LAGUNA MADRE 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 Laguna

Madre estuary, amounted to $265.6 million and $437.4 million for the region and state, respectively. Of these totals, sport fishing contributed the largest impact with $146.5 million or 55 percent for the region and $237.9 million or 54 percent for the state. Direct sport fishing expenditures in the Laguna Madre estuary of $67.7 million were also greater than those for other recreational activity of $50.8 millon. In contrast, other recreational activity participants spent more outside the local region ($7.4 million) than did sport fishermen ($6.7 million).

Over 30 percent of the direct expenditures by sport fishermen and other recreational activity participants in the Laguna Madre 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 $63.7 million for sport fishing and over $50 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 4,184 and 3,380 full-time job equivalents for sport fishing and other recreational activity, respectively.

Increased economic activity due to gross scale 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 $3.2 million for sport fishing and $2.5 million for other recreational activity statewide. Likewise, local tax revenues from sport fishing and other recreational activity were of $5.7 million and $4.5 million, respectiviely. Most of these tax revenues whether local or state were generated within the Laguna Madre estuary region.

Estimates were also made of the inshore-offshore commercial fish landings associated with the Laguna Madre estuary region. The three year (1984, 1985, 1986) average inshore annual commercial finfish and shellfish contributions were estimated at 676.1 thousand pounds with an ex-vessel value of $548 thousand. Inshore and offshore landings together, however, amounted to about $3.4 million with direct employment of 194 full-time job equivalents and direct personal income of $914 thousand.

LAGUNA MADRE ESTUARY:
ECONOMIC IMPACT OF RECREATIONAL ACTIVITY AND COMMERCIAL FISHING

Introduction

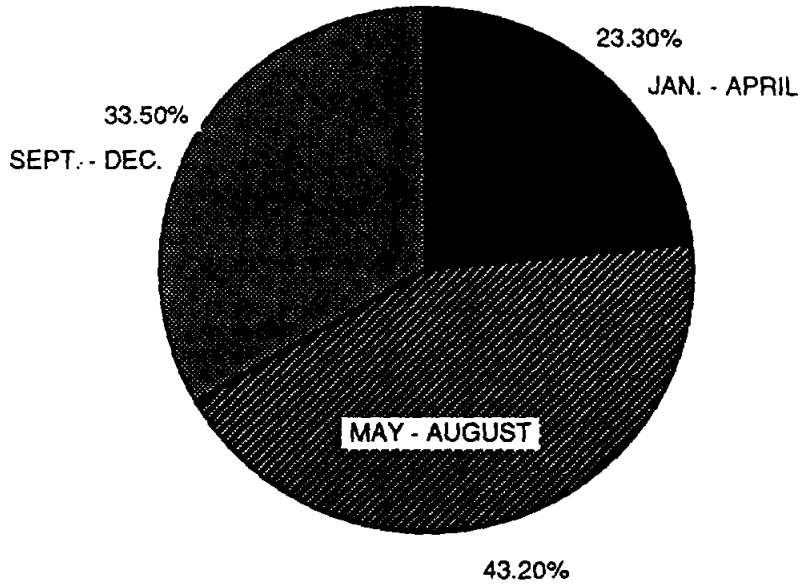
This study has been conducted as part of the Texas Water Development Board's on-going efforts to evaluate hydrological, biological, chemical and economic factors as they relate to the freshwater inflow needs of the six estuaries along the Texas Gulf Coast. Outdoor recreation, sport fishing in particular, has 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 1,277,273 visits to the Laguna Madre estuary during calendar year of 1986; and of these visits 58.0 percent were made by households involved in sport fishing.* As shown in Chart 1, there is substantial seasonal variation; approximately 23.3 percent of these visits occurred from January through April, 1986; whereas 43.2 percent of the total occurred during the summer months (May through August); finally, 33.5 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 Laguna Madre 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, 302 miles to reach their destinations located along the Laguna Madre estuary. This relatively long travel distance is reflected by the counties in which these visitors reside. Hidalgo county was the largest source for visitors; 15.3 percent of the visitors to Laguna Madre were from Hidalgo County; 13.8 percent of the visitors were from nearby Cameron County; 10.7 percent and 5.2 percent were from Harris and Dallas Counties, respectively. Interestingly, 45.9 percent of those survey indicated they had first visited places along the Laguna Madre estuary within the past six years (since 1980); another 42.4 percent started visiting this area of the Texas Coast between 1970 and 1980; finally, only 11.7 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 Laguna Madre estuary, camping and sport fishing account for 46 percent of the time allocated to recreation activity (22.7% and 23.3%, respectively). As one might expect, swimming (22.7% of the time) and sightseeing (16.2%) were also popular activities (see Chart 2).

As indicated previously, the focus of this study was on the economic importance of sport fishing to communities along the Texas Gulf Coast. For those fishing in the Laguna Madre 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 were asked to evaluate the overall quality of the Texas Gulf Coast in the

CHART 2:
RELATIVE POPULARITY OF RECREATION ACTIVITY

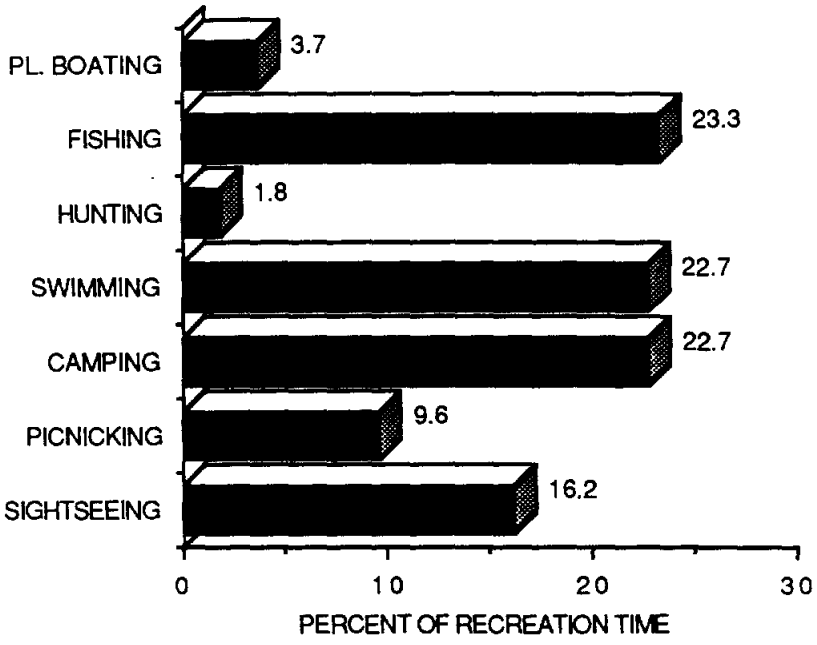
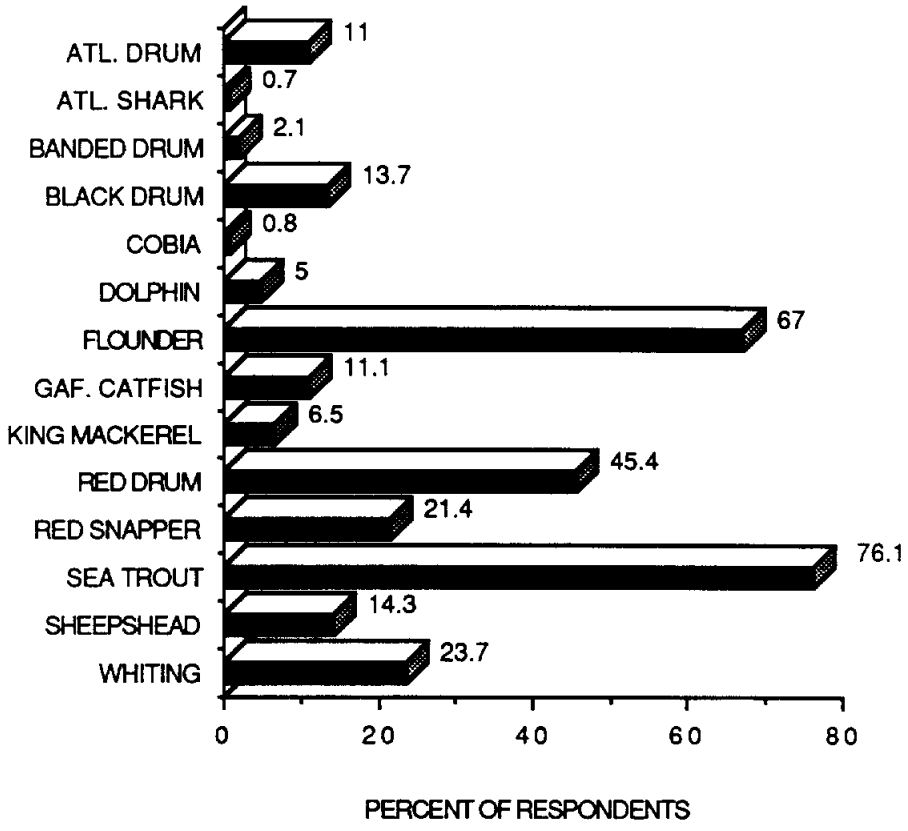


CHART 3: POPULARITY OF SELECTED FISH



vicinity of the place(s) they went fishing. 24.5 percent of those surveyed indicated that this area was excellent for fishing; 43.5 percent and 26.4 percent thought the area was fair or good for fishing while only 4.5 percent indicated that places along the Laguna Madre 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 Laguna Madre 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 Laguna Madre estuary. As can be seen in Table 1, visitors spent approximately $118,559,715 during 1986. Of this total, 57.1 percent ($67,737,046) was spent by sport fisherman. Food costs accounted for a substantial portion of expenditures by fisherman; $16,073,833 was spent on grocery store purchases and an additional $16,219,552 was spent in restaurants. Transportation expenditures were also high at $16,076,129. Interestingly, for those visitors not fishing, restaurant expenditures constituted the largest share of their trip-related cost.

Table 1. **Visitor Expenditures in the Laguna Madre Estuary***

Category	"Fishing" Household Expenditures	"Nonfishing" Household Expenditures	Total
Lodging	$ 11,066,400	$ 12,086,273	$ 23,152,673
Transportation*	16,076,129	11,682,094	27,758,673
Restaurant	16,219,552	18,633,766	34,853,318
Grocery	16,073,833	6,726,942	22,800,775
Rental	1,309,216	696,867	2,006,635
Fees	1,334,216	996,727	2,330,943
Fishing-related items	5,657,148	----	5,657,148
Total	$ 67,737,046	$ 50,822,669	$118,559,715

*For those households living outside the Laguna Madre 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 Laguna Madre 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 Laguna Madre eight 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 Laguna Madre 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 Laguna Madre estuary region were over $67 million in 1986. Statewide expenditures that occured as a result of recreational fishing in the Laguna Madre estuary exceeded $74 million. The difference between regional and state direct expenditures is the estimated transportation expenditures made by fishermen from outside the Laguna Madre region. As can be observed, most direct expenditures (90 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 $146 million, this figure accounts for more than half (62 percent) of the gross output impacts statewide ($237.9 million). This difference reflects economic linkages between the Laguna Madre 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 Laguna Madre estuary region and within the state. The input-output analysis estimated a total of 2,332 full-time job equivalents directly related to sport fishing in the Laguna Madre estuary region during 1986. Statewide, an additional 620 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 region was 2,977 jobs and 4,184 jobs in the state economy (Table 2).

Table 2. Direct and Total Economic Impact From Sport Fishing Expenditures, Laguna Madre Estuary, 1986

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	67.7	74.4	146.5	237.9
Employment (man-years)	2,332	2,952	2,977	4,184
Income (million $)	20.2	27.4	33.1	63.7
State Tax Revenues (million $)	a	0.34	2.9	3.2
Local Tax Returns (million $)	a	0.94	5.2	5.7

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

Sport fishing expenditures in the Laguna Madre 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, over $20 million and $27 million of personal income was created directly for households within the region and state, respectively, by sport fishing expenditures within the Laguna Madre region. Moreover, total personal income impacts from sport fishing in the region amounted to over $33 million within the region and $63 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 $2.9 million of the total statewide state tax revenues, which amounted to $3.2 million, were collected in the local region. As shown in

Table 2, direct state tax revenues paid by the sport fishing industry were $340 thousand. Table 3 also shows that the total tax revenue impacts for local jurisdictions were concentrated within the Laguna Madre estuary region where an estimated $5.2 million resulted from direct, indirect, and induced sport fishing expenditures. Additionally, local governments outside the Laguna Madre estuary region collected an estimated $500 thousand in taxes on travel expenditures by sport fishermen for a total impact on local governments of $5.7 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 Laguna Madre 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 Laguna Madre non-fishing recreational participants spent just over $50 million within the Laguna Madre estuary region and a total of over $58 million in the state. These expenditures generated total economic impacts of over $111 million and $188 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 1,577 jobs were directly related to other recreational activity in the Laguna Madre estuary region. The analysis also estimated that an additional 840 jobs were generated thoughout the state because of other Laguna Madre 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 over $15 million of direct income and $25.1 million of total income. Direct state income impacts were over $21 million and total state income effects amounted to $50.3 million.

State and local tax revenue impacts from other recreational activity for the Laguna Madre estuary region are also presented in Table 3. Local tax revenue for almost all categories are greater than state tax revenue. Eighty-eight percent of the total state tax revenue is generated within the region. Total state tax revenues amounted to $2.5 million while total local tax revenue was estimated at $4.5 million. Local tax jurisdictions elsewhere in the state also received an estimated $500 thousand in tax revenues from the travel expenditures of non-fishing recreationist to the Laguna Madre region.

Table 3. Direct and Total Economic Impact From Other Recreational Activity Expenditures, Laguna Madre Estuary, 1986

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	50.8	58.2	111.6	188.3
Employment (man-years)	1,577	2,417	2,065	3,380
Income (million $)	15.2	21.5	25.1	50.3
State Tax Revenues (million $)	a	0.25	2.2	2.5
Local Tax Returns (million $)	a	0.72	4.0	4.5

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 Laguna Madre estuary in 1986 are presented in Table 4. Total

state output was 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 Laguna Madre region resulted in increased household personal incomes of over $58 million for this region. In addition, household income generated outside the region was over $55 million bringing the total state personal income impact to $114.0 million from Laguna Madre recreational and fishing activities in 1986.

Table 4. Direct and Total Economic Impact From Sport Fishing and Other Recreational Activity Expenditures, Laguna Madre Estuary, 1986

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	118.6	132.6	258.1	426.1
Employment (man-year)	3,909	5,370	5,042	7,572
Income (million $)	35.5	48.8	58.2	114.0
State Tax Revenues (million $)	a	0.59	5.1	5.7
Local Tax Revenues (million $)	a	1.7	9.2	10.2

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 $5.7 million, of which $5.1 million was collected within the region. Local tax jurisdictions within the region received over $9 million in revenues while those outside the region received an additional $1 million for a total

statewide tax impact on local jurisdiction of almost $10.2 million in 1986.

Economic Impact of Commercial Fishing

The analysis of the commercial fishing industry in the Laguna Madre 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 this study.

Given that the Laguna Madre bay system corresponds with the Laguna Madre estuary, for purposes of estimating direct and total economic impacts, the value of commercial fish landings in the Laguna Madre bay system were chosen to represent Laguna Madre 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 Laguna Madre estuary were reported to be 676.1 thousand pounds with an ex-vessel value of $548 thousand for the 1984 through 1986 period. Of this, black drum made up more than 50 percent of the total value of landings, while brown & pink shrimp and blue crab account for most of the remaining value. The combined inshore and offshore ex-vessel value of landings for this same time

period was about $3.4 million. This difference in the offshore-inshore value of landings suggests the importance of offshore landings supported by the Laguna Madre estuary.

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

Table 5. Direct and Total Economic Impact of Commercial Fishing in the Laguna Madre Estuary, 1986

	Landings		Total Impacts			
	Inshore	Inshore - Offshore	Inshore Region	Inshore State	Inshore-Offshore Region	Inshore-Offshore State
Output (million $)	0.55	3.4	1.2	1.8	7.5	11.2
Employment (man-years)	31	194	36	39	223	244
Income (million $)	0.15	0.91	0.25	0.45	1.5	2.8
State Tax Rev. (million $)	0.003	0.02	a	0.02	a	0.15
Local Tax Rev. (million $)	0.004	0.02	a	0.04	a	0.24

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

Total value of the inshore catch was $548 thousand, direct employment in the inshore fisheries industry was 31 full-time job equivalents and personal income paid to households by the inshore fishing industry was $147 thousand. In addition, the commercial fishing industry paid $3 thousand directly in state taxes and $4 thousand in local taxes (Table 5). Gross Texas business

resulting from inshore commercial fishing, processing, and marketing fish attributed to the Laguna Madre estuary in 1986 was estimated at $1.8 million, of which $1.2 million was business within the estuary region. This regional inshore industry also supported a total of 36 full-time equivalent jobs and created personal income amounting to $454 thousand throughout the state. Also generated by this industry was statewide state taxes paid of $24 thousand and local taxes of $38 thousand to local jurisdictions throughout Texas.

The total value of offshore and inshore landings was reported to be about $3.4 million. Direct employment associated with this output was estimated at 194 full-time job equivalents. Personal income paid to households by the inshore and offshore fishing industry was $914 thousand. The combined inshore and offshore state tax revenues from this industry was estimated at $16 thousand, while the local tax revenues were estimated to be $23 thousand (Table 5).

Gross Texas business resulting from inshore and offshore commercial fishing, processing, and marketing fish attributed to the Laguna Madre estuary in 1986 was estimated at $11.2 million of which almost $7.5 million was business within the estuary region. The combined inshore and offshore regional commercial fishing industry also supported a total of 244 full-time equivalent jobs and generated personal income of nearly $2.8 million throughout the state. Also, generated by this commercial fishing industry were statewide local tax revenue of $150 thousand and local taxes of $235 thousand 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 of 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 Laguna Madre estuary during 1986. As defined by the Texas Water Development Board, the Laguna Madre estuarine system includes the Upper Laguna Madre below Corpus Christi Pass and the Lower Laguna Madre. The economic area around the Laguna Madre estuary includes Brooks, Cameron, Hidalgo, Jim Wells, Kenedy, Kleberg, Nueces and Willacy 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 Laguna Madre estuary;

THF_i - the total number of households residing in region i that went fishing at the Laguna Madre 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 the Laguna Madre estuary;

PF_i - the proportion of households from region i that traveled to the Texas Gulf Coast and went fishing at the Laguna Madre 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 Laguna Madre estuary;

TTF_i - the total number of trips by fishing households residing in region i to the Laguna Madre estuary;

THN_i - same as before;

THF_i - same as before;

TRN_i - the mean number of trips per "nonfishing" household taken to the Laguna Madre estuary from region i;

TRF_i - the mean number of trips per "fishing" household taken to the Laguna Madre 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 Laguna Madre estuary for expenditure category k;

TEF_k - the total expenditures by "fishing" households that visited the Laguna Madre 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 Laguna Madre estuary;

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

TEF - the total expenditure level by households that fished in the Laguna Madre 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 Laguna Madre 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 Laguna Madre 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 Laguna Madre 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 Laguna Madre estuary as well as the total dollars expended during these trips. Estimates of the total visitation and expenditure levels were developed for "fishing" and "nonfishing" households residing in each of the seven regions and traveling to the Sabine-Neches 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 expenditure levles vary substantially across Texas. Finally, estimates of the total dollars expended in the Sabine-Neches estuary were calculated using equations 7-9 where total expenditures 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 Laguna Madre Input-Output Model developed for this study are of the Leontief structure. As such these models may be expressed in matrix form as:

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

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 Laguna Madre 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 Laguna Madre 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 Laguna Madre Estuary Region Input-Output Model is available from the Texas Water Development Board.

Direct Requirement Coefficients for the Laguna Madre Estuary Region, 1986

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
1 Irrigated Agri	.00655416	.00505248	.03116521	.00002562	.00002961
2 Dryland Agri	.00011720	.01406189	.03786844	.00007259	.00008698
3 Lvestock & Pdt	.00000000	.00000000	.12830530	.02064256	.00014436
4 Agri Services	.08142541	.08918414	.03148745	.02570712	.00015916
5 Forestry	.00000000	.00000000	.00000000	.00000000	.16930090
6 Fisheries	.00000000	.00000000	.00000072	.00000000	.00000000
7 Petro & NL,NGL	.00000000	.00000000	.00000000	.00015313	.00000000
8 Other Mining	.00000000	.00000000	.00000000	.00000000	.00016824
9 Construction	.00301491	.00359922	.00079275	.01511590	.00707736
10 Food & Kindred	.00000000	.00000000	.05629713	.00068609	.00014251
11 Text & Apparel	.00000000	.00000000	.00000142	.00006975	.00000000
12 Lum & Pap Pdts	.00088887	.00004038	.00063972	.00001504	.03958801
13 Print & Publih	.00000000	.00000000	.00000692	.00062940	.00000000
14 Chemicals	.05954107	.06930304	.00689888	.14085680	.00076990
15 Petro Refining	.03765839	.06544629	.01064910	.03281003	.00014621
16 Rub Leath Plas	.00061075	.00008568	.00003007	.00005076	.00000754
17 Glas Ston Clay	.00000000	.00000000	.00000564	.00011609	.00002307
18 Prim Metal Pdt	.00001105	.00002863	.00000086	.00000000	.00000000
19 Fab Metal Pdts	.00015328	.00016879	.00024648	.00009333	.00004317
20 Non-Elec Mach	.00056517	.00067492	.00016426	.00337616	.00000669
21 Elec Machinery	.00005110	.00013444	.00004871	.00007092	.00006618
22 Transpor Equip	.00208484	.00248900	.00038904	.00066481	.00000000
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00003584	.00004029	.00003031	.00010150	.00001739
25 Transportation	.00382492	.00389842	.00782906	.00666458	.04256310
26 Communications	.00070654	.00076883	.00088606	.00265612	.00203765
27 Utilities	.12155090	.00281416	.00957557	.04232423	.00204876
28 Wholesale Trde	.00981367	.01307574	.02725784	.04496770	.05841422
29 Eat&Drink Estb	.00000000	.00000000	.00008118	.00031315	.00004627
30 Other Ret Trde	.03147744	.04249509	.03710967	.01731459	.01708037
31 F.I.R.E.	.03391590	.03218416	.02807127	.02550956	.00160562
32 Health Service	.00000000	.00000000	.00000000	.00000000	.00000000
33 Educ Services	.00130086	.00136145	.00101887	.00044696	.00001666
34 Other Services	.00469633	.00026853	.00082053	.01503939	.01480467
35 Households	.22007800	.27701600	.18431540	.20980780	.11095580

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	.00010046
6 Fisheries	.00061464	.00000000	.00000000	.00000000	.00250150
7 Petro & NL,NGL	.00013568	.12071330	.00000000	.00000027	.00430647
8 Other Mining	.00000000	.00021759	.00093589	.01370089	.00014104
9 Construction	.01610045	.00097310	.00334213	.00138510	.00143016
10 Food & Kindred	.01126276	.00003131	.00013539	.00000428	.07587554
11 Text & Apparel	.00627470	.00003216	.00017528	.00050428	.00169650
12 Lum & Pap Pdts	.00297564	.00008739	.00008072	.00486874	.00789650
13 Print & Publih	.00000000	.00029794	.00009443	.00031816	.00110769
14 Chemicals	.00114260	.00220896	.02352327	.00481593	.00484567
15 Petro Refining	.11774530	.00941689	.02985810	.02304116	.01034541
16 Rub Leath Plas	.00000707	.00000514	.00071677	.00045521	.00029838
17 Glas Ston Clay	.00000000	.00017411	.00302350	.03027962	.00711486
18 Prim Metal Pdt	.00000905	.00000409	.00054636	.00202441	.00007104
19 Fab Metal Pdts	.00002724	.00009375	.00126026	.01495333	.00797227
20 Non-Elec Mach	.00003312	.00176902	.01391468	.00280158	.00034008
21 Elec Machinery	.00003858	.00161592	.00388830	.00426492	.00018589
22 Transpor Equip	.02099490	.00003108	.00246023	.00046789	.00004456
23 Instruments	.00000000	.00001160	.00000000	.00047664	.00006989
24 Misc Manufactu	.00003450	.00000989	.00000000	.00035287	.00055681
25 Transportation	.00833577	.00536353	.02714331	.00871059	.01262300
26 Communications	.00173310	.00198073	.00211232	.00413194	.00804484
27 Utilities	.00357662	.00954685	.03825008	.00445644	.02317964
28 Wholesale Trde	.03287897	.00545162	.00395579	.01729826	.02177649
29 Eat&Drink Estb	.00053289	.00044316	.00000000	.00039591	.00498862
30 Other Ret Trde	.01575155	.00231241	.00582766	.00852867	.00840677
31 F.I.R.E.	.05649918	.01901707	.03991503	.03694743	.00984201
32 Health Service	.00000000	.00013996	.00000000	.00000462	.00014995
33 Educ Services	.00045608	.00538887	.00328413	.00044529	.00036208
34 Other Services	.01018649	.01378236	.02051827	.04842596	.01069442
35 Households	.26889250	.25928410	.23641380	.26229130	.11125960

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	.00003450	.05756395	.00027948	.00039572	.00000166
6 Fisheries	.00000727	.00003904	.00005822	.00007527	.00000034
7 Petro & NL,NGL	.00151962	.00802159	.01187144	.03971795	.17383610
8 Other Mining	.00005568	.00039542	.00039425	.00249341	.00021019
9 Construction	.00047658	.00529573	.00221677	.00909575	.00584345
10 Food & Kindred	.00011691	.00064033	.00094836	.00129176	.00000981
11 Text & Apparel	.02598173	.00110191	.00054726	.00022275	.00006104
12 Lum & Pap Pdts	.00266095	.02690008	.01803471	.00169562	.00101523
13 Print & Publih	.00218924	.00043473	.02287948	.00063330	.00017519
14 Chemicals	.00381800	.02438916	.01353726	.16051660	.05827928
15 Petro Refining	.00319998	.00753515	.01353216	.11241410	.11106620
16 Rub Leath Plas	.00005882	.00069166	.00013957	.00029391	.00002775
17 Glas Ston Clay	.00005847	.00023519	.00032666	.00047290	.00010188
18 Prim Metal Pdt	.00029243	.00033411	.00016324	.00047402	.00017844
19 Fab Metal Pdts	.00122411	.00084910	.00079439	.00117883	.00167797
20 Non-Elec Mach	.00051955	.00259835	.00148284	.00142400	.00041465
21 Elec Machinery	.00015613	.00025181	.00040162	.00050550	.00053559
22 Transpor Equip	.00002130	.00003934	.00008630	.00011805	.00001571
23 Instruments	.00001195	.00004869	.00115369	.00018065	.00012725
24 Misc Manufactu	.00318636	.00008624	.00279672	.00025562	.00001964
25 Transportation	.01008102	.01724277	.01360885	.01592093	.02711209
26 Communications	.00343882	.00367909	.00905417	.00266351	.00098709
27 Utilities	.03316351	.04986218	.02277952	.10409840	.03716093
28 Wholesale Trde	.00751643	.03421794	.01477553	.02077350	.01556982
29 Eat&Drink Estb	.00062908	.00032251	.00104599	.00032214	.00005328
30 Other Ret Trde	.00121025	.01592398	.00545600	.00626102	.00033302
31 F.I.R.E.	.03130854	.01473588	.01207350	.01128635	.01540857
32 Health Service	.00001976	.00000951	.00001851	.00004941	.00001438
33 Educ Services	.00088767	.00007250	.00028609	.00052276	.00140749
34 Other Services	.01082282	.00539447	.01526096	.00837607	.00931814
35 Households	.29958700	.18516770	.26933580	.07950056	.04133266

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	.00004548	.00005195	.00016716	.00013528	.00012276
6 Fisheries	.00000858	.00001082	.00003482	.00002788	.00002243
7 Petro & NL,NGL	.00232804	.00220274	.00708570	.00577058	.00462701
8 Other Mining	.00007605	.04016716	.00892254	.00021341	.00016442
9 Construction	.00209036	.00112635	.00485527	.00276994	.00212152
10 Food & Kindred	.00288301	.00062387	.00071536	.00083412	.00039164
11 Text & Apparel	.00196057	.00004068	.00017844	.00018497	.00138889
12 Lum & Pap Pdts	.00284070	.00588866	.00070811	.00140665	.00123317
13 Print & Publih	.00077879	.00032225	.00032177	.00103580	.00063399
14 Chemicals	.15596740	.00417098	.01261641	.01473251	.00509615
15 Petro Refining	.00371277	.00367666	.01371703	.00834831	.00707416
16 Rub Leath Plas	.00188184	.00021983	.00018476	.00066001	.00193636
17 Glas Ston Clay	.00006556	.02728539	.00088098	.00211806	.00141769
18 Prim Metal Pdt	.00008541	.00009058	.00641578	.00402308	.00321173
19 Fab Metal Pdts	.00061542	.00023680	.00117046	.01261456	.01057694
20 Non-Elec Mach	.00236630	.00066813	.00109772	.00188691	.00781263
21 Elec Machinery	.00021576	.00007248	.00121520	.00142811	.00584275
22 Transpor Equip	.00001144	.00005279	.00005150	.00052285	.00015627
23 Instruments	.00001193	.00000807	.00004445	.00007024	.00118566
24 Misc Manufactu	.00029163	.00014969	.00038284	.00042730	.00044478
25 Transportation	.01972563	.06621858	.02311276	.02165748	.01063875
26 Communications	.00417413	.00419905	.00223851	.00505246	.00481104
27 Utilities	.04424455	.11330740	.10623220	.03941485	.01984470
28 Wholesale Trde	.01766902	.01691094	.02134228	.02600926	.02978697
29 Eat&Drink Estb	.00029535	.00027921	.00016394	.00071575	.00070716
30 Other Ret Trde	.01000581	.00678560	.04330502	.00518263	.00684562
31 F.I.R.E.	.01344666	.01960347	.01295403	.01676163	.02087305
32 Health Service	.00001478	.00006588	.00008418	.00004116	.00006395
33 Educ Services	.00026323	.00095216	.00031156	.00045999	.00034294
34 Other Services	.00689029	.01505112	.01590377	.01090912	.01161911
35 Households	.21355760	.18425340	.17627420	.25136650	.26978660

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	.00010213	.00007253	.00010798	.00004928	.00000000
6 Fisheries	.00002134	.00001481	.00002255	.00001014	.00000000
7 Petro & NL,NGL	.00457942	.00308332	.00486939	.00218494	.00027949
8 Other Mining	.00016703	.00011125	.00015985	.00006943	.00022911
9 Construction	.00102474	.00226000	.00163483	.00080399	.00249570
10 Food & Kindred	.00037410	.00032301	.00318746	.00024392	.00026801
11 Text & Apparel	.00009816	.00044466	.00008345	.00733092	.00008734
12 Lum & Pap Pdts	.00111206	.00312596	.00157991	.01168345	.00062825
13 Print & Publih	.00101218	.00198114	.00214735	.00458182	.00062743
14 Chemicals	.01158199	.01444459	.00917241	.05554326	.00149839
15 Petro Refining	.00457867	.00502262	.00712799	.00424435	.07704464
16 Rub Leath Plas	.00125753	.00091554	.00121990	.00399543	.00061102
17 Glas Ston Clay	.00036861	.00274399	.00523214	.00322711	.00046593
18 Prim Metal Pdt	.00118507	.00147901	.00217128	.00091313	.00007635
19 Fab Metal Pdts	.00176821	.00903363	.00360786	.00623929	.00064666
20 Non-Elec Mach	.00125238	.00211039	.00906094	.00144872	.00079703
21 Elec Machinery	.02890925	.00566667	.00167232	.01052003	.00194126
22 Transpor Equip	.00089963	.00910134	.00002135	.00286705	.00758878
23 Instruments	.00049599	.00031544	.01506173	.00554110	.00064358
24 Misc Manufactu	.00057458	.00040649	.00345053	.00209166	.00005911
25 Transportation	.00494071	.01340255	.01931584	.00850713	.02548179
26 Communications	.00757849	.00348768	.00780432	.00587409	.01643240
27 Utilities	.01565145	.02000852	.04311561	.01971564	.02350680
28 Wholesale Trde	.01738658	.02490149	.01964613	.02493691	.01536571
29 Eat&Drink Estb	.00015674	.00013552	.00206143	.00036254	.00056008
30 Other Ret Trde	.00608799	.00587631	.00319419	.00685896	.00598030
31 F.I.R.E.	.01740067	.00784199	.02200376	.01845973	.05615678
32 Health Service	.00003938	.00003484	.00116717	.00000000	.00000076
33 Educ Services	.00030262	.00046139	.00064034	.00064739	.00088808
34 Other Services	.01106993	.01134835	.02216629	.01577082	.01754674
35 Households	.33248300	.24015370	.23783660	.29707820	.31084140

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	.00010015	.00000000	.00000000
6 Fisheries	.00000000	.00000000	.00002088	.00004999	.00000018
7 Petro & NL,NGL	.00000000	.20757070	.00574424	.00001668	.00007822
8 Other Mining	.00000000	.00510461	.00014670	.00000000	.00000025
9 Construction	.00029784	.00126658	.00307075	.00128537	.00070087
10 Food & Kindred	.00000000	.00000000	.00037148	.11740110	.00125295
11 Text & Apparel	.00003597	.00015975	.00026717	.00025406	.00072770
12 Lum & Pap Pdts	.00322072	.00239933	.00080747	.00105586	.00039083
13 Print & Publih	.00999251	.00079987	.00364277	.00717123	.01439534
14 Chemicals	.00013950	.00272018	.00442134	.00039929	.00028213
15 Petro Refining	.01199047	.00541332	.01600232	.00313711	.01131074
16 Rub Leath Plas	.00001915	.00003931	.00041052	.00001867	.00003366
17 Glas Ston Clay	.00012398	.00158914	.00020021	.00002134	.00000439
18 Prim Metal Pdt	.00001326	.00002261	.00007872	.00000017	.00000071
19 Fab Metal Pdts	.00004521	.00161468	.00050451	.00044412	.00003766
20 Non-Elec Mach	.00008348	.00009887	.00053395	.00212174	.00022540
21 Elec Machinery	.00476044	.00033175	.00036420	.00085241	.00113429
22 Transpor Equip	.00018923	.00003201	.00049557	.00032497	.00137743
23 Instruments	.00004167	.00014691	.00005413	.00000000	.00000000
24 Misc Manufactu	.00002703	.00002146	.00041859	.00184962	.00057273
25 Transportation	.00340597	.00241022	.01680150	.00207533	.00315993
26 Communications	.01060754	.00258181	.01810808	.00927700	.01649866
27 Utilities	.02217214	.19018380	.04832440	.04496827	.02837375
28 Wholesale Trde	.00158545	.00465205	.01161488	.02439302	.03174278
29 Eat&Drink Estb	.00070471	.00000000	.00293213	.00017502	.00081628
30 Other Ret Trde	.00009661	.00309234	.01008691	.00865576	.03867892
31 F.I.R.E.	.03519853	.02119087	.05498029	.04986732	.05815877
32 Health Service	.00002889	.00000000	.00004034	.00000779	.00016464
33 Educ Services	.00636768	.00440468	.00116539	.00039754	.00084580
34 Other Services	.01157038	.01183292	.02181850	.03584860	.01774520
35 Households	.25780830	.11253730	.31929500	.26205990	.28988010

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	.00004258
7	Petro & NL,NGL	.00024468	.00000000	.00000000	.00000000	.00065105
8	Other Mining	.00000000	.00000000	.00000000	.00000255	.00000000
9	Construction	.00583926	.00108563	.00079800	.00302069	.00131505
10	Food & Kindred	.00012709	.00375790	.02749917	.00348095	.04906577
11	Text & Apparel	.00005927	.00050943	.00017374	.00102910	.00441202
12	Lum & Pap Pdts	.00068692	.00062922	.00327957	.00078638	.00054500
13	Print & Publih	.00314093	.00220622	.00376613	.00633630	.00196851
14	Chemicals	.00025176	.00617367	.00433987	.00711581	.00349167
15	Petro Refining	.00079362	.00196303	.00357552	.01351199	.03702909
16	Rub Leath Plas	.00000538	.00010665	.00016097	.00115430	.00032836
17	Glas Ston Clay	.00030474	.00009127	.00016850	.00024083	.00034563
18	Prim Metal Pdt	.00000298	.00000385	.00002693	.00010694	.00003231
19	Fab Metal Pdts	.00009944	.00050229	.00068992	.00367850	.00027603
20	Non-Elec Mach	.00000732	.00021178	.00062899	.00255976	.00004199
21	Elec Machinery	.00012463	.00104611	.00206571	.00137528	.00028670
22	Transpor Equip	.00000514	.00020132	.00007490	.00202282	.00427001
23	Instruments	.00000000	.00335093	.00691243	.00314311	.00021072
24	Misc Manufactu	.00015921	.00057679	.00088196	.00202840	.00026457
25	Transportation	.00094540	.00662745	.00233023	.00796529	.01466980
26	Communications	.01635869	.01307880	.00831600	.01927910	.00691763
27	Utilities	.02502461	.04749621	.04794794	.03058608	.03845744
28	Wholesale Trde	.00338405	.02093957	.00590000	.01781016	.04284173
29	Eat&Drink Estb	.00090239	.00243755	.00020562	.00235989	.01920691
30	Other Ret Trde	.00019023	.00450384	.00240805	.00623394	.09014136
31	F.I.R.E.	.10903500	.05922360	.03012722	.05016886	.05530598
32	Health Service	.00085787	.02218865	.00023437	.00132062	.04936458
33	Educ Services	.00165683	.00075272	.00006125	.00069029	.00296000
34	Other Services	.02816005	.03695533	.01517613	.02842790	.03160942
35	Households	.32233840	.38230270	.52490490	.36531070	.05271889

Interdependence Coefficients for the Laguna Madre Estuary Region, 1986

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
1 Irrigated Agri	1.00768900	.00640503	.03860338	.00187592	.00069905
2 Dryland Agri	.00129516	1.01558800	.04660370	.00219441	.00080626
3 Lvestock & Pdt	.00729917	.00821079	1.16457300	.03029288	.00351258
4 Agri Services	.08460364	.09380212	.04514778	1.02780600	.00048773
5 Forestry	.00023107	.00016635	.00020471	.00021830	1.20728000
6 Fisheries	.00008922	.00010094	.00025842	.00009942	.00005680
7 Petro & NL,NGL	.07030471	.04554465	.02754634	.05427888	.01447536
8 Other Mining	.00149279	.00083678	.00056054	.00143956	.00063155
9 Construction	.00756619	.00861099	.00420900	.01956882	.01031982
10 Food & Kindred	.02479420	.02796014	.09417885	.02619389	.01607460
11 Text & Apparel	.00217972	.00243048	.00217794	.00220005	.00146019
12 Lum & Pap Pdts	.00252312	.00145485	.00243875	.00166953	.04988628
13 Print & Publih	.00328103	.00358004	.00331640	.00378680	.00230323
14 Chemicals	.09565438	.11210360	.03078712	.18290690	.00700002
15 Petro Refining	.08259994	.11900650	.04841075	.08612285	.02231237
16 Rub Leath Plas	.00089823	.00039391	.00032795	.00038585	.00027402
17 Glas Ston Clay	.00106973	.00092876	.00118780	.00146387	.00072833
18 Prim Metal Pdt	.00013904	.00017345	.00008419	.00020370	.00008277
19 Fab Metal Pdts	.00145667	.00138592	.00169319	.00161743	.00083111
20 Non-Elec Mach	.00145072	.00158114	.00078165	.00425190	.00047901
21 Elec Machinery	.00084741	.00092793	.00067932	.00093573	.00064246
22 Transpor Equip	.00439140	.00511020	.00284406	.00291503	.00186210
23 Instruments	.00038988	.00038749	.00032096	.00042331	.00029876
24 Misc Manufactu	.00040453	.00044020	.00041244	.00051077	.00029696
25 Transportation	.01807071	.02008292	.02171736	.02249905	.06134159
26 Communications	.01019053	.01081640	.01059477	.01239938	.01007442
27 Utilities	.20659120	.06763013	.06466421	.11740160	.03528522
28 Wholesale Trde	.04264511	.04975683	.06183318	.07688248	.09031974
29 Eat&Drink Estb	.00880067	.00991178	.00887982	.00893688	.00592140
30 Other Ret Trde	.07755828	.09469958	.08981068	.06188591	.05028161
31 F.I.R.E.	.09060835	.09164791	.08615585	.08029523	.03899347
32 Health Service	.02158519	.02436747	.02065398	.02080422	.01389546
33 Educ Services	.00448367	.00407495	.00349984	.00318683	.00149239
34 Other Services	.03269903	.02929068	.02567481	.04230895	.03538937
35 Households	.42437090	.47952680	.40612800	.40880020	.27323310
TOT INT COEF	2.34025400	2.33893600	2.31696100	2.30876300	1.95902900

Interdependence Coefficients, Cont'd.

	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10
1 Irrigated Agri	.00138654	.00087932	.00085767	.00096309	.02211507
2 Dryland Agri	.00162626	.00099078	.00096558	.00107095	.02399061
3 Lvestock & Pdt	.00775409	.00475054	.00464481	.00520664	.18292010
4 Agri Services	.00101223	.00032991	.00033490	.00462596	.00997392
5 Forestry	.00033920	.00008294	.00011432	.00046094	.00084783
6 Fisheries	1.00073500	.00008033	.00007832	.00008631	.00279782
7 Petro & NL,NGL	.04657250	1.15648900	.03527483	.02480455	.03131387
8 Other Mining	.00070599	.00060668	1.00175700	.01541624	.00099595
9 Construction	.01925732	.00279023	.00572619	1.00385600	.00381595
10 Food & Kindred	.03859240	.02414774	.02278624	.02536784	1.11099400
11 Text & Apparel	.00875953	.00209040	.00216299	.00274376	.00344943
12 Lum & Pap Pdts	.00453431	.00101143	.00123708	.00630766	.01002068
13 Print & Publih	.00317281	.00273254	.00265451	.00336436	.00357089
14 Chemicals	.01726400	.00875590	.03617408	.01528657	.01897450
15 Petro Refining	.16100420	.03497459	.06172306	.05340562	.03905629
16 Rub Leath Plas	.00031296	.00024106	.00100933	.00079675	.00056321
17 Glas Ston Clay	.00131843	.00076978	.00388430	.03187610	.00857726
18 Prim Metal Pdt	.00016728	.00006543	.00069023	.00219881	.00017888
19 Fab Metal Pdts	.00161560	.00086163	.00240253	.01619602	.00960369
20 Non-Elec Mach	.00059428	.00232428	.01447589	.00356594	.00085366
21 Elec Machinery	.00092584	.00238837	.00472793	.00512858	.00077484
22 Transpor Equip	.02358739	.00213034	.00467457	.00286691	.00195435
23 Instruments	.00039802	.00038663	.00041481	.00096603	.00036165
24 Misc Manufactu	.00043696	.00031923	.00033428	.00078101	.00089980
25 Transportation	.02397631	.01573499	.03887826	.02318961	.02508813
26 Communications	.01160163	.00943869	.01033672	.01356852	.01585463
27 Utilities	.05343834	.04724402	.08727753	.05252033	.06975945
28 Wholesale Trde	.06311490	.02971093	.02878294	.04515202	.04944343
29 Eat&Drink Estb	.01002682	.00898172	.00805624	.00947980	.01169581
30 Other Ret Trde	.06201579	.04350793	.04516128	.05285111	.04861401
31 F.I.R.E.	.11359620	.06359943	.08697215	.08904010	.05482087
32 Health Service	.02313683	.02130684	.01989034	.02226481	.01531149
33 Educ Services	.00304170	.00804906	.00552693	.00272967	.00245290
34 Other Services	.03795987	.03653062	.04332303	.07396288	.03016865
35 Households	.45467020	.41635660	.39083790	.43688880	.29777330
TOT INT COEF	2.19865100	1.95066000	1.97414900	2.04899100	2.10958800

Interdependence Coefficients, Cont'd.

	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15
1 Irrigated Agri	.00861037	.00117187	.00148463	.00144108	.00052600
2 Dryland Agri	.00500478	.00132094	.00171067	.00168808	.00059627
3 Lvestock & Pdt	.00801189	.00686363	.00906012	.00933262	.00293818
4 Agri Services	.00144754	.00048685	.00059273	.00063546	.00023161
5 Forestry	.00033147	.07151576	.00176017	.00082402	.00019470
6 Fisheries	.00009481	.00011092	.00014573	.00014717	.00004916
7 Petro & NL,NGL	.02803364	.04216308	.04031265	.13377810	.25268720
8 Other Mining	.00059336	.00121014	.00095828	.00432043	.00112355
9 Construction	.00246367	.00795650	.00434820	.01352286	.00885096
10 Food & Kindred	.02614812	.02052259	.02553001	.01727402	.01275944
11 Text & Apparel	1.02891500	.00288826	.00270135	.00164826	.00120192
12 Lum & Pap Pdts	.00393997	1.03161100	.02011505	.00344286	.00209668
13 Print & Publih	.00490597	.00291186	1.02603000	.00285357	.00187757
14 Chemicals	.01181246	.03596078	.02398429	1.20706500	.08311062
15 Petro Refining	.03000344	.03451145	.04246529	.17205830	1.15333000
16 Rub Leath Plas	.00032770	.00094712	.00042284	.00056373	.00022721
17 Glas Ston Clay	.00072103	.00103875	.00104340	.00166528	.00086596
18 Prim Metal Pdt	.00036855	.00043651	.00025629	.00068813	.00030740
19 Fab Metal Pdts	.00210523	.00177978	.00172998	.00271605	.00272892
20 Non-Elec Mach	.00088529	.00310134	.00198634	.00237318	.00128682
21 Elec Machinery	.00074358	.00087595	.00107773	.00145605	.00149221
22 Transpor Equip	.00233787	.00193962	.00230211	.00170772	.00140735
23 Instruments	.00038399	.00034955	.00156935	.00054029	.00042526
24 Misc Manufactu	.00360348	.00037741	.00319630	.00055645	.00024589
25 Transportation	.02094739	.03091610	.02523993	.03197799	.03995145
26 Communications	.01154337	.01142163	.01712440	.01004282	.00716823
27 Utilities	.08017831	.09923802	.06779704	.18851710	.08620099
28 Wholesale Trde	.03356855	.06125598	.04084974	.04535224	.03442699
29 Eat&Drink Estb	.00979986	.00741014	.00966983	.00592554	.00472131
30 Other Ret Trde	.04601750	.05276674	.04782740	.03536497	.02349910
31 F.I.R.E.	.07972182	.05662522	.05712001	.05419248	.05204877
32 Health Service	.02282537	.01725645	.02128445	.01338436	.01107312
33 Educ Services	.00318933	.00219078	.00252064	.00354609	.00432880
34 Other Services	.03429094	.02682734	.03796846	.03070661	.02841697
35 Households	.44900630	.33942050	.41871250	.26145670	.21634390
TOT INT COEF	1.96288200	1.97738100	1.96089800	2.26276500	2.03874100

Interdependence Coefficients, Cont'd.

	Sector 16	Sector 17	Sector 18	Sector 19	Sector 20
1 Irrigated Agri	.00112706	.00091345	.00115549	.00114322	.00112841
2 Dryland Agri	.00537582	.00102723	.00123481	.00130549	.00127923
3 Lvestock & Pdt	.00640048	.00509501	.00641204	.00668202	.00650433
4 Agri Services	.00081808	.00035013	.00044687	.00045199	.00043940
5 Forestry	.00046181	.00060085	.00035977	.00036685	.00033081
6 Fisheries	.00010355	.00008492	.00010439	.00010905	.00010486
7 Petro & NL,NGL	.04910966	.05355540	.05743035	.03628728	.02807015
8 Other Mining	.00129838	.04242931	.01010832	.00097856	.00072279
9 Construction	.00571196	.00342801	.00693511	.00479964	.00403757
10 Food & Kindred	.02497629	.02205885	.02054752	.02392681	.02438314
11 Text & Apparel	.00393711	.00192610	.00194059	.00217628	.00349788
12 Lum & Pap Pdts	.00438045	.00751418	.00196842	.00256762	.00232064
13 Print & Publih	.00337809	.00290724	.00323809	.00356737	.00325081
14 Chemicals	.19384950	.01273380	.02198743	.02416784	.01272516
15 Petro Refining	.05171487	.03425248	.04077161	.03604366	.03280959
16 Rub Leath Plas	1.00217900	.00053206	.00043275	.00092404	.00221627
17 Glas Ston Clay	.00093375	1.02900000	.00180466	.00291942	.00214411
18 Prim Metal Pdt	.00025292	.00018944	1.00654500	.00417807	.00337188
19 Fab Metal Pdts	.00177954	.00131590	.00221066	1.01365900	.01160436
20 Non-Elec Mach	.00305158	.00173395	.00168588	.00231763	1.00826000
21 Elec Machinery	.00094661	.00098206	.00197762	.00209737	.00663125
22 Transpor Equip	.00209488	.00256296	.00204429	.00268819	.00231417
23 Instruments	.00037172	.00040630	.00039366	.00041399	.00154978
24 Misc Manufactu	.00063655	.00046190	.00070023	.00074433	.00078072
25 Transportation	.03334206	.08070040	.03379693	.03283922	.02151629
26 Communications	.01224544	.01310430	.01034009	.01293901	.01281486
27 Utilities	.11273780	.18122690	.16721670	.08679938	.06206728
28 Wholesale Trde	.04468997	.04126373	.04441209	.05037125	.05466042
29 Eat&Drink Estb	.00804774	.00792986	.00722330	.00889014	.00922766
30 Other Ret Trde	.04916478	.04495611	.07978231	.04525552	.04841539
31 F.I.R.E.	.05884072	.06973661	.05772617	.06113382	.06591765
32 Health Service	.01894627	.01880263	.01730508	.02016501	.02105657
33 Educ Services	.00267974	.00377656	.00284534	.00266684	.00244497
34 Other Services	.02974826	.03932197	.03778579	.03287850	.03382177
35 Households	.37249960	.36833150	.33844300	.39618500	.41326210
TOT INT COEF	2.10783200	2.09521200	1.98931300	1.92463900	1.90568300

Interdependence Coefficients, Cont'd.

	Sector 21	Sector 22	Sector 23	Sector 24	Sector 25
1 Irrigated Agri	.00123950	.00094988	.00114803	.00120446	.00106244
2 Dryland Agri	.00142046	.00108006	.00129821	.00134872	.00119106
3 Lvestock & Pdt	.00706701	.00537163	.00682808	.00648143	.00570625
4 Agri Services	.00047561	.00036960	.00046887	.00044951	.00040562
5 Forestry	.00030753	.00040607	.00035410	.00104545	.00015867
6 Fisheries	.00011721	.00008895	.00010987	.00010760	.00009654
7 Petro & NL,NGL	.02827379	.02548449	.03572204	.03286172	.04326317
8 Other Mining	.00066391	.00071909	.00103444	.00091074	.00084459
9 Construction	.00307327	.00404109	.00366595	.00354564	.00537706
10 Food & Kindred	.02832868	.02161754	.02652729	.02732009	.02882354
11 Text & Apparel	.00250159	.00230384	.00210237	.00989964	.00255680
12 Lum & Pap Pdts	.00229352	.00423181	.00287730	.01345726	.00200658
13 Print & Publih	.00391310	.00432175	.00482496	.00767807	.00391732
14 Chemicals	.02083537	.02321584	.01785985	.07470370	.01443560
15 Petro Refining	.03356664	.02968758	.03375893	.04028093	.11725390
16 Rub Leath Plas	.00157040	.00117061	.00153261	.00434159	.00092354
17 Glas Ston Clay	.00106722	.00347085	.00619237	.00411165	.00131665
18 Prim Metal Pdt	.00130681	.00161613	.00233373	.00108308	.00018442
19 Fab Metal Pdts	.00270770	.01000587	.00472883	.00740001	.00184116
20 Non-Elec Mach	.00166719	.00251299	.00969546	.00206775	.00129621
21 Elec Machinery	1.03037600	.00641869	.00245260	.01155035	.00284572
22 Transpor Equip	.00336114	1.01114100	.00217249	.00532332	.01033527
23 Instruments	.00088737	.00063744	1.01570100	.00604672	.00109483
24 Misc Manufactu	.00094342	.00070804	.00385239	1.00253500	.00045072
25 Transportation	.01657644	.02354885	.03067405	.02204572	1.04024900
26 Communications	.01621139	.01054697	.01603277	.01501861	.02660964
27 Utilities	.06084851	.05957775	.09162176	.07506101	.07665337
28 Wholesale Trde	.04565622	.04747925	.04425288	.05460480	.04579130
29 Eat&Drink Estb	.01005337	.00771404	.01021846	.00998964	.01074985
30 Other Ret Trde	.05429637	.04297813	.04284679	.05413648	.05519537
31 F.I.R.E.	.06666983	.04708222	.06752817	.06956579	.11502220
32 Health Service	.02463964	.01871810	.02114917	.02369316	.02517070
33 Educ Services	.00263452	.00234233	.00288933	.00307921	.00368448
34 Other Services	.03572343	.03107870	.04480188	.04137084	.04575529
35 Households	.48465050	.36798990	.39208450	.46630100	.49478160
TOT INT COEF	1.99592400	1.82062700	1.95134200	2.10062100	2.18705000

Interdependence Coefficients, Cont'd.

	Sector 26	Sector 27	Sector 28	Sector 29	Sector 30
1 Irrigated Agri	.00080825	.00069679	.00127152	.01485343	.00316480
2 Dryland Agri	.00091342	.00078101	.00140395	.00484159	.00116795
3 Lvestock & Pdt	.00439606	.00374441	.00612556	.05121726	.00568519
4 Agri Services	.00030197	.00026548	.00046508	.00335741	.00056868
5 Forestry	.00031972	.00028047	.00029421	.00028569	.00015366
6 Fisheries	.00007410	.00006336	.00011966	.00046665	.00009577
7 Petro & NL,NGL	.02185834	.30612150	.04217633	.03365516	.02810074
8 Other Mining	.00040126	.00673784	.00087301	.00074215	.00053197
9 Construction	.00198177	.00338852	.00554005	.00396346	.00304159
10 Food & Kindred	.02212431	.01890766	.02963441	.15701770	.02866678
11 Text & Apparel	.00192190	.00183181	.00277851	.00287487	.00313212
12 Lum & Pap Pdts	.00441402	.00386653	.00223887	.00359957	.00190253
13 Print & Publih	.01251887	.00315947	.00711545	.01082309	.01842370
14 Chemicals	.00593432	.00984612	.01315713	.01039944	.00766961
15 Petro Refining	.03435630	.02945985	.04802114	.03403803	.03998062
16 Rub Leath Plas	.00023425	.00025282	.00071242	.00038180	.00031771
17 Glas Ston Clay	.00066173	.00257844	.00106544	.00175756	.00072015
18 Prim Metal Pdt	.00006821	.00009265	.00015916	.00009503	.00006955
19 Fab Metal Pdts	.00074693	.00269224	.00157198	.00257283	.00097487
20 Non-Elec Mach	.00038066	.00100988	.00099126	.00267013	.00062987
21 Elec Machinery	.00539880	.00136186	.00115268	.00162529	.00188298
22 Transpor Equip	.00208897	.00172554	.00313658	.00283117	.00382458
23 Instruments	.00039647	.00052080	.00050426	.00049003	.00041630
24 Misc Manufactu	.00033559	.00029887	.00082884	.00236540	.00101068
25 Transportation	.01242216	.01274670	.02946267	.01597836	.01499554
26 Communications	1.01756400	.01002039	.02823887	.02041611	.02682091
27 Utilities	.05915865	1.26740300	.10403160	.10445740	.07844821
28 Wholesale Trde	.02337241	.02633292	1.04127300	.05695556	.06046248
29 Eat&Drink Estb	.00847775	.00679599	.01323858	1.01056800	.01061034
30 Other Ret Trde	.03752508	.03670771	.06005279	.05923484	1.08698600
31 F.I.R.E.	.07593632	.06769871	.11331330	.10911270	.11543350
32 Health Service	.01939044	.01656255	.02553215	.02392201	.02417389
33 Educ Services	.00830008	.00857480	.00399609	.00314366	.00341034
34 Other Services	.03147748	.03606472	.04982607	.06426638	.04463258
35 Households	.38097340	.32476850	.50108740	.46917800	.47171500
TOT INT COEF	1.79723500	2.21336000	2.14138900	2.28415800	2.08982200

Interdependence Coefficients, Cont'd.

	* Sector 31 *	Sector 32 *	Sector 33 *	Sector 34 *	Households
1 Irrigated Agri	.00106047	.00137556	.00211803	.00130038	.00259787
2 Dryland Agri	.00119672	.00151972	.00237549	.00143436	.00297125
3 Lvestock & Pdt	.00574798	.00762693	.01321430	.00712642	.01413326
4 Agri Services	.00041984	.00051759	.00083775	.00049495	.00096276
5 Forestry	.00015301	.00017619	.00039483	.00019038	.00018052
6 Fisheries	.00009699	.00012621	.00021560	.00011868	.00023983
7 Petro & NL,NGL	.02446982	.03535061	.03865223	.03204168	.03634346
8 Other Mining	.00058401	.00074130	.00079404	.00066134	.00065336
9 Construction	.00834402	.00384999	.00364781	.00565230	.00380128
10 Food & Kindred	.02923789	.03876508	.07206091	.03621865	.07242265
11 Text & Apparel	.00256268	.00351117	.00383615	.00386268	.00614348
12 Lum & Pap Pdts	.00201157	.00221568	.00531103	.00238453	.00221622
13 Print & Publih	.00656625	.00617693	.00796398	.01014879	.00611197
14 Chemicals	.00649753	.01536338	.01463882	.01717109	.01324421
15 Petro Refining	.02813616	.03640332	.04405430	.04782388	.06371626
16 Rub Leath Plas	.00029402	.00047468	.00056891	.00150929	.00059130
17 Glas Ston Clay	.00120338	.00104144	.00142676	.00119148	.00138421
18 Prim Metal Pdt	.00007410	.00009484	.00013753	.00022645	.00011423
19 Fab Metal Pdts	.00110666	.00174597	.00221073	.00493594	.00168821
20 Non-Elec Mach	.00039801	.00074991	.00119265	.00309655	.00057683
21 Elec Machinery	.00081176	.00190862	.00297240	.00226099	.00110177
22 Transpor Equip	.00250967	.00323920	.00367400	.00489882	.00605848
23 Instruments	.00045457	.00402437	.00756336	.00370380	.00077322
24 Misc Manufactu	.00057294	.00109914	.00143286	.00251414	.00075161
25 Transportation	.01226474	.02092000	.01912398	.02185957	.02581661
26 Communications	.02676746	.02509652	.02065424	.03022301	.01779805
27 Utilities	.07376002	.11115450	.11763500	.08712278	.08978802
28 Wholesale Trde	.03197449	.05591840	.04762928	.05070744	.06744717
29 Eat&Drink Estb	.01126597	.01475841	.01523082	.01385720	.02551720
30 Other Ret Trde	.04959539	.06355818	.07471509	.06164503	.12300300
31 F.I.R.E.	1.17056200	.12745530	.10241890	.11241260	.10879330
32 Health Service	.02654774	1.05295700	.03742928	.02971924	.06433757
33 Educ Services	.00428765	.00389813	1.00360100	.00359939	.00511062
34 Other Services	.05654947	.07015731	.05159359	1.05877200	.05610697
35 Households	.50357770	.59474430	.73261820	.55777310	1.27011100
TOT INT COEF	2.09166300	2.30871600	2.45394300	2.21865900	2.09260800

TYPE II FINAL DEMAND AND OUTPUT MULTIPLIERS FOR THE LAGUNA MADRE ESTUARY REGION

		MULTIPLIER (Final Demand)	DIAGONAL COEFFICIENT	MULTIPLIER (Output)
1	Irrigated Agri	2.340254	1.007689	2.322398
2	Dryland Agri	2.338936	1.015588	2.303036
3	Lvestock & Pdt	2.316961	1.164573	1.989537
4	Agri Services	2.308763	1.027806	2.246301
5	Forestry	1.959029	1.207280	1.622680
6	Fisheries	2.198651	1.000735	2.197037
7	Petro & NL,NGL	1.950660	1.156489	1.686708
8	Other Mining	1.974149	1.001757	1.970686
9	Construction	2.048991	1.003856	2.041120
10	Food & Kindred	2.109588	1.110994	1.898828
11	Text & Apparel	1.962882	1.028915	1.907720
12	Lum & Pap Pdts	1.977381	1.031611	1.916789
13	Print & Publih	1.960898	1.026030	1.911151
14	Chemicals	2.262765	1.207065	1.874601
15	Petro Refining	2.038741	1.153330	1.767699
16	Rub Leath Plas	2.107832	1.002179	2.103250
17	Glas Ston Clay	2.095212	1.029000	2.036163
18	Prim Metal Pdt	1.989313	1.006545	1.976377
19	Fab Metal Pdts	1.924639	1.013659	1.898705
20	Non-Elec Mach	1.905683	1.008260	1.890070
21	Elec Machinery	1.995924	1.030376	1.937084
22	Transpor Equip	1.820627	1.011141	1.800567
23	Instruments	1.951342	1.015701	1.921177
24	Misc Manufactu	2.100621	1.002535	2.095309
25	Transportation	2.187050	1.040249	2.102430
26	Communications	1.797235	1.017564	1.766212
27	Utilities	2.213360	1.267403	1.746374
28	Wholesale Trde	2.141389	1.041273	2.056512
29	Eat&Drink Estb	2.284158	1.010568	2.260272
30	Other Ret Trde	2.089822	1.086986	1.922583
31	F.I.R.E.	2.091663	1.170562	1.786887
32	Health Service	2.308716	1.052957	2.192603
33	Educ Services	2.453943	1.003601	2.445140
34	Other Services	2.218659	1.058772	2.095502
35	Households	2.092608	1.270111	1.647578

TYPE II INCOME MULTIPLIERS
FOR THE LAGUNA MADRE ESTUARY REGION

		DIR EFFECT (Per $1.00)	TOT EFFECT (F DEMAND)	MULTIPLIER (F DEMAND)	TOT EFFECT (OUTPUT)	MULTIPLIER (OUTPUT)
1	Irrigated Agri	.220078	.424371	1.928275	.421133	1.913562
2	Dryland Agri	.277016	.479527	1.731043	.472167	1.704474
3	Lvestock & Pdt	.184315	.406128	2.203441	.348735	1.892059
4	Agri Services	.209808	.408800	1.948451	.397741	1.895737
5	Forestry	.110956	.273233	2.462541	.226321	2.039743
6	Fisheries	.268893	.454670	1.690899	.454336	1.689658
7	Petro & NL,NGL	.259284	.416357	1.605793	.360018	1.388507
8	Other Mining	.236414	.390838	1.653194	.390152	1.650294
9	Construction	.262291	.436889	1.665663	.435211	1.659264
10	Food & Kindred	.111260	.297773	2.676384	.268024	2.408998
11	Text & Apparel	.299587	.449006	1.498751	.436388	1.456632
12	Lum & Pap Pdts	.185168	.339420	1.833044	.329020	1.776875
13	Print & Publih	.269336	.418712	1.554611	.408090	1.515171
14	Chemicals	.079501	.261457	3.288741	.216605	2.724576
15	Petro Refining	.041333	.216344	5.234213	.187582	4.538348
16	Rub Leath Plas	.213558	.372500	1.744258	.371690	1.740466
17	Glas Ston Clay	.184253	.368331	1.999048	.357951	1.942709
18	Prim Metal Pdt	.176274	.338443	1.919981	.336242	1.907496
19	Fab Metal Pdts	.251367	.396185	1.576125	.390847	1.554887
20	Non-Elec Mach	.269787	.413262	1.531811	.409876	1.519261
21	Elec Machinery	.332483	.484650	1.457670	.470363	1.414697
22	Transpor Equip	.240154	.367990	1.532310	.363935	1.515427
23	Instruments	.237837	.392085	1.648545	.386023	1.623061
24	Misc Manufactu	.297078	.466301	1.569624	.465122	1.565655
25	Transportation	.310841	.494782	1.591749	.475638	1.530162
26	Communications	.257808	.380973	1.477739	.374397	1.452232
27	Utilities	.112537	.324768	2.885875	.256247	2.276998
28	Wholesale Trde	.319295	.501087	1.569355	.481226	1.507151
29	Eat&Drink Estb	.262060	.469178	1.790346	.464272	1.771624
30	Other Ret Trde	.289880	.471715	1.627277	.433966	1.497053
31	F.I.R.E.	.322338	.503578	1.562264	.430202	1.334627
32	Health Service	.382303	.594744	1.555689	.564833	1.477449
33	Educ Services	.524905	.732618	1.395716	.729990	1.390709
34	Other Services	.365311	.557773	1.526846	.526811	1.442091

TYPE II EMPLOYMENT MULTIPLIERS
FOR THE LAGUNA MADRE ESTUARY REGION

	D EFFECT PER MIL $	T EFFECT F DEMAND	MULTIPLI F DEMAND	T EFFECT OUTPUT	MULTIPLI OUTPUT	NUMBER OF EMPLOYEES
1 Irrigated Agri	21.043	32.338	1.537	32.091	1.525	8529.
2 Dryland Agri	10.317	22.376	2.169	22.033	2.136	8164.
3 Lvestock & Pdt	2.469	14.127	5.721	12.130	4.913	932.
4 Agri Services	31.806	41.231	1.296	40.115	1.261	4717.
5 Forestry	1.757	9.145	5.204	7.575	4.311	47.
6 Fisheries	57.068	65.685	1.151	65.637	1.150	197.
7 Petro & NL,NGL	5.122	11.646	2.274	10.070	1.966	9678.
8 Other Mining	5.205	12.079	2.321	12.058	2.316	287.
9 Construction	9.506	18.390	1.935	18.320	1.927	13426.
10 Food & Kindred	7.009	15.596	2.225	14.038	2.003	7892.
11 Text & Apparel	19.602	26.631	1.359	25.883	1.320	7947.
12 Lum & Pap Pdts	11.644	18.614	1.599	18.043	1.550	1149.
13 Print & Publih	18.347	25.482	1.389	24.835	1.354	2050.
14 Chemicals	2.042	8.821	4.320	7.308	3.579	2548.
15 Petro Refining	.364	6.181	16.984	5.359	14.726	2459.
16 Rub Leath Plas	21.626	28.515	1.319	28.453	1.316	388.
17 Glas Ston Clay	15.853	23.633	1.491	22.967	1.449	1678.
18 Prim Metal Pdt	3.606	11.692	3.242	11.616	3.221	77.
19 Fab Metal Pdts	11.062	17.583	1.590	17.346	1.568	1232.
20 Non-Elec Mach	10.075	16.753	1.663	16.616	1.649	2165.
21 Elec Machinery	8.092	15.112	1.868	14.667	1.813	1510.
22 Transpor Equip	20.864	26.964	1.292	26.667	1.278	5109.
23 Instruments	12.744	19.888	1.561	19.581	1.536	609.
24 Misc Manufactu	16.137	24.150	1.497	24.089	1.493	481.
25 Transportation	7.356	15.472	2.103	14.874	2.022	3661.
26 Communications	10.426	16.080	1.542	15.803	1.516	3769.
27 Utilities	2.979	10.489	3.521	8.276	2.778	5930.
28 Wholesale Trde	13.573	21.907	1.614	21.039	1.550	15621.
29 Eat&Drink Estb	19.976	30.121	1.508	29.806	1.492	17002.
30 Other Ret Trde	41.560	50.945	1.226	46.868	1.128	48870.
31 F.I.R.E.	7.200	15.209	2.112	12.993	1.805	12263.
32 Health Service	26.788	36.973	1.380	35.113	1.311	16537.
33 Educ Services	33.669	43.442	1.290	43.286	1.286	4062.
34 Other Services	31.878	40.987	1.286	38.712	1.214	30506.
				TOTAL EMPLOYMENT =		241492.