The Local and Regional Economic Impacts of the Vancouver Harbor

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EXECUTIVE SUMMARY

The marine terminals owned by the Port of Vancouver located in the Vancouver Harbor handle grain, automobiles, steel, forest products, dry bulk cargo, petroleum products and other liquid bulk cargoes. In calendar year 2010, 6.3 million tons of cargo moved via these terminals and were produced and consumed by exporters and importers located within the metropolitan region, the State of Washington, as well as throughout the Pacific Northwest and the United States. It is the purpose of this study to quantify the regional economic impacts generated by the cargo and vessel activity at these marine terminals.

In calendar year 2010, 14,871 jobs in the Vancouver metropolitan region and the State of Washington were in some way related to the activity at the maritime activity at the Port of Vancouver marine terminals. Of the 14,871 jobs:

- 1,474 are **direct** jobs, in that these jobs are generated by activities at the Port, and if such activities should cease, these jobs would be discontinued over the short term. It is these jobs that are most directly dependent upon the vessel and cargo activity in the Vancouver Harbor. These jobs are with the International Longshore and Warehouse Union, terminal operators, stevedores, trucking firms, railroads, steamship agents, freight forwarders and customhouse brokers, warehousemen, federal government agencies, towing companies, pilot organizations, and marine construction companies. Ninety-four percent of these jobs are held by residents of the Vancouver region, as defined by the counties of Multnomah, Clark, Washington, Clackamas and Skamania. About three quarters of the direct job holders reside in Vancouver and Clark County.

- 1,556 are **induced** jobs, or those jobs supporting the local purchases made by the 1,474 individuals holding the direct jobs due to port activity. Should the direct jobs be lost from the economy, the induced jobs supporting the purchases of the direct jobs would also be lost. These jobs are with local grocery stores, retail outlets, restaurants, transportation services, local government services, schools, hospitals, etc.

- The firms dependent upon the marine activity in the Vancouver Harbor made $72.6 million of local purchases for office supplies, equipment, utilities, communications, maintenance and repair services, transportation services, professional services, and goods and services. These purchases supported 952 **indirect** jobs in the Vancouver economy.

- In addition to the direct, induced and indirect job impacts, 10,889 regional jobs are influenced by cargo exported and imported over marine terminals within the Vancouver Harbor. These jobs are considered to be **influenced or related** to activities at the Port, but the degree of dependence on the Port is difficult to estimate and should not be considered as dependent on the port as are the direct, induced and indirect jobs. If the Vancouver Harbor 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.

In 2010, marine cargo activity at the Port of Vancouver marine terminals generated a total of $1.3 billion of total economic activity in the region.

- Of the $1.3 billion, $367.9 million 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. The remaining $952.1 million represents the value of the output to the Washington/Oregon region that is created due to the cargo moving via the Port of Vancouver 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 in the Vancouver Harbor and are consumed by industries within the region.

- Marine activity created $339.4 million of direct, induced and indirect personal wage and salary income and local consumption expenditures for Vancouver metropolitan residents. An additional $410.0 million of direct, induced and indirect income was received by the influenced users of the Port of Vancouver marine terminals. The 1,474 direct job holders received $86.1 million of wage and salary income for an average salary of $58,377.

A total of $31.9 million of state and local tax revenue was generated by maritime activity in the Vancouver Harbor in calendar year 2010. In addition, $38.5 million of state and local taxes were created due to the economic activity <u>of the influenced users</u> of the cargo moving via the Vancouver Harbor.

Since the 2005 study, the Port has experienced a 1.9 million ton increase of cargo. Reflecting the growth in tonnage, direct jobs grew by 290 jobs over the 2005-2010 period.

I. OVERVIEW OF THE ANALYSIS AND SUMMARY OF RESULTS

Martin Associates was retained by the Port of Vancouver to measure the local and regional economic impacts generated by maritime activity at the Port of Vancouver. This study focuses on impacts generated by marine cargo handled at the marine facilities in the harbor area of the Port of Vancouver. It is to be emphasized that all cargo considered in this analysis is handled at facilities owned and leased by the Port of Vancouver. 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 2010. In addition to the baseline impact estimates, a computer model specific to the Port of Vancouver has 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 model can also be used to evaluate the impacts of new terminal development and for annual updates.

This analysis is an update of the 2000 and 2005 economic impact analyses of the Port of Vancouver, also conducted by Martin Associates. For the most part, the same methodology has been used to measure the economic impacts generated by seaport activity at the Port of Vancouver in the years 2000, 2005 and currently. The methodology used in this analysis has been used by Martin Associates to estimate the economic impacts of seaport activity at more than 80 United States and Canadian ports, including:

- *Seattle*
- *Tacoma*
- *Longview*
- *Vancouver, BC*
- *Vancouver, WA*
- *Los Angeles (containers only)*
- *Long Beach*
- *Oakland*
- *Sacramento*
- *Houston*
- *Texas City*
- *Freeport, TX*
- *Beaumont/Port Arthur, TX*
- *Victoria, TX*
- *Port Lavaca/Point Comfort, TX*
- *Corpus Christi*
- *Baton Rouge*
- *New Orleans*
- *Gulfport*
- *Port Everglades*
- *Jacksonville*
- *Tampa*
- *Palm Beach*
- *Wilmington, NC*
- *Morehead City, NC*
- *Baltimore*
- *Philadelphia*
- *Wilmington, DE*
- *Boston*
- *Montreal*
- *Halifax*
- *13 US Great Lakes Ports*

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

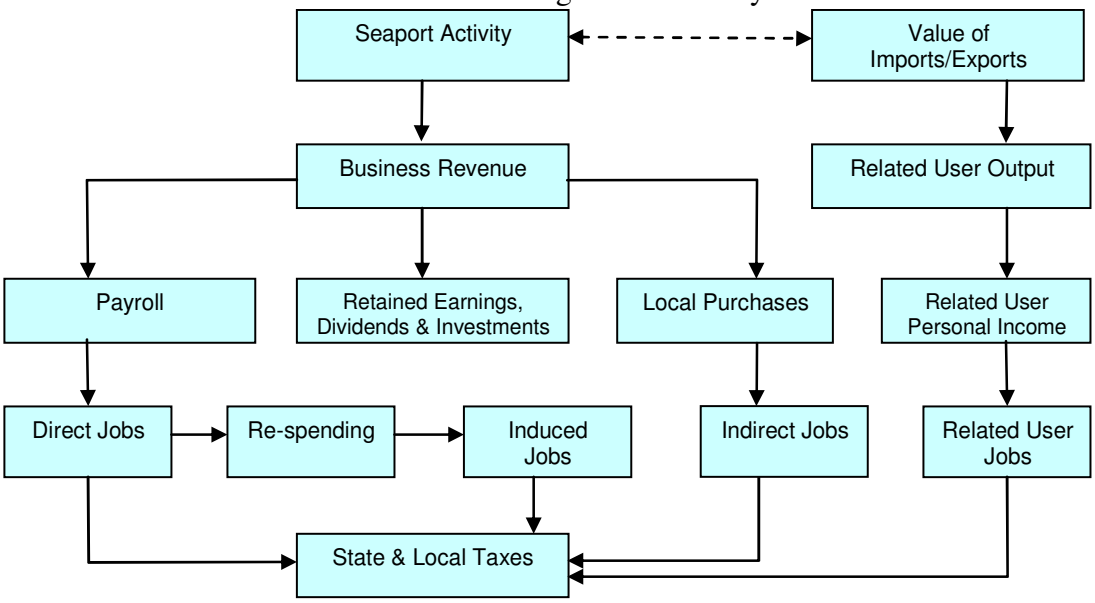
A deep water port such as Vancouver contributes to the local, regional and national economies by providing employment and income to individuals, tax revenues to local and state governments, customs fees to the federal government and revenue to businesses engaged in handling, shipping, and receiving cargo 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.

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 can be seen from Exhibit 1, and the previous discussion, the flow of economic impacts throughout an economy creates four separate and non-additive types of impacts.

Exhibit 1
Flows of Economic Activity
Through the Economy



These four types of impacts are:

- Employment Impact - the number of full-time equivalent jobs generated by activity at the public and private marine terminals in the Vancouver Harbor. This consists of jobs directly generated by port activity as well as induced jobs, or jobs created in-state due to the purchase of goods and services by those individuals directly dependent upon port activity. In addition, indirect jobs, or those jobs generated in the local economy due to the local purchases of goods and services by firms directly dependent upon maritime activity in the Vancouver Harbor are also measured as part of the employment impact;

- Income Impact - the level of earnings associated with the jobs created by port activity, and adjusted to reflect re-spending throughout the economy;

- Revenue Impact - the sales generated by firms engaged in handling and transporting cargo through the Vancouver Harbor. 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;

- Tax Impacts - the state and local tax revenues generated by port activity. These are taxes paid by individuals and firms directly dependent upon the maritime activity.

Shipments and receipts of cargo through the public and private marine terminals within the Vancouver Harbor 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 Vancouver. These are the:

- Surface Transportation Sector;
- Maritime Service Sector;
- Shippers/Consignees using the Port; and
- Marine Division of the Port of Vancouver.

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.

(1) The Surface Transportation Sector

The surface transportation sector consists of both the railroad and trucking industries. These sectors are responsible for moving the various cargoes between the Port and their inland origins and destinations. The railroads are most involved in moving grain to and from the Port.

Many local and national trucking firms serve the marine terminals in the Vancouver Harbor, as do numerous individual owner-operators. The trucking industry's major involvement is in moving steel, forest products, and petroleum for local distribution.

Barge transportation is also a key component in moving cargo to and from the Port of Vancouver, and is included in the maritime services sector, which follows.

(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;
- Linehaul Barge Operators on the Columbia and Snake River System; and
- Federal, State, and Local Government Agencies.

A brief description of the major participants in each of these five 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 Vancouver. 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. The steamship agents provide a number of services for the vessel as soon as it enters the Port; the agents arrange for pilot services and towing, for medical and dental care of the crew, and for ship supplies. The agents are also responsible for vessel documentation. In addition to the steamship agents arranging for vessel services, those providing the services include:

  - Chandlers - supply the vessels with ship supplies (food, clothing, nautical equipment, etc.);

  - Pilots - provide navigation services to ensure safe transit of vessels between the harbor entrance and docks, and along the Columbia river transit;

  - Towing firms - provide the tug service to guide the vessel to and from the 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/marine construction firms - provide repairs, either emergency or scheduled, as well as marine pier construction and dredging. Also included in this category are one-time impacts generated by the construction of marine facilities;

- 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 Longshore and Warehouse Union, 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. Employees of private terminals are included in this category;

- 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 grain, containers, forest products and petroleum products along the Columbia, Willamette, and Snake River Systems between Vancouver and various locations in Oregon, Washington and Idaho. Barge is very important in the movement of grain from Oregon, Washington and Idaho to export elevators in Vancouver. About 25 percent of grain exports arrive by barge at Vancouver for export. Petroleum products arrive in Vancouver by ship or pipeline and are then distributed throughout the region by truck and barge.

- Government Agencies - This service sector involves federal, state and local government agencies that perform services related to cargo handling and vessel operations at the Port. U.S. Customs, Bureau of Immigration, 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.

(3) Shippers/Consignees

In the previous economic impact study of maritime activity at the Port of Vancouver, two categories of shippers and consignees were considered in the analysis: those that are totally dependent on the Port of Vancouver and located in proximity to the Port, and those located throughout the states of Washington and Oregon and other states whose business is only influenced by the cargo and vessel activity at the Port's marine terminals located in the Vancouver Harbor. Those in the first category would most likely shut down operations if the marine terminals were not available for their use, while those in the second category would ship or receive materials via another port, and are considered influenced shippers/consignees or port users. Dependent shippers often have private river terminals for the shipment and receipt of cargo. Other dependent shippers/consignees have a manufacturing facility near the Port and rely on the receipt of

waterborne raw materials for the production process.

(4) Port of Vancouver

The Port of Vancouver includes those individuals employed by the Port whose purpose is to oversee port activity.

2. 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 certain types of dry bulk cargoes require a direct rail car to terminal loading.

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 Vancouver:

- Containerized cargo;
- Steel, including pipe and rail;
- Breakbulk forest products:
    - Lumber;
    - Plywood;
    - Pulp;
- Miscellaneous breakbulk cargoes such as machinery;
- Automobiles;
- Bagged cargoes;
- Copper;
- Scrap;
- Grain,
- Other dry bulk such as copper, bauxite and urea;
- Liquid bulk and petroleum products.

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 marine construction and the government sectors.

3. DATA COLLECTION

This Economic Impact Study of the Port of Vancouver is based on a telephone survey of members of each of the economic sectors. Participants were identified from *The Great Waterway* and the Journal of Commerce, "Port Telephone Tickler", internal Port of Vancouver tenant lists, and internal data bases maintained by Martin Associates. Telephone interviews were used to achieve a 100 percent response rate in all sectors. In addition to data collected from the 245 interviews, published data was collected from several sources. These publications include:

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

Other published data was obtained from the U.S. Bureau of Census, County Business Patterns; U.S. Bureau of Economic Analysis, Regional Income Division; and U.S. Bureau of Labor Statistics, "Consumer Expenditure Survey, 2010".

The economic relationships and methodology have been modeled using Microsoft Excel software. This 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.

4. IMPACT SUMMARY

The resulting economic impacts are presented in Table 2.

Table 2
Summary of Economic Impacts Generated by
Port Activity in 2010

	2010 IMPACTS
JOBS	
DIRECT	1,474
INDUCED	1,556
INDIRECT	952
TOTAL	3,982
PERSONAL INCOME (1,000)	
DIRECT	$86,056
RE-SPENDING/LOCAL CONSUMPTIC	$210,690
INDIRECT	$42,673
TOTAL	$339,419
BUSINESS REVENUE ($1,000)	$367,869
STATE AND LOCAL TAXES ($1,000)	
OREGON	$6,739
WASHINGTON	$25,171
TOTAL	$31,910
LOCAL PURCHASES ($1,000)	$72,561
RELATED USER IMPACTS	
JOBS	10,889
INCOME ($1,000)	$410,030
STATE/LOCAL TAXES ($1,000)	$38,548
TOTAL ECONOMIC VALUE ($1,000)	$952,074

*Totals may not add due to rounding

II. EMPLOYMENT IMPACTS

In this chapter, the employment generated by maritime activity at the Port of Vancouver marine terminals is documented. The chapter is organized as follows:

- First, the total employment that is in some way influenced by the activities at the 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, the direct jobs are estimated by place of residence;

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

- Fifth, indirect jobs created by local purchases by the firms directly dependent on maritime activity at the Port's terminals located in the Vancouver Harbor are defined;

- Finally, jobs influenced by the cargo activity handled by the Port's marine terminals are discussed.

The impacts presented in this chapter are for the year 2010.

1. TOTAL EMPLOYMENT IMPACT

It is estimated that 14,871 residents of Washington and Oregon are influenced by cargo and vessel activity at the public and private marine terminals in the Vancouver Harbor.

- 1,474 direct jobs are generated by cargo moving over public and private facilities at the Port of Vancouver. These jobs are classified as direct jobs and if activity at the Port of Vancouver were to cease, these jobs would be discontinued over the short term.

- 1,556 are employed by providing goods and services to the 1,474 individuals directly involved with port activity. Consequently, employment in this group is as directly dependent upon port activity as the first group.

- Firms directly dependent on maritime activity in the Vancouver Harbor made $72.6 million of local purchases for office supplies, parts and equipment, maintenance and repair services, business services, utilities, communications services and fuel. These local purchases supported 952 indirect jobs in the local economy.

- An additional 10,889 jobs are with firms, and firms that ship and receive cargo via the public and private marine terminals in the Vancouver Harbor. These jobs are considered to be influenced by activities at the Port, but the degree of dependence on the Port is difficult to estimate. The majority of these influenced jobs are related to steel, plywood, and lumber imports and grain exports. If the marine terminals 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.

  These influenced jobs are with regional exporters and importers using the public and private marine terminals, as well as other ports to ship and receive steel products, grain, dry bulk cargoes, and forest products. Forest products importers can use other Pacific Northwest Ports, while grain shippers can use other Columbia River and Puget Sound Ports, as well as the Gulf of Mexico Ports. Mineral exporters can use such ports as Longview or Portland.

The next section of this chapter is dedicated to the direct impact category of 1,474 jobs for Vancouver area residents.

2. DIRECT JOB IMPACTS

As a result of port activity, 1,474 full-time jobs were directly created by activity at the marine terminals in the Vancouver Harbor.

In this section the direct jobs are analyzed in terms of:

- Distribution by economic sector; and
- Distribution by commodity group.

These distributions are developed in more detail below.

2.1 Job Impacts by Sector

Table 3 shows the job impacts by detailed job category. As this table shows, the largest job impacts are with terminal operators, trucking firms, the railroads, members of the ILWU and with marine construction operations.

Table 3
Employment Impacts by Job Category

IMPACT CATEGORY	DIRECT JOBS
SURFACE TRANSPORTATION	
RAIL	209
TRUCK	264
SUBTOTAL	**473**
MARITIME SERVICES	
TERMINAL OPERATIONS	283
ILWU	186
TOWING/PILOTS	75
AGENTS	16
SURVEYORS/CHANDLERS/MARITIME SERVICES	14
FORWARDERS	13
WAREHOUSE	35
GOVERNMENT	46
MARINE CONSTRUCTION	160
BARGE	82
SUBTOTAL	**909**
PORT OF VANCOUVER	**92**
TOTAL	**1,474**

Note: Totals may not add due to rounding

2.2 Job Impacts by Commodity

Most of the 1,474 jobs considered to be generated by port activity can be related to the handling of specific commodities or commodity groups. Employment with certain types of firms and organizations such as local, state and federal government agencies, and marine construction firms, is extremely difficult to assign to specific commodity groups, and if such an assignment is made, it is often done so arbitrarily. As a result, employment in these groups (which totaled 318 jobs) was not allocated to commodity groups.

Table 4 presents the direct employment impacts in terms of commodity/commodity group.

Table 4
Distribution of Direct Job Impact by Commodity

	DIRECT JOBS	TONS 1,000	JOBS/ 1,000 TONS
CONTAINERS	22	17.8	1.26
STEEL	78	111.7	0.70
WIND ENERGY	32	25.2	1.26
BAGGED	2	4.4	0.35
LUMBER	13	3.4	3.80
MISC BB	6	5.8	1.09
AUTOS	234	88.8	2.63
PULP	21	102.6	0.20
SCRAP	135	490.4	0.28
GRAIN	342	3,696.5	0.09
CEMENT	81	700.0	0.12
OTHER DRY BULK	36	234.8	0.15
PETROLEUM/LIQUID BULK	139	435.8	0.32
COPPER	17	373.0	0.05
NOT ALLOCATED	318		
TOTAL	**1,474**	**6,290.1**	

This table indicates that in the year 2010, the handling of grain created the largest number of direct jobs, 342 jobs, while the movement of autos at the Port generated 234 direct jobs.

Forest products, automobiles, wind energy equipment and containerized cargo tend to generate the greatest employment impacts among firms in the maritime service sector, such as with longshoremen, terminal operators and stevedoring firms, and warehouse operators. In contrast, the majority of impacts generated by bulk commodities are concentrated with the terminal operations and surface transportation firms. The employment impacts for grain are concentrated with rail operations.

2.3 Job Impacts per Ton

The assessment of the job impacts on a per ton basis provides a tool for port planners to use in evaluating the relative importance of different commodities as economic generators. Table 4 also shows the direct job impacts per 1,000 tons for each commodity moving via the Port of Vancouver marine terminals. Forest products such as lumber, and automobiles generate the greatest impacts on a per 1,000 ton basis which reflects the more labor intensive auto processing operations.[1]

[1]The volume of lumber handled at the Port's marine terminals is relatively small, and as a result, the jobs per 1,000 tons ratio for lumber may be overstated.

3. GEOGRAPHIC DISTRIBUTION OF DIRECT JOB IMPACTS

The distribution of the direct jobs by place of residence is a useful measure of the geographic importance of the seaport to the local economy. Except for rail crew and rail headquarter employment, the direct jobs were identified by place of residence of those holding the direct jobs. The majority of the firms responding to the interviews provided Martin Associates with the zip code distribution of their workforce. Based on these zip codes, the direct jobs (excluding the rail crew and rail headquarters employment) were allocated to a county level of detail. Rail crew jobs and rail headquarters jobs are not included in the distribution of the jobs by place of residence, since rail crew jobs and headquarters jobs are, for the most part, held by non-residents of the Vancouver area. Also, the rail crew jobs were estimated from the average number of crew changes per rail linehaul required to move the rail cargo for each commodity group, and, as a result, it is not possible to trace the exact location of the residence of these crew jobs.

Table 5 shows the distribution of the direct jobs by place of residence. Forty-six percent of those directly employed (excluding rail crew and rail headquarter employment) due to port activity, live in Vancouver, WA, while another 30% reside in Clark County. Twelve percent reside in Multnomah County. Overall, 79.7% of those directly employed reside in Washington State.

Table 5
Distribution of Direct Jobs*
by Place of Residence

	PERCENT	DIRECT JOBS
VANCOUVER	45.79%	579
MULTNOMAH, OR	12.05%	152
CLARK, WA	29.88%	378
WASHINGTON, OR	1.12%	14
CLACKAMAS, OR	3.19%	40
SKAMANIA, WA	0.52%	7
OTHER WA	3.54%	45
OTHER OR	3.24%	41
OTHER US	0.65%	8
TOTAL	100%	1,265

* This excludes rail crew jobs and railroad headquarters jobs

4. INDUCED JOBS

The regional purchases by the 1,474 direct job holders with the direct income earned from port activity creates additional jobs throughout the Vancouver area. In calendar year 2010, $86.1 million was received by those 1,474 directly employed by activity at the Port of Vancouver marine terminals. As the result of the re-spending of a portion of this income for

purchases in the Vancouver region, an additional 1,556 induced jobs were generated throughout the Vancouver area.

These induced jobs are estimated based on the current expenditure profile of residents in the Vancouver area, as estimated by the U.S. Bureau of Labor Statistics, "Consumer Expenditure Survey". This survey indicates the distribution of consumer expenditures over key consumption categories for Vancouver area residents. The consumption categories are:

- Housing;
- Food at Restaurants;
- Food at Home;
- Entertainment;
- Health Care;
- Home Furnishings; and
- 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 Vancouver area, and induced jobs are estimated for the relevant consumption categories. It is to be emphasized that induced jobs are only estimated at the retail and wholesale level, since these jobs are most likely generated in the Vancouver area. Further levels of induced jobs are not estimated since it is not possible to defensibly identify geographically where the subsequent rounds of purchasing occur.

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

5. INDIRECT JOBS

The firms directly dependent upon the vessel and cargo activity at the private and public marine terminals in the Vancouver Harbor made $72.6 million of purchases from local suppliers of parts and equipment, business services, maintenance and repair services, communications and utilities, office equipment, and fuel. These local purchases supported 952 local indirect jobs. If maritime activity at the Port of Vancouver were to cease, 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. To estimate the indirect jobs, the local expenditures were used as inputs into a regional input-output model developed for the Vancouver/Portland Metropolitan area for Martin Associates by the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System.

6. INFLUENCED JOBS

Influenced jobs are jobs with users of the public and private marine terminals in the Vancouver Harbor. These users include local manufacturers exporting and importing cargo; the local construction firms importing breakbulk lumber, plywood and steel products, and Pacific Northwest (PNW) grain farmers exporting grain through the Port. It is to be emphasized that these users are related to the Port of Vancouver 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.

To estimate the related user impact, the average value per ton of each commodity type was then estimated using U.S. Bureau of Census, Foreign Trade Statistics. Employment to value of output coefficients for the export producing and import consuming industries related to the specific export and import cargo moving via the Port of Vancouver marine terminals were then computed from Bureau of Economic Analysis, Regional Input-Output Model for the Oregon/Washington region. The job coefficients corresponding to the commodities produced in the region were next multiplied by the local share of the cargo to estimate the related jobs with the cargo moving over the Port of Vancouver.

Using this methodology, it is estimated that 10,889 jobs with area exporters and importers are related to the cargo moving via the Port of Vancouver marine terminals. The majority of these jobs are related to the imported plywood, lumber and steel products and cement used in local construction, as well as with area farmers. [2]

[2] The influenced jobs include the jobs throughout the state in the export producing or import consuming industry and also include the jobs with local industries needed to produce the export cargo and use the import cargo moved via the Port. The direct, induced and indirect jobs involved in transporting the cargo to and from the port as well as serving the cargo while in port are excluded from the influenced jobs to avoid double counting.

III. ECONOMIC VALUE, REVENUE, INCOME AND TAX IMPACTS

The movement of cargo via the Port of Vancouver marine terminals generates revenue for firms in each of the economic sectors. For example, revenue is received by surface transportation firms (both railroads and trucks) as a result of moving export cargo to the Port and distributing the imported commodities inland after receipt at the Port. The firms in the maritime service sector receive revenue from arranging for transportation services, cargo handling, providing services to vessels in port and repairs to vessels calling the Port. The Port of Vancouver 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 Vancouver 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 linehaul 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 the Vancouver 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 five 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 Washington/Oregon region, and, thus, it is difficult to trace the ultimate location of the distributed revenue (other than personal income, taxes and local purchases).

The value of output created by users of the Port is attributed to the region consisting of the States of Oregon and Washington, and the local purchases from other firms within the region are also included in this user output measure, as defined by the in-state output coefficients (for the user industries) developed from the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System (RIMS II).

1. REVENUE IMPACT—TOTAL ECONOMIC ACTIVITY

The revenue impact is a measure of the total economic activity in the state that is generated by the cargo moving via the Port of Vancouver. In 2010, marine cargo activity at the Port generated a total of $1.3 billion of total economic activity in the region. Of the $1.3 billion, $367.9 million 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. The remaining $952.1 million represents the value of the output to the Washington/Oregon region that is created due to the cargo moving via the Port of Vancouver 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 Port's marine terminals in the Vancouver Harbor and are consumed by industries within the region.

The balance of the discussion focuses on the $367.9 million of direct business revenue generated from the provision of services to the cargo and vessels handled at the Port of Vancouver. Table 6 presents the $367.9 million revenue impact generated by impact category.

Table 6
Direct Revenue by Category

	REVENUE (1,000)
SURFACE TRANSPORTATION	
RAIL	$165,096
TRUCK	$23,558
SUBTOTAL	**$188,654**
MARITIME SERVICES	
TERMINAL OPERATIONS	$46,048
TOWING	$5,278
PILOTS	$7,359
AGENTS	$754
SURVEYORS/CHANDLERS/MARITIME SERVICES	$29,451
FORWARDERS	$1,286
WAREHOUSE&CONTAINER REPAIR	$2,332
GOVERNMENT	NA
MARINE CONSTRUCTION	$42,288
BARGE	$20,378
SUBTOTAL	**$155,173**
PORT OF VANCOUVER	**$24,042**
TOTAL	**$367,869**

Note: Totals may not add due to rounding

Firms in the surface transportation sector received $188.7 million of revenue. Of this revenue, the railroads received $165.1 million, primarily as the result of the movement of grain

and automobiles. The revenue generated by the surface transportation sector is based on the relevant modal (rail or truck) rate for a commodity multiplied by the tonnage of that commodity moved to and from the Port by the specified mode. The share of each commodity transported by rail and truck was estimated from interviews with the terminal operators handling the respective commodities, as well as from steamship lines.

The relative modal shares were then applied to the port tonnage (or units) of the specific cargo. Average rail rates were obtained from the Burlington Northern/Santa Fe and the Union Pacific/Southern Pacific railroads, as well as from steamship lines, automobile importers and shippers/consignees. These rates were multiplied by the tonnage of each commodity carried by rail to estimate revenue accruing to railroads. The trucking revenue was based on interviews with terminal operators, steamship lines, and shippers/consignees.

Terminal operators received $46.1 million of revenue from the handling of the cargo, including stevedoring charges as well as terminal charges, followed by revenue received by marine construction activity. Nearly $30 million was received by firms providing maritime services, including surveyors and ship chandlers.

Table 7 shows the revenue impact by commodity and per ton for cargo handled at the Port of Vancouver marine terminals. In terms of total revenue, grain generates the largest total revenue impact, followed by petroleum/other liquid bulk cargoes, miscellaneous dry bulk and scrap.

Also shown in Table 7 is the revenue impact per ton. Automobiles generate the largest revenue per ton, reflecting the processing charges and the fact that about 55 percent of the autos move by rail on tri-level car carriers. The revenue per ton measures for containers bagged cargo, and lumber and miscellaneous break bulk may result in an overstatement of the revenue impact per ton. Bulk cargoes generate relatively low revenue impacts per ton reflecting the less-labor intensive handling process associated with bulk cargoes.

Table 7
Revenue Impacts by Commodity

	REVENUE $1,000	TONS 1,000	REVENUE/ TON
CONTAINERS	$2,510	17.8	$141.01
STEEL	$10,387	111.7	$92.95
WIND ENERGY	$2,718	25.2	$107.69
BAGGED	$204	4.4	$46.30
LUMBER	$274	3.4	$81.30
MISC BB	$387	5.8	$67.17
AUTOS	$17,400	88.8	$196.01
PULP	$3,584	102.6	$34.93
SCRAP	$20,269	490.4	$41.33
GRAIN	$156,027	3,696.5	$42.21
CEMENT	$20,487	700.0	$29.27
OTHER DRY BULK	$21,119	234.8	$89.94
PETROLEUM/LIQUID BULK	$25,661	435.8	$58.88
COPPER	$19,950	373.0	$53.48
NOT ALLOCATED	$66,893		
TOTAL	**$367,869**	**6,290.1**	

Note: Totals may not add due to rounding

2. PERSONAL INCOME IMPACTS

In the previous section of this chapter, the total revenue generated by port activity was identified. As described earlier, the personal income received by those directly dependent upon port activity is one of the components of revenue that can be traced to the Vancouver area. 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. The individual annual earnings in each category multiplied by the corresponding job impact resulted in $86.1 million in personal income.

Based on data developed by the U.S. Bureau of Economic Analysis, it is assumed that for every one dollar earned by Vancouver area residents as a result of jobs directly generated by port activity, an additional $2.45 of income would be created as a result of re-spending the income for purchases of Vancouver area-produced goods and services. This re-spending generated an additional $210.7 million of local personal income and consumption expenditures with local business and service providers. This additional re-spending of the direct income generates the induced job impact, 1,556 jobs, described in the previous chapter.

The indirect jobholders received $42.7 million of personal wages and salaries. Combining the direct, induced and indirect income impacts, maritime cargo activity at the Port's marine terminals in the Vancouver Harbor created $339.4 million of wages and salaries and local consumption expenditures.

The 10,889 jobs with the influenced users of the Port of Vancouver received $410.0 million of wages and salaries.

3. LOCAL PURCHASES

The firms directly dependent upon the maritime activity at the public and private terminals in the Vancouver Harbor made $72.6 million of local purchases. These local purchases were for maintenance and repair services, utilities, communications services, office products, parts and equipment, fuel, etc. The $72.6 million of local purchases generated the 952 indirect jobs.

4. TAX IMPACTS

State and local tax impacts are based on state and local tax burdens for Oregon and Washington, which are developed from data provided by the Tax Foundation. The tax burdens are the total state and local taxes collected divided by total state income.

The state and local taxes for which estimates have been developed include:

- State and local personal and corporate income tax;
- Insurance tax;
- Gift tax;
- State fuel tax;
- Municipal school district taxes; and
- Tri-Metropolitan Tax.

Maritime activity at the marine terminals at the Port of Vancouver generated $31.9 million of state and local taxes. The State of Washington and counties and municipalities within the state received $25.2 million of tax revenue, while the State of Oregon and local and county governments received about $6.7 million of state and local taxes from activity at the Port of Vancouver marine terminals.

IV. COMPARISON OF ECONOMIC IMPACTS 2005-2010

This chapter compares the economic impacts generated by seaport activity in the Vancouver Harbor in 2005 and 2010. The methodology used by Martin Associates to estimate the economic impacts generated by seaport activity in 2005 is, for the most part, the same as the methodology used to measure the current 2010 economic impacts.

Tonnage handled in the Vancouver Harbor grew from 4.4 million tons in 2005 to 6.3 million tons in 2010. Table 8 compares the tonnage levels in the two study years.

Table 8
Comparison of Tonnage – Vancouver Harbor
(Short Tons of 2,000 Pounds)

	2010 TONS (1,000)	2005 TONS(1,000)	CHANGE
CONTAINERS	17.8	4.8	13.0
STEEL	111.7	192.8	-81.1
WIND ENERGY	25.2		25.2
BAGGED	4.4	8.1	-3.7
LUMBER	3.4	189.7	-186.4
MISC BB	5.8	59.5	-53.7
AUTOS	88.8	70.3	18.5
PULP	102.6	97.3	5.3
SCRAP	490.4	198.5	291.8
GRAIN	3,696.5	2,340.7	1,355.7
OTHER DRY BULK	934.8	279.6	655.2
PETROLEUM/LIQUID BULK	435.8	667.6	-231.8
COPPER	373.0	295.5	77.5
TOTAL	6,290.1	4,404.5	1,885.6

Note: Numbers may not add due to rounding

The largest gains in tonnage were recorded for grain exports, followed by the growth in other dry bulk cargoes, followed by scrap. The largest loss in tonnage was with petroleum and liquid bulk cargo, followed by a loss of lumber.

These changes in tonnage levels will have direct impacts on the level jobs, personal income, business revenue and state and local taxes generated by the public and private marine terminals in the Portland Harbor.

Table 9 compares the impacts generated by cargo and vessel activity at the Port's marine terminals in the Vancouver Harbor between 2005 and 2010.

Comparison of Economic Impacts
Vancouver Harbor

	2010	2005	CHANGE
JOBS			
DIRECT	1,474	1,185	290
INDUCED	1,556	1,640	(84)
INDIRECT	952	583	369
TOTAL	3,982	3,407	575
PERSONAL INCOME (1,000)			
DIRECT	$86,056	$65,423	$20,633
RE-SPENDING/LOCAL CONSUMPTION	$210,690	$197,040	$13,651
INDIRECT	$42,673	$22,613	$20,060
TOTAL	$339,419	$285,075	$54,344
BUSINESS REVENUE ($1,000)	$367,869	$219,077	$148,792
STATE AND LOCAL TAXES ($1,000)			
OREGON	$6,739	$6,070	$669
WASHINGTON	$25,171	$24,390	$780
TOTAL	$31,910	$30,460	$1,450
LOCAL PURCHASES ($1,000)	$72,561	$42,947	$29,614

Note: Totals may not add due to rounding

Direct jobs grew by 290 jobs over the 2005-2010 period reflecting the growth in tonnage. Indirect jobs grew by 369 jobs, due to the nearly $30 million increase in local purchases. Induced jobs actually fell reflecting a smaller multiplier impact in 2010 as consumers' propensity to save has increased since 2005, reflecting the economic recession. In 2005, the personal income multiplier was 4.01 while in 2010, the income multiplier is 3.45.

Direct personal income grew by $20.6 million, reflecting the growth in average salary of direct jobs from $55,209 in 2005 to $58,377. Business revenue generated by maritime activity grew by $148.8 million, reflecting the growth in grain exports, other dry bulk cargoes and scrap. State and local tax revenues increased by $1.5 million, reflecting the growth in jobs, direct income, revenue and average salary.

1. COMPARISON OF DIRECT JOB IMPACTS BY COMMODITY

Table 10 compares the direct jobs generated by commodity in 2005 and 2010.

Table 10
Comparison of Direct Job Impacts by Commodity

	2010 JOBS	2005 JOBS	CHANGE
CONTAINERS	22	2	20
STEEL	78	121	-42
WIND ENERGY	32		32
BAGGED	2	6	-4
LUMBER	13	122	-109
MISC BB	6	34	-28
AUTOS	234	218	15
PULP	21	22	-1
SCRAP	135	15	120
GRAIN	342	210	132
OTHER DRY BULK	117	62	55
PETROLEUM/LIQUID BULK	139	218	-79
COPPER	17	14	3
NOT ALLOCATED	318	142	176
TOTAL	1,474	1,185	290

The key changes in jobs generated by commodity reflect the changes in tonnage. The growth in jobs with grain and scrap reflects the growth in tonnage. The largest growth occurred with rail employees, driven by the movement of grain by rail.

In conclusion, the Port of Vancouver marine terminals are key economic generators in the local and regional economy. The growth in jobs and associated income, tax and revenue impacts due to the increased tonnage via the Port of Vancouver facilities also highlights the importance of maintaining and growing the Port's current and potential cargo base, and investing in port, rail and highway infrastructure to improve the Port's competitive position.