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## ***Background***

The commercial seafood industry, which includes all economic activity from harvesters to restaurants, generated $407.9 million in output, $239.0 million in value-added, and 3,923 full and part-time domestic jobs in 2004.[1] Of that total output, $252.6 million (62%) arises from seafood processing/wholesaling firms. Within the Virginia seafood industry, these firms are the primary clients for the H2-B worker program, completing much of the value-added processing for Virginia seafood establishments. According to the U.S. Department of Labor records, during 2010-2011 Virginia seafood processing and wholesaling establishments relied upon 1,660 H2-B seasonal contract workers for necessary processing of diverse products such as crabmeat, oysters, finfish, etc. This number adds to the estimated 745 full-time domestic processing/ wholesaling employees involved in the same activities.[2] To summarize, currently an estimated 70% of the value-added seafood processing in Virginia arises from the availability and productivity of the H2-B labor workforce.

## ***Analysis***

What impact would the loss of the H2-B visa workers in Virginia's seafood processing industry have on other employment in the region? It is assumed for this analysis that the loss of these temporary workers will not be mitigated by replacement from the domestic labor pool.

There are two unambiguous ways that domestic workers would be impacted by this loss:

- Related industries (i.e. harvesters, truckers, packaging, etc.) that supply seafood processors will experience a drop in demand for their output, resulting in less employment within those supporting industries. (*Indirect Effect*);

[1] Data according to the last complete study of this nature compiled by the Virginia Institute of Marine Science in 2005. *Economic Contributions of Virginia's Commercial Seafood and Recreational Fishing Industries: A User's Manual for Assessing Economic Impacts. J. Kirkley, T. Murray, J. Duberg. VIMS Marine Resource Report No. 2011-09. December 2005.*
2010 commercial fishery landings in Virginia were $198.8 million compared to $160.2 in 2004. In view of this the various value estimates herein are significantly understated relative to 2011.
[2] Ibid.

- The resulting direct reduction in employee income–as well as the indirect loss of jobs–reduces spending in the State's economy impacting households whose earners are not directly or even indirectly associated with the seafood industry. (*Induced Effect*)

To understand the potential economic consequences of labor disruption at the processing/wholesale level, it is important to view those enterprises as a part of the overall seafood marketplace. **Table 1** depicts the market channels that convey Virginia produced seafood from the water to the consumer. Linked both backwardly to the harvesting sector and forwardly to the eventual consumer, the processing sector both provides and enables immense value-added throughout the seafood marketing channels.[3] In summary, seafood processed by Virginia companies is the source of much of the demand for harvesters, and makes further value added-contributions possible up the market chain reaching the retail sectors, such as restaurant and food services.

**Table 1.** ***Economic Impacts of the Virginia Seafood Industry, by Sector.***

| Impact | Harvester | Processor | Wholesaler | Grocers | Restaurant | Total |
|---|---|---|---|---|---|---|
| ***Sales/Output ($000's)**** | | | | | | |
| Direct | 34,982 | 70,511 | 23,299 | 4,720 | 16,343 | 149,854 |
| Indirect | 10,758 | 14,514 | 4,620 | 723 | 3,241 | 33,856 |
| Induced | 32,661 | 110,820 | 28,819 | 10,789 | 41,173 | 224,262 |
| Total | 78,401 | 195,844 | 56,738 | 16,232 | 60,757 | 407,972 |
| ***Value-Added ($000's)**** | | | | | | |
| Direct | 16,004 | 43,225 | 16,062 | 3,600 | 11,283 | 90,174 |
| Indirect | 6,421 | 8,875 | 2,863 | 457 | 2,063 | 20,679 |
| Induced | 18,770 | 63,293 | 16,521 | 6151 | 23,439 | 128,174 |
| Total | 41,196 | 115,393 | 35,446 | 10,208 | 36,784 | 239,027 |
| ***Domestic Employment (# Jobs)*** ** | | | | | | |
| Direct | 230 | 510 | 235 | 44 | 192 | 1,212 |
| Indirect | 61 | 116 | 44 | 6 | 48 | 276 |
| Induced | 321 | 1,083 | 326 | 105 | 600 | 2,436 |
| Total | 612 | 1,709 | 605 | 156 | 841 | 3,923 |

* These figures refer to the productivity of the H2-B seasonal workers as well as the domestic labor force in the Seafood Industry.

** Employment numbers only include full-time domestic workers.

[3] In economics, the difference between the sale price and the production cost of a product is the value added per unit. Summing value added per unit over all units sold is total value added. Total value added is equivalent to Revenue less Outside Purchases (of materials and services).

The relative impact of the H2-B worker availability for the Virginia seafood processing and wholesaling industry on other domestic employment is summarized in **Table 2,** comparing economic impact on employment both with and without the H2-B workers. As shown, 1,944 total employments arise from processing and wholesaling activity with only *domestic* workers available. With H2-B workers available, total domestic employment rises to 4,616. Given the linkages below, *the loss of the H2-B workers in this sector is estimated to create an overall loss of domestic employment in Virginia of 2,672.*[4]

In summary, each H2-B worker adds value to the domestic industry and creates an additional 1.6 jobs in Virginia for U.S. workers in support industries and other local businesses.

**Table 2.** ***Employment Impacts Arising From H2-B Program in Virginia Seafood Industry-2010-2011***

| **Worker Origin** | ***Direct*** | ***Indirect (U.S)*** | ***Induced (U.S.)*** | ***Total (U.S.)*** |
|---|---|---|---|---|
| U.S. | 745 | 116 | 1083 | 1,944 |
| H2-B | 1660 | *258* | *2413* | *2,672* |
| Total Employment With H2-B Workers Available | 2,405 | 374 | 3,496 | 4,616 |

Evaluating the economic impact another way, **Table 3** reflects the losses in output by sector that would result from the lack of availability of the contract labor. Currently the processing and wholesaling activities of Virginia seafood companies contribute a total of $252.6 million in economic output to the Commonwealth. With a reduction in processing capacity associated with the loss of the H2-B labor force, the Commonwealth of Virginia would experience a $176.8 million reduction in economic activity in the processing and wholesaling sector. Further losses would accrue to firms providing inputs to that sector, and households would experience added declines in reduced labor income.

**Table 3.** ***Total Output of Virginia's Seafood Processing/Wholesaling Sector With & Without H2-B ($000's)***

| | **Processing** | **Wholesale** | **Total Output** | **Total Output Without H2-B** | ***Total Loss*** |
|---|---|---|---|---|---|
| Direct | $70,511 | $23,299 | $93,810 | $28,143 | $65,667 |
| Indirect | $14,514 | $4,620 | $19,134 | $5,740 | $13,394 |
| Induced | $110,820 | $28,819 | $139,639 | $41,892 | $97,747 |
| Total | $195,845 | $56,738 | $252,583 | $75,775 | $176,808 |

[4] The estimates may be understated as the businesses which are heavily reliant on H2-B visa workers may cease to operate, creating an added loss in direct, indirect, and induced domestic jobs in Virginia.

## *Economic Impact Modeling*

### Economic Impact Analysis

Economic impact analysis begins with introducing a change in the output of goods and services 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 accomplished the first task.

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).[5]

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 an industry are obtained, 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 and used as the base measure of the "direct impact" of the industry.

Given this measure of the direct purchases of the seafood-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 seafood-related industry.

For example, suppliers of materials into the seafood-related products manufacturing, transportation, storage, marketing and distribution are also dependent upon the sales of seafood-related goods and services. These added sales or impacts are referred to as the "indirect impacts." Such "indirectly" dependent sectors include hundreds of other types of manufacturing and trade, for which industrial classifications range from "Boat Building and Repairing" to "Veneer and Plywood."

Ultimately, the direct sales activity and the resulting indirect activity, generate some increases in the general level of employment and income in the study area. The extra income generated in this

[5] A Glossary of economic impact definitions is contained in Attachment 1.

way leads to a third "wave" of economic impact through greater household expenditures on goods and services. Much of this additional re-spending will also occur within the study area, further expanding 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, seafood sales to non-residents generates additional waves of economic impact. Expenditures by out-of-region seafood consumers are "exports" from Virginia's economic base and these transactions initiate multiple rounds of economic impact among Virginia's businesses and households.

**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 IMPLAN model used herein was regionalized for this study to reflect the City of Hampton. In addition to the modeling software, individual state data must be purchased from IMPLAN to use in the model. Running the basic IMPLAN model with Virginia data yields the necessary employment, income and output multipliers to apply to the expenditure data.

In order to estimate economic activity, each category of expenditure by the seafood industry was first matched to one or more of the IMPLAN sectors. In most instances, this matching is straightforward.

Seafood industry expenditures must be allocated by the proportion of the expenditure attributed to the value added by the retail, wholesale, transportation and producing sectors before applying the IMPLAN multipliers. Each of those sectors will have their own set of impacts on Virginia's economy. Allocation of the expenses is done through national averages of the margins for these expenditure categories as supplied in the IMPLAN data. If the expenditures are for services such

as at a brokerage, it is not necessary to calculate margins, as the full expenditure is applied to the service sector and matched to an IMPLAN multiplier.

After expenditures are broken down using margins into the various IMPLAN sectors, they are then multiplied by a regional purchase coefficient (RPC) before applying the economic activity multipliers. A regional purchase coefficient indicates the extent to which the demand for a good or service can be met by a Virginia-based industry. RPC's, expressed as percentages, are provided by IMPLAN for all sectors in Virginia.

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 RPC. Employment multipliers provide impacts in terms of jobs (full-time, part-time and seasonal). IMPLAN includes several income multipliers. For this project, two types of income impacts were calculated: personal income and total income. Personal income includes employee compensation (wages and salaries), while total income includes personal income plus proprietor (self-employment) income and other property income (e.g., rent). For output impacts, IMPLAN utilizes a Type I and modified Type III multiplier. The Type I output multiplier provides the relationship between the State 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.

An ongoing issue in the professional literature on economic impact and input-output analysis is the true value of the costly "survey approach." It is reasonable to assume that without major structural shifts and technological change within the overall economy, multipliers do not change greatly from year to year. Thus, in terms of simple analysis of the aggregate impacts of activity on the regional economy, for the purpose of this study it is appropriate that estimates of the multiplier are used. Further, if spending by industry sector does not change greatly from year to year, then it is sufficient to update these expenditures on an annual basis, based on the change in the value of seafood harvested. While it has not been modeled herein the increase in Virginia's seafood harvest value between 2004 and 2010 (+$36.6 million) further positively impacts the Commonwealth economic base and households.

## *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 Business Taxes**: Include sales, excise, and property taxes as well as fees and licenses paid by businesses during normal operations. It does not include taxes on profits or income.

**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.

**Labor Income:** All forms of employment compensation, including employee wages and salaries, and proprietor income or profits.

**Local/ Resident revenues/expenditures:** Local revenues or spending represent simple transfers between individuals or businesses within a regional economy. These transactions do not generate economic spin-off or multiplier (indirect and induced) effects.

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

**Non-resident /Non-local revenues/expenditures:** When outside or new revenues flow into a local economy either from the sale of locally produced goods and services to points outside the study area, or from expenditures by non-local visitors to the study area, additional economic repercussions occur through indirect and induced (multiplier) effects.

**Other Property Type Income:** Income in the form of rents, royalties, interest, dividends, and corporate profits.

**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.