GUADALUPE 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

GUADALUPE ESTUARY:

ECONOMIC IMPACT OF RECREATIONAL ACTIVITY AND COMMERCIAL FISHING

A REPORT TO

TEXAS WATER DEVELOPMENT BOARD

BY

DANIEL R. FESENMAIER
SEOHO UM
WESLEY S. ROEHL
ALLAN S. MILLS

For: Visitation and Direct Expenditure Estimation

TEOFILO OZUNA, JR.
LONNIE L. JONES
RAMON GUAJARDO Q.

For: Input-Output Models Total Impact Estimation

BY

DEPARTMENT OF RECREATION AND PARKS
DEPARTMENT OF AGRICULTURAL ECONOMICS

AUGUST, 1987

TEXAS AGRICULTURAL EXPERIMENT STATION
TEXAS A&M UNIVERSITY SYSTEM

Guadalupe Estuary: Economic Impact of Recreational Activity and Commercial Fishing

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 Guadalupe

estuary amounted to $80.3 million and $135.3 million for the region and state, respectively. Of these totals, commercial fishing (both inshore and offshore) contributed the largest impact with $70.4 million or 88 percent for the region and $135.3 million or 87 percent for the state. Direct sport fishing expenditures in the Guadalupe estuary of $3.8 million were greater than those for other recreational activity of $1.1 millon. Sport fishermen also spent more outside the local region ($5 million) than did other recreational activity participants ($2 million).

Over 33 percent of the direct expenditures by sport fishermen and other recreational activity participants in the Guadalupe 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 $3.6 million for sport fishing and over $1.1 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 233 and 75 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 $184 thousand for sport fishing and $56 thousand for other recreational activity statewide. Likewise, local tax revenues from sport fishing and other recreational activity were of $325 thousand and $100 thousand, respectiviely. Most of these tax revenues whether local or state were generated within the Guadalupe estuary region.

Estimates were also made of the inshore-offshore commercial fish landings associated with the Guadalupe estuary region. The three year (1984, 1985, 1986) average inshore annual commercial finfish and shellfish contributions were estimated at 5.766 million pounds with an ex-vessel value of $5.846 million. Inshore and offshore landings together, however, amounted to about $35.7 million with direct employment of 2,030 full-time job equivalents and direct personal income of $10.7 million.

GUADALUPE ESTUARY:
ECONOMIC IMPACT OF RECREATIONAL ACTIVITY
AND COMMERCIAL FISHING

Introduction

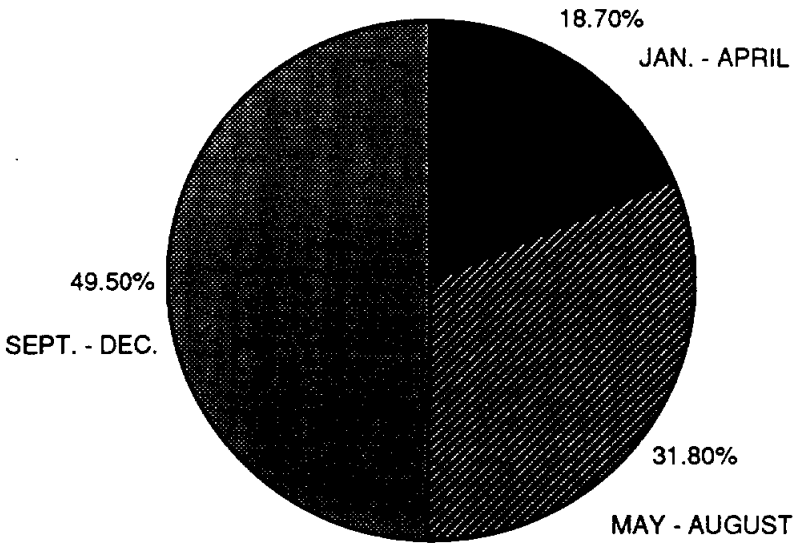
This study has been conducted as part of the Texas Water Development Board's on-going efforts to evaluate hydrological, biological, chemical and economic factors as they relate to the freshwater inflow needs of the six estuaries along the Texas Gulf Coast. Outdoor recreation, sport fishing in particular, 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 105,800 visits to the Guadalupe estuary during calendar year of 1986; and of these visits 73.3 percent were made by households involved in sport fishing.* As shown in Chart 1, there is substantial seasonal variation; approximately 18.7 percent of these visits occurred from January through April, 1986; whereas 31.8 percent of the total occurred during the summer months (May through August); finally, 49.5 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 Guadalupe 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, 150 miles to reach their destinations located along the Guadalupe estuary. This relatively short travel distance is reflected by the counties in which these visitors reside. Victoria County was the largest source for visitors; 18.2 percent of the visitors to Guadalupe were from Victoria County; 14.8 percent of the visitors were from Bexar County and 10.5 percent were from Travis County, respectively. Interestingly, only 42.1 percent of those survey indicated they had first visited places along the Guadalupe estuary within the past six years (since 1980); another 25.6 percent started visiting this area of the Texas Coast between 1970 and 1980; finally, 32.3 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 Guadalupe estuary, fishing and camping account for 66.8 percent of the time allocated to recreation activity (55.4% and 11.4%, respectively). As one might expect, sightseeing (13.9% of the time) and picknicking (6.3%) 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 Guadalupe 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

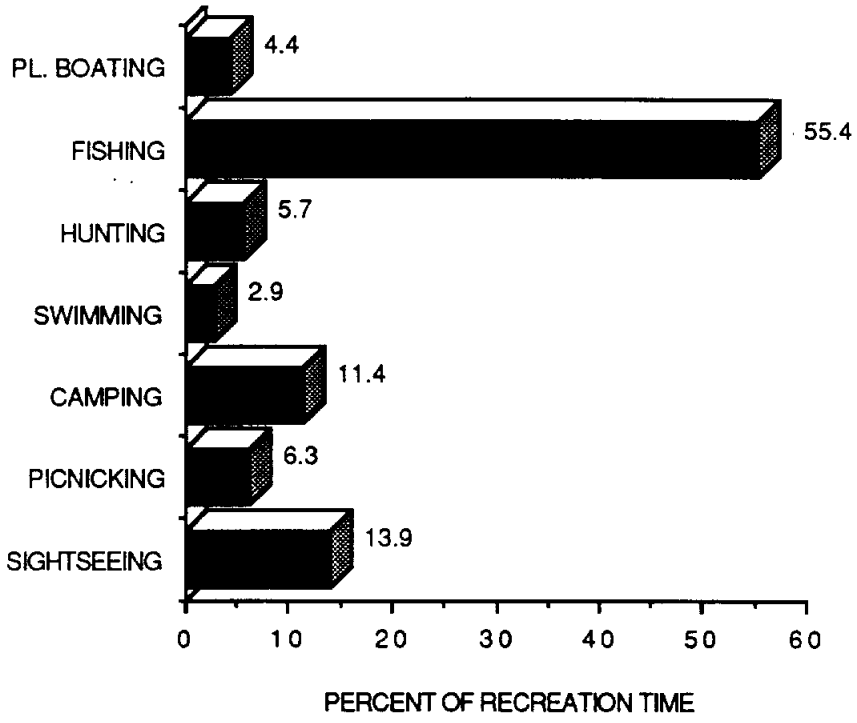
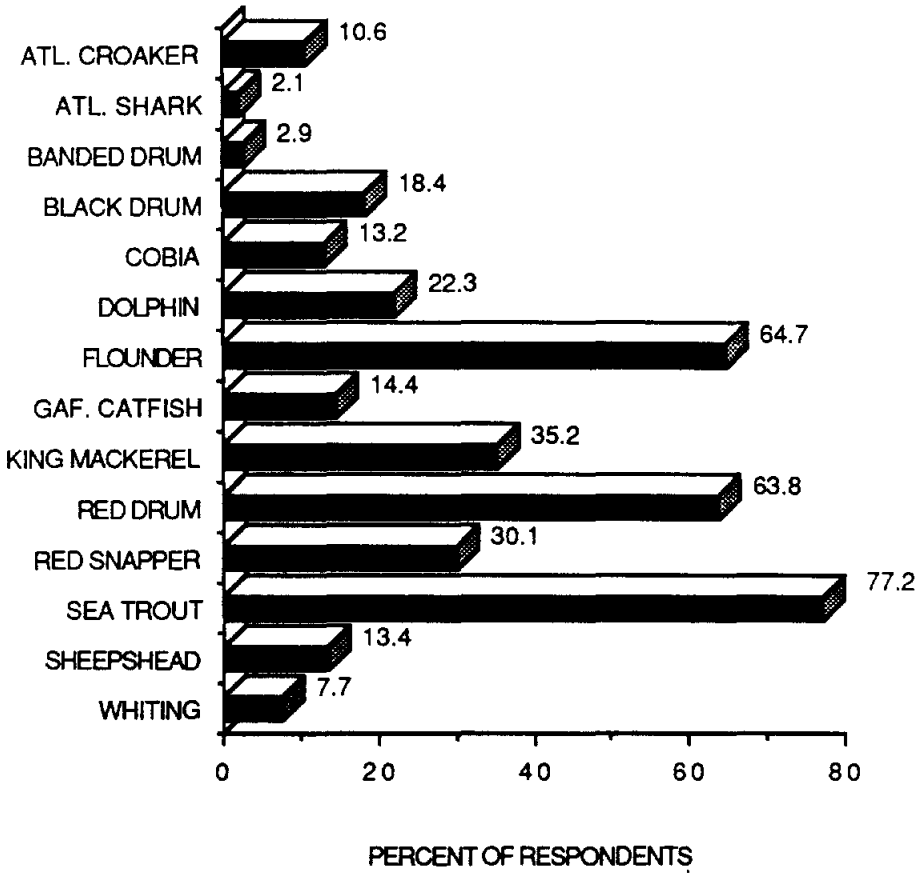


CHART 3: POPULARITY OF SELECTED FISH



were asked to evaluate the overall quality of the Texas Gulf Coast in the vicinity of the place(s) they went fishing. 15.2 percent of those surveyed indicated that this area was excellent for fishing; 44.7 percent and 30.0 percent thought the area was fair or good for fishing while only 9.2 percent indicated that places along the Guadalupe 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 Guadalupe 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) fiehing-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 Guadalupe estuary. As can be seen in Table 1, visitors spent approximately $4,881,198 during 1986. Of this total, 77.9 percent ($3,801,889) was spent by sport fisherman. Food costs accounted for a substantial portion of expenditures by fisherman; $915,913 was spent on grocery store purchases and an additional $587,578 was spent in restaurants. Transportation expenditures were also high at $773,760. Interestingly, for those visitors not fishing, restaurant expenditures constituted the largest share of their trip-related cost.

Table 1. **Visitor Expenditures in the Guadalupe Estuary***

Category	"Fishing" Household Expenditures	"Nonfishing" Household Expenditures	Total
Lodging	$ 301,591	$ 157,041	$ 458,632
Transportation*	773,760	273,669	1,047,429
Restaurant	587,518	350,256	937,774
Grocery	915,913	193,883	1,109,796
Rental	90,905	28,905	119,810
Fees	206,670	75,555	282,225
Fishing-related items	925,532	----	925,532
Total	$ 3,801,889	$ 1,079,309	$ 4,881,198

*For those households living outside the Guadalupe 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 Guadalupe 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 Guadalupe three 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 Guadalupe 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 Guadalupe estuary region were over $3.8 million in 1986. Statewide expenditures that occured as a result of recreational fishing in the Guadalupe estuary amounted to $4.3 million. The difference between regional and state direct expenditures is the estimated transportation expenditures made by fishermen from outside the Guadalupe region. As can be observed, most direct expenditures (88 percent) accrue to the region. When the indirect and induced impacts are added to the direct impacts to obtain the regional total impact of about $7.7 million, this figure accounts for more than half (57 percent) of the gross output impacts statewide ($13.5 million). This difference reflects economic linkages between the Guadalupe 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 Guadalupe estuary region and within the state. The input-output analysis estimated a total of 127 full time job equivalents directly related to sport fishing in the Guadalupe estuary region during 1986. Statewide, an additional 36 full time job equivalents were estimated to be directly related to the expenditures of sport fisermen. Taking account of the indirect and induced impacts along with the direct impacts, the total employment impact on the

Guadalupe region was 155 jobs and 233 jobs in the state economy (Table 2).

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

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	3.8	4.3	7.7	13.5
Employment (man-years)	127	163	155	233
Income (million $)	1.3	1.6	1.9	3.6
State Tax Revenues (million $)	a	0.02	0.16	0.18
Local Tax Returns (million $)	a	0.05	0.29	0.32

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

Sport fishing expenditures in the Guadalupe 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 $1.3 million and $1.6 million of personal income was created directly for households within the region and state, respectively, by sport fishing expenditures within the Guadalupe region. Moreover, total personal income impacts from sport fishing in the region amounted to $1.9 million within the region and $3.6 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 $164 thousand of the total statewide state tax revenues, which amounted to over $184 thousand, were collected in the local region. As shown in Table 2, direct state tax revenues paid by the sport fishing industry

were $20 thousand. Table 3 also shows that the total tax revenue impacts for local jurisdictions were concentrated within the Guadalupe estuary region where an estimated $290 thousand resulted from direct, indirect, and induced sport fishing expenditures. Additionally, local governments outside the Guadalupe estuary region collected an estimated $35 thousand in taxes on travel expenditures by sport fishermen for a total impact on local governments of $325 thousand 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 Guadalupe 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 Guadalupe non-fishing recreational participants spent just over $1 million within the Guadalupe estuary region and a total of $1.3 million in the state. These expenditures generated total economic impacts of about $2.2 and $4.2 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 32 jobs were directly related to other recreational activity in the Guadalupe estuary region. The analysis also estimated that an additional 21 jobs were generated thoughout the state because of other Guadalupe 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 about $360 thousand of direct income and $558 thousand of total

income. Direct state income impacts were about $479 thousand and total state income effects amounted to $1.1 million.

State and local tax revenue impacts from other recreational activity for the Guadalupe estuary region are also presented in Table 3. Local tax revenue for all categories are greater than state tax revenue. Eighty-two percent of the total state tax revenue is generated within the region. Total state tax revenues amounted to $56 thousand while total local tax revenue was estimated at $100 thousand. Local tax jurisdictions elsewhere in the state also received an estimated $16 thousand in tax revenues from the travel expenditures of non-fishing recreationist to the Guadalupe region.

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

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	1.1	1.3	2.2	4.2
Employment (man-years)	32	53	40	75
Income (million $)	0.36	0.48	0.56	1.1
State Tax Revenues (million $)	a	0.01	0.05	0.06
Local Tax Returns (million $)	a	0.02	0.08	0.01

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 Guadalupe estuary in 1986 are presented in Table 4. Total state output was almost twice that of total regional output. The total

employment impacts show that 63 percent of the jobs were generated locally while the other 37 percent were generated throughout the State. Both sport fishing and other recreational activity expenditures in the Sabine-Neches region resulted in increased household personal incomes of about $2 million for this region. In addition, household income generated outside the region was about $2.5 million bringing the total state personal income impact to $4.7 million from Guadalupe recreational and fishing activities in 1986.

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

	Direct		Total	
	Regional	State	Regional	State
Output (million $)	4.8	5.6	10.0	17.7
Employment (man-year)	158	216	195	308
Income (million $)	1.6	2.0	2.5	4.7
State Tax Revenues (million $)	a	0.03	0.21	0.24
Local Tax Revenues (million $)	a	0.07	0.37	0.43

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 $240 thousand, of which $211 thousand was collected within the region. Local tax jurisdictions within the region received over $374 thousand in revenues while those outside the region received an additional $52 thousand for a total statewide tax impact on local jurisdiction exceeding $420 thousand in 1986.

Economic Impact of Commercial Fishing

The analysis of the commercial fishing industry in the Guadalupe 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 Guadalupe bay system corresponds with the Guadalupe estuary, for purposes of estimating direct and total economic impacts, the value of commercial fish landings in the Guadalupe bay system were chosen to represent Guadalupe 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 Guadalupe estuary were reported to be 5.766 million pounds with an ex-vessel value of $5.846 million for the 1984 through 1986 period. Of this, eastern oyster made up almost 47 percent of the total value of landings, while shrimp, blue crab, and flounder account for most of the remaining value. The combined inshore and offshore ex-vessel value of landings for this same time period amounted to 35.7 million. This difference in the offshore-inshore value

of landings suggests the importance of offshore landings supported by the Guadalupe estuary.

The regional and statewide total economic impacts resulting from commercial fish catch attributed to the Guadalupe estuary were estimated using the 1986 Guadalupe 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 Guadalupe Estuary, 1986

	Landings		Total Impacts			
	Inshore	Inshore - Offshore	Inshore Region	Inshore State	Inshore-Offshore Region	Inshore-Offshore State
Output (million $)	5.8	35.7	11.4	19.1	70.4	117.5
Employment (man-years)	330	2,030	368	416	2,267	2,559
Income (million $)	1.7	10.7	2.3	4.8	16.7	29.6
State Tax Rev. (million $)	0.03	0.17	a	0.26	a	1.6
Local Tax Rev. (million $)	0.04	0.24	a	0.40	a	2.5

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

Total value of the inshore catch was $5.8 million, direct employment in the inshore fisheries industry was 330 fulltime job equivalents and personal income paid to households by the inshore fishing industry was $1.7 million. In addition, the commercial fishing industry paid $28,000 directly in state taxes and $39,000 in local taxes (Table 5). Gross Texas business resulting from in-

shore commercial fishing, processing, and marketing fish attributed to the Guadalupe estuary in 1986 was estimated at $19.1 million, of which $11.4 million was business within the estuary region. This regional inshore industry also supported a total of 368 full-time equivalent jobs and created personal income amounting to $4.8 million throughout the state. Also generated by this industry were statewide state taxes of $256 thousand and local taxes of $401 thousand to local jurisdictions throughout Texas.

The total value of offshore and inshore landings was reported to be over $35 million. Direct employment associated with this output was estimated at 2,030 fulltime job equivalents. Personal income paid to households by the inshore and offshore fishing industry was $10.7 million. The combined inshore and offshore state tax revenues from this industry was estimated at $173 thousand, while the local tax revenues were estimated to be $243 thousand (Table 5).

Gross Texas business resulting from inshore and offshore commercial fishing, processing, and marketing fish attributed to the Guadalupe estuary in 1986 was estimated at $117.5 million of which almost $70.4 million was business within the estuary region. The combined inshore and offshore regional commercial fishing industry also supported a total of 2,559 fulltime equivalent jobs and generated personal income of over $29 million throughout the state. Also, generated by this commercial fishing industry were statewide local tax revenue of $1.6 million and local taxes of $2.5 million to local jurisdictions thoughout the state.

Bibliography

Direct Expenditures

Dean, Gillian, Malcolm Getz, Larry Nelson and John Siegfried. 1978. The Local Economic Impact of State Parks. Journal of Leisure Research, 10(2): 98-112.

Garrison, Charles B. 1974. A Case Study of the Local Economic Impact of Reservoir Recreation. Journal of Leisure Research, 6(1): 7-19.

Lieber, Stanley R. and David J. Allton. 1983. "Visitor Expenditures and the Economic Impact of Public Recreation Facilities in Illinois." In Recreation Planning and Management, (ed.) Stanley R. Lieber and Daniel R. Fesenmaier. State College, PA: Venture Publishing. 36-54.

Liu, Juanita and Turgut Var. 1983. The Economic Impact of Tourism in Metropolitan Victoria, B.C. Journal of Travel Research, 22(2): 8-15.

Millerd, Frank W. and David W. Fischer. 1979. "The Local Economic Impact of Outdoor Recreation Facilities." In Land and Leisure (2 nd edition), (ed.) Carlton S. Van Doren, George B. Priddle and John F. Lewis. Chicago: Maaroufe Press. 244-258.

Pearce, Douglas G. 1981. Estimating Visitor Expenditures. Tourism Management, 7(1): 240-252.

Rose, Warren. 1981. The Measurement and Economic Importance of Tourism in Galveston, Texas: A Case Study. Journal of Travel Research, 19(4): 3-11.

Input-Output Models

American Hospital Association. American Hospital Association Guide to the Health Care Field, 1982. Chicago, Illinois.

Bureau of Economic Geology, The University of Texas at Austin. The Mineral Industry of Texas in 1982. Austin, Texas. 1984.

Council of Economic Advisers. Economic Indicators. U.S. Government Printing Office, Washington, D.C. 1987.

Edison Electric Institute. Statistical Year Book of the Electric Utility Industry for 1982. New York. 1982.

Energy Information Administration. Coal Production, 1982. Washington, D.C. 1983.

Energy Information Administration. Natural Gas Annual, 1982. Washington, D.C. 1983.

Robert Morris Associates. Annual Statement Studies, '82. Philadelphia. 1982.

Texas Agricultural Extension Service. Texas Agriculture 1986, An Economic Review. College Station, Texas. 1987.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas Agricultural Cash Receipts and Price Statistics. Vols. 1981, 1982, 1983, 1984, and 1985. Austin, Texas.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas Agricultural Cash Receipts, Prices Received and Paid by Farmers. Vols. 1981, 1982, and 1983. Austin, Texas.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas County Statistics. Vols. 1981, 1982, and 1983. Austin, Texas.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas Field Crop Statistics. Vols. 1981, 1982, and 1983. Austin, Texas.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas Field Crop Statistics. Vols. 1981, 1982, and 1983. Austin, Texas.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas Livestock, Dairy, and Poultry Statistics. Vols. 1982, 1983, 1984, and 1985.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. Texas Small Grains Statistics. Vols. 1981, 1982, and 1983. Austin, Texas.

Texas Crop and Livestock Reporting Service, Texas Department of Agriculture. 1866-1984, Texas Historic Crop Statistics. Austin, Texas. 1985.

Texas Comptroller of Public Accounts, Economic Analysis Center. Fiscal Notes. Austin, Texas. Dec. 1986.

Texas Department of Water Resources. The Texas Input-Output Model, 1979. Austin, Texas. 1983.

Texas Parks and Wildlife Department, Coastal Fisheries Branch. Computer Printout of Texas Landings by Species, by Bay and Gulf. (preliminary data for 1986). Austin, Texas.

Texas Parks and Wildlife Department, Coastal Fisheries Branch. Trends in Commercial Fishery Landings, 1977-1985. Austin, Texas. 1986.

The Railroad Commission of Texas. Annual Report of the Oil and Gas Division-1982 and 1983. Austin, Texas.

The Railroad Commission of Texas, Transportation Division. Memo on Railroad Revenues and Expenses for 1982. Austin, Texas. 1984.

Office of the Comptroller, State of Texas. Annual Report of the Comptroller of Public Accounts. Austin, Texas. 1979.

U.S. Army Corps of Engineers. News Release. Public Affairs Office. Galveston, Texas. 1982.

U.S. Bureau of the Census. 1982 Census of Construction Industries. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. 1982 Census of Manufacturing: Texas. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. 1982 Census of Mineral Industries. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. 1982 Census of Services Industries. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. 1982 Census of Wholesale Trade and Retail Trade. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. Compendium of Government Finances 1982. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. County Business Patterns, 1982 and 1983. U.S. Government Printing Office, Washington, D.C.

U.S. Bureau of the Census. Government Finances in 1982. U.S. Government Printing Office, Washington, D.C.

U.S. Department of Commerce, Bureau of the Census. Annual Survey of Manufactures. U.S. Government Printing Office, Washington, D.C. 1981 through 1986.

U.S. Department of Commerce, Bureau of the Census. Federal Expenditures by State for Fiscal Year, 1986. U.S. Government Printing Office, Washington, D.C. 1986.

U.S. Department of Commerce, Bureau of Economic Analysis. "Survey of Current Business". Washington, D.C., various monthly issues of 1982, 1983, 1986, and 1987.

U.S. Department of Labor, Bureau of Labor Statistics. Time Series for Input-Output Industries. Washington, D.C. 1096.

U.S. Department of the Interior. 1980 National survey of Fishing, Hunting, and Wildlife-Associated Recreation. Washington, D.C. 1982.

U.S. Department of Transportation, Federal Aviation Administration. Airport Activity Statistics of Certified Route Air Carriers. Washington, D.C. 1982.

U.S. Office of Management and Budget. Standard Industrial Classification Manual, 1972. U.S. Government Printing Office, Washington, D.C.

U.S. Treasury Department, Internal Revenue Service. Statistics of Income-1982, Individual Income Tax Returns.

U.S. Treasury Department, Internal Revenue Service. Statistic of Income for 1982, Corporation Income Tax Returns. U.S. Government Printing Office, Washington, D.C.

Sampling

Cannon, John C. 1987. "Issues in Sampling and Sample Design - A Managerial Perspective," In Travel, Tourism and Hospitality Research, (ed.) J.R. Brent Ritchie and Charles R. Goeldner. New York: John Wiley & Sons. 101-117.

Dikeman, Neil J., Jr. 1983. "Research and Data Collection," In Recreation Planning and Management, (ed.) Stanley R. Lieber and Daniel R. Fesenmaier. State College, PA: Venture Publishing. 216-228.

Dillman, Don A. 1978. Mail and Telephone Surveys. New York: John Wiley & Sons.

Ferber, Robert, Paul Sheatsley, Anthony Turner and Joseph Waksberg. 1980. What is a Survey? Washington, D.C.: American Statistical Association.

Snedcor, George W. and William G. Cochran. 1980. Statistical Methods (7th edition). Ames, IW: Iowa State University Press. (Chapter 21, Sample Surveys.)

Travel Demand Models

Archer, Brian H. 1980. Forcasting Demand: Quantitative and Intuitive Techniques. International Journal of Tourism Management, 1(1): 5-12.

Archer, Brian H. 1976. Demand Forcasting in Tourism. Bangor Occasional Papers in Economics, Number 9. Bangor, U.K.: University of Wales Press.

Baxter, Mike J. and Gordon O. Ewing. 1986. A Framework for the Exploratory Development of Spatial Interaction Models: A Recreation Travel Example. Journal of Leisure Research, 18(4): 320-336.

Beaman, Jay, Y. Kim and Steve Smith. 1979. The Effect of Recreation Supply on Participation. Leisure Sciences, 2(4): 463-479.

Ben-Akiva, Moshe and Steven R. Lerman. 1985. Discrete Choice Analysis. Cambridge, MA: The MIT Press.

Fesenmaier, Daniel R. and Stanley R. Lieber. 1987. Outdoor Recreation Expenditures and the Effects of Spatial Structure. Leisure Sciences, 9(1): 27-40.

Fesenmaier, Daniel R. 1985. Modeling Variation in Destination Patronage for Outdoor Recreation Activity. Journal of Travel Research, 24(2): 17-23.

Getz, Donald. 1986. Models in Tourism Planning. Tourism Management, 7(1): 21-32.

Hensher, David A. and Lester W. Johnson. 1981. Applied Discrete-Choice Modeling. New York: John Wiley & Sons.

Levine, Ralph L. and John E. Hunter. 1983. Regression Methodology: Correlation, Meta-Analysis, Confidence Intervals, and Reliability. Journal of Leisure Research, 15(4): 323-343.

Maddala, G.S. 1983. Limited-Dependent and Qualitative Variables in Econometrics. Cambridge: Cambridge University Press.

Montgomery, Douglas C. and Elizabeth A. Peck. 1982. Introduction to Linear Regression Analysis. New York: John Wiley & Sons.

Snedcor, George W. and William G. Cochran. 1980. Statistical Methods (7th edition). Ames, IW: Iowa State University Press. (Chapter 9, Regression)

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 1. 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 1. 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 Guadalupe estuary during 1986. As defined by the Texas Water Development Board, the Guadalupe estuarine system includes Espirito Santo, Guadalupe, Hynes, Mesquite and San Antonio Bays. The economic area around the Guadalupe estuary includes Aransas, Calhoun, Matagorda, Refugio and Victoria 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 Guadalupe estuary;

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

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

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

THN_i - same as before;

THF_i - same as before;

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

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

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

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

TEF - the total expenditure level by households that fished in the Guadalupe 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 Guadalupe 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 Guadalupe 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 Guadalupe 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 Guadalupe 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 Guadalupe 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 levels vary substantially across Texas. Finally, estimates of the total dollars expended in the Guadalupe estuary were calculated using equations 7-9 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 Guadalupe 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 Guadalupe 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 Guadalupe 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 Guadalupe Estuary Region Input-Output Model is available from the Texas Water Development Board.

Direct Requirement Coefficients for the Guadalupe 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	.02570713	.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	.02557883	.00031173	.00000000
11 Text & Apparel	.00000000	.00000000	.00000007	.00000352	.00000000
12 Lum & Pap Pdts	.00001384	.00000063	.00000996	.00000023	.00000000
13 Print & Publih	.00000000	.00000000	.00000642	.00058337	.00000000
14 Chemicals	.05954107	.06930304	.00689888	.14085680	.00000000
15 Petro Refining	.01406833	.02444927	.00397827	.01225709	.00000000
16 Rub Leath Plas	.00452080	.00063419	.00022260	.00037575	.00000000
17 Glas Ston Clay	.00000000	.00000000	.00000607	.00012481	.00000000
18 Prim Metal Pdt	.00011720	.00030365	.00000908	.00000000	.00000000
19 Fab Metal Pdts	.00009048	.00009964	.00014550	.00005509	.00000000
20 Non-Elec Mach	.00054283	.00064824	.00015777	.00324271	.00000000
21 Elec Machinery	.00000025	.00000066	.00000024	.00000035	.00000000
22 Transpor Equip	.00112801	.00134668	.00021049	.00035970	.00000000
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00000446	.00000502	.00000377	.00001264	.00000000
25 Transportation	.00178037	.00181458	.00364416	.00310213	.00000000
26 Communications	.00067057	.00072970	.00084096	.00252091	.00000000
27 Utilities	.12155090	.00281416	.00957557	.04232423	.00000000
28 Wholesale Trde	.00710284	.00946383	.01972841	.03254627	.00000000
29 Eat&Drink Estb	.00000000	.00000000	.00008118	.00031315	.00000000
30 Other Ret Trde	.02987735	.04033494	.03522328	.01643444	.00000000
31 F.I.R.E.	.03072858	.02915958	.02543321	.02311224	.00000000
32 Health Service	.00000000	.00000000	.00000000	.00000000	.00000000
33 Educ Services	.00130086	.00136145	.00101887	.00044696	.00000000
34 Other Services	.00368445	.00021068	.00064374	.01179899	.00000000
35 Households	.24564460	.30919720	.20572740	.23418130	.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	.00014221	.00061165	.00895419	.00009218
9 Construction	.03497890	.00211409	.00726091	.00300918	.00310708
10 Food & Kindred	.00511728	.00001423	.00006151	.00000195	.03447436
11 Text & Apparel	.00031684	.00000162	.00000885	.00002546	.00008566
12 Lum & Pap Pdts	.00004633	.00000136	.00000126	.00007581	.00012295
13 Print & Publih	.00000000	.00027615	.00008752	.00029489	.00102669
14 Chemicals	.00114260	.00220896	.02352327	.00481593	.00484567
15 Petro Refining	.04398702	.00351794	.01115432	.00860766	.00386482
16 Rub Leath Plas	.00005230	.00003804	.00530552	.00336948	.00220858
17 Glas Ston Clay	.00000000	.00018720	.00325069	.03255488	.00764948
18 Prim Metal Pdt	.00009602	.00004343	.00579540	.02147336	.00075357
19 Fab Metal Pdts	.00001608	.00005534	.00074394	.00882704	.00470608
20 Non-Elec Mach	.00003181	.00169910	.01336467	.00269084	.00032664
21 Elec Machinery	.00000019	.00000789	.00001900	.00002084	.00000091
22 Transpor Equip	.01135935	.00001682	.00133112	.00025315	.00002411
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00000430	.00000123	.00000000	.00004394	.00006934
25 Transportation	.00388002	.00249654	.01263429	.00405448	.00587558
26 Communications	.00164488	.00187991	.00200480	.00392161	.00763534
27 Utilities	.00357662	.00954685	.03825008	.00445644	.02317964
28 Wholesale Trde	.02379681	.00394572	.00286309	.01251996	.01576117
29 Eat&Drink Estb	.00053289	.00044316	.00000000	.00039591	.00498862
30 Other Ret Trde	.01495085	.00219486	.00553142	.00809513	.00797943
31 F.I.R.E.	.05118955	.01722990	.03616392	.03347522	.00891709
32 Health Service	.00000000	.00013425	.00000000	.00000444	.00014383
33 Educ Services	.00045608	.00538887	.00328413	.00044529	.00036208
34 Other Services	.00799171	.01081280	.01609738	.03799207	.00839019
35 Households	.30013000	.28940530	.26387810	.29276190	.12418470

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	.00003639	.00025843	.00025766	.00162956	.00013737
9 Construction	.00103540	.01150518	.00481601	.01976088	.01269514
10 Food & Kindred	.00005312	.00029094	.00043089	.00058692	.00000446
11 Text & Apparel	.00131194	.00005564	.00002763	.00001125	.00000308
12 Lum & Pap Pdts	.00004143	.00041884	.00028081	.00002640	.00001581
13 Print & Publih	.00202915	.00040294	.02120638	.00058699	.00016238
14 Chemicals	.00381800	.02438916	.01353726	.16051660	.05827928
15 Petro Refining	.00119544	.00281496	.00505531	.04199541	.04149184
16 Rub Leath Plas	.00043539	.00511965	.00103307	.00217553	.00020543
17 Glas Ston Clay	.00006286	.00025286	.00035121	.00050843	.00010954
18 Prim Metal Pdt	.00310184	.00354402	.00173148	.00502802	.00189274
19 Fab Metal Pdts	.00072260	.00050123	.00046893	.00069587	.00099052
20 Non-Elec Mach	.00049901	.00249565	.00142422	.00136771	.00039826
21 Elec Machinery	.00000076	.00000123	.00000196	.00000247	.00000262
22 Transpor Equip	.00001152	.00002129	.00004669	.00006387	.00000850
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00039679	.00001074	.00034827	.00003183	.00000245
25 Transportation	.00469237	.00802593	.00633446	.00741065	.01261976
26 Communications	.00326377	.00349181	.00859329	.00252793	.00093685
27 Utilities	.03316351	.04986218	.02277952	.10409840	.03716093
28 Wholesale Trde	.00544016	.02476591	.01069409	.01503523	.01126897
29 Eat&Drink Estb	.00062908	.00032251	.00104599	.00032214	.00005328
30 Other Ret Trde	.00114873	.01511451	.00517865	.00594275	.00031609
31 F.I.R.E.	.02836625	.01335104	.01093887	.01022569	.01396052
32 Health Service	.00001896	.00000912	.00001775	.00004739	.00001379
33 Educ Services	.00088767	.00007250	.00028609	.00052276	.00140749
34 Other Services	.00849093	.00423217	.01197282	.00657135	.00731045
35 Households	.33439030	.20667870	.30062470	.08873620	.04613430

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	.00777204	.00632953	.00507520
8 Other Mining	.00004970	.02625116	.00583130	.00013948	.00010745
9 Construction	.00454140	.00244705	.01054828	.00601780	.00460909
10 Food & Kindred	.00130990	.00028346	.00032502	.00037899	.00017794
11 Text & Apparel	.00009900	.00000205	.00000901	.00000934	.00007013
12 Lum & Pap Pdts	.00004423	.00009169	.00001103	.00002190	.00001920
13 Print & Publih	.00072184	.00029869	.00029824	.00096006	.00058763
14 Chemicals	.15596740	.00417098	.01261641	.01473251	.00509615
15 Petro Refining	.00138701	.00137352	.00512438	.00311874	.00264275
16 Rub Leath Plas	.01392938	.00162717	.00136757	.00488540	.01433298
17 Glas Ston Clay	.00007049	.02933566	.00094718	.00227722	.00152422
18 Prim Metal Pdt	.00090595	.00096078	.06805368	.04267374	.03406757
19 Fab Metal Pdts	.00036328	.00013978	.00069093	.00744645	.00624363
20 Non-Elec Mach	.00227277	.00064172	.00105433	.00181232	.00750382
21 Elec Machinery	.00000105	.00000035	.00000594	.00000698	.00002854
22 Transpor Equip	.00000619	.00002856	.00002786	.00028289	.00008455
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00003632	.00001864	.00004767	.00005321	.00005539
25 Transportation	.00918161	.03082250	.01075820	.01008082	.00495198
26 Communications	.00396166	.00398531	.00212456	.00479527	.00456614
27 Utilities	.04424455	.11330740	.10623220	.03941485	.01984470
28 Wholesale Trde	.01278831	.01223963	.01544690	.01882472	.02155892
29 Eat&Drink Estb	.00029535	.00027921	.00016394	.00071575	.00070716
30 Other Ret Trde	.00949718	.00644067	.04110370	.00491918	.00649764
31 F.I.R.E.	.01218298	.01776120	.01173665	.01518642	.01891146
32 Health Service	.00001418	.00006319	.00008075	.00003948	.00006134
33 Educ Services	.00026323	.00095216	.00031156	.00045999	.00034294
34 Other Services	.00540571	.01180820	.01247713	.00855863	.00911565
35 Households	.23836670	.20565830	.19675200	.28056790	.30112790

Direct Requirements, Cont'd.

	Sector 21	Sector 22	Sector 23	Sector 24	Sector 25
1 Irrigated Agri	.00014598	.00010304	.00000000	.00006516	.00000000
2 Dryland Agri	.00018099	.00012657	.00000000	.00008604	.00000000
3 Lvestock & Pdt	.00122212	.00086530	.00000000	.00058808	.00000000
4 Agri Services	.00000000	.00000000	.00000000	.00000000	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00005800	.00004025	.00000000	.00002757	.00000000
7 Petro & NL,NGL	.00502300	.00338198	.00000000	.00239658	.00030656
8 Other Mining	.00010916	.00007271	.00000000	.00004537	.00014973
9 Construction	.00222629	.00490993	.00000000	.00174669	.00542201
10 Food & Kindred	.00016998	.00014676	.00000000	.00011083	.00012177
11 Text & Apparel	.00000496	.00002245	.00000000	.00037017	.00000441
12 Lum & Pap Pdts	.00001732	.00004867	.00000000	.00018192	.00000978
13 Print & Publih	.00093816	.00183626	.00000000	.00424676	.00058155
14 Chemicals	.01158199	.01444459	.00000000	.05554326	.00149839
15 Petro Refining	.00171049	.00187634	.00000000	.00158559	.02878215
16 Rub Leath Plas	.00930823	.00677683	.00000000	.02957417	.00452279
17 Glas Ston Clay	.00039631	.00295017	.00000000	.00346960	.00050094
18 Prim Metal Pdt	.01257036	.01568821	.00000000	.00968574	.00080988
19 Fab Metal Pdts	.00104379	.00533260	.00000000	.00368309	.00038173
20 Non-Elec Mach	.00120288	.00202697	.00000000	.00139146	.00076553
21 Elec Machinery	.00014123	.00002768	.00000000	.00005139	.00000948
22 Transpor Equip	.00048675	.00492430	.00000000	.00155123	.00410593
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00007155	.00005062	.00000000	.00026047	.00000736
25 Transportation	.00229973	.00623843	.00000000	.00395978	.01186091
26 Communications	.00719272	.00331015	.00000000	.00557508	.01559594
27 Utilities	.01565145	.02000852	.00000000	.01971564	.02350680
28 Wholesale Trde	.01258388	.01802295	.00000000	.01804859	.01112124
29 Eat&Drink Estb	.00015674	.00013552	.00000000	.00036254	.00056008
30 Other Ret Trde	.00577852	.00557760	.00000000	.00651030	.00567630
31 F.I.R.E.	.01576540	.00710502	.00000000	.01672493	.05087932
32 Health Service	.00003777	.00003342	.00000000	.00000000	.00000073
33 Educ Services	.00030262	.00046139	.00000000	.00064739	.00088808
34 Other Services	.00868479	.00890322	.00000000	.01237283	.01376611
35 Households	.37110780	.26805250	.00000000	.33159000	.34695210

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	.00333611	.00009588	.00000000	.00000016
9 Construction	.00064708	.00275170	.00667133	.00279252	.00152266
10 Food & Kindred	.00000000	.00000000	.00016879	.05334168	.00056928
11 Text & Apparel	.00000182	.00000807	.00001349	.00001283	.00003675
12 Lum & Pap Pdts	.00005015	.00003736	.00001257	.00001644	.00000609
13 Print & Publih	.00926180	.00074138	.00337639	.00664683	.01334266
14 Chemicals	.00013950	.00272018	.00442134	.00039929	.00028213
15 Petro Refining	.00447937	.00202229	.00597811	.00117195	.00422544
16 Rub Leath Plas	.00014175	.00029100	.00303871	.00013819	.00024918
17 Glas Ston Clay	.00013329	.00170855	.00021526	.00002294	.00000472
18 Prim Metal Pdt	.00014070	.00023987	.00083502	.00000175	.00000752
19 Fab Metal Pdts	.00002669	.00095316	.00029781	.00026217	.00002223
20 Non-Elec Mach	.00008018	.00009496	.00051285	.00203787	.00021649
21 Elec Machinery	.00002326	.00000162	.00000178	.00000416	.00000554
22 Transpor Equip	.00010239	.00001732	.00026813	.00017582	.00074526
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00000337	.00000267	.00005213	.00023033	.00007132
25 Transportation	.00158536	.00112187	.00782053	.00096600	.00147084
26 Communications	.01006758	.00245039	.01718632	.00880477	.01565883
27 Utilities	.02217214	.19018380	.04832440	.04496827	.02837375
28 Wholesale Trde	.00114750	.00336702	.00840650	.01765493	.02297447
29 Eat&Drink Estb	.00070471	.00000000	.00293213	.00017502	.00081628
30 Other Ret Trde	.00009170	.00293515	.00957417	.00821577	.03671276
31 F.I.R.E.	.03189067	.01919941	.04981339	.04518093	.05269317
32 Health Service	.00002771	.00000000	.00003869	.00000747	.00015792
33 Educ Services	.00636768	.00440468	.00116539	.00039754	.00084580
34 Other Services	.00907742	.00928339	.01711747	.02812464	.01392181
35 Households	.28775810	.12561080	.35638780	.29250360	.32355560

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	.00000167	.00000000
9 Construction	.01268603	.00235857	.00173370	.00656257	.00285701
10 Food & Kindred	.00005774	.00170742	.01249436	.00158158	.02229323
11 Text & Apparel	.00000299	.00002572	.00000877	.00005196	.00022278
12 Lum & Pap Pdts	.00001070	.00000980	.00005106	.00001224	.00000849
13 Print & Publih	.00291125	.00204489	.00349073	.00587295	.00182456
14 Chemicals	.00025176	.00617367	.00433987	.00711581	.00349167
15 Petro Refining	.00029648	.00073335	.00133573	.00504778	.01383324
16 Rub Leath Plas	.00003985	.00078941	.00119153	.00854414	.00243050
17 Glas Ston Clay	.00032764	.00009813	.00018116	.00025893	.00037160
18 Prim Metal Pdt	.00003162	.00004087	.00028562	.00113433	.00034274
19 Fab Metal Pdts	.00005870	.00029651	.00040726	.00217144	.00016294
20 Non-Elec Mach	.00000703	.00020341	.00060413	.00245858	.00004033
21 Elec Machinery	.00000061	.00000511	.00001009	.00000672	.00000140
22 Transpor Equip	.00000278	.00010892	.00004053	.00109445	.00231030
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00001983	.00007183	.00010983	.00025259	.00003295
25 Transportation	.00044005	.00308485	.00108465	.00370757	.00682829
26 Communications	.01552598	.01241305	.00789269	.01829774	.00656550
27 Utilities	.02502461	.04749621	.04794794	.03058608	.03845744
28 Wholesale Trde	.00244928	.01515543	.00427024	.01289046	.03100755
29 Eat&Drink Estb	.00090239	.00243755	.00020562	.00235989	.01920691
30 Other Ret Trde	.00018056	.00427490	.00228564	.00591705	.08555921
31 F.I.R.E.	.09878818	.05365793	.02729595	.04545413	.05010848
32 Health Service	.00082286	.02128313	.00022480	.00126672	.04735003
33 Educ Services	.00165683	.00075272	.00006125	.00069029	.00296000
34 Other Services	.02209267	.02899291	.01190627	.02230280	.02479883
35 Households	.35978460	.42671510	.58588340	.40774900	.05884327

Interdependence Coefficients for the Guadalupe Estuary Region, 1986

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
1 Irrigated Agri	1.00742200	.00609590	.03753766	.00158685	.00000000
2 Dryland Agri	.00105251	1.01528900	.04547867	.00191153	.00000000
3 Lvestock & Pdt	.00512239	.00572080	1.15583200	.02795556	.00000000
4 Agri Services	.08452200	.09370510	.04468942	1.02777300	.00000000
5 Forestry	.00000000	.00000000	.00000000	.00000000	1.00000000
6 Fisheries	.00015353	.00017231	.00034020	.00017390	.00000000
7 Petro & NL,NGL	.06500646	.03154803	.02137138	.04627163	.00000000
8 Other Mining	.00102899	.00059371	.00035943	.00113100	.00000000
9 Construction	.01538918	.01724004	.00804136	.04136204	.00000000
10 Food & Kindred	.01142249	.01276538	.04099109	.01190590	.00000000
11 Text & Apparel	.00011237	.00012395	.00010445	.00011208	.00000000
12 Lum & Pap Pdts	.00003557	.00001845	.00002872	.00002315	.00000000
13 Print & Publih	.00289959	.00313267	.00277772	.00331489	.00000000
14 Chemicals	.09263097	.10676460	.02793194	.17911530	.00000000
15 Petro Refining	.02843027	.04082950	.01594851	.02952104	.00000000
16 Rub Leath Plas	.00657270	.00276992	.00213007	.00271407	.00000000
17 Glas Ston Clay	.00127969	.00112932	.00094947	.00215981	.00000000
18 Prim Metal Pdt	.00148685	.00182007	.00077061	.00252263	.00000000
19 Fab Metal Pdts	.00076699	.00069229	.00069680	.00097064	.00000000
20 Non-Elec Mach	.00133249	.00142649	.00065851	.00403948	.00000000
21 Elec Machinery	.00000372	.00000394	.00000276	.00000435	.00000000
22 Transpor Equip	.00237772	.00275586	.00148692	.00156047	.00000000
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00004654	.00005029	.00004317	.00005900	.00000000
25 Transportation	.00758524	.00810689	.00902267	.00951574	.00000000
26 Communications	.00899764	.00941717	.00870286	.01085996	.00000000
27 Utilities	.20308690	.06217319	.05893868	.11284500	.00000000
28 Wholesale Trde	.03050396	.03517562	.04304682	.05512695	.00000000
29 Eat&Drink Estb	.00923081	.01030395	.00875777	.00924495	.00000000
30 Other Ret Trde	.07572448	.09179357	.08500925	.06046943	.00000000
31 F.I.R.E.	.08002345	.07999416	.07377726	.07013571	.00000000
32 Health Service	.02210304	.02473442	.02038600	.02113336	.00000000
33 Educ Services	.00438750	.00387708	.00332378	.00304439	.00000000
34 Other Services	.02527053	.02217692	.01868645	.03292730	.00000000
35 Households	.45416120	.50865260	.41902660	.43407850	.00000000
TOT INT COEF	2.25017000	2.20105300	2.15684900	2.20557000	1.00000000

Interdependence Coefficients, Cont'd.

	Sector 6	Sector 7	Sector 8	Sector 9	Sector 10
1 Irrigated Agri	.00088988	.00063865	.00060929	.00068562	.02083455
2 Dryland Agri	.00114044	.00075614	.00074029	.00081112	.02263654
3 Lvestock & Pdt	.00413106	.00269690	.00262580	.00296697	.17250390
4 Agri Services	.00089663	.00023386	.00025307	.00452225	.00942251
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	1.00185000	.00013513	.00013019	.00014281	.00717982
7 Petro & NL,NGL	.02522348	1.16854300	.02933544	.01930051	.02643933
8 Other Mining	.00059699	.00041547	1.00122500	.01027745	.00065116
9 Construction	.03972414	.00560122	.01156330	1.00756900	.00725308
10 Food & Kindred	.01694543	.01137639	.01036059	.01152766	1.04789100
11 Text & Apparel	.00043117	.00011007	.00010991	.00013811	.00016354
12 Lum & Pap Pdts	.00006343	.00001324	.00001624	.00009271	.00014200
13 Print & Publih	.00262208	.00249289	.00230950	.00291506	.00297077
14 Chemicals	.00942735	.00728172	.03418425	.01317348	.01630533
15 Petro Refining	.05494457	.01225610	.02082045	.01813648	.01254580
16 Rub Leath Plas	.00200523	.00169505	.00729327	.00560103	.00374992
17 Glas Ston Clay	.00184386	.00081654	.00424948	.03431431	.00880224
18 Prim Metal Pdt	.00174873	.00063552	.00760768	.02431830	.00164585
19 Fab Metal Pdts	.00080388	.00041928	.00131039	.00938710	.00528711
20 Non-Elec Mach	.00043950	.00220570	.01383002	.00326370	.00069886
21 Elec Machinery	.00000368	.00001126	.00002201	.00002388	.00000313
22 Transpor Equip	.01267003	.00119126	.00246313	.00151348	.00100785
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00004511	.00003670	.00003705	.00009055	.00010160
25 Transportation	.00922784	.00703806	.01734309	.01020274	.01042379
26 Communications	.00966670	.00861415	.00893711	.01191647	.01350123
27 Utilities	.04399204	.04640516	.08470371	.05134220	.06289435
28 Wholesale Trde	.04356422	.02196422	.02034091	.03224249	.03329527
29 Eat&Drink Estb	.01003268	.00962506	.00833787	.00977601	.01122109
30 Other Ret Trde	.05910916	.04435585	.04453517	.05249255	.04438263
31 F.I.R.E.	.09747637	.05758207	.07599509	.07775825	.04473473
32 Health Service	.02274214	.02230054	.02009373	.02248838	.01449693
33 Educ Services	.00266801	.00814841	.00541871	.00262724	.00223453
34 Other Services	.02816761	.02901930	.03333199	.05733437	.02175231
35 Households	.46720620	.45559330	.41272540	.46141730	.29479230
TOT INT COEF	1.97229900	1.93020800	1.88285900	1.96036900	1.92196500

Interdependence Coefficients, Cont'd.

	Sector 11	Sector 12	Sector 13	Sector 14	Sector 15
1 Irrigated Agri	.00813398	.00088978	.00119011	.00122477	.00036266
2 Dryland Agri	.00462303	.00105542	.00142160	.00147868	.00043207
3 Lvestock & Pdt	.00560359	.00481653	.00671289	.00767483	.00169235
4 Agri Services	.00130435	.00039118	.00048298	.00060345	.00019896
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00016136	.00021650	.00029994	.00033115	.00008164
7 Petro & NL,NGL	.02562959	.03945509	.03699830	.12108850	.25609760
8 Other Mining	.00040471	.00083436	.00064507	.00293551	.00077703
9 Construction	.00469606	.01504066	.00846322	.02736709	.01739402
10 Food & Kindred	.01183881	.00875304	.01153129	.00745320	.00547283
11 Text & Apparel	1.00142600	.00013824	.00013394	.00007951	.00005739
12 Lum & Pap Pdts	.00005524	1.00043200	.00030010	.00004837	.00002847
13 Print & Publih	.00434439	.00239019	1.02391100	.00240713	.00153174
14 Chemicals	.01006738	.03400327	.02137417	1.19939600	.07596089
15 Petro Refining	.01006142	.01093701	.01421125	.05857653	1.05200800
16 Rub Leath Plas	.00217216	.00664670	.00278011	.00393631	.00141796
17 Glas Ston Clay	.00070474	.00121125	.00110253	.00211873	.00110562
18 Prim Metal Pdt	.00390810	.00476939	.00264817	.00763856	.00326030
19 Fab Metal Pdts	.00110236	.00096300	.00089332	.00150497	.00149231
20 Non-Elec Mach	.00077041	.00285020	.00177998	.00216555	.00115206
21 Elec Machinery	.00000307	.00000373	.00000461	.00000638	.00000660
22 Transpor Equip	.00124533	.00093959	.00121233	.00082788	.00064741
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00043357	.00004046	.00039122	.00006430	.00002601
25 Transportation	.00914225	.01194488	.01090912	.01299029	.01683741
26 Communications	.01015806	.00936632	.01536826	.00840957	.00572924
27 Utilities	.07699503	.09311268	.06370046	.18038480	.07851205
28 Wholesale Trde	.02383194	.03937452	.02855467	.03077972	.02300759
29 Eat&Drink Estb	.01008635	.00716699	.00992907	.00579411	.00459488
30 Other Ret Trde	.04520893	.04767041	.04647942	.03330646	.02185903
31 F.I.R.E.	.06943750	.04632371	.04915293	.04407571	.04244317
32 Health Service	.02297298	.01636712	.02143130	.01283965	.01057169
33 Educ Services	.00311308	.00201310	.00243539	.00320706	.00409650
34 Other Services	.02619491	.01875358	.02905890	.02247278	.02074493
35 Households	.47221160	.33640360	.44058810	.26226000	.21596890
TOT INT COEF	1.86804200	1.76527500	1.85609600	2.06544800	1.86556900

Interdependence Coefficients, Cont'd.

	Sector 16	Sector 17	Sector 18	Sector 19	Sector 20
1 Irrigated Agri	.00084571	.00064312	.00098028	.00091865	.00088885
2 Dryland Agri	.00515459	.00076145	.00107704	.00110497	.00110312
3 Lvestock & Pdt	.00419649	.00300648	.00485877	.00473766	.00451068
4 Agri Services	.00072841	.00024776	.00040286	.00037542	.00035847
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00019127	.00014413	.00022119	.00021749	.00020418
7 Petro & NL,NGL	.04635964	.05241625	.06043350	.03641112	.02768507
8 Other Mining	.00090159	.02777536	.00709747	.00095039	.00072625
9 Construction	.01168776	.00629885	.01523662	.01031759	.00868262
10 Food & Kindred	.01140264	.00955486	.00986621	.01127975	.01151960
11 Text & Apparel	.00019864	.00009273	.00010376	.00011478	.00018088
12 Lum & Pap Pdts	.00006410	.00011048	.00002919	.00003739	.00003382
13 Print & Publih	.00301037	.00242557	.00299408	.00327542	.00297480
14 Chemicals	.19367960	.01052153	.02142588	.02391102	.01399756
15 Petro Refining	.01756353	.01006028	.01440426	.01258677	.01167538
16 Rub Leath Plas	1.01611800	.00346861	.00318062	.00679201	.01643728
17 Glas Ston Clay	.00107501	1.03113700	.00219422	.00325264	.00237615
18 Prim Metal Pdt	.00278334	.00185613	1.07399600	.04695675	.03778527
19 Fab Metal Pdts	.00096648	.00063618	.00131609	1.00798800	.00676634
20 Non-Elec Mach	.00289338	.00136728	.00162008	.00222444	1.00793000
21 Elec Machinery	.00000419	.00000367	.00000960	.00000995	.00003146
22 Transpor Equip	.00109815	.00116441	.00110972	.00145494	.00127890
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00007520	.00005128	.00008783	.00009154	.00009466
25 Transportation	.01490630	.03631447	.01599682	.01527246	.01007708
26 Communications	.01090971	.01087884	.00950466	.01182355	.01175202
27 Utilities	.11063080	.17576890	.17470510	.09089910	.06580701
28 Wholesale Trde	.03211340	.02830512	.03362031	.03737130	.04051818
29 Eat&Drink Estb	.00838989	.00780423	.00788940	.00950055	.00986226
30 Other Ret Trde	.04848491	.04199843	.08162913	.04765031	.05049640
31 F.I.R.E.	.05132216	.05719635	.05275281	.05515999	.05965700
32 Health Service	.01935324	.01810928	.01850588	.02116705	.02209022
33 Educ Services	.00261768	.00356359	.00293745	.00272063	.00250271
34 Other Services	.02298882	.02895246	.03087754	.02648365	.02717232
35 Households	.39762980	.37078270	.37838100	.43454280	.45309770
TOT INT COEF	2.04034500	1.94341800	2.02944600	1.92760000	1.91027500

Interdependence Coefficients, Cont'd.

	Sector 21	Sector 22	Sector 23	Sector 24	Sector 25
1 Irrigated Agri	.00093729	.00072148	.00000000	.00085843	.00073482
2 Dryland Agri	.00115434	.00088103	.00000000	.00113899	.00088041
3 Lvestock & Pdt	.00457333	.00349826	.00000000	.00405361	.00308179
4 Agri Services	.00035862	.00029005	.00000000	.00033763	.00028472
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00021662	.00016518	.00000000	.00019365	.00015439
7 Petro & NL,NGL	.02624595	.02391322	.00000000	.03027401	.02887022
8 Other Mining	.00052531	.00060113	.00000000	.00068159	.00055435
9 Construction	.00620456	.00837296	.00000000	.00707968	.01003838
10 Food & Kindred	.01300767	.00997195	.00000000	.01253327	.01292790
11 Text & Apparel	.00012882	.00011800	.00000000	.00049328	.00012811
12 Lum & Pap Pdts	.00003187	.00006193	.00000000	.00020085	.00002600
13 Print & Publih	.00349513	.00389891	.00000000	.00694074	.00338077
14 Chemicals	.02052384	.02288285	.00000000	.07705119	.00951402
15 Petro Refining	.01161464	.01015286	.00000000	.01389217	.03971472
16 Rub Leath Plas	.01133042	.00851556	.00000000	.03206777	.00656942
17 Glas Ston Clay	.00111384	.00376744	.00000000	.00436826	.00138232
18 Prim Metal Pdt	.01423920	.01789273	.00000000	.01167209	.00173983
19 Fab Metal Pdts	.00146603	.00579058	.00000000	.00421115	.00088925
20 Non-Elec Mach	.00153501	.00236550	.00000000	.00189017	.00111334
21 Elec Machinery	1.00014400	.00003017	.00000000	.00005438	.00001270
22 Transpor Equip	.00181855	1.00599500	.00000000	.00286205	.00550005
23 Instruments	.00000000	.00000000	1.00000000	.00000000	.00000000
24 Misc Manufactu	.00011172	.00008448	.00000000	1.00030600	.00004934
25 Transportation	.00740652	.01064367	.00000000	.00981435	1.01726900
26 Communications	.01463445	.00939617	.00000000	.01343274	.02400665
27 Utilities	.06046076	.05963717	.00000000	.07403163	.07018554
28 Wholesale Trde	.03297207	.03437439	.00000000	.03923596	.03176367
29 Eat&Drink Estb	.01051431	.00808836	.00000000	.01038825	.01095613
30 Other Ret Trde	.05420578	.04323263	.00000000	.05379987	.05348620
31 F.I.R.E.	.05893156	.04142603	.00000000	.06092753	.09942738
32 Health Service	.02513280	.01918948	.00000000	.02412133	.02509177
33 Educ Services	.00261913	.00232931	.00000000	.00303590	.00342666
34 Other Services	.02779649	.02431572	.00000000	.03200352	.03434249
35 Households	.51652100	.39420030	.00000000	.49618130	.51558660
TOT INT COEF	1.93197200	1.77680400	1.00000000	2.03013300	2.01308900

Interdependence Coefficients, Cont'd.

	Sector 26	Sector 27	Sector 28	Sector 29	Sector 30
1 Irrigated Agri	.00057324	.00051043	.00095641	.01307832	.00284445
2 Dryland Agri	.00068115	.00060263	.00110539	.00294715	.00085686
3 Lvestock & Pdt	.00244481	.00214841	.00353229	.03658435	.00313566
4 Agri Services	.00020525	.00019711	.00035173	.00257707	.00044268
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00012189	.00010774	.00021945	.00066202	.00015577
7 Petro & NL,NGL	.01856311	.33573520	.03900228	.02950732	.02428589
8 Other Mining	.00026274	.00443812	.00061137	.00045950	.00035206
9 Construction	.00370487	.00695539	.01122679	.00735493	.00580828
10 Food & Kindred	.01020181	.00899865	.01364482	.06802785	.01307333
11 Text & Apparel	.00009883	.00009646	.00014254	.00013357	.00015814
12 Lum & Pap Pdts	.00006421	.00005693	.00003084	.00004106	.00002519
13 Print & Publih	.01149735	.00289356	.00643682	.00960113	.01684316
14 Chemicals	.00421525	.00858340	.01140079	.00749433	.00570552
15 Petro Refining	.01182343	.01039982	.01637296	.01072690	.01363979
16 Rub Leath Plas	.00157910	.00177780	.00512328	.00229893	.00215488
17 Glas Ston Clay	.00065874	.00280774	.00118577	.00125111	.00071681
18 Prim Metal Pdt	.00058754	.00093287	.00170363	.00078846	.00062566
19 Fab Metal Pdts	.00033900	.00151987	.00081906	.00101678	.00044595
20 Non-Elec Mach	.00029906	.00094514	.00088549	.00243088	.00052837
21 Elec Machinery	.00002537	.00000653	.00000511	.00000708	.00000855
22 Transpor Equip	.00114548	.00096779	.00168697	.00146575	.00207171
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00003783	.00003447	.00009803	.00028021	.00011950
25 Transportation	.00535560	.00570863	.01310885	.00615984	.00639472
26 Communications	1.01616600	.00923380	.02598591	.01751237	.02456247
27 Utilities	.05723098	1.26673700	.10153880	.09709935	.07537081
28 Wholesale Trde	.01679239	.01950737	1.02979400	.03858737	.04345369
29 Eat&Drink Estb	.00888395	.00737440	.01375274	1.01015700	.01099441
30 Other Ret Trde	.03751215	.03756813	.05955311	.05499865	1.08442600
31 F.I.R.E.	.06757012	.06151549	.10051640	.09322672	.10198390
32 Health Service	.01987422	.01752934	.02615136	.02328471	.02455713
33 Educ Services	.00826937	.00875888	.00394581	.00293140	.00333858
34 Other Services	.02445342	.02881192	.03874888	.04828691	.03437330
35 Households	.40809410	.35929750	.53650360	.47766650	.50108500
TOT INT COEF	1.73933200	2.21275900	2.06614100	2.06864500	2.00453900

Interdependence Coefficents, Cont'd.

	* Sector 31 *	Sector 32 *	Sector 33 *	Sector 34 *	Households
1 Irrigated Agri	.00076123	.00095760	.00134549	.00090875	.00170086
2 Dryland Agri	.00090322	.00110763	.00158630	.00107901	.00205123
3 Lvestock & Pdt	.00322866	.00419784	.00675884	.00393557	.00722854
4 Agri Services	.00032566	.00034973	.00050663	.00035121	.00059295
5 Forestry	.00000000	.00000000	.00000000	.00000000	.00000000
6 Fisheries	.00016123	.00020276	.00032126	.00019217	.00036469
7 Petro & NL,NGL	.02265278	.03291451	.03537066	.02778119	.02803858
8 Other Mining	.00046245	.00049867	.00052426	.00047678	.00040237
9 Construction	.01753885	.00755811	.00706531	.01147584	.00677882
10 Food & Kindred	.01361468	.01770662	.03249767	.01659349	.03084161
11 Text & Apparel	.00013330	.00017881	.00019690	.00019637	.00029334
12 Lum & Pap Pdts	.00002821	.00002958	.00007406	.00003238	.00002551
13 Print & Publih	.00596307	.00551838	.00723045	.00921768	.00514975
14 Chemicals	.00530659	.01364846	.01243789	.01613886	.00973294
15 Petro Refining	.00993718	.01245215	.01525555	.01645998	.02066501
16 Rub Leath Plas	.00208175	.00325735	.00393615	.01099317	.00392708
17 Glas Ston Clay	.00146794	.00103283	.00127731	.00127123	.00119024
18 Prim Metal Pdt	.00089269	.00082802	.00115570	.00227871	.00098922
19 Fab Metal Pdts	.00059963	.00086671	.00104516	.00275925	.00068860
20 Non-Elec Mach	.00033995	.00060387	.00099062	.00287864	.00042073
21 Elec Machinery	.00000375	.00000863	.00001367	.00001026	.00000445
22 Transpor Equip	.00140437	.00176582	.00204425	.00265693	.00312663
23 Instruments	.00000000	.00000000	.00000000	.00000000	.00000000
24 Misc Manufactu	.00006675	.00012803	.00016844	.00030500	.00008021
25 Transportation	.00546138	.00916626	.00823713	.00959294	.01053399
26 Communications	.02480269	.02284059	.01874985	.02782479	.01494525
27 Utilities	.07249411	.10827660	.11477710	.08467527	.08120366
28 Wholesale Trde	.02359996	.04037318	.03442255	.03663888	.04589148
29 Eat&Drink Estb	.01190667	.01532112	.01602705	.01441888	.02483460
30 Other Ret Trde	.05025734	.06315648	.07486693	.06140894	.11386970
31 F.I.R.E.	1.15327900	.11306590	.09152167	.09978264	.09094004
32 Health Service	.02740249	1.05268800	.03859274	.03036707	.06080381
33 Educ Services	.00429589	.00386236	1.00360300	.00355021	.00477702
34 Other Services	.04452513	.05451531	.04032688	1.04574000	.04114771
35 Households	.54482390	.63569220	.78975180	.59753010	1.25347100
TOT INT COEF	2.05072200	2.22477000	2.36267900	2.13952300	1.86671200

TYPE II FINAL DEMAND AND OUTPUT MULTIPLIERS FOR THE GUADALUPE ESTUARY REGION

		MULTIPLIER (Final Demand)	DIAGONAL COEFFICIENT	MULTIPLIER (Output)
1	Irrigated Agri	2.250170	1.007422	2.233592
2	Dryland Agri	2.201053	1.015289	2.167908
3	Lvestock & Pdt	2.156849	1.155832	1.866057
4	Agri Services	2.205570	1.027773	2.145969
5	Forestry	1.000000	1.000000	1.000000
6	Fisheries	1.972299	1.001850	1.968658
7	Petro & NL,NGL	1.930208	1.168543	1.651808
8	Other Mining	1.882859	1.001225	1.880555
9	Construction	1.960369	1.007569	1.945644
10	Food & Kindred	1.921965	1.047891	1.834127
11	Text & Apparel	1.868042	1.001426	1.865382
12	Lum & Pap Pdts	1.765275	1.000432	1.764512
13	Print & Publih	1.856096	1.023911	1.812751
14	Chemicals	2.065448	1.199396	1.722073
15	Petro Refining	1.865569	1.052008	1.773341
16	Rub Leath Plas	2.040345	1.016118	2.007980
17	Glas Ston Clay	1.943418	1.031137	1.884734
18	Prim Metal Pdt	2.029446	1.073996	1.889621
19	Fab Metal Pdts	1.927600	1.007988	1.912324
20	Non-Elec Mach	1.910275	1.007930	1.895245
21	Elec Machinery	1.931972	1.000144	1.931694
22	Transpor Equip	1.776804	1.005995	1.766217
23	Instruments	1.000000	1.000000	1.000000
24	Misc Manufactu	2.030133	1.000306	2.029513
25	Transportation	2.013089	1.017269	1.978915
26	Communications	1.739332	1.016166	1.711662
27	Utilities	2.212759	1.266737	1.746818
28	Wholesale Trde	2.066141	1.029794	2.006363
29	Eat&Drink Estb	2.068645	1.010157	2.047845
30	Other Ret Trde	2.004539	1.084426	1.848479
31	F.I.R.E.	2.050722	1.153279	1.778167
32	Health Service	2.224770	1.052688	2.113419
33	Educ Services	2.362679	1.003603	2.354197
34	Other Services	2.139523	1.045740	2.045940
35	Households	1.866712	1.253471	1.489234

TYPE II INCOME MULTIPLIERS
FOR THE GUADALUPE ESTUARY REGION

	DIR EFFECT (Per $1.00)	TOT EFFECT (F DEMAND)	MULTIPLIER (F DEMAND)	TOT EFFECT (OUTPUT)	MULTIPLIER (OUTPUT)
1 Irrigated Agri	.245645	.454161	1.848855	.450815	1.835233
2 Dryland Agri	.309197	.508653	1.645075	.500993	1.620302
3 Lvestock & Pdt	.205727	.419027	2.036805	.362532	1.762198
4 Agri Services	.234181	.434078	1.853600	.422349	1.803511
5 Forestry	1.000000	.000000	.000000	.000000	.000000
6 Fisheries	.300130	.467206	1.556680	.466344	1.553805
7 Petro & NL,NGL	.289405	.455593	1.574240	.389882	1.347182
8 Other Mining	.263878	.412725	1.564076	.412220	1.562162
9 Construction	.292762	.461417	1.576084	.457951	1.564245
10 Food & Kindred	.124185	.294792	2.373821	.281319	2.265332
11 Text & Apparel	.334390	.472212	1.412157	.471539	1.410146
12 Lum & Pap Pdts	.206679	.336404	1.627664	.336258	1.626961
13 Print & Publih	.300625	.440588	1.465575	.430299	1.431350
14 Chemicals	.088736	.262260	2.955503	.218660	2.464159
15 Petro Refining	.046134	.215969	4.681309	.205292	4.449880
16 Rub Leath Plas	.238367	.397630	1.668143	.391322	1.641682
17 Glas Ston Clay	.205658	.370783	1.802907	.359586	1.748465
18 Prim Metal Pdt	.196752	.378381	1.923136	.352311	1.790636
19 Fab Metal Pdts	.280568	.434543	1.548797	.431099	1.536523
20 Non-Elec Mach	.301128	.453098	1.504668	.449533	1.492830
21 Elec Machinery	.371108	.516521	1.391836	.516447	1.391636
22 Transpor Equip	.268052	.394200	1.470609	.391851	1.461845
23 Instruments	1.000000	.000000	.000000	.000000	.000000
24 Misc Manufactu	.331590	.496181	1.496370	.496030	1.495913
25 Transportation	.346952	.515587	1.486045	.506834	1.460819
26 Communications	.287758	.408094	1.418185	.401602	1.395623
27 Utilities	.125611	.359298	2.860403	.283640	2.258088
28 Wholesale Trde	.356388	.536504	1.505393	.520981	1.461838
29 Eat&Drink Estb	.292504	.477666	1.633028	.472864	1.616608
30 Other Ret Trde	.323556	.501085	1.548683	.462074	1.428113
31 F.I.R.E.	.359785	.544824	1.514306	.472413	1.313044
32 Health Service	.426715	.635692	1.489735	.603875	1.415172
33 Educ Services	.585883	.789752	1.347967	.786917	1.343128
34 Other Services	.407749	.597530	1.465436	.571394	1.401338

TYPE II EMPLOYMENT MULTIPLIERS
FOR THE GUADALUPE ESTUARY REGION

		D EFFECT PER MIL $	T EFFECT F DEMAND	MULTIPLI F DEMAND	T EFFECT OUTPUT	MULTIPLI OUTPUT	NUMBER OF EMPLOYEES
1	Irrigated Agri	9.915	18.065	1.822	17.932	1.809	266.
2	Dryland Agri	7.290	15.861	2.176	15.622	2.143	139.
3	Lvestock & Pdt	2.574	10.784	4.189	9.330	3.624	308.
4	Agri Services	8.541	16.550	1.938	16.103	1.885	102.
5	Forestry	1.000	1.000	1.000	1.000	1.000	0.
6	Fisheries	56.873	63.503	1.117	63.386	1.115	2033.
7	Petro & NL,NGL	6.121	11.934	1.950	10.213	1.668	3671.
8	Other Mining	5.613	11.280	2.010	11.266	2.007	82.
9	Construction	12.578	19.745	1.570	19.597	1.558	11627.
10	Food & Kindred	7.471	13.819	1.850	13.188	1.765	663.
11	Text & Apparel	24.113	29.327	1.216	29.285	1.215	36.
12	Lum & Pap Pdts	15.851	20.947	1.321	20.938	1.321	23.
13	Print & Publih	18.226	23.883	1.310	23.325	1.280	415.
14	Chemicals	4.844	10.984	2.267	9.158	1.891	3364.
15	Petro Refining	.552	5.756	10.426	5.472	9.911	107.
16	Rub Leath Plas	6.816	13.087	1.920	12.880	1.890	199.
17	Glas Ston Clay	13.040	18.942	1.453	18.370	1.409	466.
18	Prim Metal Pdt	7.713	15.349	1.990	14.292	1.853	1103.
19	Fab Metal Pdts	9.731	15.652	1.609	15.528	1.596	193.
20	Non-Elec Mach	8.496	14.447	1.701	14.334	1.687	400.
21	Elec Machinery	11.639	17.425	1.497	17.423	1.497	12.
22	Transpor Equip	4.196	9.211	2.195	9.156	2.182	162.
23	Instruments	1.000	1.000	1.000	1.000	1.000	0.
24	Misc Manufactu	12.530	19.108	1.525	19.102	1.525	21.
25	Transportation	6.911	13.257	1.918	13.032	1.886	352.
26	Communications	11.158	15.780	1.414	15.529	1.392	697.
27	Utilities	2.072	9.000	4.344	7.104	3.429	1923.
28	Wholesale Trde	12.593	19.544	1.552	18.978	1.507	2353.
29	Eat&Drink Estb	17.986	25.373	1.411	25.118	1.397	3058.
30	Other Ret Trde	37.607	45.293	1.204	41.767	1.111	8789.
31	F.I.R.E.	7.395	14.259	1.928	12.364	1.672	2509.
32	Health Service	27.346	35.744	1.307	33.955	1.242	3102.
33	Educ Services	24.304	32.259	1.327	32.144	1.323	490.
34	Other Services	29.507	37.012	1.254	35.393	1.199	4983.
					TOTAL EMPLOYMENT =		53648.