

ECONOMIC IMPACTS OF THE DEEPWATER HORIZON OIL SPILL ON MISSISSIPPI SEAFOOD AND COMMERCIAL AND SALTWATER RECREATIONAL SECTORS IN 2010



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Economic Impacts of the
Deepwater Horizon Oil Spill
*on Mississippi Seafood and Commercial
and Saltwater Recreational Fishing Sectors in 2010*

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ABSTRACT

This bulletin presents the results of an economic survey of the impacts of the Deepwater Horizon oil spill on business operations of Mississippi seafood and commercial and saltwater recreational fishing establishments in 2010. These primary data establish the cause-and-effect relationships between the associated economic impacts in affected economic sectors and the oil spill incident. The 331 Mississippi businesses that participated in the survey accounted for 25–65% of the total annual gross sales or employment in sectors included. The oil-spill-related closures of state and federal waters resulted in the shutdown of business operations of participating establishments, on average, for about 4.21 months. In 2010, the direct economic impacts of the oil spill resulted in a decline of almost one-half of the annual total sales and one-third of the total employment as compared with 2009.

INTRODUCTION

The National Commission on the Deepwater Horizon Oil Spill and Offshore Drilling (2011) reported that on “April 20, 2010, the Macondo well blew out, costing the lives of 11 men and beginning a catastrophe that sank the Deepwater Horizon drilling rig and spilled nearly 5 million barrels of crude oil into the Gulf of Mexico. The spill disrupted an entire region’s economy, damaged fisheries and critical habitats, and brought vividly to light the risks of deepwater drilling for oil and gas—the latest frontier in the national energy supply.”

The damages to Gulf of Mexico (GOM) natural resources due to the 2010 Gulf of Mexico or Deepwater Horizon oil spill (GOMOS) took some time to clean up, and the restoration period to get the resources back to their original pre-GOMOS status is still indefinite. Several early restoration projects in affected states are underway with initial funding from British Petroleum

(BP) amounting to \$1 billion (NOAA Gulf Spill Restoration 2012). In the meantime, the production and consumption of goods and services by economic sectors located in the GOM states are adversely affected, leading to possible reduction in the levels of economic activity, tax revenues, and employment and personal income.

The closures of significant portions of GOM federal and state waters to commercial and saltwater recreational fishing, as well as the closures of beach resources to human uses, due to the GOMOS altered the recreation and consumption decisions of residents and tourists in affected communities. The changes in market perceptions and flow of goods and services generated by the damaged natural resources affected not only households, but also communities dependent on these natural resources.

Table 1. Economic impacts of Mississippi commercial seafood industry by sector, 2009.¹

Economic sector	Sales impacts (\$M)	Income impacts (\$M)	Employment impacts (jobs)
Commercial harvesters	60.857	18.835	1,238
Seafood primary dealers and processors	78.907	31.217	1,046
Seafood importers and brokers	13.652	2.188	50
Seafood secondary wholesalers and distributors	10.450	3.688	112
Seafood grocery stores	18.091	8.938	429
Seafood restaurants	107.279	47.759	3517
Total impacts	289.241	112.625	6,392

¹Source: NOAA Fisheries (2011).

In response to the mandate from the Office of the Governor through the Mississippi Institutions of Higher Learning and the Mississippi Research Consortium, a team of economists from four Mississippi universities conducted coastwide assessments of the economic impacts of the GOMOS to the state of Mississippi. The economist from Mississippi State University volunteered to conduct the assessment of economic impacts of the GOMOS on the state marine economic sectors.

The scope of economic assessments focused on the three coastal counties, Hancock, Harrison, and Jackson; and the three adjacent counties, Stone, Pearl River, and George. The marine economic sectors covered in the coastwide assessments included seafood and commercial and saltwater recreational saltwater fishing. The decision to limit the economic assessments to these marine economic sectors was based on previous assessments conducted after Hurricane Katrina (Posadas 2007, 2008, 2010). The inclusion of these marine economic sectors was based on recommendations by state regulatory agencies that requested the economic assessments.

The total economic impacts of different economic sectors sum up the direct, indirect, and induced impacts of each sector to the Mississippi economy in terms of total sales, total personal income, and total employment:

- Direct effects express the economic impacts in the sector in which the expenditure was initially made.
- Indirect impacts result from changes in economic activity of other industrial sectors that supply goods or services to the sector being evaluated.
- Induced impacts are the result of personal consumption expenditures by industry employees.

The Mississippi seafood industry consists of the commercial harvesting sector, primary seafood dealers and processors, primary seafood wholesalers and distributors, seafood importers and brokers, secondary seafood wholesalers and distributors, seafood grocery stores, and seafood restaurants. Annual estimates in 2009 showed that the Mississippi seafood industry generated total sales impacts amounting to \$289.2 million (NOAA Fisheries 2011). The industry created a total of 6,392 jobs and generated personal income totaling \$112.6 million in 2009 (Table 1).

The Mississippi saltwater recreational fishing industry consists of for-hire boats, private boats, and shore recreational anglers (NOAA Fisheries 2011). Annual estimates in 2009 showed that the recreational fishing sector contributed \$417.1 million in total sales to the state economy, generated 3,188 jobs, and earned \$105.5 million in personal income (Table 2).

Table 2. Economic impacts of Mississippi saltwater recreational-fishing industry by fishing mode, 2009.¹

Economic sector	Sales impacts (\$M)	Income impacts (\$M)	Employment impacts (jobs)
Trip impacts by fishing mode:			
For hire	3.295	1.038	37
Private boat	21.122	5.618	183
Shore	4.261	1.240	45
Total durable equipment impacts	388.402	97.576	2,924
Total impacts	417.080	105.472	3,188

¹Source: NOAA Fisheries (2011).

I prepared four quarterly reports dealing with economic impacts of the GOMOS to the Mississippi marine economic sectors in 2010. These four marine economics reports were included in the quarterly reports submitted by the team of economists to the Mississippi Office of the Governor and state regulatory agencies that requested the economic assessments of the oil spill.

The first marine economics report discussed the baseline period determination in the assessment of the economic impacts of the GOMOS to the Mississippi commercial fisheries sector (Posadas and Posadas 2013a). In this first report, the 2010 commercial landings and landing values of the Mississippi commercial fisheries sector were compared to the pre- and post-Katrina baseline periods. The pre-Katrina period covered 2000 to 2004, while the post-Katrina period covered 2005 to 2009.

The second marine economics report described the license and size profiles of Mississippi seafood and commercial and saltwater recreational fishing sectors (Posadas and Posadas 2013b). The overall goal of the spatial profiles was to describe the number of seafood and commercial and recreational fishing establishments licensed to operate in Mississippi in 2009–10. These profiles provided snapshots of the number of licenses

bought by these establishments in 2009–10 as compared to the two baseline periods.

The third marine economics report measured the effects of the GOMOS to the direct employment creation performance of the seafood, and commercial and saltwater recreational fishing sectors in Mississippi (Posadas and Posadas 2011). The employment performance rate (EPR) compares the annual number of jobs directly created by these sectors during the GOMOS period relative to the mean number of jobs directly created during the two pre-GOMOS baseline periods. An EPR value of equal, less than, or greater than 100% indicates a constant, shrinking, or expanding number of workers employed by the marine sector during the GOMOS period relative to the baseline periods.

This publication is the fourth marine economics report that measures the direct economic impacts of the GOMOS to the business operations of the participating seafood and commercial and saltwater recreational fishing establishments in 2010. The direct economic impacts are measured in terms of the “changes in business operations in 2010 due to the April 20, 2010, Deepwater Horizon oil spill” in total annual sales, number of workers employed, length of shutdown period, and number of claims for financial losses filed and received by participating seafood and marine-related establishments.

ECONOMIC MODELS, SECTORS, AND DATA

The marine economic sectors included in this GOMOS impact analysis were commercial fishing, charter boats for hire, live-bait boats and dealers, commercial marinas, seafood dealers and processors, and restaurants (Appendix A). The economic impacts of the GOMOS on the participating establishments were measured from the “changes in business operations in 2010 due to the Deepwater Horizon oil spill.” The changes in business operations were calculated from the changes in total annual sales, number of workers employed, length of shutdown period, and number of claims for financial losses filed and received.

These are the economic variables used to measure the GOMOS impacts on seafood and marine-related establishments operating in Mississippi in 2010:

- (1) Location of establishment — coastal or noncoastal county;
- (2) Economic sector — charter boat for hire, commercial fishing, eating and drinking establishment, live-bait and commercial marina, or seafood dealer and processor;
- (3) Employment impact — percent change of the current number of workers compared to the number of workers employed as of April 20, 2010;
- (4) Sales impact — percent change of 2010 total annual sales compared to 2009 total annual sales;
- (6) Shutdown period — months business operations were shut down in 2010;
- (7) Claims proceeds — percent of claims filed and paid in 2010; and
- (8) Business interruption insurance — percent of establishments covered as of April 2010.

Analysis of variance (ANOVA) was used to compare the quantitative impacts of the GOMOS by economic sector. The length of shutdown period, percent of claims paid, percent change in total sales, and percent change in employment were measured and compared by economic sector. Statistical tests were conducted in order to determine if the estimated means were significantly different from zero.

Chi-square analysis was used to compare the qualitative impacts of the GOMOS by economic sector. The overall business impacts and decisions to file claims and buy business interruption insurance were measured and compared by economic sector. The Chi-square tests were conducted to determine whether the variables tested were significantly independent by economic sector included in the analysis.

The Interactive Fisheries Economic Model (NOAA Fisheries 2013) generates economic impact estimates for the commercial-fishing industry, processors and dealers, wholesalers and distributors, grocers or fish markets, and restaurants (Kirkley 2009). The income and output impacts are expressed in dollars for the year specified by the user. Output or sales is the gross sales by businesses within the economic region affected by an activity. Labor income includes personal income from wages and salaries, proprietors' income, or income from self-employment. Employment impacts are expressed in terms of a mix of both full-time and part-time jobs.

In order to measure the effects of the GOMOS to the seafood and commercial and saltwater recreational fishing sectors in Mississippi, a mail survey was sent to all the relevant resident establishments issued licenses by the Mississippi Department of Marine resources (MDMR 2010) to operate in the state in 2009–10. An online survey was deployed at SurveyMonkey.com for those establish-

ments that preferred to complete the survey online. The mail and online surveys as approved by the Mississippi State University Internal Review Board are shown in Appendices B and C.

MDMR issued 3,278 licenses to commercial and saltwater recreational fishing and seafood business establishments and recreational shrimpers, crabbers, and oystermen in 2009–10, as shown in Appendix D. All the commercial and recreational fishing and seafood establishments were included in the economic impact survey. The holders of licenses for the recreational harvesting of oysters, crabs, and shrimp were excluded because they were typically covered in Natural Resource Damage Assessment (NRDA). To eliminate double counting, since each commercial fishing and seafood establishment carried an average of two licenses, multiple business establishments located in the same address received only one survey. A total of 1,303 commercial marine establishments were sent the recruitment letter and survey questionnaire. The survey instruments were mailed to the selected respondents in July and October 2011 after their addresses were verified with postcards mailed in June 2011.

The survey also included all the registered eating and drinking places (EDP) licensed by the Mississippi Department of Health (MDH) to operate in the coastal and adjacent Mississippi counties in 2009–10. There were 1,557 EDP establishments licensed to operate in Hancock, Harrison, Jackson, George, Stone, and Pearl River Counties in 2009–10. These EDP establishments consisted of 747 fast-food delicatessens, 220 full-service bars, and 540 full-service restaurants. A total of 1,557 EDP establishments were sent recruitment letters and survey questionnaires in July and October 2011 after their addresses were verified with postcards mailed in June 2011.

RESULTS AND DISCUSSION

Survey Participation

The numbers of commercial and saltwater recreational fishing and seafood establishments that participated in the mail and online surveys as of December 31, 2011, are shown in Appendix E. A total of 331 commercial establishments completed the survey, representing 12.7% of the total sample included in the survey. Most of the marine-related firms (84.6%) that participated in the survey are single enterprises. About 13.3% of the participating businesses consisted of two enterprises, while approximately

2.1% operated three enterprises. The high concentration of single-firm enterprises heightens the vulnerability of these marine firms to natural or technological disasters. Damages, closures, or negative market perceptions of marine resources have serious economic implications to the sustainability of these commercial marine enterprises.

One hundred sixty commercial-fishing vessels (18.2% of the total) participated in the survey. The 2009 total annual gross sales of the participating commercial fishing vessels averaged \$109,298 per fishing unit. The 160 par-

ticipating commercial fishing vessels represented about 46% of the 2009 total commercial landings, which were valued at \$38 million, as reported by NOAA Fisheries (2011). Posadas (2008) reported that the commercial fishing boats and vessels averaged 47 feet in length and were licensed to harvest an average of two species per boat or vessel, primarily shrimp, oysters, crabs, or fish. The majority (81.3%) of the participating commercial fishing businesses (n=160) were single enterprises. Some business diversification was observed among 18.1% of these commercial fishing firms, which engaged in a second enterprise, primarily seafood dealerships and charter fishing businesses.

Among seafood dealers, 30 establishments responded to the survey, representing 15.7% of the licensed seafood processors, wholesalers, and retailers included in the survey. The total number of workers employed by these 30 dealers before the oil spill was 1,379, which was 43.7% of the combined number employed by all the seafood processors, wholesalers, and retailers in 2009, as reported by EMSI (2011). The participating seafood enterprises (n=30) were mostly single enterprises (70%). Approximately 16.7% of these firms operated a second enterprise, primarily commercial fishing and some restaurant or bait establishments. An additional 13.3% of these businesses operated two enterprises in addition to seafood dealership.

About 31% of the charter boats for hire (18 operators) responded to the survey. Before the oil spill occurred, these boat operators employed 30 workers, which represented about 40.5% of the total workers employed by the entire sector in the coastal and adjacent Mississippi counties in 2009, as reported by EMSI (2011). The participating charter boats (n=18) were highly concentrated, with 94.4% of the businesses operating single enterprises. Around 5.6% were engaged in a second enterprise, primarily fishing and a few bait and restaurant businesses.

Among eating and drinking places, 111 restaurants (8.2% of the total) participated in the survey. The total number of workers hired by participating restaurants before the GOMOS reached 7,756 workers, which was 65.1% of the 11,914 workers employed by all the restaurants in the coastal and adjacent Mississippi counties in 2009, as reported by EMSI (2011). Participating restaurants (n=111) in the coastal and adjacent regions were highly concentrated, with 97.3% engaged in single enterprises. Other participating restaurants operated second (1.8%) and third (0.9%) enterprises involving seafood dealership, bait shop, and fishing businesses.

Only seven live-bait establishments and five commercial marinas completed the survey, representing 26.9% and 15.6%, respectively, of the establishments included in the survey. Participating live-bait dealers and marinas employed 41 workers before the GOMOS, which was 25% of the 164 workers hired by the two sectors in 2009 in the coastal and adjacent Mississippi counties. These sectors are more diversified, with 42.9% of the live-bait firms and 20% of the commercial marinas consisting of single enterprises. Around 42.9% of the bait businesses and 80% of marinas operated second enterprises. Another 14.3% of the live-bait firms added a third enterprise involving commercial fishing, seafood dealer, charter boat, or restaurant businesses.

Overall Business Impacts

A large majority of the participating fishing and seafood establishments were adversely affected by the GOMOS in 2010. When asked about the overall business impacts, 88.6% of the participating businesses said they experienced “slightly” to “extremely bad” effects from the oil spill (Appendix F). About 3.3% of respondents reported no overall negative impacts in 2010. Approximately 2.4% of the responding businesses reported positive overall impacts in 2010.

The overall negative impacts on business operations were relatively stronger among the seafood and fishing sectors as compared with the eating and drinking places. Table 5 shows the specific responses by economic sector to the question about the overall impacts of the GOMOS to the business operation in 2010. Here are some highlights:

- About 94.5% of the participating charter boats for hire experienced “moderately” to “extremely bad” overall impacts in 2010.
- Approximately 88.8% of the commercial fishermen who joined the survey reported negative overall business impacts in 2010.
- Among the eating and drinking places that completed the survey, around 83.5% stated that GOMOS had a negative overall impact on business in 2010.
- All of the participating live-bait and commercial marina establishments reported “moderately” to “extremely bad” overall business impacts in 2010.
- Almost 96.7% of the seafood dealers and processors who finished the survey reported negative overall business impacts in 2010.

Table 3. Length of business operation shutdown in 2010 reported by resident seafood and marine-related establishments participating in the survey.

Economic sector	Charter boats for hire	Commercial fishing	Eating and drinking places	Live bait and commercial marina	Seafood dealer and processor	All sectors
Mean (months) ¹	5.37c	6.01c	0.15a	2.37b	3.80b	4.21
Standard deviation (months)	2.74	2.50	1.00	3.20	3.26	3.40
Number of cases	18	148	65	8	21	260

¹Significantly different at p = 0.0001. Means with different letters are significantly different at p = 0.000.

Impacts on Operating Period

The closures of Mississippi state and federal waters due to the GOMOS had serious implications for the overall business operations of the participating commercial fishing and seafood firms. Participating marine firms were shut down, on average, for more than 4 months in 2010 due to the GOMOS. Mississippi state waters were completely or partially closed to commercial and recreational fishing for more than 2 months from June 1 to August 6, 2011 (Posadas and Posadas 2013a). Federal waters in the Gulf of Mexico were completely or partially closed to commercial and recreational fishing for almost 1 year from May 2, 2010, to April 18, 2011 (Posadas and Posadas 2013a). The other Gulf states' waters were also closed partially or fully after the GOMOS explosion on April 20, 2010.

Mississippi marine establishments that completed the survey reported that, on average, they were shut down for about 4.21 months in 2010. The shutdown period in 2010 was relatively longer among the fishing sectors as compared with the other marine and eating and drinking place sectors (Table 3). Following are some specific impacts on the affected sectors:

- Commercial-fishing and charter-boat businesses that participated in the survey were shut down for 6.01 and 5.37 months in 2010, respectively.
- Seafood dealers and live-bait businesses and marinas in the survey were shut down for 3.8 and 2.37 months in 2010, respectively.

- Eating and drinking places that completed the survey were shut down for less than a week in 2010.

Impacts on Annual Total Sales

The closures of state and federal waters due to the GOMOS had serious implications for the overall business operations of participating marine establishments (Table 4). Direct economic impacts of the GOMOS on Mississippi fishing and seafood establishments that participated in the mail and online surveys amounted to a reduction in annual total sales equivalent to almost half of the annual total sales during the preceding year.

- Participating Mississippi fishing and seafood businesses reported a 47.8% reduction in total sales in 2010, as compared with total sales in 2009.

When viewed on a regional basis, the decline in total sales by the participating marine businesses created additional effects on the regional output of economic goods and services, employment, labor income, and tax revenues.

- The total sales impacts of the entire Mississippi seafood industry fell by 39.6% from \$289 million in 2009 to \$175 million in 2010, as reported by NOAA Fisheries (2013).
- The entire Mississippi saltwater recreational fishing industry reported a slight increase in total sales impacts by 2.9% from \$417 million in 2009 to \$429 million in 2010, as reported by NOAA Fisheries (2013).

Table 4. Percentage change in annual total sales in 2010 reported by resident seafood and marine-related establishments participating in the survey.

Economic sector	Charter boats for hire	Commercial fishing	Eating and drinking places	Live bait and commercial marina	Seafood dealer and processor	All sectors
Mean (%) ¹	-54.44ab	-60.32a	-27.89b	-54.29a	-46.73ab	-47.76
Standard deviation (%)	116.27	41.36	23.65	32.98	37.27	45.62
Number of cases	18	158	109	14	30	329

¹Significantly different at p=0.0001. Means with different letters at significantly different at p = 0.05.

The Mississippi charter-boat businesses that participated in the survey were shut down for about 5.37 months in 2010. As a result, the charter boats for hire lost about 54.4% of annual total sales in 2010.

- The annual sales impacts of charter boats for hire decreased by 58% from \$3.3 million in 2009 to \$1.4 million in 2010, as reported by NOAA Fisheries (2013).

The Mississippi commercial fishing businesses that participated in the survey were shut down for about 6.01 months in 2010. Subsequently, survey results showed that these commercial fishing establishments reported about 60.3% loss in annual total 2010 sales as compared with 2009.

- Total sales impacts of the commercial fishing sector fell to \$35.2 million in 2010, as reported by NOAA Fisheries (2013), which was 42.1% less than 2009 sales impacts (\$60.8 million).

The Mississippi eating and drinking places that completed the survey were shut down for less than a week in 2010. Consequently, the participating eating and drinking places stated that they lost 27.9% of total sales in 2010. Total sales impacts of seafood eating and drinking places are reported by NOAA Fisheries (92013) under the seafood retailing sector.

The Mississippi live-bait and marina firms that participated in the survey were shut down for 2.37 months in 2010. As a result, these businesses suffered a reduction in total sales of 54.3% in 2010. The long-term secondary data on total gross sales for these economic sectors are not available.

The Mississippi seafood dealer license allows establishments to engage in the processing, wholesaling, and retailing of seafood products in the state. Seafood dealers that responded to the mail and online surveys reported a decline in total sales of 46.7% in 2010. These businesses were shut down for 3.8 months in 2010.

- Annual sales impacts of the seafood-processing sector fell by 41.8% from \$78.9 million in 2009 to \$45.9 million in 2010, as reported by NOAA Fisheries (2013).
- The seafood-wholesaling sector also registered a decline in total sales impacts by 41% from \$10.4 million in 2009 to \$6.4 million in 2010 (NOAA Fisheries 2013).
- The seafood-retailing sector, which includes seafood stores and restaurants, experienced a reduction in total sales impacts by 40.4% from \$125.3 million in 2009 to \$74.6 million in 2010 (NOAA Fisheries 2013).

Impacts on Employment

GOMOS-related closures of state and federal waters adversely impacted the overall business operations of participating Mississippi businesses. Direct economic impacts of the GOMOS on Mississippi establishments that participated in the mail and online surveys resulted in a drop of more than one-third of the total employment in marine establishments (Table 5).

- Participating Mississippi marine businesses reported a decrease in total employment in 2010 by 33.6%, as compared with total employment in 2009.

On a regional basis, the significant fall in total direct employment in the participating marine businesses produced additional effects on the regional output of economic goods and services, employment, labor income, and tax revenues.

- Total employment impacts of the whole Mississippi seafood industry fell by 40% from 6,392 jobs in 2009 to 3,829 jobs in 2010 (NOAA Fisheries 2013).
- The entire Mississippi saltwater recreational fishing industry reported an increase in total employment impacts by 2.9% from 3,188 jobs in 2009 to 3,280 jobs in 2010 (NOAA Fisheries 2013).

Table 5. Percentage change in the number of workers employed by resident seafood and marine-related establishments participating in the survey.

Economic sector	Charter boats for hire	Commercial fishing	Eating and drinking places	Live bait and commercial marina	Seafood dealer and processor	All sectors
Mean (%) ¹	6.41bc	-44.09ab	-18.15bc	-16.96bc	-52.21a	-33.57
Standard error (%)	26.72	5.47	3.51	7.74	7.62	3.50
Number of cases	13	137	77	12	25	264

¹Significantly different at p=0.0001. Means with different letters at significantly different at p = 0.05.

Mississippi charter boats that participated in the survey were shut down for about 5.37 months in 2010. As a result, the charter-boat businesses lost more than half of their annual total sales in 2010. Despite the shut-down and reduction in total sales, the net increase in employment in 2010 reported by participating charter boats for hire was about 6.4%. This increase in employment was consistent with the Bureau of Labor Statistics (BLS) employment data for this sector.

- The annual number of jobs created by this sector was 147 jobs in 2010 representing an increase by 4.3% from 141 jobs in 2009 as reported by EMSI (2011).

The most likely explanation for the increased hiring in this sector is that charter boats for hire, which were employed in the Vessels of Opportunity Program (National Commission on the Deepwater Horizon Oil Spill and Offshore Drilling 2013), decided to hire some more crew to participate in the program.

Mississippi commercial fishing businesses that participated in the survey were shut down for about 6.01 months in 2010. These establishments reported a reduction of less than two-thirds in annual total sales in 2010. Due to the shutdown and reduction in total sales, the cutback in employment in 2010 reported by participating commercial fishing businesses was about 44.09%.

- Total employment impacts of the commercial fishing sector fell to 721 jobs in 2010 (NOAA Fisheries 2013), which was 41.7% less than the 2009 employment impacts (1,238 jobs).

The Mississippi eating and drinking places (EDP) that completed the survey were shut down for less than a week in 2010. Participating EDP establishments stated that they lost more than one-fourth of annual total sales in 2010. Because of the shutdown and reduction in total sales, the decline in employment in 2010 reported by participating eating and drinking places was about 18.15%.

- The annual number of jobs created by the EDP sector in coastal and adjacent Mississippi counties was 12,061 jobs in 2010, representing a slight increase of 1.2% from 11,914 jobs in 2009, as reported by EMSI (2011).

This section indicates that the survey's results do not coincide with secondary data on employment. EDP establishments that participated in the survey reported a decline in hiring workers, while the region's overall EDP sector experienced a slight increase in hiring. The

overall hiring increase was mostly likely brought about by the increased demand for EDP services in the region from transient customers consisting of response personnel and clean-up crews.

Mississippi live-bait and marina firms that joined the survey were shut down for 2.37 months in 2010. As a result, these businesses suffered a reduction in annual total sales of more than half in 2010. The shutdown and reduction in total sales reported by the participating firms resulted in a net percent decrease in employment of about 16.96%.

- The total number of workers employed by the live-bait and commercial marine sectors in coastal and adjacent Mississippi counties fell by 7.3% from 164 jobs in 2009 to 152 jobs in 2010 (EMSI 2011).

The Mississippi seafood dealers that responded to the survey reported a decline in total sales of almost half in 2010. These businesses were shut down for 3.8 months in 2010. Due to the shutdown and reduction in total sales, the loss in employment reported by participating seafood dealers was about 52.21%.

- Total employment impacts of the seafood-processing sector fell by 41.1% from 1,046 jobs in 2009 to 616 jobs in 2010 (NOAA Fisheries 2013).
- Total employment impacts of the seafood-wholesaling sector declined by 40.2% from 112 jobs in 2009 to 67 jobs in 2010 (NOAA Fisheries 2013).
- Total employment impacts of the seafood-retailing sector (seafood stores and restaurants) dropped by 39.7% from 3,946 jobs in 2009 to 2,379 jobs in 2010 (NOAA Fisheries 2013).

Filing and Payment of Claims

Percentages of the participating businesses by economic sector that filed direct claims with BP for financial losses in 2010 are shown in Appendix G. Almost 75% of the participating establishments stated that they filed direct claims associated with the GOMOS. Overall, the following statements summarize responses to the survey's query on financial loss claims:

- More than 73% of the participating businesses said they did file direct claims.
- About 20% of the establishments said they did not file direct claims.
- Less than 2% said they did not know or were not sure.

- Less than 5% preferred not to answer.

The means and standard deviations, by economic sector, of the percentages of claims paid to the participating Mississippi businesses that filed direct claims with BP for financial losses in 2010 are shown in Table 6.

- More than 33% of all direct claims filed by participating marine-related firms were compensated by BP or the Gulf Coast Claims Facility.
- Establishments that completed the survey reported about 34.81% of the direct claims filed with BP were paid in 2010.

Business Interruption Insurance

The percentages of all participating businesses, by economic sector, that had business insurance coverage are shown in Appendix H. About 4.5% of all participating establishments carried business interruption insurance when the oil spill occurred. This coverage was lower than the percent of insured establishments reported by Posadas (2007, 2008, 2010) in surveys of similar marine establishments after Hurricane Katrina in 2005.

- A few participating businesses (4.5%) stated that they had business interruption insurance in 2010.
- Most of the participating businesses (82.5%) said they did not carry business interruption insurance.
- Almost 5% said they did not know or were not sure if they had they insurance.
- More than 9% preferred not to answer the question.
- None of the charter boats for hire, live-bait businesses, or commercial marinas carried business interruption insurance.
- Participating commercial fishermen (1.3%) showed very low preference for insurance protection.
- Few of participating seafood dealers and processors (3.3%) reported carrying insurance protection.
- Ten percent of the participating eating and drinking establishments reported carrying business interruption insurance.

Table 6. Percent of claims filed with BP in 2010 actually paid as of December 31, 2010.¹

Economic sector	Charter boats for hire	Commercial fishing	Eating and drinking places	Live bait and commercial marina	Seafood dealer and processor	All sectors
Mean (%) ²	52.67a	40.89ab	26.54b	25.83b	20.45b	34.81
Standard deviation (%)	9.17	2.77	4.41	5.56	3.44	2.09
Number of cases	15	118	68	12	22	235

¹Means and standard deviations (in percent) of responses of resident seafood and marine-related establishments participating in the survey.
²Significantly different at p=0.0001. Means with different letters at significantly different at p = 0.002.

SUMMARY AND IMPLICATIONS

This bulletin summarizes the results of a survey of the direct economic impacts of the Deepwater Horizon oil spill on the business operations of participating Mississippi seafood and commercial and saltwater recreational fishing establishments in 2010. These impacts were measured in terms of the “changes in business operations in 2010 due to the Deepwater Horizon oil spill” in total annual sales, number of workers employed, length of shutdown period, and number of claims for financial losses filed and received by participating seafood and marine-related establishments.

The 331 Mississippi marine businesses that participated in the survey contributed between 25% and 65% of the total annual gross sales or total employment in marine economic sectors included in the impact assessment. Oil-spill-related closures of state and federal waters adversely impacted the overall business operations of participating establishments, which were shut down, on average, by about 4.21 months. The direct economic impacts of the oil spill on these businesses resulted in a decline in 2010 of almost 50% of the annual total sales and 33% of the total employment as compared with 2009.

The 18 Mississippi charter boats that participated in the survey created 41% of all the jobs generated by this economic sector in 2009. Due to the oil spill, these establishments were shut down for about 5.37 months in 2010. As a result, the boats lost more than 50% of total sales in 2010. Despite the shutdown and reduction in total sales, the number of workers employed by the participating charter boats increased by 6.4%.

The 160 Mississippi commercial fishing businesses that participated in the survey accounted for 44% of the total commercial landings in 2009. These fishing vessels were shut down for about 6.01 months in 2010 as a result of the oil spill. They reported a loss in 2010 annual total sales of almost 66%. Due to the shutdown and reduction in annual total sales, the net percent decrease in 2010 employment reported by participating commercial fishing businesses was 44.1%.

The 111 eating and drinking places located in Mississippi coastal and adjacent counties that completed the survey provided jobs to 65% of all the workers in this sector in 2009. These restaurants were shut down for less than a week in 2010 as a result of the oil spill. They reported a loss of more than 25% of annual total sales in 2010. Because of the shutdown and reduction in total

sales, the net decrease in employment in 2010 reported by participating eating and drinking places was 18.2%.

The 12 Mississippi live-bait and marina firms that joined the survey contributed 25% of all the jobs provided by this economic sector in 2009. These establishments reported that they were shut down for 2.37 months in 2010 due to the oil spill. As a result, the live-bait and marina businesses suffered a reduction in annual total sales of more than 50% in 2010. The shutdown and reduction in total sales reported by the participating live-bait and marine firms resulted to a net decrease in employment of about 16.9%.

The 30 Mississippi seafood dealers that responded to the mail and online survey reported a decline in total sales of almost 50% in 2010. These seafood businesses, which produced 44% of all the jobs of this sector in 2009, were shut down for 3.8 months in 2010. Due to the shutdown and reduction in total sales, the net decrease in employment in 2010 reported by participating seafood dealers was about 52.2%.

The majority of participating Mississippi establishments stated that they filed direct claims associated with the oil spill. When asked whether they filed direct claims with BP for financial losses, almost 75% of the businesses responded affirmatively. About 20% of the respondents did not file a direct claim. More than 33% of all direct claims filed by the participating marine-related firms were compensated by BP or the Gulf Coast Claims Facility.

Less than 5% of the participating establishments carried business interruption insurance. None of the charter boats for hire or the live-bait and commercial marinas carried this insurance. Only 1.3% of commercial fishermen had insurance coverage. A similar percentage of participating seafood dealers and processors carried the insurance. Among the eating and drinking places, 10% of the participating establishments reported carrying business interruption insurance.

I strongly suggest that follow-up surveys of business establishments be conducted in order to measure the medium- and long-term impacts perceived by commercial fishing and seafood establishments affected by the oil spill. These primary data will establish the cause-and-effect relationships between the associated economic impacts in affected economic sectors and the oil spill incident.

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dra Jones. This bulletin is dedicated to all the owners and workers of Mississippi commercial fishing, charter boats for hire, live-bait boats and dealers, commercial marinas, seafood dealers and processors, and restaurant establishments that participated in the economic impacts survey in 2010. I also appreciate the comments and suggestions of the three Mississippi State University faculty members who reviewed this manuscript.

APPENDIX A

Description of Economic Sectors

- (1) The commercial fishing sector corresponds to economic sectors 114111 or “Finfish Fishing” and 114112 or “Shellfish Fishing” in the North American Industrial Classification System (NAICS 2011).
- (2) The seafood-processing sector primarily corresponds to code 311711 or “Seafood Canning” and code 311712 or “Fresh and Frozen Seafood Processing” in the NAICS (NAICS 2011).
- (3) The seafood-wholesaling sector corresponds to NAICS codes 424460 or “Fish and Seafood Merchant Wholesalers” and 424490 or “Other Grocery and Related Products Merchant Wholesalers” (NAICS 2011).
- (4) The seafood-retailing sector corresponds to NAICS code 445220 or “Fish and Seafood Markets” and “Eating and Drinking Places.” Eating and drinking places include “full-service restaurants” or NAICS code 722110 and “limited-service restaurants” or NAICS code 722211 (NAICS 2011).
- (5) The live-bait-merchant-wholesaler sector corresponds to NAICS code 424990 or “Other Miscellaneous Nondurable Goods Merchant Wholesalers” (NAICS 2011).
- (6) The charter-boats-for-hire sector corresponds to NAICS code 487210 or “Scenic and Sightseeing Transportation, Water” (NAICS 2011).
- (7) Commercial marinas are included in the NAICS (2011) code 713930, commonly known as marinas.

APPENDIX B

Recruitment Letter: Economic Impacts of the Deepwater Horizon Oil Spill on Mississippi Seafood and Marine-Related Businesses Survey

August 11, 2011

Dear Mississippi Seafood and Marine-Related Business:

In our efforts to determine the economic impacts of the Deepwater Horizon Oil Spill to the economy of the State of Mississippi, we invite you to participate in a survey. The survey is completely voluntary. The survey will take approximately 15 minutes or less to complete. Your responses will remain confidential.

The survey is conducted by the Mississippi State University Coastal Research and Extension Center to evaluate the economic impacts of the oil spill to the Mississippi seafood and marine-related businesses. The results of the survey will provide estimates of the impacts of the oil spill to the levels of sales, tax revenues, personal income, and number of employed persons among Mississippi commercial and recreational fishing, seafood processors and dealers, marinas and live bait dealers, and restaurant sectors.

Your participation in the survey will enable us to determine the economic impacts of the oil spill to the economy of the State of Mississippi in 2010. If you have any questions or comments, please contact Amanda Seymour at 228-546-1044 or by email at aseymour@ext.msstate.edu.

We truly appreciate your participation in this survey.

Very respectfully yours,

Benedict Posadas
Associate Extension/Research Professor
228-546-1024
benp@ext.msstate.edu

<http://www.coastal.msstate.edu/gomossurvey2010.html>

APPENDIX C

Economic Impacts of the Deepwater Horizon Oil Spill on Mississippi Seafood and Marine-Related Businesses Survey

1. On April 20, 2010, how many workers were employed in your business? Please write the total number of workers employed: _____ workers.

2. Did the oil spill affect your overall business in any way during 2010? Please circle one that best describes the effects on your business operations.

0	1	2	3	4	5	6	7
Prefer not to respond	Extremely bad	Moderately bad	Slightly bad	Not at all	Slightly good	Moderately good	Extremely good

3. As a result of the oil spill, did your business experience a reduction in annual total sales during 2010? Please circle one that best describes the percent reduction in 2010 annual total sales as compared to 2009.

0	1	2	3	4	5	6	7	8	9	10	Others, specify
Prefer not to respond	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

4. Has your business laid off any workers in 2010 because of the oil spill? Please write the number of workers laid off in 2010: _____ workers.

5. As a result of the oil spill, did your business shut down operations in 2010? Please write either the total number of days, weeks or months your business shut down operations in 2010.

Number of days:	
Number of weeks:	
Number of months:	

6. Have you filed a direct claim with BP for financial losses in 2010? Please circle one.

0	1	2	3
Prefer not to respond	Yes	No	Don't know/Not sure



7. What percent of your claims filed with BP in 2010 was actually paid as of December 31, 2010? Please circle one that best estimates the percent of your claims actually paid.

0	1	2	3	4	5	6	7	8	9	10	Others, specify
Prefer not to respond	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %	

8. Do you anticipate filing a claim with BP for financial losses due to the oil spill if you have not already done so? Please circle one.

0	1	2	3
Prefer not to respond	Yes	No	Don't know/Not sure

9. As a result of the oil spill, did your business experience an increase in annual total sales during 2010? Please circle one that best describes the percent increase in 2010 annual total sales as compared to 2009.

0	1	2	3	4	5	6	7	8	9	10	Others, specify
Prefer not to respond	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %	

10. Did your business hire additional workers in 2010 as a result of the oil spill? Please write the number of workers hired in 2010: _____ workers.

11. Was your business covered by business interruption insurance in 2010? Please circle one.

0	1	2	3
Prefer not to respond	Yes	No	Don't know/Not sure

12. If your business used business interruption insurance in 2010, was the use of such insurance a direct result of the oil spill? Please circle one.

0	1	2	3
Prefer not to respond	Yes	No	Don't know/Not sure



13. For the purpose of classifying businesses by size of operation, please circle one that best describes the annual total sales of your business in 2009?

Choices	Annual Total Sales
0	Prefer not to respond
1	Less than \$250,000
2	\$250,000 to \$500,000
3	\$500,001 to \$1,000,000
4	More than \$1,000,000

14. For the purpose of classifying businesses by type of operation, please circle all that apply to your business:

Choices	Type of Operation
1	Commercial fishing
2	Charter boat for-hire
3	Seafood processing
4	Seafood dealer
5	Marina
6	Live bait dealer
7	Restaurant



End of Survey



Please mail your completed questionnaire to Mississippi State University, Coastal Research and Extension Center in the enclosed pre-paid envelope.

APPENDIX D

Number of resident seafood and marine-related establishments issued licenses to operate in Mississippi, 2009–10.

License description	Duplicate address			Sector	Decision	Sample
	No	Yes	Total			
Oyster Recreational License	8	3	11	Recreational	Exclude	0
Recreational Crab License	453	128	581	Recreational	Exclude	0
Shrimp Recreational	231	23	254	Recreational	Exclude	0
Charter Boat Tax ID	8	39	47	Charter boat for hire	Include	8
Fishing Boat - Charter, Party	59	21	80	Charter boat for hire	Include	59
Crab	87	55	142	Commercial fleet	Include	87
Crab License for Shrimpers	2	64	66	Commercial fleet	Include	2
Fishing Boat License	100	52	152	Commercial fleet	Include	100
Interstate Commerce	77	144	221	Commercial fleet	Include	77
Live Bait License - Boat	9	15	24	Commercial fleet	Include	9
Menhaden Boat & Net	0	7	7	Commercial fleet	Include	0
Mississippi Captain License	18	91	109	Commercial fleet	Include	18
MS Saltwater Minnow License	10	7	17	Commercial fleet	Include	10
Oyster Dredging + Captain License Oyster	201	78	279	Commercial fleet	Include	201
Oyster Tonging + Captain License Oyster	50	14	64	Commercial fleet	Include	50
Resident Commercial Hook & Line, Fisherman/Gig	141	178	319	Commercial fleet	Include	141
Resident Commercial Hook & Line, Vessel/Gig	142	51	193	Commercial fleet	Include	142
Shrimp/Captain 30' to 45'	47	72	119	Commercial fleet	Include	47
Shrimp/Captain Over 45'	22	179	201	Commercial fleet	Include	22
Shrimp/Captain Under 30'	90	38	128	Commercial fleet	Include	90
Live Bait License - Dealer	15	5	20	Live bait dealer	Include	15
Menhaden Processor	0	1	1	Seafood dealer	Include	0
Seafood Dealer and Processor	222	13	235	Seafood dealer	Include	222
Seafood Transport	3	5	8	Seafood dealer	Include	3
Total	1,995	1,283	3,278			1,303

Source of raw data: MDMR (2010).

APPENDIX E

Number and rate of participation by resident seafood and marine-related establishments in a mail and online survey conducted between July and December 2011.

Sector	Completed survey	Mailed survey	Returned survey	Net mailed survey	Percent completed
Commercial Fishing	160	975	96	879	18.2
Seafood Dealer	30	221	30	191	15.7
Charter Boat for Hire	18	64	6	58	31.0
Eating and Drinking Places	111	1,507	161	1,346	8.2
Live Bait Dealers and Boats	7	32	6	26	26.9
Commercial Marina	5	50	18	32	15.6
All sectors	331	2,849	317	2,532	13.1

APPENDIX F

Did the oil spill affect your overall business in any way during 2010?¹

Economic sector	Charter boats for hire (n=18)	Commercial fishing (n=160)	Eating and drinking places (n=109)	Live bait and commercial marina (n=14)	Seafood dealer and processor (n=30)	All sectors (n=331)
Prefer not to respond	0.0	8.1	5.5	0.0	0.0	5.7
Extremely bad	88.9	71.9	33.9	71.4	63.3	59.5
Moderately bad	5.6	12.5	34.9	21.4	30.0	21.5
Slightly bad	0.0	4.4	14.7	7.1	3.3	7.6
Not at all	0.0	0.6	9.2	0.0	0.0	3.3
Slightly good	0.0	0.6	0.9	0.0	0.0	0.6
Moderately good	0.0	0.0	0.0	0.0	3.3	0.3
Extremely good	5.6	1.9	0.9	0.0	0.0	1.5
All participating establishments	100.0	100.0	100.0	100.0	100.0	100.0

¹Percentage distribution of the responses of resident seafood and marine-related establishments that participated in a mail and online survey conducted between July and December 2011. Pearson Chi-Square – 87.847. Significantly different at p = 0.0001.

APPENDIX G

Have you filed a direct claim with BP for financial losses in 2010?¹

Economic sector	Charter boats for hire (n=18)	Commercial fishing (n=160)	Eating and drinking places (n=109)	Live bait and commercial marina (n=14)	Seafood dealer and processor (n=30)	All sectors (n=331)
Prefer not to respond	0.0	6.3	3.7	0.0	3.3	4.5
Yes	88.9	80.6	58.7	85.7	76.7	73.7
No	11.1	11.9	34.9	14.3	16.7	19.9
Don't know/Not sure	0.0	1.3	2.8	0.0	3.3	1.8
All participating establishments	100.0	100.0	100.0	100.0	100.0	100.0

¹Percentage distribution of the responses of resident seafood and marine-related establishments that participated in a mail and online survey conducted between July and December 2011. Pearson Chi-Square – 28.25. Significantly different at p = 0.005.

APPENDIX H

Was your business covered by business interruption insurance in 2010?¹

Economic sector	Charter boats for hire (n=18)	Commercial fishing (n=160)	Eating and drinking places (n=109)	Live bait and commercial marina (n=14)	Seafood dealer and processor (n=30)	All sectors (n=331)
Prefer not to respond	11.1	6.3	13.8	0.0	10.0	9.1
Yes	0.0	1.3	11.0	0.0	3.3	4.5
No	83.3	89.4	70.6	100.0	80.0	82.5
Don't know/Not sure	5.6	3.1	4.6	0.0	6.7	3.9
All participating establishments	100.0	100.0	100.0	100.0	100.0	100.0

¹Percentage distribution of the responses of resident seafood and marine-related establishments that participated in a mail and online survey conducted between July and December 2011. Pearson Chi-Square – 25.81. Significantly different at p = 0.011.



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