Mississippi Research Consortium

Economic Impact Assessment of the Deepwater Horizon Oil Spill

Final Report

December 2011

This page intentionally left blank

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

SUMMARY OF KEY FINDINGS

Before declining in the second half of 2011, it appears that the Mississippi Gulf Coast economy received a slight overall boost from activities related to the Deepwater Horizon oil spill in 2010 and the early part of 2011. Reductions in leisure tourism were offset by cleanup activities and direct payments from BP. However, the negative tourism impact continued as cleanup activities and BP payments declined.

Employment increased by about 1,400 in 2010 and 1,100 in 2011. This represents an approximately 1 % increase in total Gulf Coast employment in 2010 and 3/4 % in 2011. Personal income increased by $277 million in 2010 and $215 million in 2011 as BP compensated businesses and households for documented lost income.

Executive Table 1. Total Gulf Coast Impacts Resulting from Observed Oil Spill Related Effects.

	2010	2011
Total Employment	1,404	1,091
Personal Income (millions)	$277.1	$215.5
Output (millions)	$188.0	$73.0
Population	342	393

In more recent months, a number of tourism specific and broader economic indicators have declined. Occupancy rates have declined on the Gulf Coast relative to the broader southeastern region. Gulf Coast sales tax collections have declined relative to the state. Unemployment rates are rising relative to a comparison group of counties.

Much of this can be explained by an oil spill related decline in tourism. Based on trends in available data and a survey of travelers in key feeder markets, it is estimated that the volume of tourists has declined about 10 percent. Table 2 presents a forecast of the economic effects of a permanent 10 percent decline in tourists during the key summer months. The projected employment losses represent about 1 % of Mississippi Gulf Coast employment

Executive Table 2. Forecasted Gulf Coast Impacts Resulting from a Permanent Tourism Decline.

	2012	2013	2014	2015
Total Employment	(1,576)	(1,527)	(1,455)	(1,374)
Personal Income (millions)	$ (46.4)	$ (51.9)	$ (55.9)	$ (58.6)
Output (millions)	$ (101.0)	$ (99.7)	$ (96.5)	$ (92.6)
Population	(605)	(906)	(1,151)	(1,347)

The effects of a temporary decline in tourism were also examined. Table 3 presents the impacts of a forecasted 10 percent tourism decline in 2012 and a 5 percent decline in 2013. This projection assumes a return to normal tourism activity in 2014.

Executive Table 3. Forecasted Gulf Coast Impacts Resulting from a Temporary Tourism Decline.

	2012	2013	2014	2015
Total Employment	(1,576)	(785)	(22)	12
Personal Income (millions)	$ (46.4)	$ (31.2)	$ (11.0)	$ (7.6)
Output (millions)	$ (101.0)	$ (52.1)	$ (2.9)	$ 0.2
Population	(605)	(717)	(630)	(554)

There remains considerable uncertainty related to the oil spill related effects on the Mississippi Gulf Coast. While cleanup efforts are winding down, plans for restoration activities are being formed. BP has committed $1 billion to fund restoration projects across the Gulf of Mexico. Early projects selected for this funding include an oyster restoration project in the Mississippi Sound and an artificial reef habitat project across the Mississippi coast.

The survey conducted as part of this research demonstrates that the tourism market has been negatively impacted by the oil spill. Some leisure tourists who had previously visited the Mississippi Gulf Coast are now visiting other destinations. It remains to be seen whether this will be a permanent outcome or if they will eventually return.

INTRODUCTION

SURVEY OF KEY FEEDER MARKETS

Executive Summary

The primary objectives of this component of the research were to (a) assess current and historical visitation patterns to the Mississippi Gulf Coast, (b) investigate behavioral perspectives, relative to the BP oil spill, of recent visitation trends to the Mississippi Gulf Coast, (c) discern the importance of seafood safety when deciding whether to visit the Mississippi Gulf Coast, and (d) understand perceptions of the safety of Mississippi Gulf Coast seafood.

Data were collected via telephone in November 2011. The data extraction method was a quota sample with random properties of the following Mississippi Gulf Coast feeder markets:

- $ Atlanta, Georgia Metropolitan Statistical Area (MSA) (ATL)
- $ Orlando, Florida MSA (ORL)
- $ Birmingham, Alabama MSA (BIR)
- $ Mobile, Alabama MSA (MOB)
- $ South Central Mississippi (SCM)

The subpopulation sample size was n = 200 for each of the aforementioned feeder markets, which resulted in a total sample size of n = 1,000. In order to qualify for the survey, the potential respondent had to be 21 years of age and indicate that they had visited the Mississippi Gulf Coast in the past six years.

Notably, the average time to complete the survey was four minutes and the overall incidence rate was 31%. Of the 54,990 total dialings, 48.1% were terminated by answering machine or voicemail, and 39.3% were terminated by either respondent not being available, no answer, or a disconnection. The majority (55.4%) of the respondents were female.

General Findings

- $ The plurality (48.7%) of respondents indicated the last time they had visited the Mississippi Gulf Coast was less than one year ago.
  - As expected, place of residence in the context of distance from the Gulf Coast was directly related to the response proportions.
- $ The mean number of visits to the Mississippi Gulf Coast since October 2005 (9.87) was highly skewed by the south central Mississippi feeder market (15.31).
- $ The mean number of visits to the Mississippi Gulf Coast since April 2010 (3.22) was very slightly skewed by the south central Mississippi feeder market (5.44).
- $ Just under 22% of the total respondents indicated they would have visited the Mississippi Gulf Coast more often if the oil spill had not occurred.
- $ When asked to name the types of activities they typically participated in when visiting the Mississippi Gulf Coast, the most often cited response was beach activities (42.1%). With regard to the impact on tourism, this finding further illustrates the importance of perception related to beach cleanliness and safety as related to the oil spill.

-However, reasons for visiting were variable, and, at least to some extent, determined by geography.

$ Just under 18% of the total respondents indicated they purposefully visited the Mississippi Gulf Coast less frequently since the BP oil spill.

-Those guests that indicated they had not visited the Mississippi Gulf Coast since the oil spill occurred were more likely to indicate they *purposefully* visited less often since the event. This finding was statistically significant at the 95% confidence level.

$ Just over 32% of the total respondents indicated that, because of the BP oil spill, they had visited other places instead of the Mississippi Gulf Coast.

-The highest proportion (37.9%) who visited other areas was from the Birmingham market.

-Notably, when asked what other places they visited instead of the Mississippi Gulf Coast, there were 254 destinations mentioned by respondents. Of these 254 destinations, 29.9% were in the State of Florida, 15.4% were in the Florida Panhandle, and 4.7% were on the Alabama Gulf Coast.

-Those guests that indicated they had not visited the Mississippi Gulf Coast since the oil spill occurred were more likely to indicate they visited other places instead of the Mississippi Gulf Coast. This finding was statistically significant at the 95% confidence level.

Seafood Safety

$ Overall, 74.6% of the respondents indicated that the safety of seafood was an important or very important issue when deciding whether to visit the Mississippi Gulf Coast.

-The highest proportion (81.7%) of important/very important responses was discerned from the south central Mississippi market.

-One-way analysis of variance revealed that, while the mean score of importance levels differed among the feeder markets, only the difference between the Orlando market (3.82) and south central Mississippi market (4.23) was statistically significant at the 95% confidence level. In other words, we can be 95% confident that the differences observed in the sample are true differences in the population. In this regard, seafood safety is more important to the south central Mississippi market. This does not indicate that there are no other population differences regarding this question, but only indicates that we cannot make that inference with 95% confidence.

-An independent samples t-test revealed that there was a statistically significant difference at the 99% confidence level in perceived seafood safety importance between

those respondents that would and would not have visited the Mississippi Gulf Coast more often if the oil spill had not occurred. The mean importance level was higher (4.56) for respondents that would have visited more often than those that would not have visited any more often (3.86).

-An independent samples t-test revealed that there was a statistically significant difference at the 99% confidence level in perceived seafood safety importance between those respondents that did and did not purposefully visit the Mississippi Gulf Coast less often due to the BP oil spill. The mean importance level was higher (4.60) for respondents that purposefully visited less often than those that did not purposefully visited less often (3.91).

-An independent samples t-test revealed that there was a statistically significant difference at the 99% confidence level in perceived seafood safety importance between those respondents that did and did not visit other places instead of the Mississippi Gulf Coast. The mean importance level was higher (4.29) for respondents that visited other places than those that did not visit other places (3.90).

$ Just over 80% of the total respondents believed that seafood from the Mississippi Gulf Coast is safe to eat.

-Those respondents that indicated they did *not* believe the seafood was safe to eat were much more likely to indicate they would have visited the Mississippi Gulf Coast more often if the oil spill had not occurred. This finding was statistically significant at the 99% confidence level.

-Those respondents that indicated they did *not* believe the seafood was safe to eat were much more likely to indicate they purposefully visited the Mississippi Gulf Coast less frequently since the BP oil spill. This finding was statistically significant at the 99% confidence level.

-Those respondents that indicated they did *not* believe the seafood was safe to eat were much more likely to indicate they visited other places instead of the Mississippi Gulf Coast. This finding was statistically significant at the 99% confidence level.

$ Just over 66% of the total respondents indicated they planned to visit the Mississippi Gulf Coast within the next 12 months.

-Of the individual markets, just under 85% of those from south central Mississippi answered in the affirmative.

-An independent samples t-test indicated that the importance of seafood safety was not an indicator of *future* plans to visit the Mississippi Gulf Coast.

Based on the findings herein, it is clear that visitation patterns to the Mississippi Gulf Coast were

significantly interrupted due to the BP oil spill. This is evident by the fact that 1 out of 5 residents in the key feeder markets indicated they would have visited more often if the oil spill had not occurred. Moreover, this finding is corroborated by the fact that 17.8% of the total sample indicated they purposefully visited the Mississippi Gulf Coast less often since the BP oil spill. Along those lines, 32.3% indicated they had visited other places instead of the Mississippi Gulf Coast since the oil spill. Moreover, the findings suggest that the State of Florida, and, more specifically, the Florida Panhandle, was the primary benefactor of this visit migration.

Of importance, the findings further indicate there is a high degree of association between the change in visitation patterns and perception of seafood safety on the Mississippi Gulf Coast. For example, those respondents that indicated they did *not* believe the seafood was safe to eat were much more likely to indicate they purposefully visited the Mississippi Gulf Coast less frequently since the BP oil spill. This information is critical to understanding the phenomenon of visitation loss during this period, and the inherent challenges in rebuilding loyalty and visitation rates to an area when 20% of its visitor population believes the seafood is still unsafe to eat today.

As long as there is doubt about the safety of Mississippi Gulf Coast seafood, the conversion rate of advertising expenditures will be lower than in the past. It should also be noted that there are hidden tourism costs associated with the oil spill in terms of loyalty degradation related to trial visits to other areas. Hence, scaffolding advertising expenditures that were incurred in the years leading up to the oil spill must be incurred again to rebuild loyalty in the region.

Data Extraction Method

A telephone survey was conducted in October 2011 with residents of the following Mississippi Gulf Coast feeder markets:

$ Atlanta, Georgia Metropolitan Statistical Area (MSA) (ATL)
$ Orlando, Florida MSA (ORL)
$ Birmingham, Alabama MSA (BIR)
$ Mobile, Alabama MSA (MOB)
$ South Central Mississippi (SCM)

The subpopulation sample size was n = 200 for each of the aforementioned feeder markets, which resulted in a total sample size of n = 1,000. In order to qualify for the survey, the potential respondent had to be 21 years of age and indicate that they had visited the Mississippi Gulf Coast in the past six years. The primary objectives of the study were to (a) assess current and historical visitation patterns to the Mississippi Gulf Coast, (b) investigate behavioral perspectives, relative to the BP oil spill, of recent visitation trends to the Mississippi Gulf Coast, (c) discern the importance of seafood safety when deciding whether to visit the Mississippi Gulf Coast, and (d) understand perceptions of the safety of Mississippi Gulf Coast seafood.

In sum, the data extraction method was a quota sample in each feeder market with random properties. The total sample size was n = 1,000. With a sample size of1,000, the proportional margin of

error at the 95% confidence level for the entire sample is ±3.09% (in the worst case).

Findings

The plurality (48.7%) of respondents indicated the last time they had visited the Mississippi Gulf Coast was less than one year ago. As expected, place of residence in the context of distance from the Gulf Coast was directly related to the response proportions. Please see Table 12 for details.

Table 12

When was your last visit to the Mississippi Gulf Coast?

Response	Total	ATL	ORL	BIR	MOB	SCM
<1 year ago	48.7%	33.5%	35.9%	37.4%	67.9%	69.0%
>1 but <2 years ago	17.0%	20.1%	19.2%	20.7%	14.8%	10.2%
>2 but <3 years ago	11.8%	14.9%	11.6%	13.6%	8.2%	10.7%
>3 but <4 years ago	9.7%	15.5%	7.6%	15.2%	5.6%	4.6%
>4 but <5 years ago	6.9%	6.7%	13.6%	8.1%	2.0%	4.1%
>5 but <6 years ago	4.2%	6.2%	8.6%	4.5%	0.5%	1.0%
>6 but <7 years ago	1.7%	3.1%	3.5%	0.5%	1.0%	0.5%

The mean number of visits to the Mississippi Gulf Coast since October 2005 (9.87) was highly skewed by the south central Mississippi feeder market (15.31). Please see Table 13 for details.

Table 13 How often have you visited the Mississippi Gulf Coast since October 2005?					
Total	**ATL**	**ORL**	**BIR**	**MOB**	**SCM**
9.87	3.99	2.17	4.00	6.24	15.31

The mean number of visits to the Mississippi Gulf Coast since April 2010 (3.22) was very slightly skewed by the south central Mississippi feeder market (5.44). Please see Table 14 for details.

Table 14 How often have you visited the Mississippi Gulf Coast since April 2010?					
Total	**ATL**	**ORL**	**BIR**	**MOB**	**SCM**
3.22	1.10	1.84	1.21	3.92	5.44

Just under 22% of the total respondents indicated they would have visited more often if the oil spill had not occurred. As expected, the south central Mississippi was impacted the most by perceptions of the oil spill. Please see Table 15 for details.

Table 15 Would you have visited the Mississippi Gulf Coast more often if the oil spill had not occurred?						
Response	**Total**	**ATL**	**ORL**	**BIR**	**MOB**	**SCM**
Yes	21.7%	18.7%	16.5%	23.0%	20.6%	23.7%

Table 15 Would you have visited the Mississippi Gulf Coast more often if the oil spill had not occurred?						
No	78.3%	81.3%	83.5%	77.0%	79.4%	76.3%

When asked to name the types of activities they typically participated in when visiting the Mississippi Gulf Coast, the most often cited response was beach activities (42.1%). However, reasons for visiting were variable, and, at least to some extent, determined by geography. Please see Table 16 for details.

Table 16 What types of activities do you typically participate in when visiting the Mississippi Gulf Coast?						
Response	**Total**	**ATL**	**ORL**	**BIR**	**MOB**	**SCM**
Beach activities	42.1%	52.6%	40.3%	54.9%	24.5%	37.8%
Casino gaming	36.3%	32.7%	31.6%	30.8%	55.7%	31.1%
Other	27.0%	24.0%	24.0%	26.2%	24.4%	37.2%
Sightseeing	17.4%	14.8%	21.9%	19.0%	14.6%	16.8%
Shopping	15.4%	10.7%	6.6%	12.3%	14.1%	33.2%
Charter boat fishing	13.9%	14.3%	13.8%	13.8%	10.4%	17.3%
Cultural activities	7.4%	7.1%	7.1%	6.7%	6.8%	9.2%
Golf	3.6%	4.6%	5.6%	4.6%	2.1%	1.0%

Just under 18% of the total respondents indicated they purposefully visited the Mississippi Gulf Coast less frequently since the BP oil spill. Please see Table 17 below for details.

Table 17

Have you purposefully visited the Mississippi Gulf Coast less frequently since the BP oil spill?

Response	Total	ATL	ORL	BIR	MOB	SCM
Yes	17.8%	15.1%	12.0%	23.0%	20.6%	18.5%
No	82.2%	84.9%	88.0%	77.0%	79.4%	81.5%

Just over 32% of the total respondents indicated that, because of the BP oil spill, they had visited other places instead of the Mississippi Gulf Coast. The highest proportion (37.9%) who visited other areas was from the Birmingham market. Please see Table 18 below for details.

Notably, when asked what other places they visited instead of the Mississippi Gulf Coast, there were 254 destinations mentioned by respondents. Of these 254 destinations, 29.9% were in the State of Florida, 15.4% were in the Florida Panhandle, and 4.7% were on the Alabama Gulf Coast.

Table 18

Since the BP oil spill, have you visited other places instead of the Mississippi Gulf Coast?

Response	Total	ATL	ORL	BIR	MOB	SCM
Yes	32.3%	30.8%	31.0%	37.9%	32.7%	29.1%
No	67.7%	69.2%	69.0%	62.1%	67.3%	70.9%

Overall, 74.6% of the respondents indicated that the safety of seafood was an important or very important issue when deciding whether to visit the Mississippi Gulf Coast. The highest proportion (81.7%) was discerned from the south central Mississippi market. Please see Table 19 for details.

Table 19

When deciding on whether to visit the Mississippi Gulf Coast, how important is the safety of the seafood in your decision-making process?

Response	Total	ATL	ORL	BIR	MOB	SCM
Very important	53.1%	57.3%	46.2%	53.8%	49.7%	58.7%
Important	21.5%	20.1%	22.6%	22.1%	19.5%	23.0%
Neither important nor unimportant	6.5%	6.0%	7.5%	4.5%	8.2%	6.1%
Unimportant	13.3%	11.1%	14.6%	15.6%	17.9%	7.1%
Very unimportant	5.7%	5.5%	9.0%	4.0%	4.6%	5.1%
Mean score	4.03	4.13	3.82	4.06	3.92	4.23
Top two box proportion	74.6%	77.4%	68.8%	75.9%	69.2%	81.7%
Bottom two box proportion	18.9%	16.6%	23.6%	19.6%	22.6%	12.2%

Just over 80% of the total respondents believed that seafood from the Mississippi Gulf Coast is safe to eat. Please see Table 20 for details.

Table 20 Do you believe the seafood from the Mississippi Gulf Coast is safe to eat?						
Response	**Total**	**ATL**	**ORL**	**BIR**	**MOB**	**SCM**
Yes	80.3%	75.6%	82.2%	83.0%	77.3%	83.2%
No	19.7%	24.4%	17.8%	17.0%	22.7%	16.8%

Just over 66% of the total respondents indicated they planned to visit the Mississippi Gulf Coast within the next 12 months. Of the individual markets, just under 85% of those from south central Mississippi answered in the affirmative. Please see Table 21 for details.

Table 21 Do you plan to visit the Mississippi Gulf Coast in the next 12 months?						
Response	**Total**	**ATL**	**ORL**	**BIR**	**MOB**	**SCM**
Yes	66.3%	57.0%	54.9%	63.8%	69.9%	84.4%
No	33.7%	43.0%	45.1%	36.2%	30.1%	15.6%

OVERALL IMPACTS AND MODELING

Introduction

An April 20, 2010 explosion on the Deepwater Horizon oil-drilling rig, owned by Transocean Ltd. and licensed by BP, resulted in an estimated 4.9 million barrels of oil being released into the Gulf of Mexico (Polson, 2011). Within one week, a 20 mile by 20 mile rainbow sheen with areas of emulsified crude was located approximately 40 miles offshore and the Gulf Coast states were notified (RestoreTheGulf.gov, 2010a). Local, state and federal agencies began preparing for potential impacts from the spill.

Oil began washing ashore in early May 2010 (RestoreTheGulf.gov, 2010c). The first oil spill-related advisories for the beaches of Mississippi were issued on June 28, 2010 and all advisories were lifted in early November. A total of 2,148 advisory days at 17 beaches in Mississippi were issued due to the oil spill (Natural Resources Defense Council, 2011).

Commercial and recreational fishing areas are closed along with several wildlife refuges. According to NOAA, in 2008 commercial fishermen alone harvested more than 1 billion pounds of finfish and shellfish in 2008 in the Gulf of Mexico (RestoreTheGulf.gov, 2010). At least some portion of the fishing grounds off the coast of Mississippi was closed from June 1 through the first week of August. For the month of July, all of Mississippi's fishing waters were closed due to the oil spill.

Economic Impacts Analysis

This section details the estimation of economic impacts related to the oil spill. First, the direct impacts are estimated in the tourism and fisheries sectors. These direct impacts were then used as inputs into the REMI economic modeling software to estimate the indirect, or multiplier, effects.

In many cases, the impacts of the oil spill were difficult to separate from wider trends in the economy. The national recession that began in 2008 and the continued recovery from Hurricane Katrina were impacting Mississippi simultaneously to the oil spill. Wherever possible, comparison regions were used to provide counterfactuals. In other words, the Mississippi Gulf Coast was compared with other regions in an attempt to isolate the effects of the oil spill from some of the other trends in the overall economy. The Methodology Appendix provides further detail about these procedures.

Tourism

Changes in tourism related to the oil spill were estimated based on occupancy rate data (see Methodology appendix for details). This captured both the effects of decreased leisure tourism and the effects of monitoring and cleanup workers from out of the region who stayed in hotels. This approach does not capture the impacts of changes in day trips to the Mississippi Gulf Coast. Data for this type of visitors were not available.

It was estimated that on average, hotel room nights increased 68 rooms per day over the period May-December 2010 compared with pre-spill levels. The increase in 2010 was due to a large number of

BP contracted workers on the gulf coast. There were approximately 4,000 workers in Mississippi working on monitoring and cleanup of the oil spill in the summer of 2010. About 35% of those workers were from out of state. This influx of cleanup workers was offset by a reduction in the volume of the Mississippi Gulf Coast's traditional tourists. The increase in room nights of 14,554 represented less than 1% of the total room nights sold from May to December.

In 2011, occupancy rates were lower, with an average decrease of 397 rooms per day. As the cleanup efforts were being wrapped up, occupancy rates decreased, especially in the latter half of the year. Beginning in May 2011, occupancy rates in Mississippi Gulf Coast hotels fell an average of 13% (year over year) through October, the most recent data available at the time of the report. The 122,401 room nights represents a decrease of about 4% in total room nights.

Table 22. Estimated Changes in Hotel Room Nights

	No. of Rooms Per Day	No. of Days	No. of Room Nights
May – December 2010	68	214	14,554
January – December 2011	-397	365	-122,401

The gulf coast visitor survey conducted as part of this research confirms that the Mississippi coast's tourism sector has been hurt by the oil spill. As detailed above, almost 18% of respondents indicated that they purposefully visited the Mississippi Gulf Coast less frequently since the BP oil spill. A significant proportion of those respondents indicated that they had visited other places instead of the Mississippi coast because of the oil spill. Seafood safety was an important consideration for these tourists.

The estimated changes in room nights are used to calculate the estimated changes in spending related to tourism. According to the Mississippi Development Authority Tourism Division, the average travel party size for Mississippi visitors is 2.8 persons. A visitor profile study provided estimates of visitor spending for Mississippi overnight visitors. These values were used to estimate the total change in tourism related spending.

Table 23 displays visitor spending by sector. The estimates of changes in room nights provide the basis for the spending calculations. Hotel spending was calculated by multiplying the change in room nights by the average daily rate (ADR) for the Gulfport-Biloxi market in each of the years. Spending in the other sectors was calculated by multiplying the change in visitor nights by average daily spending figures (see Methodology Appendix for data source and calculation details).

Table 23. Estimated Changes in Visitor Spending

		May – Dec 2010	Jan – Dec 2011
Room Nights		14,554	-122,401
Average Party Size		2.8	2.8
Visitor Nights		40,751	-342,723
	Estimated Spending Per Night	May – Dec 2010	Jan – Dec 2011
Total Loss of Hotel Revenue	$82 – 2010 ADR $84 – 2011 ADR	$ 1,194,883	$ (10,281,684)
Food	$51	$ 2,078,311	$ (17,478,863)
Gas	$10	$ 407,512	$ (3,427,228)
Gaming	$56	$ 2,282,067	$ (19,192,477)
Other Retail	$14	$ 570,517	$ (4,798,119)
Attraction/Amusements	$5	$ 203,756	$ (1,713,614)
Total Estimated increase/ decrease in visitor spending		$ 6,737,047	$ (56,891,985)

The overall estimate of the increase in 2010 tourism spending due to the oil spill was just over $6.7 million. For 2011, the decrease is estimated at almost $56.9 million. The changes in sectoral visitor spending will be used as the primary impacts for purposes of modeling the wider regional effects of the oil spill on tourism.

Fisheries

The value of commercial fisheries landings and a survey of fishing and seafood related firms were used to determine the impacts of the oils spill on their employment and output. Sales in these industries were down about $46.7 million. Table 24 details the reductions in each sector.

Table 24. 2010 Sales Reductions in Fishing and Related Industries

	Sales (in millions)
Fishing	$ 16.5
Seafood Product Preparation and Packaging	$ 26.8
Fish and Seafood Merchant Wholesalers	$ 1.8
Scenic and Sightseeing Transportation, Water	$ 1.7

In 2011, advanced reports of landing volumes suggest that the fisheries industry has recovered well from the oil spill. Shrimp and menhaden, which make up the bulk of Mississippi's seafood harvest,

were on track to match historical average volumes. No impacts from the fisheries sector were assumed for 2011.

Vessels of Opportunity

The Vessels of Opportunity (VoO) program was created to provide local boat operators an opportunity to assist with response activities of the oil spill. The main activities of the program include supporting skimming, tending and maintaining boom, collecting sheen and light oil in shallower waters, finding and removing tar balls from the water, and transportation of supplies, personnel and wildlife.

To qualify for the program boat operators and crew had to complete four hours of training, pass a U.S. Coast Guard dockside examination and meet crewing requirements based on vessel size. Vessels had to be certified as safe. Payment amount was based on the size of the vessel and crew. Table 25 shows the breakdown of rates for vessels and crew.

Table 25. Payment Rates for Vessels of Opportunity Program

Vessels	Rate
Vessel less than 30'	$1200/24 hour day
Vessel >30'-45'	$1500/24 hour day
Vessel >46'-65'	$2000/24 hour day
Vessel >65'	$3000/24 hour day

Crew Services	Rate
Actual spill response, classroom training, table top activities or meetings as defined in contract	$200/8 hour day/ crew member
	If 12 hours are worked will be prorated to $300/day/crew member

Source: Factsheet on BP Vessels of Opportunity Program

BP published a factsheet on the VoO on July 7, 2010 and stated that on average there were 3,000 vessels in the water daily across the Gulf Coast, and over 85% of the vessels were registered as commercial and charter fishing vessels. (BP, 2010)

Total paid to Mississippi VoO participants as of November 30, 2011 was $117,100,000. Ninety eight percent of payments were paid out in 2010. Table 26 shows the total payments for this program in Mississippi.

Table 26. Mississippi Total Payments for Vessels of Opportunity Program

	2010	2011
VoO Payments (in millions)	$ 114.9	$ 2.2

Source: BP Payments and Investments – Mississippi Reports

Government Impacts

BP has made a number of payments to government entities in Mississippi related to the oil spill. During 2010 and 2011, these payments have totaled almost $122.8 million in Mississippi. The payments to government by category are displayed in Table 27.

Table 27. BP Payments to Mississippi State and Local Governments

Category	Amount
Response and Removal Advances	$ 75,000,000
Response and Removal Cost Requests	$ 4,245,887
Loss of Revenue	$ 189,997
Increased Public Service Costs	$ 33,941
Behavioral Health Payments	$ 12,000,000
Contributions	$ 530,327
Total	$ 92,000,152

Source: BP Claims and Government Payments. Gulf of Mexico Oil Spill Public Report.

Government Reimbursements

The $75 million for response and removal activities was transferred to the Mississippi Department of Marine Resources to be used for state and local government responses activities. About $33.3 million was allocated to state agencies, cities and counties along the gulf coast to cover environmental monitoring, cleanup and restoration along with other increased municipal costs. About $16.4 million was used to purchase oil barrier fencing. The Mississippi Department of Marine Resources administered these funds. As of December 1, 2011, $24,541,516 of the $75 million remains in a fund that will be used in restoration activities. Table 28 sums these payments by year (Tom Doster, personal communication).

Table 28. State and Local Government Monitoring, Cleanup, and Restoration Reimbursements

	2010	2011
Government Reimbursements	$ 11,698,106	$ 21,649,408

Source: MS Department of Marine Resources

In addition to the response and removal advances, BP reimbursed state and local government directly for reimbursement of response costs, loss of revenue, and increased public service costs. These payments total $4,245,887. Table 29 sums these payments by year.

Table 29. Local Government Reimbursement Payments

	2010	2011
Local Gov't Payments	$ 2,633,721	$ 1,836,104

Source: BP Report. State of Mississippi Claims Paid.

Behavioral Health

BP announced in August 2010 that it would provide $52 million in funding to provide support and outreach services for mental health programs in the Gulf. The Mississippi Department of Mental Health, which received $12 million, will lead the mental health effort across the Mississippi Gulf Coast. The MS Department of Health awarded 14 grants to provide behavioral health services to individuals impacted by the Deepwater Horizon Gulf Coast oil spill.

Examples of services to be provided through the grant funding are substance abuse prevention and treatment, employment assistance for individuals with a mental illness, coping skills for families and children dealing with stress, anxiety and/or depression, domestic violence prevention and intervention, as well as general psychiatric interventions for those who have been affected by the oil spill.

Grants were awarded to the following providers:

- Gulf Coast Mental Health Center
- Singing River Services
- NAMI-MS
- Dream Inc.
- Gulf Coast Women's Center for Nonviolence
- Lutheran Episcopal Services
- The ARC
- Mental Health Association of Mississippi (received two grants)
- Mississippi Coast Collaborative Partnership
- MS Families as Allies for Children's Mental Health
- Mississippi Children's Home Services
- South Mississippi State Hospital
- Gulf Coast Family Counseling

Source: MS Dept. of Mental Health

The $12 million will be used as a 2011 input in the modeling process as an increase in the social assistance sector.

BP Claims Data

BP has committed to paying individuals and businesses for lost earnings or profits related to the oil spill. These payments were reported by industry at the state level and by total amount at the county level. Table 30 displays estimates of BP claims payments made to businesses by sector for the three coastal counties (see Methodology appendix for details on estimations). Table 31 displays payments made to individuals.

Table 30. BP Claims Payments to Businesses for Mississippi Coastal Counties

	2010	2011	Total
Fishing	$ 39,894,628	$ 16,651,812	$ 56,546,441
Food, Beverage and Lodging	$ 19,579,032	$ 14,144,056	$ 33,723,087
Multiple Industry/Business Types	$ -	$ 11,550,099	$ 11,550,099
No Industry Designation	$ -	$ 1,856,105	$ 1,856,105
Rental Property (ies)	$ 9,759,327	$ 21,373,164	$ 31,132,491
Retail, Sales and Service	$ 54,152,558	$ 52,229,702	$ 106,382,260
Seafood Processing and Distribution	$ 7,092,611	$ 4,744,566	$ 11,837,177
Tourism and Recreation	$ 1,971,943	$ 7,427,736	$ 9,399,680
Total	$ 132,450,099	$ 129,977,240	$ 262,427,339

*Figures in this table have been estimated using MS Program Statistics GCCF Reports, BP Payments and Investments – MS Report and Total Amounts Paid by Category Table August 2010.

Table 31. BP Claims Payments to Individuals for Mississippi Coastal Counties

	2010	2011	Total
Fishing	$ 17,829,779	$ -	$ 17,829,779
Food, Beverage and Lodging	$ 33,510,727	$ 17,467,898	$ 50,978,625
Multiple Industry/Business Types	$ -	$ 13,629,903	$ 13,629,903
No Industry Designation	$ -	$ 120,536	$ 120,536
Rental Property (ies)	$ 636,477	$ 4,769	$ 641,245
Retail, Sales and Service	$ 44,939,401	$ 18,962,951	$ 63,902,352
Seafood Processing and Distribution	$ 7,978,735	$ 3,109,499	$ 11,088,234
Tourism and Recreation	$ 715,930	$ 10,602,943	$ 11,318,873
Total	$ 105,611,049	$ 63,428,670	$ 169,039,719

*Figures in this table have been estimated using MS Program Statistics GCCF Reports, BP Payments and Investments – MS Report and Total Amounts Paid by Category Table August 2010.

Table 32. BP Claims Payments to Businesses Statewide

	2010	2011	Total
Fishing	$ 47,016,311	$ 19,624,366	$ 66,640,677
Food, Beverage and Lodging	$ 23,074,130	$ 16,668,944	$ 39,743,073
Multiple Industry/Business Types	$	$ 13,611,934	$ 13,611,934
No Industry Designation	$	$ 2,187,442	$ 2,187,442
Rental Property (ies)	$ 11,501,486	$ 25,188,537	$ 36,690,024
Retail, Sales and Service	$ 63,819,457	$ 61,553,347	$ 125,372,803
Seafood Processing and Distribution	$ 8,358,730	$ 5,591,529	$ 13,950,259
Tourism and Recreation	$ 2,323,959	$ 8,753,679	$ 11,077,638
Total	$ 156,094,073	$ 153,179,778	$ 309,273,850

*Figures in this table have been estimated using MS Program Statistics GCCF Reports, BP Payments and Investments – MS Report and Total Amounts Paid by Category Table August 2010.

Table 33. BP Claims Payments to Individuals for Statewide

	2010	2011	Total
Fishing	$ 21,012,614	$ -	$ 21,012,614
Food, Beverage and Lodging	$ 39,492,804	$ 20,586,133	$ 60,078,938
Multiple Industry/Business Types	$ -	$ 16,063,009	$ 16,063,009
No Industry Designation	$ -	$ 142,054	$ 142,054
Rental Property (ies)	$ 750,096	$ 5,620	$ 755,716
Retail, Sales and Service	$ 52,961,637	$ 22,348,071	$ 75,309,708
Seafood Processing and Distribution	$ 9,403,038	$ 3,664,582	$ 13,067,620
Tourism and Recreation	$ 843,732	$ 12,495,699	$ 13,339,431
Total	$ 124,463,921	$ 74,751,469	$ 199,215,391

*Figures in this table have been estimated using MS Program Statistics GCCF Reports, BP Payments and Investments – MS Report and Total Amounts Paid by Category Table August 2010.

Oil & Gas Sector

Employment in industries related to the Oil and Gas Sector were examined for Hancock, Harrison and Jackson Counties along the MS Gulf Coast to see what role they play in the economy of the coast and also what they contribute at the state level. Table 34 shows the industries examined and the employment in these industries for the study area and for Mississippi. In 2011 employment on the coast accounted for 3% of total state employment for these industries. This is down .16% from 2009 and up .02% from 2010. The Oil and Gas Sector represents less than 0.2% of total employment in the three coastal counties.

Table 34. Oil and Gas Related Industries for the Gulf Coast of Mississippi

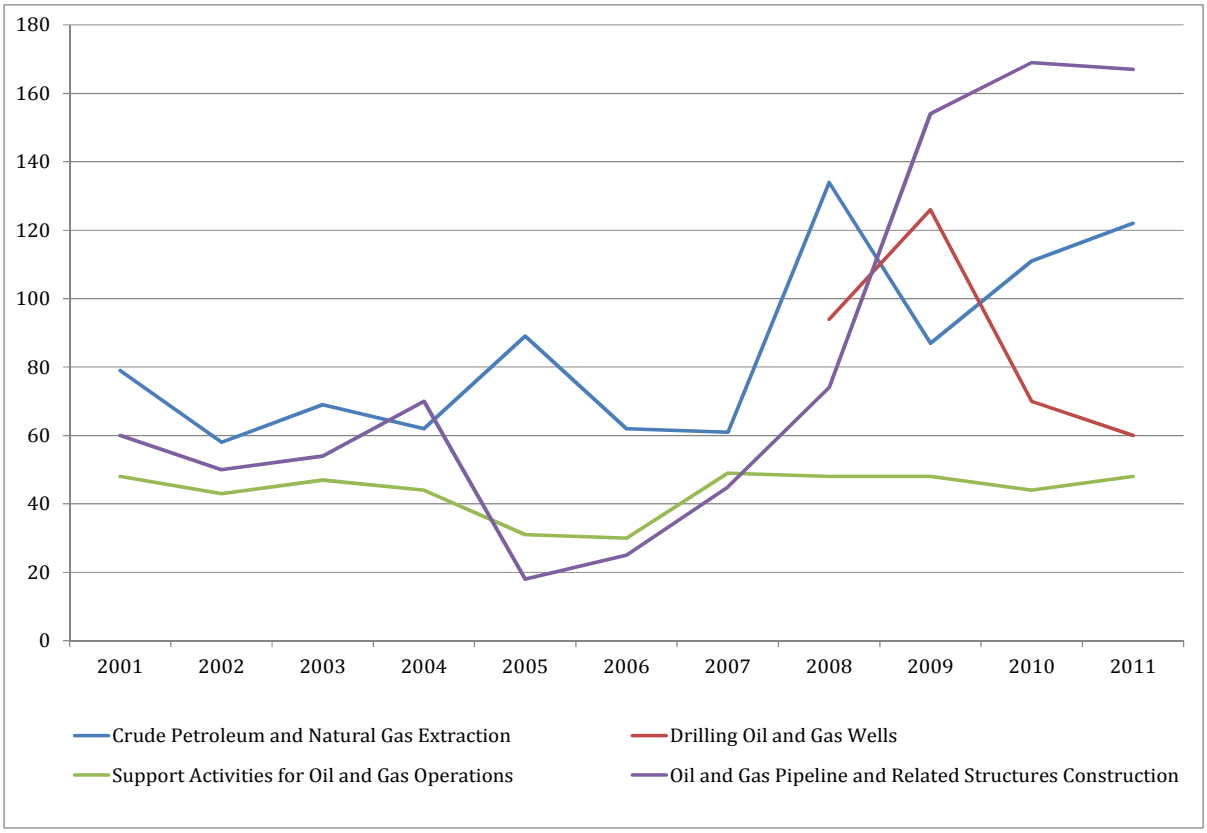
NAICS Code	Description	Gulf Coast Employment 2011	MS Employment 2011	Coast Employment as a % of State Employment
211111	Crude Petroleum and Natural Gas Extraction	122	6,957	2%
213111	Drilling Oil and Gas Wells	60	1,122	5%
213112	Support Activities for Oil and Gas Operations	48	3,225	1%
237120	Oil and Gas Pipeline and Related Construction	167	1,682	10%
	Total	397	12,986	3%

Source: EMSI Complete Employment, 2011.4

Figure 3 shows the trend for employment in the oil and gas industries on the MS Gulf Coast between 2001 and 2011. Total employment for these industries increased by 112% over the 10 year period, primarily in 2007 and 2008. In 2010 employment decreased by 5% from 2009 while 2011 has an almost 1% growth over 2010.

Oil and Gas Pipeline and Related Structures Construction industry showed the most growth over the period. Total employment went from 60 in 2001 to 169 in 2011. In 2011 employment decreased by 1% in this sector. The industry with the largest recent decrease in employment is the Drilling Oil and Gas Wells which decreased by 44% from 2009 to 2010 and by 14% from 2010 to 2011. Further research is underway to evaluate the causality of the oil spill and related drilling moratorium on the decline of this sector.

Figure 3. Employment in Gas and Oil Related Industries in the MS Gulf Coast Counties



Source: EMSI Complete Employment – 2011.4

Oil and gas related employment makes up a small fraction of the total employment in Mississippi and the Gulf Coast. Employment in these industries showed no apparent effects in 2010 and 2011 with some sectors increasing and others decreasing. Thus, impacts on this industry were not used in the modeling of oil spill impacts.

REMI Modeling

The impacts detailed above were used as inputs into the REMI economic model to determine the effects on the overall economy. The REMI model is a dynamic economic model that allows the effects of changes in the economy to be evaluated over time. The modeling section will be divided into two sections. The first section will focus on the impacts related to the oil spill that have been observed during 2010 and 2011. The second section will evaluate the potential impacts under several scenarios, using assumptions about the future effects of the oil spill on tourism.

Observed Effects – Gulf Coast

The modeling of the observed impacts of the oil spill was done in stages. The first step looked at the sectors that were negatively impacted: tourism and fisheries. Because data were not available to accurately separate the negative effects of leisure tourism and the offsetting positive tourism effects of

the cleanup activities, an overall tourism effect was estimated. As detailed above, tourism spending increased $6.7 million in 2010 and decreased $56.9 million in 2011.

Fisheries were negatively affected by the oil spill due to closures of the fishing grounds in 2010. 2010 fisheries and related industry sales were reduced by $46.7 million. In 2011, it appears the fisheries sector recovered well and no impacts are included in the model.

The overall (direct and indirect) impacts of the changes in these two sectors are displayed in Table 35. Employment was reduced by 582 jobs in 2010 and 1,023 jobs in 2011. Personal income fell by over $19 million in 2010 and over $28 million in 2011 as a result of the impacts in the tourism and fisheries sectors.

Table 35. Total Impacts from Tourism and Fisheries.

	2010	2011
Total Employment	-582	-1,023
Personal Income (millions)	($19.1)	($28.2)

The second step of modeling the observed impacts focused on the cleanup efforts and reimbursements for lost earnings or profits ('BP Claims'). The Vessels of Opportunity program spent $114.9 million in 2010 and $2.2 million in 2011. State and local government expenditures on monitoring, cleanup and restoration projects (reimbursed by BP) totaled $14.3 million in 2010 and $23.5 million in 2011. Funds for a behavioral health program totaled $12 million in 2011. The largest impacts in this section came from the BP claims payments. Payments to businesses and individuals totaled $238.1 million in 2010 and $193.4 million in 2011.

The overall (direct and indirect) impacts of the changes in these sectors are displayed in Table 36. Employment increased by almost 2,000 jobs in 2010 and over 2,100 jobs in 2011. Personal income increased by almost $300 million in 2010 and $245 million in 2011 as a result of the cleanup activities and BP claims.

Table 36. Total Impacts Resulting from Cleanup and Claims.

	2010	2011
Total Employment	1,987	2,114
Personal Income (millions)	$296.4	$243.8

Combining all of the observed effects yields the overall impacts of the oil spill on the Mississippi Gulf Coast. The positive economic effects of the cleanup activities and BP claims payments more than offset the negative impacts in fisheries and tourism. The results were positive overall in both 2010 and 2011. Employment increases were about 1,400 in 2010 and 1,100 in 2011.

Since the BP claims payments went directly to households and business owners, the personal income increases were much higher than would typically be seen for an increase of 1,400 jobs. Personal

income increased by $277 million in 2010 and $215 million in 2011. REMI also estimates population change as a result of changing employment opportunities. The model estimates that 342 persons in 2010 and 393 in 2011 moved in to the region as a result of increased employment opportunities.

Table37. Total Gulf Coast Impacts Resulting from Observed Oil Spill Related Effects.

	2010	2011
Total Employment	1,404	1,091
Personal Income (millions)	$277.1	$215.5
Output (millions)	$188.0	$73.0
Population Change	342	393

Retail trade had the largest employment increase in 2010, but those gains decreased in 2011 following the larger impact trends. The transportation sector had a large increase in 2010, which essentially went away in 2011. The Vessels of Opportunity program was modeled as 'water transportation', driving the pattern in that sector. Health care and social assistance saw a big increase in 2011, driven by the BP grant aimed at establishing behavioral health programs.

There were some sectors that showed losses in employment. After gaining some jobs in 2010, both accommodations & food service and arts, entertainment & recreation showed drops in 2011. The drop in tourism drove this in 2011. Not surprisingly, the fishing sector showed employment losses in 2010. The 2010 drop in manufacturing is primarily a loss in seafood processing jobs.

Table 38. Employment Changes in Selected Sectors

	2010	2011
Retail Trade	345	209
Transportation and Warehousing	276	5
Construction	235	261
Health Care and Social Assistance	221	868
Accommodation and Food Services	148	-301
Administrative and Waste Services	135	99
Real Estate and Rental and Leasing	90	50
Arts, Entertainment, and Recreation	59	-361
Manufacturing	-51	4
Forestry, Fishing, Related Activities	-472	2

Observed Effects – State of Mississippi

The primary impacts for the state level modeling were essentially the same as for the gulf coast, except for the BP claims. Claims data were available in a format that allowed for a split between the gulf coast counties and the rest of the state. About 85% of the claims were focused on the three coastal counties.

It is estimated that 2,141 jobs were created statewide in 2010 as a result of the various impacts of the oil spill. That number fell to 881 in 2011. Personal income increased by over $350 million in 2010 and $265 million in 2011.

Table 39. Total Statewide Impacts Resulting from Observed Oil Spill Related Effects.

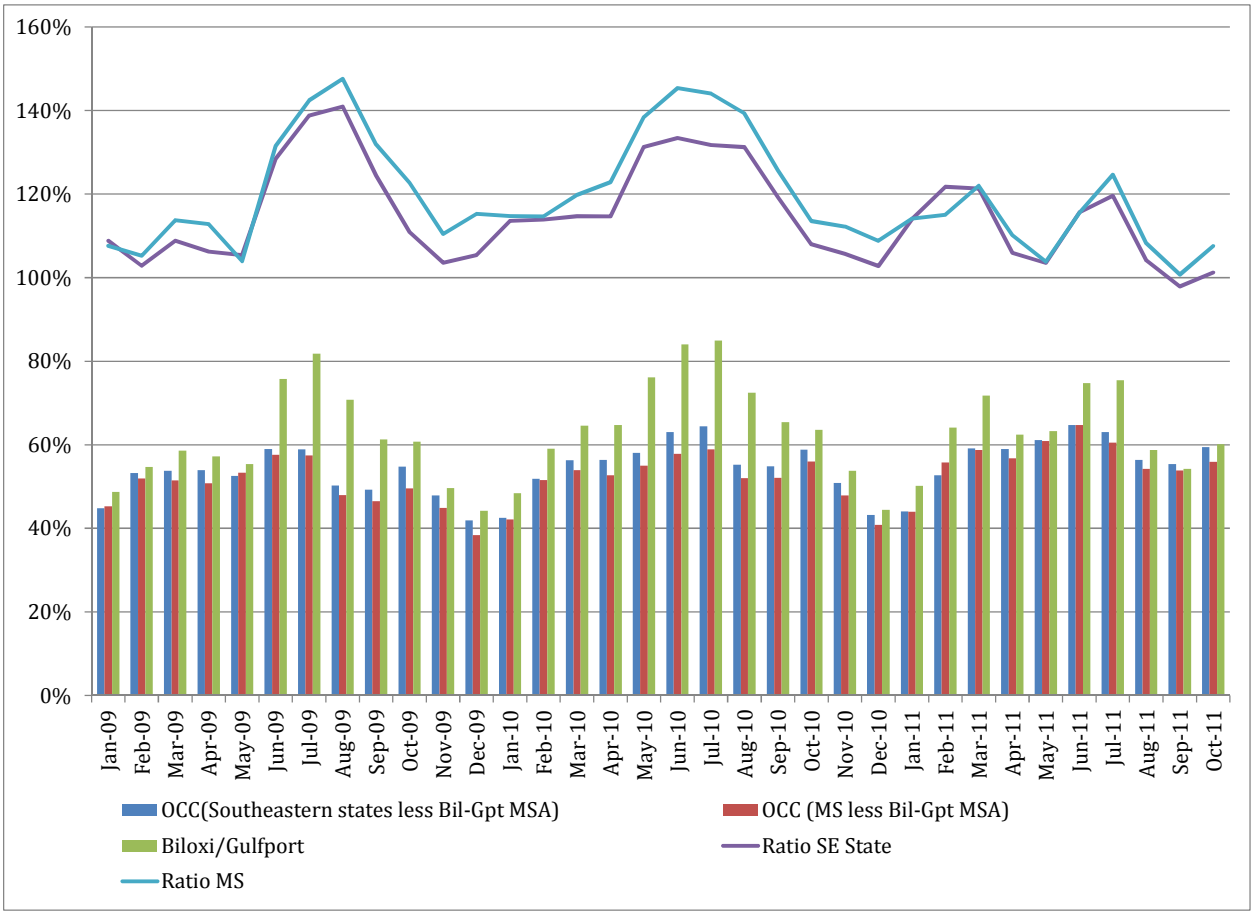
	2010	2011
Total Employment	2,141	881
Personal Income (millions)	$351.8	$265.3
Output (millions)	$203.2	$81.7
Population Change	468	518

Recent Trends

The 2011 decline in tourism amounted to about 4% of the market. However, the declines were primarily in the second half of the year. Figure 4 shows occupancy rates for the Mississippi Gulf Coast (MGC), the State of Mississippi (outside of the coast), and the southeast region (Louisiana, Arkansas, Mississippi (outside of the coast), Tennessee and Alabama). MGC occupancy rates tend to be similar (within 5-10%) to the wider region during the winter months while in the summer months they increase to about 40% higher. In 2009, MGC occupancy rates rose 20% higher than the wider region in June and stayed above that level through September. It peaked in July and August with rates about 40% above the southeast. In 2010, MGC occupancy rates rose above the 20% increase level a little earlier, in May. This was likely due to cleanup efforts early in the oil spill. The 2010 peak rate was also seen a month earlier in June. Rates stayed about 40% above the Mississippi average through August. MGC rates dropped below the 20% higher level in September, just as was observed in 2009.

The pattern of occupancy rates was quite different in the summer of 2011. MGC occupancy rates did increase in June, but to a level that was significantly lower than previous years. Rates peaked in July, just 20% higher than the regional rates. August rates were about 10% above the region, down from 35 to 40% in previous years. September rates were roughly equal to regional rates, compared to levels that were 20 to 30% higher in 2009 and 2010.

Figure 4. Hotel Occupancy Rates for the Mississippi Gulf Coast and Southeastern States.



Source: Smith Travel Research Data

The decline in Mississippi Gulf Coast occupancy rates is further illustrated by comparing various markets in the southeast. Mobile, Biloxi-Gulfport, and Pensacola (all areas impacted by the oil spill) were the worst performing over the period May-October 2011 (Table 40). Biloxi-Gulfport occupancy rates fell by 13% from 2010 to 2011. Non-coastal areas saw occupancy rates increase over this period. These reductions in occupancy rates were supported by the survey conducted as part of this study. About 20% of respondents indicated that they had made fewer trips to the Mississippi Gulf Coast since the oil spill.

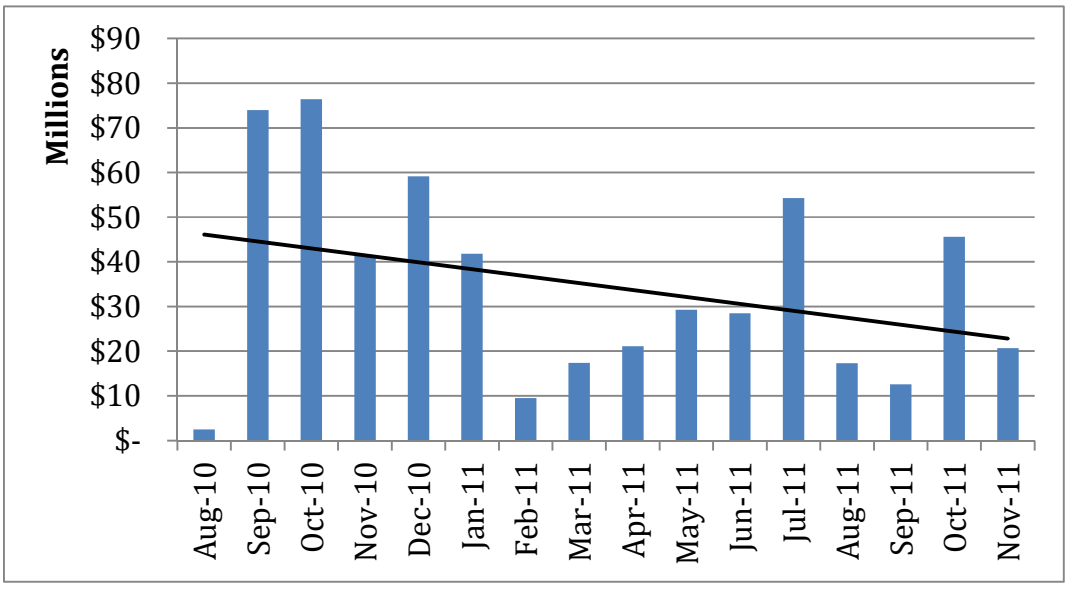
Table 40. Changes in Occupancy Rates, 2010 vs. 2011, in Southeastern Markets.

	May - October Yr/Yr Change
Mobile, AL	-25%
Biloxi-Gulfport MSA	-13%
Pensacola, FL	-8%
New Orleans, LA	-1%
Chatanooga, TN	1%
MS South/Hattiesburg	1%
Gatlinburg, TN	1%
Baton Rouge, LA	1%
Memphis, TN	3%
Columbia, SC	4%
Jackson, MS	5%
Nashville, TN	6%
MS Central/Vicksburg	7%
MS North/Tupelo	10%
Tuscaloosa, AL	11%
Birmingham, AL	13%

Source: Smith Travel Research

BP claims payments have also decreased in 2011. Figure 5 shows claims paid by month in Mississippi. While they tend to fluctuate considerably from month to month, there is a downward trend as the time since the oil spill increases.

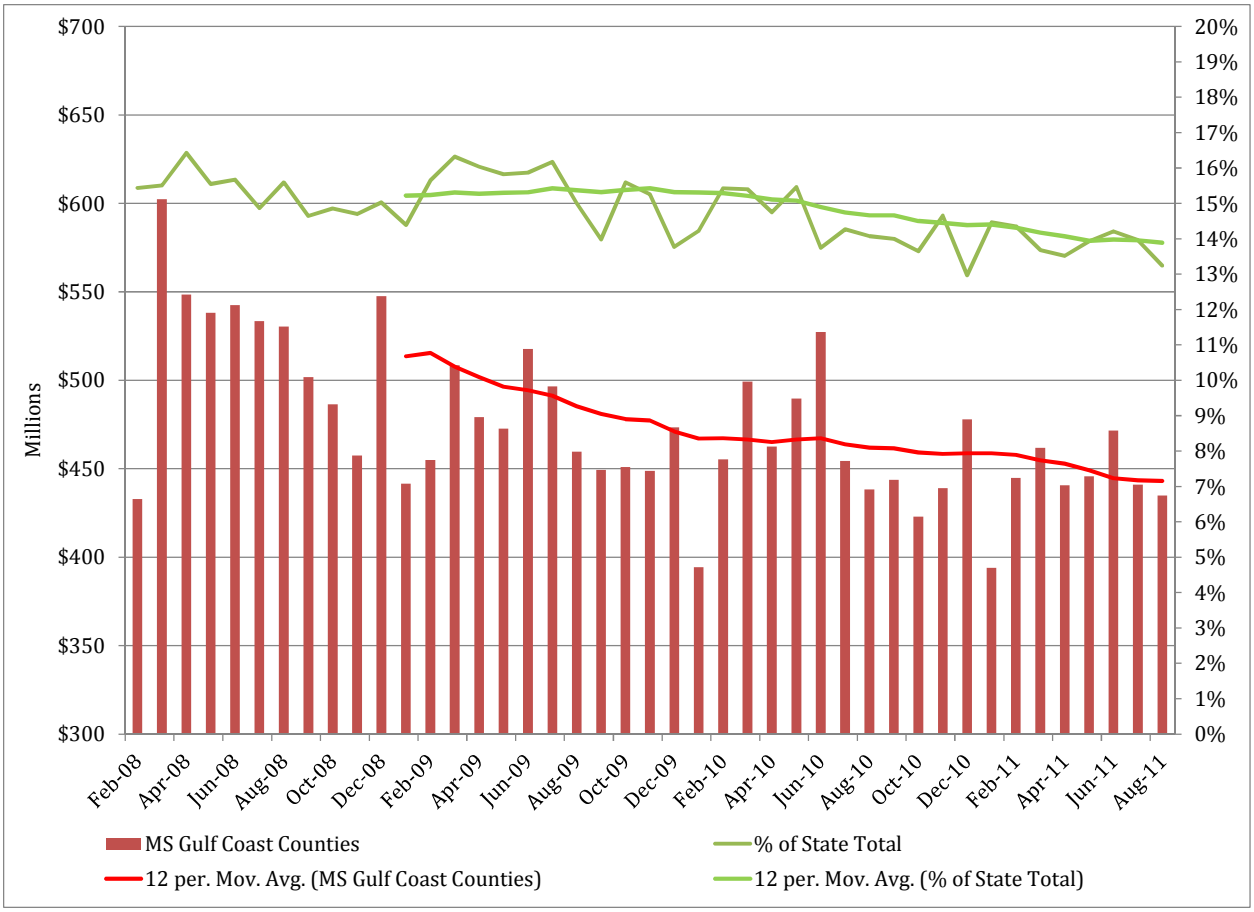
Figure 5. Mississippi monthly total claims paid.



Source: GCCF MS Program Statistics Report

Broader measures of economic activity are also showing signs of a weakening economy on the Mississippi Gulf Coast. Retail sales are falling, both in absolute terms and as a percentage of statewide collections. Figure 6 displays total sales for the three coastal counties. They have been falling steadily since 2008, when average monthly sales were over $500 million. These declines mirrored the statewide trend through mid-2010 as the coast's share of statewide sales stayed at about 15.5%. Since that point, the coast's share fell steadily, dropping below 14% by the summer of 2011.

Figure 6. Mississippi Gulf Coast Retail Sales as Indicated by Tax Collections



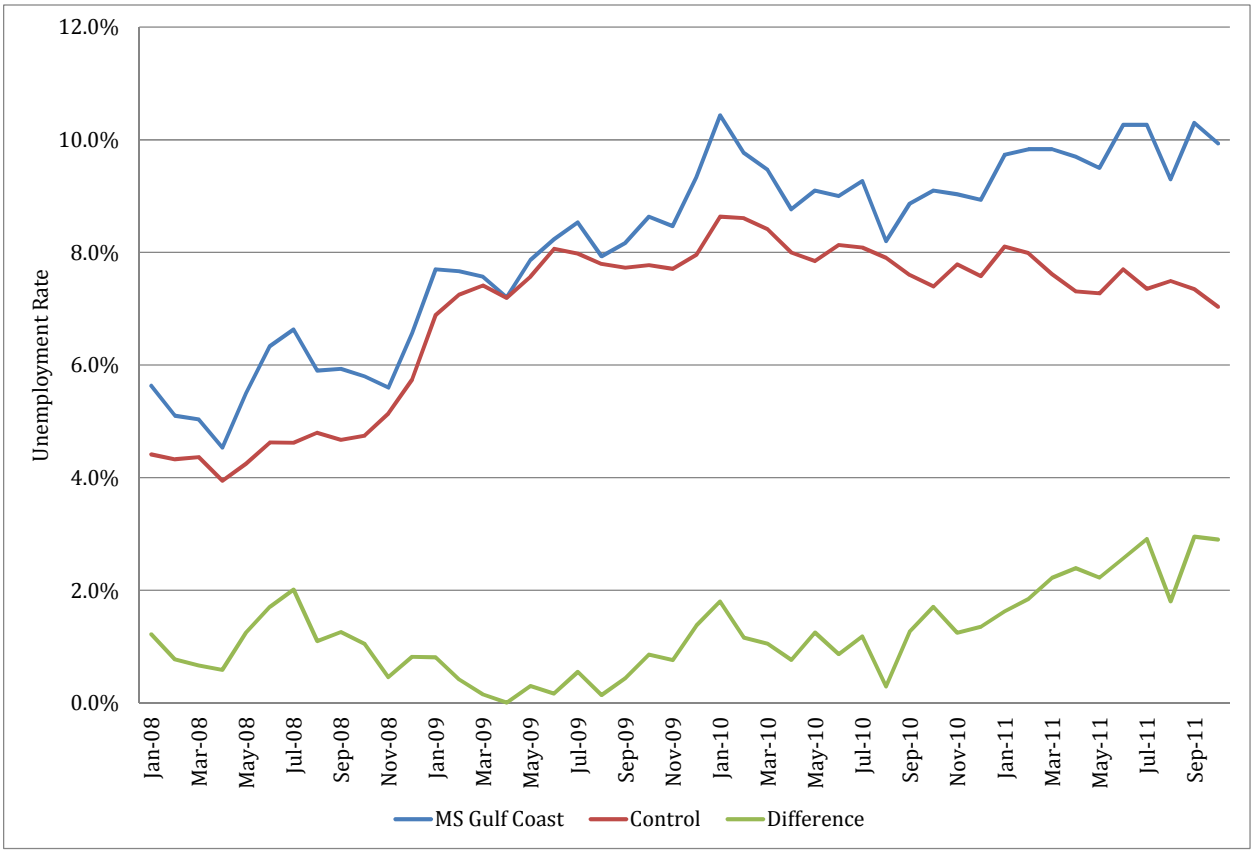
Source: MS Dept. of Revenue

Unemployment rates are rising on the Mississippi Gulf Coast relative to similar counties. Mississippi Gulf Coast counties were matched[4] with control counties using a variety of economic and demographic measures to give a comparison group to contrast the observed trends. Unemployment rates are one of the few economic indicators that are available for all US counties on a monthly basis. Figure 7 compares monthly unemployment rates for the oil spill impacted coastal counties and the matched control counties. Throughout 2010, the difference between the two groups was roughly about

[4] See Appendix for the matching methodology.

1%, with short fluctuations above or below that value. Beginning in the end of 2010, the difference between the two groups began to steadily grow, with the difference reaching about 3% by fall 2011.

Figure 7. Comparison of Unemployment Rates for the MS Gulf Coast and Matched Control Counties



Source: Bureau of Labor Statistics. Local Area Unemployment Statistics.

Tourism Scenario Modeling

In addition to the observed effects modeled above, a couple of scenarios were examined to gauge potential impacts going forward. First, a permanent reduction in tourism was assumed and modeled through 2015. The second scenario assumed that the reduction in tourism will be temporary and that the market would return to 2009 levels by 2014.

The analyses below assume that the reductions occur just in these months. Mississippi Gulf Coast occupancy rates compared with the wider region were about 10% lower than 2009. In addition, the visitor results indicate that about 20% of Mississippi Gulf Coast visitors are purposefully visiting less because of the oil spill. Based on the declining occupancy rates in late 2011 and the survey results indicating a decline in Mississippi Gulf Coast visitation, the reduction in tourism is projected to be 10% in 2012. This reduction is carried through 2015 for the first scenario. For the second, the reduction drops to 5% in 2013 and no effect is assumed for 2014 forward.

Permanent Tourism Decline

A shift in visitation can lead to a permanent decline for a region. If the visitors to the Mississippi Gulf Coast decide that they like the new destination better, they might never return to Mississippi. A permanent 10% decline in tourist visits to the Mississippi Gulf Coast would result in significant economic damage (Table 41). Employment losses of about 1,500 represent about 1% of total employment in the three coastal counties. Sales in all industries would decline about $100 million.

Table 41. Economic Effects of a Permanent Tourism Decline

	2010	2011	2012	2013	2014	2015
Total Employment	123	-1,010	-1,576	-1,527	-1,455	-1,374
Personal Income (millions)	$3.1	($25.9)	($46.4)	($51.9)	($55.9)	($58.6)
Output (millions)	$7.7	($63.8)	($101.0)	($99.7)	($96.5)	($92.6)
Population Change	32	-237	-605	-906	-1,151	-1,347

Temporary Tourism Decline

Another scenario involves leisure tourists eventually returning to Mississippi as the real or perceived threat to the beaches and seafood subside. Table 42 displays the economic effects of a 10% decline in 2012 followed by a gradual return to the baseline by 2014. Employment would return to the baseline by 2015. However, the population would decline by over 500 as workers moved to other regions in search of better employment opportunities during the slowdown in tourism.

Table 42. Economic Effects of a Temporary Tourism Decline

	2010	2011	2012	2013	2014	2015
Total Employment	123	-1,010	-1,576	-785	-22	12
Personal Income (millions)	$3.1	($25.9)	($46.4)	($31.2)	($11.0)	($7.6)
Output (millions)	$7.7	($63.8)	($101.0)	($52.1)	($2.9)	$0.2
Population Change	32	-237	-605	-717	-630	-554

Summary/Conclusions

It appears that the short-term economic impacts of the Deepwater Horizon oil spill were positive on Mississippi and the coastal counties. This is not uncommon for a natural or man-made disaster. Following Hurricane Katrina, retail sales, employment in sectors such as construction, and other economic indicators increased significantly.

Following the oil spill, coastal counties benefited from activities related to the monitoring and clean-up of oil in the water and on the beaches. These activities have continued into the second half of 2011, but have diminished to a small fraction of the levels seen in mid to late 2010. As of December 2011, only small crews of cleanup workers are present on the barrier islands off the Mississippi coast.

It also appears that some groups benefited from the effects of the oil spill while others were harmed. Throughout 2010, occupancy rates and tax revenues stayed relatively stable and showed little indication that the economy was suffering. However, BP paid millions of dollars to individuals and businesses that demonstrated lost earnings or profits. A speculative example of this might be in the hotel sector where larger chain hotels may have benefited from having cleanup workers while smaller, locally owned hotels may have been hurt by a lack of leisure tourists. If these smaller hotels demonstrated to BP that their business was hurt by the oil spill, they were reimbursed for lost profits. In addition employee at those small hotel may have been laid off and collected payments from BP for lost income.

Much uncertainty remains related to the economic effects of the oil spill. It is not clear how long the tourism decline will last. There are also a number of planned and potential restoration projects on the gulf coast. As was mentioned earlier in this report, Mississippi Department of Marine Resources still has $24.5 million in a fund that will be used for restoration efforts. BP has also pledged to spend $1 billion across the Gulf of Mexico on restoration projects in the coming years. Two project funded by this pledge have been announced for Mississippi with a total cost of about $13.6 million. It is not clear how much of an impact these types of projects will have on the economy of south Mississippi.

Economic Impact Methodology

Contributed by
Brian Richard
University of Southern Mississippi

Visitor Spending

Estimated changes in visitor spending on the Mississippi Gulf Coast related to the oil spill were calculated for May through December 2010 and January through December 2011. Occupancy data available from Smith Travel Research were used to calculate the expected occupancy rates on the Mississippi Gulf Coast. These expected occupancy rates were then compared to actual rates to determine post-oil spill changes in room nights.

Two comparison regions were used to isolate the effects of the oil spill. The state of Mississippi and southeastern states composed of Alabama, Arkansas, Louisiana, Mississippi and Tennessee. Data for the Biloxi-Gulfport MSA were removed from each of the comparison areas.

It was assumed that the tourism effects of the oil spill began in May 2010. The hotel average occupancy for the Biloxi-Gulfport MSA and the two comparison regions were calculated for May through December 2009 and 2010. The ratio of average 2009 occupancy for the Biloxi-Gulfport MSA to the two comparison areas was calculated. It was assumed that the occupancy rates for the Gulfport-Biloxi MSA would have behaved similarly to the comparison regions. In other words, the 2009 ratio of occupancy rates on the Mississippi Gulf Coast should have remained constant through subsequent years.

The 2010 expected occupancy rate was calculated by multiplying the 2010 southeastern states occupancy rate by the previous year ratio of southeastern states occupancy to Biloxi-Gulfport occupancy. The southeastern states were chosen as a comparison region for a more conservative calculation. Table 1 displays data used for the 2010 calculations. The ratio of occupancy rates between Gulfport-Biloxi hotels and southeastern states hotels was 1.21 in 2009 (62.5 / 51.8 = 1.21). If that ratio had held through 2010, occupancy rates in Gulfport-Biloxi given rates in the southeastern states would have been 67.6% (56.1% x 1.21 = 67.6%).

This estimated 2010 occupancy rate was then compared with the actual occupancy rate to yield a change in occupancy resulting from the oil spill. For this period, the actual occupancy rate was about 0.5% higher than the expected occupancy rate (68.1% - 67.6% = 0.5%). The difference was multiplied by the number of hotel rooms on the gulf coast to yield an estimate of 68 additional rooms per night (0.5% x 12,971 = 68). Finally, this rooms per night estimate was multiplied by the number of night between May and December to yield an estimate of the change in total number nights resulting from the oil spill (68 x 214 = 14,554).

Table 1. Data for 2010 Change in Room Nights Calculations.

	May - December 2009	May - December 2010
Average Occupancy		
Biloxi - Gulfport MSA	62.5%	68.1%
Mississippi (less Biloxi - Gulfport MSA)	49.5%	52.6%
Southeastern States (less Biloxi - Gulfport MSA)	51.8%	56.1%
Ratio of Biloxi-Gulfport Average Occupancy to		
Mississippi (less Biloxi - Gulfport MSA)	1.26	1.30
Southeastern States (less Biloxi - Gulfport MSA)	1.21	1.21
	Expected Occ Rate	67.6%
	Difference	0.5%
	GC Hotel Rooms	12,971
	Rooms/day	68
	Days	214
	Room Nights	14,554

The calculations for 2011 used a similar methodology. Since data were only available through October 2011 at the time of the report, the calculations compared January-October 2009 with the same period in 2011. The results for this period were then increased by 13%, which is the portion of annual gulf coast hotel rooms typically sold during the final two months of the year. The resulting estimate was a reduction of 122,401 rooms sold during 2011.

Table 2. Data for 2011 Change in Room Nights Calculations.

	January - October 2009	January - October 2011
Average Occupancy		
Biloxi - Gulfport MSA	59.9%	63.5%
Mississippi (less Biloxi - Gulfport MSA)	49.6%	56.5%
Southeastern States (less Biloxi - Gulfport MSA)	51.7%	57.5%
Ratio of Biloxi-Gulfport Average Occupancy to		
Mississippi (less Biloxi - Gulfport MSA)	1.21	1.12
Southeastern States (less Biloxi - Gulfport MSA)	1.16	1.10
	Expected Occ Rate	66.6%
	Difference	-3.1%
	GC Hotel Rooms	12,701
	Rooms/day	-397
	Days	273
	Room Nights	-108,320
	% Room Nights Nov/Dec	13%
	2011 Room Nights	-122,401

These estimated changes in room nights were then used as the basis for estimating changes in visitor spending. The gain/loss of hotel revenue was calculated by multiplying the estimated changes in room nights times by average daily rate from the Smith Travel Research data. The average daily rate was calculated by taking the average of the January through December time periods used above times the number of room nights.

For other visitor spending categories, the changes in room nights were converted to visitor nights by multiplying by the average party size for Mississippi Gulf Coast visitors, which was 2.8 in FY2011 (MDA, 2011). Average daily spending was divided into five categories – food, gas, gaming, other retail and attractions/amusement. Amount per night for each category were estimated by using figures from MDA for average visitor spending in Mississippi and FY 2012 federal per diem rates minus incidentals. The amount per night was multiplied by the number of visitor nights to give the total average daily spending per category for the MS Gulf Coast.

Fisheries

According to NOAA Monthly Landings reports for 2010, the value of fisheries landings in Mississippi was 42% lower in 2010 compared with the previous year. Similarly, a survey of fishermen conducted as part of this research project found that about 66% of commercial fishing firms experienced a reduction in total sales during 2010. To estimate the reduction in fisheries output, EMSI estimates of fisheries sales for 2010 was reduced by 42% to yield a reduction in total output of $16.5 million.

Similarly, the Seafood Preparation and Packaging and Seafood Wholesalers sectors were reduced by 42%. The survey of fisherman also collected data on charter boats and respondents indicated that revenue was reduced by about 52 percent.

Table 3. 2010 Reductions in Fisheries Related Industries.

	Annual Sales	Reduction	Sales Impact
Fishing	$39.3	0.42	-$16.5
Seafood Product Preparation and Packaging	$63.7	0.42	-$26.8
Fish and Seafood Merchant Wholesalers	$4.2	0.42	-$1.8
Scenic and Sightseeing Transportation, Water	$3.0	0.52	-$1.6

NOAA landings data is not yet available to 2011. Anecdotal evidence indicates that fisheries landings responded well in 2011. Losses in oyster harvests may be more related to the massive release of freshwater related to the Mississippi River floods in the spring than the oil spill. Thus, no fisheries impacts were estimated for 2011.

Claims Data

From the beginning of the oil spill until August 2010, BP directly handled the claims process. Beginning in August, the process was taken over by the Gulf Coast Claims Facility (GCCF), headed by Ken Feinberg. The total amount paid out in claims in all states by BP before the GCCF took over in August 2010 was reported in the categories as shown in Table 4. The total amount paid to Mississippi by BP during this time was $30.5 million, however a breakdown by category for each state was not available (BP, 2011c). To estimate Mississippi payments by category, it was assumed that the category breakdown for Mississippi was the same as the overall payouts.

Table 4. Gulf Wide BP Claims Paid.

	Total BP Claims (millions)	MS Claims (millions)
Wage Loss - Undefined	$ 157	$ 12.9
Fisherman	$ 51	$ 4.2
Rental Property Owners	$ 48	$ 4.0
Commercial	$ 46	$ 4.0
Shrimper	$ 30	$ 2.5
Oyster Harvester	$ 10	$ 0.8
Charter Boat Owners	$ 8	$ 0.7
Crabber	$ 8	$ 0.7
Real Estate Sales	$ 4	$ 0.3
Seafood Processor	$ 4	$ 0.3
Restaurant Owners	$ 4	$ 0.3
Total	$ 370	$ 30.5

Source: Total Amounts Paid by Category – BP Press Release Aug 23, 2010

The Mississippi estimates were then added to the GCCF payouts made between August and December 2010 to get the total claims payouts for 2010. The 'Wage Loss – Undefined' was added to the individual claims from the GCCF data. This amount was allocated by industry based on the distribution of payments by industry to individuals on the 2010 Mississippi Summary GCCF report.

Next, the GCCF used different industry sectors than BP so the BP industries were matched to the GCCF industries:

- Fisherman, Shrimper, Oyster Harvester, Crabber = Fishing
- Restaurant Owners = Food, Beverage, Lodging
- Real Estate Sales, Rental Property Owners = Rental Property (ies)
- Commercial = Retail, Sales and Service
- Seafood Processor = Seafood Processing and Distribution
- Charter Boat Owners = Tourism and Recreation

The BP individual and business payments by industry calculated above were added to the MS 2010 individual and business payments to give the total claims paid to Mississippi in 2010.

County level data by sector are not available. County level payments reported by GCCF were separated into three claim types: Resident of County, Resident and Loss in County, Claim Loss in County. Total amount paid to the MS Gulf Coast Counties Resident and Loss in County was added to Claim Loss

in County to yield the amount paid for the three coastal counties. Claims in these three counties amounted to 85% of all claims paid by GCCF in Mississippi. Individual and business claims were distributed by sector using the same allocation as the statewide claims by industry.

REMI methodology

Economic models require an estimate of a primary impact, which is used to calculate the related secondary impacts (often referred to as the multiplier effect). There are many different types of economic impacts models. The most common type of model used to calculate the multiplier effects of an activity or event (such as a factory opening or closing) is the input-output model. Input-output analysis is founded on the principle that industries are interdependent. One industry purchases inputs from other industries and households (i.e. labor) then sells outputs to other industries, households, and government. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages on consumer goods produced or sold in the region and local economy. Therefore, economic activity in one sector impacts other sectors.

Input-output models are limited in the nature of the analysis they can perform. The only changes to the economy that can be analyzed must be calculated in terms of employment, payroll, or industry sales. They are also 'static' in the sense that all impacts are calculated instantaneously and it is up to the analyst to determine the timing of how the multiplier effects work their way through an economy. Dynamic models are much more sophisticated in that many more economic variables can be manipulated and the effects of changes can be projected out in to the future. The REMI model is one of the most common dynamic economic modeling packages.

REMI evaluates changes in an economy over time. It has a baseline forecast that can be compared to observed changes in the regional economy that resulted from the oil spill. For example, the observed decline in the fisheries industry as a result of the closure of the gulf can be entered into the model. The decline in the fisheries sector, along with other interrelated sectors will be modeled to estimate the overall decline in the economy. The estimates of economic activity after the fisheries decline is modeled will then be compared to the baseline forecast to give an estimate of the changes in the economy (and resulting tax revenue changes) as a result of the fisheries decline. This methodology will be followed for all industries affected.

For the purposes of this research, modeling inputs will focus on changes in industry sales, spending related to the clean-up effort, and local government spending.