Economic Impact of the Port of Boston

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Executive Summary

Martin Associates was retained by the Massachusetts Port Authority (MASSPORT) to measure the local and regional economic impacts generated by maritime activity at the MASSPORT owned public and private marine terminals within the Boston Harbor, including economic impacts generated by cargo activity, the fish/seafood processing operations as well as harbor sightseeing tours and cruise activity. Economic impacts generated at public facilities include marine cargo that crosses the piers owned by MASSPORT including activity at the Conley Container Terminal and Autoport as well as by the cement discharged over MASSPORT docks for a private cement operation adjacent to the dock. Also included are the impacts created by the harbor tours that are tenants of MASSPORT, the cruise vessels calling at the Black Falcon Cruise Terminal, and fish/seafood processing/distribution operations located on MASSPORT property. The impacts created at private terminals include the activity at privately owned terminals along the Mystic River within the Port of Boston district such as the Distrigas LNG Terminal, Eastern Minerals Salt Terminal, and several petroleum and cement terminals. Also included in the impacts generated at private facilities are impacts created by fish/seafood processing/distribution operations that are not located on MASSPORT property as well as harbor tours not based on MASSPORT property. Impacts are estimated in terms of jobs, personal earnings, business revenue, and state and local taxes. The impacts are estimated for marine cargo activity in calendar year 2012.

The Economic Impact Study of the Port of Boston is based on a telephone survey of port tenants and firms providing services to the marine terminals, cruise vessels and associated passengers, and seafood processing operations. Telephone interviews were used to achieve a greater than 95% percent response rate. A total of 315 firms provided data for the study. In addition, a survey of 1,010 passengers and crew was conducted. This survey consisted of a survey of 441 passengers embarking on homeport/turnaround vessels, 407 passengers on port of call vessels, and a survey of 162 crew members. The results of these surveys were used to develop the passenger expenditure model for the cruise impact analysis.

In 2012, a total of 50,042 jobs were in some way related to cargo, cruise, seafood processing, and harbor tours and marina activity within the Port of Boston. Of these jobs:

- 7,091 direct jobs were created by cargo, cruise, fish processing and harbor tours activity at the public and private terminals at the Port of Boston. Of these direct jobs, 2,885 direct jobs were created by the activity at the MASSPORT facilities;

- 6,665 induced were supported by the local purchases by those directly employed. Of these 6,665 induced jobs, activity at MASSPORT facilities supported 2,375 induced jobs;

- 2,601 indirect jobs were created by the $261.7 million of local purchases by the firms directly dependent upon the activity at the public and private facilities at the Port of Boston. Of the 2,601 indirect jobs, 1,079 jobs are generated by the local purchases made by the firms that are dependent upon the maritime activity at the MASSPORT facilities;

- 33,686 jobs are related jobs with users of the MASSPORT and private marine cargo terminals. These jobs are classified as user jobs since they are with the importers and exporters using the public and private marine terminals. The majority of these related jobs, 29,812, are associated with the movement of containerized cargo at the Conley Marine Terminal, while the balance are associated with the liquid bulk and petroleum cargo moving via private terminals in the Port of Boston.

These job impacts are summarized in Table E-1.

Table E-1
Composition of Total Job Impact

	Total Port of Boston Jobs	MASSPORT Jobs
Direct	7,091	2,885
Induced	6,665	2,375
Indirect	2,601	1,079
Related	33,686	29,812
TOTAL	**50,042**	**36,151**

Totals may not add due to rounding

In 2012, $4.6 billion of economic value was related to the activity at the Port of Boston. This economic value represents economic value of the marine cargo, seafood processing, cruise and harbor tour activity at a given point in time, 2012, and consists of the direct business revenue impact generated by maritime activity at the MASSPORT public and private terminals, $1.2 billion, plus the related economic value of $2.7 billion, and the re-spending /local consumption impact generated by the maritime activity at the public and private terminals, $657.9 million. These components exclude double counting and represent the total economic value of the cargo activity at the public and private marine terminals. Of the $4.6 billion, $1.2 billion is the direct business revenue received by the firms directly dependent upon the Port and providing maritime services and inland transportation services to the cargo handled at the marine terminals and the vessels calling the port, as well as the cruise activity, seafood processing and harbor tours. The remaining $2.7 billion represents the value of the output to the New England Region that is created due to the cargo moving via the public and private marine cargo terminals. This includes the value added at each stage of producing an export cargo and the value added at each stage of production for the firms using imported raw materials and intermediate products, as well as consumer products that flow via the marine terminals and are consumed by industries and individuals within the region. Table E-2 provides a summary breakdown of the $4.6 billion economic value related to the Port of Boston in 2012.

Table E-2
Summary of the $4.6 billion of Economic Activity Related to the Port of Boston, 2012

	Total Port of Boston Economic Value (Billions)	**MASSPORT Economic Value (Billions)**
Direct Business Revenue	$1.25	$0.40
Related Economic Output	$2.71	$2.31
Re-spending/Local Consumption	$0.66	$0.22
TOTAL	**$4.61**	**$2.94**

Totals may not add due to rounding

The $1.2 billion of direct business revenue consists of the following components:

- $335.9 million of direct personal wage and salary income received by those 7,091 direct jobs holders;
- $261.7 million of in-state purchases made by the firms directly dependent on the Port of Boston; these expenditures supported the 2,601 indirect jobs;
- $136.2 million of state and local taxes;
- $202.7 million of federal taxes;
- The remaining $309.2 million is used for out of state purchases and for retained earnings.

The last economic impact study conducted for the Port of Boston was conducted by Martin Associates in 2006, using 2005 cargo data; total direct, induced and indirect jobs increased by 5,246 jobs over the seven year period. Direct business revenue grew by $155.9 million, while total direct, induced and indirect income and local consumption expenditures grew by $272.5 million. Local purchases made by firms directly dependent on the public and private marine terminals increased by $113.9 million. State and local taxes grew by $56.6 million while federal taxes grew by $21.4 million.

The biggest growth in direct jobs was due to the increase in direct cargo generated jobs, and this is driven by the inclusion of 984 Coast Guard employees, which are allocated to MASSPORT and private facilities based on tonnage handled by the respective facilities. Only 47 of these jobs were included in the 2005 impact analysis, but after further discussion with the Coast Guard during this most recent analysis, it was recommended that the total 984 jobs are counted as directly dependent upon the Port of Boston for the purpose of this study.

If these 937 additional Coast Guard jobs are added into the direct cargo generated jobs estimated in the 2006 Economic Impact Study to isolate the impact of the growth of activity, the increase in direct jobs is reduced to 1,247 and total direct, induced and indirect jobs increased by 3,621, rather than 5,246 total jobs.

With respect to direct jobs associated with marine cargo handled at MASSPORT, direct jobs created by containerized cargo grew from 985 direct jobs to 1,072 direct jobs, reflecting the growth in 300,000 tons of containerized cargo over the period. Direct jobs with auto imports and exports remained nearly the same, while direct jobs associated with cement handled at the MASSPORT terminals increased slightly by nine jobs. With respect to the private terminals, the majority of commodity associated jobs declined, reflecting the closing of the U.S. Gypsum facility. The growth in the private cargo terminal direct jobs is driven by the addition of the U.S. Coast Guard employees, as previously noted.

Seafood impacts increased significantly due to a combination of growth in activity and employment levels at these operations, as well as a more comprehensive survey of the seafood processing operations in Boston, particularly the private sector seafood processors.

Cruise impacts increased due to the nearly doubling of cruise passengers over the seven year period, as cruise passengers grew from 199,453 to more than 380,000 passengers in 2012. The number of sailings increased from 95 to 117. In 2005, the majority of vessel calls were by smaller coastal ships, and these vessels typically made Boston a port of call, rather than a homeport.

I. OVERVIEW OF THE ANALYSIS AND SUMMARY OF RESULTS

Martin Associates was retained by the Massachusetts Port Authority (MASSPORT) to measure the local and regional economic impacts generated by maritime activity at MASSPORT owned public and private marine terminals at the Port of Boston, including economic impacts generated by cargo activity, the fish/seafood processing operations as well as harbor sightseeing tours and cruise activity. Economic impacts generated at public facilities include marine cargo that crosses the piers owned by MASSPORT including activity at the Conley Container Terminal and Autoport as well as by the cement discharged over MASSPORT docks for a private cement operation adjacent to the dock. Also included are the impacts created by the harbor tours that are tenants of MASSPORT, the cruise vessels calling at the Black Falcon Cruise Terminal, and fish/seafood processing/distribution operations located on MASSPORT property. The impacts created at private terminals include the activity at privately owned terminals along the Mystic River within the Port of Boston district such as the Distrigas LNG Terminal, Eastern Minerals Salt Terminal, and several petroleum and cement terminals. Also included in the impacts generated at private facilities are impacts created by fish/seafood processing/distribution operations that are not located on MASSPORT property as well as harbor tours not based on MASSPORT property. Impacts are estimated in terms of jobs, personal earnings, business revenue, and state and local taxes. The impacts are estimated for marine cargo activity in calendar year 2012.

In addition to the baseline impact estimates, computer models specific to the Port of Boston private marine terminals and the MASSPORT owned and leased public terminals have been prepared which can be used in evaluating the sensitivity of impacts to changes in tonnage, labor productivity, labor work rules, commodity mix, inland origins/destinations of commodities and vessel size. The models can also be used to evaluate the impacts of new terminal development, channel deepening, evaluation of master plan scenarios and for annual updates. In addition, the cruise economic impact model can be used to test the sensitivity of changes in passenger levels, length of cruises, size of vessels, and pre and post cruise passenger expenditure patterns while in Boston.

In addition to the 2006 Economic Impact Study for the Port of Boston conducted by Martin Associates, the methodology used in this analysis has been used by Martin Associates to estimate the economic impacts of seaport activity at more than 120 United States and Canadian ports, including:

- *Everett*
- *Seattle*
- *Tacoma*
- *Portland, OR*
- *Longview*
- *Oakland*
- *San Francisco*
- *Los Angeles*
- *Long Beach*
- *San Diego*
- *Port of Hueneme*
- *Houston*
- *Galveston*
- *Corpus Christi*
- *Lake Charles*
- *New Orleans*
- *Gulfport*
- *Tampa*

- *Miami*
- *Port Everglades*
- *Palm Beach*
- *Port Canaveral*
- *Jacksonville*
- *Port Manatee*
- *Wilmington, NC*
- *Virginia Port Authority*
- *Baltimore*
- *Philadelphia*
- *Diamond State Port Corp.*
- *New Jersey Port Corp.*
- *32 Us Great Lakes Ports*
- *32 Canadian Great Lakes Ports*

In addition, Martin Associates has used the same methodology to estimate the economic impacts of cruise operations at the Ports of Miami, Port Everglades, Port Canaveral, Tampa, Jacksonville, Baltimore, Seattle, San Francisco and Los Angeles. Martin Associates also provides the economic impact studies for Disney Cruise Lines.

This chapter presents an overview of the economic impact analysis by defining the following:

- The types of economic impacts estimated;
- The economic sectors for which impacts have been estimated; and
- The commodities/commodity types for which impacts have been estimated.

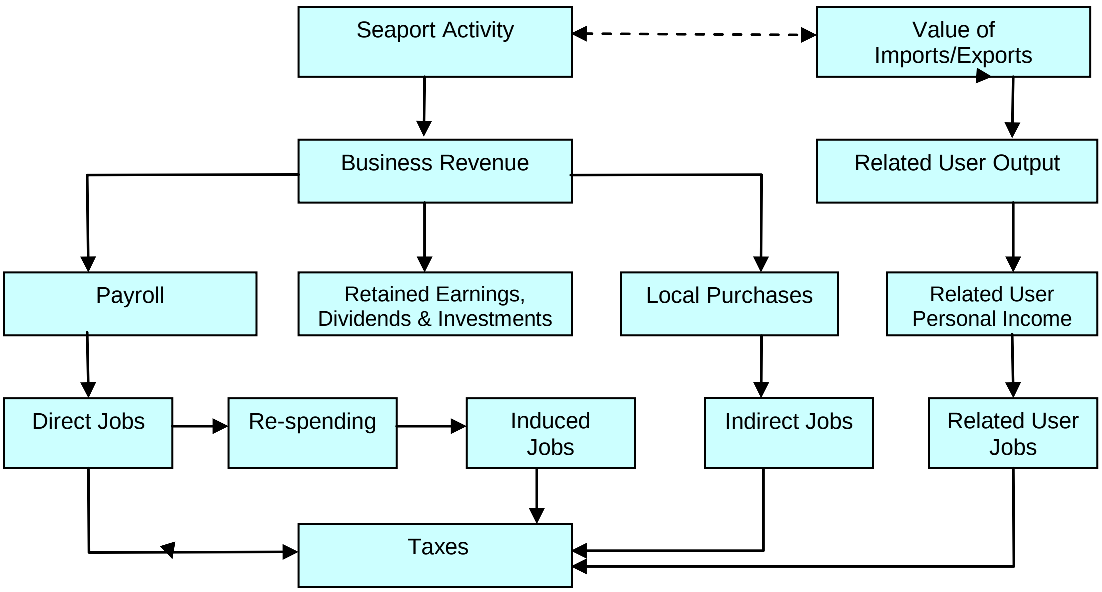
In addition, a summary of the data sources used in the analysis is presented.

1. ECONOMIC IMPACT STRUCTURE

A deep water port such as Boston contributes to the local, regional, and national economies by providing employment and income to individuals, tax revenues to local and state governments, customs fees to the Federal Government, and revenue to businesses engaged in handling, shipping, and receiving cargo via the port. Exhibit 1 illustrates the flows of economic impacts throughout the economy. As this exhibit shows, activity at a seaport (i.e., the handling of cargo and the servicing of vessels) initially creates business revenue to firms providing those cargo handling and vessel services. This revenue is in turn used for several purposes:

- To hire employees to provide the services;
- To pay stockholders dividends, retire debt, and invest
- To buy goods from other firms; and
- To pay federal, state, and local taxes.

Exhibit 1
Flows of Economic Activity through the Economy



The hiring of employees generates personal income. This personal income is spent throughout the state, local and national economy to purchase goods and services. This re-spending of income is known as the multiplier effect, which in turn creates induced jobs throughout the economy. Finally, state and local taxes are paid by those directly employed due to port activity and those employed as a result of the in-state purchases of goods and services by those individuals directly employed.

As demonstrated in Exhibit 1, and the previous discussion, the flow of economic impacts throughout an economy creates four separate and non-additive types of impacts.

These four types of impacts are:

1.1 Employment Impact

The employment impact consists of direct jobs, induced jobs, indirect jobs and related jobs. The servicing of the vessels, the handling of cargo and manufacturing at the Port generates the direct employment impact. These direct jobs would not exist in the absence of cargo and vessel activity at the Port, activity with the fish processors, the cruise operations and the harbor tours. The induced jobs are supported by the purchases of goods and services by those directly employed, and would also cease to exist if the direct jobs were discontinued. Hence, the induced jobs are dependent upon the direct jobs and the associated level of wages and salaries, and the resulting local purchases made by those directly employed (direct jobs) by activity at the Port of Boston.

In addition to the direct and induced jobs, another type of employment impact supported by seaport activity is the indirect job impact. These indirect jobs are generated in the local economy by the purchases of goods and services by the firms which provide the direct jobs. For this study, indirect jobs are estimated based on the regional purchase patterns of the firms providing the vessel and cargo handling services at the port, those providing services to the cruise vessels and cruise passengers, and those firms involved in fish processing.

The last component of the employment impact is the related job impact. Related jobs are jobs with shippers/consignees using the private and public marine terminals for the export and import of cargo. However, these shippers/consignees also use other ports and are not completely dependent upon the Port of Boston and MASSPORT facilities. The level of employment with these firms is driven by the demand for the firms' products, not because the Port of Boston is used. Therefore, these related jobs are not dependent upon port activity, and their degree of dependence on the public and private terminals at the Port of Boston is much less than the other components of the job impact[1]. Furthermore, should the Port of Boston marine terminals not be available to these importers and exporters in the longer term, logistics costs will likely increase from the use of other more distant ports, which could result in the relocation of the importers and exporters from the New England region to an area in closer proximity to the ports that would be used.

1.2 Personal Income Impact

Personal income impact is derived from three sources. First, personal income impact is the measurement of the wages and salaries generated by port activity and paid to those holding the direct jobs. As the result of local purchases made by the direct employees who received the wages and salaries, a re-spending effect also occurs in the local economy. This personal income multiplier effect, which is also included in the measurement of the personal income impact, generates the induced jobs. An indirect income impact is estimated as part of this study in order to capture the wage and salary income received by those indirectly employed due to the local purchases by the firms’ dependent upon the Port of Boston. An estimate is also developed for the wages and salaries received by the related users.

[1]The related jobs, income, value of output and taxes should not be used when evaluating the incremental economic impacts of specific port projects or the impacts of changes in cargo volume.

1.3 Revenue Impact

The business revenue impact measures the sales generated by firms engaged in handling and transporting cargo through the MASSPORT terminals and the private marine cargo terminals at the Port of Boston. This impact includes national, as well as, local and state revenue. The value of shipments through the Port is not included as a revenue impact for the purposes of this analysis because the value of a particular commodity shipped or received via the Port of Boston is determined by the demand for that particular commodity, not by the fact that the commodity moves via the Port. A portion of this revenue generated by providing vessel services and cargo handling services at the Port is then used to pay wages and salaries to those holding the direct jobs and to purchase goods and services to support port activity.

A measure of the total value of economic activity created in the state by cargo moving via the Port is developed to demonstrate the magnitude of the value of the economic activity supported by cargo moving via the public and private marine terminals.

1.4 Tax Impacts

The tax impacts measure the state and local tax revenues generated by port activity. These are taxes paid by both corporations and those holding the direct, induced, indirect and related jobs. The tax revenue impacts include the following types of taxes:

- State taxes, including personal and corporate income tax, state sales and use taxes, motor fuel tax, vehicle registration tax, property tax, property transfer tax, shellfish tax, recordation tax, death tax, horse racing tax, telecommunication tax and miscellaneous taxes;
- Local taxes, including the local share of the income tax and property tax;
- Federal taxes include both individual as well as corporate taxes.

Federal, state and local taxes created by the related use activity are also quantified.

Shipments and receipts of cargo through the public and private marine terminals within the Port of Boston generate economic activity in various business sectors of the state and local economy. Specifically, the following economic sectors are involved in providing cargo and vessel handling services at the Port of Boston. These are the:

- Surface Transportation Sector
- Maritime Service Sector
- Cruise Operations

- Fish/Seafood Processing
- Harbor Tours
- MASSPORT operations

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.

2. ECONOMIC IMPACT SECTORS

Seven economic impact sectors are defined for this project. Each sector is described in the balance of this section.

2.1 The Surface Transportation Sector

The surface transportation sector consists of the railroad, trucking and pipeline industries. These sectors are responsible for moving the various cargoes between the marine terminals and their inland origins and destinations. In general, the truck is the most frequently used mode of inland transportation, while pipeline is used to move LNG. A combination rail-truck routing is used to move domestic cars to the Port for processing.

Many local and national trucking firms serve the marine terminals at the Port of Boston, as do numerous individual owner-operators. The trucking industry's major involvement is in moving containers, break bulk cargos, automobiles and petroleum for local and regional distribution.

2.2 The Maritime Service Sector

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

- Cargo Marine Transportation
- Vessel Operations
- Cargo Handling
- Line haul Barge Operators
- Federal, State, and Local Government Agencies
- Maritime Services.

A brief description of the major participants in each of these categories is provided below:

- Cargo Marine Transportation - Participants in this category are involved in arranging for inland and water transportation for export or import freight through the Port of Boston. The freight forwarder/customhouse broker is the major participant in this category. The freight forwarder/customhouse broker arranges for the freight to be delivered between the marine terminals and inland destinations, as well as the ocean transportation. This function performed by freight forwarders and customhouse brokers is most prevalent for general cargo commodities. For bulk cargo, arrangements are often made by the shipper/receiver, and the cargo passes over private docks.

- Vessel Operations - This category consists of several participants providing vessel services including:

  - Steamship agents - provide a number of services for the vessel as soon as it enters the Port; including arranging for pilot tug assist services, for medical and dental care of the crew, and for ship supplies. Agents are also responsible for vessel documentation

  - Pilots – provide navigation services to ensure safe transit of vessels between the harbor entrance and docks

  - 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

  - Bunkering firms - provide fuel to the vessels

  - Marine surveyors - inspect the vessels and the cargo

  - Launch services - provide transportation for the crew between land and vessel

  - Chemical testing services - test cargo, such as coal, for proper chemical composition, water content, etc.

  - Shipyards/ship repair firms - provide repairs, either emergency or scheduled

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

- Longshoremen - are members of the International Longshoremen's Association, and are involved in the loading and unloading of cargo from the vessels, as well as handling the cargo prior to loading and after unloading

- Stevedoring firms - manage the longshoremen and cargo-handling activities

- Terminal operators - are often stevedoring firms who operate the maritime terminals where cargo is loaded and off-loaded

- Warehouse operators - store cargo after discharge or prior to loading and consolidate cargo units into shipment lots

- Container leasing and repair firms - provide containers to steamship lines and shippers/consignees and repair damaged containers

- Container consolidators - consolidate containerized cargo as well as full containers in order to achieve favorable transportation rates for their customers

- Automobile service firms - service new automobiles after they are off-loaded from the vessels and are often terminal operators as well

• Barge Operators - move liquid and dry bulk cargo such as petroleum products, cement, and bunker ships while in port

• Government Agencies - this service category involves federal, state and local government agencies that perform services related to cargo handling and vessel operations at the Port. U.S. Customs and Border Protection, U.S. Department of Labor, U.S. Department of Agriculture, and U.S. Department of Commerce employees are involved. In addition, both civilian and military personnel with the U.S. Coast Guard and the U.S. Army Corps of Engineers have been included.

• Maritime Services – This category includes engineers, architects and consultants who provide a wide spectrum of services to the maritime industry, including terminal design, naval architect services, and planning services. Also this category includes a wide range of service providers, including environmental firms, security firms, and firms providing fumigation services.

2.3 Fish/Seafood Processors

The Port of Boston is home to numerous fish/seafood processors located on MASSPORT property as well as those processors located in other parts of Boston Harbor.

2.4 Harbor Tours/Marinas

Numerous tour boat operators provide sightseeing tours of the Boston Harbor. These operations include tenants of MASSPORT as well as operations at non-MASSPORT facilities. Also included in this category are marina operations in Boston Harbor, some of which are located on MASSPORT property.

2.5 Cruise Operations

The Black Falcon Cruise Terminal had 117sailings of cruise ships from its docks in 2012. This included turnaround sailings and port-of-call sailings. These cruises brought over 380,000 passengers through the Black Falcon Terminal.

2.6 Massachusetts Port Authority

This category includes employees of the MASSPORT Maritime Department that operate Conley Container Terminal, the Black Falcon Cruise Terminal and the Fish Pier as well as manage other Port properties. In addition, MASSPORT leases terminal space to Autoport for the import and processing of automobiles.

2.7 Port Related Users

Related user jobs are jobs with shippers and consignees of containerized cargo moving via the MASSPORT cargo terminals as well as the private terminals in the Boston Harbor. This impact incorporates the distribution and supply chain aspects of the shipper and consignee operations as well as value added services. These jobs include the direct, induced, and indirect jobs created at each level of production of an export cargo produced in Massachusetts, as well as the total jobs associated with an imported product consumed in-state, either as a final consumption good or as an intermediate or primary raw material used by industries within the state. For example, all aspects of the distribution chain associated with an imported container carrying consumer products are included in the related job impacts, from the time the cargo arrives at the distribution center to its final sales at a retail outlet. This includes the actual distribution center operations such as cross dock operations, repackaging, sorting, labeling, repairs, etc.; as well as the services supplied in support of the distribution center activity such as technical support, maintenance and repair services, utilities, supplier locations, etc. The related user jobs include the induced and indirect jobs supporting the direct related jobs.

The aspects of the distribution chain from the discharge of the containers from a ship through the container terminal to its initial destination (i.e., regional distribution center within the state) are included in the port-generated direct, induced, and indirect jobs, not the related impacts.

It is to be emphasized that these users are related to the Port of Boston marine terminals in that if these facilities were not available, the users could ship and receive cargo via other ports. In fact, the majority of these users currently use multiple ports for export and import. Furthermore, the level of employment with the related users is driven by the demand for the products produced by these firms, and not as the result of providing cargo handling or vessel support services at the marine terminals. In contrast, the level of direct jobs generated by the public and private marine terminals is driven by the vessel and cargo activity. It is to be emphasized that in the long run, the fact that these users could no longer use the Port of Boston marine terminals would result in an increase in logistics costs. Therefore, it is possible that these importers and exporters in the Boston region could be lost from the region, as the importers and exporters move to areas nearby the other ports used should the terminals in the Boston Harbor no longer be available for use.

3. COMMODITIES INCLUDED IN THE ANALYSIS

A major use of an economic impact analysis is to provide a tool for port development planning. As a port grows, available land and other resources for port 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, automobiles require a large area for storage, while containerized cargo requires container cranes, yard equipment and open storage. Covered storage is needed for break bulk cargo such as steel and lumber. Silos are needed for cement storage and storage tanks for petroleum products.

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 port development plans. Because of this need for understanding relative commodity impacts, economic impacts are estimated for the following commodities handled via public and private facilities at the Port of Boston:

***Public Terminals*:**

- Containerized Cargo
- Automobiles
- Cement

Private Terminals:

- Scrap
- Petroleum
- Salt
- LNG
- Other Dry Bulk
- Other Liquid Bulk/Gum

- Cement

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 to individual commodities with any degree of accuracy for the banking/insurance/law job category, marine construction and the government category.

4. DATA COLLECTION

This Economic Impact Study of the Port of Boston is based on a telephone survey of members of each of the economic sectors. Participants were identified by MASSPORT and the 2005 data base developed for the 2005 Economic Impact study conducted by Martin Associates. Telephone interviews were used to achieve a greater than 95% percent response rate in all sectors. Table 1 summarizes the 315 firms contacted.

Table 1
Summary of Firms Contacted

Category	Number Contacted
Terminal Operators/Private Terminals	16
Stevedores	3
Steamship Lines/Agents	33
Government	6
Ship Repair	5
Tug & Barge Operators	7
Warehouse/CFS/Container Repair	55
Shipyards	4
Pilots	1
Marine Surveyors	20
Chandlers/Suppliers	12
Bunkering	3
Banking/Insurance/Law *	26
ILA	1
Freight Forwarders	26
Maritime Services	25
Marinas	2
Harbor Cruise	6
Consultants	4
Fishing	56
Ocean Cruise	4
TOTAL	**315**

*Based on 2005 data

Secondary data sources include the following U.S. Bureau of Census publications:

- Census of Wholesale Trade;
- Census of Retail Trade;
- Census of Construction; and
- Census of Service Industries Annual Survey of Manufacturers.

Other published data included U.S. County Business Patterns and U.S. Bureau of Labor Statistics, Consumer Expenditure Survey. Indirect impacts and related user impacts were estimated using the U.S. Bureau of Economic Analysis, Regional Input-Output Model for the Commonwealth of Massachusetts.

In addition, a survey of 1,010 passengers and crew was conducted. This survey consisted of a survey of 441 passengers embarking on homeport/turnaround vessels, 407 passengers on port of call vessels, and a survey of 162 crew. The results of these surveys were used to develop the passenger expenditure model for the cruise impact analysis.

The economic relationships and methodology have been modeled using Microsoft Excel software. The cargo model has been designed to update the port impact assessment on an annual basis, as well as to test sensitivities of impacts to changes in commodity tonnage, labor productivity, labor work rules, vessel calls (by type of vessel), pilotage and tug assist assumptions. Also, the model is designed to test the impacts of new facilities development. The cruise impact model is used to estimate the changes in impacts due to changes in the number of passengers, number of homeport vs. port of call vessels, length of cruises, size of vessels, and pre and post expenditure patterns of cruise passengers.

5. IMPACT SUMMARY

The resulting economic impacts are presented in Table 2.

Table 2
Summary of Economic Impacts Generated By Port Activity in 2012

Impact Categories	Massport Terminals	Private Terminals	All Terminals
Jobs			
Direct	2,885	4,206	7,091
Induced	2,375	4,289	6,665
Indirect	1,079	1,522	2,601
Total Jobs	6,339	10,017	16,356
Personal Income (1,000)			
Direct	$121,059	$214,892	$335,952
Re-spending/Consumption	$224,757	$433,116	$657,872
Indirect	$51,392	$80,597	$131,989
Total Income and Consumption	$397,208	$728,606	$1,125,813
Business Revenue (1,000)	$404,304	$841,396	$1,245,700
Local Purchases (1,000)	$103,042	$158,667	$261,709
State & Local Taxes (1,000)	$48,062	$88,161	$136,223
Federal Taxes (1,000)	$71,497	$131,149	$202,646
Related User Impacts			
Jobs	29,812	3,873	33,686
Personal Income (1,000)	$1,030,882	$117,022	$1,147,904
Output (1,000)	$2,314,825	$390,671	$2,705,496
State/Local Taxes (1,000)	$124,737	$14,160	$138,896
Federal Taxes (1,000)	$185,559	$21,064	$206,623

Note: Totals may not add due to rounding

A total of 16,356 direct, induced, and indirect jobs were generated by the maritime activities at the public and private marine terminals at the Port of Boston. Of these jobs:

- 7,091 direct jobs were created by cargo, cruise, fish processing and harbor tours activity at the public and private terminals at the Port of Boston. Of these direct jobs, 2,885 direct jobs were created by the activity at the MASSPORT facilities.

- 6,665 induced were supported by the local purchases by those directly employed. Activity at MASSPORT facilities supported 2,375 induced jobs.

- 2,601 indirect jobs were created by the $261.7 million of local purchases by the firms directly dependent upon the activity at the public and private facilities at the Port of Boston. 1,079 jobs are generated by the local purchases by the firms dependent upon the maritime activity at the MASSPORT facilities.

- 33,686 jobs are related jobs with users of the MASSPORT and private marine cargo terminals. These jobs are classified as user jobs since they are with the importers and exporters using the public and private marine terminals. The majority of the jobs, 29,812, are associated with the movement of containerized cargo at the Conley Marine Terminal, while the balance are associated with the liquid bulk and petroleum cargo moving via private terminals at the Port of Boston.

The port activity generated $1.1 billion in personal wage and salary income.

- The 7,091 directly employed individuals received $335.9 million of personal wage and salary income, for an average salary or wage of $47,370.

- As a result of the multiplier effects of using a portion of this income for local purchases, $657.9 million in induced income and local consumption expenditures were created within the Commonwealth.[2] Those 2,601 indirectly employed received $132 million of indirect income.

Businesses providing maritime services at the Port of Boston received $1.2 billion of revenue.

- The $1.2 billion of revenue received by the businesses providing the services at the Port does not include the value of the cargo moving over the marine terminals, since the value of the cargo is determined by the demand for the cargo, not the use of the Port of Boston.

- Of the $1.2 billion, $335.9 million was paid out in terms of direct salaries to those 7,091 directly employed by activity at the Port of Boston.

- A total of $261.7 million of in-state purchases were made by the firms directly dependent on the Port of Boston. These expenditures supported the 2,601 indirect jobs.

A total of $136.2 million of state and local tax revenue was generated by Port activity in 2012. $202.7 million was paid in Federal taxes.

[2] The re-spending impact includes the local purchases by those directly employed as well as the consumption expenditures. Therefore, the total re-spending impact cannot be divided by 6,665 induced jobs to estimate induced salary, as this would be an overestimate of personal income.

In addition to the direct, induced and indirect impacts, the cargo, cruise passengers, seafood processing, and harbor tours at the Port of Boston generated $2.7 billion of economic activity in 2012. This represents the value of the output of the Port of Boston that is created due to the cargo moving via the Port of Boston's public and private marine 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 within the Commonwealth, as well as the revenue generated at each stage of delivery of a consumer import (via the Port) to final sales. The majority of these user impacts are associated with imported containerized cargo via the MASSPORT Conley Marine Terminal. The 33,686 related direct, induced and indirect users of the Port of Boston received $1.2 billion of total wages and salaries. Finally, the cargo activity at the Port of Boston generated $138.9 million of state and local taxes with the related users and $206.6 million of Federal taxes.

Comparison of Economic Impacts – 2005-2012

The last economic impact study conducted for the Port of Boston was conducted by Martin Associates in 2006, using 2005 cargo data. Total direct, induced and indirect jobs increased by 5,246 jobs over the seven year period. Direct business revenue grew by $155.9 million, while total direct, induced and indirect income and local consumption expenditures grew by $272.5 million. Local purchases by firms directly dependent on the public and private marine terminals increased by $113.9 million. State and local taxes grew by $56.6 million while federal taxes grew by $21.4 million.

The biggest growth in direct jobs was due to the increase in direct cargo jobs, and this is driven by the inclusion of 984 Coast Guard employees, which are allocated to MASSPORT and private facilities based on tonnage handled by the respective facilities. Only 47 of these jobs were included in the 2006 impact analysis, but after further discussion with the Coast Guard during this most recent analysis, it was recommended that the total 984 jobs are counted as directly dependent upon the Port of Boston for the purpose of this study.

If these 937 additional Coast Guard jobs are added into the direct cargo generated jobs estimated in the 2006 Economic Impact Study to isolate the impact of the growth of activity, the increase in direct jobs is reduced to 1,247 and total direct, induced and indirect jobs increased by 3,621, rather than 5,246 total jobs. It is to be emphasized that even when the Coast Guard jobs are discounted, the growth of 3,621 jobs represents a significant contribution to the local economy over the 7 year period.

With respect to direct jobs associated with marine cargo handled at MASSPORT, direct jobs created by containerized cargo grew from 985 direct jobs to 1,072 direct jobs, reflecting the growth in 300,000 tons of containerized cargo over the period. Direct jobs with auto imports and exports remained nearly the same, while direct jobs associated with cement handled at the MASSPORT terminals increased slightly by nine jobs. With respect to the private terminals, the majority of commodity associated jobs declined, reflecting the closing of the U.S. Gypsum facility. The growth in the private cargo terminal direct jobs is driven by the addition of the U.S. Coast Guard employees, as noted previously.

Seafood impacts increased significantly due to a combination of growth in activity and employment levels at these operations, as well as a more comprehensive survey of the seafood processing operations in Boston, particularly the private sector seafood processors. For example, previously interviewed private processors, North Coast Seafood and Slade Gordon, both experienced increased employment. In addition, there were also several new private processors that added jobs to this sector, such as Atlantic Capes, Channel Fish Processing, and SeaFreeze that were not included in the 2006 impact study.

Cruise impacts increased due to the nearly doubling of cruise passengers over the seven year period, as cruise passengers grew from 199,453 to more than 380,000 passengers in 2012. The number of sailings increased from 95 to 117. In 2005, the majority of vessel calls were by smaller coastal ships, and these vessels typically made Boston a port of call, rather than a homeport.

The impacts with the marine harbor cruises fell as a result of a decrease in both full time and seasonal employees by a key tour operator.

II. EMPLOYMENT IMPACTS

In this chapter, the employment generated by maritime activity at the public and private marine terminals within the Boston Harbor is documented. The chapter is organized as follows:

- First, the total employment that is in some way related to the activities at the public and private marine terminals is estimated

- Second, the subset of total employment that is judged to be totally dependent on maritime activity is analyzed in the following ways:

  - ✓ Direct jobs are estimated in terms of key economic sectors, e.g., surface transportation sector

  - ✓ Direct jobs are estimated for each of the key commodities/commodity groups

- Third, induced jobs generated by local purchases made by those directly employed as a result of port activity are described

- Fourth, indirect jobs created by local purchases by the firms directly dependent on maritime activity at the Port of Boston are defined

- Finally, jobs related to containerized cargo moving via the public terminal (Conley) are discussed.

The impacts presented in this chapter are for the year 2012.

1. TOTAL EMPLOYMENT IMPACT

It is estimated that 50,042 jobs in New England are related to marine cargo, cruise, harbor tours and seafood processing activity at the public and private marine terminals located at the Port of Boston. Of the 50,042 jobs:

- 7,091 direct jobs are generated at the public and private facilities within the Boston Harbor. Of these 7,091 direct jobs, 2,885 jobs are directly dependent upon activity at the MASSPORT public facilities. These jobs are classified as direct jobs and if activity at the Port of Boston were to cease, these jobs would be discontinued over the short term.

- 6,665 are employed by providing goods and services to the 7,091 individuals directly involved with port activity. The Port's public facilities are responsible for 2,375 of the 6,665 induced jobs. Consequently, employment in this group is as directly dependent upon port activity as the first group.

- Firms directly dependent on the Port of Boston made $261.7 million of purchases within the New England region for office supplies, parts and equipment, maintenance and repair services, business services, utilities, communications services and fuel. These purchases supported 2,601 indirect jobs in the local economy. Purchases by firms providing services to the MASSPORT terminals accounted for $103.0 million and supported 1,079 of indirect jobs.

- An additional 33,686 jobs are with importers and exporters using the Port of Boston of marine terminals. These jobs are considered to be influenced by activities at the Port, but the degree of dependence on the Port is difficult to estimate. If the marine terminal were not available to these organizations, they would suffer an economic penalty over the longer term. Such a penalty would vary from a loss of employment opportunities in some cases, to an increase in total transportation costs in other cases, which could in turn result in employment reductions.

- Of these 33,686 related jobs, 29,812 jobs are with exporters and importers using MASSPORT’s Conley Container Terminal and incorporate all aspects of their distribution supply chain and value added services in the local and regional economy. These shippers can and do use other container facilities such as the Port Authority of New York and New Jersey as well as West Coast ports for land-bridged Asian container imports. The balance of the related user jobs, 3,873 are associated with the petroleum products handled over private terminals within the Port of Boston.

The next section of this chapter is dedicated to the 7,091 jobs generated directly from maritime related activity in the Port of Boston. The induced and indirect jobs spin-off in the local and regional economy from the spending by the direct job holders and dependent businesses and the related shippers jobs are discussed in subsequent sections of this chapter.

2. DIRECT JOB IMPACTS

As a result of vessel, marine cargo and passenger activities in the Boston Harbor, 7,091 full-time dependent jobs were directly created by these activities at both public and private marine terminals in the Port[3]. Of these 7,091 direct jobs, 2,885 jobs were created by maritime activity at the public port facilities owned/operated by MASSPORT.

[3] Jobs are measured in terms of full-time equivalent workers working 2,080 hours per year. If a worker is employed only 50% of the year, the job is reported as 0.5 direct jobs.

In this section, the direct port-dependent jobs are analyzed in terms of:

- Distribution by type of activity
- Distribution by type of jobs
- Distribution by commodity group
- Distribution by place of residence.

These distributions are developed in more detail below. The spin-off induced and indirect jobs, as well as the related jobs identified in this report cannot be distributed by type of job, commodity and residency.

2.1 Job Impacts by Type of Activity

Table 3 shows the impacts at the public and private marine terminals by type of activity – cargo, cruise, fish/seafood processing and harbor cruise/marina activity.

With respect to the activity at the MASSPORT public terminals, the cargo activity generates the majority of the economic impacts, 1,464 direct jobs, followed by 971 direct jobs created by the cruise activity at the Black Falcon Cruise Terminal. In 2012 there were 63 port of call/turnaround calls, 54 ports of call, and about 380,000 cruise passengers. This activity included turnaround cruises by Norwegian Cruise Line, Holland America Line, and Royal Caribbean Cruises, Ltd. Boston port-of-call cruises were offered by Carnival Cruise Lines, Cunard Cruise Line, Aida Cruises, Compagnie du Ponant, KD Marine, Princess Cruises, P & O, Crystal Cruises, Silverseas Cruises, Seabourn Cruise Line, Oceania Cruises, Phoenix Reisen, Regent Cruises, Fred Olsen, as well as Norwegian Cruise Line, Royal Caribbean and Holland America. These operations created impacts in two key sectors of the economy – firms that provide services to the vessels while in port and firms in the local visitor industry such as hotels, restaurants and landside tours. The cruise operations at MASSPORT created 971 direct jobs, 480 induced jobs, and 510 indirect jobs, as well as $79.5 million of total income and local consumption expenditures. A detailed description of the methodology used to estimate the cruise economic impacts is presented in Appendix A of this report.

Fish and seafood processing by tenants of MASSPORT created the next largest economic impacts, generating 412 direct jobs, 286 induced jobs and 170 indirect jobs. The fish/seafood processing activity at MASSPORT created $196.9 million of annual business revenue, as well as $47.9 million of total personal income and local consumption expenditures.

MASSORT tenants providing commercial harbor cruise activity created 37 direct jobs in the local economy, as well as 27 induced jobs and 11 indirect jobs. This includes the activities of Massachusetts Bay Lines and Spirit of Boston harbor cruises operating out of the Black Falcon Cruise Terminal and the Constitution Marina.

With respect to the private terminals, cargo activity again generated the majority of the economic impacts, creating 3,110 of the 4,574 direct jobs in the Boston Harbor. Commercial seafood processing and fishing activity located at private facilities within Boston Harbor supported the next largest economic impact, 1,042 direct jobs.

Table 3
Economic Impacts Generated by Type of Activity

Impact Categories	Massport Terminals					Private Terminals				Total				
Jobs	**Cargo**	**Seafood**	**Harbor Tours**	**Cruises**	**Total Massport**	**Cargo**	**Seafood**	**Harbor Tours**	**Total Private**	**Cargo**	**Seafood**	**Harbor Tours**	**Cruises**	**Total**
Direct	1,464	412	37	971	2,885	3,110	1,042	54	4,206	4,574	1,454	91	971	7,091
Induced	1,583	286	27	480	2,375	3,470	780	39	4,289	5,052	1,066	66	480	6,665
Indirect	388	170	11	510	1,079	896	610	16	1,522	1,284	780	26	510	2,601
Total Jobs	3,435	868	74	1,962	6,339	7,475	2,432	109	10,017	10,910	3,301	184	1,962	16,356
Personal Income (1,000)														
Direct	$79,274	$12,807	$1,750	$27,228	$121,059	$175,663	$36,655	$2,574	$214,892	$254,937	$49,462	$4,324	$27,228	$335,952
Re-Spending/Consumption	$163,194	$23,807	$2,280	$35,475	$224,757	$361,620	$68,143	$3,354	$433,116	$524,814	$91,950	$5,634	$35,475	$657,872
Indirect	$22,691	$11,289	$572	$16,840	$51,392	$52,396	$27,360	$841	$80,597	$75,086	$38,649	$1,413	$16,840	$131,989
Total Income and Consumption	$265,159	$47,903	$4,602	$79,543	$397,208	$589,678	$132,158	$6,769	$728,606	$854,838	$180,061	$11,371	$79,543	$1,125,813
Business Revenue (1,000)	$143,966	$196,936	$7,403	$55,999	$404,304	$332,432	$498,076	$10,888	$841,396	$476,399	$695,012	$18,291	$55,999	$1,245,700
Local Purchases (1,000)	$42,088	$29,786	$3,429	$27,739	$103,042	$97,186	$56,438	$5,043	$158,667	$139,275	$86,224	$8,472	$27,739	$261,709
State & Local Taxes (1,000)	$32,084	$5,796	$557	$9,625	$48,062	$71,351	$15,991	$819	$88,161	$103,435	$21,787	$1,376	$9,625	$136,223
Federal Taxes (1,000)	$47,729	$8,623	$828	$14,318	$71,497	$106,142	$23,788	$1,218	$131,149	$153,871	$32,411	$2,047	$14,318	$202,646
Related User Impacts														
Jobs	29,812	NA	NA	NA	29,812	3,873	NA	NA	3,873	33,686	NA	NA	NA	33,686
Personal Income (1,000)	$1,030,882	NA	NA	NA	$1,030,882	$117,022	NA	NA	$117,022	$1,147,904	NA	NA	NA	$1,147,904
Output (1,000)	$2,314,825	NA	NA	NA	$2,314,825	$390,671	NA	NA	$390,671	$2,705,496	NA	NA	NA	$2,705,496
State/Local Taxes (1,000)	$124,737	NA	NA	NA	$124,737	$14,160	NA	NA	$14,160	$138,896	NA	NA	NA	$138,896
Federal Taxes (1,000)	$185,559	NA	NA	NA	$185,559	$21,064	NA	NA	$21,064	$206,623	NA	NA	NA	$206,623

Note: Totals may not add due to rounding

2.2 Job Impacts by Type of Job

Table 4 presents the distribution of the 7,091 direct jobs by type of job. As this table shows, the largest job impacts are with seafood processing, followed by truckers bringing cargo to and from the private and public marine cargo terminals.

Table 4
Direct Marine Cargo Employment Impacts by Job Category

	MASSPORT DIRECT JOBS	PRIVATE DIRECT JOBS	TOTAL DIRECT JOBS
SURFACE TRANSPORTATION			
RAIL	2	11	13
TRUCK	208	1,195	1,403
MARITIME SERVICES			
TERMINAL EMPLOYEES	178	418	593
ILA/DOCKWORKERS	600	3	603
TOWING	8	23	31
PILOTS	5	13	18
AGENTS	26	47	72
MARITIME SERVICES/FREIGHT FORWARDERS	65	84	150
WAREHOUSING/CONTAINER REPAIR	180	13	193
MARINE CONSTRUCTION/DREDGING	52	183	235
BARGE	7	154	161
PASSENGER CRUISES	971	NA	971
SEAFOOD PROCESSING	412	1,042	1,454
HARBOR CRUISES	37	54	91
PORT AUTHORITY	111	NA	111
TOTAL	**2,885**	**4,209**	**7,091**

Note: Totals may not add due to rounding. Terminal employees with private terminals also include dockworkers.

The majority of the trucking jobs are created by cargo activity at the private terminals, in particular with the distribution of petroleum products throughout the Boston area.

2.3 Job Impacts by Commodity

Most of the 4,574 jobs created by marine cargo activity at the public and private marine terminals are generated by the handling of specific commodities or commodity groups. Employment with certain types of firms and organizations such as federal, state and local government agencies, marine construction firms and maritime service firms, cannot be assigned to specific commodity groups, and if such an assignment is made, it is often done so arbitrarily. Also, impacts generated by the non-cargo tenants (fish/seafood processing, cruise service, and harbor tours/marinas) are not allocated to specific commodities, nor included in this analysis of cargo generated jobs.

Table 5 presents the employment impacts in terms of commodity/commodity group and for maritime cargo activity at the Port of Boston public and private marine facilities.

Table 5
Distribution of Direct Marine Cargo Job Impact by Commodity

Cargo (1,000 Tons)	Massport Direct Jobs	Private Terminal Direct Jobs	Total Direct Jobs
Containers (Units)	1,072		1,072
Salt		81	81
Gum		127	127
Autos (Units)	179		179
Scrap Metal		151	151
Cement	26		26
LNG		109	109
Petroleum		1,327	1,327
Other Bulk		97	97
Not Allocated	187	1,218	1,405
Total	**1,464**	**3,110**	**4,574**

Note: Totals may not add due to rounding

This table indicates that petroleum products handled at the private terminals generated the largest number of direct jobs, 1,327 jobs (the majority of which are associated with the distribution of these products regionally); followed by containerized cargo handled at Conley Container Terminal. The majority of the 1,405 non-allocated jobs (984) are with government agencies, specifically the US Coast Guard[4].

2.4 Distribution of Jobs by Place of Residence

Table 6 presents the distribution of the 4,574 direct cargo generated jobs by place of residency. This distribution is based on the results of the surveys conducted from the 315 businesses contacted by Martin Associates.

[4] The non-allocated jobs with ship repair facilities, government agencies, etc. were allocated between public and private terminals based on the allocation of tonnage moving via each of these types of facilities.

Table 6
Distribution of Direct Cargo Generated Jobs by County/State of Residency

RESIDENCE	TOTAL	
	SHARE	DIRECT JOBS
MASSACHUSETTS		
Bristol	5.12%	234
Essex	10.42%	476
Middlesex	15.39%	704
Norfolk	10.76%	492
Plymouth	7.06%	323
Suffolk	27.40%	1,253
Worcester	3.90%	178
Other Massachusetts	2.38%	109
Total Massachusetts	***82.43%***	***3,770***
RHODE ISLAND		
Bristol	0.21%	10
Kent	0.44%	20
Newport	0.12%	5
Providence	0.98%	45
Other Rhode Island	3.94%	180
Total Rhode Island	***5.69%***	***260***
NEW HAMPSHIRE		
Rockingham	2.15%	98
Strafford	0.83%	38
Other New Hampshire	3.71%	170
Total New Hampshire	***6.69%***	***306***
OTHER U.S.	***5.19%***	***237***
TOTALS	**100.00%**	**4,574**

Note: Totals may not add due to rounding

As this table shows, the majority of the direct cargo generated jobs (83%) are held by Massachusetts residents, with the largest concentration of direct job holders in Suffolk County, followed by Middlesex County and Norfolk County.

Table 7 illustrates the residency of direct employees associated with fish and seafood processors. The residency data is presented at the aggregate level of detail for fish processing due to a smaller sample size of the fish processors reporting residency data.

Table 7
Distribution of Direct Seafood Processing Generated Jobs

RESIDENCE	TOTAL	
	SHARE	DIRECT JOBS
MASSACHUSETTS		
Bristol	5.25%	76
Essex	20.48%	298
Middlesex	6.66%	97
Norfolk	8.49%	123
Plymouth	7.03%	102
Suffolk	37.60%	546
Worcester	2.09%	30
Other MA	1.04%	15
Total MA	***88.63%***	***1,288***
OTHER NEW ENGLAND AND US	***11.37%***	***165***
TOTAL	**100.00%**	**1,454**

Note: Totals may not add due to rounding

Residency of cruise generated jobs is not estimated due to the fact that the cruise jobs are estimated from an expenditure model, based on passenger expenditures and vessel expenditures while in port.

3. INDUCED JOBS

The regional purchases made by the 7,091 direct job holders with the direct income earned from port activity create additional jobs throughout the New England Region. In calendar year 2012, $335.9 million was received by those 7,091 directly employed by seaport activity at the Port of Boston. As a result of the re-spending of a portion of this income for purchases in the region, an additional 6,665 induced jobs were generated. Of these 6,665 induced jobs, the MASSPORT public maritime facilities were responsible for 2,375 induced jobs.

These induced jobs are estimated based on the current expenditure profile of residents in the Boston Metropolitan Area as estimated by the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey, 2012*. This survey provides the distribution of consumer expenditures over key consumption categories for residents of the Boston Metropolitan Area. The consumption categories are:

- Housing
- Food at Restaurants
- Food at Home
- Entertainment
- Health Care
- Home Furnishings
- Transportation Equipment and Services.

The estimated consumption expenditures generated as a result of the re-spending impact is distributed across these 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 the Boston Metropolitan Area, and induced jobs are estimated for the relevant consumption categories. Induced jobs are only estimated at the retail and wholesale level, since these jobs are most likely generated initially in the Boston Metropolitan Area. Further levels of induced jobs are not estimated since it is not possible to identify with certainty where the subsequent rounds of purchasing actually occur.

The *Consumer Expenditure Survey* does not include information to estimate the job impact with supporting business, financial, legal, social and educational services. To estimate this induced impact, a ratio of Commonwealth of Massachusetts employment in these key service industries to total Massachusetts employment was developed from the U.S. Bureau of Census. This ratio is then used with the direct and induced consumption jobs to estimate induced jobs with business/financial services, legal, educational and other social services.

4. INDIRECT JOBS

The firms directly dependent upon the vessel and cargo activity and seafood processing activity at the private and MASSPORT owned public marine terminals in the Boston Harbor made $261.7 million of purchases from local (in-region) suppliers of parts and equipment, business services, maintenance and repair services, communications and utilities, office equipment, and fuel. These purchases supported 2,601 local indirect jobs. Of the $261.7 million of purchases made, nearly $103 million of the purchases supporting 1,079 indirect jobs were created by activity at MASSPORT marine facilities, while the activity at the private facilities created $158.7 million of the purchases, supporting 1,522 of the total 2,601 indirect jobs.

If maritime activity within Boston Harbor ceased, these indirect jobs would also be lost. To estimate these indirect jobs, actual local expenditures by port-dependent firms were estimated from the telephone surveys. These local expenditures were used as inputs into a regional input-output model developed for the Commonwealth of Massachusetts for Martin Associates by the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System, 2012.

5. RELATED USER JOBS

Related user jobs are jobs with shippers and consignees of containerized cargo moving via the MASSPORT cargo terminals as well as the private terminals in the Boston Harbor. This impact incorporates the distribution and supply chain aspects of the shipper and consignee operations as well as value added services. It is to be emphasized that these users are related to the Port of Boston marine terminals in that if these facilities were not available, the users could ship and receive cargo via other ports. In fact, the majority of these users currently use multiple ports for export and import. Furthermore, the level of employment with the related users is driven by the demand for the products produced by these firms, and not as the result of providing cargo handling or vessel support services at the marine terminals. In contrast, the level of direct jobs generated by the public and private marine terminals is driven by the vessel and cargo activity. It is to be emphasized that in the long run, the fact that these users could no longer use the Port of Boston marine terminals would result in an increase in logistics costs. Therefore, it is possible that these importers and exporters in the Boston region could be lost from the region, as the importers and exporters move to areas nearby the other ports that are used.

To estimate the related user impact, Martin Associates identified the types of containerized cargo moving via the Port's terminals and the average value per ton of the specific key commodities. The data was developed from the U.S. Census Bureau's Foreign Trade Statistics. Based on interviews with the carriers serving the terminal, it is assumed that 95%, of the containerized cargo originates in, or is destined for the New England area. A weighted average dollar value per ton of containerized cargo moving via the Port was next developed from this data for both imported and exported international containerized cargo.

For containerized cargo, employment to value of output coefficients for the sector in the New England Region was computed from the Bureau of Economic Analysis, Regional Input-Output Model for the Massachusetts/New Hampshire/Rhode Island region. This coefficient includes direct, indirect and induced jobs required to deliver one dollar of containerized cargo through the MASSPORT Conley Terminal. Next, the average value per ton of containerized cargo was multiplied by the tons of containerized cargo handled at Conley Container Terminal and the share of containerized cargo that originated in or was destined for the region. The corresponding job, income and output coefficients associated with each type of containerized import or export commodity were developed from the U.S. Bureau of Economic Analysis RIMS II model data. Weighted average related jobs, income and output coefficients were developed for export containers and import containers to reflect the composition of containerized cargo moving via the Port of Boston. These coefficients were multiplied by the value of the containerized cargo for import and export containers) moving via the Port's container terminal (originating/destined in the region) to estimate the related jobs, income and output for containerized cargo. For imported retail cargo it is important to note that the retail margin was applied to the value of the imported products as it is the "value added" to the commodity that supports the related jobs in the regional economy. The job coefficients also account for the various stages involved in the wholesale process, including warehousing and distribution activities associated with the imported cargo.

Related jobs were also estimated for the petroleum products moving via the private marine terminals. This was based on the employment multiplier for petroleum products distribution in the Commonwealth of Massachusetts, as developed by the U.S. Bureau of Economic Analysis, RIMS II model and applied to the direct jobs. No related jobs were estimated for the automobiles since the exports are produced outside the New England Region and hence no related jobs would be supported in the region.

Finally, the direct, induced and indirect job impacts associated with the international and domestic containerized cargo movements were subtracted from the total related jobs to avoid double counting, since the related jobs include job impacts at each 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 the port and the induced and indirect jobs associated with the direct port activity.

Using this methodology, it is estimated that about 33,686 jobs are related to the cargo moving via the marine terminals at the Port of Boston. The majority of the related user jobs, 29,812, are associated with the containerized cargo moving via the Conley Container Terminal. The balance, 3,873 jobs, are related to the petroleum products moving via the private marine terminals.

III. REVENUE, INCOME AND TAX IMPACTS

The maritime activity at public and private marine terminals located in the Port of Boston generates revenue for the directly dependent firms. For example, revenue is received by surface transportation firms as a result of moving export cargo to the marine terminals and then distributing the imported commodities inland after receipt at the terminals. The firms in the maritime service sector receive revenue from arranging for transportation services, cargo handling, and providing services to vessels in port. Ship repair yards and marine construction firms receive revenue by providing repair services to vessels and new construction and repair work at the marine terminals. MASSPORT receives revenue from leases at the terminals it owns. In addition, revenue is received by shippers/consignees from the sales of cargo shipped or received via the Port of Boston marine cargo facilities and from the sales of products made with raw materials received through the Port. 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 Port) will be excluded from the remaining discussion. Similarly, steamship lines' revenue from the ocean line haul portion of the cargo movements is excluded from the revenue impact, since very few vessels calling the Port are American flag vessels, and it is not likely that a large portion of the revenue from ocean transportation remains in the local or even national economy.

The revenue generated by port activity consists of many components. For example, gross revenue is used to pay employee salaries and taxes, it is distributed to stockholders, 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. The personal income component of revenue can be traced to geographic locations based on the residence of those receiving the income. The local purchases by firms dependent upon maritime activity at marine terminals in Boston Harbor are identified through the interviews and used to estimate the indirect job impacts. Finally, state and local taxes paid by individuals and businesses can be traced to a geographic location based on the residency of the individuals directly employed and the location of the firms dependent on maritime activity. The balance of the revenue is distributed in the form of non-local payments to firms providing goods and services to the six sectors, for the distribution of company profits to shareholders and to payment of federal taxes. Many of these firms and owners are located outside of the New England Region, and, thus, it is difficult to trace the ultimate location of the distributed revenue (other than personal income, taxes and local purchases).

1. TOTAL ECONOMIC ACTIVITY

The revenue impact is a measure of the ***total economic activity*** in the Commonwealth that is ***related to*** the marine activity at the MASSPORT marine facilities, as well as the private facilities within the Boston Harbor. In 2012, a total of $4.6 billion of economic activity in the region was related to the maritime activity at the public and private marine terminals in the Boston Harbor. This economic value represents the economic value of the maritime activity at a given point in time, 2012, and consists of the direct business revenue impact generated by marine cargo, cruise, seafood processing, and harbor tour activity at the MASSPORT public and private terminals, $1.2 billion, plus the related economic value of $2.7 billion, and the re-spending /local consumption impact generated by the maritime activity at the public and private terminals, $657.9 million. These components exclude double counting and represent the total economic value of the cargo activity at the public and private marine terminals. Of the $4.6 billion, $1.2 billion is the direct business revenue received by the firms directly dependent upon the Port and providing maritime services and inland transportation services to the cargo handled at the marine terminals and the vessels calling the port, as well as the cruise activity, seafood processing and harbor tours. The remaining $2.7 billion represents the value of the output to the New England Region that is created due to the cargo moving via the public and private marine cargo terminals. This includes the value added at each stage of producing an export cargo, and the value added at each stage of production for the firms using imported raw materials and intermediate products, as well as consumer products that flow via the marine terminals and are consumed by industries and individuals within the region.

It is important to note that the value of the cargo handled at all marine cargo facilities at the Port of Boston in 2012, $11.5 billion, as estimated by the U.S. Bureau of the Census, USA Trade OnLine, is not included in the total economic impact value, as the cargo value is determined by the demand for the cargo, not the fact that the Port of Boston marine terminals are used to import and export the cargo. The $11.5 billion does not include the value of the domestic cargo handled at the terminals.

The balance of the discussion focuses on the more than $1.2 billion of direct business revenue generated from the provision of services to the cargo, cruise, seafood processing and harbor tours at the MASSPORT public and private marine terminals.

2. DIRECT REVENUE IMPACT

In calendar year 2012, maritime activity at public and private facilities in the Boston Harbor generated more than $1.2 billion of total revenue in the New England Region. Activity at the MASSPORT public facilities generated $404.31 million of revenue, while activity at the private terminals created $841.4 million of revenue.

Table 8 presents the revenue impact generated by impact category for maritime activity at public and private terminals.

Table 8
Total Revenue Generated by Port Activity
(Thousands of Dollars)

	MASSPORT	PRIVATE	REVENUE (1,000)
SURFACE TRANSPORTATION			
RAIL	$3,302	$13,051	$16,353
TRUCK	$38,820	$169,671	$208,491
MARITIME SERVICES			
TERMINAL	$31,002	$57,076	$88,078
TOWING	$1,668	$4,554	$6,222
PILOTS	$1,112	$3,036	$4,148
AGENTS	$1,098	$2,998	$4,096
MARITIME SERVICES/FREIGHT FORWARDERS	$11,627	$10,958	$22,585
WAREHOUSING/CONTAINER REPAIR	$33,048	$2,392	$35,440
MARINE CONSTRUCTION/DREDGING	$6,806	$40,705	$47,511
BARGE	$1,347	$27,991	$29,338
CRUISE PASSENGERS	$55,999	NA	$55,999
SEAFOOD PROCESSING	$196,936	$498,076	$695,012
HARBOR PASSENGERS	$7,403	$10,888	$18,291
PORT AUTHORITY*	$14,136	NA	$14,136
TOTAL	$404,304	$841,396	$1,245,700

Note: Totals may not add due to rounding. * Indicates net revenue received by MASSPORT, which excludes revenue from leases and other fees paid by the terminal operators and tenants to MASSPORT. These fees are included in the revenue reported by the terminal operators and tenants of MASSPORT facilities.

Seafood processing operations generated the largest revenue impact followed by trucking, terminal operations, cruise operations, and marine constriction.

The revenue generated by the surface transportation sector is based on the relevant modal rate for a commodity multiplied by the tonnage of that commodity moved to and from the marine terminals by the specified mode. The share of each commodity transported by each mode was estimated from interviews with the terminal operators handling the respective commodities. The relative modal shares were then applied to the port tonnage (or units) of the specific cargo. Average truck, rail and pipeline rates were obtained from the steamship lines, automobile processors and transporters, and shippers/consignees.

The stevedores and terminal operators received $88.1 million in revenue from handling the cargo and loading and discharging ships, while the marine construction firms received $47.5 million and warehousing received $35.4 million.

MASSPORT received about $14.1 million in net revenues from port tariffs and revenue generated by marine terminal leases. In order to avoid double counting, the $14.1 million does not include the revenue paid in leases, which is reported as revenue to the terminal operators.

3. PERSONAL INCOME IMPACTS

The direct job holders received $336 million of direct income. The income impact is estimated by multiplying the average annual earnings of each port participant, i.e., railroad employees, truckers, steamship agents, freight forwarders, bankers, insurance agents, etc., by the corresponding number of jobs in each category. Of the $336 million of income received, $121.1 million was generated by cargo, cruise, seafood processing and harbor tours at MASSPORT facilities.

Based on data developed by the U.S. Bureau of Economic Analysis[5], a separate income multiplier was developed for each maritime line of business. Overall, for every dollar of direct personal income earned, an additional $1.96 of income would be created as a result of re-spending the direct income for purchases of goods and services in the region. This multiplier effect results in a re-spending/local consumption impact of $657.9 million of personal income and consumption expenditures with business and service providers located throughout the New England Region. This additional re-spending of the direct income generates the induced job impact of 6,665 jobs described in the previous chapter.

The indirect job holders received $132 million of personal wages and salaries. Combining the direct, induced and indirect income impacts, maritime activity in Boston Harbor created $1.1 billion of wages and salaries and local consumption expenditures. The MASSPORT owned and leased marine terminals created $397.2 million of the total $1.1 billion personal total income/local consumption impact.

4. LOCAL PURCHASES

The firms directly dependent upon the maritime activity at the public and private terminals in the Boston Harbor made $261.7 million of purchases locally. These purchases were for maintenance and repair services, utilities, communications services, office products, parts and equipment, fuel, etc. The $261.7 million of purchases generated the 2,601 indirect jobs.

[5] U.S. Department of Commerce, Bureau of Economic Analysis, RIMS II. 2012.

5. TAX IMPACTS

Federal, state and local tax impacts are based on state and local tax burdens for the Commonwealth of Massachusetts, and the states of Rhode Island and New Hampshire, which are developed from data provided by the Tax Foundation.[6] The tax burdens are the ***total*** federal, state and local taxes collected divided by total state income. A weighted average tax burden was developed based on the share of direct employees residing in each state. Maritime activity at the public and private marine terminals in the Boston Harbor generated nearly $136.2 million of state and local taxes, and $202.6 million of federal taxes.

In addition, the state and local tax payments generated by seaport activity, in FY2013, MASSPORT paid a total of $18,090,365 in PILOT payments. Of that, $2,087,803 was allocated to Maritime related business lines.

[6] The Tax Foundation is an educational organization formed in 1937 to provide American citizens with a better understanding of the tax system and the effects of tax policy. (www.taxfoundation.org)

IV. COMPARISON WITH 2005 ECONOMIC IMPACTS

The last economic impact study conducted for the maritime activities at the public and private marine terminals in the Boston Harbor was conducted in 2006, by Martin Associates. This study was based on 2005 Port of Boston cargo, cruise, harbor tours and seafood processing activity levels at both MASSPORT and private facilities within Boston Harbor. The same methodology was used on this current study as was used in the previous study, thus facilitating direct comparisons.

Table 9 presents a summary of the changes in economic impacts between 2005 and 2012. As this table demonstrates, total direct, induced and indirect jobs increased by 5,246 jobs over the 7 year period. Direct business revenue grew by $137.2 million, while total direct, induced and indirect income and local consumption expenditures grew by $155.9 million. Local purchases made by firms directly dependent on the public and private marine terminals increased by $98.5 million. State and local taxes grew by $53.6 million while federal taxes grew by $21.4 million.

Table 9
Comparison of Economic Impacts

	Total 2012	Total 2005	Change
JOBS			
DIRECT	7,091	4,927	2,164
INDUCED	6,665	4,252	2,413
INDIRECT	2,601	1,931	670
TOTAL JOBS	16,356	11,110	5,246
PERSONAL INCOME (1,000)			
DIRECT	$335,952	$198,770	$137,182
RE-SPENDING/CONSUMPTION	$657,872	$566,293	$91,579
INDIRECT	$131,989	$88,265	$43,724
TOTAL INCOME AND CONSUMPTION	$1,125,813	$853,328	$272,485
BUSINESS SERVICES REVENUE (1,000)	$1,245,700	$1,089,759	$155,941
LOCAL PURCHASES (1,000)	$261,709	$163,185	$98,524
STATE & LOCAL TAXES (1,000)	$136,894	$83,268	$53,626
FEDERAL TAXES (1,000)	$202,646	$181,221	$21,425

Note: Totals may not add due to rounding

Table 10
Comparison of Economic Impacts by Line of Business

	Marine Cargo 2012	Marine Cargo 2005	Change	Cruise 2012	Cruise 2005	Change	Seafood 2012	Seafood 2005	Change	Harbor Tours\Marina 2012	Harbor Tours\Marina 2005	Change	Total 2012	Total 2005	Change
Jobs															
Direct	4,574	3,603	971	971	418	553	1,454	751	703	91	155	-64	7,091	4,927	2,164
Induced	5,052	3,355	1,697	480	239	241	1,066	558	508	66	111	-45	6,665	4,263	2,413
Indirect	1,284	1,718	-434	510	48	462	780	126	654	26	39	-13	2,601	1,930	670
Total Jobs	10,910	8,676	2,234	1,962	704	1,258	3,301	1,435	1,866	184	305	-121	16,356	11,110	5,246
Personal Income (1,000)															
Direct	$254,937	$157,723	$97,214	$27,228	$10,098	$17,130	$49,462	$25,168	$24,294	$4,324	$4,981	-$657	$335,951	$197,970	$137,981
Re-Spending/Consumption	$524,814	$451,167	$73,647	$35,475	$28,885	$6,590	$91,950	$71,993	$19,957	$5,634	$14,248	-$8,614	$657,872	$566,293	$91,579
Indirect	$75,086	$79,550	-$4,464	$16,840	$2,120	$14,720	$38,649	$5,199	$33,450	$1,413	$1,396	$17	$131,989	$88,265	$43,724
Total Income and Consumption	$854,838	$688,440	$166,398	$79,543	$41,103	$38,440	$180,061	$102,360	$77,701	$11,371	$20,625	-$9,254	$1,125,812	$852,528	$273,284
Business Services Revenue (1,000)	$476,399	$509,358	-$32,959	$55,999	$16,975	$39,024	$695,012	$544,652	$150,360	$18,291	$18,774	-$483	$1,245,700	$1,089,759	$155,941
Local Purchases (1,000)	$139,275	$125,699	$13,576	$27,739	$18,074	$9,665	$86,224	$14,089	$72,135	$8,472	$5,323	$3,149	$261,709	$163,185	$98,524
State & Local Taxes (1,000)	$103,435	$67,266	$36,169	$9,625	$3,987	$5,638	$21,787	$9,999	$11,788	$1,376	$2,016	-$640	$136,894	$83,268	$53,626
Federal Taxes (1,000)	$153,871	$146,351	$7,520	$14,318	$8,726	$5,592	$32,411	$21,761	$10,650	$2,047	$4,383	-$2,336	$202,646	$181,221	$21,425

Table 10 shows that the biggest growth in direct jobs was due to the increase in direct cargo jobs, and this is driven by the inclusion of 984 Coast Guard employees, which are allocated to MASSPORT and private facilities based on tonnage handled by the respective facilities. Only 47 of these jobs were included in the 2005 impact analysis, but after further discussion with the Coast Guard during this analysis, it was recommended that we use the full 984 jobs for the purpose of this study. If these 937 jobs are added into the direct cargo generated jobs estimated in the 2006 Economic Impact Study to isolate the impact of the growth of activity, the increase in direct jobs is reduced to 1,247 and total direct, induced and indirect jobs increased by 3,621, rather than 5,246 total jobs. Even when controlling for the Coast Guard jobs, the addition of 1,247 direct jobs and a total of 3,621 total jobs is a significant contribution to the regional economy over the 7 year time period.

Table 11 shows the change in impacts over time with the adjustment in Coast Guard jobs in the 2005 economic impacts.

Table 11
Comparison of Economic Impacts, Adjusted with Coast Guard Employment

	Total 2012	Total 2005	Change
JOBS			
DIRECT	7,091	5,844	1,247
INDUCED	6,665	4,801	1,864
INDIRECT	2,601	2,090	511
TOTAL JOBS	16,356	12,735	3,621
PERSONAL INCOME (1,000)			
DIRECT	$335,952	$221,698	$114,254
RE-SPENDING/CONSUMPTION	$657,872	$631,879	$25,993
INDIRECT	$131,989	$94,621	$37,368
TOTAL INCOME AND CONSUMPTION	$1,125,813	$948,198	$177,615
BUSINESS SERVICES REVENUE (1,000)	$1,245,700	$1,089,759	$155,941
LOCAL PURCHASES (1,000)	$261,709	$182,212	$79,497
STATE & LOCAL TAXES (1,000)	$136,894	$92,176	$44,718
FEDERAL TAXES (1,000)	$202,646	$187,615	$15,031

As shown in Table 11, when the 2005 impact numbers are adjusted to include the additional Coast Guard jobs, the major growth in jobs is due to the growth of seafood processing activity at the public and private terminals in Boston. This increase is due to the inclusion of several new processing firms in the current study compared to the 2005 impact numbers.

Table 12
Comparison of Economic Impacts by Line of Business, 2005 Direct Jobs Adjusted to Include Additional Coast Guard Jobs

	Marine Cargo 2012	Marine Cargo 2005	Change	Cruise 2012	Cruise 2005	Change	Seafood 2012	Seafood 2005	Change	Harbor/ Marina 2012	Harbor/ Marina 2005	Change	Total 2012	Total 2005	Change
JOBS															
DIRECT	4,574	4,520	54	971	418	553	1,454	751	703	91	155	-64	7,090	5,844	1,246
INDUCED	5,052	3,893	1,159	480	239	241	1,066	558	508	66	111	-45	6,664	4,801	1,863
INDIRECT	1,284	1,877	-593	510	48	462	780	126	654	26	39	-13	2,600	2,090	510
TOTAL JOBS	10,910	10,290	620	1,962	705	1,257	3,300	1,435	1,865	183	305	-122	16,355	12,735	3,620
PERSONAL INCOME (1,000)															
DIRECT	$254,937	$180,651	$74,286	$27,228	$10,898	$16,330	$49,462	$25,168	$24,294	$4,324	$4,981	-$657	$335,951	$221,698	$114,253
RE-SPENDING/CONSUMPTION	$524,814	$516,753	$8,061	$35,475	$28,885	$6,590	$91,950	$71,993	$19,957	$5,634	$14,248	-$8,614	$657,873	$631,879	$25,994
INDIRECT	$75,086	$85,906	-$10,820	$16,840	$2,120	$14,720	$38,649	$5,199	$33,450	$1,413	$1,396	$17	$131,988	$94,621	$37,367
TOTAL INCOME AND CONSUMPTION	$854,837	$783,310	$71,527	$79,543	$41,903	$37,640	$180,061	$102,360	$77,701	$11,371	$20,625	-$9,254	$1,125,812	$948,198	$177,614
BUSINESS SERVICES REVENUE (1,000)	$476,399	$509,358	-$32,959	$55,999	$16,975	$39,024	$695,012	$544,652	$150,360	$18,291	$18,774	-$483	$1,245,701	$1,089,759	$155,942
LOCAL PURCHASES (1,000)	$139,275	$144,726	-$5,451	$27,739	$18,074	$9,665	$86,224	$14,089	$72,135	$8,472	$5,323	$3,149	$261,710	$182,212	$79,498
STATE & LOCAL TAXES (1,000)	$103,435	$76,174	$27,261	$9,625	$3,987	$5,638	$21,787	$9,999	$11,788	$2,047	$2,016	$31	$136,894	$92,176	$44,718
FEDERAL TAXES (1,000)	$153,871	$152,745	$1,126	$14,318	$8,726	$5,592	$32,411	$21,761	$10,650	$2,047	$4,383.00	-$2,336	$202,646	$187,615	$15,031

With respect to direct jobs associated with marine cargo handled at MASSPORT, direct jobs created by containerized cargo grew from 985 direct jobs to 1,072 direct jobs, reflecting the growth in 300,000 tons of containerized cargo over the period. Direct jobs with auto imports and exports remained nearly the same, while direct jobs associated with cement handled at the MASSPORT terminals increased slightly by nine jobs. With respect to the private terminals, the majority of commodity associated jobs declined, with the exception of the addition of new jobs with the handling of gum. The growth in the private cargo terminal direct jobs is driven by the addition of the U.S. Coast Guard employees. It is to be noted that the direct cargo generated revenue declined over the period, reflecting the decline in cargo at private marine terminals. Direct jobs increased due to the inclusion of the additional Coat Guard jobs, which do not have an associated revenue.

Seafood impacts increased significantly due to a combination of growth in activity and employment levels at these operations, as well as a more comprehensive survey of the seafood processing operations in Boston, particularly the private sector seafood processors. For example, previously interviewed private processors, North Coast Seafood and Slade Gordon, both experienced increased employment. In addition, there were also several new private processors that added jobs to this sector, such as Atlantic Capes, Channel Fish Processing, and SeaFreeze, which were not included in the 2005 impacts.

Cruise impacts increased due to the nearly doubling of cruise passengers over the seven year period, as cruise passengers grew from 199,453 to 380,000 passengers in 2012. The number of sailings increased from 95 to 117. In addition to the increase in sailings and passenger levels since 2005, the composition of the types of cruise vessels calling MASSPORT's cruise terminal has changed. In 2005, the majority of vessel calls were by smaller coastal ships, and these vessels typically made Boston a port of call, rather than a homeport.

The impacts with the marine harbor tour operations fell as a result of a decline in both full time and seasonal employees with a key tour boat operator.

Appendix A
Cruise Impact Methodology

The methodology used to estimate cruise service impacts is described in the following section.

1. METHODOLOGY

1.1 Economic Impacts of Home Port Activity

Homeport cruise activity at MASSPORT affects two sectors of the local and regional economy. These sectors are the:

- Maritime Service Sector
- Visitor Industry Sector.

The maritime service sector includes those firms that provide services to the cruise vessels while in port, such as:

- ➢ Chandlers and other local retailers and wholesalers that provide ship stores and provisions to be used by passengers and crew
- ➢ Towing services that assist vessels in docking and undocking (a majority of the new cruise vessels are equipped with bow and stern thrusters and the need for tug assistance is minimized)
- ➢ Pilots assist the vessels navigating the channels from the open sea to the docks
- ➢ Stevedoring services performed by members of the International Longshoremen's Association and include handling baggage and ship supplies
- ➢ Linehandling services that are required when a vessel enters port
- ➢ Bunkering firms that provide fuel to the vessels
- ➢ Landside tours and other charters
- ➢ Parking services for the passengers driving from their place of residence to embark on the cruise
- ➢ Ground transfers from the airport and hotels to the ship prior to and after the cruise.

The visitor industry sector consists of firms providing services to the passengers and crew of the current cruises prior to and after the cruise. Included in this category are:

- Hotels and motels
- Restaurants/bars
- Retail goods
- Entertainment establishments such as ground tours, golf, fishing, amusements, etc.

To estimate these impacts, the cruise lines currently calling MASSPORT were interviewed. The purpose of these interviews was to determine the amount of purchases, by type of service, made by each vessel call and type of service. Types of purchases include vessel purchases for:

- Ship stores
- Bunkers
- Water
- Liquor
- Flowers
- Pilots
- Tugs
- Local advertising
- Local travel agents
- Linehandling
- Tendering services
- Stevedoring
- Retail items
- Maintenance and repair
- Trash disposal
- Laundry
- Crew allowance
- Wharfage and dockage.

Cruise ship expenditure data was provided by the various cruise operators and stevedores. This data was used to develop a typical ship disbursement account profile. Associated with each vessel expenditure category are jobs to sales ratios with the types of firms providing the goods and services to a homeported/turnaround vessel. These jobs to sales ratios, as well as personal income levels were developed from the U.S. Bureau of Census data sources for the Boston metropolitan area. The total annual expenditures, by type of service, is multiplied by the corresponding jobs to sales ratios to estimate the total direct job impacts in the maritime service sector, by type of service.

The revenue impacts are estimated directly from the expenditure profiles provided by the carriers. Direct income is estimated from the average annual salaries developed by type of firm, from the Census data specific to the Boston metropolitan area. The jobs generated in the Visitor Industry/Tourism Sector (for example, hotels, restaurants, etc.) are estimated based on the results of a 1,010 cruise passenger and crew survey. A total of 441 passengers embarking on homeport/turnaround vessels, 407 passengers on port of call vessels, and 162 crew members were surveyed to collect data regarding expenditures on hotels, restaurants, retail purchases, as well as length of stay in the Boston area, pre and post cruise. Based on the survey results, 47% of all passengers on homeport/turnaround cruises arrived via air. This percentage differed by the length of cruise for a homeport/turnaround cruise; 31% for 7 day cruises and 75% for 10 day cruises. Each homeport/turnaround passengers spends about $101 in Boston before and after the cruise, with about 45 % of passengers spending the night in Boston before the cruise. Less than 5% of passengers spend the night in Boston after the cruise. Port of call passengers spend an average of $53 in Boston for each port of call and spend an average of 4 hours off the ship. About 67% of the crew leaves the vessel while in Port, and spends an average of $211 per call.

Using these purchase patterns, and the appropriate jobs to sales ratios and personal income measures for the supplying firms, the visitor industry model calculates the direct jobs, induced and indirect impacts that are generated by the homeport cruise service at MASSPORT.

1.2 Port of Call Economic Impacts

Economic impacts created by a port of call, rather than a homeport call, generate impacts primarily on the landside consisting of tour packages and individual sightseeing excursions. To estimate these impacts, the cruise lines calling MASSPORT, along with the tour operators and travel agents, provided Martin Associates with the typical purchases and value of the landside tour packages. These local purchases were converted into direct, induced and indirect impacts using the visitor industry methodology described above. In addition to the passenger expenditures, the vessels also spend money for linehandling, pilots, tender services, and in some cases miscellaneous emergency purchases. These purchases are also included in the port of call impact analysis.

2. CRUISE SERVICE IMPACT MODEL

In order to assess the economic impacts of potential cruise business at the Black Falcon Cruise Terminal, Martin Associates developed a spreadsheet framework, which can be used to assess the impacts of changes in such factors as:

- Number of cruise vessel calls
- Passenger levels
- Passenger characteristics:
  - Local expenditures
  - Local residents versus tourists
  - Length of time and where stayed after disembarking
- Different types of cruise service, including:
  - Homeport
  - Port of Call
- Number of crew
- Size of vessel.

This model will estimate the impacts of current and potential cruise operations at MASSPORT.