

# **Estimated Economic Impact of Gulf Oil Spill on Virginia's Oyster Industry – July 2010**

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## Background

The Gulf of Mexico oil spill has created disruptions in Virginia's seafood market place by virtue of the extensive trade and interdependence in fishery and seafood products between the regions. For example, the use of gulf oysters is critical to Virginia oyster processors and dealers in supplementing product not always locally available from Virginia waters. The traditional access to oysters produced in the Gulf States has been important to the Virginia seafood industry in maintaining its historic leadership in the national market place while rebuilding Virginia's native oyster supply through aquaculture and improved oyster strains more resistant to endemic oyster diseases.<sup>1</sup>

Presently Virginia is widely acknowledged to be some years away from regaining self-sufficiency in supplying its extensive local, regional and national oyster market. While making significant gains in that direction; since the Gulf oil spill, Virginia's industry has found itself unable to continue to process and distribute products critical to its established customer base while expending considerable capital to develop self-sufficiency through emerging aquaculture techniques and productivity. In short the income and cash flow based upon processing and distributing Gulf oysters has now virtually disappeared. Without recovering this capital the firms involved in re-developing a Virginia based oyster industry may not be able to financially sustain itself while attempting to recover the full potential of oyster aquaculture in the Commonwealth.

In this report, estimates of the primary sales (both bushels and shucked oysters) by category were obtained via a direct survey of Virginia's oyster processors. The estimates of the total supply of oysters traditionally procured from the northern gulf and no longer available were used to develop an overall percentage decrease in supply to Virginia industry. Imputing this reduction (60%) on overall oyster processing levels provided the base measure of the "direct impact" of the industry. The economic impact

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<sup>1</sup>Additional losses have reportedly impacted Virginia seafood industry with spill-related loss of many traditional sources of fishery products; significant among which are: blue crab, crab meat, shrimp, in addition to sales of bait and other products to the gulf seafood industry. Finally the reduction in overall shipping of seafood products between the two regions has lead to significant freight revenue losses to Virginia seafood companies.

model for Virginia’s oyster industry was a component of survey based research of Virginia’s seafood industry completed by the authors.<sup>2</sup>

## Economic Impact

In order to estimate the level of losses associated with the disruption of gulf oyster “feed stock” to Virginia industry, estimation was made in parallel with an effort by the Virginia Marine Products Board (VMPB). The VMPB surveyed seafood companies in Virginia assessing overall losses of seafood product availability (including oyster quantities, i.e. bushels and gallons) resulting from spill induced closures. In comparison with those reported physical losses in oyster supply, overall revenue loss estimates were developed by the authors based upon average 2009 (pre-spill) prices for bushels of fresh shell-stock oysters and gallons of shucked oysters.

From the quantity information an overall percentage of annual through-put represented by those shipments from the Gulf was calculated and imposed on the state-wide seafood industry input output model developed by the authors (see Economic Impact section). The model readily translated the losses in direct revenues to the oyster industry to the overall economy in the Commonwealth. The two estimates were quite close, indicated a direct loss of between \$11-13 million to Virginia’s oyster industry.

## Economic Losses

Table 1 reflects the preliminary estimate for the direct annual economic loss in sales by the Virginia oyster industry from the spill is approximately \$11.6 million, generating a total negative economic impact at each market level from “water to table” of approximately \$30.1 million statewide.

**Table 1.** Losses to Virginia Oyster Industry, Processors-Restaurants ( Sales Impacts 2010 Dollar Values)

	Direct	Indirect	Induced	Total
Processors	\$6,480,300	\$739,800	\$10,373,900	\$17,594,000
Wholesalers	4,790,200	949,600	5,923,100	11,663,000
Grocers	117,300	180,000	268,200	403,500
Restaurants	228,700	44,400	186,300	459,500
<b>Total Losses</b>	<b>\$11,616,500</b>	<b>\$1,751,800</b>	<b>\$16,751,600</b>	<b>\$30,120,000</b>

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<sup>2</sup>“Economic Contributions of Virginia’s Commercial Seafood and Recreational Fishing Industries.” James E. Kirkley and Thomas J. Murray, College of William & Mary, Virginia Institute of Marine Science. VIMS Marine Resource Report No. 2005-9. December 2005 (<http://www.vims.edu/GreyLit/VIMS/mrr05-9.pdf>).

Associated with the individual sector sales losses are decreases in employment due to the decrease in the level of processing, wholesaling and retailing of oyster products handled by Virginia firms.

**Table 2.** Employment Losses to Virginia Oyster Industry, Processors-Restaurants (Full/Part Time Jobs)

	Direct	Indirect	Induced	Total
Processors	107	9	135	251
Wholesalers	37	7	51	95
Grocers	1	0	2	3
Restaurants	1	0	2	3
<b>Total Losses</b>	<b>146</b>	<b>16</b>	<b>190</b>	<b>352</b>

## Economic Impact Analysis

Economic impact analysis begins with introducing a change in the output of goods, in this case oyster product, using the multiplier model to analyze the effects on a region’s economic base. Most regional input-output studies attempt to characterize either, the economic impacts of specified changes in final demand for a given set of products, services, and industries, or, the economic significance of specific industries in a regional and national economy. The research described herein accomplishes the first task. It assesses the economic disruption to the Virginia oyster industry resulting from the loss of oyster supplies from the northern Gulf of Mexico arising from the “Deep Horizon Oil Spill.”

The standard input-output model estimates the direct, indirect, and induced economic implications of some basic economic activity. The secondary effects (the indirect and induced impacts), along with the basic economic activity estimates, provide an estimate of the “multiplier” effects from the basic activity (direct impact).<sup>3</sup>

In the standard input-output model, measures of aggregate economic activity are used as a basis for estimating the total economic impact of the subject activity. For example, measures of direct employment or total sales in the oyster industry were obtained in previous survey research, and these are then used as a basis for evaluating the total impact. In this report, estimates of the primary sales by category were obtained in two ways: direct survey of Virginia’s oyster industry; and imputing an overall reduction in oyster processing levels based upon the percentage of oysters used by Virginia industry from areas closed due to the oil spill provided the base measure of the “direct impact” of the industry.

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<sup>3</sup> A Glossary of economic impact definitions is contained in Attachment 1.

Given this measure of the direct purchases of the oyster-related industry, an estimate is made of the indirect impacts using information on the interactions between these industry sectors and other economic sectors which are, to varying extent, dependent upon such oyster processing, distribution and marketing industry.

For example, suppliers of materials into the oyster shipping and boxing, transportation, storage, marketing and distribution are also dependent upon the sales of oyster products. These added lost sales or impacts are referred to as the “indirect impacts.” Such “indirectly” dependent sectors include many other types of manufacturing and trade.

Ultimately, losses in the direct oyster sales activity, and the resulting reductions in indirect activity, generate some decreases in the general level of employment and income in the Commonwealth. The lost income generated in this way leads to a third “wave” of negative economic impact through lower household expenditures on goods and services by those employed directly or indirectly with the oyster industry. Much of this additional decline will also occur within the State, further reducing economic activity. These effects are referred to as the “induced impacts” of the industry.

To summarize, because of the interrelationships among the many sectors of Virginia’s economy, lost oyster sales resulting from lower supplies generates additional waves of economic impact.

## **Economic Input-Output Model Application – IMPLAN**

Many economic impact studies use information from a regional inter-industry impact (input-output) model such as *Impact Planning for Analysis* (IMPLAN). IMPLAN is a nationally recognized economic model used for community/regional economic impact analysis across the country. The model uses [input-output analysis](#) in tandem with regional social accounting matrices and multipliers. IMPLAN divides the total national economy into 440 sectors corresponding to North American Industry Classification System (NAICS) codes related to agriculture, extraction, manufacturing, transportation, wholesale trade, retail trade, services and government. Data on these 440 industry sectors is based on national input/output or industry transaction tables (Minnesota IMPLAN Group, 2007).

The final components of the economic impact analysis are the economic activity multipliers. The multipliers estimate the amount of employment, income or output that a given level of expenditure generates, after it has been adjusted by the Regional Purchase Coefficient (RPC). Employment multipliers provide impacts in terms of jobs (full-time, part-time and seasonal). IMPLAN includes several income multipliers. For output impacts, IMPLAN utilizes a Type I and modified Type III multiplier. The Type I output multiplier provides the relationship between the oyster industry expenditures and the direct output or sales in the state. The Type III multiplier includes the additional indirect and induced effects created by the initial expenditure amount.

## Attachment 1. Glossary of Input-Output Terms

**Direct effects/impacts:** Direct impacts represent the revenues, value-added, income, or jobs that result directly from an economic activity within the study area or a regional economy.

**Employment or Jobs:** Represents the total numbers of wage and salaried employees as well as self-employed jobs. This includes full-time, part-time and seasonal workers measured in annual average jobs.

**Indirect effects/impacts:** Indirect effects occur when businesses use revenues originating from outside the region, or study area, to purchase inputs (goods and services) from local suppliers. This secondary, or indirect business, generates additional revenues, income, jobs and taxes for the area economy.

**Induced effects/impacts:** Induced effects or impacts occur when new dollars, originating from outside the study area, are introduced into the local economy. Induced economic impacts occur as the households of business owners and employees spend their earnings from these enterprises to purchase consumer goods and services from other businesses within the region. This induced effect generates additional revenues, income, jobs and taxes for the area economy.

**Input-Output Analysis:** The use of input-output models to estimate how revenues or employment for one or more particular industries, businesses or activities in a regional economy impact other businesses and institutions in that region, and the regional as a whole.

**Input-Output Models:** A mathematical representation of economic activity within a defined region using inter-industry transaction tables or matrices where the outputs of various industries are used as inputs by those same industries and other industries as well.

**Margins:** Represent the differences between retail, wholesale, distributor and producers prices.

**Output:** Revenues or sales associated with an industry or economic activity.

**Total Impacts:** The sum of direct, indirect and induced effects or economic impacts.

**Value-added:** Includes wages and salaries, interest, rent, profits, and indirect taxes paid by businesses. In the IMPLAN results tables, Value-added equals the sum of Labor Income, Other Property Type Income, and Indirect Business Taxes.

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