IXTOC I OIL SPILL ECONOMIC IMPACT STUDY
Executive Summary

Prepared By
Restrepo & Associates
for the
Bureau of Land Management
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IXTOC I OIL SPILL ECONOMIC IMPACT STUDY
Executive Summary

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EXECUTIVE SUMMARY

On June 3, 1979, in the Bahia de Campeche, Gulf of Mexico (19° 20' N, 92° 25' W), an exploratory oil well, the IXTOC I, blew out. As a result of this disaster and especially due to the progression of events that followed, the Bureau of Land Management contracted Restrepo and Associates of El Paso, Texas to conduct an economic assessment of the IXTOC I oil well blowout on the Texas coastal region--the area of the U.S. that received the brunt of the oil spilled by the Mexican oil well.

The IXTOC I, as of this date, is the world's largest and probably most expensive oil spill. Estimates of the amount of oil spilled range from 3 million barrels to 5 million barrels. The oil that was extruded by the IXTOC I was carried by Gulf currents into American waters on August 6, 1979. The U.S. was given two months to prepare for the oil slick and mounted a planned effort to protect the Texas coast against the effects of the IXTOC I accident. In addition to the oil from the IXTOC I, the Texas coast was affected by fresh unweathered oil from the sinking of the oil tanker, BURMAH AGATE, on November 6, 1979. These events have had multiple effects and consequences on local, state, federal and international economies. Several studies are currently being conducted to assess the impact of these multiple effects in a variety of disciplines; this study examines some of the macro-economic effects that resulted from the oil that was spilled by the IXTOC I and the BURMAH AGATE. A synopsis of the IXTOC I Oil Spill Economic Impact Study is presented in this Executive Summary.

OBJECTIVES

Economics is a discipline that deals with the production, distribution and consumption of wealth. Economic assessments generally attempt to translate the results of a physical action into a set of monetary values. The purpose of this report is to define and quantify the economic components and their relationships that were established as a result of the June third accident in the Bahia de Campeche.

The Objectives were:

1) To apply traditional economic methods to assess the physical events that occurred as a result of the IXTOC I oil well blowout and the sinking of the BURMAH AGATE and, if needed, to develop innovative methods to assign dollar values to the various services, products and goods that were affected by the oil spills.

2) To implement the appropriate methods and measure the economic effects of the IXTOC I oil well blowout and the sinking of the BURMAH AGATE upon the tourism, recreation and commercial fishing industries in the Texas coastal region.

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3) To document and quantify the economic losses, if any, that can be attributed, directly or indirectly, to the IXTOC I oil well blowout and the BURMAH AGATE sinking so that the appropriate form of compensation can be made to the affected parties.

4) To identify and compile the cost of the clean-up procedures to the local, state, and federal governments.

SCOPE

The extent of this temporal economic examination is localized to the Texas coastline. Nineteen counties along the Texas coastline were selected for the study and divided into five subregions: (see Figure 1).

Study Period

The study of the impact period is based upon 2 factors: 1) the duration period of the exogenous disturbance and 2) the period of time of the economic reaction or impact from the exogenous disturbance. The validity of any economic impact study is based upon the comparison between the defined impact study period and the actual disturbance and the economic reaction period.

The oil spill impact study period was defined as the period from January 1979 to December 1981. The IXTOC I blowout occurred in June of 1979 and was followed by the sinking of the BURMAH AGATE some six months later. The selection of the 3-year study period was largely governed in this study by the limited resources available to conduct an economic impact assessment of the oil spills. However, the results of this study indicate that the study period was adequate to include all known and measurable economic effects within the study region.

Impact Period

The magnitude of the economic impact is directly related to the geographic size of the chosen region of study. If the chosen site or region of the study is quite small, it is quite likely that a significant amount of economic impact will occur outside the area and result in an understatement of the total economic impact for the study region.

The Texas coastal counties that were selected for the oil impact study period vary considerably in their economic activities; ranging from King's ranch in Kenedy county to a major urban complex in Harris county - Houston, which is currently the fourth largest city in the United States (Figure 1).

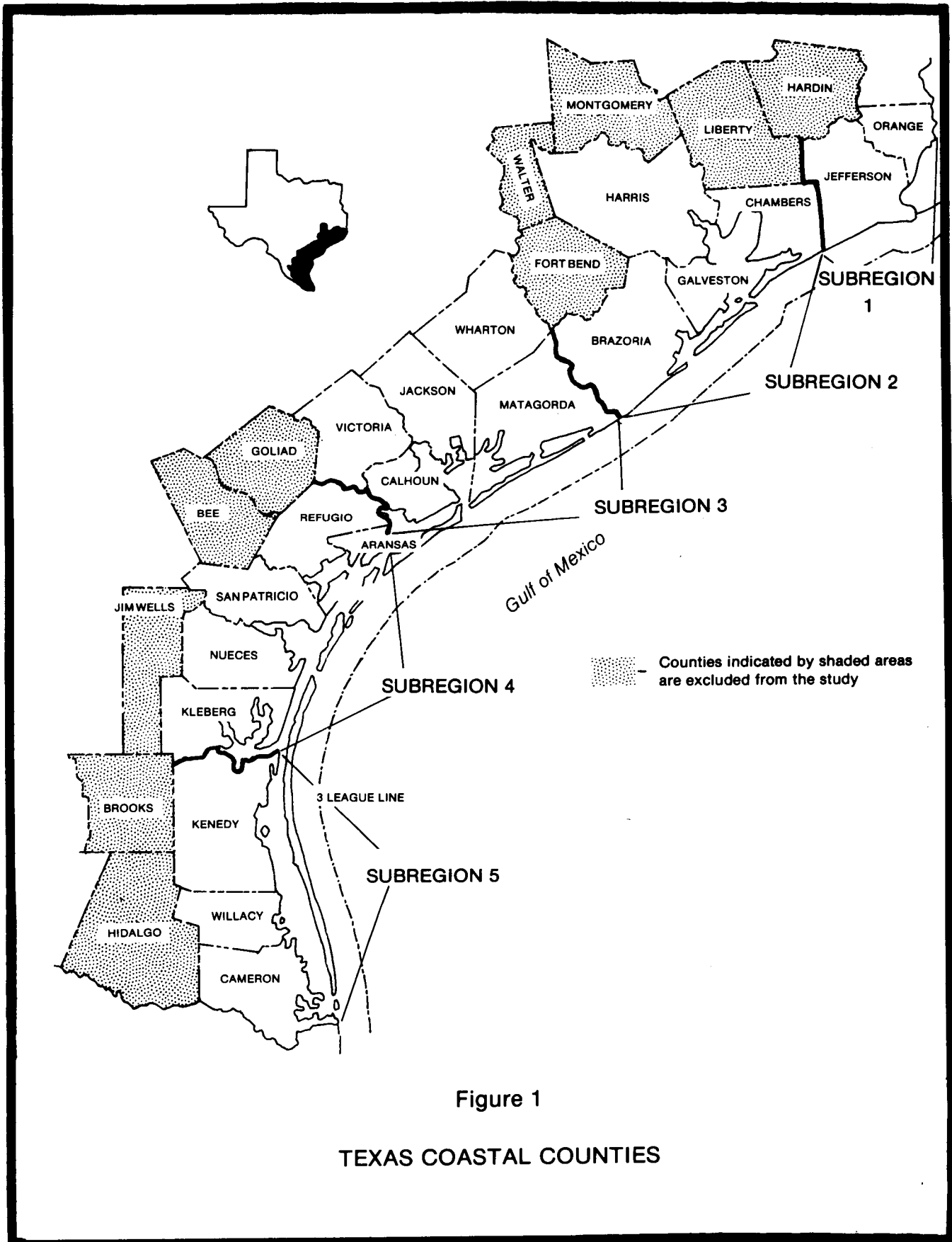Such economic diversity suggests that many of the counties

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Figure 1

TEXAS COASTAL COUNTIES

have stronger economic ties with areas outside the study region than with their neighboring counties within the defined study region. The inclusion of additional counties or areas into the study region would undoubtedly increase the estimates of economic impact of the IXTOC I blowout and the BURMAH AGATE sinking.

The 19 coastal counties of Texas are indicated in Figure 1. The 19-county study region was subdivided into five multicounty subregions in order to differentiate more clearly between the economic impact of the BURMAH AGATE sinking and the IXTOC I blowout. These subregions are also indicated in Figure 1. It should be noted that because of the subregional disaggregation and the corresponding relative increase in importation that such disaggregation creates, the size of the economic impacts will decline accordingly. It should also be noted that this geographic-size effect on the magnitude of the impact estimates does not render them invalid. It simply means that the impacted area of study has been reduced geographically to a subregion. Therefore, the impact estimates should be smaller.

An additional point needs to be noted with the measurement of economic impacts at the regional or area level. Regional level impacts measurements conceal the varying degree of economic impact at the establishment level. For instance, a disturbance such as an oil spill can trigger both negative and positive economic effects across the study region. An oil spill can sharply reduce the occupancy level of shoreline hotels. But, at the same time, hotels located adjacent to inland lakes within the same study region may pick up some or all of the business lost by the hotels along the oil stained coast. Thus, one hotel's loss can mean another one's gain, and the economic impact, measured at the regional level, would be zero or insignificant. In order to provide some information of the possible severity of the effects of the oil spills at the establishment level, a number of on-site interviews were conducted with the owners and managers of businesses located along the coast. However, in accordance with the contract requirements of the Bureau of Land Management, economic impact estimates were measured at the area level rather than at the establishment level.

The limitations of the study are primarily due to the state of the art in assessing oil landing impacts on coastal areas. The sources of data that were available were erratic and sometimes conflicting. In the case of the study on the commercial fishing industry, the limited data on the biological fluctuations of certain variables prevented the development of a truly descriptive mathematical model. The Texas Employment Commission could only furnish data for the two years prior to the oil spills' impact on the employment levels in the region.

Within the scope of any major study, certain assumptions

must be made; some of these assumptions are contractual in nature, while others serve to define the study itself. The major assumptions associated with the scope are:

1)   The major economic impacts occurred during the study period and within the defined study area.

2)   Economic impact estimates are measured at the area level rather than at the establishment level.

3)   Deviations from the observed economic activities, prior to the disturbance, are regarded as direct economic impacts.

The IXTOC I Oil Spill Economic Impact Study is intended to present a scientifically based analysis of the major direct and indirect effects of the oil spill on the commercial fishing, tourism, and recreation industries along the designated Texas Gulf Coast Communities. In light of the limitations and assumptions, the reader is cautioned to interpret the results of the study with the limitations and assumptions in mind.

METHODS

The analysis of the economic effects of the IXTOC I and BURMAH AGATE oil spills upon the study region are based upon the following methods: 1) the establishment of a baseline of regional economic activity prior to the disturbance and 2) the development, implementation and interpretation of economic models that are congruent with the events that occurred in the study region and during the study period as defined by the scope of the work.

However, before conducting an economic analysis of the oil spill's impact, a major question must be answered so that the reader may understand the content of the study. The question is "How much of the 'total' economic impact has been included in the impact measure?" This is a definitional question; the geographic area and the time period of the study have already been outlined in the scope of the work. A simpler restatement of the question is: "What shall we measure?" rather than "where shall we measure?".

In order to answer this definitional question, we must define "total economic impact." Total economic impact consists of (a) current or short term impacts and (b) investment or long term impact. Current economic impact estimates consider only changes in current economic activity - changes in a fixed amount of economic capital. For example, the current impact of an oil spill on shoreline hotels would be measured by a change in the current operating levels of the hotels; an indicator of change being the shift in the occupancy rates for a given period of time. On the other hand, investment economic impact estimates consider changes in long term economic activity, such

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as the effects of relocation of hotels away from the coast, which would create obvious long term economic impacts upon the coastal economy.

In addition to the distinction between current impacts and investment impacts is the difference between direct impacts and indirect impacts. Direct impacts are "cause and effect" impacts. A current direct impact is a reduction of output in an industry as the result of a disaster. An example of a current direct impact in the commercial fishing industry is a reduction of the amount of fish caught as the result of an oil spill. Indirect impacts are the "secondary" impacts and are observed in those industries that are linked to the industry directly affected by an economic event via a supply and demand sequence. There are two types of indirect effects: "induced by" and "stemming from" effects. In either case, the industries that supply or depend upon the production of the "directly impacted" industry may also feel the effects of the original economic event.

For example, suppose the commercial fishing industry's output of catches of marine animals declines due to the result of an oil spill. This reduction in landings reduces the revenue that is available to the industry. Because of this loss of revenue, the suppliers of commercial fishing equipment are also affected. This leads to a reduction of capital for the suppliers and a subsequent loss for the industries associated or linked to the suppliers. The losses in commercial fishing induced or caused a reduction of the available inputs to the "backward" or supply linked industries associated with commercial fishing.

An example of current indirect "stemming from" effects, again associated with commercial fishing, is the purchase of fish by food processing plants. If a reduction in the output of commercial fishing leads to a reduction in the output of food processing plants, the impact is referred to as a "stemming from" effect. Stemming from effects can only be identified by conducting extensive field surveys of establishments in the study area.

Due to contract specifications and budget restrictions, namely the specification of a non-survey approach, it was assumed that the economic impact assessment of the oil spills could be limited to 1) the current direct economic impacts on the tourism, recreation, and commercial fishing industries and 2) the current indirect, "induced by" economic effects on the supportive or related economic activities located in the study region. Impact figures in this report must be interpreted in the context of this contract related restriction.

Finally, as part of an answer to the question raised earlier, there is the consideration of an appropriate economic unit of impact measurement. The appropriate unit of measure

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depends largely on the expected duration of the impact period.

If the disturbance is short-lived, and the economic recovery period is brief, businesses would not likely reduce employment as a result of the impact. Therefore, an employment measure for economic impact would be inappropriate in this case. The appropriate measure would be some volume indicator of current business activity, such as gross revenue or value of production. Impact periods of several years probably do involve employment effects as well as changes in gross business activities. In this case, estimates of employment effects would be appropriate. Because of the short term nature of the economic effects of the IXTOC I blowout and the BURMAH AGATE sinking, it was assumed that the appropriate economic impact measure would be gross revenues by economic sector. Thus, the impact estimates reported are measured in terms of the value of sector or industry output.

The extent of identifiable current direct economic impacts that occurred in these three sectors could then be used to determine the extent of current indirect, "induced by" economic effects. The appropriate form of measurement for the tourism and recreation industries is an "expenditures" approach to impact measurements. This is in contrast to an "output" approach assumed to be more suitable for commercial fishing. Information on total tourist dollars spent (expenditures) in the study region provided the base for identifying the extent of the relationships between oil spills and tourism/recreation activity during the study period. The "output" approach to commercial fishing, by contrast, measures the quantity of the landings and converts the production to a dollar value.

The problem of data availability for the coastal counties of Texas, especially the lack of time series data on a number of tourist and recreationists in the study region, precluded the use of an expenditures approach to measure the economic impact on tourism and recreation. An output approach was used instead. In brief, recreation and tourism were defined on the basis of major industry groups; for example, all eating and drinking establishments in the study area were considered a part of tourism. Defining tourism and recreation activity on the basis of industry groups was not desirable. It was necessary because of data limitations experienced during the investigation. As a result of data limitations, the expenditures approach assumption was abandoned for the output approach to measure the current direct economic impacts for recreation and tourism.

BASELINE

A baseline economy represents the mathematical projection of recent past economic conditions across the study period for the region. Thus, for the study period, observed deviations of economic activity from the baseline can be assumed to be a

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result of the exogenous disturbance under study. Further, deviations from the baseline for the economic sectors under consideration can be regarded as "direct" economic impacts. A properly prepared economic baseline would include all phenomena affecting the study region's economy during the defined study period except the exogenous event under consideration.

IMPACT MODELS

The assessment of current direct and indirect economic impacts associated with the oil spills required the formulation of two separate analytical procedures that would yield estimates of current direct and current indirect economic impacts. These two separate procedures, however, contained certain common definitions, since the estimates of the current direct economic impact were used in the second procedure or model to estimate the current indirect economic impacts associated (indirectly) with the oil spills. For discussion purposes, the procedure for measuring direct impacts will be referred to as a direct impact density gradient model. The model used in this study to measure current indirect economic impacts is referred to as the input-output model. The density gradient model and the input-output models will be briefly described.

DENSITY GRADIENT MODEL

For each of the specified industries, a relative density gradient model was developed for each of the economic sectors as classified by the Standard Industrial Classification (SIC). The sector composition of each industry is:

Recreation - other retail trade - recreation services.

Tourism - eating and drinking establishments - automobile services - lodging.

Commercial Fishing - finfish - shellfish - miscellaneous fish.

Relative density gradients refer to the relative degree of direct economic impact across the geophysical-temporal locus of a subregion. A relative density gradient of 100% indicates that the economic establishments suffered a total loss of business activity; whereas, a relative density gradient of 0% indicates no loss.

Relative density gradient models were used to evaluate the tourism and recreation industries because of serious data deficiencies. The use of relative density gradient models to estimate the direct economic impacts shifted the methodology from an "expenditures" approach to an "output" approach. Relative density gradient models were constructed by 1) obtaining qualitative assessments of direct economic impacts

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via onsite interviews with the owners and managers of study site Standard Industrial Classification coded businesses. These qualitative interviews were transformed into quantitative impact estimates - or estimates of lost revenues by SIC sector at the subregional level.

INPUT-OUTPUT MODELS

Current indirect "induced by" economic effects were assessed with an input-output model. At the beginning of the study, input-output models did not exist for either the total 19-county study region or for any of the five subregions. Because of this deficiency, the 1972 Texas Input-Output Model was modified to reflect the economic relations within the study region. Eighteen separate regional input-output models (an input-output model for the entire region and five different subregion models all over the years 1979, 1980, and 1981) were developed to analyze the oil spill's economic impact upon the linkage sectors within the region.

While a full discussion of the analytic features of input-output models for economic impact assessment purposes is beyond the scope of this summary, to facilitate the reader's comprehension of regional input-output models, a brief description of regional input-output models is presented.

The regional input-output model consists of three tables: the transaction table, the direct requirements table, and the total requirements table. The transaction table is a system of accounts, and its most important feature is the classification of inter-industry transactions. The direct requirements table is calculated from part of the information that is contained within the producing sector's purchases.

The total requirements table uses the direct requirements table to measure the regional impact due to some change in the regional sales to final demand. The reliability of the model is based upon the assumptions that are used to convert the transactions table into an analytic model. The assumptions are: 1) a proportional relationship exists between the input and the output, 2) the input coefficients are average relationships and 3) there is no substitution effects in the production factors.

Procedures used to "regionalize" and "update" the 1972 Texas Input-Output Model for the substate coastal economies are thoroughly discussed in the Input-Output Model for Economic Analysis Instructional Manual. Readers are encouraged to obtain and read this document.

RESULTS

The results of the economic impact assessment of the IXTOC I and BURMAH AGATE oil spills are presented in the following

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format: first, the data collection procedures are discussed; then a brief description of the analysis is presented; and finally, the results of each of the major industrial divisions are described. In addition to the industrial divisions of Tourism, Recreation and Commercial Fishing, a portion of the summary is devoted to an analysis of the role of the media coverage and clean-up costs of the oil spills.

TOURISM

Gross receipts data for the tourism results were obtained from the Texas Office of the Comptroller of Public Accounts. The data consisted of Standard Industrial Classification coded tourist businesses' gross receipts for the 19 coastal counties and was supplemented by hotel gross receipts data from the Miscellaneous Tax Division.

Data on Tourist expenditures were obtained from the State Department of Highways and Public Transportation. The data were statewide and not broken down by expenditure categories. No data was provided on in-state tourism. As a result of these constraints, only the data on out-of-state automobile visitors to Texas were used in the analysis.

In addition, interview data were collected from 38 businesses and tourist agencies. The interviews provided data that were useful in developing regional density gradient models.

The results of surveys and interviews served as the foundation for estimating overall impact. Because the apparent concentration of the impact was on South Padre Island area, it was necessary to break down the data of Subregion V, and especially Cameron County due to the fact that the South Padre Island area represents approximately 25 percent of all tourism activity in Cameron County. The interviews, together with the surveys, provided the researchers sufficient evidence to assume that decreases of an estimated 50 percent of the total tourist business season affected the South Padre Island area for the year.

When this percentage loss is applied to Subregion V, estimates total to $3.8 million. Because of the nature of the data used in the tourism analysis, it would appear that a tolerance of +/- 5% should be applied to the estimates. This would place the losses in the South Padre Island area from a low estimate of $3.6 million to a high estimate of $4.0 million.

If the results are converted to the entire Subregion V, this results in the following estimates:

Auto	$ 943,000	to	$1,055,000
Food	$1,217,000	to	$1,364,000
Lodging	$1,819,000	to	$2,025,000

Impact of the IXTOC I oil spill was estimated as a decrease of tourist activity in Subregion V that totaled from a low estimate of $3,979,000 to a high estimate of $4,444,000.

During the progress of the study, an attempt was made to develop mathematical projections of the 1979 levels of business activity for tourism based upon the levels of 1976 through 1978. These calculations were made; however, the limited number of years available as a base and the erratic performance during those years did not provide definitive results. It did show, however, some indication that there was an unusual change in Subregion V.

There was no apparent negative impact upon tourism in any subregion as a result of the BURMAH AGATE sinking. This does not mean that there was no tourism business negatively affected; rather, when evaluated on a subregional basis, there was no negative impact.

The quantity of indirect loss associated with tourism industry was analyzed with the regionalized Texas Input-Output Model. The discussion of the indirect estimates associated with the oil spills needs to be interpreted in the following manner: because no significant direct economic impacts were identified, it follows that there were no significant indirect economic impacts. In short, indirect economic effects follow the direct economic effects.

Output multiplier coefficients were derived from the regionalized Input-Output Model for 65 Standard Industrial Classification sectors. The output multiplier coefficients were summed over the 65 sectors to produce three total output multipliers for the major sectors of automotive, food, and lodging. The total output multipliers for the automotive, food, and lodging sectors are, respectively, 1.110454, 1.313062, and 1.255657. The total output multipliers were then multiplied by the direct economic impact estimates to yield the indirect induced-by economic impacts.

Indirect induced-by economic impacts are:

Auto	$104,158	to	$116,528
Food	$380,996	to	$427,016
Lodging	$465,040	to	$517,705

No indirect economic impact exceeded $1 million. Thus, it appears that the overall indirect economic impact, due to the oil spills, was quite limited. However, the inter-industry transaction data used in the construction of the 1972 Texas State Input-Output Model were rounded to the nearest millions of dollars. Because the regional Input-Output Model was based upon the Texas Model, the regional model also reflects the same degree of rounding. What this means is that indirect impact estimates of less than $1 million needs to be interpreted with

extreme caution.

RECREATION

Data relative to sales in Standard Industrial Classification recreation-related categories for each county in the study area were secured from the Texas Comptroller's office and transformed on a county basis by expenditure category by year. The county data were consolidated to yield subregional quarterly totals by expenditure category by year and used to generate a trend line for each recreation sector.

Interviews were conducted with the owners and managers of recreation establishments to obtain information on the extent of losses; these interviews were used to adjust the estimated percentages of lost income, since nearly all of the losses attributed to the oil spills were incurred in Gulf-front communities. A procedure based on a ratio of general retail sales between the county level and the major Gulf-front city was used to discount reports of lost sales in the coastal region. Adjusted percentages were computed to represent the extent of lost sales in each subregion. These adjusted percentages were then applied to actual 1979 retail sales figures to arrive at an estimate of the non-exogenous baseline.

The results of these procedures yield an economic assessment of the oil spill's impact upon the Texas coastal recreation industry. These results indicate that the losses were not equally distributed within each subregion. Rather, they were absorbed by a small number of businesses close to the water's edge and in the recreation orientated subregions.

The calculated losses, in terms of gross receipts, across the three major affected regions (II, IV, and V) indicate a total direct economic loss of $3,098,616 for the Standard Industrial Classification recreation sectors. The majority of these losses were assumed to be attributed to the IXTOC I oil spill. This spill, as well as the associated statewide and national media coverage, occurred during the height of the summer tourist season. Oil from the BURMAH AGATE reached the area in early November, during the off-season, and did not have any significant economic impact in the area.

Estimates of direct economic impacts upon the Texas coastal recreation industry are as given:

	Subregion II	Subregion IV	Subregion V
Other retail	$835,205	$1,026,053	$1,129,082
Recreation Services	$ 17,978	$ 36,452	$ 53,846
Total	$853,183	$1,062,505	$1,182,928

The data do not show any direct economic impact from the

two spills in Subregions I and III. These subregions are not major coastal recreation centers. From the interviews, recreation activities apparently were not interrupted despite any physical presence of oil. Neither of these subregions received any great amount of media attention with regard to the movement of spills along the coast.

The impacts shown for Subregion II can be directly attributed to the BURMAH AGATE oil spill. Interviews indicated that many recreation areas were closed, as the event occurred during the off-season.

The indirect induced-by economic effects in the recreation industry were analyzed with the regionalized Texas Input-Output model. Output multiplier coefficients were derived from the Input-Output model and applied to the recreation sectors. The output multiplier coefficients for Subregions II, IV, and V are, respectively, 1.341443, 1.267129, and 1.229916.

When the output multiplier coefficients are applied to the direct economic impact estimates, the indirect economic impact estimates are derived. The indirect economic impact estimates are:

	Subregion II	Subregion IV	Subregion V
Other retail	$228,587	$280,820	$309,018
Recreation Services	$ 17,978	$ 36,452	$ 53,846
Total	$246,565	$245,272	$362,864

None of the indirect economic effects exceed $1 million. These estimates, based upon the available data, support a statement of no significant indirect economic impact in the study region that can be attributed to the oil spills. This conclusion must be evaluated in light of the degree of rounding on the inter-industry transactions used in the construction of the 1972 Texas Input-Output Model.

The accounting of the inter-industry transactions reported in the Texas model are rounded to the nearest million dollars. Although the accuracy of the model can be questioned, sector figures of less than $1 million can be considered to be insignificant, particularly when examined from the regional level.

COMMERCIAL FISHING

Data were obtained on landing, effort and value on the commercial fishing industry from the National Marine Fisheries Service and the Texas Parks and Wildlife Department. Additional data were obtained through a survey-interview of fishermen, dealers, biologists, marine advisory agents and local business people. These data were classified according to

Standard Industrial Classification codes for finfish, shellfish and miscellaneous marine products.

The analysis of the economic impacts of the oil spills is made by comparing the ex-vessel value of previous years to the year the oil spills occurred. The ex-vessel value is the commercial value of the catch and is the primary economic variable that was used to quantify the output of the harvesting level of the Texas Commercial Fishing Industry. The results of the analysis indicate that there were no significant direct economic effects of either oil spill on the commercial fishing industry measurable on either the regional or subregional level. The results also indicate no measurable indirect economic effects on the industry from the oil spills. Biological analysis of the important commercial species indicates that no aromatic hydrocarbons were found in the tissues of sampled shrimp. In summary, the commercial fishing industry of Texas did not sustain direct or indirect economic effects of magnitude sufficient to be measurable, or did other sectors of the economy sustain any effects.

COSTS

The IXTOC I Oil Spill is probably the world's most expensive oil spill. The estimated loss of oil exceeded 5 million barrels of oil, worth approximately $365 million. Damage claim suits that are pending in U.S. Courts total in excess of $400 million. The SEDCO - 135 Semi-Submersive Drilling Platform, a complete loss, was valued at $21 million. PEMEX has reportedly spent over $70 million in capping operations and $42 million in clean-up operations. The expense to the U.S. Government is still being compiled, and cost estimates exceed $8 million. The cost to the State of Texas, for the clean-up measure, has been compiled by the involved agencies and totals to $331,389. The Small Business Administration received 523 inquiries for economic recovery loans. They approved 238 business loans for a total of over $7 million.

MEDIA COVERAGE

The rationale for the analysis of the media coverage is due to the postulated association between the effects of an information system and its ability to mediate overt behavior by reshaping the cognitive image of the environment.

Analysis of statewide and national media coverage devoted to the oil spills is based upon 593 newspaper reports, journal articles and television stories published during June of 1979 to May of 1981. Each media source was abstracted and ordered into one of the following 8 categories: BURMAH AGATE sinking, Capping attempts of the IXTOC I, Cost of IXTOC I Blowout, Environmental Issues, Commercial Fishing, Tourism, Legal/Political Issues, and Informational. If the source

contained more than one topic as its content, the topic that was given the most emphasis was used to classify the source.

A breakdown of the sources indicates the following: 32 or 5.4% of the sample reported the sinking and subsequent oil spill of the BURMAH AGATE; 102 (17.20%) dealt with the capping of the IXTOC I; 10 (1.69%) reported upon the costs of the IXTOC oil spill; 53 (8.94%) described the environmental issues; 16 (2.70%) reported the impact of the oil spill on the commercial fishing industry; 137 (23.10%) provided information on the litigation and/or political negotiations; 28 (4.72%) described the effects of the oil spill on tourism; 213 (35.92%) provided the public with a brief history of the disaster and updated the status of spill; 25% or 7 of the 28 sources that dealt with tourism were carried by the television medium.

The majority of the media coverage occurred during the month of September in 1979. This corresponds to the approximate arrival of the oil in American waters. The media coverage increased as August approached, peaked during September and then tapered off in October. The time of the year corresponds approximately to the seasonal tourist influx during the last days of summer.

As part of the study, an indirect indicator of tourist behavior, traffic counts at the Flour Bluff entrance to Padre Island were compared with the temporal distribution of the media coverage. The media coverage has several peaks--in early June, corresponding to the IXTOC I blowout and during the month of August. The slope of the traffic count remains relatively stable until August, when it exhibits a sharp decline. This does not establish a clear cause and effect relationship between the media and the behavior of tourists, nor does it establish a relationship between the media and the decline in expenditures that were asserted in other sections.

The number of information sources and their relatively high density (August/September/October of 1979) may have reshaped the public's viewpoint of the Texas Coastal Region and changed the public's subsequent behavior from approach to avoidance of the coast. As a direct result, the tourism and recreation industries along the coastline may have suffered an economic loss.

FUTURE RESEARCH NEEDS

The approach used to study the economic effects of the IXTOC I oil spill was macro in orientation. The objective was to produce a scientific estimate of the direct and indirect impacts of the spill on a particular study area as well as to produce a methodology that is exportable so that future spill effects may be assessed.

For Texas, the following recommendations will improve the state of the art:

1) Regular annual surveys of tourists (in and out of state) are needed to determine expenditure patterns (a) by tourist classes, (b) within separate regions of Texas, (c) by SIC coded business categories, (d) by travel objective, (e) by origin, (f) by quarter, to reflect seasonal differences.

2) A model of tourist activity should be implemented and include: regular measurement of employment, payroll, and taxes generated by travel.

3) Recreation and Tourism tradespeople in the coastal areas where there is a high risk of oil spills should organize for oil spill contingency planning and develop information systems that will yield accurate estimates of social and economic impacts once the spill has been controlled.

The IXTOC I Oil Spill Economic Impact Study is intended to present a scientifically based analysis of the major direct and indirect effects of the oil spill on the commercial fishing, tourism, and recreation industries along the designated Texas Gulf coast counties. The study also provides, through the use of an input-output analytical model, the basis for future updating of industry data and the prediction of economic impacts of future oil spills on the three major industrial sectors analyzed.

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.