The NMFS Commercial Fishing & Seafood Industry Input/Output Model

(CFSI I/O Model)

Prepared for the
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by

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Executive Summary

The NMFS Commercial Fishing & Seafood Industry Input / Output Model (CFSI I/O Model) uses an IMPLAN platform to estimate the economic impacts associated with the harvesting of fish by U.S. commercial fishermen and the other major components of the U.S. seafood industry.[1] These impacts reflect how sales in each sector generate economic impacts directly in the sector in which the sale was made and then ripple throughout the state and national economy as each dollar spent generates additional sales by other firms and consumers. Economic impacts are expressed in terms of employment (full-time and part-time jobs), personal income, and output (sales by U.S. businesses). Geographically, the model estimates impacts for the U.S. as a whole and for 23 marine coastal states. For the 23 states, estimates for each sector are based on fishery products harvested in that state or imported to that state from a foreign source.

Model Objective: The CFSI I/O Model was designed to estimate economic impacts for fishery products as they work their way through the entire economy from harvesting to the final users. In addition the model was designed to estimate the effect that imports have on the seafood sectors, a major part of the U.S. seafood industry.[2] These imports are inputs for processors, wholesalers/distributors, and others and contribute substantially to the value added by the seafood sectors.

Model Outputs: The CFSI I/O Model generates economic impact estimates for the harvest sector and each of the four segments of the seafood industry – processors and dealers; wholesalers and distributors; grocers; and restaurants. Economic impacts are expressed in terms of employment (full-time and part-time jobs), personal income, and output (sales by U.S. businesses). Each of these impacts is broken out further as direct, indirect, and induced effects.

Estimates are also disaggregated for harvesting and seafood industry activities. For the commercial harvest sector, impacts are provided for each of the 18 categories of species of fish defined by the model. For the seafood industry, estimated impacts associated with processors, wholesalers/distributors, grocers, and restaurants are provided. As with harvesting, seafood industry impacts are provided for the 18 categories of species.

These impacts can be generated for the U.S. or any of 23 coastal states. All model outputs can be generated with or without imports.

Intended Uses: The CFSI I/O Model is primarily intended to be used to provide industry statistics at the state and national level. The model is not intended for management use in NMFS regions in which economic impact models have been developed specifically for management purposes.

1 As used here, the term fish refers to the entire range of finfish, shellfish, and other life (i.e., sea urchins, seaweed, kelp, and worms) from marine and freshwaters that are included in the landings data maintained by the National Marine Fisheries Service.

2 In 2006, the value of imported fish and seafood products exceeded $12 billion, whereas domestic landings that year were valued at $4 billion.

Methodology: The economic impacts estimated by an input-output model reflects the direct expenditures of a particular sector (study sector) and also account for the fact that the employees of the study sector and local businesses from which the study sector purchased goods and services both continue to spend at least some percentage of these monies locally, spurring additional economic impacts. In other words, the initial expenditure generates a chain of spending creating what has been termed a "ripple effect" of economic activity. Input-output models use a series of "multipliers" to estimate the economic impacts associated with each initial dollar of direct spending.

The CFSI I/O Model uses IMPLAN (IMpact analysis for PLANning), a software package for conducting the input-output analyses. IMPLAN is used by a number of state and regional planning agencies, universities and federal agencies, including the U.S. Forest Service, the U.S. Army Corps of Engineers, the National Park Service, the Federal Emergency Management Agency, the Bureau of Land Management. In addition, the NMFS Northeast Fisheries Science Center, Northwest Fisheries Science Center and Alaska Fisheries Science Center all have or are developing IMPLAN economic models for assessing the impacts of proposed management options.

To estimate the economic impacts of the seafood industry and retail outlets for fish and seafood, the CFSI I/O Model estimates impacts for each sector based only on the value that each segment adds to the fish and seafood products that it purchases. For example, the impacts of seafood processors that purchase fish from harvesters exclude the value of the purchases from harvesters. Instead, the impacts of the purchased fish are included under the impacts of the harvesting sector. By estimating impacts only on the value that is added to fish and seafood products that are purchased, the CFSI I/O Model avoids double counting the impacts associated with these goods that were created by upstream segments of the seafood industry or by harvesters.

Model Caveats: The CFSI I/O Model relies on the best available data for the costs and earnings of harvesters and the other seafood industry sectors. The lack of cost and earnings data for a number of commercial fishing fleets posed a challenge to model development. Where data was missing for a particular fleet, the model relies upon synthesizing industry reports and/or using data from comparable fisheries from other regions.

Another source of uncertainty is the data on product flow, the movement of fish and seafood products between the several segments of the seafood industry that begin with harvesting and imports and end with final sales to domestic consumers or with exports. Although data are available for a few states, there are no data for the great majority of states, for the nation as a whole, or for movements between specific states.

Finally, the model does not address activities associated with fish produced by U.S. aquaculture operations. U.S. aquaculture operations constitute roughly one-quarter of the value of U.S. commercially harvested fish.[3]

3 U.S. Department of Commerce, National Marine Fisheries Service, *Fisheries of the United States, 2006.*

Introduction

The NMFS Commercial Fishing & Seafood Industry Input/Output Model (CFSI I/O Model) is designed to estimate the economic impacts associated with the harvesting of fish by U.S. commercial fishermen and the activities of the seafood and retail industries that depend on fish and seafood products. These impacts are expressed in terms of employment (full-time and part-time jobs), personal income, and output (sales by U.S. businesses). The model can estimate impacts at the national level and for each coastal state.

The model begins with the harvesting of fish in U.S. waters. The scope of the model includes the activities of commercial fishermen (reflected in commercial landings of fish), processors, wholesalers/distributors, retail grocers, and restaurants. To estimate the economic impacts of the seafood industry, the CFSI I/O Model estimates impacts for each sector based only on the value that each segment adds to the fish and seafood products that it purchases. For example, the impacts of seafood processors that purchase fish from harvesters exclude the value of the purchases from harvesters. Instead, the impacts of the purchased fish are included under the impacts of the harvesting sector. By estimating impacts only on the value that is added to fish and seafood products that are purchased, the CFSI I/O Model avoids double counting the impacts associated with these fish and seafood products that were created by upstream segments of the seafood industry or by harvesters.

Geographically, the model estimates impacts for the U.S. as a whole and for 23 marine coastal states. For the 23 states, estimates for each sector are based on fish and seafood harvested in that state or imported to that state from a foreign source. Because of a lack of data, the state level estimates do not include the impacts associated with interstate movement of fish and seafood. That is, the model will not capture the impacts of a crab processor using crabs from another state. This is a clear weakness but there are few data on the destination of fish and seafood products within states at each stage in the value added process and virtually none on fish and seafood products moving from one state to another.

The model disaggregates these impacts by 18 species (e.g., shrimp) or groups of species (e.g., East Coast groundfish). These impacts by species and groups of species are shown not only for harvesters, but also for the three segments of the seafood industry included in the model.

Imported fish and seafood products are a major part of the U.S. seafood industry and the retail outlets for fish and seafood. In 2006, the value of imported fish and seafood products exceeded $12 billion, whereas domestic landings that year were valued at $4 billion. These imports are inputs for processors, wholesalers/distributors, retail grocers, and restaurants.

Finally, with its focus on the impacts of U.S. harvested fish, the model does not address activities associated with fish produced by U.S. aquaculture operations. U.S. aquaculture operations have tended to grow over time (e.g., from 691 million pounds in 1992 to 789 million pounds in 2005), and constitute roughly one-quarter of the value of U.S. commercially harvested fish.

Model outputs: The model generates estimates for three types of impacts—employment, income, and output.

The I/O methodology employed here measures economic impacts in terms of business sales (referred to as "output" in I/O terminology), labor income, and employment. These impact measures are defined as follows:

- Output is the gross sales by businesses within the economic region affected by an activity.
- Labor income includes personal income (wages and salaries) and proprietors' income (income from self-employment).
- Employment is specified on the basis of full-time and part-time jobs. There is significant part-time and seasonal employment in commercial fishing and many other industries.

Each of these impacts is expressed as direct, indirect, and induced effects as well as the total of these effects. Types of impacts are defined as follows:

- Direct effects express the economic impacts (for output, income or employment) in the sector in which the expenditure was initially made. For example, the direct income multiplier for the wholesale trade sector would show the total income generated among wholesale employees and proprietors by demand for services from the wholesale trade sector. This direct impact would result, for example, from expenditures made by commercial fishermen in wholesale establishments.
- Indirect effects measure the economic impacts in the specific sectors providing goods and services to the directly affected sector. For directly affected wholesalers, indirect effects would include the purchases of products from manufacturers and purchases of accounting services. These indirect impacts extend throughout the economy as each supplier purchases from other suppliers in turn. For example, the accounting firms would need to purchase office supplies and business equipment. Thus, the indirect output multiplier would represent the total output generated in the various supplier sectors resulting from demand for goods or services from the direct sector.
- Induced effects are the economic activity generated by personal consumption expenditures by employees in the directly and indirectly affected sectors, as wholesalers, accountants, and other directly and indirectly affected employees spend their paychecks. These household purchases have additional "indirect" and "induced" effects as well, all of which are defined as induced effects.
- Total effects are the sum of the direct, indirect and induced economic impacts. Total effects quantify the total impact (i.e., for output, income or employment) throughout the economy created by demand for goods and services by the direct sector.

Different impact multipliers are presented for direct, indirect, induced and total impacts. Multipliers express the respective impacts resulting from demands for goods or services associated with a particular activity such as commercial fishing. Estimates are also disaggregated for harvesting and seafood industry activities. For harvesting, impacts are provided for each of the 18 categories of species of fish defined by the model. For the seafood industry, estimated impacts associated with processors, wholesalers/distributors, grocers, and restaurants are

provided. As with harvesting, seafood industry impacts are provided for the 18 categories of species.

These impacts can be generated for the U.S. or any of the 23 coastal states. The model generates impacts for one geographic area at a time. All model outputs can be generated with or without imports.

Limitations and notes Any model represents an approximation of true conditions and is limited by various uncertainties. One potential source of uncertainty in the model is that associated with the costs and earnings of commercial fish harvesters. Cost and earnings data are typically collected for specific gear types such as trawls or pots in a particular area of the U.S. The goal of this national model is to synthesize these particular data into national averages that address individual species or groups of species harvested in widely varying locations. Given that cost and earnings data for some important gear types are unavailable altogether and other data are available for only some of the relevant locations, there are unavoidable uncertainties built into the current version of this model.

Another source of uncertainty is the data on product flow, the movement of fish and seafood products between the several segments of the seafood industry that begin with harvesting and imports and end with final sales to domestic consumers or with exports. Although data are available for a few states, there are no data for the great majority of states, for the nation as a whole, or for movements between specific states. Despite these limitations, the model produces estimates of the economic impacts of the nation's fisheries that are logical and reasonable.

In addition, at the time the model was developed, IMPLAN data for 2006 were the most recent year available. The impacts of Hurricane Katrina, in particular, and other recent distortions in the economy that affect the harvesting processing and sale of seafood fish are presumably not clearly reflected in these data from IMPLAN. Given the widespread damage to fisheries and the onshore seafood industry in the Gulf of Mexico from the hurricane, the ability of the model to accurately reflect these damages and the changes they made in business interrelationships is at least questionable.

Product flow estimates are another source of uncertainty. Data are available from state-level studies of New York and Virginia and a study of the shrimp industry. National flow data would almost certainly show different patterns of sales between and among harvesters and seafood establishments. Based on product flow data for New York State (TechLaw 2001), it is also likely that more comprehensive data would demonstrate a pattern of product flow more complex than the model assumes. This complexity could include more sales between seafood industry establishments and more value added by these establishments. To the extent that the model's assumptions underestimate value added, the economic impacts of this value added are also underestimated.

In addition to product flow studies, this analysis had the benefit of a study of the seafood processing industry. That study provided state-by-state estimates of the output of seafood processors. Using these output data it was possible to deduce the estimated flow of fish and seafood products to processors not only from domestic harvesters but also from imports.

Notwithstanding these attempts to understand the flow of seafood products from harvesters to processors to wholesalers to retail outlets, no data were found that estimate the flow of products between and among states. As a result the model fails to capture the economic activity associated with processing, distributing, or selling to end users Fish and seafood products that move from state to state. Consequently, the model underestimates the total economic contribution of harvesting seafood and the seafood industry in general.

IMPLAN and the General Methodology for Estimating Impacts

The economic impacts estimated by an input-output models reflect the direct expenditures of a particular sector (study sector) and also account for the fact that the employees of the study sector and local businesses from which the study sector purchased goods and services both continue to spend at least some percentage of these monies locally, spurring additional economic impacts. The initial expenditure essentially spurs a chain or indirect and induced spending creating what has been termed a "ripple effect" of economic activity. Input-output model use a series of "multipliers" to estimate the economic impacts associated with each initial dollar of direct spending.

IMPLAN (IMpact analysis for PLANning) is a system for conducting economic analyses based on national input-output (I/O) structural matrices. IMPLAN was originally developed by the U.S. Forest Service and has gained wide acceptance in a variety of impact assessment applications. In addition to the Forest Service, users of IMPLAN have included the U.S. Army Corps of Engineers, the National Park Service, the Soil Conservation Service, the Federal Emergency Management Agency, the Bureau of Land Management, universities, and numerous state and regional planning agencies.

The basic IMPLAN model performs an I/O analysis for a given region in terms of as many as 509 economic sectors, roughly corresponding to NAIC codes. In addition, IMPLAN allows the analyst to add custom sectors for a particular application. Impacts are specified in terms of output, income, and employment.

Multipliers and other variables used in the analysis were generated using IMPLAN's software and a separate IMPLAN data file for each study area. In this case, the IMPLAN data files for the United States and 23 coastal states were used to create national and state level variables, corresponding to the national and state study areas. Multipliers for the year 2006 economy are available as a report from the basic model of the national economy created by IMPLAN software. Margins and RPCs are available in the "Edit" portion of the basic model created by IMPLAN software.

The I/O methodology employed here measures economic impacts in terms of business sales (referred to as "output" in I/O terminology), labor income, and employment. These impact measures are defined as follows:

- Output is the gross sales by businesses within the economic region affected by an activity.

- Labor income includes personal income (wages and salaries) and proprietors' income (income from self-employment).

• Employment is specified on the basis of full-time and part-time jobs. There is significant part-time and seasonal employment in commercial fishing and many other industries.

Each of these impacts is expressed as direct, indirect, and induced effects as well as the total of these effects. Types of impacts are defined as follows:

• Direct effects express the economic impacts (for output, income or employment) in the sector in which the expenditure was initially made. For example, the direct income multiplier for the wholesale trade sector would show the total income generated among wholesale employees and proprietors by demand for services from the wholesale trade sector. This direct impact would result, for example, from expenditures made by commercial fishermen in wholesale establishments.

• Indirect effects measure the economic impacts in the specific sectors providing goods and services to the directly affected sector. For directly affected wholesalers, indirect effects would include the purchases of products from manufacturers and purchases of accounting services. These indirect impacts extend throughout the economy as each supplier purchases from other suppliers in turn. For example, the accounting firms would need to purchase office supplies and business equipment. Thus, the indirect output multiplier would represent the total output generated in the various supplier sectors resulting from demand for goods or services from the direct sector.

• Induced effects are the economic activity generated by personal consumption expenditures by employees in the directly and indirectly affected sectors, as wholesalers, accountants, and other directly and indirectly affected employees spend their paychecks. These household purchases have additional "indirect" and "induced" effects as well, all of which are defined as induced effects.

• Total effects are the sum of the direct, indirect and induced economic impacts. Total effects quantify the total impact (i.e., for output, income or employment) throughout the economy created by demand for goods and services by the direct sector.

To estimate the economic impacts of each sector's activities, the first step is to estimate the budgets and expenditures of the harvest sector and each of the seafood sectors. Given the estimated expenditure patterns, I/O multipliers were developed by economic sector for the U.S. and each of the coastal states. These multipliers express the economic impacts generated as a function of the amount of these expenditures. For output (sales), income, and employment, impact ratios were developed for direct, indirect, induced and total multipliers.

The next step is to determine whether the expenditures occurred in the study area. For the national model, a simplifying assumption is made that almost all expenditures occur in the U.S. Exceptions are made for certain gear, including boats, where a minority of spending was made outside the U.S. and electronics where half of all spending is made outside of the U.S. To the extent that these estimates of purchases of goods actually are directly made in the U.S., the model will underestimate economic impacts. Alternatively, other assumptions may overstate impacts by assuming that all spending was made in the U.S. (e.g., Norwegian insurance companies traditionally specialize in services for large factory trawlers).

In estimating the impacts of expenditures on goods, IMPLAN requires the disaggregation of expenditures into value-added shares attributed to manufacturing, transportation, wholesale, and retail activities, using allocations (termed margins) generated by IMPLAN. The model assumes that all purchases by commercial fishing and seafood industry establishments are made from wholesalers. Consequently, the model uses IMPLAN's information on margins to distribute the value of purchased goods among manufacturing, transportation, and wholesale sectors, thereby creating adjusted margins. The CFSI I/O MODEL adjusts these margins to reflect the fact that most harvesters and seafood businesses deal with wholesalers rather than retailers. Accordingly, the model pro-rates the value of a good across the manufacturing, Transportation, and wholesale sectors. IMPLAN does not use margins for services.

The importance of margins is two fold. First, the multipliers for sectors are distinct. Typically, manufacturing will have a greater multiplier effect than will the wholesale sector. Second, the capacity of any given economy to provide a good or a service can vary substantially. An obvious example is refining capacity, which accounts for the majority of fuel value. In most states, refined fuel is imported and most of the manufacturing value of fuel creates no impacts in the state economy. Alternatively, most economies can provide all needed real estate or utility services.

By disaggregating the value added by harvesters and the seafood industry segments into specific distributions of expenditures/costs and earnings, the CFSI I/O Model takes advantage of IMPLAN's inherent flexibility. As a result the CFSI I/O Model distinguishes between gear types of harvesters and among harvesters in different regions of the country, for example, rather than relying on IMPLAN's single commercial fishing segment to generate impacts for all commercial fishing operations. Similarly, the CFSI I/O Model can distinguish the between different types of processors rather than rely on IMPLAN's single seafood processing sector.

As noted above, any purchase of a good by harvesters or the seafood industry that is included in the CFSI I/O Model uses IMPLAN margins. For example, spending by harvesters, processors, or wholesalers on ice is treated by the model as a purchase of ice manufacturing, Transportation services from the ice manufacturer to the ice wholesaler, and wholesale services from the ice wholesaler. Because it is assumed that harvesters and the businesses of the seafood industry deal with wholesalers and not retailers, the CFSI I/O Model does not treat spending on ice as a new demand for retail services by ice retailers. The allocation of ice expenditures among manufacturing, Transportation services, and wholesale services is based on margins for ice that are part of the IMPLAN software. This use of margins applies throughout the CFSI I/O Model in estimating impacts for the retail sectors, wholesalers, processors, and harvesters.

In addition, the CFSI I/O Model differentiates between the value added by these retail sectors and the value of the fish and seafood products the sectors purchase. As noted above, the CFSI I/O Model estimates impacts for all seafood sectors solely on the basis of the markup the sectors apply to fish and seafood products they purchase. Markup is defined as a percentage of the value of fish and seafood products purchased by each sector. For grocers, the CFSI I/O Model estimates that there is a markup of 33.4% on any purchased fish or seafood. If the grocer purchases $100 of fish, the model estimates that $33.40 of value is added by the grocer. This $33.40 is disaggregated into the expenditures and earnings of the grocer. These expenditures and earnings are considered new final demands in the local economy and are aligned with the appropriate economic sectors available in IMPLAN. New final demands for goods are

disaggregated into the value attributable to manufacturing, Transportation, and wholesalers by using IMPLAN's margins.

By basing economic impacts on the markup value for each segment of the seafood industry the CFSI I/O Model avoids double counting impacts. In the example of retail value added by a grocer, the value added by harvesters, processors, and/or wholesalers is part of the price of the fish or seafood purchased by a grocer. Impacts associated with this value added are assigned to and estimated for the appropriate upstream part of the value added chain.

Note that while the *Fisheries Economics of the US* report (available at http://www.st.nmfs.noaa.gov/st5/publication/economics_communities.html) only provides a single estimate for the retail sector, the underlying CFSI I/O Model is actually composed of two sectors, the grocery sector and the restaurant sector. The average markup at grocery stores is 33.4% while the average markup at restaurants is 182.4%. The output associated with a grocery store's purchase of $100 of seafood at wholesale is $133.40 while the output associated with a restaurant's purchase of $100 of seafood at wholesale is $282.40. Given the wide disparity between the value added by restaurants and grocery stores, the CFSI I/O Model takes pains to estimate the product flow between these two segments of the retail industry. Ignoring the contribution of the restaurant segment of the seafood industry in favor of grocers will substantially change the economic impacts associated with the retail sale of fish and seafood products.

Although it is likely true that some purchases made by commercial fishing and seafood industry establishments occur at the retail level (e.g., some groceries), it is believed that almost all purchases of goods are made at the wholesale level. This assumption is based on the common practice of businesses purchasing supplies from wholesalers. Anecdotal data suggest that even certain purchases by commercial fishing establishments from retail outlets are made at discounts that approximate wholesale prices. That is, retailers may be willing to provider commercial fishing establishments discounts in return for continuing, high-volume purchases. To the extent that purchases are made from retail, rather than wholesale, establishments, the model overstates the importance of production and understates the importance of retail. In the absence of survey data, the assumption of wholesale purchases is believed to introduce less distortion.

The one exception to the assumption of purchases made at the wholesale level is the spending made by wage earners that create induced impacts. These expenditures are assumed to occur in the retail sector.

A substantial portion (usually a majority) of the value of any good is created by the manufacturing of the item. The economic impacts associated with expenditures on goods will then largely occur where those items are manufactured, often different than the location of the purchase. Given the increasingly global nature of manufacturing, this is true even when the scope of the impact analysis is the U.S. Thus, for the purchase of fuel, the model assumes that approximately 88 percent of the demand will be met by U.S. manufacturers (i.e. refineries). Thus, a purchase of fuel will create economic impacts in the U.S., but will also generate impacts elsewhere (e.g., Mexican or Canadian refineries).

The provision of services tends to be much more local. For many services, it is assumed that establishments located within the region being analyzed can meet the great majority of demand for the service. Thus, the model assumes that 99 percent of motor freight services and 100 percent of wholesale services are met by U.S. businesses.

The ability of the economic region being analyzed to meet regional demands for goods and services is measured by regional purchase coefficients (RPC). RPCs are generated by IMPLAN and are specific to economic regions. Generally, regions with larger and more comprehensive economies are more able to meet demand for goods and services and have higher values for their RPCs. Thus, California with its large and complex economy would generally capture more of the total potential impacts of commercial fishing than would a smaller state like Rhode Island with fewer opportunities to meet the demands initially created by commercial fishing.

The I/O methodology converts expenditures to economic impacts with multipliers. These multipliers were developed using IMPLAN software and the U.S. and various state data sets. The multipliers for economic sectors corresponding to particular types of expenditures made by commercial fishing and seafood industry establishments were used to estimate economic impacts. For example, impacts of purchases of diesel, gasoline and other fuels and lubricants were estimated using the IMPLAN multipliers for several sectors: petroleum refining, transportation services, and wholesale businesses. Purchases of repair and maintenance services for the harvester sector were estimated using the boat repair sector. These multipliers address output, income, and employment impacts.

Custom multipliers were developed for several types of expenditures that do not directly correspond to a specific sector in the IMPLAN multiplier system. This resulted in custom multipliers, analogous to the standard IMPLAN industry sector multipliers. These consisted of expenditures for grocery or food expenditures, vehicle ownership costs, marinas, and wages.

Grocery expenditures are developed using a standard “basket” of foodstuffs and other grocery goods purchased by consumers. Like all other goods, part of the value of grocery purchases is assigned to the transportation and wholesale sectors.

Wages are similar to groceries in that they represent a mix of purchases made by typical households. These include food, shelter, transportation, and other goods and services consumed by households. For goods, part of the value is assigned to transportation, wholesale, and (because these are purchases made by consumers) retail activities. Unlike all other expenditures addressed by the model, a percentage of wages is assumed to be saved, devoted to taxes, or otherwise not spent in the economy. For the nation, 81 percent of wages is assumed to be personal consumption spending. For individual states, this figure is much lower, for example, an estimated 46 percent of Marylanders’ income is spent in that state.

For both grocery expenditures and wages, custom sectors were created using data available from IMPLAN. IMPLAN generates a “Household Commodity Demand” report, based in turn on estimates by the U.S. Bureau of Economic Analysis of personal consumption expenditures. Expenditures related to food and groceries were used to estimate groceries purchased by fishing operations. The entire set of expenditures was used to estimate the induced effects of wages.

These expenditure files for the U.S. economy for the year 2006 were used to create weighted averages for multipliers, RPCs, margins, and other components of the estimating algorithms. The weighted averages, based on the expenditures of all U.S. households, were then used to estimate impacts from the expenditures of commercial fishing and seafood industry operations as well as wage earners. Grocery expenditures by commercial fishing and seafood industry operations are assumed to occur at the wholesale level. Wage expenditures are at the retail level.

Vehicle ownership costs are based on American Automobile Association data on operating and fixed costs. The specific costs for this custom sector were based on the ownership costs of an SUV (the closest model to a pickup truck) driven 15,000 miles annually with a useful life of 8 years. Costs include gas and oil, maintenance, tires, insurance, fees and taxes, capital costs, and bank loan fees. Similarly, marina costs are based on survey work done by A.T. Kearney that looked at typical expenditures of these businesses.

The model also allows for modifications to structural parameters such as the RPCs, distribution of cost and earnings/expenditures, and other economic variables. These modifications may be made to the model, but also require some caution on the part of the user as they tend to override the default configuration of the model and diminish the model's ability to make impact estimates with a minimum of user inputs and effort.

The following summarizes the key aspects of the I/O analysis.

- The IMPLAN economic analysis system served as the starting point for the I/O analysis and directly generated most of the variables used in the analysis.
- Sets of multipliers were developed for the U.S. as a whole and 23 coastal states.
- Custom multipliers were developed for critical sectors not effectively represented by the standard IMPLAN model.
- For each expenditure, a Regional Purchase Coefficient was applied to estimate the portion of demand which could be fulfilled by U.S. businesses.
- Appropriate margins were applied to the purchase of goods where there is activity in the transportation, wholesale, or retail sectors as well as the manufacturing sector.
- These variables were used to evaluate representative expenditures for commercial fishing and seafood industry activities resulting from the harvesting of fish in U.S. waters and subsequent processing, distribution, and retail sale of fish and seafood products.
- Weighted averages for each combination of geography, species, and industry segment were compiled to create a more efficient model.

Background Information on the CFSI I/O Model

Additional detail on the model is presented here. This section also includes a discussion of IMPLAN and its use in the methodology employed by the national model.

Seafood Sectors: In this model the seafood sector (sometimes referred to as "seafood industry" herein) are defined as those businesses that process and distribute fish and seafood products and sell those products to final consumers. These are broadly grouped into four segments: processors,

wholesalers/distributors, grocers, and restaurants. Processing can be as little as sizing and packing shrimp or as elaborate as preparing cooked products.

Species groupings: NMFS provides landings data on over 400 species or subspecies of fish. One of the first major tasks of the project was to determine a manageable way to group the many species of fish reported in the NMFS landings database. The option of grouping species exclusively by the gear used to harvest them was not chosen because of the general lack of understanding of gear types. While gear types are frequently used to determine expenditure patterns, it was decided that defining groups primarily by species would communicate more effectively with most people. These categories were designed to reflect a general understanding of fish and seafood products. In some cases, a given species (e.g., shrimp) is sufficiently important to warrant its own category. At the other extreme, scores of species are included within some categories (e.g., all other finfish).

The final categorization of groups was based on several factors. One, the economic value of landings helped to identify a few highly valuable species (e.g., shrimp, lobster) and closely related groups of species (e.g., groundfish). Two, location was significant in the cases of groundfish (i.e., East Coast versus West Coast), reef fish, and inshore fisheries (e.g., Blue Crab, Striped Bass). Three, the use of specific gear (i.e., trawls) defined one group. Remaining species were allocated to broad categories (e.g., all other finfish, freshwater). The 18 categories of species or groups of species of fish and their general components are listed below in Table 1.

Table 1: Species Groupings

Species group	Major species in group
Shrimp	All Shrimp
Crab	All Crab except Blue Crab
Lobster	American Lobster
East Coast Groundfish	Cod, Flounder, Goosefish, Haddock, Hake, Plaice, Pollock, Shark (Dogfish)
HMS	Shark (other than Dogfish), Swordfish, Tuna
Reef Fish	Gag, Grouper, Mackerel (King & Spanish), Snapper, Tilefish
West Coast Groundfish	Cod, Hake, Pollock, Rockfish, Sablefish, Sole, Whiting
Halibut	All Halibut
Menhaden/Industrial	Alewife, Ladyfish, Menhaden
Salmon	All Salmon
Sea Scallop	All Scallop
Surf Clam/Ocean Quahog	Surf Clam, Ocean Quahog, Quahog
Other Trawl	Anchovies, Croaker, Herring, Mackerel (other than King & Spanish), Mullet, Sardine, Shad, Squid
All Other Finfish	Amberjack, Drum, Hind, Pompano, Porgy, Scad, Sea Bass, Tautog
All Other Shellfish	Clam, Spiny Lobster, Mussel, Oyster, Sea Urchin, Snail (Conch)
Freshwater	Catfish, Crayfish, Perch, Tilapia, Trout
Inshore & Miscellaneous	Bass, Blue Crab, Seaweed, Sponge
Bait	Worms, Bait fish

Gear Types: The NMFS landings database reports gear used to harvest fish and includes scores of gear types. The model incorporates the variations in gear type operating economics into the estimating factors for the model's 18 species groups.

Product Flow: For the CFSI I/O MODEL, product flow refers to the sale of fish and seafood products by harvesters, processors, and wholesalers/distributors. By understanding where these businesses sell their products, the full potential for economic impacts can be better understood. If fish or seafood products are sold to final consumers in the U.S. or exported, the opportunity for adding value and thereby creating new economic impacts ends. Alternatively, when fish or seafood products are sold to businesses that then add value, economic impacts are created.

The model estimates the total product flow for fish beginning with harvesting activities and ending with sales to final consumers or export markets. There is a hierarchy in this estimation of product flow. Flow starts with harvesters who may sell to processors, wholesalers, grocers, restaurants, or directly to final consumers/exporters. Processors may sell to wholesalers, grocers, restaurants, or directly to final consumers/exporters. Finally, wholesalers may sell to grocers, restaurants or directly to final consumers/exporters. In reality, flow of products is more complicated with product moving between processors or from processors to wholesalers to processors and so on. Given the scarcity of data on even the simple hierarchy used in the model, no attempt was made to try model a more complex, more realistic product flow.

The determination of seafood industry economic impacts is determined in large part by estimating two types of what are termed product flow.

1. One set of flow estimates where commercial harvesters and segments of the seafood industry sell their products. So long as these products remain in the chain of value-added activity within the U.S., they continue to create impacts in the U.S. economy. Whenever they are purchased by final consumers or are exported, new economic impacts are no longer generated.

2. A second set of flow estimates the destinations of imported fish and seafood products and which segment of the seafood industry, including retail outlets, is the initial destination. A potential destination of imports is re-exporters.

Several sources of data on product flow of domestically harvested fish and seafood were reviewed. A study of the shrimp industry in the Southeastern U.S. addressed product flow of shrimp from harvesters to dealers to processors to final markets. (Keithly 1994) While this was a narrowly focused study, shrimp are the single most valuable species harvested commercially in the U.S., accounting for 17 percent of the total value of landings in 2001. Two other studies looked at a broad range of fish and seafood products from the perspective of individual states, specifically Virginia and New York. (A.T. Kearney 1997, TechLaw 2001) The state-level studies presented their own idiosyncrasies. In Virginia, a substantial share of harvested, processed, and distributed fish and seafood products is exported outside of the state. Most of these exports from Virginia, however, are sold within the U.S. New York's fish and seafood product flow is substantially influenced by Fulton Market, a mecca for fish and seafood products from many locations (including Virginia) that occupies a unique place in the national seafood industry structure. The State of Alaska has begun to develop a model of the state's commercial fishing and processing industry. Data supplied by Alaska included information on product flow in that state.

Another set of data was used to estimate flow related to domestically harvested fish and seafood. NMFS has surveyed seafood processors and has state-level data on that segment. These data were used to adjust flow from harvesters to processors.

While these sources of product-flow data do not directly address all issues related to domestically harvested fish and seafood, they provide an overall picture of the movement of fish and seafood through the supply chain. In the absence of other data, they represent the best picture of product flow currently available. Table 2 presents the estimated product flow from these sources.

A data set concerning the volume and value of imported fish and seafood products was also used to estimate product flow. This data set included information on the port of entry and the state to which these products were consigned. The place of consignment was assumed to be the location where these products entered the value added chain, typically entering this chain through processors and wholesalers.

Table 2: Product Flow for Fishing & Seafood Industries Related to Domestic Harvest

Source of fish, seafood products	***Destination of fish, seafood products (percentage distribution)***					
	Processors	**Wholesalers / distributors**	**Restaurants/ Food Service**	**Groceries/ retail markets**	**Exports**	**Final consumers**
Harvesters: non-shrimp, non-bait,	40.0%	45.0%	2.5%	7.0%	0.0%	5.5%
Harvesters: shrimp, except as noted	87.5%	12.5%	0.0%	0.0%	0.0%	0.0%
Harvesters: non-bait species in	90.0%	5.0%	2.5%	2.5%	0.0%	0.0%
Harvesters: non-bait species in AK	90.0%	5.0%	1.0%	1.0%	0.0%	3.0%
Harvesters: non-bait species in CT, FL, HI, ME, NJ, NY, RI, SC	20.0%	25.0%	5.1%	6.2%	35.0%	8.7%
Harvesters: non-bait species in US	60.7%	27.8%	2.5%	4.0%	5.0%	0.0%
Harvesters: bait	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Processors: non-shrimp, non-bait: except AK	0.0%	51.7%	17.7%	23.0%	0.0%	7.6%
Processors: shrimp: except AK	0.0%	10.0%	72.0%	17.8%	0.3%	0.0%
Processors: AK		5.0%	1.0%	1.0%	93.0%	0.0%
Wholesalers/ distributors: except			60.0%	30.0%	8.0%	2.0%
Wholesalers/ distributors: AK			6.0%	3.0%	91.0%	0.0%

The TechLaw study of product flow in New York (2001) found that product flow was complex with harvesters and seafood establishments selling some portion of their output to virtually all seafood industry segments as well as exporters and final consumers. Such sales patterns present challenges to modeling which are met by simplifying assumptions. The model assumes a linear flow of product sales from upstream to downstream segments of the value-added chain. At any given point, a business establishment is assumed to sell its output to any downstream firm. Segments of the value-added chain are arrayed from upstream to downstream as follows.

Harvesters Dealers/ Fulton Market Wholesalers/ Exporters/

Processors Distributors Final Consumers

Cost-earnings data for harvesters: In the course of this project, a considerable effort was made to identify and collect available cost-earnings data for commercial harvesters. These data were found in a variety of reports as well as databases. Formal sources are listed in the bibliography.

These data were collected and standardized. The method of standardization was to match the types of expenditures reported in these sources with the categories of expenditures that can be examined by IMPLAN (see Appendix). These expenditures included profits, not strictly speaking, an expenditure, but included to reflect the total distribution of revenues.

Table 3: Typical categories of harvester expenditures

Purchases of goods	**Fixed and general expenses**
• Fishing gear	• Moorage
• Miscellaneous hardware & supplies	• Dues, fees
• Electronics	• Licenses, permits
Repair & maintenance	• Accounting
• Fishing gear, nets	• Insurance
• Vessel & engine	• Bank fees and services
• Electronics	• Vehicle costs
Trip expenses	• Capital costs, boats
• Groceries, food, & supplies	• Other expenses
• Fuel & lubricants	**Taxes**
• Ice	**Income and profit**
• Bait	• Crew & captain shares, other income
	• Profit

By accounting for all revenues associated with costs and earnings for harvesters, it was possible to associate the value of landings (i.e., revenues for harvesters) with a set of expenditures. These expenditures in turn are used to generate estimated economic impacts.

The review of cost-earnings data and its conversion to a standardized format involved a series of judgments on particular data issues. The following notes address those judgments.

1. Costs and earnings are specific to the species of interest. In some cases, source data were configured in this manner. In other cases, source data were converted to align with the 18 species groups in the model.

2. Cost-earnings data from all sources have been converted to a percentage distribution of costs and income, including profit. Even in the few cases where data from published sources provided just this type of information, certain assumptions have been made in order to use the data in the developed national model. The authors of this national model take responsibility for these judgments.

3. Unless explicit information to the contrary is available in data sources, all capital expenses are assigned to boats, rather than motor vehicles. This may overestimate vessel expenditures and underestimate the expenditures for trucks and other motor vehicles.

4. When ice and bait costs are aggregated, they are split evenly between these two cost categories.

5. Fishing gear repair is assumed to be the repair of electronic equipment unless more specific information on the repair of equipment is available.

6. The values assigned by IMPLAN to RPCs for certain sectors have been adjusted to reflect conditions for the commercial fishing and seafood sectors. See Table 4.

Table 4: Adjusted RPCs

IMPLAN sector	Sector description	Expenditure category	IMPLAN RPC	Adjusted RPC
16	Commercial fishing	Bait	0.05	1.00
85	Manufactured ice	Ice	0.85	1.00
358	Boat building & repair	Vessel maintenance & repair	0.86	1.00

RPCs estimate the percentage of demand for a good or service that can be met by business establishments in the economic region being analyzed. For example, the IMPLAN model assumes that about 85 percent of the demand for manufactured ice in the U.S. is met by the U.S. ice plants. For the model, it is assumed that all demand for ice by the commercial fishing operations or seafood businesses is met by local ice plants.

Cost-earnings data for seafood industry: Some of the same sources that were used to develop product flow also included information on costs and earnings for seafood industry establishments. These sources of data were standardized using IMPLAN expenditure categories. Typical expenditure categories for processors, wholesalers/distributors, grocers, and restaurants are shown in Table 5.

Table 5: Typical Categories of Seafood Industry Expenditures

• Supplies / Packaging	• Insurance
• Other supplies	• Accounting
• Breading	• Maintenance and repairs
• Ingredients	• Bank fees and services
• Transportation	• Capital costs
• Real estate	• Ads, promotion
• Utilities, telephone	• Taxes/employment taxes
• Administration	• Wages & profits
• Overhead, miscellaneous	

It is important to emphasize that these expenditures do not include the cost for fish or seafood products purchased by the seafood industry as inputs into their value-added activities. The economic impacts of these inputs have been estimated as a part of the activities of harvesters or dealers/processors that are providing these inputs. By focusing the estimation of economic impacts on the value added by the seafood industry, the analysis avoids double counting of impacts.

The estimation of value added to the fish or seafood products purchased by seafood industry establishments is based on data from Alaska's survey of seafood processors and from value added statistics published in *Fisheries of the United States* (2006). For processors this figure is 129 percent; for wholesalers/distributors, the figure is 63 percent; for grocers, markup on seafood inputs is 33 percent, while for restaurants, the figure is 182 percent.

Imports: The CFSI I/O Model can generate impacts with and without the addition of imported fish and seafood products. In the "no imports" case, the model generates impacts associated with the fish harvested in the state in question. That is, as harvested fish or seafood products created by processors or wholesalers are exported from the state in question or are sold directly to final users, no further impacts are created for the state. The total impacts for a state in the "no imports" case then are the impacts from landings and all seafood industry impacts related to fish and seafood products that remain in the state.

In the "with imports" case, the CFSI I/O Model estimates impacts associated with both (1) fish that are harvested and then processed, wholesaled and/or retailed within that same state and (2) fish and seafood products that are imported into the state and then used as inputs by processors, wholesalers, groceries, or restaurants located in the same state. Given the relative value of domestic landings and imports from foreign countries, the inclusion of imports makes a substantial difference in the generation of economic impacts associated with the seafood industry in almost all states.

Weighted averages files: The custom sector capability of IMPLAN was utilized in the model because of the complexity and quantity of calculations required by a model that addresses:

- The U.S. and 23 coastal states
- 18 species groups
- Harvesters and 4 downstream segments of the seafood industry
- The potential to include or exclude imported fish and seafood products

These variables allow for 4,320 combinations of place, species, segment, and imported inputs. Accordingly, the final model uses weighted averages for 2,160 combinations of place, species, and segment. (Imports can be added into the calculations of impacts as a separate process.)

These weighted averages use the percentage distribution of costs and earnings data in combination with IMPLAN data for the economic sectors associated with each type of expenditure. The resulting weighted average can be used in the final model as a standalone IMPLAN sector. This greatly reduces the memory requirements of the final model, simplifying calculations, and generally streamlining and making the model more efficient.

Opportunities to improve the national model: Any model is a tool for creating estimates. Necessarily, elements of uncertainty are introduced into models. Not surprisingly for a model that covers this many distinct activities, there are opportunities to improve the current model and reduce the uncertainties built into the current version of the national model. Better cost-earnings data on harvesters may be the best opportunity for improvement. No data are available for several individual groups of species for some states.

In addition, better information on the national, intrastate, and interstate flow of fish and seafood products would help understand the economic impacts of the commercial fishing and seafood industries. Current flow data is available only for New York and Virginia and for shrimp. While these data account for perhaps 25 percent of total U.S. landings, the flow data for the remaining landings are poorly understood. Furthermore, many of the existing flow data address flow within a state, not across state or within national boundaries.

The absence of better data has led to some simplifying assumptions about product flow. For example, the model assumes that dealers/processors receive inputs only from harvesters and that wholesalers/distributors only sell their products to retail level businesses or final consumers. Better data could support a more complex and comprehensive understanding of the movement of food and seafood in the seafood industry.

The absence of better product flow data almost certainly results in an underestimation of the economic impacts of fish and seafood products. Estimates of product flow in New York state (TechLaw 2001) indicate that product flow is quite complicated with seafood products often moving among several processing or wholesale level seafood industry establishments before moving to the retail level, to exporters, or to final consumers. This national model makes a number of simplifying assumptions that may well underestimate the number of processing or distribution establishments that handle these products. Consequently, to the extent that the model underestimates the number of processing or distribution steps taken, it also underestimates the value added by these establishments and the overall economic impact of the seafood industry.

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Appendix

Commercial Fisheries Harvesters Sector	NAICS IMPLAN Sector Description for Margined Expenditures	NAICS IMPLAN Sector Number
Fishing Tackle, Reels, other gear	Sporting & Athletic Goods Manufacturing	381
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Fishing nets	Other Miscellaneous Textile Product Mills	103
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Electronics	Search, Detection & Navigation Instruments	314
	Wholesale Trade	390
	Air Transportation	391
Safety Equipment	Other Leather Product Manufacturing	111
	Wholesale Trade	390
	Air Transportation	391
	Truck Transportation	394
Miscellaneous Hardware & Supplies	Motor Vehicle Vehicle Manufacturing	350
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
Repair & Maintenance		
Fishing Gear, Nets	Commercial Machinery Repair & Maintenance	485
Vessel & Engine	Boat Building	358
Electronics	Electronic Equipment Repair & Maintenance	484
Groceries, Food, & Supplies	Custom Sector--Groceries	512
Fuel & Lubricants	Petroleum Refineries	142
	Wholesale Trade	390
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
	Pipeline Transportation	396
Ice	Soft Drink & Ice Manufacturing	85
	Wholesale Trade	390
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394

Commercial Fisheries Harvesters Sector (*continued*)	NAICS IMPLAN Sector Description for Margined Expenditures	NAICS IMPLAN Sector Number
Bait	Fishing	16
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
Packaging & Other Materials	Coated & Laminated Paper & Packing	129
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Licenses, Permits	State & Local non-education	504
Accounting	Accounting & Bookkeeping Services	438
Insurance	Insurance Agencies, Brokerages, & Related	428
Moorage, Docking	Custom Sector--Marina	513
Bank Fees & Services/Interest/interest	Monetary Authorities & Depository Credit in	430
Vehicle Costs	Custom Sector--Vehicles	510
Capital Expenditures--Boats	Boat Building	358
	Wholesale Trade	390
	Air Transportation	391
	Truck Transportation	394
Other Expenses	Commercial Machinery Repair & Maintenance	485
Taxes	State & Local non-education	504
Crew & Captain Shares, Other Income	Custom Sector--Wages	511
Profit	Custom Sector--Wages	511

Seafood Processors & Dealers Sector	NAICS IMPLAN Sector Description for Margined Expenditures	NAICS IMPLAN Sector Number
Fish, Fish Products	Fishing	16
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
Other non-Fish Ingredients	Bread & Bakery Product, except Frozen, Manufacturing	73
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Ice	Soft Drink & Ice Manufacturing	85
	Wholesale Trade	390
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
Containers, Packaging Supplies	Coated & Laminated Paper & Packing	129
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Miscellaneous Supplies	Spice & Extract Manufacturing	83
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Maintenance & Repairs,	Commercial Machinery Repair & Maintenance	485
Freight, Shipping Costs	Postal Service	398
Warehousing, Cold Storage	Warehousing & Storage	400
Ads, Promotion	Advertising & Related Services	447
Travel, Entertainment	Food Services & Drinking Places	481
Broker Fees	Business Support Services	455
Accounting, Legal	Accounting & Bookkeeping Services	438
Insurance	Insurance Agencies, Brokerages & Related	428
Bank Fees & Services, interest	Monetary Authorities & Depository Credit in	430
Truck/Vehicle Costs	Custom Sector--Vehicles	510
Equipment lease, Depreciation	Machinery & Equipment Rental & Leasing	434
General & Administrative		
Real Estate	Real Estate	431
Utilities, Telephone	Power Generation & Supply	30
Office Supplies	Stationery & Related Product Manufacturing	133
	Wholesale Trade	390
	Truck Transportation	394
Other Expenses	Boat Building	358

Seafood Processors & Dealers Sector (*continued)*	NAICS IMPLAN Sector Description for Margined Expenditures	NAICS IMPLAN Sector Number
Taxes		
Payroll Taxes/FICA	Federal Non-Military	506
Property/Local Taxes	State & Local Non-Education	504
Employee Benefits/Health	Insurance Agencies, Brokerages & Related	428
Wages, other Income	Custom Sector--Wages	511
Profit, Income before Tax	Custom Sector--Wages	511

Wholesale & Distributors Sector	NAICS IMPLAN Sector Description for Margined Expenditures	NAICS IMPLAN Sector Number
Fish, Fish Products	Fishing	16
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
Other non-Fish Ingredients	Bread & Bakery Product, except Frozen,	73
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Ice	Soft Drink & Ice Manufacturing	85
	Wholesale Trade	390
	Rail Transportation	392
	Water Transportation	393
	Truck Transportation	394
Containers, Packaging Supplies	Coated & Laminated Paper & Packing	129
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Miscellaneous Supplies	Spice & Extract Manufacturing	83
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Maintenance & Repairs,	Commercial Machinery Repair & Maintenance	485
Freight, Shipping Costs	Postal Service	398
Warehousing, Cold Storage	Warehousing & Storage	400
Ads, Promotion	Advertising & Related Services	447
Travel, Entertainment	Food Services & Drinking Places	481
Broker Fees	Business Support Services	455
Accounting, Legal	Accounting & Bookkeeping Services	438
Insurance	Insurance Agencies, Brokerages & Related	428
Bank Fees & Services, interest	Monetary Authorities & Depository Credit in	430
Truck/Vehicle Costs	Custom Sector--Vehicles	510
Equipment lease, Depreciation	Machinery & Equipment Rental & Leasing	434
General & Administrative		
Real Estate	Real Estate	431
Utilities, Telephone	Power Generation & Supply	30
Office Supplies	Stationery & Related Product Manufacturing	133
	Wholesale Trade	390
	Truck Transportation	394
Other Expenses	Boat Building	358

Wholesale & Distributors Sector (*continued)*	**NAICS IMPLAN Sector Description for Margined Expenditures**	**NAICS IMPLAN Sector Number**
Taxes		
Payroll Taxes/FICA	Federal Non-Military	506
Property/Local Taxes	State & Local Non-Education	504
Employee Benefits/Health	Insurance Agencies, Brokerages & Related	428
Wages, other Income	Custom Sector--Wages	511
Profit, Income before Tax	Custom Sector--Wages	511

Groceries Sector	NAICS IMPLAN Sector Description for Margined Expenditures	NAICS IMPLAN Sector Number
Repair & Maintenance		
Miscellaneous	Commercial Machinery Repair & Maintenance	485
Electronics	Electronic Equipment Repair & Maintenance	484
Music, Entertainment	Independent Artists, Writers & Performers	473
Ads, Promotion	Advertising & Related Services	447
Accounting	Accounting & Bookkeeping Services	438
Insurance	Insurance Agencies, Brokerages & Related	428
Bank Fees & Services	Monetary Authorities & Depository Credit in	430
Capital expenditures	AC, Refrigeration & Forced Air Heating	278
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Miscellaneous Services	Legal Services	437
General & Administrative		
Rent (40%)	Real Estate	431
Utilities (20%)	Power Generation & Supply	30
Supplies (40%)	Stationery & Related Product Manufacturing	133
	Wholesale Trade	390
	Truck Transportation	394
Tip Income @ 12% of total sales	Custom Sector--Wages	511
Taxes	State & Local Non-Education	504
Wages, other Income	Custom Sector--Wages	511
Profit	Custom Sector—Wages	511

Groceries Sector *(continued)*	**NAICS IMPLAN Sector Description for Margined Expenditures**	**NAICS IMPLAN Sector Number**
Equipment Rentals	Machinery & Equipment Rental & Leasing	434
Maintenance & Repairs		
Miscellaneous	Commercial Machinery Repair & Maintenance	485
Electronics	Electronic Equipment Repair & Maintenance	484
Ads, Promotion	Advertising & Related Services	447
Accounting	Accounting & Bookkeeping Services	438
Insurance	Insurance Agencies, Brokerages & Related	428
Bank Fees & Services	Monetary Authorities & Depository Credit in	430
Capital Expenditures	AC, Refrigeration & Forced Air Heating	278
	Wholesale Trade	390
	Air Transportation	391
	Rail Transportation	392
	Truck Transportation	394
Miscellaneous Services	Legal Services	437
General & Administrative		
Rent (40%)	Real Estate	431
Utilities (20%)	Power Generation & Supply	30
Supplies (40%)	Stationery & Related Product Manufacturing	133
	Wholesale Trade	390
	Truck Transportation	394
Taxes	State & Local Non-Education	504
Wages, other Income	Custom Sector--Wages	511