock & Pdt	.00501705	.00559265	1.15504200	.02783805	.00000000
4 Agri Services	.08452031	.09370267	.04465213	1.02777100	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	1.00000000
6 Fisheries	.00015084	.00016879	.00030906	.00017076	.00000000
7 Petro & NL,NGL	.05902307	.02275049	.01828524	.04010788	.00000000
8 Other Mining	.00302116	.00171346	.00106452	.00333248	.00000000
9 Construction	.01515756	.01683548	.00798011	.04112854	.00000000
10 Food & Kindred	.01048151	.01168403	.03583739	.01088143	.00000000
11 Text & Apparel	.00121418	.00133798	.00113095	.00121189	.00000000
12 Lum & Pap Pdts	.00150273	.00077023	.00120500	.00098116	.00000000
13 Print & Publih	.00322205	.00348409	.00310492	.00364804	.00000000
14 Chemicals	.09043280	.10401860	.02689091	.17719700	.00000000
15 Petro Refining	.00073333	.00104951	.00041458	.00076060	.00000000
16 Rub Leath Plas	.00351130	.00150770	.00116727	.00148941	.00000000
17 Glas Ston Clay	.00152254	.00132872	.00109665	.00257164	.00000000
18 Prim Metal Pdt	.00105902	.00127300	.00055319	.00183718	.00000000
19 Fab Metal Pdts	.00079448	.00069747	.00071441	.00101827	.00000000
20 Non-Elec Mach	.00164208	.00173250	.00081086	.00497745	.00000000
21 Elec Machinery	.00013658	.00014199	.00010257	.00016028	.00000000
22 Transpor Equip	.00162096	.00187399	.00102555	.00107467	.00000000
23 Instruments	.00000138	.00000134	.00000109	.00000148	.00000000
24 Misc Manufactu	.00071529	.00077296	.00066505	.00089825	.00000000
25 Transportation	.00282043	.00296050	.00341835	.00355544	.00000000
26 Communications	.00804549	.00841836	.00779621	.00964474	.00000000
27 Utilities	.20367510	.06225925	.06019906	.11351360	.00000000
28 Wholesale Trde	.03416403	.03918629	.04793139	.06097385	.00000000
29 Eat&Drink Estb	.00986908	.01098642	.00936552	.00987235	.00000000
30 Other Ret Trde	.08295587	.10011670	.09265861	.06679885	.00000000
31 F.I.R.E.	.08387955	.08376337	.07766420	.07371861	.00000000
32 Health Service	.02470413	.02756675	.02287138	.02365097	.00000000
33 Educ Services	.00442947	.00388938	.00339486	.00308212	.00000000
34 Other Services	.02591139	.02277522	.01946419	.03350080	.00000000
35 Households	.48655330	.54336820	.45059900	.46566020	.00000000
TOT INT COEF	2.26099400	2.19915300	2.18030100	2.21656200	1.00000000

Interdependence Coefficients, Cont'd.

	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10
1 Irrigated Agri	.00091348	.00066549	.00062684	.00072673	.02074875
2 Dryland Agri	.00114181	.00077703	.00073933	.00083946	.02252767
3 Lvestock & Pdt	.00387532	.00261491	.00251799	.00292957	.17152040
4 Agri Services	.00088776	.00023545	.00025009	.00452767	.00937350
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	1.00184100	.00013350	.00012706	.00014352	.00714010
7 Petro & NL,NGL	.01305628	1.16639200	.02489153	.01631825	.02409485
8 Other Mining	.00170123	.00124339	1.00361700	.03073644	.00204183
9 Construction	.03908366	.00561480	.01135373	1.00770100	.00722979
10 Food & Kindred	.01513140	.01050047	.00945215	.01081966	1.04156000
11 Text & Apparel	.00443286	.00119875	.00117618	.00150875	.00171075
12 Lum & Pap Pdts	.00265423	.00057571	.00068270	.00397933	.00600931
13 Print & Publih	.00288866	.00279002	.00254748	.00328641	.00322913
14 Chemicals	.00573116	.00658587	.03237576	.01246698	.01550559
15 Petro Refining	.00140508	.00032329	.00053242	.00048138	.00032367
16 Rub Leath Plas	.00107924	.00095209	.00388738	.00310320	.00203001
17 Glas Ston Clay	.00214076	.00098662	.00505509	.04092775	.01043241
18 Prim Metal Pdt	.00115197	.00047894	.00561062	.01789009	.00123055
19 Fab Metal Pdts	.00077350	.00044796	.00139841	.01008161	.00563699
20 Non-Elec Mach	.00049808	.00272169	.01700875	.00435126	.00088634
21 Elec Machinery	.00012465	.00041811	.00081342	.00089906	.00011642
22 Transpor Equip	.00843550	.00083782	.00165155	.00108005	.00069043
23 Instruments	.00000127	.00000141	.00000138	.00000342	.00000118
24 Misc Manufactu	.00070055	.00057584	.00056995	.00137116	.00150791
25 Transportation	.00329272	.00270560	.00651803	.00405411	.00396418
26 Communications	.00851165	.00774766	.00783078	.01074234	.01177374
27 Utilities	.04294225	.04809711	.08494614	.05457373	.06404787
28 Wholesale Trde	.04779617	.02518241	.02287732	.03682139	.03705043
29 Eat&Drink Estb	.01058148	.01031605	.00886241	.01064866	.01163579
30 Other Ret Trde	.06496939	.05013575	.04940856	.05951151	.04893591
31 F.I.R.E.	.10079990	.06134577	.07904172	.08348148	.04719277
32 Health Service	.02515784	.02504282	.02232870	.02569060	.01625214
33 Educ Services	.00261361	.00824305	.00545253	.00281547	.00227735
34 Other Services	.02831500	.02986863	.03369281	.05859293	.02221454
35 Households	.49543280	.49059370	.43961840	.50531970	.31701960
TOT INT COEF	1.94006200	1.96634900	1.88746500	2.02842400	1.93791200

Interdependence Coefficients, Cont'd.

	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15
1 Irrigated Agri	.00826439	.00092691	.00122988	.00122231	.00035547
2 Dryland Agri	.00470566	.00107607	.00145433	.00146256	.00041715
3 Lvestock & Pdt	.00560727	.00481607	.00668887	.00753010	.00156534
4 Agri Services	.00132361	.00039705	.00048926	.00059367	.00018953
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00016268	.00021806	.00030093	.00032566	.00007658
7 Petro & NL,NGL	.02443958	.03795640	.03488539	.10763440	.24400310
8 Other Mining	.00122510	.00249353	.00194510	.00855018	.00218995
9 Construction	.00484756	.01524221	.00862713	.02656092	.01660589
10 Food & Kindred	.01111577	.00815519	.01072254	.00658516	.00476272
11 Text & Apparel	1.01457500	.00148193	.00147499	.00082699	.00058733
12 Lum & Pap Pdts	.00243335	1.01835900	.01279511	.00200306	.00115643
13 Print & Publih	.00482959	.00268226	1.02524700	.00255033	.00159757
14 Chemicals	.01003393	.03347473	.02118952	1.19532000	.07234484
15 Petro Refining	.00027209	.00028757	.00037508	.00148878	1.00131600
16 Rub Leath Plas	.00130957	.00359706	.00163518	.00208774	.00072474
17 Glas Ston Clay	.00089300	.00147272	.00136248	.00248512	.00126006
18 Prim Metal Pdt	.00294440	.00355363	.00202093	.00550352	.00228658
19 Fab Metal Pdts	.00121925	.00104501	.00098380	.00154106	.00152581
20 Non-Elec Mach	.00098584	.00357483	.00225195	.00268252	.00137018
21 Elec Machinery	.00012734	.00014036	.00018156	.00022790	.00023164
22 Transpor Equip	.00089307	.00065686	.00085781	.00054707	.00040662
23 Instruments	.00000144	.00000117	.00000576	.00000175	.00000131
24 Misc Manufactu	.00644297	.00063142	.00575740	.00094284	.00037762
25 Transportation	.00357586	.00460200	.00421795	.00464755	.00609259
26 Communications	.00925028	.00839436	.01363480	.00715235	.00474013
27 Utilities	.08018101	.09553253	.06644133	.17761980	.07552781
28 Wholesale Trde	.02786816	.04443070	.03291728	.03303686	.02436103
29 Eat&Drink Estb	.01099101	.00777798	.01070692	.00596484	.00464755
30 Other Ret Trde	.05206868	.05343324	.05297774	.03587032	.02323381
31 F.I.R.E.	.07478878	.04977154	.05321511	.04441337	.04206286
32 Health Service	.02626086	.01861694	.02433759	.01386772	.01120441
33 Educ Services	.00327141	.00210422	.00254540	.00307636	.00394592
34 Other Services	.02761153	.01962841	.03014307	.02195710	.01999951
35 Households	.51738470	.36676240	.47956990	.27162070	.21946850
TOT INT COEF	1.94190500	1.81329400	1.91318900	1.99790000	1.79063700

Interdependence Coefficients, Cont'd.

	Sector 16	Sector 17	Sector 18	Sector 19	Sector 20
1 Irrigated Agri	.00086528	.00069160	.00099458	.00093057	.00091031
2 Dryland Agri	.00513440	.00080499	.00107688	.00109883	.00108603
3 Lvestock & Pdt	.00405885	.00304598	.00471635	.00458595	.00437642
4 Agri Services	.00072304	.00025938	.00039856	.00037012	.00035376
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00018685	.00014812	.00021662	.00021263	.00020020
7 Petro & NL,NGL	.04260965	.05201143	.05689822	.03343629	.02501566
8 Other Mining	.00263864	.08245475	.02059066	.00260500	.00197985
9 Construction	.01151682	.00683000	.01502371	.01011557	.00853304
10 Food & Kindred	.01031810	.00916524	.00899414	.01023881	.01052173
11 Text & Apparel	.00206984	.00105641	.00111369	.00122648	.00190214
12 Lum & Pap Pdts	.00270806	.00474177	.00123427	.00158329	.00143227
13 Print & Publih	.00328214	.00278176	.00328043	.00355604	.00326779
14 Chemicals	.19139190	.01158558	.02049959	.02259510	.01197724
15 Petro Refining	.00044946	.00027700	.00037073	.00032218	.00030248
16 Rub Leath Plas	1.00852300	.00204426	.00173784	.00361421	.00871518
17 Glas Ston Clay	.00127724	1.03730600	.00263219	.00385451	.00282329
18 Prim Metal Pdt	.00203440	.00166279	1.05401200	.03426179	.02761586
19 Fab Metal Pdts	.00102058	.00074570	.00139477	1.00854400	.00724887
20 Non-Elec Mach	.00355292	.00259750	.00217365	.00272922	1.00973400
21 Elec Machinery	.00015383	.00017352	.00035899	.00036524	.00116398
22 Transpor Equip	.00074852	.00083744	.00076463	.00098629	.00088494
23 Instruments	.00000129	.00000130	.00000142	.00000149	.00000571
24 Misc Manufactu	.00112765	.00080413	.00129830	.00135690	.00141163
25 Transportation	.00559854	.01412951	.00602395	.00573491	.00378805
26 Communications	.00953110	.00975064	.00833842	.01031847	.01035454
27 Utilities	.11091340	.18169140	.17360540	.09025847	.06560712
28 Wholesale Trde	.03568990	.03276904	.03715751	.04136988	.04502053
29 Eat&Drink Estb	.00889361	.00870301	.00838566	.01002780	.01046913
30 Other Ret Trde	.05351081	.04901614	.08771506	.05224457	.05571196
31 F.I.R.E.	.05383295	.06335858	.05561187	.05777576	.06292203
32 Health Service	.02149809	.02119955	.02059306	.02344920	.02460693
33 Educ Services	.00265310	.00389471	.00300774	.00276344	.00256687
34 Other Services	.02342217	.03100856	.03125161	.02683743	.02774011
35 Households	.42338300	.41619070	.40374160	.46146790	.48384760
TOT INT COEF	2.04531900	2.05373900	2.03521400	1.93083800	1.92409700

Interdependence Coefficients, Cont'd.

	Sector 21	Sector 22	Sector 23	Sector 24	Sector 25
1 Irrigated Agri	.00096822	.00074182	.00088329	.00091307	.00074977
2 Dryland Agri	.00116013	.00088079	.00104165	.00111578	.00087636
3 Lvestock & Pdt	.00447678	.00340364	.00436586	.00396900	.00291912
4 Agri Services	.00035866	.00028846	.00035941	.00033728	.00027833
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00021473	.00016273	.00019930	.00019188	.00014917
7 Petro & NL,NGL	.02415164	.02189692	.03239455	.02760523	.02007421
8 Other Mining	.00150598	.00174004	.00246832	.00201893	.00158629
9 Construction	.00620726	.00831506	.00743868	.00705593	.00956139
10 Food & Kindred	.01201248	.00914221	.01097439	.01155116	.01170871
11 Text & Apparel	.00140139	.00126213	.00117328	.00509221	.00136443
12 Lum & Pap Pdts	.00136859	.00263260	.00176261	.00854154	.00107178
13 Print & Publih	.00386834	.00422376	.00467340	.00747763	.00365724
14 Chemicals	.01916807	.02171609	.01649903	.07408096	.00644478
15 Petro Refining	.00030796	.00026410	.00029598	.00036284	.00101340
16 Rub Leath Plas	.00606553	.00453506	.00595422	.01700890	.00347820
17 Glas Ston Clay	.00134308	.00448205	.00786081	.00522315	.00161305
18 Prim Metal Pdt	.01044772	.01306664	.01891269	.00858080	.00119528
19 Fab Metal Pdts	.00157473	.00619421	.00286255	.00452119	.00089611
20 Non-Elec Mach	.00189454	.00291019	.01125421	.00232758	.00133059
21 Elec Machinery	1.00532400	.00111470	.00042359	.00201720	.00045982
22 Transpor Equip	.00126525	1.00400700	.00079060	.00195195	.00366836
23 Instruments	.00000322	.00000230	1.00005800	.00002228	.00000382
24 Misc Manufactu	.00167670	.00126176	.00686526	1.00451200	.00074824
25 Transportation	.00284303	.00403695	.00525706	.00373648	1.00638800
26 Communications	.01299650	.00831390	.01259456	.01192213	.02074656
27 Utilities	.06194862	.06032692	.09229196	.07531068	.06950542
28 Wholesale Trde	.03738324	.03835902	.03580492	.04416065	.03509849
29 Eat&Drink Estb	.01131661	.00864170	.01112346	.01115168	.01152645
30 Other Ret Trde	.06090501	.04806982	.04827645	.06031493	.05911263
31 F.I.R.E.	.06317985	.04416843	.06238238	.06506324	.10267440
32 Health Service	.02828028	.02144061	.02392571	.02711799	.02767604
33 Educ Services	.00272894	.00239595	.00292406	.00313461	.00339637
34 Other Services	.02883289	.02489668	.03531775	.03293089	.03452302
35 Households	.55709410	.42218860	.44782450	.53464780	.54511370
TOT INT COEF	1.97427400	1.79708300	1.91723400	2.06596900	1.99060900

Interdependence Coefficients, Cont'd.

	Sector 26	Sector 27	Sector 28	Sector 29	Sector 30
1 Irrigated Agri	.00059893	.00053922	.00098544	.01295583	.00288348
2 Dryland Agri	.00070196	.00062644	.00111945	.00280343	.00088412
3 Lvestock & Pdt	.00238187	.00211225	.00341537	.03520793	.00305173
4 Agri Services	.00020744	.00020108	.00035152	.00250949	.00044606
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00012089	.00010786	.00021658	.00060685	.00015443
7 Petro & NL,NGL	.01651630	.33415110	.03591169	.02777455	.02202869
8 Other Mining	.00079381	.01315063	.00181266	.00138171	.00106396
9 Construction	.00374073	.00707896	.01118583	.00742010	.00587608
10 Food & Kindred	.00942959	.00839574	.01252388	.05917480	.01208823
11 Text & Apparel	.00107890	.00105554	.00153790	.00145074	.00170538
12 Lum & Pap Pdts	.00273968	.00243379	.00131874	.00174551	.00110045
13 Print & Publih	.01218618	.00319687	.00692231	.01025282	.01786171
14 Chemicals	.00360834	.00827479	.01021516	.00705224	.00502109
15 Petro Refining	.00031187	.00027834	.00042628	.00028550	.00036185
16 Rub Leath Plas	.00089323	.00102035	.00276245	.00132383	.00122319
17 Glas Ston Clay	.00079884	.00339517	.00142328	.00144922	.00087739
18 Prim Metal Pdt	.00044298	.00074064	.00124573	.00062144	.00047133
19 Fab Metal Pdts	.00036140	.00163922	.00086950	.00106567	.00047959
20 Non-Elec Mach	.00038125	.00131199	.00109550	.00300934	.00066451
21 Elec Machinery	.00093856	.00024915	.00018852	.00026982	.00031889
22 Transpor Equip	.00080508	.00069390	.00116360	.00102953	.00143537
23 Instruments	.00000143	.00000192	.00000177	.00000165	.00000148
24 Misc Manufactu	.00059126	.00054107	.00147433	.00412545	.00179843
25 Transportation	.00206904	.00225485	.00498080	.00238614	.00248411
26 Communications	1.01421200	.00828863	.02264895	.01542702	.02157698
27 Utilities	.05886480	1.26893900	.10307270	.09910035	.07763949
28 Wholesale Trde	.01949599	.02250241	1.03377300	.04340592	.04893363
29 Eat&Drink Estb	.00951535	.00800624	.01451512	1.01087800	.01181465
30 Other Ret Trde	.04266516	.04276529	.06649446	.06160641	1.09306000
31 F.I.R.E.	.07136740	.06558982	.10527700	.09817661	.10748290
32 Health Service	.02235808	.01990554	.02925178	.02623188	.02770943
33 Educ Services	.00834794	.00887852	.00402590	.00303691	.00344746
34 Other Services	.02525360	.02974982	.03956653	.04914665	.03547288
35 Households	.44006980	.39114900	.57526610	.51587490	.54221670
TOT INT COEF	1.77384900	2.25922500	2.09703900	2.10878800	2.05363500

Interdependence Coefficients, Cont'd.

	* Sector 31 *	Sector 32 *	Sector 33 *	Sector 34 *	Households
1 Irrigated Agri	.00079604	.00099541	.00136093	.00094276	.00167393
2 Dryland Agri	.00093157	.00113459	.00158732	.00108580	.00199156
3 Lvestock & Pdt	.00314306	.00405620	.00633948	.00378763	.00661657
4 Agri Services	.00032900	.00035134	.00049513	.00034993	.00056472
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00015989	.00019950	.00030704	.00018835	.00034021
7 Petro & NL,NGL	.02124214	.03108092	.03311963	.02479540	.02369689
8 Other Mining	.00140590	.00150817	.00159194	.00142196	.00117706
9 Construction	.01767309	.00768035	.00721449	.01147442	.00659792
10 Food & Kindred	.01260684	.01627276	.02921534	.01519932	.02688549
11 Text & Apparel	.00145645	.00193731	.00214987	.00210780	.00301969
12 Lum & Pap Pdts	.00122063	.00128610	.00317517	.00140762	.00106815
13 Print & Publih	.00645399	.00603911	.00789361	.00987831	.00556060
14 Chemicals	.00483963	.01302055	.01170103	.01467544	.00820092
15 Petro Refining	.00026860	.00033410	.00041073	.00043276	.00052929
16 Rub Leath Plas	.00117669	.00181703	.00220620	.00591375	.00209850
17 Glas Ston Clay	.00177466	.00125921	.00154406	.00154103	.00138053
18 Prim Metal Pdt	.00066876	.00062923	.00088128	.00170415	.00069700
19 Fab Metal Pdts	.00064731	.00093436	.00112143	.00296376	.00070025
20 Non-Elec Mach	.00043877	.00076337	.00124673	.00354406	.00050838
21 Elec Machinery	.00014102	.00032358	.00051251	.00038567	.00016268
22 Transpor Equip	.00099679	.00124368	.00145023	.00182729	.00209289
23 Instruments	.00000165	.00001477	.00002794	.00001363	.00000258
24 Misc Manufactu	.00102492	.00192901	.00252855	.00450161	.00120819
25 Transportation	.00215349	.00356271	.00323464	.00367346	.00393426
26 Communications	.02177724	.02016497	.01676664	.02434849	.01307273
27 Utilities	.07499805	.11117620	.11830440	.08665551	.08164924
28 Wholesale Trde	.02738268	.04593420	.03990715	.04156455	.05058517
29 Eat&Drink Estb	.01277288	.01633416	.01726507	.01532233	.02522410
30 Other Ret Trde	.05722053	.07153109	.08502677	.06912619	.12202120
31 F.I.R.E.	1.16008800	.11947470	.09827363	.10524290	.09447844
32 Health Service	.03081230	1.05756500	.04346257	.03400467	.06445781
33 Educ Services	.00442276	.00401156	1.00379200	.00365869	.00479173
34 Other Services	.04563900	.05578833	.04204478	1.04680300	.04142418
35 Households	.58858430	.68673280	.85276930	.64327840	1.27337700
TOT INT COEF	2.10524900	2.28708700	2.43892700	2.18382100	1.87179000

TYPE II FINAL DEMAND AND OUTPUT MULTIPLIERS FOR THE LAVACA-TRES PALACIOS ESTUARY REGION

	MULTIPLIER (Final Demand)	DIAGONAL COEFFICIENT	MULTIPLIER (Output)
1 Irrigated Agri	2.260994	1.007448	2.244279
2 Dryland Agri	2.199153	1.015302	2.166009
3 Lvestock & Pdt	2.180301	1.155042	1.887639
4 Agri Services	2.216562	1.027771	2.156668
5 Forestry	1.000000	1.000000	1.000000
6 Fisheries	1.940062	1.001841	1.936497
7 Petro & NL,NGL	1.966349	1.166392	1.685839
8 Other Mining	1.887465	1.003617	1.880662
9 Construction	2.028424	1.007701	2.012923
10 Food & Kindred	1.937912	1.041560	1.860586
11 Text & Apparel	1.941905	1.014575	1.914008
12 Lum & Pap Pdts	1.813294	1.018359	1.780604
13 Print & Publih	1.913189	1.025247	1.866076
14 Chemicals	1.997900	1.195320	1.671436
15 Petro Refining	1.790637	1.001316	1.788283
16 Rub Leath Plas	2.045319	1.008523	2.028034
17 Glas Ston Clay	2.053739	1.037306	1.979877
18 Prim Metal Pdt	2.035214	1.054012	1.930921
19 Fab Metal Pdts	1.930838	1.008544	1.914481
20 Non-Elec Mach	1.924097	1.009734	1.905548
21 Elec Machinery	1.974274	1.005324	1.963819
22 Transpor Equip	1.797083	1.004007	1.789911
23 Instruments	1.917234	1.000058	1.917123
24 Misc Manufactu	2.065969	1.004512	2.056690
25 Transportation	1.990609	1.006388	1.977975
26 Communications	1.773849	1.014212	1.748993
27 Utilities	2.259225	1.268939	1.780405
28 Wholesale Trde	2.097039	1.033773	2.028531
29 Eat&Drink Estb	2.108788	1.010878	2.086095
30 Other Ret Trde	2.053635	1.093060	1.878795
31 F.I.R.E.	2.105249	1.160088	1.814731
32 Health Service	2.287087	1.057565	2.162596
33 Educ Services	2.438927	1.003792	2.429715
34 Other Services	2.183821	1.046803	2.086181
35 Households	1.871790	1.273377	1.469942

TYPE II INCOME MULTIPLIERS
FOR THE LAVACA-TRES PALACIOS ESTUARY REGION

		DIR EFFECT (Per $1.00)	TOT EFFECT (F DEMAND)	MULTIPLIER (F DEMAND)	TOT EFFECT (OUTPUT)	MULTIPLIER (OUTPUT)
1	Irrigated Agri	.260888	.486553	1.864987	.482956	1.851200
2	Dryland Agri	.328385	.543368	1.654670	.535179	1.629732
3	Lvestock & Pdt	.218494	.450599	2.062295	.390115	1.785473
4	Agri Services	.248714	.465660	1.872274	.453078	1.821684
5	Forestry	1.000000	.000000	.000000	.000000	.000000
6	Fisheries	.318755	.495433	1.554276	.494522	1.551420
7	Petro & NL,NGL	.307365	.490594	1.596130	.420608	1.368434
8	Other Mining	.280253	.439618	1.568647	.438034	1.562993
9	Construction	.310929	.505320	1.625191	.501458	1.612772
10	Food & Kindred	.131891	.317020	2.403647	.304370	2.307738
11	Text & Apparel	.355141	.517385	1.456843	.509952	1.435914
12	Lum & Pap Pdts	.219504	.366762	1.670866	.360150	1.640744
13	Print & Publih	.319280	.479570	1.502035	.467760	1.465047
14	Chemicals	.094243	.271621	2.882138	.227237	2.411185
15	Petro Refining	.048997	.219469	4.479205	.219180	4.473318
16	Rub Leath Plas	.253159	.423383	1.672401	.419805	1.658268
17	Glas Ston Clay	.218421	.416191	1.905456	.401223	1.836927
18	Prim Metal Pdt	.208962	.403742	1.932133	.383052	1.833122
19	Fab Metal Pdts	.297979	.461468	1.548660	.457559	1.535541
20	Non-Elec Mach	.319815	.483848	1.512900	.479183	1.498315
21	Elec Machinery	.394137	.557094	1.413452	.554144	1.405967
22	Transpor Equip	.284687	.422189	1.482994	.420504	1.477076
23	Instruments	.281940	.447825	1.588368	.447799	1.588276
24	Misc Manufactu	.352167	.534648	1.518165	.532246	1.511346
25	Transportation	.368482	.545114	1.479348	.541654	1.469958
26	Communications	.305615	.440070	1.439948	.433903	1.419771
27	Utilities	.133406	.391149	2.932027	.308249	2.310614
28	Wholesale Trde	.378504	.575266	1.519843	.556473	1.470191
29	Eat&Drink Estb	.310655	.515875	1.660603	.510323	1.642733
30	Other Ret Trde	.343634	.542217	1.577889	.496054	1.443553
31	F.I.R.E.	.382111	.588584	1.540348	.507362	1.327785
32	Health Service	.453195	.686733	1.515314	.649353	1.432832
33	Educ Services	.622241	.852769	1.370481	.849548	1.365304
34	Other Services	.433052	.643278	1.485452	.614517	1.419036

TYPE II EMPLOYMENT MULTIPLIERS
FOR THE LAVACA-TRES PALACIOUS ESTUARY REGION

		D EFFECT PER MIL $	T EFFECT F DEMAND	MULTIPLI F DEMAND	T EFFECT OUTPUT	MULTIPLI OUTPUT	NUMBER OF EMPLOYEES
1	Irrigated Agri	11.482	19.986	1.741	19.838	1.728	728.
2	Dryland Agri	6.030	14.933	2.476	14.708	2.439	376.
3	Lvestock & Pdt	2.232	10.738	4.811	9.296	4.165	168.
4	Agri Services	8.884	17.125	1.928	16.662	1.876	259.
5	Forestry	1.000	1.000	1.000	1.000	1.000	0.
6	Fisheries	55.902	62.789	1.123	62.674	1.121	2405.
7	Petro & NL,NGL	6.242	12.422	1.990	10.650	1.706	4026.
8	Other Mining	4.349	10.219	2.350	10.183	2.342	375.
9	Construction	13.289	21.048	1.584	20.887	1.572	10788.
10	Food & Kindred	5.592	12.094	2.163	11.611	2.077	419.
11	Text & Apparel	17.706	23.601	1.333	23.262	1.314	259.
12	Lum & Pap Pdts	11.606	17.249	1.486	16.938	1.459	160.
13	Print & Publih	17.854	24.042	1.347	23.450	1.313	416.
14	Chemicals	4.048	10.007	2.472	8.372	2.068	1904.
15	Petro Refining	.477	5.511	11.546	5.503	11.531	5.
16	Rub Leath Plas	13.354	19.740	1.478	19.574	1.466	202.
17	Glas Ston Clay	13.056	19.704	1.509	18.995	1.455	502.
18	Prim Metal Pdt	6.965	14.748	2.117	13.992	2.009	249.
19	Fab Metal Pdts	9.680	15.716	1.623	15.583	1.610	192.
20	Non-Elec Mach	8.534	14.727	1.726	14.585	1.709	443.
21	Elec Machinery	8.314	14.515	1.746	14.438	1.737	60.
22	Transpor Equip	4.068	9.341	2.296	9.304	2.287	124.
23	Instruments	17.787	23.901	1.344	23.899	1.344	9.
24	Misc Manufactu	.875	7.930	9.064	7.895	9.024	73.
25	Transportation	8.194	14.699	1.794	14.605	1.782	155.
26	Communications	10.953	15.908	1.452	15.685	1.432	575.
27	Utilities	2.053	9.406	4.581	7.413	3.610	2150.
28	Wholesale Trde	12.572	19.886	1.582	19.237	1.530	2456.
29	Eat&Drink Estb	18.185	25.849	1.421	25.570	1.406	3288.
30	Other Ret Trde	38.016	46.230	1.216	42.294	1.113	9451.
31	F.I.R.E.	7.395	14.711	1.989	12.681	1.715	2509.
32	Health Service	26.527	35.453	1.336	33.524	1.264	3516.
33	Educ Services	24.145	32.733	1.356	32.610	1.351	537.
34	Other Services	29.234	37.187	1.272	35.524	1.215	4834.
					TOTAL EMPLOYMENT =		53613.