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Economic Impact of Recreational Activities And Commercial Fishing on the Texas Gulf Coast

Executive Summary

I. Introduction

This report summarizes the findings of the study entitled "Economic Impacts of Recreational Activities and Commercial Fishing on the Texas Gulf Coast". The study area covers six individual Texas bay and estuaries, including: the Sabine-Neches estuary, the Trinity-San Jacinto, the Lavaca-Tres Palacios estuary, the Guadalupe estuary, the Nueces-Mission-Aransas estuary, and the Laguna Madre estuary. The study was conducted to update economic impact estimates of an earlier study conducted in 1987 (Fesenmaier et al., 1987).

This study was completed in two steps. First, an independent analysis was constructed and reported for each of the six major bay and estuary systems in Texas. Then, the present analysis which includes all bay and estuary systems taken together was completed. This summary provides regional and statewide economic impact estimates of bay and estuary related recreation and commercial fishing along the Texas Gulf Coast.

There are twenty-six counties included in the six bay and estuary systems which include several metropolitan areas. In 1995, the population for all twenty-six counties was 5,155,700. Average travel expenditures for 1993-1995 in the region were $6.2 billion (TDOC, 1996). These figures include business and leisure travel expenditures spent within the area for all kinds of business and leisure activities including bay and estuary related recreation. Eighty-seven percent of travel spending was in Harris,

Cameron, Nueces, Galveston and Jefferson counties. Given some of the major metropolitan areas in the counties mentioned above, most of the travel expenditures in the area are for non water-related recreation and business. Nevertheless, these coastal areas are also attractive destinations for water based recreational activities.

Commercial fishing activity in the bays and estuaries along the Texas Gulf Coast consists of bay (inshore) and gulf (offshore) fishing. Inshore commercial fishing for the Texas Gulf Coast was valued at $37.8 million for the 1993-1995 period. The Galveston bay system was the largest in terms of value of output, at about $15 million. Value of output from both inshore and offshore fishing during the same time period was $175.4 million (Robinson, et al. 1996).

References and comparisons to the 1987 Fesenmaier study are made within the body of the report. The two studies were conducted using different data sources and models. Therefore, the comparisons should be interpreted with care.

II. Methodology

In the 1987 Fesenmaier study a 1979 Texas Input-Output model was updated and used to estimate economic impacts. The Texas model is no longer available in a current and regional format. The model used in the present analysis is IMPLAN, a large computer algorithm of a system of equations, each representing a sector of the economy and identifying the interrelationships among sectors (Olsen, et al., 1993). The system shows the interdependence of all sectors of the economy by capturing the intermediate sales among sectors, as well as sales to households, exports and other components of final

demand. Using IMPLAN, input-output models may be developed for any county in the US or, by aggregation within the database, any group of counties to form a regional impact analysis. The model for the Texas Gulf Coast was defined separately for the twenty-six counties rather than adding up impacts of the six estuaries, to avoid double counting of some counties included in two different estuaries.

In the 1987 Fesenmaier study, an extensive survey was conducted to estimate direct impacts of estuarine dependent recreational activities. No survey was conducted for the present analysis. Instead, expenditure and recreational activity data provided by the Texas Department of Commerce (TDOC) along with updated information from the 1987 survey were used to estimate direct impacts of recreational activities in the region. The TDOC data include a travel survey conducted by D.K.Shifflett and Associates Ltd. (D.K.S.&A Ltd.) along with total travel expenditures from 1987 to 1995 by county compiled by the TDOC. The D. K. S & A. Ltd. survey is by Metropolitan Statistical Area (MSA) or Designated Market Area (DMA). In this study the MSA's were used because the counties included in the MSA's provided the best correspondence with the counties included in the estuary region. The per person daily expenditure shares for seven MSA's along the Texas Gulf Coast were used for travel expenditure breakdowns and share of business and leisure travel in the Texas Gulf Coast region. Direct impacts of commercial fishing were estimated using data from the Texas Parks and Wildlife Department (TPWD), and the National Marine Fisheries Service (NMFS).

The input-output model calculates multipliers, which show the impact of an increase in the output of one sector on other sectors. Direct impacts estimated for each

activity are then multiplied by these multipliers to estimate total impacts. There are several multipliers depending on the economic variable of interest:

1) The output multiplier which is an estimate of the change in total output (business sales) by all sectors within the regional economy that results from a change in sales to final demand by one particular sector in the economy.

2) The employment multiplier which estimates the change in total employment (all jobs) throughout the regional economy that results from a change in sales to final demand by a given sector.

3) The total income multiplier which is an estimate of the change in total household income from all sources (wages, salaries, profits, and rents) resulting from a change in sales to final demand of a given sector.

4) The value-added multiplier which is an estimate of the change in total, regional economic returns from the employment of all resources of production in the economy from a change in sales to final demand by a given sector. Value-added is the same as the value of all goods and services produced within the study area. It is analogous to Gross Domestic Product as reported at the national level. Hence, value-added within a region may be referred to as Gross Regional Product.

Multiplier estimates are expressed as the impact on a selected economic variable of a one-dollar change in final demand. It is assumed that the functional relationship to final demand is linear so the multiplier may be used to estimate the impact of larger sales to final demand by any given sector in the economy.

The notion of multipliers rests on the difference between the initial effect of a change in final demand and total effects of that change. Total effects can be defined as

the sum of direct and indirect effects (which does not include the effects generated by the increase in household incomes) or direct, indirect, and induced effects (which includes the effect of increased household incomes on the economy) (Miller and Blair, 1985). Impact estimates in this study include the effect of increased household incomes along with direct and indirect impacts.

Like any economic model, input-output analysis is limited by its assumptions and by the accuracy of the endogenous equations, as well as the data on exogenous variables that drive the model. Input-output analysis is limited by several assumptions. These include: (1) categorization of individual firms by their primary products, (2) the linearity of all equations in the model, (3) the assumption of proportionality of output to inputs, and (4) fixed prices and technology.

Input-output analysis is also limited in terms of the use and interpretation of its results. In some cases, attempts are made to use input-output results as a means of evaluating and justifying public, or private, expenditures on projects. That is, the results are used as benefit-cost assessments. These uses of input-output models are incorrect. Input-output models are limited to providing information on secondary impacts of some economic activity. While this is most useful for planning purposes, it does not answer questions as to the feasibility or justification of the activity itself. Those questions are best answered using cost-benefit analysis.

Results of the study are presented in terms of total output, income, value-added and employment impacts both at the regional and state levels. Multipliers and detailed impacts are presented in Appendices II and III.

III. Recreation and Tourism

III.1. Estimation of Direct Impacts

Recreation and tourism related activities provide economic benefits to the economy of the region where these activities occur as well as throughout Texas. These economic impacts can be classified into direct and secondary impacts. Impacts on a regional or state economy are typically indicated by total output value, employment or total income resulting from sales to final demand by a given sector of the economy. Estimation of economic impacts for recreational activities is not so straightforward since the direct impacts (expenditures) are not organized within an economic sector but may be distributed over several sectors of the economy. Recreational activities such as boating, fishing, birdwatching, and others do not have immediately measurable economic values such as sales or payrolls. However, contribution to local businesses is significant as participants in these activities generate local income by recreational spending. Direct impacts for recreational activities are represented by estimated total expenditures by leisure travelers. These direct impacts also have secondary impacts on regional and state economies. To estimate secondary impacts of these activities, direct expenditures are allocated to the sectors in which money is spent, according to the Standard Industrial Classification (SIC) to match up with the input-output model. Secondary impacts are estimated to be the direct recreational expenditures multiplied by the input-output multiplier.

Since no survey was conducted for this study, the choice of methodology for estimation of direct impacts was dictated by availability of data and a desire for a consistent methodology for all six estuaries. An estimate of total expenditures by leisure

travelers participating in water-related activities was obtained by using direct impact estimates from the 1987 Fesenmaier survey and projecting them to 1995. Projections were made using a trend function developed from total expenditure data from TDOC for the period 1987-1995 (Table III.1). Total travel expenditures were regressed using a trend function defined as:

$$X = b\, m^{t}$$

Where:

X = total travel expenditures

b = constant

m = growth rate

t = years

The estimate for m, the growth rate, was 1.05 for the Texas Gulf Coast, which represents an increase in expenditures of about 5 percent per year during the period. Assuming expenditures for water-related activities increased at the same rate, the 1987 estimate from the Fesenmaier study was used as a base and total expenditures by leisure travelers participating in water-related activities were projected for 1995 (see Appendix I). These expenditures were estimated as $866.65 million for the Texas Gulf Coast compared to $586.58 million in 1987, a nominal increase of about 48 percent for the study period.

Table III.1. Total Travel Expenditures for the Texas Gulf Coast, 1987-1995.

Year	Expenditures ($millions)
1987	4799.82
1988	4705.38
1989	4155.40
1990	4906.61
1991	5293.10
1992	5506.97
1993	5879.11
1994	6239.42
1995	6503.78

Source: Texas Department of Commerce, 1996.

These changes in expenditures include inflation that occurred during the 1987 through 1995 period. An alternate projection was also made of bay and estuary related recreational expenditures discounted for annual inflation using the Consumer Price Index. This projection more nearly estimates the real increase in expenditures that result from either more visitors or greater spending by the same number of visitors. In real terms, 1995 expenditures were estimated to be $606.22 million. Hence, in real terms, recreational expenditures in the Texas Gulf Coast region showed a 3.3 percent increase during the study period.

Per person daily expenditures for bay and estuary related recreational activities Texas Gulf Coast was estimated as $64.3 which is the average of per person per day expenditures for the MSA's along the Texas Gulf Coast (Table III.2). Daily expenditures

of travelers to each MSA varied in 1995. Travelers to the Galveston MSA spent about $90 per day, compared to $38.5 per day in the Brazoria MSA (Table III.2).

Table III.2. Leisure expenditures per person per day for each of the MSA's along the Texas Gulf Coast, 1995.

MSA	Travel Expenditures $/ person/day
Beaumont-Port Arthur	47.1
Galveston	90.3
Houston	60.3
Brazoria	38.5
Victoria	66.1
Corpus Christi	68.9
Brownsville-Harlingen-San Benito	78.9
Average expenditures	64.3

Source: D.K.S.&A Ltd., 1996

To estimate direct impacts of recreational expenditures on each sector, a weighted average of daily expenditure shares for different sectors for the six estuaries was then used as an estimate of expenditure shares for the whole region. In the 1987 study, the same expenditure shares were used for each estuary and for the whole region. Given the availability of more detailed data for this study, an estimate of average daily expenditure pattern for the region was possible. Projected bay and estuary related expenditures were allocated to the different sectors based on expenditure patterns from TDOC and D.K.S.&A. Ltd. The distribution into expenditure categories is shown in Table III.3. The assumption is made here that the distribution of water-related travel expenditures to the

various sectors is the same as that for all leisure travel. Expenditures by sector were then allocated to the corresponding sector in the input-output model for the purpose of estimating secondary impacts (Table III.4).

Table III.3. Bay and estuary related travel expenditures by expenditure category in the Texas Gulf Coast region, 1995

	Texas Gulf Coast
Transport	247.98
Lodging	104.15
Food	195.63
Shopping	92.601
Entertainment	39.206
Other	187.09
Total	866.65

Source: Estimated from TDOC and D.K.S.&A Ltd., 1996

Expenditures in the six categories shown in Table III.3 were allocated to appropriate sectors that are represented by SIC's to be used in the input-output model to estimate secondary impacts. The allocation of estimated 1995 direct bay and estuary related recreational expenditures ($866.65 million) to Texas Gulf Coast regional economic sectors is shown in Table III.4.

Table III.4. Direct Impacts of bay and estuary recreation related sectors in the Texas Gulf Coast Region, 1995.

Expenditure category	Total ($millions)	Corresponding Regional Economic Sector
Transport	247.98	Gas Service Stations
Lodging	104.15	Hotels and Motels
Food	195.63	Restaurants and Food Stores
Entertainment	92.601	Amusement, Theaters,etc
Other	39.206	Miscellaneous Retail
Shopping	187.09	Miscellaneous Retail
TOTAL	866.65	

Source: Estimated from D.K.S.&A Ltd. and TDOC.

It is estimated that leisure travelers participating in water-related activities spent $248 million in the region for transportation, and about $104 million for food related purchases (food stores and restaurants). Other businesses impacted by direct expenditures include hotels and motels, amusement services, and miscellaneous retail (Table III.4).

III.2. Visitation patterns and trends

Total number of leisure visitor days to the Texas Gulf Coast were estimated using projected 1995 expenditures and data on daily expenditures by travelers from the D.K.S.&A Ltd. survey. Total leisure travel expenditures for 1995 for the Texas Gulf Coast were divided by expenditures per day for the region, resulting in an estimated 13,478,227 visits to the Texas Gulf Coast region in 1995.

III.3. Regional and Statewide Impacts

Estimated direct impacts by sector presented in Table III.4 provide the basis for estimating total economic impacts of recreation related sectors in the Texas Gulf Coast region. Sales by these sectors to recreational travelers participating in water-related activities by these sectors constitute initial impacts that stimulate demand for goods and services from other sectors of the economy through secondary and tertiary rounds of market exchanges. This "ripple effect" in the regional economy leads to a total impact larger than original sales transactions. The input output model used in this study provides a methodology by which these successive rounds of impacts are aggregated into a total for regional and state economies (Leontief).

Estimated impacts of recreation related economic activities in the Texas Gulf Coast region are presented in Table III.5. Estimates of total impacts are given for total regional output, personal income, value-added, and employment for each of the six recreation related economic sectors. These are calculated using economic impact multipliers for the Texas Gulf Coast region given in Appendix II. It is estimated in total, that these sectors' sales to final demand stimulated total regional business sales of over $1.6 billion, personal income of about $651 million, value-added of $999 million and over 32,168 jobs in the Texas Gulf Coast region (Table III.5).

Employment, personal income, and value-added are the most useful economic variables to use in comparing the relative contribution of bay and estuary recreation related sectors. Output or total regional business sales is a less desirable variable because it includes double counting of sales of products as they move through the production, processing and marketing system.

Table III.5. Regional and statewide impacts of water-related recreational activities in the Texas Gulf Coast , 1995.

	Total Impacts	
Economic Impact Variable	Regional	State
Direct Impact ($ mil)	866.65	866.65
Output ($ mil)	1,565.46	1,654.79
Personal Income($ mil)	651.27	674.14
Value-Added ($ mil)	999.26	1,040.13
Employment (jobs)	32,168	33,529

a/ State level economic impacts are derived from regional direct expenditures. They are generally larger in magnitude because they include secondary and tertiary impacts that occur outside the Texas Gulf Coast region, but within the state.

Statewide impacts are slightly larger for all variables. Value-added impacts are $1.04 billion with a personal income impact of $674 million. Recreation related industries contribute 1,361 additional jobs and an additional $22.87 million in personal income elsewhere in the state (Table III.6).

In constructing the model to estimate total impacts, it was not possible to develop a multiplier for tourism and recreation because expenditures from these activities are spread among several sectors. However, after the analysis, "pseudo-multipliers" may be constructed. Total impacts presented in Table III.6 are based on an estimated $866.65 million annual expenditure by recreationists in the regional economy (Table III.4). Therefore, it may be stated that, on average, each dollar of tourist and recreationist expenditures resulted in about $1.81 in total output, $0.75 in personal income, and $1.15

of value-added in the Texas Gulf Coast regional economy. In addition, an employment multiplier of about 37 jobs per million dollars of tourist and recreationist expenditures is indicated by the analysis.

IV. Commercial Fishing

The Texas Gulf Coast includes the seven bay systems including the Sabine Lake, Galveston, Matagorda, San Antonio, Aransas, Corpus Christi, Upper Laguna Madre, and Lower Laguna Madre bay systems. Commercial fishing along the region is composed of two distinct activities: bay fishing (inshore) and gulf fishing (offshore). Bay fishing primarily consists of smaller boats that sell their catch at points of landing. Gulf fishing uses larger commercial boats that may fish over a wide expanse of the Gulf of Mexico. Gulf boats fishing the waters off the Texas Gulf Coast may sell their catch locally or outside the region. Likewise, gulf boats fishing in areas remote from the Texas Gulf Coast may land fish and shrimp in counties within the estuary.

IV.1. Estimation of Direct Impacts

Total value of commercial fishing in the area was estimated using data from Robinson, et al. and the National Marine Fisheries Service (NMFS) . These data were used to estimate the total value of inshore and offshore finfish and shellfish, and inshore shrimp

In estimating direct impacts, two distinct scenarios were considered[1].

I. bay system only (inshore catch),

[1] A third scenario where landings from all other areas of the Gulf were considered was added for the six estuaries. Since the total landings (inshore+offshore) reported in this report are almost equal to all landings to the Texas Gulf Coast (excluding landings from outside Texas), this scenario was not included in the present study.

II. bay and gulf catch (inshore+offshore),

IV.1.1. Direct impacts of offshore and inshore commercial fishing

Total value of output from commercial fishing in the region was used as an estimate of direct impacts for this industry. In addition, since landings from one year to the other may differ significantly due to weather and other factors, an average of landings in 1993, 1994, and 1995 were computed to represent a typical year. Direct impacts for the commercial fishing industry were estimated by total ex-vessel value of finfish, shellfish, and shrimp landed in the Texas Coastal bays (inshore) and the Texas Gulf Coast (offshore).

Total value of output from commercial fishing in the Texas Gulf Coast region was estimated to be about $174.6 million (Table IV.1). This is the total value of output for inshore and offshore commercial fishing in the region. Total value of output from inshore fishing was estimated to be about $37.4 million (Table IV.1). These estimates are used as the direct impacts of commercial fishing within the Texas Gulf Coast region for scenarios I and II.

Direct impacts of commercial fishing in the Texas Gulf Coast region were estimated as $205.3 million in the 1987 study (Fesenmaier et al., 1987), compared to $174.6 million in 1995, representing a decrease of about 15 percent in current dollars. In order to compare the value of output from commercial fishing in real terms, direct impacts for 1987 and 1995 were deflated by the respective Producer Price Indices for those years. In real dollars, direct impacts of commercial fishing in 1987 and 1995 were $198.9 and $140.7 million respectively, showing a decrease of about 29.3 percent from 1987 to 1995.

Table IV.1. Ex-Vessel Value (Direct Impacts) of inshore and offshore landings for finfish, shrimp, and shellfish for the Texas Gulf Coast (1993-1995 average)

	Inshore	Offshore	Total
	($)	($)	($)
Fish and shellfish (except shrimp)	12,777,943	4,257,533	17,035,476
Shrimp	24,657,795	132,904,667	157,562,462
Total	37,435,738	137,162,200	174,597,938

Source: Robinson et al., 1996

The two scenarios considered in the model have the following direct impacts:

I. Texas Coastal bays (inshore) catch: $37.4 million

II. Inshore + Texas Gulf Coast (offshore)catch : $174.6 million

IV.2. Regional And Statewide Impacts of Commercial Fishing

Regional and statewide total impacts of commercial fishing in the area for all three scenarios are presented in Tables IV.2. Total impacts from inshore fishing are $56.86 million in output, accounting for 1,190 jobs in the region in 1995. Impacts of total commercial fishing under scenario II (inshore+offshore) total to $265.47 million in output and $185.08 million in value-added. Commercial fishing activity by both inshore and offshore fishing generates 5,558 jobs and a personal income of $80.32 million in the Texas Gulf Coast region (Table IV.2).

Table IV.2. Estimated total impacts of commercial fishing under for scenarios I and II in the Texas Gulf Coast and Texas, 1995.

	Regional		Statewide	
	Inshore (scenario I)	Inshore+ offshore (scenario II)	Inshore (scenario I)	Inshore+ offshore (scenario II)
Output ($ mil)	56.86	265.47	59.20	276.36
Personal Income ($ mil)	17.20	80.32	18.30	85.41
Value-added ($ mil)	39.64	185.08	40.83	190.61
Employment (jobs)	1,190	5,558	1,309	6,111

At the state level, impacts are estimated to be about $59.2 million in total output and 1,309 jobs for inshore commercial fishing (Table IV.3). Statewide impacts of both inshore and offshore commercial fishing are $276.36 million in output and $190.61 million in value-added. This scenario generates an estimated total of 6,111 jobs and $85.4 million at the state level (Table IV.3).

V. Summary and Conclusions

The present study estimates economic impacts associated with bay and estuary related recreational activity and commercial fishing in the Texas Gulf Coast region. To estimate these economic impacts of the bay and estuarine related activities, an input-output model was developed for the Texas Gulf Coast regional economy and Texas, using IMPLAN. This input-output model was used to estimate multipliers that show the impact

of an increase in the sales to final demand of one sector on the value of output of other sectors of the economy (Appendix II). Total regional and state impacts were then estimated in terms of the total value of output, personal income, employment and value-added.

Travel expenditures in the region were about $6.2 billion in 1995, most of this being business travel (TDOC,1996). About $866.65 million of this was by travelers participating in water-related recreational activities such as recreational fishing, boating, swimming, birdwatching and others.

Impacts of the commercial fishing industry were estimated for two different scenarios:

I. Inshore catch

II. Inshore+offshore catch

As a first step in developing the input-output model and estimating economic impacts, direct impacts of bay and estuarine related sectors were estimated. Direct impacts (sales to final demand) were estimated for recreational travel related sectors and commercial fishing. A summary of direct impacts by sector is shown in Table V.1. Estimated direct impacts or sales to final demand shown in Table V.I provide the basis for estimating total economic impacts of bay related sectors in the Texas Gulf Coast region.

Table V.1 Direct Impacts for Recreational Activities and Commercial Fishing in The Texas Gulf Coast region.

Sector	Direct Impacts ($millions)
Total recreation	866.65
Commercial Fishing I (inshore only)	37.40
Commercial Fishing II (inshore+offshore)	174.60

It is estimated that, bay and estuary recreation related sectors sales to final demand stimulated total regional business sales of about $1.57 billion, personal income of $651.27 million, value-added of $999.26 million, and around 32,168 jobs in the Texas Gulf Coast region (Table V.2). For the case where fishing impacts are estimated by the sum of inshore and offshore landings, output impact of bay and estuary related sectors were estimated as $265.47 million, along with a personal income impact of $80.32 million, and employment impact of 5,558 jobs in the region (Table V.2).

Table V.2 Estimated Total Impacts of Recreational Activities and Commercial Fishing on the Texas Gulf Coast region and Texas, 1995.

Economic Impact Variable	Recreational Activities		Commercial Fishing (scenario I)		Commercial Fishing (scenario II)	
	Regional	Texas	Regional	Texas	Regional	Texas
Output ($mils)	1,565.46	1,654.79	56.86	59.20	265.47	276.36
Pers. Income($mils)	651.27	674.14	17.20	18.30	80.32	85.41
Value-Added($mils)	999.26	1,040.13	39.64	40.83	185.08	190.61
Employment(jobs)	32,168	33,529	1,190	1,309	5,558	6,111

From the results of this analysis, on average, each dollar of bay and estuary related tourist and recreationist expenditure resulted in about $1.81 in total value of output, $0.75 of personal income, and $1.15 of value-added in the regional economy. In addition, an employment multiplier of about 37 jobs per million dollars of tourist and recreationist expenditures is indicated by the analysis.

Statewide impacts represent estimated impacts of the recreational activity related sectors and commercial fishing in the Texas Gulf Coast region on the rest of the state of Texas. Total statewide impacts can be interpreted as the regional impact plus the additional impact created elsewhere in the state by the sectors included in the study. For the Texas Gulf Coast region, the recreation related sectors were estimated to have an output impact of $1.66 billion and personal income impact of $674 million with 133,529 jobs at the state level (including regional impacts). Statewide impacts for commercial fishing including both inshore and offshore fishing activity were $276.36 million for

output with a value-added impact of $85.41 million . In terms of employment, 6,111 jobs were created statewide for this scenario (Table V.2).

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Appendix I. Methodology for Estimation of Projected Travel Expenditures

$$X = b\, m^{t} \qquad (1)$$

Where:

X = total travel expenditures

b = constant

m = growth rate

t = years

The estimated equation is:

$$\hat{X} = 169\ (1.036)^{t} \qquad (2)$$

Given

$$\hat{X}_{1995} = \hat{b}\ \hat{m}^{9} \qquad (3)$$

$$\hat{X}_{1987} = \hat{b}\ \hat{m}^{1} \qquad (4)$$

Where $\hat{X}_{1987}$ is the 1987 Fesenmaier estimate.

Solving for $\hat{X}_{1995}$, from (3) and (4)

$$\hat{X}_{1995} = m^{8}\,(\hat{X}_{1987})$$

Appendix II. Multipliers for the Texas Gulf Coast Region

Table II.1. Output Multipliers for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing	1.00	0.21	0.31	1.52
Food and Eating & Drinking	1.00	0.33	0.48	1.81
Automotive Dealers & Service Stations	1.00	0.27	0.54	1.81
Miscellaneous Retail	1.00	0.21	0.53	1.75
Hotels and Lodging Places	1.00	0.37	0.48	1.85
Amusement and Recreation Services	1.00	0.45	0.56	2.01

Table II.2. Employment Multipliers for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing	25.57	1.80	4.46	31.83
Food and Eating & Drinking	29.63	3.49	6.78	39.90
Automotive Dealers & Service Stations	16.21	2.93	7.59	26.73
Miscellaneous Retail	40.71	2.31	7.58	50.60
Hotels and Lodging Places	20.12	5.25	6.85	32.22
Amusement and Recreation Services	21.05	6.46	7.95	35.46

Table II.3. Personal Income Multipliers for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing	0.29	0.06	0.11	0.46
Food and Eating & Drinking	0.42	0.11	0.17	0.70
Automotive Dealers & Service Stations	0.50	0.10	0.19	0.78
Miscellaneous Retail	0.52	0.07	0.19	0.78
Hotels and Lodging Places	0.39	0.14	0.17	0.71
Amusement and Recreation Services	0.45	0.17	0.20	0.82

Table II.4. Total Value Added Multipliers for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing	0.77	0.10	0.19	1.06
Food and Eating & Drinking	0.58	0.18	0.29	1.06
Automotive Dealers & Service Stations	0.73	0.16	0.32	1.22
Miscellaneous Retail	0.79	0.13	0.32	1.24
Hotels and Lodging Places	0.61	0.21	0.29	1.11
Amusement and Recreation Services	0.51	0.25	0.34	1.10

TableII.5 Output Multipliers for Texas State

Event	Sector	Direct	Indirect	Induced	Total
1	Commercial Fishing	1	0.2097	0.3731	1.5828
2	Food and Eating & Drinking	1	0.3782	0.5604	1.9386
3	Automotive Dealers & Service Stations	1	0.2792	0.6166	1.8958
4	Miscellaneous Retail	1	0.2183	0.6169	1.8352
5	Hotels and Lodging Places	1	0.3964	0.5687	1.9651
6	Amusement and Recreation Services	1	0.5251	0.6169	2.1421

TableII.6 Employment Multipliers for Texas State

Event	Sector	Direct	Indirect	Induced	Total
1	Commercial Fishing	28	2	5	35
2	Food and Eating & Drinking	29	4	8	42
3	Automotive Dealers & Service Stations	17	3	9	28
4	Miscellaneous Retail	41	2	9	52
5	Hotels and Lodging Places	20	6	8	34
6	Amusement and Recreation Services	20	8	9	37

TableII.7 Income Multipliers for Texas State Estuary

Event	Sector	Direct	Indirect	Induced	Total
1	Commercial Fishing	0.3026	0.0564	0.1302	0.4892
2	Food and Eating & Drinking	0.4209	0.1183	0.1956	0.7348
3	Automotive Dealers & Service Stations	0.4939	0.0993	0.2152	0.8084
4	Miscellaneous Retail	0.5165	0.077	0.2153	0.8089
5	Hotels and Lodging Places	0.3923	0.1548	0.1985	0.7456
6	Amusement and Recreation Services	0.4049	0.1887	0.2153	0.8089

TableII.8 Total Value Added Multipliers for Texas State

Event	Sector	Direct	Indirect	Induced	Total
1	Commercial Fishing	0.7746	0.0966	0.2205	1.0917
2	Food and Eating & Drinking	0.5809	0.2002	0.3312	1.1123
3	Automotive Dealers & Service Stations	0.7335	0.168	0.3644	1.266
4	Miscellaneous Retail	0.7906	0.1309	0.3646	1.2861
5	Hotels and Lodging Places	0.6104	0.2262	0.3361	1.1727
6	Amusement and Recreation Services	0.4774	0.2859	0.3646	1.128

Appendix III. Regional and Statewide Impacts for the Texas Gulf Coast Region

TableIII.1. Output Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	37.40	7.69	11.77	56.86
Commercial Fishing (Inshore+Offshore)	174.60	35.91	54.96	265.47
Food and Eating & Drinking	195.63	64.56	93.90	354.09
Automotive Dealers & Service Stations	247.98	66.95	133.91	448.84
Miscellaneous Retail	219.27	46.05	116.21	383.72
Hotels and Lodging Places	104.15	38.54	49.99	192.68
Amusement and Recreation Services	92.60	41.67	51.86	186.13

Table III. 2. Employment Impacts the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	956	67	167	1190
Commercial Fishing (Inshore+Offshore)	4465	314	779	5558
Food and Eating & Drinking	5797	683	1326	7806
Automotive Dealers & Service Stations	4020	727	1882	6629
Miscellaneous Retail	8926	507	1662	11095
Hotels and Lodging Places	2095	547	713	3356
Amusement and Recreation Services	1949	598	736	3284

Table III.3. Personal Income Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	10.85	2.24	4.11	17.20
Commercial Fishing (Inshore+Offshore)	50.63	10.48	19.21	80.32
Food and Eating & Drinking	82.16	21.52	33.26	136.94
Automotive Dealers & Service Stations	123.99	24.80	47.12	193.42
Miscellaneous Retail	114.02	15.35	41.66	171.03
Hotels and Lodging Places	40.62	14.58	17.71	73.95
Amusement and Recreation Services	41.67	15.74	18.52	75.93

Table III.4. Total Value Added Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	28.80	3.74	7.11	39.64
Commercial Fishing (Inshore+Offshore)	134.44	17.46	33.17	185.08
Food and Eating & Drinking	113.47	35.21	56.73	207.37
Automotive Dealers & Service Stations	181.03	39.68	79.35	302.54
Miscellaneous Retail	173.22	28.50	70.17	271.89
Hotels and Lodging Places	63.53	21.87	30.20	115.61
Amusement and Recreation Services	47.23	23.15	31.48	101.86

Table III.5. Statewide Output Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	37.40	7.84	13.95	59.20
Commercial Fishing (Inshore+Offshore)	174.60	36.61	65.14	276.36
Food and Eating & Drinking	195.63	73.99	109.63	379.25
Automotive Dealers & Service Stations	247.98	69.24	152.90	470.12
Miscellaneous Retail	219.27	47.87	135.27	402.40
Hotels and Lodging Places	104.15	41.29	59.23	204.67
Amusement and Recreation Services	92.60	48.62	57.13	198.36

Table III.6. Statewide Employment Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	1047	75	187	1309
Commercial Fishing (Inshore+Offshore)	4889	349	873	6111
Food and Eating & Drinking	5673	783	1565	8216
Automotive Dealers & Service Stations	4216	744	2232	6943
Miscellaneous Retail	8990	439	1973	11402
Hotels and Lodging Places	2083	625	833	3541
Amusement and Recreation Services	1852	741	833	3426

Table III.7. Statewide Personal Income Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	11.32	2.11	4.87	18.30
Commercial Fishing (Inshore+Offshore)	52.83	9.85	22.73	85.41
Food and Eating & Drinking	82.34	23.14	38.27	143.75
Automotive Dealers & Service Stations	122.48	24.62	53.37	200.47
Miscellaneous Retail	113.25	16.88	47.21	177.36
Hotels and Lodging Places	40.86	16.12	20.67	77.65
Amusement and Recreation Services	37.49	17.47	19.94	74.90

Table III.8. Statewide Value Added Impacts for the Texas Gulf Coast Region

Sector	Direct Effects	Indirect Effects	Induced Effects	Total
Commercial Fishing (Inshore)	28.97	3.61	8.25	40.83
Commercial Fishing (Inshore+Offshore)	135.25	16.87	38.50	190.61
Food and Eating & Drinking	113.64	39.17	64.79	217.60
Automotive Dealers & Service Stations	181.89	41.66	90.36	313.94
Miscellaneous Retail	173.35	28.70	79.94	282.00
Hotels and Lodging Places	63.57	23.56	35.00	122.14
Amusement and Recreation Services	44.21	26.47	33.76	104.45