Ohio Maritime Plan

WORKING PAPER 4:
Economic Impacts of the Ohio Maritime System

MARTIN ASSOCIATES

cpcs

Ohio Department of Transportation

Ohio Maritime Plan

The Ohio Maritime Plan will provide ODOT with information on the owners and operators of Ohio's MTS, their roles and responsibilities, and opportunities for collaboration and partnership.

Working Paper 4: Economic Impacts of the Ohio Maritime System

This Working Paper provides an evaluation of the economic impacts at the local, regional, and state levels generated by maritime cargo activity at Ohio's ports and maritime facilities.

Acknowledgments

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Opinions and Limitations

Unless otherwise indicated, the opinions herein are those of the authors and do not necessarily reflect the views of the Ohio Department of Transportation.

CPCS makes efforts to validate data obtained from third parties, but CPCS cannot warrant the accuracy of these data.

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Contents

Table of Figures

Acronyms and Abbreviations

Acronym	Definition
BEA	Bureau of Economic Analysis
CBP	Customs and Border Protection
CY	Calendar Year
DHS	Department of Homeland Security
ICE	Immigration and Customs Enforcement
ILA	International Longshoremen's Association
MTS	Maritime Transportation System
ODOT	Ohio Department of Transportation
OMP	Ohio Maritime Plan
PSA	Port Statistical Area
RIMS	Regional Input/Output Modeling System
USACE	U.S. Army Corps of Engineers

Executive Summary

The Ohio Maritime Plan (OMP) assessed the local, regional, and state economic impacts generated by maritime cargo activity at Ohio's maritime facilities, including the state's public ports authorities and Port Statistical Areas (PSA's), and the many private terminals on Lake Erie and the Ohio River. Economic impacts generated at the cargo and industrial facilities include those generated by steel products; inputs to the steel making process such as ore, coal, and coke; miscellaneous breakbulk; grain products; aggregates; chemicals; fertilizers; cement; minerals; other dry bulk; salt; petroleum products; and other liquid bulk. In 2002, the U.S. Army Corps of Engineers notes about 61.7 million tons of foreign and domestic cargoes were handled on the navigable waterways bordering the state on Lake Erie and the Ohio River.

In 2023, waterborne shipping at Ohio's maritime facilities in some way supported 130,798 jobs in the state. Of these jobs, 17,439 jobs were directly created by cargo shipping and dependent industrial activities.

An additional 16,374 induced jobs were generated in the state as a result of local purchases made by those directly employed by Ohio's ports and maritime terminals that generate cargo and tenant activity. In addition, there were 21,133 indirect jobs supported in Ohio as the result of nearly $2.4 billion of local purchases. A further 75,852 jobs were in some way related to Ohio maritime cargo. The majority of these jobs were associated with the processing and movement of steel products, fertilizer, grain and dry bulk cargoes at the individual terminals.

Ohio's 17,439 direct jobholders received $1.1 billion in direct wage and salary income, for average earnings of $60,500 per direct employee.

As a result of local purchases with this $1.1 billion of direct wages and salaries, nearly $2.5 billion of additional income and local consumption expenditures were created in Ohio. It is this re-spending impact that supported the 16,374 induced jobs. Indirect jobholders received nearly $1.3 billion in personal income. Related users in the state received another $4.8 billion of personal income. In total, $9.7 billion of personal income is in some way related to Ohio's maritime transportation system.

Local maritime service providers, port tenants and dependent shippers received nearly $5.6 billion of revenue from providing services supporting cargo activity. In addition, $31.9 billion of output was generated throughout the state by related users using the marine terminal facilities for shipment and receipt of cargo.

As a result of the direct, induced and indirect cargo activity on Ohio's maritime transportation system, a total of $486.8 million of state and local tax revenue was generated.

A further $483.5 million of related taxes bring the total state and local taxes that are in some way related to maritime and cargo activity to $970.3 million.

The following figure provides the economic impacts of the maritime cargo activity on Ohio's maritime transportation system.

Figure ES-1: Impacts of Waterborne Shipping Activity on Ohio Maritime System CY2023*

IMPACT CATEGORY	Ohio River	Lake Erie	Total OMS
JOBS			
Direct	7,827	9,612	17,439
Induced	6,750	9,624	16,374
Indirect	8,893	12,240	21,133
Related	50,887	24,966	75,852
TOTAL JOBS	**74,357**	**56,441**	**130,798**
PERSONAL INCOME ($1,000)			
Direct	$437,585	$617,972	$1,055,557
Re-Spending/Local Purchases	$1,034,013	$1,460,268	$2,494,280
Indirect	$575,660	$742,278	$1,317,937
Related	$3,525,362	$1,309,402	$4,834,764
TOTAL INCOME	**$5,572,619**	**$4,129,919**	**$9,702,538**
VALUE OF ECONOMIC REVENUE ($1,000)			
Business Services Revenue	$2,969,749	$2,627,277	$5,597,025
Related Output	$19,227,988	$12,676,917	$31,904,905
TOTAL VALUE OF ECONOMIC REVENUE	**$22,197,737**	**$15,304,194**	**$37,501,930**
LOCAL PURCHASES ($1,000)	**$1,030,180**	**$1,348,282**	**$2,378,462**
STATE AND LOCAL TAXES ($1,000)			
Direct, Induced and Indirect	$204,726	$282,052	$486,777
Related	$352,536	$130,940	$483,476
TOTAL STATE AND LOCAL TAXES	**$557,262**	**$412,992**	**$970,254**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$23,231,749**	**$16,764,461**	**$39,996,211**

*Totals may be rounded.

In all, by combining the businesses services revenue, related output and re-spending income, the total economic activity generated by the Ohio Maritime System is $40 billion.

1. Introduction

As part of the Ohio Maritime Plan (OMP), Martin Associates was retained to measure the local, regional, and state economic impacts generated by maritime cargo activity at Ohio's maritime facilities, including the state's public ports authorities and Port Statistical Areas (PSA's), as well as the many private terminals on Lake Erie and the Ohio River. Economic impacts generated at the cargo and industrial facilities include those generated by steel products; inputs to the steel making process such as ore, coal, and coke; miscellaneous breakbulk; grain products; aggregates; chemicals; fertilizers; cement; minerals; other dry bulk; salt; petroleum products; and other liquid bulk. According to latest U.S. Army Corps of Engineers (USACE) Waterborne Commerce Statistics (2022), about 61.7 million tons of foreign and domestic cargoes were handled on the navigable waterways bordering the state on Lake Erie and the Ohio River.

The methodology used in this analysis has been developed by Martin Associates and has been used since 1986 to estimate the economic impacts of seaport activity at public and private marine terminals of more than 600 U.S. and Canadian ports, including Martin Associates' 2019 "Economic Impact of Ohio River Maritime Activity on the State of Ohio" and recent 2023 update of the "Economic Impacts of Maritime Shipping in the Great Lakes St. Lawrence Region." It is to be emphasized that only measurable impacts are included in this study. In order to ensure defensibility, Martin Associates' approach to economic impact analysis is based on data developed through an extensive interview and telephone survey program of the port tenants and the firm's providing cargo and logistics services on the Ohio maritime transportation system. Specific re-spending models have been developed for the state of Ohio to reflect the unique economic and consumer profiles of the State economy. To further underscore the defensibility of the study, standardized impact models were not used. Instead, the resulting impacts reflect the uniqueness of the state's port and maritime operations, as well as the surrounding regional economies.

The statewide impacts are measured for the calendar year 2023. Detailed interviews were conducted with the port authorities, marine terminal operators, barge lines, fleeting operators, maritime service providers, port tenants, etc. that operate along Lake Erie and the Ohio River within the state boundaries, specifically Mile Marker 40-491. In total, 184 firms were contacted. Tonnages for 2023 were estimated based upon results of these interviews, data provided by public port authorities, and USACE 2022 detailed commodity-specific statistics by port and PSA for Ohio.

The impacts presented in this report represent the economic activity associated with all maritime activity within the state. Ohio's maritime transportation system (MTS) is unique in the fact that three separate modes of waterborne commerce are currently used in the shipment and receipt of raw materials and finished products. These include international ships moving cargo through the St. Lawrence Seaway ("salties"), lake vessels carrying international cross-lake and domestic intra-lake shipments ("lakers"), and barges moving international and domestic cargoes along the Mississippi River System including the Ohio River. It is this unique convergence of water transportation modes that provides steel mills and other industries with the ability to use cost-effective methods for receiving raw material products to domestic and international markets. Without water transportation, production costs would undoubtedly increase and therefore potentially hinder future contracts and levels of manufacturing.

Throughout the report, impacts are presented into two distinct regions: Lake Erie and the Ohio River. Lake Erie encompasses nine cargo handling public ports along the shoreline bordering Lake Erie, which include the Ports of Ashtabula, Cleveland, Conneaut, Fairport, Lorain, Marblehead, Put-in-Bay, Sandusky, and Toledo. It is estimated, in 2023 Lake Erie ports account for 34.6 million tons in annual shipments by salties, lakers, and barges.

The Ohio River is comprised of three USACE Port Statistical Areas (PSA): Mid-Ohio River Valley Port District mile marker 40-199.7 (Columbiana, Jefferson, Belmont, Monroe, and Washington Counties); Port of Huntington Tri-State mile marker 199.7-356.8 (Meigs, Gallia, Lawrence and Scioto Counties); and Ports of Cincinnati and Northern Kentucky mile marker 356.8-491.0 (Adams, Brown Clermont and Hamilton Counties). The Ohio River is estimated to account for approximately 33.9 million tons of cargo in 2023.

1.1. Impact Definitions

The impacts discussed in this report are measured in terms of:

- Jobs [direct, induced, indirect and related shipper/consignee (related users)];
- Personal income;
- Business revenue; and
- State and local taxes.

Each impact measurement is described below:

- **Jobs:**
    - ***Direct jobs*** are those that would not exist if cargo activity at Ohio marine terminals were to cease. Direct jobs created by cargo activity at the maritime terminals are those jobs with the firms directly providing cargo handling and vessel services, including trucking companies, terminal operators and stevedores, port tenants, members of labor unions including the International Longshoremen's Association (ILA), vessel agents, pilots, barge repair, barge towing and tug assist companies.
    - ***Induced jobs*** are jobs created in Ohio by the purchases of goods and services by those *individuals* directly employed by each of the terminals' lines of business. These jobs are based on the local purchase patterns of area residents. The induced jobs are jobs with grocery stores, restaurants, health care providers, retail stores, local housing/construction industry, and transportation services, as well as with wholesalers providing the goods to the retailers.
    - ***Indirect jobs*** are created throughout the area as the result of purchases for goods and services by the *firms* directly impacted by Ohio maritime activity, including the tenants, terminal operators and the firms' providing services to cargo. The indirect jobs are measured based on actual local purchase patterns of the directly dependent firms, and occur with such industries

as utilities, office supplies, contract service providers, maintenance and repair, and construction.

- ***Related user jobs*** are jobs with shippers and consignees (exporters and importers) including the state's manufacturing, farming, retail, wholesale, distribution industries, and the in-state industries supporting the movement and distribution of cargo imports and exports using the port terminals for shipment and receipt of cargo. ***Related jobs are not dependent upon the port marine terminals to the same extent as are the direct, induced, and indirect jobs since it is the demand for the final products, which creates the demand for the employment with these shippers/consignees, not the use of a particular port or maritime terminal, and therefore these firms can, and do use other ports.*** For example, when hurricane devastation renders a port's container and breakbulk terminals inoperable, essentially suspending operations at the port, the direct, induced, and indirect jobholders are immediately affected with similar consequences. However, the jobs held with related users such as manufacturing as well as wholesale and retail distribution throughout the unaffected areas of state will continue to operate. These firms are required to find alternative ports to ship and receive cargo in order to maintain given levels of operation. Therefore, viable port operations are essential to long-term retention of import and export related jobs throughout the state.

- **Personal income** consists of wages and salaries received by those directly employed by port and maritime activities and includes a re-spending impact which measures the personal consumption activity in Ohio of those directly employed as the result of Ohio cargo activity. Indirect personal income measures the wages and salaries received by those indirectly employed.
- **Business revenue** consists of total business receipts by firms providing services in support of cargo activity. **Local purchases for goods and services** made by the directly impacted firms are also measured. These local purchases by the dependent firms create indirect impacts. Revenues from port tenants, dependent shippers and consignees and maritime terminals are included.
- **State and local taxes** include taxes paid by individuals as well as firms dependent upon Ohio cargo activity.

1.2. Methodology

The impacts of Ohio's maritime industry presented in this report were estimated based on telephone interviews and data collected from 184 firms in Ohio (**Appendix A**). This represents the universe of cargo and related industrial businesses (apart from trucking firms) on Ohio's navigable waterways. It is to be emphasized that a 95+% response rate was achieved from these firms located on public port authority property, as well as those on the privately held lands within the Lake Erie and Ohio River segments.

The direct impacts are measured at the firm level of detail and aggregated to develop the impacts for each of the terminals' lines of business. Terminals and tenants surveyed were asked to provide Martin Associates with detailed employment levels (both full time and part time), annual payroll, local purchases, and capital

expenses. Additional data collected from the private terminals includes employment, vessel and barge tonnage, vessel and barge calls, revenues, and local purchases and capital expenses.

The induced impacts are based on the current expenditure profile of residents of Ohio as estimated by the U.S. Bureau of Labor Statistics, "Consumer Expenditure Survey." This survey indicates the distribution of consumer expenditures over key consumption categories for Ohio residents. The consumption categories are Food at Home; Food at Restaurants; Housing; Home Furnishings; Apparel; Transportation equipment and Services; Entertainment; and Health Care.

The re-spending impact is developed by deriving an implied marginal propensity to consume from income multipliers for the water transportation industry, as developed by the Bureau of Economic Analysis (BEA). The estimated consumption expenditure generated as a result of the re-spending impact is distributed across the above consumption categories. Associated with each consumption category is the relevant retail and wholesale industry. Jobs to sales ratios in each industry are then computed for Ohio, and induced jobs are estimated for the relevant consumption categories. It is to be emphasized that induced jobs are only estimated at the retail and wholesale level, since these jobs are most likely generated in each terminal's region. Further levels of induced jobs are not estimated since it is not possible to defensibly identify geographically where the subsequent rounds of purchasing occur.

The "Consumer Expenditure Survey" does not include information to estimate the job impact with supporting business services, legal, social services, state and local governments, and educational services. To estimate this induced impact, a ratio of state of Ohio employment in these key service industries to total state of Ohio employment is developed. This ratio is then used with the direct and induced consumption jobs to estimate induced jobs with business/financial services, legal, educational, governmental, and other social services.

The indirect impacts are estimated based on the local purchases by the directly dependent firms, combined with indirect job, income, and revenue coefficients for the supplying industries in the state of Ohio as developed for Martin Associates by the U.S. Bureau of Economic Analysis, Regional Input/Output Modeling System (RIMS II).

1.3. Economic Impact Models

The impacts are measured for CY2023 – based on interview results, individual Port Authority data and the latest USACE Waterborne Commerce Statistics data (2022) available at the time of this report. In addition, computer models for cargo and industrial operations have been developed to test the sensitivity of the impacts to changes in economic conditions and facility utilization. It is to be emphasized that this study is designed to provide a framework which ODOT and ports can use in formulating and guiding future development of shipping facilities and policies for the state of Ohio.

The cargo impact model is designed to test the sensitivity of impacts to changes in such factors as maritime tonnage levels, port productivity and work rules, new port facilities development, inland distribution patterns of cargo, number of vessel/barge calls and the introduction of new carrier services. Finally, the maritime cargo impact model can be used to assess the economic benefits of increased maritime activity

due to infrastructure development and the opportunity cost of not undertaking specific maritime investments such as dredging, new terminal development or warehouse development.

1.4. Summary of Results

Figure 1 provides the economic impacts of the maritime cargo activity on Ohio's MTS. Details for the twelve ports analyzed can be found in **Appendix B**.

Figure 1: Impacts of Waterborne Shipping Activity on Ohio Maritime System CY2023*

IMPACT CATEGORY	Ohio River	Lake Erie	Total OMS
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Direct	7,827	9,612	17,439
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*Totals may be rounded.

In 2023, waterborne shipping at Ohio maritime facilities in some way supported 130,798 jobs in the region. Of these jobs, 17,439 jobs were directly created by cargo shipping and dependent industrial activities, while another 16,374 induced jobs were generated in the state as a result of local purchases made by those directly employed by Ohio maritime terminals and Ports of Ohio cargo and tenant activity. In addition, there were 21,133 indirect jobs supported in Ohio as the result of nearly $2.4 billion of local purchases. A further 75,852 jobs were in some way related to Ohio maritime cargo. The majority of these jobs were associated with the processing and movement of steel products, fertilizer, grain and dry bulk cargoes at the individual terminals. *Related jobs are not dependent upon the port marine terminals to the same extent as are the direct, induced,*

and indirect jobs. It is the demand for the final products which creates the demand for the employment with these shippers/consignees, not the use of a particular port or maritime terminal, and therefore these firms can, and do use other ports.

The 17,439 direct jobholders received $1.1 billion in direct wage and salary income, for average earnings of $60,500 per direct employee. As a result of local purchases with this $1.1 billion of direct wages and salaries, nearly $2.5 billion of additional income and local consumption expenditures were created in Ohio. It is this re-spending impact that supported the 16,374 induced jobs.[1] Indirect jobholders received nearly $1.3 billion in personal income. Related users in the state received another $4.8 billion of personal income. In total, $9.7 billion of personal income is in some way related to the Ohio Maritime System.

Local maritime service providers, port tenants and dependent shippers received nearly $5.6 billion of revenue from providing services supporting cargo activity. In addition, $31.9 billion of output was generated throughout the state by related users using the marine terminal facilities for shipment and receipt of cargo.

As a result of the direct, induced and indirect cargo activity on Ohio's maritime transportation system, a total of $486.8 million of state and local tax revenue was generated. A further $483.5 million of related taxes bring the total state and local taxes that are in some way related to maritime and cargo activity to $970.3 million.

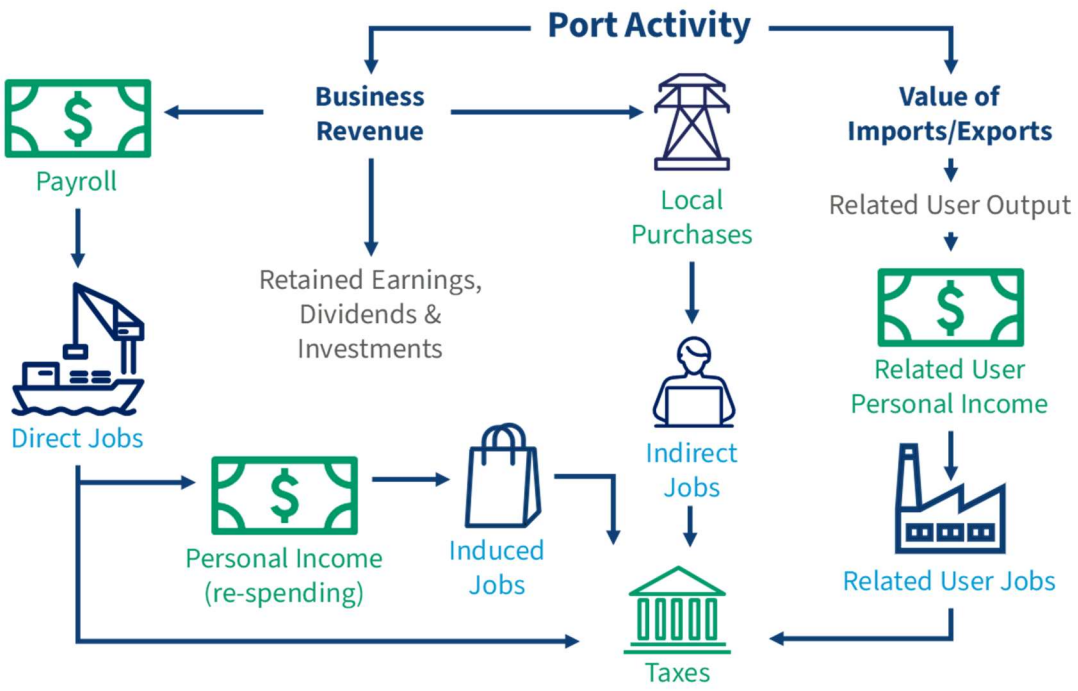
In all, by combining the businesses services revenue, related output and re-spending income, the total economic activity generated by the Ohio maritime transportation system is $40 billion.

[1]The induced income impact also includes local consumption expenditures and should not be divided by induced jobs to estimate the average salary per induced job.

2. Economic Impacts of Ohio's Maritime Cargo Activity

Waterborne cargo activity at a port or cargo terminal contributes to the state economy by generating business revenue to local and national firms providing vessel and cargo handling services at the terminals. These firms, in turn, provide employment and income to individuals, and pay taxes to state and local governments. Figure 2 shows how activity at maritime terminals generates impacts throughout the local, state, and national economies. As this figure indicates, the impact of waterborne shipping on a local, state, or national economy cannot be reduced to a single number, but instead creates several impacts. These are the revenue impact, employment impact, personal income impact, and tax impact. These impacts are nonadditive. For example, the income impact is a part of the revenue impact, and adding these impacts together would result in double-counting. The figure shows graphically how activity at Ohio maritime facilities generates the four impacts.

Figure 2: Flow of Economic Impacts Generated by Maritime Cargo Activity



At the outset, activity at the maritime terminals generates **business revenue** for firms which provide services. This business revenue impact is dispersed throughout the economy in several ways. It is used to hire people to provide the services, to purchase goods and services, and to make federal, state and local tax payments. The remainder is used to pay stockholders, retire debt, make investments, or is held as retained earnings. It is to be emphasized that the only portions of the revenue impact that can be identified as remaining in the local/regional economy are those portions paid out in salaries to local employees, for local purchases by

individuals and businesses directly dependent on the port, in contributions to state and local taxes, in lease payments by tenants, and wharfage and dockage fees paid to a port.

The **employment impact** of maritime activity consists of four levels of job impacts:

- ***Direct employment impact*** – are jobs directly generated by maritime activity. Direct jobs generated by cargo include jobs with railroads and trucking companies moving cargo between inland origins and destinations and the terminals, longshoremen and dockworkers, steamship agents, freight forwarders, stevedores, etc. It is to be emphasized that these are classified as directly generated in the sense that these jobs would experience near term dislocation if the activity at Ohio maritime terminals were to be discontinued.
- ***Induced employment impact*** – are jobs created throughout the local economy because individuals directly employed due to maritime activity spend their wages locally on goods and services such as food, housing, and clothing. These jobs are held by residents located throughout the region, since they are estimated based on in-state purchases.
- ***Indirect Jobs*** – are jobs created locally due to purchases of goods and services by firms, not individuals. -These jobs are estimated directly from local purchases data supplied to Martin Associates by the companies interviewed as part of this study, and include jobs with local office supply firms, maintenance and repair firms, parts, and equipment suppliers, etc.
- ***Related User jobs*** – are jobs with shippers and consignees (exporters and importers) including the state's manufacturing, farming, retail, wholesale, distribution industries, and the in-state industries supporting the movement and distribution of cargo imports and exports using the port terminals for shipment and receipt of cargo. ***Related jobs are not dependent upon the port marine terminals to the same extent as are the direct, induced, and indirect jobs since it is the demand for the final products, which creates the demand for the employment with these shippers/consignees, not the use of a particular port or maritime terminal, and therefore these firms can, and do use other ports.*** For example, when hurricane devastation renders a port's container and break-bulk terminals inoperable, essentially suspending operations at the port, the direct, induced, and indirect jobholders are immediately affected with similar consequences. However, the jobs held with related users such as manufacturing as well as wholesale and retail distribution throughout the unaffected areas of the state will continue to operate. These firms must find alternative ports to ship and receive cargo to maintain given levels of operation. Therefore, viable port operations are essential to long-term retention of import and export related jobs throughout the state.

The personal earnings impact is the measure of employee wages and salaries (excluding benefits) received by individuals directly employed due to port activity. Re-spending of these earnings throughout the regional economy for purchases of goods and services is also estimated. This, in turn, generates additional jobs -the induced employment impact. This re-spending throughout the region is estimated using a regional personal earnings multiplier, which reflects the percentage of purchases by individuals that are made within the area-.

The re-spending effect varies by region -- a larger re-spending effect occurs in regions that produce a relatively large proportion of the goods and services consumed by residents, while lower re-spending effects are associated with regions that import a relatively large share of consumer goods and services (since personal earnings "leak out" of the region for these purchases). The direct earnings are a measure of the local impact since they are received by those directly employed by local maritime activity.

Tax impacts are payments to the state and local governments by firms and by individuals whose jobs are directly dependent upon and supported (induced jobs) by activity at the marine terminals.

2.1. Impact Structure

Economic impacts are created throughout various business sectors of the state and local economies. Specifically, three distinct economic sectors are impacted as a result of activity at the marine terminals:

- Surface Transportation Sector;
- Maritime Services Sector;
- Dependent Shippers/Consignees Sector; and
- Port Authorities.

Within each sector, various participants are involved. Separate impacts are estimated for each of the participants. A discussion of each of the economic impact sectors is provided below, including a description of the major participants in each sector.

Surface Transportation Sector

The surface transportation sector consists of both the railroad and trucking industries. The trucking firms and railroads are responsible for moving the various cargoes between the marine terminals and the inland origins and destinations.

Maritime Services Sector

This sector consists of numerous firms and participants performing functions related to the following maritime services:

- Maritime Cargo Transportation;
- Vessel Operations;
- Cargo Handling; and
- Federal, State and Local Government Agencies.

A brief description of major participants in these four categories follows:

- Maritime Cargo Transportation: Participants in this category are involved in providing and arranging inland and water transportation for inbound and outbound freight. For example, a freight forwarder/customs house broker arranges for the freight to be delivered between the terminals and inland destinations, as well as the freight transportation, while the line haul barge operator provides transportation on the river system to port facilities.

- Vessel/Barge Maritime Service Operations: This category consists of several participants. The steamship agents provide a number of services for the vessel as soon as it enters a port. The agents arrange for medical and dental care of the crew, for ship supplies as well as payment of various expenses including port charges. The agents are also responsible for vessel documentation. In addition to the steamship agents arranging for vessel services, those providing the services include:

    - Chandlers supply the vessels with ship supplies (food, clothing, nautical equipment, etc.);
    - Towing firms provide the tug service to guide the vessel to and from port;
    - Pilots assist in navigating the vessels to and from the maritime terminals;
    - Bunkering firms provide fuel to the vessels;
    - Barge Fleeting/Cleaning provide fleeting services for barges at the terminals;
    - Marine surveyors inspect the vessels/barges and the cargo; and
    - Shipyards/marine construction firms provide repairs (either emergency or scheduled) as well as marine pier construction and dredging;

- Cargo Handling: This category involves the physical handling of the cargo at the terminals between the land and the vessel/barge. Included in this category are the following participants:

    - Longshoremen & dockworkers include members of the International Longshoremen's Association (ILA), International Union of Operating Engineers, International Brotherhood of Teamsters and United Steelworkers as well as those dockworkers with no union affiliation that are involved in the loading and unloading of cargo from the vessels/barges, as well as handling the cargo prior to loading and after unloading;
    - Stevedoring firms manage the longshoremen and cargo-handling activities;
    - Cargo terminal operators provide services to operate the maritime terminals, track cargo movement and provide security where cargo is loaded and off-loaded;
    - Warehouse operators store cargo after discharge or prior to loading and consolidate cargo units into shipment lots. In many cases, the freight forwarders and consolidators are also involved in warehousing activity; and

- Government Agencies: This service sector involves federal, state and local government agencies that perform services related to cargo handling and vessel/barge operations at the port. Department of

Homeland Security (DHS), which includes Customs and Border Protection (CBP), U.S. Immigration and Customs Enforcement (ICE), U.S. Coast Guard, U.S. Department of Agriculture (grain inspection), and the USACE, are involved. These services are provided by the government offices located in the Great Lakes region.

Dependent Shipper/Consignees Sector

This sector includes those firms that ship or receive cargo via the specific terminal. For the analysis, shippers/consignees will be divided into two categories. The first category will consist of those users 1) dependent upon the terminal and usually located within the terminal's immediate hinterland; or 2) Exhibit a high degree of dependency on the cargo moving over the terminal. These direct impacts are included in the terminal operators and dependent shippers/consignees category.

The second category of shippers/consignees consists of those users that could easily use competing ports or terminals. For example, if the Ohio maritime terminals were not available, members of the first category would likely be driven out of business in the near term, while members of the second category would shift to another port. These impacts are classified as related user impacts in that the exporters and importers using the marine terminals can and do use other ports for the shipment and receipt of cargo. The related impacts measure the impact, or influence, of the marine terminals at a given point in time, and if the Ohio River terminals were no longer used, these influenced users would use other ports to export and import cargo. Unlike the direct, induced, and indirect impacts, the related impacts would not necessarily be dislocated from the economy – instead, the impacts would no longer be influenced by the state's ports, but by another out-of-state port. It is emphasized that only the portion of jobs, income taxes and revenue related to the actual cargo moving via the marine terminals within the state are counted in the related user impacts.

Finally, the direct, induced, and indirect port sector job, income, revenue and tax impacts associated with each of the cargoes for which related shipper/consignee impacts were estimated were subtracted from the total related impacts (by commodity and cargo type). This was done to avoid double counting, as the related shipper/consignee impacts include impacts at each logistical stage of handling the imported and exported cargo, such as the port activity and the trucking and rail activity to move the cargo to and from each terminal and the induced and indirect jobs associated with the direct terminal activity.

Port Authorities

This sector includes the employees of public port authorities, the income received by these employees, the revenue received by the port authorities from leases, and terminal and cargo charges.

2.2. Commodities Included in the Analysis

A major use of economic impact analysis is to provide a tool for terminal development planning. As a port or terminal grows, available land and other resources for facilities become scarce, and decisions must be made as to how to develop the land and utilize the resources in the most efficient manner. Various types of facility configurations are associated with different commodities. For example, bulk materials may require a large amount of paved, open storage space, while certain types of break bulk cargoes such as steel coils, lumber and plywood may require covered storage. Perishable commodities require temperature-controlled

warehouses, and some dry bulk cargo requires covered storage and special dust removing equipment, while tank farms are needed to store liquid bulk cargo.

An understanding of the commodity's relative economic value in terms of employment and income to the local community, the cost of providing the facilities, and the relative demand for the different commodities is essential in making future development plans. Because of this need for understanding relative commodity impacts, economic impacts are estimated for the following commodities handled at the public and private cargo terminals:

- Containerized cargo (Cleveland only)
- Aggregates (including cement, stone, sand)
- Chemicals (including dry and liquid fertilizers)
- Coal
- Grain (including ag products)
- Iron ore
- Steel products
- Ores & minerals
- Petroleum Products
- Other (including specialized or miscellaneous dry and liquid bulks and general cargo).

It should be emphasized that commodity specific impacts are not estimated for each of the economic sectors described in the last section. Specific impacts could not be allocated by individual commodities with any degree of accuracy for maritime construction, ship repair, or the state and federal government due to the fact that it is difficult to estimate the percentage of resources that are dedicated to one commodity over another. For example, maritime construction may occur at a terminal that is multi-use and cannot be attributed to a specific commodity. Similarly, law enforcement and security operations cannot be attributed to a single commodity.

2.3. Maritime Cargo Employment Impacts

Employment generated by maritime cargo activity on Ohio's MTS is estimated.

- First, the total employment that is in some way related to maritime activity is estimated from the interview process of 184 Ohio maritime terminals, port companies and service providers as well as data provided by the Ports of Ohio and USACE as described in the methodology;
- Second, the subset of total employment that is judged to be totally dependent (i.e., direct jobs) on port activity is analyzed as follows:

- The direct job impact is estimated by detailed job category, i.e., trucking, dockworkers, barge operators, steamship agents, chandlers, surveyors, etc.;
- The direct job impact is estimated for each of the key commodities/commodity groups;
- Induced and indirect jobs are estimated; and
- Finally, jobs related to maritime activity at the cargo terminals are described.

It is estimated that 130,798 jobs are in some way related to the maritime activity at the cargo terminals on Ohio Maritime System. Of the 130,798 jobs:

- 17,439 jobs are directly generated by activities at the cargo terminals and if such activities should cease, these jobs would be discontinued over the short term.
- 16,374 jobs (induced jobs) are supported by the local purchases of the 17,439 individuals directly generated by port activity at the cargo terminals. An additional 21,133 indirect jobs were supported by nearly $2.5 billion of purchases in the state of Ohio by firms providing direct cargo handling and vessel/barge services. Direct, induced, and indirect categories total 54,946 jobs. These are the jobs that may be considered dependent upon Ohio maritime activity and would experience immediate disruption if that activity were to cease.
- 75,852 jobs are related to inbound and outbound cargoes transiting Ohio maritime facilities. These jobs are supported in the state's steel processing, manufacturing, farming, construction, retail, wholesale and distribution industries, and the in-state industries supporting the movement and distribution of all commodities, primarily concentrated with steel, coal, petroleum products, grain, aggregates, limestone, and fertilizer cargo imports and exports using Ohio maritime terminals.

Direct Maritime Cargo Jobs

As a result of the domestic and foreign waterborne cargo moved via Ohio Maritime System 17,439 full-time jobs were directly created[2]. These jobs would vanish immediately if shipping operations on the Ohio Maritime System were to cease. Figure 3presents the distribution of the 17,439 direct jobs by sector and job category. As this figure shows, the largest job impacts are with dependent shippers/consignees including utility companies, steel processors and polymer manufacturers, followed by trucking industry jobs. Jobs generated by terminal operations is the third largest employment impact category, followed by jobs with maritime service providers.

[2] Jobs are measured in terms of full-time worker equivalents. If a worker is employed only 50 percent of the time by activity at a cargo terminal, then this worker is counted as 0.5 jobs.

Figure 3: Direct Employment Impacts by Job Category*

CATEGORY	Ohio River	Lake Erie	Total OMS
SURFACE TRANSPORTATION			
RAIL	126	125	251
TRUCK	2,799	1,826	4,626
TERMINALS	1,297	2,564	3,861
MARITIME SERVICES	330	848	1,178
GOVERNMENT	69	205	274
TOWING & BARGE	344	164	508
LAKER	0	635	635
MARINE EQUIPMENT & CONSTRUCTION	493	672	1,165
SHIPPER / CONSIGNEES & TENANTS	2,364	2,530	4,894
PORT AUTHORITY	5	43	48
TOTAL	**7,827**	**9,612**	**17,439**

* Totals may be rounded.

Most of the 17,439 jobs considered to be generated directly by maritime activity can be associated with the handling of specific commodities or commodity groups. Certain employment categories such as government employees and maritime construction firms cannot be identified with a specific commodity. As a result, employment in these groups (which totaled 2,054) was not allocated to specific commodities. Figure 4presents the relative employment impacts in terms of commodity groups.

Figure 4: Direct Employment by Commodity*

COMMODITY	Ohio River	Lake Erie	Total OMS
CONTAINER	0	12	12
AGGREGATES	1,114	1,552	2,667
CHEMICALS	334	0	334
COAL	1,307	279	1,586
GRAINS	447	294	741
IRON ORE	0	2,913	2,913
STEEL	739	651	1,391
ORES & MINERALS	98	792	890
PETROLEUM PRODUCTS	1,803	1,344	3,147
OTHER	1,418	286	1,704
NON ALLOCATED	567	1,487	2,054
TOTAL	**7,827**	**9,612**	**17,439**

*Totals may be rounded

As this figure shows, petroleum products generate the largest number of employment impacts followed by iron ore, aggregates, and coal.

Induced Jobs

The 17,439 directly employed individuals due to activity at the cargo terminals received $1.1 billion of wages and salaries, a part of which was used to purchase local goods and services such as food, housing, clothing, transportation services, etc. As a result of these local purchases, 16,374 induced jobs in the regional economy

were supported. The majority of the induced jobs are with private sector social services, business services, educational services and state and local government agencies, followed by jobs in the food and restaurant sector, and then jobs in the construction and home furnishings sector.

Indirect Jobs

In addition to the induced jobs generated via purchases by directly employed individuals, the firms providing the direct services and employing the 17,439 direct jobs make in-state purchases and capital expenditures for goods and services. These purchases by the firms dependent upon the cargo facilities generated additional Ohio jobs – indirect jobs. Based on interviews and data, these firms made $2.5 billion of local and in-state purchases and capital expenditures. These purchases created an additional 21,133 indirect jobs in the local economy.

Related User Jobs

It is estimated that 75,852 jobs are supported in Ohio with shippers/consignees that use Ohio maritime facilities. To estimate the related user impact for cargo, the average value per ton of imports and exports was estimated using data from the USACE, US Census, and port authorities. The employment to value of output coefficient for the retail sector related to the exported and imported cargoes was then computed from BEA, Regional Input-Output Model for the state of Ohio.

For break bulk cargoes, the associated consuming and producing industries were identified with each commodity. For example, for inbound iron and steel products, relationships were developed to convert the dollar value of these materials into a dollar value of output in the key consuming industries, which include construction and metal fabrication. Relationships between the values of inputs to the value of outputs in these industries were estimated using data from the U.S. Bureau of Census, Census of Manufacturing and Census of Construction. These ratios were then used to convert the dollar value of the imported break bulk and bulk cargoes into a dollar value of output in the consuming industries in the state. Using the respective jobs to value of output multipliers for these industries from the BEA, Regional Input-Output Modeling System (RIMS II) model, the value of the break bulk and bulk cargoes moving via the maritime terminals and remaining in (or produced in) the state of Ohio was converted into related shipper/consignee jobs with these users and associated supporting industries within the state. A similar methodology was used in estimating related user jobs for agricultural products.

Finally, the direct, induced, and indirect maritime sector job impacts (maritime shippers, port companies and dependent shippers) associated with each of the cargoes for which related shipper/consignee jobs were estimated were subtracted from the total related jobs (by commodity and cargo type) to avoid double-counting. The related shipper/consignee jobs include job impacts at each stage of handling the imported and exported cargo, such as the port activity, the trucking activity and the rail activity used to move the cargo to and from the maritime terminals and the induced and indirect jobs associated with the direct terminal activity.

It is to be further emphasized that when the impact models are used for planning purposes and sensitivity analysis, related jobs should not be used to judge the economic benefits of a particular project. Related jobs are not estimated with the same degree of defensibility as are the direct, induced, and indirect jobs. Therefore, only

these three types of job impacts should be used in evaluating port investments. The purpose of the related jobs estimate is to provide a proxy for the magnitude of the more general economic development impact of the private and public port facilities.

2.4. Economic Output and Business Revenue Impacts

The cargo handled on Ohio Maritime System included in the study generated revenue for firms in each of the economic sectors. For example, revenue is received by the railroads and the trucking companies within the surface transportation sector as a result of moving outbound cargo to the terminals and distributing the inbound commodities inland after receipt at the cargo terminals. The firms in the maritime services sector receive revenue from arranging for transportation services, cargo handling, providing services to vessels/barges and repairs to vessels/barges calling on the terminals. Ports receive revenue from terminal leases and port charges such as wharfage and dockage assessed on cargo and vessels. In addition, revenue is received by dependent shippers/consignees from the sales of cargo shipped or received via the cargo terminals and from the sales of products made with raw materials received through the terminals. Since this chapter is concerned with the revenue generated from providing maritime services, the shipper/consignee revenue (i.e., the value of the cargo shipped or received through the maritime terminals, as well as the value of the products produced by the port-dependent shippers/consignees) will be excluded from the remaining discussion.

The revenue generated by port and maritime terminal activity consists of many components. For example, gross revenue is used to pay employee salaries and taxes. It is also distributed to stockholders of the companies providing vessel and cargo handling services, and it is used for the purchases of equipment and maintenance services. Of these components, only three can be isolated geographically with any degree of accuracy. These are the personal income component of revenue, which can be traced to geographic locations based on the residence of those receiving the income, the payment of state and local taxes, and the local purchases made by firms dependent upon the maritime activity. The balance of the revenue is distributed in the form of payments to firms located outside the state of Ohio providing goods and services to the economic sectors and for the distribution of company profits to shareholders. Many of these firms and owners are located outside of the state of Ohio and, thus, it is difficult to trace the ultimate location of the distributed revenue (other than personal income, taxes, and local purchases). The value of output created by in-state related shippers/consignees of the port is attributed to the state of Ohio, and the local purchases from other firms within the state are also included in this user output measure, as defined by the in-state output coefficients developed from the BEA, Regional Input-Output Modeling System (RIMS II).

The revenue impact is a measure of the total economic activity in the state that is generated by the cargo moving via the Ohio Maritime System. In 2023, maritime cargo and port industrial activity on the Ohio Maritime System and related activities generated a total of $40 billion of total economic activity in the state. Of the $40 billion, $5.6 billion is the direct business revenue received by the firms directly dependent upon the terminals and providing maritime services and inland transportation services to the cargo handled at the maritime terminals and the vessels/barges calling on the terminals, port tenants and on-site dependent shippers/consignees. The remaining $31.9 billion represents the value of the output to the state of Ohio that is created due to the cargo moving via the port and maritime terminals. This includes the value added at

each stage of producing an export cargo, as well as the value added at each stage of production for the firms using imported raw materials and intermediate products that flow via the marine terminals and are consumed by industries within the state of Ohio. The following figures focus on the $5.6 billion of business services revenue.

Figure 5 presents the distribution of the nearly $5.6 billion of directly generated revenue across the various port sectors and job categories. This revenue includes the revenue received by firms providing services to the cargo activity on the Ohio Maritime System, and includes revenue received by trucking firms, terminal operators, stevedores, the port authorities, line haul barge operators, local towing & fleeting operators, etc.

Figure 5: Revenue by Sector and Category

CATEGORY	Ohio River	Lake Erie	Total OMS
SURFACE TRANSPORTATION			
RAIL	$81,192	$353,026	$434,217
TRUCK	$528,270	$307,050	$835,320
TERMINALS	$370,255	$191,323	$561,578
MARITIME SERVICES	$40,417	$192,112	$232,529
GOVERNMENT	$0	$0	$0
TOWING & BARGE	$414,114	$27,410	$441,524
LAKER	$0	$319,870	$319,870
MARINE EQUIPMENT & CONSTRUCTION	$86,319	$85,077	$171,395
SHIPPER / CONSIGNEES & TENANTS	$1,448,327	$1,142,865	$2,591,192
PORT AUTHORITY	$856	$8,544	$9,400
TOTAL ($1,000)	**$2,969,749**	**$2,627,277**	**$5,597,025**

*Totals may be rounded

The majority of the direct revenue is received by the dependent shippers/consignees, followed by terminal operations and truck transportation.

Figure 6 shows the direct revenue impact by commodity. It is to be emphasized that the revenue received by shippers/consignees from the sales of the products (value of the commodities) moving via the port terminals is not included, since product value is determined by the demand for the product, not the use of the cargo terminals.

Figure 6: Flow of Economic Impacts Generated by Maritime Cargo Activity

COMMODITY	Ohio River	Lake Erie	Total OMS
CONTAINER	$0	$696	$696
AGGREGATES	$315,500	$271,931	$587,431
CHEMICALS	$76,406	$0	$76,406
COAL	$750,089	$191,185	$941,273
GRAINS	$105,661	$47,981	$153,642
IRON ORE	$0	$1,441,055	$1,441,055
STEEL	$318,247	$110,886	$429,134
ORES & MINERALS	$40,537	$262,507	$303,044
PETROLEUM PRODUCTS	$645,529	$11,066	$656,595
OTHER	$630,604	$56,261	$686,866
NON ALLOCATED	$87,175	$233,709	$320,883
TOTAL ($1,000)	**$2,969,749**	**$2,627,277**	**$5,597,025**

*Totals may be rounded.

As this figure indicates iron ore, coal and petroleum products generate the largest direct revenue impacts.

2.5. Personal Earnings Impacts

The income impact is estimated by multiplying the average annual earnings (excluding benefits) of each port participant, i.e., truckers, terminal operations personnel, maritime service providers, pilots, barge and towing firm employees, longshoremen, warehousemen, etc., by the corresponding number of direct jobs in each category. The individual annual earnings in each category multiplied by the corresponding job impact resulted in $1.1 billion in personal wage and salary earnings. It is important to emphasize that the average annual earnings of a marine terminal-dependent job is $60,530.

The impact of re-spending this direct income for local purchases is estimated using a personal earnings multiplier. The personal earnings multiplier is based on data supplied by the BEA, Regional Input-Output Modeling System (RIMS II). The BEA estimates that for every one dollar earned by direct employees generated by activity at the cargo terminals, an additional $2.36 of personal income and consumption expenditures would be created as a result of re-spending the direct income for purchases of goods and services produced locally. Hence, a personal earnings multiplier of 3.36 was used to estimate the total income and consumption impact of nearly $2.5 billion, inclusive of the re-spending effect. This additional re-spending of the direct income generates 16,374 induced jobs. The 21,133 indirect job holders earned $1.3 billion in indirect wages and salaries. The 75,852 related shipper/consignee jobs tied to cargo moving via marine terminals received $4.8 billion of personal income.

Therefore, the total personal income impact and consumption impact created by Ohio maritime cargo shipments and related industrial activity is estimated at just over $9.7 billion. However, it must again be emphasized that the $4.7 billion received by the related shipper/consignee jobs cannot be said to be dependent upon Ohio's maritime industry.

2.6. Tax Impacts

State and local tax impacts are based on per employee tax burdens which are developed at the county, local and state jurisdictional levels. These tax per employee burdens are essentially tax indices that are used to allocate total taxes at each level of government to economic activity generated by the cargo terminals. To estimate the per employee tax indices, total taxes received at each governmental level in Ohio was developed by applying indices from the Tax Foundation[3] to dependent and related incomes. These indices represent total state and local taxes paid by residents as a percentage of total personal income. Cargo and marine terminal activity generated $486.8 million of state, county, and local taxes. As a result of the economic activity created by the related users, an additional $483.5 million of state and local taxes were generated for a total cargo tax impact of $970.3 million. The state of Ohio receives approximately 55.5% of the tax revenues while local governments received 45.5% of the tax revenue.

[3] Tax Foundation, *Ohio's State and Local Tax Burden*, http://taxfoundation.org/article/ohios-state-and-local-tax-burden.

Appendix A List of Companies Contacted

1. ACBL
2. ADM
3. Allied #76 Shelly Materials 3rd Street
4. Altivia Petrochemicals (Haverhill/Sunoco)
5. AM&O Towing
6. Amcor
7. Americas Styrenics (fmly Chevron-Phillips Chemical Co., Marietta Plant Dock)
8. Amsty (formerly Dow Chemical) American Styrenics
9. Anchor Drilling
10. Arcadian Chemical Corp. (fmly Liquid Transfer Term?)
11. Asphalt Materials and Construction Company
12. Asphalt Materials, Inc.
13. Athens County Port Authority
14. B & N Coal / American Municipal Power
15. B.W.C. Trucking
16. Bellaire Harbor Service
17. Belmont County Port Authority
18. Belpre Sand and Gravel
19. Benchmark River and Rail Terminals
20. Buckeye Cardinal Power Plant
21. Buckeye Partners (fmly Shell Asphalt Co.)
22. Buckeye Terminals
23. Buzzi UniCem
24. Canadian Silica CSI (fmly Sand Products)
25. Cargill
26. Cargill Deicing Technology
27. Cargill Salt
28. Carmeuse
29. Carmeuse
30. Carmeuse Americas/Huron Lime
31. Center Port Terminal (old Ormet Primary Aluminum Corp.)
32. Center Port Terminal (old Ormet Primary Aluminum Corp.) Eastern Terminal
33. CGB (formerly Indiana Grain?)
34. CGB Fleeting
35. Cimbar Minerals
36. Cincinnati Barge & Rail Terminal (2 docks)
37. Cincinnati Bulk Terminal
38. Cincinnati Bulk Terminal
39. Cleveland Cliffs (fmly ArcelorMittal)
40. CN Railroad (Pittsburgh and Conneaut Dock Company)
41. Columbiana County Port Authority
42. Conley River Terminal
43. Consolidated Grain and Barge (both facilities)
44. Contanda (Westway Terminal Co.) / BWC
45. CSX
46. CTLC North Bend/Consolidated Grain and Barge
47. Cumberland-Elkhorn Coal Co.
48. Cuyahoga Concrete/Osborne/Cuyahoga Materials
49. D.W. Dickey & Son
50. Dayton Power and Light
51. Dayton Power and Light
52. Defense Logistics Agency
53. Dock Side, Hannibal Terminal Dock Port Facility
54. East Liverpool River-Rail Terminal
55. Enerfab
56. Eramet Chemical Marietta
57. Ergon Inc. / Action Terminal
58. Ergon Trucking Marietta
59. Erie County Port Authority
60. former Pittsburgh Steel Corp.
61. Gatling Coal Co.
62. Great Lakes Towing
63. Greater Cincinnati Water Works
64. Growmark
65. Growmark (fmly C.F. Industries)
66. Hannibal Industrial Park
67. Hansen-Mueller
68. Hanson Redi Mix (fmly Arrow Concrete)
69. Heritage Cooperative

70. Hilcorp Harvest Pipeline - Wellsville Terminal
71. Hilltop Basic Resources East / Hilltop Kellogg
72. Hilltop Basic Resources River Downtown (Cincinnati R Term)
73. Holcim Cement Cincinnati
74. I. Deutch & Sons
75. IBT
76. INEOS ABS USA Addyston (Monsanto)
77. J. Hall Gallipolis Trust
78. Jaymar Cheshmire
79. Jefferson County Port Authority
80. JSW Steel (Mingo Junction) 3 docks
81. Jurgensen Co Greater Cincinnati Asphalt Terminal 2
82. Kinder Morgan Pinney Dock
83. Kinder Morgan Queen City Terminal
84. Kokosing Asphalt Terminal
85. Kosmos Cement
86. Kraton Polymers
87. L & J Bowers (Steubenville)
88. Lafarge
89. Lafarge Cement
90. Lafarge Holcim (intl bulk storage)
91. Lafarge Marblehead Quarry
92. Lake County Port Authority
93. Lawrence County Port Authority
94. Lehigh Hansen Cement CCCPA (fmly ESSROC)
95. Lightstone (fmly AEP Gavin) General James Gavin
96. Logistec CCCPA (CBT)
97. Long Ridge Energy (under construction 2019)
98. Lorain Port & Finance Authority
99. Luminant Miami Fort Station/DYNEGY (fmly Duke Energy)
100. Marathon Ashland
101. Marathon MPLX (formerly Tresler Oil)
102. Marathon North Bend Asphalt Terminal (formerly Chevron USA Inc.)
103. Marathon Petroleum
104. Marathon Petroleum (Ashland) Wellsville Wharf Port Facility
105. Marathon/Ashland
106. Marathon/Ashland Pipeline/American River Terminals
107. Marietta Industrial (fmly Dock Side Terminal) / MIE River Terminals (3 docks)
108. Martin Marietta
109. Martin Marietta Aggregates
110. Martin Marietta Aggregates/Apple Grove Sand & Gravel
111. Maysville Ready Mix / Wellsville Ready Concrete
112. McGinnis/McNational Inc (3 docks) Cincinnati/Sayler Park
113. McGovney River Terminal (2 docks)
114. Mid Continent Coal & Coke
115. Middle Port Terminal - Shelly Liquid
116. Mid-Ohio Valley Lime
117. Midwest Terminals
118. Monroe County Port Authority
119. Morton Salt
120. Mose Cohen & Sons
121. MPR Supply Chain Transloading/Capital Sand (user)
122. National Lime and Stone
123. National Lime and Stone (Martins Ferry) and HMA plant
124. Noramco
125. Norfolk & Southern Railway
126. Norfolk & Southern Railway Wheelsburg
127. Nova Chemical (closed in 2008)
128. Ohio Edison / R.E. Burger power plant
129. Ohio Valley Electric , Kyger Creek (AEP Gavin)
130. O-kan Marine
131. Ontario Stone
132. Orion Engineered Carbons (fmly Degussa Carbons)
133. Osborne Concrete Stone
134. Oxford Coal Dock/Mineral Labs
135. Paragon Integrated Services
136. Parsons Terminal
137. Peter Cremer North America
138. Pier 48
139. Plains Energy Toronto Ohio Terminal

140. Port of Cincinnati, Cincinnati Bulk Terminal (5 docks)
141. Price Inland Terminals (5 terminals)
142. Price Inland Terminals / Lafarge Holcim / Shelly
143. Quality Liquid Feeds
144. Raven Hoking Coal
145. Rayle Coal Co./Marietta Coal
146. Robindale Warrenton River Terminal
147. S. H. Bell
148. Sands Hill Coal Mining
149. Sandusky Dock Corp
150. Seaforth Mineral & Ore
151. Shelly & Sands Terminal
152. Shelly Materials
153. Shelly Materials Belpre
154. Shelly Materials Gallipolis
155. Shelly Materials Portland
156. Shelly Materials Reedsville
157. Six Recycling
158. Smith Concrete (division of Shelly) 2 docks (also 173.2)
159. Smith Concrete (formerly Tri-Son Concrete)
160. Solvay Advance Polymers
161. Southeastern Ohio Port Authority
162. Southern Ohio Port Authority
163. Southside River Rail (Contanda?)
164. SRM (was Sidley)
165. St Mary Cement
166. St Marys Cement
167. Superior Marine Proctorville
168. Terminal Ready Mix
169. The Point Industrial Park
170. Tidewater Logistics (Steubenville)
171. Trammo North Bend Nitrogen Operations (fmly Nutrium/Agrium)
172. TransMontaigne formerly Itapco
173. TransMontaigne
174. Tri State Petroleum
175. Tri Valley Asphalt
176. Veolia Regeneration Services Fort Hill Plant (frmly Dupont Chemours)
177. Walden Industries
178. Walter C. Beckjord / Cincinnati G&E
179. WATCO (formerly Kinder Morgan)
180. WATCO Liquid (fmly River Transpo Bulk Terminal) 3 terminals
181. Wells Readymix
182. Wellsville Intermodal Terminal
183. Westway Feeds
184. Yaeger Materials

Appendix B Summary Results Detailed by Port

The Ports of Cincinnati and Northern Kentucky

Figure 7: Summary Results – The Ports of Cincinnati and Northern Kentucky

	CINCINNATI
JOBS	
Direct	2,589
Induced	2,236
Indirect	2,941
Related	22,857
TOTAL JOBS	**30,623**
PERSONAL INCOME ($1,000)	
Direct	$145,145
Re-Spending/Local Purchases	$342,977
Indirect	$190,373
Related	$1,578,572
TOTAL INCOME	**$2,257,066**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$827,763
Related Output	$8,811,604
TOTAL VALUE OF ECONOMIC REVENUE	**$9,639,367**
LOCAL PURCHASES ($1,000)	**$340,685**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$67,849
Related	$157,857
TOTAL STATE AND LOCAL TAXES	**$225,707**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$9,982,343**

Port of Huntington Tri-State

Figure 8: Summary Results – Port of Huntington Tri-State

	HUNTINGTON
JOBS	
Direct	1,660
Induced	1,353
Indirect	1,886
Related	6,952
TOTAL JOBS	**11,851**
PERSONAL INCOME ($1,000)	
Direct	$93,187
Re-Spending/Local Purchases	$220,201
Indirect	$122,082
Related	$575,749
TOTAL INCOME	**$1,011,218**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$645,101
Related Output	$2,806,877
TOTAL VALUE OF ECONOMIC REVENUE	**$3,451,978**
LOCAL PURCHASES ($1,000)	**$218,473**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$43,547
Related	$57,575
TOTAL STATE AND LOCAL TAXES	**$101,122**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$3,672,179**

Mid-Ohio River Valley Port District

Figure 9: Summary Results – Mid-Ohio River Valley Port District

	MID OH VALLEY
JOBS	
Direct	3,579
Induced	3,161
Indirect	4,066
Related	21,078
TOTAL JOBS	**31,883**
PERSONAL INCOME ($1,000)	
Direct	$199,253
Re-Spending/Local Purchases	$470,835
Indirect	$263,205
Related	$1,371,041
TOTAL INCOME	**$2,304,334**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$1,496,885
Related Output	$7,609,507
TOTAL VALUE OF ECONOMIC REVENUE	**$9,106,392**
LOCAL PURCHASES ($1,000)	**$471,022**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$93,329
Related	$137,104
TOTAL STATE AND LOCAL TAXES	**$230,433**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$9,577,227**

Conneaut Harbor

Figure 10: Summary Results – Conneaut Harbor

	CONNEAUT
JOBS	
Direct	192
Induced	165
Indirect	47
Related	4,086
TOTAL JOBS	**4,489**
PERSONAL INCOME ($1,000)	
Direct	$10,073
Re-Spending/Local Purchases	$23,802
Indirect	$2,615
Related	$192,050
TOTAL INCOME	**$228,539**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$122,493
Related Output	$1,346,333
TOTAL VALUE OF ECONOMIC REVENUE	**$1,468,826**
LOCAL PURCHASES ($1,000)	**$5,837**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$3,649
Related	$19,205
TOTAL STATE AND LOCAL TAXES	**$22,854**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$1,492,628**

Ashtabula Harbor

Figure 11: Summary Results – Ashtabula Harbor

	ASHTABULA
JOBS	
Direct	247
Induced	242
Indirect	73
Related	542
TOTAL JOBS	**1,105**
PERSONAL INCOME ($1,000)	
Direct	$15,436
Re-Spending/Local Purchases	$36,476
Indirect	$4,165
Related	$27,188
TOTAL INCOME	**$83,265**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$43,100
Related Output	$251,356
TOTAL VALUE OF ECONOMIC REVENUE	**$294,457**
LOCAL PURCHASES ($1,000)	**$9,462**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$5,608
Related	$2,719
TOTAL STATE AND LOCAL TAXES	**$8,327**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$330,933**

Fairport Harbor

Figure 12: Summary Results – Fairport Harbor

	FAIRPORT
JOBS	
Direct	588
Induced	576
Indirect	1,701
Related	965
TOTAL JOBS	**3,831**
PERSONAL INCOME ($1,000)	
Direct	$36,790
Re-Spending/Local Purchases	$86,935
Indirect	$107,639
Related	$46,317
TOTAL INCOME	**$277,680**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$136,943
Related Output	$380,474
TOTAL VALUE OF ECONOMIC REVENUE	**$517,417**
LOCAL PURCHASES ($1,000)	**$192,466**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$23,136
Related	$4,632
TOTAL STATE AND LOCAL TAXES	**$27,768**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$604,352**

Port of Cleveland

Figure 13: Summary Results – Port of Cleveland

	CLEVELAND
JOBS	
Direct	4,442
Induced	4,939
Indirect	6,991
Related	7,386
TOTAL JOBS	**23,758**
PERSONAL INCOME ($1,000)	
Direct	$326,009
Re-Spending/Local Purchases	$770,359
Indirect	$421,757
Related	$375,699
TOTAL INCOME	**$1,893,824**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$1,567,473
Related Output	$4,737,265
TOTAL VALUE OF ECONOMIC REVENUE	**$6,304,738**
LOCAL PURCHASES ($1,000)	**$681,462**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$151,812
Related	$37,570
TOTAL STATE AND LOCAL TAXES	**$189,382**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$7,075,097**

Lorain Harbor

Figure 14: Summary Results – Lorain Harbor

	LORAIN
JOBS	
Direct	156
Induced	166
Indirect	23
Related	1,077
TOTAL JOBS	**1,422**
PERSONAL INCOME ($1,000)	
Direct	$10,823
Re-Spending/Local Purchases	$25,576
Indirect	$1,344
Related	$49,197
TOTAL INCOME	**$86,940**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$35,557
Related Output	$262,395
TOTAL VALUE OF ECONOMIC REVENUE	**$297,953**
LOCAL PURCHASES ($1,000)	**$2,419**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$3,774
Related	$4,920
TOTAL STATE AND LOCAL TAXES	**$8,694**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$323,528**

Sandusky Harbor

Figure 15: Summary Results – Sandusky Harbor

	SANDUSKY
JOBS	
Direct	220
Induced	187
Indirect	635
Related	816
TOTAL JOBS	**1,857**
PERSONAL INCOME ($1,000)	
Direct	$11,415
Re-Spending/Local Purchases	$26,974
Indirect	$40,165
Related	$57,716
TOTAL INCOME	**$136,270**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$82,233
Related Output	$325,467
TOTAL VALUE OF ECONOMIC REVENUE	**$407,699**
LOCAL PURCHASES ($1,000)	**$71,817**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$7,855
Related	$5,772
TOTAL STATE AND LOCAL TAXES	**$13,627**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$434,673**

Marblehead

Figure 16: Summary Results – Marblehead

	MARBLEHEAD
JOBS	
Direct	301
Induced	279
Indirect	869
Related	573
TOTAL JOBS	**2,022**
PERSONAL INCOME ($1,000)	
Direct	$17,545
Re-Spending/Local Purchases	$41,459
Indirect	$54,992
Related	$27,504
TOTAL INCOME	**$141,500**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$72,918
Related Output	$186,965
TOTAL VALUE OF ECONOMIC REVENUE	**$259,883**
LOCAL PURCHASES ($1,000)	**$98,330**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$11,400
Related	$2,750
TOTAL STATE AND LOCAL TAXES	**$14,150**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$301,342**

Put-In-Bay Harbor

Figure 17: Summary Results – Put-In-Bay Harbor

	PUT-IN-BAY
JOBS	
Direct	4
Induced	4
Indirect	3
Related	0
TOTAL JOBS	**12**
PERSONAL INCOME ($1,000)	
Direct	$273
Re-Spending/Local Purchases	$645
Indirect	$189
Related	$0
TOTAL INCOME	**$1,107**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$292
Related Output	$0
TOTAL VALUE OF ECONOMIC REVENUE	**$292**
LOCAL PURCHASES ($1,000)	**$279**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$111
Related	$0
TOTAL STATE AND LOCAL TAXES	**$111**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$937**

Port of Toledo

Figure 18: Summary Results – Port of Toledo

	TOLEDO
JOBS	
Direct	3,461
Induced	3,065
Indirect	1,898
Related	9,521
TOTAL JOBS	**17,945**
PERSONAL INCOME ($1,000)	
Direct	$189,608
Re-Spending/Local Purchases	$448,043
Indirect	$109,412
Related	$533,731
TOTAL INCOME	**$1,280,794**
VALUE OF ECONOMIC REVENUE ($1,000)	
Business Services Revenue	$566,267
Related Output	$5,186,662
TOTAL VALUE OF ECONOMIC REVENUE	**$5,752,929**
LOCAL PURCHASES ($1,000)	**$286,211**
STATE AND LOCAL TAXES ($1,000)	
Direct, Induced and Indirect	$74,706
Related	$53,373
TOTAL STATE AND LOCAL TAXES	**$128,079**
TOTAL ECONOMIC ACTIVITY ($1,000)	**$6,200,972**